The choice of policies by politicians and the permanence of ministers in governments in a democracy

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Biographical Note

Carlos Eduardo Soares de Seixas was born on May 26th, 1989, in Lourosa, Portugal.

He concluded his undergraduate studies in Economics in 2010 from Faculdade de Economia, Universidade do Porto. During the program of studies, he has rewarded for his performance with *Prémio Incentivo* and with two merit scholarships.

In September of 2010, he started doctoral studies in Economics at Faculdade de Economia, Universidade do Porto, and later on his dissertation, under the supervision of Professors António Brandão and Manuel Luís Costa. During the time of this program he has made presentations of his works at the UECE Lisbon Meetings 2013, the 7th Annual Meeting of the Portuguese Economic Journal (Covilhã, Portugal), and the 2013 Conference of the Association for Public Economic Theory (Lisbon, Portugal). He also was a discussant at the 21st Workshop on Political Economy (Pontresina, Switzerland). Besides, he spend time as a visiting researcher at the Faculty of Economics and Management, University of Kassel.

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Resumo

Esta tese compreende quatro ensaios em Economia Política com duas linhas principais de pesquisa. Cada linha consiste em dois ensaios. No primeiro ensaio, o modelo de Bischoff and Siemers (2013) é estendido. Esse modelo considera duas eleições e prevê que existe a possibilidade de um partido escolher implementar uma política puramente boa (ainda que impopular) apesar da existência de convicções enviesadas, porque o voto retrospetivo serve como um auto-mecanismo de correção em democracia. Diferentemente de Bischoff and Siemers (2013), este primeiro ensaio considera T eleições e a conclusão é de que existem duas situações de equilíbrio possíveis. Uma é equivalente a Bischoff and Siemers (2013) e, na outra, existe um possível equilíbrio em que o partido com vantagem na valência é levado a escolher a política puramente boa (ainda que impopular) e o outro partido compensa essa desvantagem escolhendo a política puramente má (ainda que popular).

O segundo ensaio combina três características do processo político: por um lado, convicções enviesadas acerca de como as políticas públicas afectam os resultados económicos e voto retrospectivo, tal como no primeiro; e, por outro lado, efeitos das políticas com característica *down-up*, i.e., políticas cuja efeito positivo só é perceptível no longo prazo. Pode ser concluído que as escolhas de política em equilíbrio variam entre a puramente boa e a puramente má. Acontece que existe a possibilidade de um político optar por uma plataforma política boa no longo prazo apesar da presença de convicções enviesadas e do problema de *down-up*, desde que dois elementos estejam presentes: o político esteja em algum grau motivado para aplicar uma boa política, e os benefícios percebidos pelo político sejam suficientemente elevados.

O terceiro ensaio questiona se os caminhos para o poder importam para a sobrevivência dos ministros no governo. Neste trabalho, são definidos quatro caminhos para uma posição ministerial: "Parlamentar", "Partido", "Serviço Público" e "Independente". A perspectiva teórica assenta em problemas de informação assimétrica *ex ante* e de risco moral. A principal conclusão desta análise de sobrevivência é que, em geral, os caminhos para o poder não afectam a durabilidade dos ministros, o que pode significar que os dois efeitos se cancelam. Apesar disso, é possível concluir que ministros que atingiram o poder através do "Partido" têm uma maior longevidade no governo do que os "Parlamentares".

Finalmente, o quarto ensaio lida com a re-selecção de um ministro por um Primeiro-Ministro (PM). É construído um modelo onde um PM reeleito que quer vencer a próxima eleição tem de decidir se mantém ou substitui um ministro que esteve no anterior governo. O ministro pode ser de dois tipos, independente ou partidário. É assumido que um independente tem uma competência esperada maior, mas o PM sabe que indigitar um irá implicar um custo. Os eleitores preocupam-se com a ideologia e com a competência do governo. A competência de um ministro e o custo de um independente são percebidos pelos eleitores e pelo PM na vigência do governo, antes da próxima eleição ter lugar. As principais conclusões do modelo são: um ministro partidário será mantido com uma maior probabilidade que um independente, e uma maior competência percebida aumentará as hipóteses de ser reeleito. Empiricamente, é conclui-se que um ministro partidário tem uma maior probabilidade de ser retido do que um independente.

Neste sentido, o quarto ensaio complementa o terceiro e resolve o aparente resultado negativo aí encontrado: apesar de um independente não ter menor durabilidade na vigência do governo, na verdade, revela-se uma menor potencialidade de um independente prosseguir carreira política.

Abstract

This thesis comprises four essays on Political Economy with two main lines of research. Each line consists of two essays. In the first essay, Bischoff and Siemers (2013)'s model is extended. Their model considers two elections and predicts that the possibility exists that a party chooses to implement a purely good (yet unpopular) policy despite persistently biased beliefs, because retrospective voting will serve as a self-correction mechanism in democracy. Differently from Bischoff and Siemers (2013), this first essay considers T elections and the conclusion is that there are two possible equilibrium situations. One is equivalent to Bischoff and Siemers (2013) and, in the other, a possible equilibrium exists in which the party with a valence advantage is led to choose the purely good (yet unpopular) policy and the other party compensates the disadvantage by choosing the purely bad (yet popular) policy.

The second essay combines three features of the political process: on one hand, biased beliefs about how public policies affect economic outcomes and retrospective voting, as in the first essay; and, on the other hand, the down-up characteristic of the effects of policies, that is, policies whose positive results are only observed in the long run. It can be concluded that the policy choices in equilibrium range between the purely good and purely bad. There is the possibility that a politician may opt for a good long term policy platform despite being in presence of both biased beliefs and down-up problem, in the condition that two elements are present: the politician is to a certain degree motivated to apply a good policy, and the benefits perceived by the politician are sufficiently high.

The third essay enquires whether paths to power matter for the survival of ministers. In this work, four different paths to ministerial position are defined: "Parliamentary", "Party",

"Public Service" and "Independence". The theoretical perspective is based on both the *ex ante* informational asymmetry and the moral hazard problems. The main conclusion from the survival analysis is that, in general, the paths to power do not affect ministers' durability, which may mean that the two effects cancel each other. Nevertheless, it is possible to conclude that ministers who attained power through the "Party" last longer in government than "Parliamentary" ones.

Finally, the fourth essay deals with the re-selection of a minister by a Prime-Minister (PM). A model is constructed where a reelected PM who wants to win the next election has to decide whether to keep or replace a minister who has been in the previous government. The minister can be of two types, either independent or partisan. An independent minister is assumed to have a higher expected competence, but the PM knows that appointing one in office will imply some cost. Voters care about ideology and competence of the government. The competence of the minister and the cost of an independent one are realized by the voters and the PM in the duration of the government before the next election takes place. The main conclusions of the model are that a partisan minister will be maintained with a higher probability than an independent minister, and a higher realized competence of a minister will increase his chances of being re-selected. Empirically, it is concluded that a partisan minister has a higher probability of retention than an independent minister.

This way, the fourth essay complements the third and solves the apparent negative result found there: although an independent minister shows a similar durability in government as a partisan, in fact, an independent shows a lower potential of pursuing a political career.

Contents

List of Figures

List of Tables

Chapter 1

Introduction

This thesis has two main lines of research: one deals with the choice of policies in an electoral context and the other focuses on the relation of the Prime-Minister (PM) with her ministers dealing in particular with durability and the re-selection of ministers. The first part consists in theoretical models and the second is empirically motivated. Each part is composed of two works.

In what concerns the first part, the main work is: **"Biased Beliefs and Retrospective Voting: A generalization to T elections"** (chapter 2), which is closely connected with Bischoff and Siemers (2013). The authors assume that there are two competing office seeker candidates, each one choosing a policy platform, which can be any linear combination of bad (yet popular) policies and good (yet less popular) policies. The bad (yet popular) policy will increase the chances of winning the election now, but decrease valence and so the chances of winning in the future. Bischoff and Siemers (2013) are able to conclude that there is the possibility to implement a purely good policy, despite persistent biased beliefs, since retrospective voting will serve as a self-correction mechanism in democracy. Following Bischoff and Siemers (2013)'s set-up, this extension considers as well two additional features: an incumbent bias, since an elected politician has greater chances of reelection; and limited accountability, in the sense that the government has far from complete control of the economic outcome.

The main difference of this model from Bischoff and Siemers (2013) is that in their model parties only care about two elections and in our model parties will care about T future elections. In democracies, parties in fact run for power for more than two terms; equally, in most parliamentary democracies, party leaders also run for power for more than two terms. For instance, and referring only to the case of Germany, Angela Merkel has already faced 3 elections, Gerhard Schröder faced 3 elections, Helmut Kohl 6, Helmut Schmidt 3 and Konrad Adenauer 5. Using this extended framework, the model addresses the question whether Bischoff and Siemers (2013)'s problem will have a similar prediction in the case of T elections.

With T elections, there are two possible equilibrium situations. One is equivalent to Bischoff and Siemers (2013) if the effect of biased beliefs on the probability of election is higher than the initial valence. Another occurs in the situation where this effect of biased beliefs is smaller than the initial valence, and a possible equilibrium consists in the party with a valence advantage choosing the pure good policy and the other the pure bad policy. This particular equilibrium situation is not found in Bischoff and Siemers (2013). The party with a valence advantage is led to choose a better policy (in every possible equilibrium) and the party with the valence disadvantage has to be even more populist than the other one in order to compensate for the disadvantage.

Furthermore, the number of elections will matter as when politicians care about more elections they will be more (less) populist if the bias effect is higher (lower) than the weighted valence effect. Besides, we find a surprising result: the effect of both the existence of an incumbent bias and of the expected quality of outside policies is independent of the number of elections considered in the future. Finally, considering that politicians do not fully control the results of the policies, it may happen that the variation in the fraction of control of the economic outcomes can either increase or decrease populism.

The other work **"Policy Choices by an Incumbent, with reference to biased beliefs and the down-up problem"** (chapter 3) came about as a reflection on Bischoff and Siemers (2013). In that paper, retrospective voting worked as a mechanism which possibly corrected the negative effects of biased beliefs. I realized that if I would add to the basic model the

down-up problem such result would be compromised. The down-up problem stems from a given policy having a down-up characteristic, that is, policies that despite being efficient require a temporary deterioration of welfare while the benefits are only realized later (Gersbach, 2004). An efficient policy is one that will improve the overall welfare, in spite of the short term negative effects. For modelling purposes, the down-up characteristic of the effects of a policy is framed in electoral terms. The timing of the effects is lagged in such a way that the median voter's welfare deterioration effect is observed before the next election, and the welfare beneficial effect is observed by the voters only after the next election has taken place.

My question then became whether the possibility exists that good policies are chosen even when retrospective voting does not serve as a self-correction mechanism due to the existence of the aforementioned down-up problem. Bearing this in mind, the model considers a politician that gets some benefits from holding office, and some benefits from the positive results of the policy implemented. Moreover, the political process in the model consists basically of two steps. To start with, an elected politician will choose a policy platform including any mixture of socially undesirable yet popular policies, which produces good results in the short-run, and of socially desirable yet less popular policies, which produces bad results in the short run. The next step in the model consists in the PM deciding whether she wants to run for reelection and then voters decide on her reelection.

Before describing the results obtained in this work, it may be of interest to present the similarities and differences between this model and the previous one: "Biased Beliefs and Retrospective Voting: A generalization to *T* elections".

In fact, if the previous work is a generalization of Bischoff and Siemers (2013) and keeps the same basic structure, this one combines biased beliefs and retrospective voting with lagged positive effects of policies, and this requires the adaptation of some structural features of the basic model. Let us see:

i) In both models, voters are modelled as in Bischoff and Siemers (2013).

ii) In this work, politicians care about both the policy outcome and winning elections, which are weighted by parameters m and $(1-m)$, respectively. In the first one, they

are implicitly treated as purely office seekers.

iii) In this work, policies have a down-up characteristic and lagged effects. This means that the positive effects of a good policy and the negative effects of a bad policy only appear after the next election. Notice also that regarding the short term effect of good *vs* bad policies, we assume that the bad policy produces better results than the good policy before the next election. In the first work, the effects of policies are observed before the next election takes place and, therefore, voters will be able to take into consideration the effect of the policy in the perceived valence of the politician.

iv) In this work, only two electoral terms are considered, the current term and the following, after a new election has taken place. In the first one, parties face T elections in the future.

v) Political competition is also different. In the first work, parties compete in a game where they announce their policy position in advance, that is, before the first election. Incumbency is an endogenous result of the model. In this work, political competition consists in an election to which an incumbent and an opposition party candidate run. The incumbent is assumed to be in government, that is, she has won the previous election. It is somewhat *ad hoc* as if she has "waken up" in government making policy choices in order to maximize her payoff, which includes the probability of winning the next election.

Returning to our model and its results, the possibility exists that a politician may opt for a good long term policy platform despite being in presence of both the biased beliefs and the down-up problems, in the condition two elements are present: the politician is to a certain degree motivated to apply a good policy and the benefits she perceives are sufficiently high.

The basic model developed here is extended considering three other elements, the first two of which were dealt with in Bischoff and Siemers (2013, p.173-74): (i) an incumbent bias, since an elected politician has greater chances of reelection; (ii) limited accountability, because the government does not fully control the economic outcome; (iii) and, finally,

the penalization of deviations from campaign promises, given that voters do not like to be deceived. From these extensions we may conclude that: (i) an incumbent bias gives an advantage for reelection and will induce politicians to choose better policies; (ii) admitting that politicians do not fully control the results of the policies applied, a variation in the fraction of control of the economic outcomes can either increase or decrease populism; (iii) and, finally, higher costs of deviating from campaign promises will lead the politician to choose a policy platform closer to her promised platform.

As to the second part of this dissertation, the first work, **"Paths to Power and Minister's Durability: The Portuguese case"** (chapter 4) enquires whether paths to power matter for the survival of ministers in Portugal. The studies that analyse paths to power in Portugal (Tavares de Almeida and Costa Pinto, 2002; Costa Pinto and Tavares de Almeida, 2009) emphasize as a special feature of the Portuguese democracy from 1974 on, the significant number of ministers without political experience, that is, independents. Their explanation for this fact points to three factors: (i) the attempt to have a higher technical legitimacy of the executive and to counterbalance the bias against the political class; (ii) the weak penetration in civil society of the political parties, that is to say, the apparent reluctance of important people in civil society to belong to political parties; (iii) the PM's discretion. Additionally, Costa Pinto and Tavares de Almeida (2009) affirm that there is a significant number of independent ministers (ministers without political experience), who are maintained whenever a reshuffle or a dismissal takes place.

However, a survival analysis has not been carried out and, therefore, the authors' conjecture has not been thoroughly studied and, more crucially, statistically validated. This is the goal in this work, to enquire whether paths to power matter for the survival of ministers. For this purpose, we construct an adequate data base and use a survival analysis to study if paths to power actually explain the survival of ministers and, if they do, how do they compare with each other.

Four different paths to ministerial position are defined: "Parliamentary", "Party", "Public Service" and "Independence" and relate these paths to power to both the *ex ante* informational asymmetry and the moral hazard problems.

The principal, the PM, gets a benefit from being in office. She will choose agents, ministers, with the objective to win the next election. Voters can value several characteristics of the government and, for the purpose of this exposition, voters are assumed to value a good performance by the government. The performance of the government will be a function of the PM's performance and of the ministers performance. A minister's performance will be an increasing function of the quality of his actions and of a random variable. On its turn, the quality of his actions will be higher, the higher his competence. The PM does not have complete information about competence of ministers *ex ante*, neither can she fully monitor his actions as a minister; that is to say, two problems are present, *ex ante* informational asymmetry and moral hazard.

For the purposes of our analysis which concerns the decision of the PM to de-select a minister in office, the only factor that matters for her is the observation of the under-performance of an appointed minister. When the possibility is raised that the PM is faced with a bad performance of her minister, the probability of this occurring and of eventually firing him can be analysed in terms of two elements: the contribution of the *ex ante* informational asymmetry and the moral hazard problem to the event of a bad performance by the minister, on the one hand, and the restrictions she faces when contemplating the decisions to select or fire him, on the other hand. As to first element, the fact is that the minister is currently in office and the *ex ante* informational problem is past, but nonetheless it influenced the conditions under which the decision of the PM was taken.

Concerning the *ex ante* information problem and the restrictions the PM faces when selection a minister, the theory may allow to predict a higher turnover from the "Parliamentary" or "Party" paths, followed by the "Public Service" path and then by the "Independence" path. On the other hand, as to the moral hazard problem and the restriction the PM faces when firing a minister, the prediction here is of a lower turnover from the "Parliamentary" or "Party" paths, followed by the "Public Service" path and then by the "Independence" path. Thus, the theory points in opposite directions and, therefore, it does not allow for a prediction.

The main positive finding of the empirical analysis is that ministers who attained power through the "Party" last longer than "Parliamentary" ones. Nonetheless, considering any

other comparison between paths to power, no difference in ministers' durability could be ascertained. This conclusion may mean that the two effects cancel each other.

Given that the hypothesis that led to this statistical analysis could not be confirmed, a more detailed analysis became especially important. This was carried out along two ways: first, the database was divided in sub-samples according to personal and government characteristics and, second, interaction variables between paths to power and characteristics of ministers or governments were defined. The conclusions obtained from these two statistical procedures confirm the results, as presented above.

This study was very time consuming as the gathering of data and the exploration of appropriate techniques were necessary in order to accomplish the statistical analysis.

The final work **"Re-selection of Ministers in Government - A theoretical perspective and an empirical application to the Portuguese case"** (chapter 5), which also addresses the relation of the PM with her ministers, focuses on the capacity of ministers of different types to build up their political careers.

As to the theoretical part, a reelected PM who wants to win the next election has to decide whether to keep or replace a minister who was in the previous government. Ministers can be of two types, either independent or partisan. An independent minister is assumed to have a higher expected competence, but the PM knows that appointing one in office will imply some cost. Voters care about ideology and competence of the government. The actual competence of the minister and the magnitude of the cost of an independent one are realized by the voters and the PM in the duration of the government before the next election takes place.

The main conclusions of the model are that a partisan minister will be maintained with a higher probability than an independent minister, and a higher realized competence of a minister will increase his chances of being re-selected.

The model also allows for several other conclusions: (i) a partisan minister will be maintained with certainty if his competence is higher than the expected value of competence of ministers; (ii) when a partisan's competence is below the expected value of competence of ministers, his retention probability will decrease when the PM's benefit of holding office increases; (iii) it is possible to have a positive probability of retention of a partisan minister even

when his competence is minimal; (iv) the higher the benefit of holding office by the PM, the lower is the retention probability of an independent minister for levels of competence below the expected value of competence of ministers, and vice-versa; (v) an independent minister may have a positive probability of retention even when his competence is not too high, since there is the chance that her choice of a new minister is of an independent with a potential higher cost; (vi) finally, a lower realized cost from an independent minister will make his retention probability closer to that of a partisan.

Next, an empirical analysis was carried out, which used the data set constructed especially for the purposes of the study "Paths to power and ministers' durability: The Portuguese case".

The influence of minister type (partisan *vs* independent) on the probability of re-selection in consecutive governments is analysed. Given the limitations of the available database, only the first set of predictions of the model could be addressed.

The main conclusion is that a partisan minister has a higher probability of retention than an independent minister. This holds for both situations analysed, when the PM remains or when the party remains in power; however, this relation is less strong when we consider that the party remains in power. This conclusion is robust when we introduce interaction variables between the minister type and variables related with experience and education, or with the type of government.

This work has a limitation due to the difficulty of measuring competence. The theoretical model operates with *ex post* competence and it is not possible to measure it given the limitation of the available database. There are two main possibilities to measure performance of an individual minister in a government. One is to address performance directly and this can be proxied by a positive (e.g. quality of the policies) or a negative (e.g. scandals) variable. Another would be less direct, looking for personal characteristics of ministers, correlated with competence. In this case, the analysis in this work indicates that a master's or a Ph.D degree affect positively the probability of reelection, in some models; however, experience does not have any influence on re-selection. Even though these variables may acceptably signal competence, their *ex-ante* nature may involve a model misidentification and, therefore, the findings here regarding the influence of education and experience should be read with

caution.

This way, the fourth essay complements the third and solves the apparent negative result found there: although an independent minister shows a similar durability in government as a partisan, in fact, an independent shows a lower potential of pursing a political career.

Chapter 2

Biased Beliefs and Retrospective Voting: A generalization to T elections

2.1 Introduction

Politicians often happen to choose policies that are not the socially desirable. Why do they do it? What type of incentives an elected politician has to choose socially undesirable policies? The literature has recently paid attention to voters' biased beliefs as an explanation of inefficient choices (see Beilharz and Gersbach (2004), Caplan (2007), and Bischoff and Siemers (2013)). Caplan's book "The Myth of the Rational Voter" (Caplan (2007)) shows broad evidence of a systematic bias in voters' beliefs about economic policies, namely in disfavor of free trade and of corporate downsizing. Bischoff and Siemers (2013) use the concept of mental models from cognitive psychology as a micro-foundation of biased beliefs in order to study the trade-off faced by political parties: they can offer popular yet economically harmful policies that increase their chances of election today, but decrease their chances of reelection in the future. A mental model is a simplified representation of a real system, based on the individual's knowledge, experience and beliefs. An individual uses his mental model to reason about how the underlying system functions. Basically, when facing a new situation, this individual will use his mental model to simulate its impact on his well-being, and ac-

cording to these simulations support the most appropriate course of action. Given mankind's cognitive limitations, mental models are simplified representations of a complex real world (see Bischoff and Siemers (2013, p.164-168)).

Retrospective voting is also an important feature in Bischoff and Siemers (2013, p.168). In fact, retrospective voting can be used in conjunction with mental models. In this framework, in case economic outcomes contradict the mental model simulations, an individual will solve this cognitive dissonance by arguing that this contradiction results from unexpected, singular or exogenous events. The authors use retrospective voting as a way to make valence endogenous: incumbents are evaluated as competent and assigned a high competence-related valence if they are believed to have reached good macroeconomic results.

Our model is an extension of Bischoff and Siemers (2013). As in their paper, we assume that there are two competing office-seeker candidates, each one choosing a policy platform, which can be any linear combination of bad (yet popular) policies and good (yet less popular) policies. The bad (yet popular) policy will increase the chances of winning the election now, but decrease valence and so the chances of winning in the future. Bischoff and Siemers (2013) are able to conclude that there is the possibility to implement a purely good policy, despite persistently biased beliefs, since retrospective voting will serve as a self-correction mechanism in democracy. As in Bischoff and Siemers (2013), this extension considers as well two additional features: an incumbent bias, since an elected politician has greater chances of reelection (e.g., Alesina and Rosenthal, 1995), and limited accountability in the sense that the government has far from complete control of the economic outcomes of policies.

The main difference of our model from Bischoff and Siemers (2013) is that in their model parties only care about two elections and in our model parties will care about T future elections. In democracies, parties in fact run for power for more than two terms. Moreover, in most parliamentary democracies, parties' leaders also run for power for more than two terms. For instance, and referring only to the case of Germany, Angela Merkel has already faced 3 elections, Gerhard Schröder faced 3 elections, Helmut Kohl 6, Helmut Schmidt 3 and Konrad Adenauer 5. Using our extended framework, the model addresses the question whether Bischoff and Siemers (2013)' problem will have a similar prediction in the case of

T elections.

We are able to conclude that there are two possible equilibrium situations. One is equivalent to Bischoff and Siemers (2013) if the effect of biased beliefs is higher than the initial valence. Another occurs in the situation where the effect of biased beliefs is smaller than the initial valence, and a possible equilibrium consists in the party with a valence advantage choosing the pure good policy and the other the pure bad policy. This particular equilibrium situation is not found in Bischoff and Siemers (2013). The party with a valence advantage is led to choose a better policy (in every possible equilibrium) and the party with the valence disadvantage has to be even more populist than the other one in order to compensate for the disadvantage. Moreover, the number of elections will matter as when politicians care about more elections they will be more (less) populist if the bias effect is higher (lower) than the weighted valence effect. Besides, we find a surprising result: the effect both of the existence of an incumbent bias and of the expected quality of outside policies is independent of the number of elections considered in the future. Finally, we also obtain that a variation in the fraction of control of the economic outcomes can either increase or decrease populism.

This work will be divided as follows: section 2.2 presents the model; section 2.3 presents the equilibrium results with subsection 2.3.2 and 2.3.3 adding an incumbent bias and limited accountability, respectively; finally, section 2.4 concludes.

2.2 The basic model

2.2.1 The voting decision

We use the same basic assumptions as in Bischoff and Siemers (2013), with two competing political parties A and B that offer policy platforms, η_t^A and η_t^B, respectively.

The utility of a single voter i in period t is given by the utility function:

$$U_{it} = U_{it}\left(y_{it}, a_t\right) \tag{2.1}$$

where y_{it} is voter i's income in period t and a_t is the index of macroeconomic performance in t.

Let η_t represent the policy vector in period t. η directly influences both the voters' income and the macroeconomic performance. However, η can have different impacts in each voter's income since they have singular individual characteristics, e.g. employment status, sector of employment, education. Also through its influence on the macroeconomic performance a_t, η will have an indirect effect on y_{it}. Therefore, voter i's utility is ultimately seen as determined by economic policy η_t:

$$U_{it} = U_{it}\left(y_{it}\left(\eta_t\right), a_t\left(\eta_t\right)\right) \equiv U_{it}\left(\eta_t\right) \tag{2.2}$$

As the true functional forms of $y_{it}\left(\eta_t\right)$ and $a_t\left(\eta_t\right)$ are unknown to each voter i, as in Bischoff and Siemers (2013) we assume, first, that voter i will use his mental model in order to estimate the effect of each of the two competing policy platforms on his expected utility:

$$\hat{U}_{it}^{j} = \hat{U}_{it}^{j}\left(\eta_t^j\right),\ j = A, B \tag{2.3}$$

Other things being equal, he favours the party whose policy platform promises a higher estimated utility.

Next, voter i will also take into account his perception of each party's valence, that is to say, the parties' perceived competence, defined by γ_{it}^{j}:

$$\gamma_{it}^{j}\left(\eta_{t-1}^{j}\right) = \begin{cases} a_{t-1}\left(\eta_{t-1}^{j}\right) - \bar{a}_i \text{ if party } j \text{ is the incumbent} \\ 0 \text{ otherwise} \end{cases} \tag{2.4}$$

where $\bar{a}_i$ is voter i's benchmark value. If the expected outcome of the incumbent's policy is lower (higher) than the benchmark, voter i will perceive the incumbent as incompetent (competent), that is, $\gamma_{it}^{j}\left(\eta_{t-1}^{j}\right) < (>)\, 0$.

As in Bischoff and Siemers (2013), each voter's probability of voting in party j, π_{it}^{j}, is a function of his expected utility and of the perceived valence of party j. Both components are

additively separable. Thus, the expected vote share of party j in election t will be the integral across all voters' probabilities:

$$\Pi_t^j\left(\gamma_{it}^j, \gamma_{it}^{-j}, \hat{U}_{it}^j, \hat{U}_{it}^{-j}\right) = \int_{i=0}^{1} \pi_{it}^j di = \Lambda_t^j\left(\eta_t^j, \eta_t^{-j}\right) + V_t^j\left(\gamma_{it}^j, \gamma_{it}^{-j}\right) \tag{2.5}$$

where $\Lambda_t^j\left(\eta_t^j, \eta_t^{-j}\right)$ and $V_t^j\left(\gamma_{it}^j, \gamma_{it}^{-j}\right)$ are the platform-related and the valence-related vote share, respectively.

2.2.2 Party competition

In Bischoff and Siemers (2013) the candidates are office-seekers and want to maximize their party's probability of being elected. In their model, this is equivalent to maximizing both the party's probability of being elected in period t and the expected probability of being elected in the next elections. In our model, where T periods are considered, parties will equally be rent seeking and want to maximize their expected probability of winning not only the next election, but everyone of the next $T-1$ elections, as well: $\sum_{k=1}^{T} E\left(\Pi_{t+k}^j\left(\gamma_{it+k}^j, \gamma_{it+k}^{-j}, \hat{U}_{it+k}^j, \hat{U}_{it+k}^{-j}\right)\right)$. The payoff over all the periods will be discounted with factor $\delta\,(0<\delta<1)$. The payoff function Θ_t^j then reads:

$$\Theta_t^j = \Pi_t^j\left(\gamma_{it}^j, \gamma_{it}^{-j}, \hat{U}_{it}^j, \hat{U}_{it}^{-j}\right) + \sum_{k=1}^{T} E\left(\delta^k \Pi_{t+k}^j\left(\gamma_{it+k}^j, \gamma_{it+k}^{-j}, \hat{U}_{it+k}^j, \hat{U}_{it+k}^{-j}\right)\right) \tag{2.6}$$

Party j chooses the policy platform that maximizes the value of Θ_t^j. As in Bischoff and Siemers (2013), there are two pure policy platforms from which the parties can choose: a good policy platform η_g and a bad platform η_b. Using the notion of biased beliefs, as in Bischoff and Siemers (2013), the majority of voters will assert that $\hat{U}_{it}\left(\eta_b\right) > \hat{U}_{it}\left(\eta_g\right)$ for all t, despite the fact that the reverse ordering holds for the true utility values.

Assuming that the parties have complete information and since the policy platform η_g yields better results than the policy platform η_b, the parties know that $a\left(\eta_g\right) > a\left(\eta_b\right)$. We also assume that $a\left(\eta_g\right) > \bar{a}_i$ and $a\left(\eta_b\right) < \bar{a}_i$ for most $i \in [0,1]$. Thus, if a given party wins

the election and applies the good policy, η_g, it will get a positive valence ($v > 0$), but if it applies a bad policy, η_b, it will get a negative valence. Let V_t^{Inc} be the incumbent party's valence and V_t^{Opp} the opposition's valence. We define:

$$V_t^{Inc} = V\left(\eta_{t-1}^{Inc} = \eta_g\right) \equiv v \tag{2.7}$$

$$V_t^{Inc} = V\left(\eta_{t-1}^{Inc} = \eta_b\right) \equiv -v \tag{2.8}$$

$$V_t^{Opp}\left(\eta_{t-1}^{Inc}\right) = -V_t^{Inc}\left(\eta_{t-1}^{Inc}\right) \tag{2.9}$$

With respect to the platform-related part of the expected vote share, as in Bischoff and Siemers (2013), we also define:

$$\Lambda_t^j\left(\eta_t^j = \eta_t^{-j}\right) = \frac{1}{2} \tag{2.10}$$

$$\Lambda_t^j\left(\eta_b, \eta_g\right) = \frac{1}{2} + f \tag{2.11}$$

$$\Lambda_t^j\left(\eta_g, \eta_b\right) = \frac{1}{2} - f \tag{2.12}$$

where $f > 0$ represents the biased beliefs effect: by choosing the good policy, η_g, the party will potentially lose vote share up to $2f$ (if the other party plays η_b). However, the party will be building up valence. Note that the advantage of party A is always the mirror-inverted disadvantage of party B, and vice-versa.

The probability of election must be higher than 0 and smaller than 1 so we restrict $1/2 + f + v < 1$.

2.3 Political Equilibrium

Party competition is modelled as a non-cooperative dynamic game. As in Bischoff and Siemers (2013), we assume that:

- The tie-breaking rule is such that if a party is indifferent between the two platforms, it

will choose the populist platform η_b;

- Parties follow the platform proposed in the campaign, that is, platforms are commitments; otherwise, the good policy, η_g, would be applied after the election as it gives the party a positive valence.

2.3.1 Nash equilibria in mixed compromise platforms

As in Bischoff and Siemers (2013), parties choose any linear combination of the two pure strategies. The impact of a mixed platform on economic outcomes is given by the weighted average of the pure platforms' impact; we admit that the expected and actual impact are the same, that is to say, expectations are coherent with the structure of the game and with equilibrium outcomes. The fraction of the bad policy, η_b, applied by party j in period t considering T periods will be given by $\beta^j_{t,T}$. This will imply that:

$$\Lambda^j_{t,T}\left(\beta^j_{t,T}, \beta^{-j}_{t,T}\right) = \frac{1}{2} + \left(\beta^j_{t,T} - \beta^{-j}_{t,T}\right) f \tag{2.13}$$

and

$$V^{Inc}_{t,T}\left(\beta^{Inc}_{t-1,T}\right) = \beta^{Inc}_{t-1,T}\left(-v\right) + \left(1 - \beta^{Inc}_{t-1,T}\right) v = v\left(1 - 2\beta^{Inc}_{t-1,T}\right) \tag{2.14}$$

Thus, we also have $V^{Opp}_{t,T}\left(\beta^{Inc}_{t-1,T}\right) = -v\left(1 - 2\beta^{Inc}_{t-1,T}\right)$. We assume that there is an initial valence advantage of party j, which we denote by $v^j_0 > 0$; so $v^{-j}_0 = -v^j_0 < 0$.

As a result of the framework presented, we are going to assume that the differences between the fraction of populist policies applied by each party are between minus one and plus one, that is, $-1 \leq \beta^j_{t,T} - \beta^{-j}_{t,T} \leq 1$.

The resulting payoff function reads:

$$\begin{aligned}\Theta^j\left(\beta_{t,T}^j,\beta_{t,T}^{-j}\right)=\Pi_{t,T}^j+\delta\Bigg[&\Pi_{t,T}^j\left(\frac{1}{2}+\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f+\left(1-2\beta_{t,T}^j\right)v\right)+\\&\left(1-\Pi_{t,T}^j\right)\left(\frac{1}{2}+\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f-\left(1-2\beta_{t,T}^{-j}\right)v\right)\Bigg]+\\&\delta^2\Bigg[\Pi_{t,T}^j\Bigg[\left(\frac{1}{2}+\left(\beta_{t+1}^{j,T}-\beta_{t+1,T}^{-j}\right)f+\left(1-2\beta_{t,T}^j\right)v\right)\times\\&\left(\frac{1}{2}+\left(\beta_{t+2}^{j,T}-\beta_{t+2,T}^{-j}\right)f+\left(1-2\beta_{t+1,T}^j\left(\beta_{t,T}^j\right)\right)v\right)+\\&\left(\frac{1}{2}-\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f-\left(1-2\beta_{t,T}^j\right)v\right)\times\\&\left(\frac{1}{2}+\left(\beta_{t+2,T}^j-\beta_{t+2,T}^{-j}\right)f-\left(1-2\beta_{t+1,T}^{-j}\left(\beta_{t+1,T}^j\right)\right)v\right)\Bigg]+\\&\left(1-\Pi_{t,T}^j\right)\Bigg[\left(\frac{1}{2}+\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f-\left(1-2\beta_{t,T}^{-j}\right)v\right)\times\\&\left(\frac{1}{2}+\left(\beta_{t+2,T}^j-\beta_{t+2,T}^{-j}\right)f+\left(1-2\beta_{t+1,T}^j\left(\beta_{t,T}^{-j}\right)\right)v\right)+\\&\left(\frac{1}{2}-\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f+\left(1-2\beta_{t,T}^{-j}\right)v\right)\times\\&\left(\frac{1}{2}+\left(\beta_{t+2,T}^j-\beta_{t+2,T}^{-j}\right)f-\left(1-2\beta_{t+1,T}^{-j}\left(\beta_{t,T}^{-j}\right)\right)v\right)\Bigg]\Bigg]+\\&\delta^3...\end{aligned}\tag{2.15}$$

with $\Pi_{t,T}^j=\frac{1}{2}+v_0^j+\left(\beta_{t,T}^j-\beta_{t,T}^{-j}\right)f$.

Proposition 1. *Suppose* $v_o^A\geq 0$.

1. *If* $f>v_0$*:*

   (a) If $(\delta v)^{T-t}>\frac{f^{T-t}}{1-2f-2v_0}$*, the unique Nash equilibrium (hereafter NE) is* $(0,0)$*;*

   (b) If $\frac{f^{T-t}}{1-2f-2v_0}\geq(\delta v)^{T-t}>\frac{f^{T-t}}{1-2f+2v_0}$*, the unique NE is* $\left(0,\beta_{t,T}^B\in(0,1)\right)$*;*

   (c) If $\frac{f^{T-t}}{1-2f+2v_0}\geq(\delta v)^{T-t}>\frac{f^{T-t}}{1+2f-2v_0}$*, the unique NE is* $\left(\beta_{t,T}^A\in(0,1),\beta_{t,T}^B\in(0,1)\right)$*;*

(d) If $\frac{f^{T-t}}{1+2f-2v_0} \geq (\delta v)^{T-t} > \frac{f^{T-t}}{1+2f+2v_0}$*, the unique NE is* $\left(\beta^A_{t,T} \in (0,1), 1\right)$*;*

(e) If $(\delta v)^{T-t} \leq \frac{f^{T-t}}{1+2f+2v_0}$*, the unique NE is* $(1,1)$*.*

2. *If* $f < v_0$*:*

(i) If $(\delta v)^{T-t} > \frac{f^{T-t}}{1-2f-2v_0}$*, the NE is* $(0,0)$*;*

(ii) If $\frac{f^{T-t}}{1-2f-2v_0} \geq (\delta v)^{T-t} > \frac{f^{T-t}}{1+2f-2v_0}$*, the unique NE is* $\left(0, \beta^B_{t,T} \in (0,1)\right)$*;*

(iii) If $\frac{f^{T-t}}{1+2f-2v_0} \geq (\delta v)^{T-t} > \frac{f^{T-t}}{1-2f+2v_0}$*, the unique NE is* $(0,1)$*;*

(iv) If $\frac{f^{T-t}}{1-2f+2v_0} \geq (\delta v)^{T-t} > \frac{f^{T-t}}{1+2f+2v_0}$*, the unique NE is* $\left(\beta^A_{t,T} \in (0,1), 1\right)$*;*

(v) If $(\delta v)^{T-t} \leq \frac{f^{T-t}}{1+2f+2v_0}$*, the unique NE is* $(1,1)$*.*

Proof. See Appendix 2.A. □

Notice that for $f = v_0$ equilibrium *(c)* and *(iii)* do not apply.

From Proposition 1, we can see that there are two possible situations of equilibria, for $f > v_0$ and $f < v_0$. The first one is equivalent to Bischoff and Siemers (2013). For both situations, we can conclude that good policies can be applied no matter the number of elections considered if the discounted gain of valence in the subsequent elections is higher than the gain of populism today (cases *(a)* and *(i)*). When the opposite occurs, both parties will choose the pure bad policy (cases *(e)* and *(v)*).

Nash Equilibrium will differ in the two situations for the intermediate cases. In the situation where $f > v_0$ at least one party chooses a mixed platform: in case *(b)*, the party with the valence advantage chooses the pure good policy and the other one a mixed one; in case *(c)*, both parties will choose mixed platforms; and in case *(d)*, the party with the valence advantage chooses a mixed platform and the other one the pure bad policy. In the situation where $f < v_0$ (cases *(ii)* and *(iv)*), the same NE arise, as in the previous situation. That is, in the former situation the party with the valence advantage chooses the pure good policy and the other a mixed one, and in the latter situation the party with the valence advantage chooses

a mixed platform and other party the pure bad policy. However, in the second situation in case *(iii)* the NE will be quite different: the party with the valence advantage chooses the pure good policy and the other the pure bad policy. This kind of equilibrium is not found in Bischoff and Siemers (2013). As can be seen, the party with a valence advantage is led to choose a better policy (in every possible equilibrium) and when the initial valence is higher than the effect of the biased beliefs, the party with the valence disadvantage has to be even more populist than the other one in order to compensate for the disadvantage.

Moreover, the number of prospective elections will matter for party's choice of platform (with two elections only, this cannot be addressed in Bischoff and Siemers (2013), by definition). Actually, from Proposition 1, the higher the number of elections considered the more likely are the extreme cases, that is, case *(a)* and *(i)* or *(e)* and *(v)*. In fact, the party's choice will change with the number of elections considered. This is stated in Corollary 1.

Corollary 1. *For any T and T' with $T > T'$, we have $\beta^j_{t,T} > \beta^j_{t,T'}$ if $f^{T-T'} > (\delta v)^{T-T'}$ for any j.*

Proof. See Appendix 2.A. □

The number of elections considered will have an impact on populism: the higher the spectrum of elections considered the higher will be the impact of the dominant effect. Thus, when parties care about a higher number of elections, they will be more (less) populist if the bias effect is higher (lower) than the weighted valence effect.

The effect on the choice of policy platforms when the number of elections varies is reflected in the equilibrium strategies, as is stated in Corollary 2.

Corollary 2. *For a given NE in t for T elections, the only equilibria that will occur with certainty when T' elections are considered, with $T > T'$, are cases (c) and (iii). Moreover, the smaller is T, the more likely the NE falls in these two cases.*

Proof. See Appendix 2.A. □

Corollary 2 reinforces the idea in Corollary 1, that is, as the number of elections considered decreases, the policy platforms will change as parties try to maximize their chances of

winning the next and future elections. In fact, as case *(c)* and *(iii)* are equilibria for T elections considered they will also be equilibria when the number of elections is $T-1$, $T-2$, $T-3$ and so on. In case *(c)* where $f > v_0$, both parties will remain between $(0,1)$. Notice that the policy can still be different and that the party with the valence disadvantage will be more populist. In case *(iii)* where $f < v_0$, the party with valence advantage will remain with the pure good policy and the other one will remain with the pure bad policy. Again, in the latter case, as the initial valence is higher than the effect of the biased beliefs, the party with the valence disadvantage has to be as populist as it can in order to compensate for that disadvantage. Thus, the parties might assume the extremist positions, as mentioned.

2.3.2 Biased valence evaluation and the incumbent bias

As in Bischoff and Siemers (2013, p.173), we introduce an incumbent bias $\rho^{Inc} > 0$ that will be weighed with the vote share $M\left(\Pi^j_{t,T}\right)$ that party j can expect in $t+1$, conditional on having been voted into office in election t. For the incumbent, when she has won the election, we have $1/2 \leq M\left(\Pi^j_{t,T}\right) \leq 1$, with $\partial M\left(\Pi^j_{t,T}\right)/\partial \Pi^j_{t,T} \geq 0$ for all $0 < \Pi^j_{t,T} < 1$. As Bischoff and Siemers (2013) demonstrated, we know that $M\left(\Pi^j_{t,T}\right) = \max\left(\frac{1}{2}, \Pi^j_t\right)$. The

payoff function for party j then reads:

$$
\begin{aligned}
&\Theta^j\left(\beta_{t,T}^j, \beta_{t,T}^{-j}\right) = \Pi_{t,T}^j + \\
&\delta\left[\Pi_{t,T}^j\left(\frac{1}{2} + \left(\beta_{t+1,T}^j - \beta_{t+1,T}^{-j}\right) f + \left(1 - 2\beta_{t,T}^j\right) v + \rho^{Inc} M\left(\Pi_{t,T}^j\right)\right) + \right. \\
&\left.\left(1 - \Pi_{t,T}^j\right)\left(\frac{1}{2} + \left(\beta_{t+1,T}^j - \beta_{t+1,T}^{-j}\right) f - \left(1 - 2\beta_{t,T}^{-j}\right) v - \rho^{Inc} M\left(\Pi_{t,T}^{-j}\right)\right)\right] + \\
&\delta^2\left[\Pi_{t,T}^j\left[\left(\frac{1}{2} + \left(\beta_{t+1,T}^j - \beta_{t+1,T}^{-j}\right) f + \left(1 - 2\beta_{t,T}^j\right) v + \rho^{Inc} M\left(\Pi_{t,T}^j\right)\right) \times \right.\right. \\
&\left(\frac{1}{2} + \left(\beta_{t+2,T}^j - \beta_{t+2,T}^{-j}\right) f + \left(1 - 2\beta_{t+1,T}^j\left(\beta_{t,T}^j\right)\right) v + \rho^{Inc} M\left(\Pi_{t+1,T}^j\left(\beta_{t,T}^j\right)\right)\right) + \\
&\left(\frac{1}{2} - \left(\beta_{t+1,T}^j - \beta_{t+1,T}^{-j}\right) f - \left(1 - 2\beta_{t,T}^j\right) v - \rho^{Inc} M\left(\Pi_{t,T}^j\right)\right) \times \\
&\left.\left(\frac{1}{2} + \left(\beta_{t+2,T}^j - \beta_{t+2,T}^{-j}\right) f - \left(1 - 2\beta_{t+1,T}^{-j}\left(\beta_{t+1,T}^j\right)\right) v - \rho^{Inc} M\left(\Pi_{t+1,T}^{-j}\left(\beta_{t,T}^j\right)\right)\right)\right] + \\
&\left(1 - \Pi_{t,T}^j\right)\left[\left(\frac{1}{2} + \left(\beta_{t+1,T}^j - \beta_{t+1,T}^{-j}\right) f - \left(1 - 2\beta_{t,T}^{-j}\right) v - \rho^{Inc} M\left(\Pi_{t,T}^{-j}\right)\right) \times \right. \\
&\left(\frac{1}{2} + \left(\beta_{t+2,T}^j - \beta_{t+2,T}^{-j}\right) f + \left(1 - 2\beta_{t+1,T}^j\left(\beta_{t,T}^{-j}\right)\right) v + \rho^{Inc} M\left(\Pi_{t+1,T}^j\left(\beta_{t,T}^{-j}\right)\right)\right) + \\
&\left(\frac{1}{2} - \left(\beta_{t+1,T}^j - \beta_{t+1,T}^{-j}\right) f + \left(1 - 2\beta_{t,T}^{-j}\right) v + \rho^{Inc} M\left(\Pi_{t,T}^{-j}\right)\right) \times \\
&\left.\left.\left(\frac{1}{2} + \left(\beta_{t+2,T}^j - \beta_{t+2,T}^{-j}\right) f - \left(1 - 2\beta_{t+1,T}^{-j}\left(\beta_{t,T}^{-j}\right)\right) v - \rho^{Inc} M\left(\Pi_{t+1,T}^{-j}\left(\beta_{t,T}^{-j}\right)\right)\right)\right]\right] + \\
&\delta^3 ...
\end{aligned}
\tag{2.16}
$$

with $\Pi_t^j = \frac{1}{2} + v_0^j + \left(\beta_{t,T}^j - \beta_{t,T}^{-j}\right) f$.

Proposition 2. *Suppose $v_0^A \geq 0$, incumbent bias $\rho^{Inc} > 0$, and $M\left(\Pi_{t,T}\right) = \max\left(\frac{1}{2}, \Pi_{t,T}\right)$. A higher incumbent bias, ρ^{Inc}, will lead to a more populist policy equilibrium; and its effect on the policy equilibrium will be independent of the number of elections considered, as:*

$$
\frac{\partial \beta_{t,T}^j}{\partial \rho^{Inc}} = \begin{cases} \frac{1}{4v} \text{ if } \Pi_{t,T} < \frac{1}{2} \\ \\ \frac{1}{2v} \text{ if } \Pi_{t,T} \geq \frac{1}{2} \end{cases} \quad \forall t \in [1, T] \text{ and for } j = \{A, B\}
$$

Proof. See Appendix 2.A. □

From Proposition 2, and in line with Bischoff and Siemers (2013, p.173), a higher incumbent bias leads to more populist policies as the party does not need to build up so much valence. Moreover, the incumbent bias today will affect the policies that are chosen tomorrow through the current valence. However, we find a new and surprising result: the number of elections considered will not affect the magnitude of the incumbent bias effect on the policy chosen. Actually, with a greater number of prospective elections, we could expect the incumbent bias to have an increasing effect on populism, since this might encourage them to win elections, therefore building up incumbent bias. Nonetheless, this does not happen, since the magnitude of the effect will not intensify with a greater number of prospective elections. In each new election that will take place, the policy platform chosen by the parties will adapt in such a way that endogenizes the current valence differences, which includes the incumbent bias. Therefore, the possible advantage of obtaining an incumbent bias will only affect the policies one period ahead and in the following period the difference in the current valence that results from the incumbent bias will be compensated for by the choice of policies. Besides, the actual chance of losing the election in the next period will also cancel the opportunity to build up valence.

2.3.3 Limited accountability

Again from Bischoff and Siemers (2013, p.174), we use the responsibility hypothesis which states that the incumbent is punished or rewarded independently of her responsibility, despite the fact that the government does not fully control the economic outcome. Thus, the incentives for the incumbent to build up valence will be different. Independently of being caused or not by the incumbent, the overall economic results of the country will define the voters' assignment of the valence. Thus, as in Bischoff and Siemers (2013), the incumbent's

valence becomes:

$$\begin{aligned} V_{t,T}^{Inc}\left(\beta_{t-1,T}^{Inc},\beta_{t-1,T}^{ex}\right) =& k\left[\beta_{t-1,T}^{Inc}.\left(-v\right)+\left(1-\beta_{t-1,T}^{Inc}\right)v\right] \\ &+\left(1-k\right)\left[\beta_{t-1,T}^{ex}.\left(-v\right)+\left(1-\beta_{t-1,T}^{ex}\right).v\right]+\varepsilon \\ =& v\left[k\left(1-2[\beta_{t-1,T}^{Inc}\right)+\left(1-k\right)\left(1-\beta_{t-1,T}^{ex}\right)\right]+\varepsilon \end{aligned} \tag{2.17}$$

Coefficient k $(0<k<1)$ is the fraction of the economic outcome the incumbent can control. It follows that $(1-k)$ is the economic outcome otherwise determined. Let β^{ex} be the action taken by these exogenous actors which is considered affected by stochastic shocks; the term ε captures these stochastic effects of shocks and we assume $E\left(\varepsilon\right)=0$. The actions of the other actors are not totally predictable and the incumbent forms an expectation $0<E\left(\beta^{ex}\right)<1$.

Then, the payoff reads:

$$
\begin{aligned}
&\Theta^j\left(\beta_{t,T}^j,\beta_{t,T}^{-j}\right)=\Pi_t^{j,T}+\\
&\delta\left[\Pi_{t,T}^j\left(\frac{1}{2}+\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f+k\left(1-2\beta_{t,T}^j\right)v+(1-k)\left(1-2E\left(\beta_{t,T}^{ex}\right)\right)v\right)+\right.\\
&\left.\left(1-\Pi_{t,T}^j\right)\left(\frac{1}{2}+\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f-k\left(1-2\beta_{t,T}^{-j}\right)v-(1-k)\left(1-2E\left(\beta_{t,T}^{ex}\right)\right)v\right)\right]+\\
&\delta^2\left[\Pi_{t,T}^j\left[\left(\frac{1}{2}+\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f+k\left(1-2\beta_{t,T}^j\right)v+(1-k)\left(1-2E\left(\beta_{t,T}^{ex}\right)\right)v\right)\times\right.\right.\\
&\left(\frac{1}{2}+\left(\beta_{t+2,T}^j-\beta_{t+2,T}^{-j}\right)f+k\left(1-2\beta_{t+1,T}^j\left(\beta_{t,T}^j\right)\right)v+(1-k)\left(1-2E\left(\beta_{t+1,T}^{ex}\right)\right)v\right)+\\
&\left(\frac{1}{2}-\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f-k\left(1-2\beta_{t,T}^j\right)v-(1-k)\left(1-2E\left(\beta_{t,T}^{ex}\right)\right)v\right)\times\\
&\left.\left(\frac{1}{2}+\left(\beta_{t+2,T}^j-\beta_{t+2,T}^{-j}\right)f-k\left(1-2\beta_{t+1,T}^{-j}\left(\beta_{t+1,T}^j\right)\right)v-(1-k)\left(1-2E\left(\beta_{t+1,T}^{ex}\right)\right)v\right)\right]+\\
&\left(1-\Pi_{t,T}^j\right)\left[\left(\frac{1}{2}+\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f-k\left(1-2\beta_{t,T}^{-j}\right)v-(1-k)\left(1-2E\left(\beta_{t,T}^{ex}\right)\right)v\right)\times\right.\\
&\left(\frac{1}{2}+\left(\beta_{t+2,T}^j-\beta_{t+2,T}^{-j}\right)f+k\left(1-2\beta_{t+1,T}^j\left(\beta_{t,T}^{-j}\right)\right)v+(1-k)\left(1-2E\left(\beta_{t+1,T}^{ex}\right)\right)v\right)+\\
&\left(\frac{1}{2}-\left(\beta_{t+1,T}^j-\beta_{t+1,T}^{-j}\right)f+k\left(1-2\beta_{t,T}^{-j}\right)v+(1-k)\left(1-2E\left(\beta_{t,T}^{ex}\right)\right)v\right)\times\\
&\left.\left.\left(\frac{1}{2}+\left(\beta_{t+2,T}^j-\beta_{t+2,T}^{-j}\right)f-k\left(1-2\beta_{t+1,T}^{-j}\left(\beta_{t,T}^{-j}\right)\right)v-(1-k)\left(1-2E\left(\beta_{t+1,T}^{ex}\right)\right)v\right)\right]\right]+\\
&\delta^3...
\end{aligned}
\tag{2.18}
$$

with $\Pi_t^j=\frac{1}{2}+v_0^j+\left(\beta_{t,T}^j-\beta_{t,T}^{-j}\right)f$

Proposition 3. *Suppose $v_0^A\geq 0$ and the political parties face limited control.*

- *With a higher quality of the expected action of other actors (a decrease in $E\left(\beta_{t,T}^{ex}\right)$), both party platforms become more populist; and its effect on the policy equilibrium is independent of the number of elections considered as $\frac{\partial\beta_{t,T}^j}{\partial E\left(\beta_{t,T}^{ex}\right)}=-\frac{1-k}{k}<0\;\forall\; t\in[1,T]$ and $0\leq E\left(\beta_{t,T}^{ex}\right)\leq 1$ and for $j=\{A,B\}$ and $0<k<1$.*

- *With a higher fraction of control (an increase in k), two effects occur: (i) a substitution effect and (ii) an income effect. If the first dominates the second, policies will become*

less populist, that is, $\frac{\partial \beta_{t,T}^{j}}{\partial k} < 0$. *If the opposite happens, policies will become more populist, that is,* $\frac{\partial \beta_{t,T}^{j}}{\partial k} > 0$

Proof. See Appendix 2.A. □

From Proposition 3, and in line with Bischoff and Siemers (2013), a lower expected quality of external actions leads to less populist policies as the party needs to build up valence to compensate for the poor outside actions. However, again we find a new result: the number of elections considered will not affect the magnitude of this effect on the policy chosen. The intensity of the effect will always be the same, since in the next election the policy platform will be adapted to the point that the policy choice will fully made endogenous the effect of the valence difference in that term, that may have resulted from the actions of the external actors. Therefore, these external actions will only affect the policies one period ahead and in the next period the difference that results from them will be corrected by the policies chosen. Besides, the possibility of losing an election in any of the following period will also cancel the effect that these actions might have.

On the other hand, the effect of the fraction of control, k, is different from Bischoff and Siemers (2013, p.174). Given that the fraction of control increases, the party faces two effects:

1. The substitution effect: the party has a higher control over valence, so it can decrease populism in order to build up more valence.

2. The income effect: the party has a higher control over valence, so it can increase populism without damaging its valence.

If the first dominates the second, populism will decrease; otherwise populism will increase. The second effect is more likely to dominate the first, when the following situations occur: (i) the fraction of control (k) is high; (ii) the effect of valence (v) is high, which means that a higher control will allow the party an even higher valence; (iii) the expected quality of external actions is low ($E\left(\beta_{t,T}^{ex}\right)$ is high), thus, having a negative impact on the valence,

which means that the increase in control will give the party a smaller negative impact on valence from the outside actions; and (iv) the number of elections considered is not too high, which increases the valence effect weighted by the number of prospective elections. Only the substitution effect occurs in Bischoff and Siemers (2013), since in their case parties only gain valence for one period and in our case they can gain valence for several periods.

As a result, the effect of variations in the fraction of control will also depend on the number of elections considered, as is seen in Corollary 3.

Corollary 3. *For any T and T' with $T > T'$, we have $\frac{\partial \beta_{t,T}}{\partial k} > \frac{\partial \beta_{t,T'}}{\partial k}$ if $\left(\frac{\delta v k}{f}\right)^{T-T'} > \frac{(T-t)}{(T'-t)}$ for any $j = \{A, B\}$.*

Proof. See Appendix 2.A. □

Again, when a higher number of prospective elections is considered, an increase in the fraction of control leads to a higher impact on populism if the effect of the valence is greater than the bias effect. In this case, if the substitution effect dominates the income effect, the difference between the two effects will be smaller; and if the income effect dominates the substitution effect, the difference between both effects will be higher. As previously explained, a higher valence effect increases the income effect and this effect will be higher with a larger number of prospective elections.

2.4 Conclusions

Our paper tries to extend Bischoff and Siemers (2013) by considering more than 2 elections. We are able to reach some extra conclusions.

First, equilibrium can have two possible situations. One is equivalent to Bischoff and Siemers (2013) if the effect of biased beliefs is higher than the initial valence. Another occurs in the situation where the effect of biased beliefs is smaller than the initial valence, and a possible equilibrium consists in the party with a valence advantage choosing the pure good policy and the other the pure bad policy. The party with a valence advantage is led to choose

a better policy (in every possible equilibrium) and the party with the valence disadvantage has to be even more populist than the other one in order to compensate for the disadvantage.

Second, the number of elections considered will matter as when a politician cares about more elections, she will be more (less) populist if the biased beliefs effect is higher (lower) than the weighted valence effect. This means that the policy applied will differ according to the amount of elections considered.

Third, we conclude that the incumbent bias will have always the same effect independently of the amount of elections considered. The same thing happens with regard to the expected quality of the actions of outside actors. Although these results are surprising, they can be explained: the effects will only last one election as the losing party counters them in the immediate election. Finally, we also conclude that the fraction of control over the economic outcomes can either decrease (or increase) populism, if the substitution effect dominates (is dominated by) the income effect.

One possible topic for an extension would be to introduce campaign promises and evaluate whether and how the parties would change their actual policies away from the ones promised. Another extension would be to broaden the scope of the model in order to include not only the expected actions beyond the control of the government, but also the realized actions. If the expectation would not be accurate during the legislature, we could think of the government making mid-term changes in its policies, which might have consequences on the reelection chances.

Chapter 3

Policy Choices by an Incumbent, with reference to biased beliefs, retrospective voting and the down-up problem

3.1 Introduction

The question exists of whether and how the democratic mechanism provides appropriate incentives for the political agents to choose socially desirable policies. What features of the democratic process tend to encourage an elected politician to choose policies that are socially good or bad? In order to answer these questions, the literature has considered several aspects which appear to be salient behavioural patterns of voters and of political agents. One of these features regards biased beliefs of voters, which consist in the evaluation of policy platforms being carried out on the basis of *a priori* judgements, encouraging, therefore, politicians to opt for policies which main goal is to conquer votes. Another feature equally considered in the literature is retrospective voting, which means that voters' evaluation of a policy platform has a backward looking element, that is, attention is paid not only to expectations of future results but also to observed past outcomes.

In Bischoff and Siemers (2013) a model is built with the two assumptions of biased beliefs

and retrospective voting in conjunction. Bischoff and Siemers (2013, p.164) "show to what extent retrospective voting serves as a self-correction mechanism in democracy and identify equilibrium conditions under which even purely good policy choices occur, despite persistently biased beliefs. For a wide range of parameter constellations, parties choose a mediocre mix of either good yet unpopular or popular though bad policies".

However, politicians may face the down-up problem, which stems from a given policy having a down-up characteristic, that is, policies that despite being efficient require a temporary deterioration of welfare while the benefits are only realized later. An efficient policy is one that will improve the overall welfare, in spite of the short term negative effects.

For modelling purposes, the down-up characteristic of the effects of a policy is framed in electoral terms. The timing of the effects is lagged in such a way that the median voter's welfare deterioration effect is observed before the next election and the welfare beneficial effect is observed by the voters only after the next election has taken place. If such a policy will only be observed as beneficial in a longer time horizon and meanwhile the median voter's welfare is negatively affected, the important result is that the incentives for a politician to even considering the choice of such a policy may be compromised to start with.

Our model is motivated by Bischoff and Siemers (2013), regarding the biased beliefs effect, and by Gersbach (2004) and Müller (2007), regarding the down-up problem. The model considers a politician that sets some store on the benefits from holding office and some on the benefits from the positive results of the policy implemented. Moreover, the political process in the model consists basically of two steps. To start with, an elected politician will choose policy platforms including any mixture of socially undesirable yet popular policies and socially desirable yet less popular policies. Later, she chooses whether she wants to run for reelection, in which case voters decide on her reelection.

The model developed here has some crucial characteristics as the following:

i) Voters are modelled as in Bischoff and Siemers (2013).

ii) Politicians care about both the policy outcome and winning elections, which are weighted by parameters m and $(1 - m)$, respectively.

iii) Policies have a down-up characteristic and lagged effects. This means that the positive effects of the good policy and the negative effects of the bad policy only appear after the next election. Notice also that regarding the short term effect of good *vs* bad policies, we assume that the bad policy produces better results than the good policy before reelection.

iv) Two electoral terms are considered, the current term and the following, after a new election has taken place.

v) Political competition consists in an election to which an incumbent and an opposition party candidate run. The incumbent has won the previous election; this is somewhat *ad hoc* as if she has "waken up" in government making policy choices in order to maximize her payoff, which includes the probability of winning the next election.

The predictions of this model are broadly similar to Bischoff and Siemers (2013) in the sense that the policy choices in equilibrium range between the purely good and purely bad. In the same way, there is the possibility that a politician may opt for a good long term policy platform despite being in presence of both the biased beliefs and the down-up problems, but we show that for this to happen two elements must be present, the politician is in some degree a "policy success-seeker" and the benefits of the policy for the politician are sufficiently high.

This result is interesting. In the presence of biased beliefs only, retrospective voting may allow to correct the inefficiency; adding the down-up problem, in order for the possibility to exist of good policies to be applied, retrospective voting is not sufficient, a certain degree of motivation of the politician to undertake a good policy becomes necessary.

The basic model developed here is extended considering three other elements, the first two of which were dealt in Bischoff and Siemers (2013, p.173-74): (i) an incumbent bias, since an elected politician has greater chances of reelection; (ii) limited accountability, because the government does not fully control the economic outcome; (iii) and, finally, the penalization of deviations from campaign promises, given that voters do not like to be deceived. From these extensions the following conclusions are possible: (i) an incumbent bias gives an advantage for reelection and will induce politicians to choose better policies; (ii) admitting that

politicians do not fully control the results of the policies applied, a variation in the fraction of control of the economic outcomes can either increase or decrease populism; (iii) and, finally, higher costs of deviating from campaign promises will lead the politician to choose a policy platform closer to her promised platform.

The model assumes that the PM in office is considering applying a good policy, one that does not perform well in the short run so that its effects do not become evident before the election. This assumption begs, however, the explanation of why this policy is by any chance chosen to start with by the incumbent. If the conclusion is that for a good policy to be chosen, a certain type of politician is required, for the sake of completeness the model should be inserted in a broader framework which would include explicitly the past electoral contest, and the derivation of the conditions under which a politician of this type might have won the election.

Given that the previous election of the politician is not addressed in this work, this can be motivated as a thought experiment. It is implicitly assumed that the politician has been voted to office under some circumstances, and one of two possibilities could happen: a crisis may change the conditions under which she was first elected with the consequence of leading her to take some measure that she did not intend or expect; or, otherwise, that the politician may not keep all her promises, a subject which we pay attention in section 3.4.3.

The work is organized as follows. In section 3.2, we discuss the assumptions of the model, in particular the down-up problem. The model is derived in section 3.3, and the equilibrium characterized in section 3.4. Some extensions of the basic model are also treated in section 3.4. Section 3.5 concludes.

3.2 Model assumptions: the down-problem and the timing of the effects

Biased beliefs is one of the main features of this model. Biased beliefs have been studied by Beilharz and Gersbach (2004), Caplan (2007) and Bischoff and Siemers (2013). Caplan's

book "The Myth of the Rational Voter" (Caplan, 2007) shows broad evidence of a systematic bias in voters' beliefs about economic policies, namely, in disfavour of free trade and of corporate downsizing. Bischoff and Siemers (2013) use the concept of mental models from cognitive psychology in order to micro-found biased beliefs.[1]

Retrospective voting is also an important feature in Bischoff and Siemers (2013). The authors use retrospective voting as a way to make valence endogenous: incumbents are evaluated as competent and assigned a high competence-related valence if they are believed to have reached good macroeconomic results.

Bischoff and Siemers (2013) assume that there are two competing office seeker candidates that can choose policy platforms, including any linear combination of bad (yet popular) policies and good (yet less popular) policies. They assume that the good (bad) yet unpopular (popular) policies produce good (bad) results in the current electoral term. Bischoff and Siemers (2013) are able to conclude that it is possible for a politician to choose a purely good policy, despite persistently biased beliefs, since retrospective voting will serve as a self-correction mechanism in democracy.

A policy is defined as good when the outcome for the voter is good. The perception of the outcome of the policy may be different, however, due to biased beliefs. Let us explain. Given a certain configuration of the beliefs of voters, the case may happen that voters evaluate the outcome of a good policy as negative, therefore happening that, in this configuration of the perceptions, a good policy is unpopular. Of all the possible configuration of beliefs, Bischoff and Siemers (2013) address specifically this interesting case of biased beliefs: a good policy is unpopular and a bad policy is popular for a majority of voters.

As referred in the introduction, this work adds a third feature of the political process in democracies, the down-up problem. This problem stems from the existence of policies that despite being efficient require a temporary deterioration of welfare while the benefits are only realized later. This is important because a socially beneficial policy that does not perform well in the short-run might not be chosen.

This approach follows Gersbach (2004) and Müller (2007). In order to introduce the

[1]For more about mental model see Bischoff and Siemers (2013, p.166-68).

down-up problem, they both assume that the incumbent can choose between three policy projects: a short-term policy that is not efficient in the long-run; a socially beneficial policy that does not perform well in the short run; and the status-quo. There are two competing candidates for office, who face an initial election period and a subsequent new election. Candidates are motivated by the office they hold and by the policies they choose. Voters, who are rational, decide which politician gets elected and, once a candidate is elected, she will choose which type of policy she will apply. If the incumbent decides to run for office again, the voters will decide whether the politician is reelected.

However, the two papers by Gersbach (2004) and Müller (2007) have differences between them: in the first, politicians differ in their discount factors and, in the second, in their type in the "policy-success" and "office-seeker" spectrum.

In Gersbach (2004), the problem to the voters is that the discount factor of the politician may be smaller than theirs. Then, the politician does not have the incentive to undertake long-term policies which are beneficial to the public, even if the voters commit to a reelection scheme.

In Müller (2007), a possible outcome of the model is that politicians who are mainly motivated by the positive results of the policy they have implemented do not have the incentive to undertake long-term projects, even if the voters commit to a reelection scheme. This results from the shape of the politicians' utility function and the assumption that voters are fully rational. Voters will only reelect a politician if she chooses a long term policy, so the politician that cares more about office has a higher incentive to undertake it in order to guarantee reelection. Thus, in Müller (2007) a populist politician causes smaller inefficiencies in the political process.

Bischoff and Siemers (2013) is the basis of this work, as said. It should be made clear that their paper does not address the down-up problem and, therefore, that it may be interesting to combine the down-up problem with the two other features addressed in their paper, biased beliefs and retrospective voting. If they consider that the effect of policies are observed in the current term, it is assumed instead that the results of policies have a down-up characteristics and lags of effect such that a good policy only will show its good results in the next electoral

term meanwhile producing negative results in the near future. The lagged effects assumption reflects the down-up problem.

In Bischoff and Siemers (2013), the possibility exists that a good policy is chosen by the politician in spite of being unpopular to the voter since the retrospective voting effect may be high enough to counterbalance the negative biased beliefs effect. The fact that, in our model a good policy produces bad results in the current election term and good results in the following introduces a delay in the realization of the retrospective voting effect; and, as a consequence, the interaction of the two initial effects, biased beliefs and retrospective voting, will not be able to provide the positive outcome as predicted in Bischoff and Siemers (2013).

Now, in our model, the possibility exists that, in the presence of the three effects, the choice of a good (yet unpopular) policy will not be a successful bet for a politician: as long as the policy results in the current term are bad, retrospective voting does not compensate for the presence of biased beliefs, and therefore a good policy is not chosen in equilibrium.

Thus, introducing an explicit timing framework of the effects of the policies is interesting: policies that attain good results for voters in a future electoral term often require the implementation of measures which imply diminished utility for voters in a shorter term. For instance, in order to deal with structural or supply side policies this lag of effect is pertinent.

One example commonly accepted of the down-up problem regards the political initiatives undertaken by German Chancellor Gerhard Schröder who led the Federal government for two terms, from October 1998 to November 2005. In the context of his Agenda 2010, announced in 2003, his government implemented measures regarding unemployment benefits (as well as the national health system and pensions). These measures generated unemployment in the near future, but have been thought of as crucial for the subsequent improvement in the employment and unemployment figures. The fact is that he faced a steady loss of support and called a new election in 2005, which he lost to the opposition.

In this work, we attempted to include the down-up problem in the political process directly, operating by means of the choices of politicians and of voters, as part of the democratic process. Another perspective followed in the literature in order to address the down-up problem is the adoption of incentive contracts as in Gersbach (2003), Gersbach (2004) and

Müller (2007). The politicians could sign a contract before the first election (*ex ante*) such that if she stands for reelection and she is actually reelected, she will be assigned a payoff that is dependent on some macroeconomic variable. This contract will motivate her to take the socially desirable projects.

This approach is criticised by several authors, namely by Dixit (1996) and others, whose point is that the solution is not contracting, the solution of the political process must be found within the democratic set-up, as we know it or how we could imagine it. The information and agency problems in the political domain should be addressed in the framework of the political set-up of democracies, not in contracting. In fact, if we agree that the amount of contingencies in the political process tend to abound "... the transaction-cost politics view leads me to argue that the political process should be viewed as indeed a process - taking place in real time, governed and constrained by history, and containing surprises for all parties", thereby we can conclude that transaction costs are part of the given of the political problem and that mechanisms involving high transaction costs are accordingly hardly part of the solution. "Many features and outcomes of the political process can be better understood and related to each other by thinking of them as the results of various transactions costs and of the strategies of the participants to cope with these costs." Dixit (1996, p.xiv-xv).

Contracting by politicians and governments involving policy choices happens, however, in the case of support programs by supranational institutions, in which transfers are made conditional on the attainment of certain policy objectives. Another important case regards the fiscal vigilance in the European Monetary Union. In any of the two cases, contracting involves a government and an external entity and occurs not as part of the political process in a given democratic country but as a complement involving an institution external to the political system.

3.3 A simple model

The game can be described as follows:

- *Stage 1*: An elected politician undertakes a policy project known to the voters.

- *Stage 2*: The result from the policy in the first period is revealed to voters. The incumbent decides whether she runs for office again and the public decides on the reelection of the politician based on the policy platform applied and its results in the past.

In order to determine the politician's strategy, her possible policy decision in the second stage is not considered. That could be studied, but it would be simple and redundant: the politician would choose the policy with best payoff in just that period.

3.3.1 Voting decision

We use the same basic assumptions as in Bischoff and Siemers (2013).

The voter will value the incumbent's policy choice and his competence.

The utility of a single voter i in period t is given by the utility function:

$$U_{it} = U_{it}\left(y_{it}, a_t\right) \tag{3.1}$$

where y_{it} is voter i's income in period t and a_t is the index of macroeconomic performance in t.

Let η_t represent the policy vector in period t. η directly influences both the voters' income and the macroeconomic performance. However, η can have different impacts in each voter's income since they have singular individual characteristics, e.g. employment status, sector of employment, education. Also through its influence on the macroeconomic performance a_t, η will have an indirect effect on y_{it}. Therefore, voter i's utility is ultimately seen as determined by the economic policy η_t:

$$U_{it} = U_{it}\left(y_{it}\left(\eta_t\right), a_t\left(\eta_t\right)\right) \equiv U_{it}\left(\eta_t\right) \tag{3.2}$$

As the true functional forms of $y_{it}\left(\eta_t\right)$ and $a_t\left(\eta_t\right)$ are unknown to each voter i, as in Bischoff and Siemers (2013), we assume that voter i will use his mental model in order to

estimate the effect of the incumbent policy platforms on his utility:

$$\hat{U}_{it} = \hat{U}_{it}\left(\eta_t\right) \tag{3.3}$$

Then to evaluate the incumbent's competence, voter i will also take into account his perception of the incumbent's valence, that is to say, the incumbent's perceived competence, defined by γ_{it}:

$$\gamma_{it}\left(\eta_{t-1}\right) = a_{t-1}\left(\eta_{t-1}\right) - \bar{a}_i \tag{3.4}$$

where $\bar{a}_i$ is voter i benchmark value. If the expected outcome of the incumbent's policy is lower (higher) than the benchmark, voter i will perceive the incumbent as incompetent (competent), that is, $\gamma_{it}^{j}\left(\eta_{t-1}^{j}\right) < (>)\, 0$.

As in Bischoff and Siemers (2013), each voter's probability of voting in the incumbent, π_{it}, is a function of his estimated utility and of the perceived valence of the incumbent. Both components are additively separable. Thus, the expected vote share of party j in election t will be the integral across all voters' probabilities:

$$\Pi_t^j\left(\gamma_{it}^{j}, \gamma_{it}^{-j}, \hat{U}_{it}^{j}, \hat{U}_{it}^{-j}\right) = \int_{i=0}^{1} \pi_{it}^{j} di = \Lambda_t^j\left(\eta_t^j, \eta_t^{-j}\right) + V_t^j\left(\gamma_{it}^{j}, \gamma_{it}^{-j}\right) \tag{3.5}$$

where $\Lambda_t^j\left(\eta_t^j, \eta_t^{-j}\right)$ and $V_t^j\left(\gamma_{it}^{j}, \gamma_{it}^{-j}\right)$ are the platform-related and the valence-related vote shares, respectively.

3.3.2 Policy platforms

A bad policy generates a positive result in the first period and a negative one in the second period. A good policy generates a bad result in the first period and a good result in the second

period. We assume that the good policy is better, considering the true utility values:[2]

$$U_i(\eta_g) > U_i(\eta_b) \ \forall\, i \in [0,1]^3 \tag{3.6}$$

However, in order to follow the idea of biased beliefs, we assume that the mental models of the majority of voters assert $\hat{U}_i(\eta_b) \succ \hat{U}_i(\eta_g)$. Only a minority of voters applies mental models that yield the accurate preference ordering, so biased beliefs hold in the aggregate.

As voters believe that a bad policy, η_b, yields a higher utility and the good policy, η_b, a lower utility, the probability of election with respect to the platform-related part is (see Bischoff and Siemers, 2013, p.171):

$$\Lambda_t(\eta_b) = \frac{1}{2} + f \tag{3.7}$$

$$\Lambda_t(\eta_g) = \frac{1}{2} - f \tag{3.8}$$

where $f > 0$ represents the biased beliefs effect and $\frac{1}{2}$ is the probability of reelection given a priori. This can be justified by considering that the incumbent will face only one opponent and both have $\frac{1}{2}$ probability of reelection if the incumbent has chosen the *status quo*.[4]

Given the definitions of bad and good policies presented above, a politician that wins the first election and undertakes a bad policy η_b will be given a positive valence, $v > 0$, and a politician that wins the first election and undertakes a good policy η_g will be given a negative valence. Remember that voters will be able to observe the results of the policy in the first period before the new election takes place. We define:

$$V(\eta = \eta_b) = v \tag{3.9}$$

[2]For a matter of simplification, it is assumed that this is applied to all voters. However, it can also be assumed that this applies to more than half of the voters.

[3]Any social utility function can justify the notion of good or bad policies. Moroever, this is only valid if the politicians are a set of measure zero in the continuum of voters.

[4]If n opponents were consider, the probability of reelection in case the incumbent follows the *status quo* would be given by $\frac{1}{n}$.

$$V(\eta = \eta_g) = -v \tag{3.10}$$

Therefore, there is an advantage in applying the bad policy.

3.3.3 Politician's utility

The elected politician cares about the economic results she produces while in office. This benefit from office can be interpreted as either personal satisfaction from the macroeconomic performance, or privately appropriated gains. In any case, this is a measure of a policy benefit (satisfaction or gains) from office. The politician's policy benefit is given by a utility function similar to that of the voters: $W_t = W_t(y_t(\eta), a_t(\eta)) \equiv W_t(\eta)$. Given this and making normalizations, we have: $W_1(\eta_b) > W_1(\eta_g)$; $W_2(\eta_g) > W_2(\eta_b)$ and $W_1(\eta_g) + \delta W_2(\eta_g) > W_1(\eta_b) + \delta W_2(\eta_b)$, which is the formal representation of the down-up problem and where $\delta \in [0, 1)$ is the politician's discount factor.

The politician also gets utility from holding office, given by $Z > 0$. Z can be monetary (e.g. wages) as well as non-monetary benefits (e.g. status or the pleasure of being in power).[5]

The politician's utility of outside options is set to zero, that is, her utility in case she will have her best alternative occupation. Consequently, the net surplus of a politician not holding office is normalized to zero. Θ denotes the expected utility of the politician after the first election and before deciding the policy to implement, as evaluated with reference to stage 1:

$$\Theta = (1 - m) Z + mW_1(\eta) + \delta Q[(1 - m) Z + mW_2(\eta)] \tag{3.11}$$

The parameter m, with $0 < m < 1$, is the fraction the politician assigns to the results of the policies obtained in office, while $(1 - m)$ is the fraction the politician assigns to benefits from holding office. The value of m is exogenously given a priori to the politician. If m is close to 1, this means that the politician is mainly motivated by the policies she undertakes, while if it is close to 0 it means that she is mainly concerned with her reelection; in other words, a politician with a high value of m is a "policy success-seeker", while a politician

[5]Non-monetary benefits are transformed into monetary value in order to calculate all utility elements in one utility function.

with a low value of m is more like an "office-seeker" and thus may be called populist.

3.4 Political equilibrium

The policy actions after the reelection are totally determined by the strategy choice in stage 1. The policy choice in stage 2 would be simple and redundant: the politician would choose the policy with best payoff in just that period. The interesting discussion regards stage 1, at the end of which the election takes place.

Similar to Bischoff and Siemers (2013), the incumbent chooses any linear combination of the two pure strategies. The impact of a mixed platform on economic outcomes is given by the weighted average of the pure platforms' impact. We admit that the expected and actual impact are the same, that is to say, expectations are coherent with the structure of the game and with equilibrium outcomes. The fraction of the bad policy, η_b, applied by the incumbent will be given by β.

This implies that the impact of mixed policy platforms on vote shares is:

$$\Lambda(\beta) = \frac{1}{2} + \beta f - (1-\beta) f = \frac{1}{2} + f(2\beta - 1) \tag{3.12}$$

It also implies that the valence effect of a mixed platform is the linear combination of the single effects:

$$V(\beta) = \beta.v + (1-\beta)(-v) = v(2\beta - 1) \tag{3.13}$$

Then, the politician's payoff reads:

$$\Theta(\beta) = (1-m) Z + \delta \left[\frac{1}{2} + (f+v)(2\beta - 1)\right] [(1-m) Z + m(1-\beta) W] \tag{3.14}$$

Given the fact that $Q = \frac{1}{2} + (f+v)(2\beta - 1)$ with $Q > 0$, running for reelection is a dominant strategy for a politician no matter the policy undertaken. Therefore, the case when the politician does not want to run for reelection is not taken into account.

Before we present the proposition, it is important to explain some probabilities:

- $\left(\frac{1}{2}+f+v\right)$ is the maximum reelection probability that a politician can get. Only choosing a purely bad policy, will she get it. We will denote this probability by Q^{max}.

- $2\left(f+v\right)$ is the marginal reelection probability, that is, $\frac{\partial Q}{\partial \beta}$. We will denote this probability by Q_{mg}.

- $\left(\frac{1}{2}-f-v\right)$ is the minimum reelection probability that a politician can get. Only choosing a purely good policy, will she get it. We will denote this probability by Q^{min}.

Proposition 1. *Given the definitions of Q^{max}, Q_{mg}, Q^{min}:*

(a). If $\delta mW\left(\eta_g\right)\left(Q^{min}-Q_{mg}\right) \geq 2\delta\left(1-m\right)ZQ_{mg},\ \beta=0$

(b). If $\delta mW\left(\eta_g\right)Q^{max} \leq 2\delta\left(1-m\right)ZQ_{mg},\ \beta=1$

(c). If $\dfrac{2\delta\left(1-m\right)ZQ_{mg}}{Q^{max}} < \delta mW_2 < \dfrac{2\delta\left(1-m\right)ZQ_{mg}}{\left(Q^{min}-Q_{mg}\right)},\ \beta\in(0,1)$

Proof. See Appendix 3.A. □

The politician faces a clear trade-off: she can get a higher reelection probability if she chooses a more populist, policy or higher policy benefits if she chooses a less populist policy. Therefore, the politician has to compare weighted gains from the good policy with the weighted gains from the bad policy ($2\delta\left(1-m\right)ZQ_{mg}$).[6]

In case (a), the politician will choose a purely good policy, because the weighted gains from the good policy are higher than the gains from the bad policy. In this case, the gains from the purely good policy are weighted by the difference between the reelection probability under this choice and the marginal reelection probability. Under a purely good policy, the politician has reelection probability of Q^{min}, but she will lose the marginal reelection probability, since she does not choose any element of the bad policy.

In case (b), the politician will choose a purely bad policy, because the weighted gains from the good policy are lower than the gains from the bad policy. In this case, the gains

[6]The benefits of holding office in the second period are weighted by the marginal reelection probability. This benefit is constant whatever the policy. However, the politician has a better chance of getting it if the reelection probability is higher. Thus, the benefit will be favorable to the bad policy since it provides better chances of reelection given by the marginal reelection probability.

from the good policy are weighted by the maximum reelection probability. The politician will not get any policy benefit in the second period, but she will get the maximum reelection probability. Thus, she must compensate for the loss $\delta m W Q^{max}$.

Then for case (c), the politician will chose a combination of platforms.

Notice that if $Q^{min} \leq Q_{mg}$, we have that $3\,(f+v) \geq \frac{1}{2}$, and only case (b) is feasible. The politician will not have incentives to undertake a purely good policy if the probability of reelection under this choice is inferior to the marginal reelection probability. In this case, the politician loses as well much reelection probability if she does not choose a purely bad policy.

Notice also that the degree of motivation that a politician has regarding the results from the policy platform that she implements, m, has a role. The higher the value of m, the lower is β; that is, the more a politician is "policy-success" seeker, the lower will be the fraction of bad policies applied. In this model, the more a politician is "policy success-seeker" the more good policies she chooses, since they give her higher policy benefits. She values policy outcomes, and the policy that gives better overall results is the good one. Actually, according to proposition 1, if $m = 0$ only purely bad policies are implemented. For the choice of a platform that includes a good policy fraction, m must be strictly positive.

Equally, the benefits of the good policy, W, also have a role; that is, they must be strictly positive in order for the politician to apply the good policy.

However, it should also be noted that the conclusions regarding the motivation of the politicians raise the question of whether this type of politician can actually be selected to office. That is, in a competition for office can a more "policy success-seeker" politician win an election against a more "office success-seeker"? If it is possible to win, it is important to understand under which circumstances this may take place. If it is not possible to win, then, good policies (that do not perform well in the short run so that its effects do not become evident before the election) will never be applied.

3.4.1 Biased valence evaluation and the incumbent bias

As in Bischoff and Siemers (2013), we introduce an incumbent bias $\rho^{Inc} > 0$ that will be weighed with the vote share $M(\Pi)$ that the incumbent can expect, conditional on having won the election with a vote share of Π with $\frac{1}{2} < \Pi < 1$.[7] For the incumbent, as she has won the election, we have $1/2 \leq M(\Pi) < 1$, with $\partial M(\Pi)/\partial \Pi \geq 0$. As the incumbent knows her vote share in the past election, she will be able to assess the impact of the bias in favour of her reelection probability, that is defined as $\Omega = \rho^{Inc}.M(\Pi)$. The payoff function for the incumbent then reads:

$$\Theta(\beta) = (1-m)Z + \delta\left[\frac{1}{2} + (f+v)(2\beta - 1) + \Omega\right][(1-m)Z + mW] \tag{3.15}$$

Proposition 2. *Suppose $\frac{1}{2} < \Pi < 1$, incumbent bias ρ^{Inc}, $M(\Pi)$ and $\Omega = \rho^{Inc}M(\Pi)$. Then, the policy in equilibrium becomes less populist the higher the incumbent bias is:* $\dfrac{\partial \beta}{\partial \Omega} < 0$.

Proof. See Appendix 3.A. □

The incumbent bias allows the politician to have a higher probability of reelection without having to choose bad policies; this happens in our model because she has won the election and therefore benefits from the incumbent bias; differently, in Bischoff and Siemers (2013), the incumbent bias is a function of the expected probability of wining the election. Then, we have here that the politician can benefit more from the good policy results in the second period without having to build up valence and, as a consequence, she chooses a higher fraction of good policies. This is an important result, as an incumbent's advantage provides assurance allowing her to undertake the good policy without caring for its immediate results.

3.4.2 Limited accountability

Again from Bischoff and Siemers (2013), we use the responsibility hypothesis which states that the incumbent is punished or rewarded independently of her responsibility, despite

[7] Again it is assumed that the incumbent has only defeated one opponent.

the fact that the government does not fully control the economic outcome. Thus, the incentives for the incumbent to build up valence will be different. Independently of being caused or not by the incumbent, the overall economic results in the country will define the voters' assignment of the valence. Thus, similar to Bischoff and Siemers (2013), the incumbent's valence becomes:

$$\begin{aligned} V(\beta, \beta^{ex}) &= k\left[\beta.v + (1-\beta)(-v)\right] + (1-k)\left[\beta^{ex}.v + (1-\beta^{ex}).(-v)\right] \\ &= v\left[k(2\beta - 1) + (1-k)(2\beta^{ex} - 1)\right] + \varepsilon \end{aligned} \tag{3.16}$$

Coefficient k $(0 < k < 1)$ is the fraction of the economic outcome the incumbent can control. It follows that $(1-k)$ is the economic outcome otherwise determined, that is, that comes as a consequence of the actions of other actors in the economy, taken as exogenous. Let β^{ex} be the actions taken by these outside actors, which are considered affected by stochastic shocks; the term ε captures these stochastic effects of shocks and it is assumed $E(\varepsilon) = 0$. The actions of these other actors are not perfectly predictable and the incumbent forms an expectation $0 < E(\beta^{ex}) < 1$.

Then, the politician gets benefits from the economic results, so her utility will take into account the final result from her policies and the outside actions.[8] Then, the payoff reads:

$$\begin{aligned} \Theta(\beta) = &(1-m)Z + \delta\left\{\frac{1}{2} + f(2\beta - 1) + v\left[k(2\beta - 1) + (1-k)(2E(\beta^{ex}) - 1)\right]\right\} \\ &\times \left\{(1-m)Z + m\left[k(1-\beta)W + (1-k)(1 - E(\beta^{ex}))W\right]\right\} \end{aligned} \tag{3.17}$$

Proposition 3. *Suppose $v_0^A \geq 0$ and the political parties face limited control.*

- *With a higher quality of the expected actions of outside actors (a decrease in $E(\beta^{ex})$), both party platforms become more populist as $\dfrac{\partial \beta}{\partial E(\beta^{ex})} < 0$, with $0 < k < 1$ and $0 < E(\beta^{ex}) < 1$.*

[8] Alternatively, the economic results can have different importance if they are obtained from the politician's policies or from outside policies. Regarding the fraction of control and the expected actions of exogenous actors, the conclusions are equal to proposition 3 with more complexity. In addition, we can conclude that if the politician gives relatively more importance to her own policies, she will select better ones.

- *With a smaller fraction of control (a decrease in k), two effects occur: (i) a "populism effect" and (ii) a "counter-populism effect". If the first dominates the second, policies will become more populist, that is, $\frac{\partial \beta}{\partial k} > 0$. If the opposite happens, policies will become less populist, that is, $\frac{\partial \beta}{\partial k} < 0$*

Proof. See Appendix 3.A. □

From Proposition 3, and in line with Bischoff and Siemers (2013, p.174), a lower expected quality of outside actions leads to less populist policies as the incumbent needs to build up valence to compensate for such poor actions.

On the other hand, the effect of the fraction of control, k, is different from Bischoff and Siemers (2013, p.174). An increase in the fraction of control has an impact on the choice of the degree of populism of the policy platform. This impact has two channels of effect, one operates through the politician's policy payoff, and the other through her perceived valence by the voter.

Thus, given that the fraction of control increases, the incumbent faces two effects:

1. The "populism effect": The incumbent has a higher control over the policy payoff, so she can increase populism without damaging her policy payoff. The incumbent also has a higher control over valence, so she can increase populism in order to build up more valence.

2. The "counter-populism effect": The incumbent has a higher control over the policy payoff, so she benefits more from the results of her policy, and therefore, she decreases populism. The incumbent also has a higher control over valence, so she can decrease populism without damaging her valence.

When the fraction of control, k, increases, the combination of these two effects allows for the following conclusions:

- Obviously, if the "populism effect" dominates the other effect, populism will increase.

- The relative importance of the "counter-populism effect" in comparison with the "populism effect" increases, when any of the following situations occur:

  i) The higher the benefit from holding office (Z); or the lower the fraction the politician assigns to the results she gets once in office (m); or the lower the payoff from applying the good policy (W).

  That is, when the fraction of control (k) increases, all of these variations in Z, m and W will increase the relative importance of the policy payoff over the benefits of holding office.

  ii) The higher the expected quality of outside agents (lower $E(\beta^{ex})$).

  When the fraction of control over the PM's policies (k) increases, she receives more from her own actions, but, on the other hand, she obtains a lower payoff $[(1-k)(1-E(\beta^{ex}))]$ and a lower perceived valence from the external actions $[v(1-k)(2E(\beta^{ex}))]$. With a lower $E(\beta^{ex})$, the external actions provide the politician a higher policy payoff and a lower perceived valence. Thus, with the increase of the fraction of control the politician will be led to compensate for the loss of policy payoff resulting from the external actions. Therefore, the politician will decrease populism.

3.4.3 Penalization due to deviations from the campaign promises

If politicians seeking office have made promises, later they may as well have an incentive to deviate from the announced policy platform. A PM in office running for reelection may be tempted to do this under the conviction that voters' beliefs about her policy position or her capacity as a politician may change, favouring her reelection. However, such a deviation from promises may be harmful to an office holder who is seeking reelection (Austen-Smith and Banks (1989), Wittman (1990) and Aragonès et al. (2007)). The voters can perceive this deviation as a lack of character of the politician and her chances of reelection may decrease.

In this extension, we do not derive campaign promises and we just consider this as an exogenous effect. For this purpose, we extend the model changing stage 0:

- *Stage 0*: An elected politician undertakes a policy project known to the voters. The politician will take into account that, before the first election, she had promised to the voters that she would implement a given β^* of elements of the bad policy, with $0 \leq \beta^* \leq 1$. The reelection probability decreases by g times the absolute value of the deviation, that is, $g\left|\beta - \beta^*\right|$ with $g > 0$. g represents the effect of the belief that the politician lacks character and, therefore, it is a measure of the cost of the deviation.

Thus, the politician's payoff reads:

$$\begin{aligned}\Theta\left(\beta\right) = &\left(1-m\right)Z + m\beta W_1\left(\eta_b\right) + \\ &+ \rho\left[\frac{1}{2} + \left(f+v\right)\left(2\beta - 1\right) - g\left|\beta - \beta^*\right|\right]\left[\left(1-m\right)Z + m\left(1-\beta\right)W_2\left(\eta_g\right)\right]\end{aligned} \tag{3.18}$$

In the spirit of the paper, it assumed that an increase in β leads to an increase in the reelection probability, so $2\left(f+v\right) - g > 0$.

Proposition 4. *Suppose that there is a cost to the PM of deviating from campaign promises given by g:*

(i). When she is less populist than promised, an increase in the costs of deviating from the policy platform promised will lead to a more populist platform applied: $\dfrac{\partial\beta}{\partial g} > 0$ if $\beta < \beta^*$.

(ii). When she is more populist than promised, an increase in the costs of deviating from the policy platform promised will lead to a less populist platform applied: $\dfrac{\partial\beta}{\partial g} < 0$ if $\beta < \beta^*$.

Proof. See Appendix 3.A. □

When facing an increase in the costs from deviating, the incumbent will always converge to her promised policy platform in order to decrease her costs of deviating.

3.5 Conclusion

The model deals with the choice of policies by an incumbent and intends to include in the analysis the down-up problem in conjunction with biased beliefs and retrospective voting. There are several conclusions possible. First, it is shown that although in general the policy choice is mediocre, there is the possibility politicians may prefer good long term policy platforms even when those policies have bad short term results. For that to happen, the politician must be in some degree a "policy success-seeker" and the perceived benefits of some magnitude. Second, the fact that incumbency gives an advantage for reelection will induce politicians to choose better policies. Third, the fraction of control over the economic outcomes can either decrease (or increase) populism, if the "counter-populism" effect dominates (is dominated by) the "populism effect"; moreover, a high expected level of populism from outside agents improves the quality of policies chosen by the incumbent. Fourth, higher costs of deviating from campaign promises will lead to a convergence to the PM's promised policy platform, in order to decrease her costs of deviating.

Summing up, the main conclusion of this work is that the possibility of a good policy being chosen and implemented does not depend on some self-correction mechanism as in Bischoff and Siemers (2013), or on external incentives as in Gersbach (2004) and Müller (2007). It requires that two elements are present, first, that the politician is to a certain degree motivated to apply a good policy (m) and, second, that the benefits (W) she perceives are sufficiently high.

As to the role of incentives, an aspect discussed in the literature is the importance of wages as an element of compensation from holding office (Z). According to our model, the wage will not have a role in the first period. However, in the second period, a wage will make the incentives from holding office higher, so it will induce the politician to apply bad policies in order to build up valence and get reelected. In any case, the model is not immediately amenable to study how the magnitude of wages affects the quality of candidates or their motivations; this can be, however, a topic for further research. A related element concerns the possible existence of expectations of obtaining positions in the private sector or

in organizations after leaving office in the future.

Both these benefits from holding office, although of very different nature, will affect the relative sizes of the "populism" and "counter-populism" effects, as in Proposition 3. Given that those features are characteristics of the institutional set-up of democracies, a study of the effects of external benefits in different political systems would be of interest.

A topic for further research would be deriving campaign promises. In this model, promises are dealt with as an exogenous effect, but the campaign promises could be derived in a model of competition between politicians to get elected to office in an earlier stage of the game.

Another topic would be to extend the scope of the model in order to include not only the expected action beyond the control of the government, but also the action itself. If the expectation would not be accurate, we could think of the government making mid-term changes in its policies, with consequence on the reelection expectation.

Chapter 4

Paths to Power and Ministers' Durability: The Portuguese case

4.1 Introduction

This chapter addresses the question of durability of individual ministers in a given government and carries out an empirical investigation about the Portuguese case. Ministers are individually accountable as they play a vital role in defining and applying policies. Their duration in office matters in several aspects and one of those is the ability to implement policies: if turnover is very high, the ability to implement good policies will be low as the minister will not have the time needed to do so; if turnover is very low, the motivation to do the best for society will also be low. Turnover of individual ministers in a government may be determined by several factors, namely: end of government; death; illness; personal error; departmental error; sexual scandal; financial scandal; poor personal performance; policy disagreement; policy criticism from outside government (see Fischer et al., 2012, p.506). We raise the possibility that the paths to a ministerial position may explain turnover.

The studies that analyse paths to power in Portugal (Tavares de Almeida and Costa Pinto, 2002; Costa Pinto and Tavares de Almeida, 2009) emphasize as a special feature of the Portuguese democracy from 1974 on, the significant number of ministers without political ex-

perience (which the authors refer as independents). Their explanation for this fact points to three factors: (i) the attempt to have a higher technical legitimacy of the executive and to counterbalance the bias against the political class; (ii) the weak penetration in civil society of the political parties, that is to say, the apparent reluctance of important people in civil society to belong to political parties; (iii) the PM's discretion.

As an important finding of their work, they point out the following:

> A significant proportion of those who ascend to executive offices are drawn from the universities or managerial positions, as specialists with high academic credentials and/or technical competences. This strong presence of non-political ministers is also related with the attempts made by parties to promote their "openness towards civil society" in a political culture with strong feelings against the "political class", as well as with the increasing complexity and technocratic nature of policy-making. Although with less autonomous political power than party leaders, "independents" became so important to "quality" of cabinets that prime ministers think twice before sending them back to "civil society". (p.156-7)

In particular, Costa Pinto and Tavares de Almeida (2009, p.155) assert that there is a significant number of independent ministers, who are maintained whenever a reshuffle or a dismissal takes place.

However, a survival analysis has not been carried out and, therefore, the authors' conjecture has not been thoroughly studied and, more crucially, statistically validated. This is the goal proposed here, to enquire whether paths to power matter for the survival of ministers. For this purpose, an adequate data base was constructed and a survival analysis was carried out in order to study whether paths to power actually explain the survival of ministers and, if they do, how do they compare with each other.

The discussion is framed in terms of the incentives of the PM and the ministers that impact on the dismissal of a minister from the government; the relation of paths to power with the durability of a minister in government can be explained on the basis of the *ex ante* informational asymmetry and of the moral hazard problem, which are discussed in section

4.3.

The main conclusion of the empirical analysis is that the paths to power do not affect ministers' durability, which means that the two effects previously mentioned may cancel each other. Nevertheless, it is possible to conclude that ministers who attained power through the "Party" last longer than "Parliamentary" ones.

This work will be organized as follows: section 4.2 will present a literature revision; section 4.3 the theoretical framework; section 4.4 the data and the empirical strategy; section 4.5 the descriptive analysis of the data; section 4.6 theThe definition of paths to power is based on Blondel (1985)'s book *Government and Ministers in the Contemporary World* determinants of ministerial hazard rates; and finally section 4.7 concludes.

4.2 Literature revision

The definition of paths to power is based on Blondel (1985)'s book *Government and Ministers in the Contemporary World*, where the most common routes to ministerial office are presented: "Civil Service" as an internal promotion, "the Parliamentary-*cum*-Party" route, the "pure Party" form, the "Military Career", and "Others" as an external promotion (see Blondel, 1985, ch.3).

"Civil Service" or "Public Service" is one of the oldest and natural methods of nominating ministers, given the familiarity with the government problems, but in recent years this path has tended to become more roundabout, first being nominated to a political party and then to the government. Thus, it has become a grey area nowadays and, therefore, further discussion of this aspect will be necessary for the purpose of empirical treatment.

The "Parliamentary-*cum*-Party", hereafter named "Parliamentary", is related with the influence of the legislature and is mostly a characteristic of prime ministerial regimes, that is, a regime where the Prime Minister is the political agent with more power. In this type of path, the work for the party is important to obtain a parliamentary seat and from there on to become a political agent of ministerial calibre.

The "Pure Party" regards someone who arrives in office through work for the party and

without even having been in parliament.

The "Military Career" should be considered widespread around the world, although it has an irregular character in parliamentary democracies. This path will not be taken into consideration here, since this is residual in Portugal.

Finally, "Others" include four types of people: legal professions; professors, teachers and writers; journalists; businessmen. These are nominated essentially for two reasons: their expertise and/or for being well-known to the public. This is referred to as the "Independence" path, since they do not belong to a party.

Regarding studies of paths to power in Portugal two are very important (see Tavares de Almeida and Costa Pinto, 2002; Costa Pinto and Tavares de Almeida, 2009). The former presents a description and characterization of the several regimes in Portugal from 1851 to 1999 in terms of the number of cabinets and ministers, the cabinet duration, the mobility and durability of ministers. It also focuses on the social background of ministers and their political paths to the cabinet, that is, it statistically presents the previous political or parliamentary experience of ministers. The latter continues this line of research, concentrating on the Second Republic (from 1974 to this day). In this study, Costa Pinto and Tavares de Almeida (2009) devote a section to the termination of governments and de-selection of ministers where they describe the causes of ministerial de-selection. They assert that there is a significant number of independent ministers (ministers without political experience) who are maintained whenever a reshuffle or de-selection takes place which, in their opinion, indicates that party pressures do not restrict the PM (p.155).[1]

Addressing the same subject for other countries as Tavares de Almeida and Costa Pinto (2002) and Costa Pinto and Tavares de Almeida (2009) did for the Portuguese case, some authors show that parliamentary and/or political experience have a positive impact on the ministerial tenure (for Germany see Kaiser and Fischer (2009), and for Sweden see Bäck, Persson, Vernby and Wockelberg (2009, p.173-74)) and others attain the opposite conclusion

[1] "... data from 1976 to 2005 show that only six out of a total of 63 de-selected ministers were independent and/or specialists without a former political career - i.e. less than one-tenth. This suggests that the leadership power and autonomy of prime ministers, even in critical junctures, is not necessarily constrained by pressures or demands" (Costa Pinto and Tavares de Almeida, 2009, p.155).

(for Canada see Kerby (2010), for UK see Berlinski et al. (2007) and for ministerial exits during a term in Spain see Jerez and Real Dato (2005, p.158)).

Nevertheless, to the best of our knowledge, career paths to become a minister have not been yet adequately included in the duration studies. There has been recent interest in the individual ministerial durability as a branch of the traditional literature on government durability in parliamentary democracies.[2] Actually, Huber and Martinez-Gallardo (2008) show that the stability of individual ministers is only loosely related to the stability of cabinets. Moreover, recent studies have focused on the institutional framework of ministerial tenure with attention to the institutional and political characteristics of the environment (for a survey see Fischer et al., 2012).

Let us now present the difference between duration and durability in the literature. Duration analysis consists in measuring the length of time ministers are in office. Durability analysis consists in identifying which are the factors that affect the duration of a political agent and explaining how these factors operate in the survival of the political agent in government or, conversely, in his dismissal from government. Durability is a property inherent to the minister and depends on his personal characteristics as well as on the context he is in, namely the political regime and the institutional environment. Different counting rules can be used, with no definition being universally accepted as correct in the literature. Fischer et al. (2012, p.508) discuss the options and their opinion is that duration studies should consider "uninterrupted ministerial tenure across various governments as one spell, whereas most studies on durability are more rigorous and operate with a definition of a 'ministerial spell as the length of time which a minister serves in a given administration'(Berlinski et al., 2007)". In fact, Berlinski et al. (2007), who study the factors that influence the durability of ministers in government, opts for the latter definition. On the other hand, Jäckle (2013) assumes the former definition as he tries to understand how long a minister is able to remain in cabinet, using personal and political characteristics. Finally, Huber and Martinez-Gallardo (2008) "study how cabinet duration (defined by terminal events) and cabinet turnover (defined by the replacement of individuals within cabinets) are distinctive elements of government sta-

[2]For surveys on government durability, see Laver (2003) and Grofman and van Roozendaal (1997).

bility in parliamentary systems" (p.178); that is the reason why they use a competing risks framework, as they study if these failures have different dynamics.

4.3 Selecting and firing a minister: a principal-agent theory

The theoretical framework adopted here is related to the principal agent theory in parliamentary democracies (see Strøm, 1985; Strøm et al., 2003; Besley, 2006, for a wider analysis). In this line of thought, turnover is viewed as a result of informational problems (see Huber and Martinez-Gallardo, 2008).

The principal, the PM, gets a benefit from being in office. She will choose agents, ministers, with the objective to win the next election. Voters can value several characteristics of the government and, for the purpose of this exposition, voters are assumed to value a good performance by the government. The performance of the government will be a function of the PM's performance and of the ministers performance. A minister's good performance will be an increasing function of the quality of his actions and of a random variable. On its turn, the quality of his actions will be higher, the higher his competence.[3] The PM does not have complete information about competence of ministers *ex ante* neither can fully monitor his actions as a minister. Thus, there are two problems, one is an *ex ante* information asymmetry and the other the scope for moral hazard of the minister that has been appointed.

As to the *ex ante* information problem, the PM must collect information and scrutinize the candidates in the light of her objectives and of the objectives she defines for her government. Given that the informational asymmetry cannot be solved entirely, the PM potentially faces an adverse selection problem, that is, the possibility that less competent candidates make themselves more visible or devise ways to be more noted by the PM in order for her to consider appointing them in office. The adverse selection problem fully considered is important but it is our understanding that, for the scope of our description of the circumstances influ-

[3] An alternative way of explaining ministers' performance could be based on the variables competence and effort. As long as the results of effort is increasing in the degree of competence of the minister, we can simplify and assume only the variable competence; this more descriptive way of formalizing behaviour would be equivalent to the more simple and direct way described here.

encing turnover of ministers, the analysis should be restricted to the existence of uncertainty only, that is, concentrate on the actions of the PM and disregard the possible actions of the candidate ministers. We are going to put ourselves in the perspective of the PM and have in mind her goals. The PM's first immediate problem stems from uncertainty about which type of minister is being selected, a competent one or an incompetent. This *ex ante* informational problem is higher, the greater the uncertainty about "which ministers will perform well, and on incentives the PM has to engage in *ex ante* screening before portfolio allocation decisions are made" (Huber and Martinez-Gallardo, 2008, p.172).

In short, the *ex ante* informational asymmetry is bigger, the less the PM knows about the competence of the ministerial candidates. Therefore, the larger is her risk regarding their competence and, the higher is the expected turnover.

With respect to the moral hazard problem, it is conditioned by the evaluation of the conduct of a minister in office and then by the decision to fire him. The problem results from actions taken by the selected minister which are contrary to the PM intents, raising the potential for misalignment of interests with relation to the different types of paths to power. A "Party" or "Parliament" minister, on one hand, can be aligned with the PM since their objectives are also keeping the party in power. On the other hand, these types of ministers may have interest in obtaining more power within the party, and with that purpose, may take actions that go against the interest of the PM. On the contrary, an "Independent" minister does not have his own political agenda and therefore he may be easily aligned with the PM; however, he also does not have so much interest in keeping the party in power and thus may pursue his own goals or agenda. Concluding, the more difficult it is for the PM to control the actions of ministers, the higher is the moral hazard problem, and so the turnover is higher as it was shown by Kam and Indridason (2005) for parliamentary democracies.

For the purposes of the analysis concerning the decision of the PM to de-select a minister in office, the only factor that matters for her is the observation of the under-performance of an appointed minister. When the possibility is considered that the PM is faced with a bad performance of her minister, the probability of this occurring and of eventually firing him can be analysed in terms of two elements: the contribution of the *ex ante* informational

asymmetry and the moral hazard problem to the event of a bad performance by the minister, on the one hand, and the restrictions she faces when contemplating the decisions to select or fire him, on the other hand. As to first element, the fact is that the minister is currently in office and the *ex ante* informational problem is past, but nonetheless it influenced the conditions under which the decision of the PM was made.

In short, a bad performance by the minister may result from three factors: a bad selection, a sub-par quality of actions by the minister, or a random situation. But the decision of the PM to eventually fire a minister that has shown a bad performance must consider as well the restrictions she faces in firing different types of ministers, and those she has faced when selecting him.

Given the setup described, the durability of a minister will be analysed in an informational framework taking into consideration, first, the process of selection of a minister with a given set of restrictions and, second, the decision to fire him under the moral hazard problem with another set of restrictions. These elements will be related with the characteristics of the minister, in particular, the different paths to ministerial position: "Parliamentary", "Party", "Public Service" and "Independence".

Firing

Contemplating the decisions of the PM to fire a minister, let us first discuss the moral hazard issue. To begin with, the PM cannot fully identify the reason for the bad performance of the minister and, yet, has to decide whether to keep him or not. Moreover, when considering to take this decision, she faces restrictions posed especially by her party or by deputies of her party in parliament. Given this context, the different paths to power these ministers had are an important consideration in the analysis of the durability of ministers.

On one hand, it seems reasonable to posit that "Parliamentary" or "Party" paths to power should have effects on turnover of approximate magnitude. However, parliamentary groups do not have a powerful position within the parties' internal structure (see Tavares de Almeida and Costa Pinto, 2002, p.32)), which may indicate that "Parliamentary" ministers are more

susceptible to be fired than “Party” ministers.

On the other hand, the PM has more constraints to fire a minister who attains power through the “Parliamentary” or “Party” paths comparatively with the “Public Service” or “Independence” paths, since the PM may face strong pressures or conclude it is more convenient for her to maintain a minister who has a higher degree of proximity to the party.

Additionally, the PM has some constraints to fire a minister coming from the “Public Service”, as he might be connected with her party, than to fire a minister who reaches power through “Independence”. In fact, and as a result of what was previously argued, in case of an “Independent” minister the PM faces less constraints to let him go than in case of a non independent minister.

In conclusion, under the moral hazard problem and given the restrictions just described, a lower turnover from the “Party” path should be expected, followed by the “Parliamentary” path, “Public Service” path and then by the “Independence” path.

Selecting

Now, let us address the other issue, raised by the *ex ante* informational asymmetry regarding the competence of the candidate ministers and the degree of scrutiny candidate ministers are subject to by the PM in order to mitigate her lack of knowledge.

On one hand, between the “Parliamentarian” and the “Party” paths to power, it is not clear-cut which one is more scrutinized and therefore about which type more is known about competence. First, a minister who is or was in parliament is subject to more scrutiny due to his parliamentarian work and, second, a minister who is not or was not in parliament but is connected with the party may face higher competition in order to be selected as minister, thus, being more scrutinized.

On the other hand, a minister that attains power through the “Parliamentary” or “Party” paths is less scrutinised than a minister who attains power through other paths, namely by the “Public Service” or “Independence” paths. As he belongs to the party it is not necessary to assess his competence as thoroughly as if he did not belong; and, in any case, this type of

minister might be imposed by his own achievements or connections.

Given that a minister who attained power through the "Public Service" is selected to a specific job, usually connected with the office he is chosen for, his performance on it has been assessed, and the PM can know quite well who she is hiring. Thus, this type of minister should be more scrutinized that "Parliament" or "Party", as mentioned. However, we should expect this type of minister to be less scrutinized than a minister that reaches power through "Independence", since not seldom the nomination to a "Public Service" position is made to please parties or influence groups and the same may happen in his subsequent nomination to minister. Actually, as an "Independent" minister is defined as someone who is not connected with the party and that may be not close to the PM (either because he is not personally known by the PM or because he is ideological somewhat distant), it should be expected that the *ex ante* screening effort should be greater for a minister who is independent than for another who is not.

A note may be useful in order to clarify the relation between the degree of *ex ante* information asymmetry faced by the PM in his choice of a minister and the effort she engages in, in order to mitigate her information needs about different possible ministers to that office.

As is obviously expected, the PM will have more information about a "Party" minister than about an "Independent", especially regarding the political and personal characteristics.[4] Now, if she considers for a given ministerial position one from the "'Party" path and another "Independent", it can be expected, as a consequence, that the intensity of effort she devotes in gathering information will be much greater for the "Independent". This way, she will mitigate the smaller proximity to the "Independent" by collecting a larger amount of information about a minister from this path.

The informational requirements regard not only the political and personal characteristics but also the specific abilities and knowledge required for the office considered. Some elements enter the picture in this respect. First, the gap in the information between the two types is not so large as we might think. One reason is that the "Party" minister's abilities

[4]In order to simplify the exposition, we use "Party" applying to both "Party" and "Parliament"; also, in general, "Public Service" is an intermediate path and it will be omitted here.

for the specific ministerial position may well be hard to figure out by the PM. The other is that, even though it is highly reasonable to expect that an "Independent" is in most circumstances valued for his ability and experience in the field, it might happen that someone who is seen as "Independent" has unobservable connections to the party interests. These two aspects in conjunction, that competence for a specific job is hard to appraise, and that being an "Independent" does not perfectly signal competence, will mean that understanding the PM's screening effort is not so straightforward as previously said.

Second, if a "Party" minister may be valued for his ideological proximity or forced on the PM by the party, the choice of an "Independent" may involve more risk within the "Party". Therefore, in order to control for this higher risk, the PM has stronger incentives to devote more effort in the evaluation of the general characteristics and of the specific ability of the "Independent" for the office.

In this explanation, a distinction was made between two moments, one when names are suggested as potential ministers and another after the PM has concluded her screening effort and is ready to ponder her choice of minister. The degree of uncertainty is particularly diminished but not totally solved. Our contention is that, as regards competence, the degree of scrutiny of an "Independent" is higher than for a "Party" minister and, as a consequence, that the *ex ante* information asymmetry problem is lower for the "Independent" path. Bearing in mind the discussions presented, three main arguments are reasonable: one, that the "Party" advantage regarding information is not so large as could be thought, given that *ex ante* competence is not easily appraised; another, that the PM has strong incentives to carry out a thorough scrutiny of an "Independent", given the party pressures and the setbacks she may endure in the case of a failure of the minister; and, finally, that the scrutiny of an "Independent" may be facilitated in case he is a specialist or a professional with proven ability in the field, which is quite frequent for the choice of "Independents".

Let us conclude now, considering the four paths to power. In order to mitigate the *ex ante* information asymmetry and given the restrictions previously explained, the PM should have collected more information and obtained more knowledge about the competence of the "Independent" minister, followed by "Public Service", and then by he "Parliamentary" or

Table 4.1: Sign of the effects of the *ex ante* information and moral hazard problems on turnover, by Paths to Power

Path to Power	*Ex ante* informational asymmetry	Moral Hazard
Party	$++?$	$---$
Parliamentary-*cum*-Party	$++?$	$--$
Public Service	$+$	$-$
Independent	base	base

The "+" sign means that there is an expected increase in turnover in comparison with the reference base; the "-" sign means that there is an expected decrease in turnover in comparison with the reference base.

"Party" minister. As a result, we should expect a higher competence from the minister about whom the PM knows more about, which allows for the prediction of a higher turnover from the "Parliamentary" or "Party" paths, followed by the "Public Service" path and then by "Independence" path.

Finally, the fact that ministers are in office allows for a stronger prediction about the expectation of the competence of different types that the PM had at the time she appointed them. If a PM has chosen an "Independent" despite the restrictions she faces, the case will be that his competence must be sufficiently high in order to compensate for the opposite forces in operation.

The arguments in this section are summed up in table 4.1, assuming that the "Independent" path is the reference base.

4.4 Data, empirical strategy and survival model

First of all, in order to understand the arguments as well as the empirical treatment, it is important to present a few main characteristics of the Portuguese political system regarding the nomination and dismissal of ministers by the PM:[5]

- The number of terms a PM can be appointed is not restricted. A legislature lasts four years.

[5]For a complete historical survey of the political circumstances regarding the period of 1974-2011, covered in this study, see Costa Pinto and Tavares de Almeida (2009).

- The number and distribution of portfolios is decided by the PM. Ministers can be appointed by the PM without any particular restrictions. However, as to "Independents" the case is that they can be appointed to the government as ministers but cannot run in elections for deputies on their initiative; in fact, parties have the monopoly of parliamentary representation.

- Equally, the PM has discretion as regards cabinet reshuffles and de-selection of individual ministers, even though formally it is the President of the Republic who nominates ministers and junior ministers (usually in charge of a sub-portfolio of a minister's office; in several political systems they are referred to as "secretaries of State").

- Parliamentary groups do not have a powerful position within the parties' internal structure (see Tavares de Almeida and Costa Pinto, 2002, p.32)).

- In the period covered, the political parties to which PMs belonged are: Partido Socialista, a member of the Group of the Progressive Alliance of Socialists & Democrats in the European Parliament; and Partido Social Democrata, a member of the European People's Party.

- The average number of ministers per government is around 20.

Regarding the data set, it was necessary to collect a new one. It includes every Portuguese government from 1976 to June 2011, except the ones formed by presidential initiative, governments formed between 1978 and 1980 by presidential initiative were excluded, since they do not allow to study the relationship between the PM and her ministers. The duration of ministers was obtained through the government site.[6] Regarding the other features, information was gathered from several sources: biographical dictionaries, official directories, newspapers, published CV, etc. We will have 302 minister's spells of 202 individual ministers.

Paths to a ministerial position fall into four types, as mentioned above. For empirical purposes, a more detailed definition is necessary:

[6] http://www.portugal.gov.pt/pt/o-governo/arquivo-historico/governos-constitucionais.aspx

(i) A minister will be considered to attain power through "Parliament" if he has been previously elected as a deputy; notice that if someone is elected and is appointed as minister in that legislature, we opt to classify him in this type even though he may not have been effectively a deputy.

(ii) A minister will be considered to attain power through the "Party" if he is strongly connected with it. There are several situations where we consider that a minister is connected to the party:

- he is a party member;
- he has run for the party in an election;
- he has strongly and publicly demonstrated support for the party's candidates or policies.

(iii) A minister will be considered to attain power through "Public Service" if he has previously worked in the public service, that is, if he was employed in any government agency.

(iv) Finally, a minister will be considered "Independent" if he does not belong to any of the "Parliament", "Party" or "Public Service" paths. Our notion of "Independence" is residual and it is not related with any sort of particular experience. Thus, the definition here is not exactly coincident with the one in Costa Pinto and Tavares de Almeida (2009) as they define an "Independent" minister as someone who had no experience as party leader, mayor, deputy or junior minister.

The definition of the variables can be seen in table 4.2.

Regarding the empirical strategy, as we are studying how paths to power affect the ministerial durability in Portugal, the minister spell considered will be the length of time that elapses from when a minister enters the government until he leaves or the government terminates. As to the government, it ends when a new government is formed. When the termination of a minister is due to a government termination (end of legislature or government failure),

Table 4.2: Variables: Paths to Power

Variables	Designation	Definitions
Parliament	**pp**	Dummy variable 1 if the minister attained power through Parliament-*cum*-Party; 0 otherwise.
Party	**p**	Dummy variable 1 if the minister attained power through the Party; 0 otherwise.
Public Service	**sp**	Dummy variable 1 if the minister attained power through the Public Service; 0 otherwise.
Independent	**i**	Dummy variable 1 if the minister is considered Independent; 0 otherwise. In the estimation, this variable is dropped in order to avoid collinearity.

death or illness, this event is not considered a failure for our empirical analysis. Statistically, this is accomplished by the right censoring of data.

In order to assess ministers' durability, the hazard rate for each minister in government at any given point in time t is estimated, that is, the probability that if a minister has survived to t, he will leave the government in the next instant (in other words, he will fail). The hazard rate is the ratio between the failure rate and the survival function.

Besides, as the distribution in time of the risk of exiting the government is not clear, the statistical analysis uses the semi-parametric Cox Proportional Hazard models (Cox, 1972), which enables to construct the covariates to ministerial duration without the need to make specific assumptions about the shape of the hazard function.[7]

As the information is organized in multiple record data, the observations for the same subject are not conditionally independent (Box-Steffensmeier and Jones, 2004). This effect produces incorrect standard errors. In order to address this problem, and given the fully parametric setting established here, we use Lin-Wei standard errors clustered on each min-

[7]The use of Ordinary Least Squares causes problems as a result of data censoring and it violates the assumption of normally distributed error terms (see Box-Steffensmeier and Jones, 1997).

ister (Lin and Wei, 1989). This procedure relaxes the assumption that observations for the same minister are independent, and produces a robust variance-covariance matrix and correct standard errors without changing the coefficient estimates.

We define t_{ig} as the duration of minister i in government g where a minister starts a new ministerial spell every time he enters government independently of having had spells in previous governments. Thus, we will adopt the following empirical specification in the proportional hazard format:

$$h_{igt} = \lambda\left(t_{ig}\right).\exp\left[\alpha_1 p + \alpha_2 pp + \alpha_3 sp\right], \tag{4.1}$$

where $\lambda\left(t_{ig}\right)$ is the minister's baseline hazard at t_{ig} (see Berlinski et al., 2007, p.248).[8] For the definition of variables p, pp and sp, see table 4.2.

It may be the case that the duration of a minister in a government depends on his personal characteristics. This is dealt with by considering other variables in the specification, as displayed in table 4.3.[9] As well, the durability of ministers may depend on the initial features that characterize the government. Thus, we also add to the specification some political characteristics of the government in which the minister belongs, as presented in table 4.4.

In conclusion, adding the individual and governmental characteristics, the proportional hazard rate model becomes:

$$h_{igt} = \lambda_{PM}\left(t_i\right).\exp\left[\alpha_1 p + \alpha_2 pp + \alpha_3 sp + \beta_0 X_{ig} + \gamma_0 Y_g\right], \tag{4.2}$$

where $\lambda_{PM}\left(t_{ig}\right)$ is the minister's baseline hazard at t_i in a given Prime Ministerial term, X_{ig} a vector of the individual characteristics (see table 4.3) and Y_g a vector of the government characteristics (see table 4.4).

[8] See also Berlinski et al. (2012)

[9] Other characteristics were considered in the regressions, such as, holding a PhD, if the minister has studied in Porto or Lisbon, profession and age, but none showed significant explanatory power of ministers' durability.

Table 4.3: Personal characteristics of the ministers

Variables	Definitions
Experience as Minister (**Em**)	Dummy variable 1 if the minister was minister in any government but the previous; 0 otherwise.
Experience as "Junior Minister" (**Es**)	Dummy variable 1 if the minister was "junior minister" in any government but the previous; 0 otherwise.
Served as Minister in the previous government (**Sm**)	Dummy variable 1 if the minister was a minister in the previous government; 0 otherwise.
Served as "Junior Minister" in the previous government or in the current government (**Ss**)	Dummy variable 1 if the minister was a "junior minister" in the previous government or in the government to which he was nominated; 0 otherwise.

4.5 Descriptive analysis

As table 4.5 shows, each minister has lasted on average 648 days (more than 2 years), but the standard deviation is high, which means that ministers' duration has varied a lot. Actually, the maximum amount of time that a minister spent in a government was 1689 days[10] and the minimum 14 days.

It can also be concluded that about 45% of ministers have attained power through the "Party", being followed by 31% of ministers attaining power as "Parliament", 18% as "Independents" and 6% as "Public Service". This means that PM most frequently selects ministers that have some sort of connection with the party. Actually, in a representative democracy where parties have the monopoly of parliamentary representation as is the case in Portugal, it is reasonable to expect the PM to give priority in her choice of ministers to party members. It can also be noted that ministers who attained power through "Public Service" are a smaller portion, as expected.

In order to carry out the analysis, we consider as control variables both the personal and

[10]The XVII government, with PM Sócrates, lasted from Sept. 12th, 2005 to Oct. 26th, 2009, which was above the standard 4 years duration of the legislature.

Table 4.4: Political characteristics of the governments

Variables	**Definitions**
Percentage of parliament support (**Maj**)	The percentage of deputies that support the government at the beginning of the legislature.
Minority (**Min**)	Dummy variable 1 if the minister belongs to a supporting minority party, in case of coalition; 0 otherwise. In the period under analysis, coalition governments were supported by two parties.
Parliamentary support	4 dummy variables that represent the combinations of parties that support the government (Partido Socialista (**GPS**); Partido Social Democrata (**GPSD**); Partido Social Democrata and Centro Democrático Social (**GPSDCDS**); and Partido Socialista and Partido Social Democrata (**GPSPSD**)). When we condition on this variable in the regression analysis we use 3 dummies, in order to avoid collinearity.
Percentage of the minority party that supports the coalition (**Pmin**)	The percentage of deputies of the minority party that supports the government at the beginning of the legislature
Term	Term currently being served by the PM. Until today, the maximum amount of terms in the period under analysis in Portugal was three. Thus, when we condition on this variable in the regression analysis, we only use two dummies.
Prime Minister	8 PM identifiers. When we condition on this variable in the regression analysis, we use 7 dummies.

Table 4.5: Summary statistics

Variable	Obs	Mean	Std. Dev.
Days in office	302	648,24	424,07
i	302	0,18	0,39
p	302	0,45	0,50
pp	302	0,31	0,46
sp	302	0,06	0,24

government characteristics. Considering the personal characteristics only, table 4.6 shows that ministers with some sort of previous experience in government attain power mainly through the "Party" path. In fact, while for the complete set of ministers 45% attained power through the "Party" path, for different subsets of ministers with previous experience in government, the share of the "Party" path varies from 58% to 68% (60% of those who have experience as minister in other governments either than the previous; 68% of those who have experience as "junior minister" in other governments either than the previous; 58% of those who were ministers in the previous government; 58% of those who were "junior ministers" in the previous or in the actual government.) Moreover, if we add the "Party" and "Parliament" paths, the same trend is clearly apparent.

This comes as a consequence of several features of the political system: the insufficient power from parliamentary groups within the parties' internal structure (see Tavares de Almeida and Costa Pinto, 2002, p.32); the residual value of the "Public Service" path; and also the low presence of "Independent" ministers with previous experience in government (that is, experienced ministers). Actually, in relative terms, we can see that only a small fraction of experienced ministers are "Independent"; this might either be explained by the small percentage of "Independent" ministers selected to governments or by the small percentage of those ministers who are re-selected. Although in Portugal there is a significant presence of "Independent" ministers, the fact is that "Independents" tend not to be re-appointed in future governments, what may mean that they will not be able to build up their political careers. Indeed, just 8% of ministers who have been promoted from "junior ministers" within the same or from the previous government are "Independents". The opposite occurs for ministers who attained power through the "Party" as this type of ministers represent 58% of ministers who had also served as "junior ministers" in the current or in the previous government (which compares to the 18% of "Independents" and 45% of "Party" ministers in governments).

Table 4.7 addresses the distribution of paths to power for each of the PMs in office. We can see that Prime-Minister Sócrates made a strong bet on "Independent" ministers, which happened especially in his first term. We can also find out that PSD prime-ministers as Barroso, Sá Carneiro and more strongly Cavaco Silva have preferred to appoint ministers who attained

Table 4.6: Personal characteristics of the ministers and Paths to Power

	Nr of ministers	Distribution of Paths to Power			
		i	p	pp	sp
Em	65	0,14	0,60	0,25	0,02
Es	80	0,10	0,68	0,20	0,03
Sm	74	0,11	0,58	0,26	0,05
Ss	49	0,08	0,58	0,31	0,03
All	302	0,18	0,45	0,31	0,06

Table 4.7: Prime Ministers and Paths to Power

Government	Nr of ministers	Distribution of Paths to Power			
		i	p	pp	sp
Sócrates	37	0,41	0,27	0,22	0,11
Santana	19	0,32	0,37	0,11	0,03
Barroso	22	0,09	0,55	0,23	0,14
Guterres	52	0,29	0,23	0,44	0,04
Cavaco	64	0,13	0,77	0,06	0,05
Soares	58	0,12	0,50	0,38	0,00
Balsemão	36	0,11	0,33	0,47	0,08
Sá Carneiro	14	0,00	0,50	0,43	0,07
All	302	0,18	0,45	0,31	0,06

power through the "Party". This is particularly true for Cavaco Silva's governments (which are PSD governments) where 77% of the selected ministers have attained power through the "Party". However, these governments had few ministers (only 6%) who attained power from "Parliament". The inverse happens for governments supported by PS where "Independents" and "Parliament" have a high preponderance. "Independents" represented 28% and "Parliament" 37% of the ministers (see table 4.8).

Finally, according to table 4.9 the representation of paths is similar in the first and the second terms; regarding the third term no conclusion is allowed, given that it only happened once (Cavaco Silva's: 1985-87; 1987-91; 1991-95).

As to survival profiles, figure 4.1 presents the Kaplan-Meier survivor function applied to

Table 4.8: Parties in governments and Paths to Power

Government	Nr of ministers	Distribution of Paths to Power			
		i	p	pp	sp
PS	126	0,28	0,30	0,37	0,05
PSD	64	0,13	0,77	0,06	0,05
PSD/CDS	91	0,11	0,41	0,38	0,10
PS/PSD	21	0,10	0,62	0,29	0,00
All	302	0,18	0,45	0,31	0,06

Table 4.9: Terms and Paths to Power

Term	Nr of ministers	Distribution of Paths to Power			
		i	p	pp	sp
T1	173	0,28	0,30	0,37	0,05
T2	103	0,13	0,77	0,06	0,05
T3	26	0,11	0,41	0,38	0,10
All	302	0,18	0,45	0,31	0,06

all ministerial spells in the sample.[11] The data reveal that the probability of survival falls rapidly after the 600 days of the ministerial term, which means that the chances of a minister to remain in office drops sharply after the two year mark. This is the period at which reshuffles have a higher incidence.

Figure 4.2 shows the survival functions for each path relative to the rest of the ministers in the other three paths (for instance, in figure 4.2a the line for $i = 1$ (red) represents the survival probability of an "Independent" and $i = 0$ (blue) represents the survival probability of the other paths). Figure 4.2a shows that the survival probability of an "Independent" minister is lower than for other types of paths until the 900 days mark. As government reshuffles tend to occur at the 2 years mark, this pattern is even clearer between the 600 days and 900 days. Given that reshuffles are frequent in this period, "Independents" are more susceptible of dismissal at this point. After the 900 days, the opposite happens: an "Independent" minister

[11] We could test if the paths to power survivor functions differ, using a log-rank test; however, as we are going to study the ministerial hazard rates, this would be redundant.

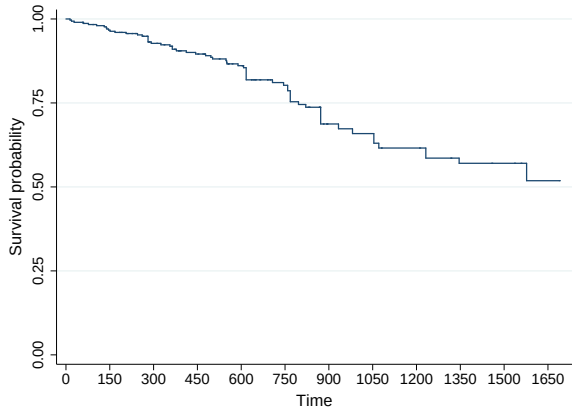


Figure 4.1: Ministerial survival function

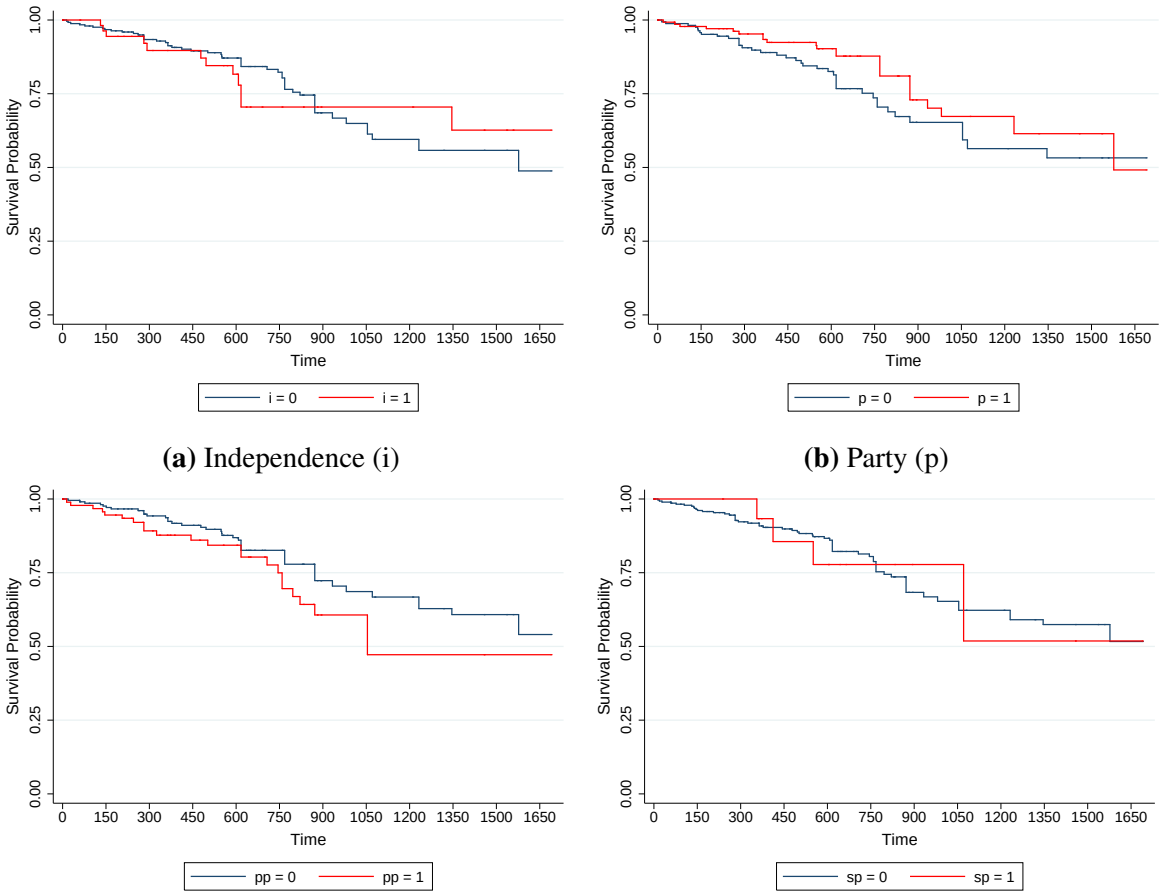
will have a higher probability of survival than a minister who attained power through other ways. This might be explained by the fact that an "Independent" minister who lasts this long, and possibly endured setbacks, may be very competent.

Figure 4.2b shows the case of ministers who have attained power through the "Party" in relation to another who attained power through a different path. This type of minister presents a higher probability of survival, except around the 100 days and the around the 1550 days marks; the opposite occurs for ministers who attained power through the "Parliament", since this type of minister has a smaller probability of surviving (see figure 4.2c).

Figure 4.2d displays the survival probability of a minister who attained power through "Public Service" in relation to any other path. Until the 450 days mark, this type of minister has a higher probability of survival. After that point until the 750 mark, the opposite happens. Again, this is a time at which reshuffles tend to occur and this type of minister may be more susceptible to them. From then on, it will have a higher probability of survival until the 1050 days mark.

4.6 The determinants of ministerial hazard rates

The results from the standard Cox models using as base the "Independence" path are displayed in table 4.10. Model (1) uses the main variables, regarding paths to power: *i, p, pp,*



(a) Independence (i)

(b) Party (p)

(c) Parliament-*cum*-Party (pp)

(d) Public Service (sp)

Figure 4.2: Ministerial survival function by paths to power

sp. Model (2) uses these variables together with ministers' personal characteristics. Model (3) uses the political characteristics of the government the ministers belong to, instead of their personal characteristics. Model (4) merges models (2) and (3). Model (5) adds to model (4) the terms' variables. Model (6) adds to model (5) the PM fixed effects, but removes the political characteristics of the government, since the goal in this case is to specify for each PM a hazard rate. Finally, model (7) uses the personal characteristics and an interaction between the PM and terms.

We can conclude from table 4.10 that our model has no predictive power regarding the influence of paths to power on the durability of ministers;[12] as it happens, we conclude that none of the "Party", "Parliament" and "Public Service" paths shows a different turnover pattern from the "Independent" path. This may mean that the moral hazard and *ex ante* informational effects cancel each other out for each minister. The possibility that the flexibility of a PM firing ministers who attained power through "Independence" or "Public Service" is compensated by their higher competence. The opposite may occur for the ministers who attained power through the "Parliament" and "Party", their possible lower competence is compensated by the lower flexibility of the PM to fire them.

In our work, the paths to power are compared with each other. The conclusions just described refer to the case where "Independence" is the base to which any one of the other paths is compared. For completeness, it is important to consider each one of the other paths as base, in order to have a clearer view of the comparison between paths. In Annex 4.A we can see the hazard ratios for Cox models using as base the "Public Service" and "Parliament" paths, in tables 4.11 and 4.12, respectively. As to the "Public Service" path as base, no difference in turnover is observed. As to the "Parliaments" base, a conclusion is possible, however.

In fact, a "Party" minister will last longer than a "Parliamentary" one (as can be seen in table 4.12 in Annex 4.A). A possible explanation is that a "Party" minister who is not or was not in parliament but is connected with the party may face higher competition in order to be selected as minister, thus, being comparatively more scrutinized and expectedly more

[12] A table with the results with all the variables is presented in Annex 4.M.

Table 4.10: Hazard rates for Cox models for all ministers - "Independent" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.765	0.699	0.749	0.721	0.716	0.589	0.605
	(0.287)	(0.282)	(0.297)	(0.302)	(0.303)	(0.243)	(0.251)
pp	1.251	1.261	1.431	1.437	1.460	1.102	1.124
	(0.497)	(0.510)	(0.565)	(0.588)	(0.599)	(0.447)	(0.453)
sp	0.992	0.893	0.937	0.890	0.904	1.011	1.063
	(0.606)	(0.567)	(0.582)	(0.565)	(0.575)	(0.620)	(0.666)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.3312	0.0967	0	0	0	0	0
Observations	302	302	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

competent. Another would be that parliamentary groups do not have a powerful position within the parties' internal structure; in this case, the less powerful position within the party structure of "Parliamentary" ministers in relation to "Party" ones might lead to the former being more susceptible to be fired than the latter, given a similar degree of under performance.

It could be argued that the analysis is biased because we include ministers who initiated at mid term after a reshuffle or dismissal has taken place. However, if we only take into account ministers who entered in office at the start of government our results persist[13] (see Annex 4.B). This result strongly reinforces our conclusions.

4.6.1 Sub-samples

It may be argued that some of the control variables are related with the paths to power or even that control variables are related with each other. For that reason, the data is divided in

[13]In this case, the variable Ss will only represent the "Junior ministers" who have served in the previous government.

sub-samples. For each sub-sample considered, durability is analysed considering the personal characteristics of a minister or the political characteristics of a government.

- Experienced *versus* non-experienced ministers

One possible correlation concerns the fact that experienced ministers might be more related with the "Party" and "Parliament" path. Thus, the sample is divided in "experienced" ministers and "non-experienced" ministers, and the results can be seen in Annex 4.C. For the "experienced" ministers, as the sub-sample contains a reduced number of ministers who attained power through the "Public Service", no inference is possible for the results obtained concerning that path. It can be concluded that "Party" ministers last longer than "Parliamentary" ones (see table 4.16). This is also valid when ministers who initiated at mid term are omitted (see table 4.17). For "non-experienced" ministers, no conclusions are allowed.

- First term *versus* other than the first term

Another correlation might be between paths to power and the terms of PM. Thus, the sample is divided in first term and the remaining terms.[14] The results can be seen in Annex 4.D. "Parliamentary" ministers will last less than "Party" ministers in the "first term", which is especially corroborated when ministers who initiated at mid term are omitted (see table 4.19). Note that, from table 4.20, in model (1) can be inferred that "Party" ministers last longer than "Independent" ministers considering "terms other then the first". However, this last result only holds for models (6) and (7) when ministers who initiated at mid term are omitted (see table 4.21).

- Left *versus* right-wing governments

Another possible correlation concerns the fact that left or right-governments[15] might select more ministers from one type than another. The results can be seen in Annex 4.E. It can be

[14]There is only one third term, so it will make no sense to analyse it on its own. The conclusions hold if, instead, of considering the remaining second and third terms we just consider the second term.

[15]The government with the support of PS and PSD (1983-85) will be considered a "left-wing government" as PS was the party with a higher number of seats in the Parliament and the Prime Minister belonged to this party.

concluded that "Parliamentary" ministers last less than "Party" ministers in left-wing governments if ministers who initiated at mid term are omitted (see table 4.25). When we consider right-wing governments, the same conclusion is allowed for model (1) (see table 4.22); however, this last result does not hold when ministers who initiated at mid term are omitted (see table 4.23).

- Minority *versus* majority governments

The degree of parliamentary support of governments may be related with the type of minister selected. The results are presented in Annex 4.F. Regarding the governments that are not supported by a majority, table 4.26 shows that there is a tendency for "Public Service" ministers to last less than "Independent" and "Parliamentary" ones in models (6) and (7), and than "Party" ones in models (1), (6) and (7); these results basically holds when ministers who initiated at mid term are omitted, with the exception of the relation between "Public Service" and "Independent" (see table 4.27). Next, concerning governments supported by a majority, it can be concluded in table 4.28 that "Party" ministers last longer than "Parliamentary" ministers. The result also holds when ministers who initiated at mid term are omitted (see table 4.29). For these governments and when ministers who initiated at mid term are omitted, it can be concluded in models (6) and (7) that "Party" ministers last longer than "Independent" ones (see table 4.30).

- Coalition *versus* non-coalition governments

Finally, again coalition and non-coalition governments may be correlated with paths to power. It can be concluded that, when ministers who initiated at mid term are not considered, "Parliamentary" ministers last less than "Party" ministers in non-coalition governments (see table 4.31 in Annex 4.G).

- Main conclusion

The main aspect to emphasize from the sub-samples is that "Party" ministers last longer than "Parliamentary" ministers when each one of the following characteristics is present: they are experienced, in first term, left-wing, majority and non-coalition governments.

4.6.2 Interaction variables

The argument can be made that the distributions between sub-samples may overlap and, therefore, that a sub-sample may not be adequate to discriminate among characteristics. In order to obviate this statistical problem we may create interactions between paths to power and variables that define characteristics of the ministers or of governments and, in this way, attempt to capture differences in durability between paths to power, in particular situations. Great attention has to be given to the possibility of collinearity between those new interaction variables and the variables that are used to control. This is the reason why the results of the analysis are presented on a case by case basis, and this is also the reason to opt to present only those configurations of interaction variables, which not only seem more interesting, but also show positive results.

- Paths to power $\times$ Experience or no-experience

The first situation regards the interaction between ministers' paths to power and experience. In this case, there is an obvious collinearity between this interaction variable and the variables concerning experience. For that reason experience as a control variable is dropped, and models (2) and (4) from the general case are eliminated. The results are presented in Annex 4.H. In table 4.32, it can be concluded that a "Party" minister with experience lasts longer than a "Parliamentary" one with experience; this conclusion is corroborated even when ministers who initiated at mid term are omitted (see table 4.33). Some additional and partial conclusions are also allowed from table 4.32: in models (6) and (7), it can be concluded that an "Independent" experienced minister lasts less than a "Party" experienced minister. However, this conclusion is not corroborated by the other models neither when ministers who initiated at mid term are omitted (see table 4.33). Additionally, models (5), (6) and (7) from table 4.32 show that ministers who attained power through the "Public Service" and do not have experience last less than "Party" ministers with experience; this conclusion is only verified for ministers appointed at the beginning of the government in models (6) and (7) (see table 4.33). Another conclusion from models (6) and (7) in table 4.33 is that "Independent" ministers with no experience last less than "Party" ministers with experience. Notice that, as there

is a small number of ministers who attained power through the "Public Service" and have experience, no inference is possible for the results obtained concerning that path.

- Paths to power × Term of the government

Another interesting interaction regards paths to power and term of the government. In this case, there is also an obvious collinearity between the interaction variables and the terms. For that reason models (5) and (7) from the general case are dropped. The results are presented in Annex 4.I. From table 4.34, it can be concluded that there is a tendency for first term "Parliamentary" ministers to last less than first term "Party" ministers. This is even more salient when ministers who initiated at mid term are omitted (see table 4.36). Also, from tables 4.34 and 4.36, it can be concluded that other terms than the first "Parliamentary" ministers last less than first term "Party" ministers.

Additionally, from table 4.35, models (1), (3), (4) allow to conclude that first term "Independent" ministers last longer than other terms than the first "Independent" ones. However, when ministers who initiated at mid term are omitted, the conclusions only hold for model (3) (see table 4.37).

There is also an extra conclusion that can be seen in every table: other terms than the first "Independent" ministers last less than first term "Party" ministers.

- Paths to power × Left or right-wing government

It may also be interesting to study the durability of paths to power within left or right-wing governments. In this case, an obvious collinearity exists between the party that supports the government with the new interaction variables. For this reason, this variable will be dropped. There is another possible correlation with the PM, but this is possibly less severe. The results are presented in Annex 4.J using the PM fixed effects, but aware of the limitation. One partial conclusion in table 4.38 is that "Party" ministers in right-wing governments last longer than "Parliamentary" ministers in left wing governments. This conclusion holds when ministers who initiated at mid term are omitted (see table 4.39); in this case, it is possible to conclude that "Party" ministers in left governments last longer than "Parliamentary" ministers also in

left governments. Note that it is very hard to conclude anything from models (6) and (7), in both tables, which may be a consequence of collinearity, as mentioned.

- Paths to power × Minority or majority government

Another aspect regards the degree of parliamentary support of governments. In this case, there is an obvious correlation with the variable measuring the support of the government in parliament. Therefore, that variable will be dropped. The results are presented in Annex 4.K. One particular conclusion from table 4.40 is that "Public Service" ministers in minority governments last less than the other types of ministers, in particular "Party" ministers under a majority government. However, when ministers who initiated at mid term are omitted, these conclusions only hold for model (7) (see table 4.42). Another conclusion from table 4.41 is that "Party" ministers in majority governments last longer than "Parliamentary" ministers in the same type of government, and this also occurs when ministers who initiated at mid term are omitted (see table 4.43). Another conclusion can be obtained from table 4.43, "Party" ministers in minority governments also last longer than "Parliamentary" ministers in majority governments.

- Paths to power × Coalition or non-coalition government

The final aspect to consider is whether the minister belongs to a coalition or a single party government. In this case, the variable that indicates if the minister belongs to a minority government and the variable that gives the parliamentary percentage of the minority party that supports the government is closely related with this variable. Both variables are dropped. The results are presented in Annex 4.L. Models (3) and (7), from table 4.44, allow to conclude that "Parliamentary" ministers in a non-coalition government last less than "Party" ministers in a coalition government. This condition also holds when ministers who initiated at mid term are omitted for those models as well for model (6) (see table 4.45). In this situation, it is possible to conclude that "Parliamentary" ministers in a non-coalition government last less than "Party" ministers in a non-coalition government.

- Main conclusions

"Party" ministers last longer than "Parliamentary" ministers when each one of the following characteristics is present: they are experienced, in first term, left wing, majority and non-coalition governments. In fact, the characteristics for which such difference is revealed are exactly the same either for the sub-sample or the interaction analyses.

4.7 Conclusion

The purpose of this work is to study the durability of ministers in a government and how it is affected by paths to power. We have considered four ways to become a minister: through the "Parliamentary-*cum*-Party", through the "Party", through "Public Service" and through "Independence".

An informational framework underlies the explanation of ministers' durability. As "Party" or "Parliamentary" ministers are more difficult to fire since they have stronger connections to the party, we should expect that these types last longer than "Independent" ministers. However, "Independent" ministers should be more competent as their *ex ante* screening is more rigorous, so we should expect that they would last longer than "Party" or "Parliamentary" ministers. The "Public Service" ministers are in an intermediate stage: they are more scrutinized than the "Party" and "Parliamentary" ministers, but less than the "Independents", and the PM faces less constraints to fire them in relation with the "Party" and "Parliamentary" ministers, but more in relation with the "Independents".

The main conclusion is that, in general, the paths to power do not affect ministers' durability, which means that the *ex ante* informational asymmetry and moral hazard effects may cancel each other. In particular, let us point out three findings.

First, comparing the "Party" and the "Parliamentary" paths to power (which are the predominant ways to get in office) with the two other paths, no significant difference in durability is found. Comparing, however, those two paths, it is possible to conclude that "Party" ministers last longer than "Parliamentary" ones. According to our model, this can result from a combination of two effects, the *ex ante* information asymmetry and the moral hazard effects.

The *ex ante* informational asymmetry effect is mainly explained by the fact that "Party" ministers face a higher competition, as there are more possible candidates to be chosen as ministers than there are "Parliamentary" ones, this translating into an expected higher competence of "Party" ministers as compared with "Parliamentary" ones; if this is the case, "Party" ministers face fewer situations where they might be fired. The moral hazard effect is mainly explained by the fact that parliamentary groups do not have a powerful position within the parties' internal structure; in this case, the less powerful position within the party structure of "Parliamentary" ministers in relation to "Party" ones might lead to the former being more susceptible to be fired than the latter, given a similar degree of under performance.

Second, regarding the "Public Service" path, they represent a small fraction of ministers as their role in the Portuguese political system is minor. As to their duration in relation to other paths nothing can be concluded. Again, according to our theoretical interpretation, the moral hazard and the *ex ante* informational asymmetry problems might cancel each other.

Finally, the results do not allow to infer that "Independent" ministers last longer than any other path. This may result from the fact that "Independents", despite being more susceptible to be fired than other paths, have a higher competence which may allow them not to face as many situations in the sequence of which they might be fired. That is, the moral hazard and the *ex ante* informational asymmetry problems might cancel each other. Another possible explanation, however, might be that, once they have been appointed and are in office, their path to power ceases to count for the PM's decisions. Interestingly, the results here are compatible with the statement in Costa Pinto and Tavares de Almeida (2009, p.155) that party pressures do not restrict the PM in her decision to dismiss "Independents".

In order to allow for a more thorough analysis and address possible statistical problems, we carried out a detailed analysis in two ways: in one, the database was divided in subsamples according to personal and government characteristics and, in the other, interaction variables were defined between paths to power and interesting characteristics of ministers or governments. The conclusions of this detailed analysis could only confirm the conclusions obtained for the basic set of models: "Party" ministers last longer than "Parliamentary" ministers when each one of the following characteristics is present: they are experienced, in first

term, left wing, majority and non-coalition governments. This detailed analysis allowed for only a few comparisons among paths to power with some meaning and interest; however, our option was to describe the results in some detail in order to fully explore the data.

This work presents a limitation which is related with the relatively scarce number of ministers in Portugal as our democratic regime, from 1974 on, is a young one. Thus, for future research this study could be extended adding "junior ministers", gaining a larger number of data entries and raising instead the broader question of the durability of political nominees.

Chapter 5

Re-selection of Ministers in Government - A theoretical perspective and an empirical application to the Portuguese case

5.1 Introduction

This chapter focuses on the capacity of ministers with different characteristics to build up their political careers and discusses specifically whether being partisan or independent has an influence on their chances of being maintained in consecutive governments. This is the re-selection problem, faced by the Prime-Minister (PM) who having been in power, has won the elections and has to form a new government.

The question addressed here is motivated by our previous empirical work "Paths to Power and Ministers' Durability: The Portuguese case". A survival analysis was carried out in order to verify whether paths to power matter for the survival of ministers in government but the results were basically negative. The main conclusion was that the paths to power do not affect ministers' durability in government, with the exception that "Party" ministers last longer than

"Parliamentary" ones.

But the doubt came to our minds, whether durability within governments dealt with the overall picture. The hypothesis arose that, even though in the econometric study paths to power are not predictors of durability of ministers in government, these could influence the capacity of a minister to be reappointed, allowing therefore to build a political career. A model is built and then an empirical analysis carried out in order to study the influence of minister type (partisan *vs* independent) and competence on the re-selection in consecutive governments.

Actually, the formation of a new government is an event that, in general, will have only a limited relationship with the decision of the PM to keep or replace an individual minister in government. Two cases may take place:

1. When there is a new election and the PM will form a new government after the complete duration of the previous legislature. The event of formation of a new government can be assumed independent of the performance of any particular minister in the previous government.

2. When there is a new election and the previous government has not lasted the full term, the possibility exists that a given minister has been instrumental for the event of the fall of the government either because of incompetence or a scandal. The government is constituted by a certain number of ministers and it may happen that one or more than one of the replaced ministers were causal regarding the event that led to the fall of the government. The same applies when there is not a new election but for some reason a new government takes place.

Concerning the theoretical model, a reelected PM has to decide whether to keep or replace a minister who has been with her in the previous government. The government is composed by the Prime-Minister (PM) and a representative minister (m). The representative minister can be one of two types: independent (i) or partisan (p), which is publicly known. Voters care about ideology and competence of the government. In each term, the PM is able to apply her policy position and the government produces public goods. From the production of public

goods, the PM and voters are able to realize the minister's competence before the end of the term. Voters also realize the PM's competence.

Resuming the chain of actions, after the reelection, the PM decides whether to retain the minister or not. If she does not retain the minister, a new one is appointed to office. This newly appointed minister can either be independent with some probability, or partisan with the remaining probability. The competence of an independent and of a partisan minister will each follow a given distribution. As an independent minister is not connected to the party, he must have been chosen for his higher expected valence, so the expected competence of the independent is higher than the one of the partisan. Voters then decide if they want to retain the incumbent or select the opposition, in which case a new government is formed, with a new PM and a representative minister.

The PM wants to win elections, for what she obtains a benefit.[1] However, the PM must support a cost when she has an independent minister, as there are foregone rents for the PM associated with having as minister someone who does not belong to her party; for instance, this may result from ideological conflicts with the PM by this type of minister. The magnitude of the cost is only known after selecting the minister and is drawn from a distribution.

From the model, it is possible to conclude that a partisan minister will be maintained with a higher probability than an independent minister, and a higher realized competence of a minister will increase his chances of being re-selected.

The model also allows for several other conclusions: (i) a partisan minister will be maintained with certainty if his competence is higher than the expected value of competence of ministers; (ii) when a partisan's competence is below the expected value of competence of ministers, his retention probability will decrease when the PM's benefit of holding office increases; (iii) it is possible to have a positive probability of retention of a partisan minister even when his competence is minimal; (iv) the higher the benefit of holding office by the PM, the lower is the retention probability of an independent minister for levels of competence below the expected value of competence of ministers, and vice-versa; (v) an independent minister

[1]This benefit can be interpreted as an external benefit such as a monetary compensation or as an intrinsic benefit of holding office.

may have a positive probability of retention even when his competence is not too high, since there is the chance that PM's choice of a new minister is of an independent with a potential higher cost; (vi) finally, a lower realized cost from an independent minister will make his retention probability closer to that of a partisan.

The data set used for the empirical analysis is the one constructed especially for the purposes of the study "Paths to power and ministers' durability: The Portuguese case".

Concerning the empirical analysis, we study the influence of minister type (partisan *vs* independent) on the probability of re-selection in consecutive governments. Given the limitations of the available database, only the first set of predictions of the model can be addressed. In the present work, *ex post* competence of ministers cannot be measured and, therefore, it is not possible to enquire how realized competence actually affects the probability of re-selection. The predictions of the theoretical model have this element in their construction but the case is that some conclusions are possible that are independent of this observation.

In fact, it can be concluded that a partisan minister has a higher probability of retention than an independent minister. This holds for the two situations when the PM remains or when the party remains in power; however, this relation is less strong in case the party remains in power. This conclusion is robust when interaction variables are introduced between the minister type and variables related with experience and education, or the type of government.

In section 5.2, the literature is discussed and an explanation is given of some variables imported in the model. In section 5.3, the model is presented and the predictions described. In section 5.4, the data is classified and the empirical strategy defined. The descriptive analysis follows in section 5.5 and the econometric findings are explained in section 5.6. Finally, section 5.7 concludes.

5.2 Literature revision

To the best of our knowledge re-selection has not been a theme subject to study in the literature. Actually, neither has been selection, with a few exceptions only, such as Fleischer and Seyfried (2015). They carry out a logit analysis with a database that includes all potential

minister candidates in Germany between 1983 and 2009. They are able to conclude that the longer the time a candidate is publicly referred for a possible appointment the more likely he will be appointed, while partisan or parliamentary expertise are less relevant. However, the fact that a minister was a previous cabinet member also increases his chances of being re-selected.

There are also some studies about the probability of selection of non-partisan (or independent) ministers, that is, the incidence of this type of minister in a government.

Neto and Ström (2006) create a model which predicts that the frequency of non-partisan ministers increases with electoral uncertainty and with the powers of the president relative to the prime-minister, and decreases with the extent of the political agents' concern with efficiency of the policies rather than the distribution of rent in favour of the party. Empirically, the results show that the fraction of non-partisan ministers increases with electoral volatility and with minority governments. With less significance, it is also shown that this fraction is higher with the importance of the power of the president relative to the prime-minister. Finally, they find a result that economic crises decrease the incidence of non-partisan ministers. Schleiter (2009) also presents evidence through a statistical analysis that the selection of non-partisan ministers by Yeltsin and Putin in Russia is conditioned by contextual circumstances and particular goals of each politician.

In the same line of work as Neto and Ström (2006), Bäck, Dumont, Meier, Persson and Vernby (2009) argue that European integration contributes to a greater autonomy of PMs, which translates into them selecting more expert ministers (who have held positions in the private or public sectors or in labour unions). The empirical results for Sweden partially confirm this expectation, particularly for expert ministers who are also insiders (that is, who have held a party position or a seat in parliament).

Alexiadou and Gunaydin (2014) partially support the conclusion that parties want to appoint non-partisan or expert ministers when they face two problems: lack of credibility, and willingness to implement necessary reforms. They carry out an econometric analysis for financial ministers of thirteen parliamentary democracies and find that technocratic ministers are more likely to be appointed in periods of high inflation and by left-wing parties during

currency crises. Verzichelli and Cotta (2012) draw similar conclusions for Italy through a statistical analysis.

Bearing the same idea, but now focusing on the appointment of candidates to electoral districts rather than ministerial positions, Galasso and Nannicini (2011) study how parties allocate candidates to different districts based on the fact that they have a high valence (that the authors define as experts) or low valence (that the authors define as party loyalists). They create a model where they show that high valence candidates are selected to the most contestable districts. They verify empirically this conclusion for a database including the Italian members of parliament. In their case (in line with Krasno and Green, 1988), valence is an *ex ante* factor and a function of several features: years of schooling, previous market income, and past experience in local governments.[2] They also study empirically the impact of political competition on effort, where effort is measured by the absenteeism rate.

Hallerberg and Wehner (2013) also focus on the *ex ante* competence of policy makers in OECD democracies, including the PMs, the finance ministers and the central bank governors. They are able to conclude that in the period after a stock market crash the likelihood that a finance minister with a Ph.D. degree is appointed increases.

Another line of work, concerns the probability of members of parliament (MP) to become ministers. Bäck et al. (2013) study this problem in coalition governments in Austria, Germany, Ireland and Sweden as a function of the distance between the MPs' policy position and the policy position of either the PM, the coalition or the party. The idea is that ministers are appointed to minimize the policy distance to the most important principal, which is one of the three already mentioned. It is shown that in Austria, where the Chancellor has limited power, the policy distance between the minister and the coalition is important but the distance to the party or the PM is not, while in Germany, where the Chancellor has more power, those two distances play a role. Furthermore, in Ireland and Sweden the party has a significant role in the selection of ministers from the parliament as these countries do not have a tradition concerning coalition governments; in Austria, Germany and Ireland a member of the previ-

[2]Other authors use the same variables: for years of schooling, see Besley and Reynal-Querol (2009); Zhang and Congleton (2008); and for past experience in local governments, see Jacobson (1989); Shugart et al. (2005).

ous government (they use this variable to control) is selected with a higher probability. In the same line but addressing durability, Kerby (2009) studies the time a MP in Canada must wait in order to be selected as a minister. The author is able to conclude that both the personal characteristics of ministers and the political characteristics of governments affect the time they wait and, also, that previous ministerial experience increases the probability of being selected early on.

Concerning Portugal, the studies about selection of ministers are Tavares de Almeida and Costa Pinto (2002) and Costa Pinto and Tavares de Almeida (2009). The former presents a description and characterization of the several regimes in Portugal from 1851 to 1999 in terms of the number of cabinets and ministers, the cabinet duration, the mobility and durability of ministers. It also focuses on the social background of ministers and their political paths to the cabinet, that is, it statistically presents the previous political or parliamentary experience of ministers. The latter continues this line of research, concentrating on the Second Republic (from 1974 on) emphasizing the already mentioned significant number of ministers without political experience. Additionally, Costa Pinto and Tavares de Almeida (2009) add a section about termination of governments and de-selection of ministers where they describe the causes of ministerial de-selection and affirm that there is a significant number of independent ministers (ministers without previous political experience), who are maintained whenever a reshuffle or de-selection takes place, and explain their contention on the grounds that party pressures do not restrict the PM (p.155).

Concerning also Portugal there is one paper that deals with running again for office at the regional level (Castro and Martins, 2013). The authors are able to conclude that the local economic conditions matter more for a mayor's decision to seek reelection than the national or regional economic environment. Age and the number of terms in office also influence the decision to run for reelection.

Finally, we must mention Quiroz Flores and Smith (2011) that although not closely related with this literature, serves as an inspiration for the method followed in this paper. They build a game where a leader has to decide whether to replace a minister or not considering that she will face both internal and general elections after that decision. They produce

probabilities of winning each one of consecutive elections. Under a non-democratic regime, leaders will remove high performing ministers to reduce internal competition. Under more democratic regimes, the leader must weight whether to replace or not high performance ministers, given that they improve party performance, which allows the leader to win general elections, but at the same time they create internal party rivalry.

5.3 Model

A reelected PM has to decide whether to keep or replace a minister who has been with her in the previous government. The government is composed by the Prime-Minister (PM) and a representative minister (m), that is, for the purpose of this simple model, the government is composed by the pair (PM, m). The representative minister can be one of two types: independent (i) or partisan (p), which is publicly known. Voters care about ideology and competence of the government. In each term, the PM is able to apply her policy position, α_{PM}, which follows a uniform distribution between 0 and 1, and the government produces public goods. From the production of public goods, voters before the end of the term are able to realize the PM's competence, which is represented by θ_{PM} and follows a uniform distribution between 0 and 1. The PM and voters, before the end of the term, will also realize the minister's competence which is represented by θ_m; that is, θ_m is the realized competence of the minister that was in office and can be re-appointed.[3]

However, before the realization of the competence of the minister in office, the competence of an independent minister is assumed to be a uni-dimensional variable which follows a distribution $\theta_i \sim k_i$ with $E(\theta_i)$ and the competence of a party minister a distribution $\theta_p \sim k_p$ with $E(\theta_p)$. As an independent minister is not connected to the party, we posit that if he was chosen, this has happened because of his higher expected competence. Thus, $E(\theta_i) > E(\theta_p)$.[4]

[3]Competence is best understood as based on the production of public goods. Here, a simplification is made and assumed that realized competence is observed directly. The conclusions would be qualitatively similar.

[4]For a description of the process of selection of a minister by the PM see section 4.3. The PM values competence and will try to select the most competent minister as possible, but the case is that she faces an *ex*

Assuming that an election has taken place and the PM has been reelected, after the reelection the PM decides whether to retain her minister or not. Notice that the competence of the minister has already been realized by the PM and voters. If she does not retain the minister, a new one will be chosen. Again, the new minister can either be independent with probability σ or partisan with probability $1-\sigma$.[5] Voters then decide if they want to maintain the incumbent PM or select one from the opposition, which will form a government (PM, m). The opposition PM's policy position is distributed uniformly between -1 and 0 and competence distributed uniformly between 0 and 1. It is assumed that the opposition representative minister that may be appointed by the opposition PM has the same level of competence as a minister selected by the incumbent PM; moreover, he can either be independent with probability σ or partisan with probability $1-\sigma$, following the same respective distributions.

The utility of a voter depends on two variables, the policy applied by the PM and the competence of the government. Voters prefer a higher competence of the government and their preference as to the policy position of the PM (ideal point) follows a uniform distribution between -1 and 1.

Voter i's utility is defined by u_i with ideal point α_i. We assume that both components of the utility are additively separable (see Quiroz Flores and Smith, 2011, p.351). We will have:

$$u_i\left(\alpha_{PM}, \theta_{PM}, \theta_m\right) = -\rho \mid \alpha_i - \alpha_{PM} \mid + \gamma\left[\lambda\theta_{PM} + (1-\lambda)\,\theta_m\right] \tag{5.1}$$

where ρ reflects the relative benefit of ideology (proximity), λ the influence of the PM relative to the minister in the production of public goods, and γ the relative benefit of competence.

We assume that $\alpha_i = 0$ for the median voter as voters' ideal points are equally distributed between -1 and 1. The voter is also affected by a common popular shock, χ, which occurs before the election and might benefit either the PM or the opposition. χ is drawn from a

ante informational asymmetry problem and some restrictions. In order to reduce the informational asymmetry regarding different types of ministers, the PM scrutinizes them and it makes sense to predict that an independent minister will be more scrutinized than a partisan. Moreover, the selection of the partisan minister may have been imposed to the PM, for reasons other than his competence. As a result, for a minister appointed in office, it makes sense to expect a higher competence of an independent than of a partisan minister.

[5]This probability could be treated as endogenous. However, this would not bring any qualitative difference to the results of this study.

distribution $F(x)$, such that, $F(x) = \Pr(\chi < x)$.

The PM's objective is to win the next election, for what she obtains a benefit (from holding office) of v. If she loses it, she receives a (normalized) value of 0. However, the PM must incur a cost, $c > 0$, when she appoints an independent minister, as there are foregone rents for the PM associated with having as minister someone who does not belong to her party (see Galasso and Nannicini, 2011). For instance, this may result from potential ideological conflicts with the PM by this type of minister. The magnitude of c is drawn from a distribution $G(x)$, such that, $G(x) = \Pr(c < x)$ and it is only known after selecting the minister.[6]

There are three stages in this model:

- *Stage 1*: The PM is reelected. The representative minister from her previous term was either independent (i) or partisan (p), which is publicly known. Voters have already realized the real policy position of the PM and the real competence of both the PM and the minister. The PM also has realized the real competence of the minister. In case the representative minister was an independent, the random variable c was drawn and known to the PM.

- *Stage 2*: The PM decides whether to maintain the minister or not. If she does not maintain the minister, a new one is appointed. This new minister can be independent with probability σ or partisan with probability $1 - \sigma$. If the new appointed minister is independent, the random variable c is drawn and known to the PM.

- *Stage 3*: Voters observe a random variable χ, and the election takes place. Voters decide whether to maintain the PM or vote in the opposition party.

5.3.1 Election probability

When the PM is considering whether or not to maintain the minister, she has to take into account the expected utility of the median voter at the time of the elections.

[6]It could be assumed that the PM has always a payoff higher than 0, however that condition does not affect the issue under study here.

In case the opposition will win the elections, the expected utility for the median voter will be:

$$E\left(u_i\left(\alpha_{PM},\theta_{PM},\theta_m\right)\right) = -\rho E\left(\mid \alpha_{PM} \mid\right) + \gamma\left[\lambda E\left(\theta_{PM}\right) + \left(1-\lambda\right) E\left(\theta_m\right)\right]$$
$$= -\rho\frac{1}{2} + \gamma\left[\lambda\frac{1}{2} + \left(1-\lambda\right) E\left(\sigma E\left(\theta_i\right) + \left(1-\sigma\right) E\left(\theta_p\right)\right)\right] \quad (5.2)$$

In case the PM will win the election and opt to maintain the minister, the expected utility for the median voter will be known, since the policy position of the PM and the competence of both the PM and the minister are known:

$$E\left(u_i\left(\alpha_{PM},\theta_{PM},\theta_m\right)\right) = u_i\left(\alpha_{PM},\theta_{PM},\theta_m\right)$$
$$= -\rho\alpha_{PM} + \gamma\left[\lambda\theta_{PM} + \left(1-\lambda\right)\theta_m\right] \quad (5.3)$$

Otherwise, in case the PM will win and opt not to maintain the minister, the expected utility for the median voter is a function of the known policy position and of the competence of the PM and of the expected utility of the new minister:

$$E\left(u_i\left(\alpha_{PM},\theta_{PM},\theta_m\right)\right) = -\rho E\left(\mid \alpha_{PM} \mid\right) + \gamma\left[\lambda E\left(\theta_{PM}\right) + \left(1-\lambda\right) E\left(\theta_m\right)\right]$$
$$= -\rho\alpha_{PM} + \gamma\left[\lambda\theta_{PM} + \left(1-\lambda\right) E\left(\sigma E\left(\theta_i\right) + \left(1-\sigma\right) E\left(\theta_p\right)\right)\right] \quad (5.4)$$

In order to fully anticipate the utility that voters will get, the PM also has to take into consideration the effect of the shock χ on the voters' well-being. Thus, if the PM maintains the minister, she is expected to be reelected if:

$$-\rho\alpha_{PM} + \gamma\left[\lambda\theta_{PM} + \left(1-\lambda\right)\theta_m\right] - \chi > -\rho\frac{1}{2} + \gamma\left[\lambda\frac{1}{2} + \left(1-\lambda\right) E\left(\sigma E\left(\theta_i\right) + \left(1-\sigma\right) E\left(\theta_p\right)\right)\right]$$

Given the distribution of χ, this occurs with probability $F(q_1)$, with

$$q_1 = -\rho\left[\alpha_{PM} - \frac{1}{2}\right] + \gamma\lambda\left[\theta_{PM} - \frac{1}{2}\right] + \gamma(1-\lambda)\left[\theta_m - \left((\sigma E(\theta_i) + (1-\sigma)E(\theta_p))\right)\right] \tag{5.5}$$

Instead, if the PM does not maintain the minister, she expects to be reelected if:

$$\begin{aligned} &-\rho\alpha_{PM} + \gamma\left[\lambda\theta_{PM} + (1-\lambda)E(\sigma E(\theta_i) + (1-\sigma)E(\theta_p))\right] - \chi > \\ &> -\rho\frac{1}{2} + \gamma\left[\lambda\frac{1}{2} + (1-\lambda)E(\sigma E(\theta_i) + (1-\sigma)E(\theta_p))\right] \end{aligned}$$

Given the distribution of χ, this occurs with probability $F(q_2)$, with

$$q_2 = -\rho\left[\alpha_{PM} - \frac{1}{2}\right] + \gamma\lambda\left[\theta_{PM} - \frac{1}{2}\right] \tag{5.6}$$

5.3.2 Probability of re-selection of the minister

There are two cases to consider, the minister in the previous government before the re-election of the PM was independent or partisan. For an independent minister and after the realization of the cost c, which we define by $\bar{c}$, her expected payoff if she keeps him will be $F(q_1)v - \bar{c}$. For a partisan minister, her expected payoff if she keeps him will be $F(q_1)v$. If the PM decides not to keep the minister, her expected payoff will be $F(q_2)v - \sigma c$.

As a result, when a minister is independent, the PM will keep him when $F(q_1)v - \bar{c} > F(q_2)v - \sigma c$. Given the distribution of c, this occurs with probability $1 - G(p_i)$, with

$$p_i = \frac{v\left[F(q_1) - F(q_2)\right] - \bar{c}}{-\sigma} \tag{5.7}$$

When the minister is partisan, the PM will keep him when: $F(q_1)v > F(q_2)v - \sigma c$. Given the distribution of c, this occurs with probability $1 - G(p_p)$, with

$$p_p = \frac{v\left[F(q_1) - F(q_2)\right]}{-\sigma} \tag{5.8}$$

The main results of our model are presented in the following proposition:

Proposition 1. *Given the distributions $F(x)$ and $G(x)$, we can conclude, regarding the probability of the result of the election, that:*

1. *If the PM maintains the minister, her probability of reelection is given by $F(q_1)$ with $q_1 = -\rho\left[\alpha_{PM} - \frac{1}{2}\right] + \gamma\lambda\left[\theta_{PM} - \frac{1}{2}\right] + \gamma(1-\lambda)\left[\theta_m - ((\sigma E(\theta_i) + (1-\sigma)E(\theta_p)))\right]$*

2. *If the PM does not maintain the minister, her probability of reelection is given by $F(q_2)$ with $q_2 = -\rho\left[\alpha_{PM} - \frac{1}{2}\right] + \gamma\lambda\left[\theta_{PM} - \frac{1}{2}\right]$*

And regarding the probability of re-selecting the minister:

1. *If the minister under analysis for possible re-appointment is independent, he will be maintained with probability $1 - G(p_i)$ with $p_i = \frac{v[F(q_1) - F(q_2)] - \bar{c}}{-\sigma}$*

2. *If the minister under analysis for possible re-appointment is partisan, he will be maintained with probability $1 - G(p_p)$ with $p_p = \frac{v[F(q_1) - F(q_2)]}{-\sigma}$*

It is also possible to establish some correlations between the variables. The higher the realized competence of the minister, θ_m, the higher the probability of re-appointment for that minister independently of the type. The higher the realized cost of an independent minister, $\bar{c}$, the lower the probability of re-selecting that minister.

The fact that the PM has a more appealing characteristic to the median voter (that is, a policy position, α_{PM}, closer to 0) or has a higher competence, θ_{PM}, may increase or decrease the probability of maintaining a minister of any type, depending whether the distribution $F(x)$ is increasing or decreasing in x, respectively; the probability of retention of a minister of any type will increase if the PM's probability of wining the next election increases in case she retains the minister.

A higher benefit from holding office by the PM may increase or decrease the probability of retention of a minister, depending on whether his continuation on office has a positive or negative effect on her reelection.

Finally, it is possible to establish some connections between the two probabilities (the PM's probability of winning the elections and the minister's probability of being re-selected), which deserve to be emphasized and are stated in the two following corollaries.

Let us define the competence of a partisan that was in office as θ_m^p, and of an independent that was in office as θ_m^i.

Corollary 1. *Given the realized level of competence of the minister, θ_m, the probability of re-selection of that minister will be higher if he is a partisan rather than if he is an independent.*

Proof. If the competence of both is equal, that is $\theta_m^p = \theta_m^i = \theta$, the probability of re-selecting an independent minister is given by $1 - G(p_i)$ with $p_i = p_p + \frac{\bar{c}}{\sigma}$, where $G(p_p)$ is the probability of re-selecting a partisan minister. As $G(.)$ is a distribution such that $G(x) = \Pr(c < x)$, we know that $1 - G(p_i) < 1 - G(p_p)$. □

Corollary 2. *An independent minister will be re-appointed with a higher probability than a partisan if his realized competence is higher than $F^{-1}\left(F(q_1(\theta_m^p)) + \frac{c}{v}\right)$.*

Proof. Given that $G(.)$ is a distribution such that $G(x) = \Pr(c < x)$, an independent minister will be re-appointed with a higher probability than a partisan minister if $1 - G(p_i) > 1 - G(p_p) \Leftrightarrow p_i < p_p$. This happens when $\frac{v[F(q_1(\theta_i)) - F(q_2)] - \bar{c}}{-\sigma} > \frac{v[F(q_1(\theta_p)) - F(q_2)]}{-\sigma}$. Solving the inequality we obtain the corollary. □

Basically, these two additional predictions from this model consist in the following: for the same level of competence, the partisan minister has a higher probability of re-selection, but this effect in favour of the partisan may be compensated by the higher competence of the independent minister as was expected by the PM at the time of the selection.

5.3.3 Graphical analysis

In order to have a clear view of the model and its results, in particular the retention probability, some illustrative graphs are presented (see figures 5.1, 5.2 and 5.3). It is assumed

that the incumbent PM has no expected advantage in relation to the opposition, that is, $\alpha_{PM} = \frac{1}{2}$ and $\theta_{PM} = \frac{1}{2}$. It is assumed that $\lambda = \frac{3}{4}$, $\rho = 1$ and $\gamma = 1$ (see Quiroz Flores and Smith, 2011); and also that $F()$ follows a standard normal distribution and $G()$ an exponential distribution with a rate of 1.

In figure 5.1, we present the retention probability for different levels of v, particularly, $v = 15$, $v = 20$ and $v = 25$, with $\bar{c} = 1$, $E(\theta_i) = 0.75$ and $E(\theta_p) = 0.25$. Figure 5.2 presents the retention probability for different levels of $\bar{c}$, particularly, $\bar{c} = \frac{1}{10}$, $\bar{c} = 1$ and $\bar{c} = \frac{3}{2}$, with $v = 20$, $E(\theta_i) = 0.75$ and $E(\theta_p) = 0.25$. Finally, figure 5.3 presents the retention probability for different expected values of competence, particularly, $E(\theta_i) = 0.75$ and $E(\theta_p) = 0.25$; $E(\theta_i) = 0.65$ and $E(\theta_p) = 0.35$; and $E(\theta_i) = 0.55$ and $E(\theta_p) = 0.45$, with $v = 20$ and $\bar{c} = 1$ (for a more detailed explanation, see Appendix 5.A).

A general conclusion that can be extracted from the graphs is the following: as a partisan minister does not imply any cost, he will be maintained with certainty if his competence is higher than the expected value of competence of ministers. Note that it is possible to have a positive probability of retention for a partisan minister even when his competence is minimal, since there is the possibility that the choice of an independent new minister imposes a cost and, thus, the PM may prefer to keep a free cost minister even with a low level of competence. For an independent minister the possibility exists that he has a positive probability of retention even when his competence is not too high, since there is the chance that a new independent minister imposes a higher cost and, in this case, it is better for the PM to keep the known less competent independent minister. Also, it is possible in certain circumstances to have an independent minister being retained with certainty (see lines blue and green in figure 5.1 and red and magenta in figure 5.2).

Next, from figure 5.1 and considering an increase in the PM's benefit of holding office, two possibilities exist for a partisan minister: (i) when his competence is above the expected value of competence of ministers, the case is trivial because she is elected with certainty; (ii) when his competence is below the expected value of competence of ministers the retention probability will decrease because the PM gets a higher expected benefit from dropping the

minister, that is, choosing a new minister would allow her to have a more competent minister.[7]

For an independent minister, for levels of competence below the expected value of competence of ministers, the PM has a higher chance of winning the next election if she appoints a new minister; in this case, the higher the benefit of holding office by the PM, the lower is the retention probability. When the level of competence of the independent minister becomes higher than the expected level of competence of ministers, the PM gets a higher reelection probability if she keeps this minister; in this case, the higher the benefit of holding office, the higher is the probability of re-selection.[8]

From figure 5.2, it is also possible to conclude that, as expected, a lower realized cost from an independent minister will make his retention closer to that of a partisan. It is noteworthy that an independent minister might have a high level of competence and still have a retention probability lower than 50% in case his cost to the PM is too high (which happens in the yellow line).

Finally, from figure 5.3, we can see that the lower the expected value of competence of new ministers, the higher the retention probability of an incumbent minister. Moreover, the impact of a change in competence around the expected value on the retention probability is higher, the higher is expected competence, independently of the type.

[7]For case (ii), the impact of the variation of the benefit from holding office on the probability of retention of a partisan minister (second derivative) will be higher the lower the minister's level of competence, since the PM gets a higher expected benefit from dropping the minister as competence is lower.

[8]The impact of the variation of the benefit of holding office on the retention probability of an independent minister (second derivative) will be higher, the lower is his realized competence; this happens in case the realized competence is below the expected value of competence of ministers, as the PM gets a higher expected benefit from dropping the minister as competence is lower. However, when the minister's competence level is above the expected value of competence of ministers, the impact of the variation of benefit of holding office by the PM on the retention probability of this type of minister will be higher, the higher is his level of competence, since it increases even further the chances of the PM being reelected and therefore her benefits of holding office. Note that this impact is especially significant for levels above the expected value of competence of ministers, since for higher levels of competence the possibility increases that competence compensates for the costs of having an independent minister; on the other hand, for levels below the expected value of competence of ministers, the costs are not compensated, they are aggravated.

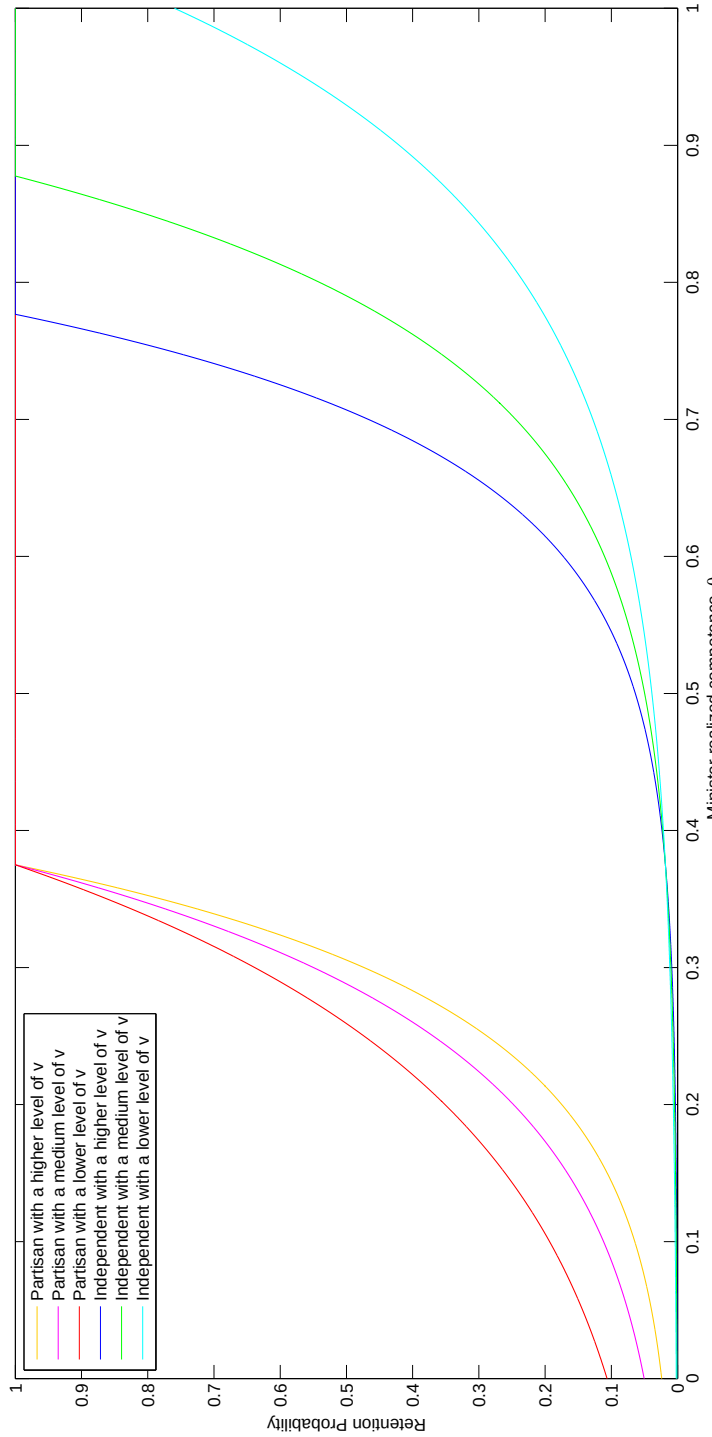


Figure 5.1: Retention probability as v changes

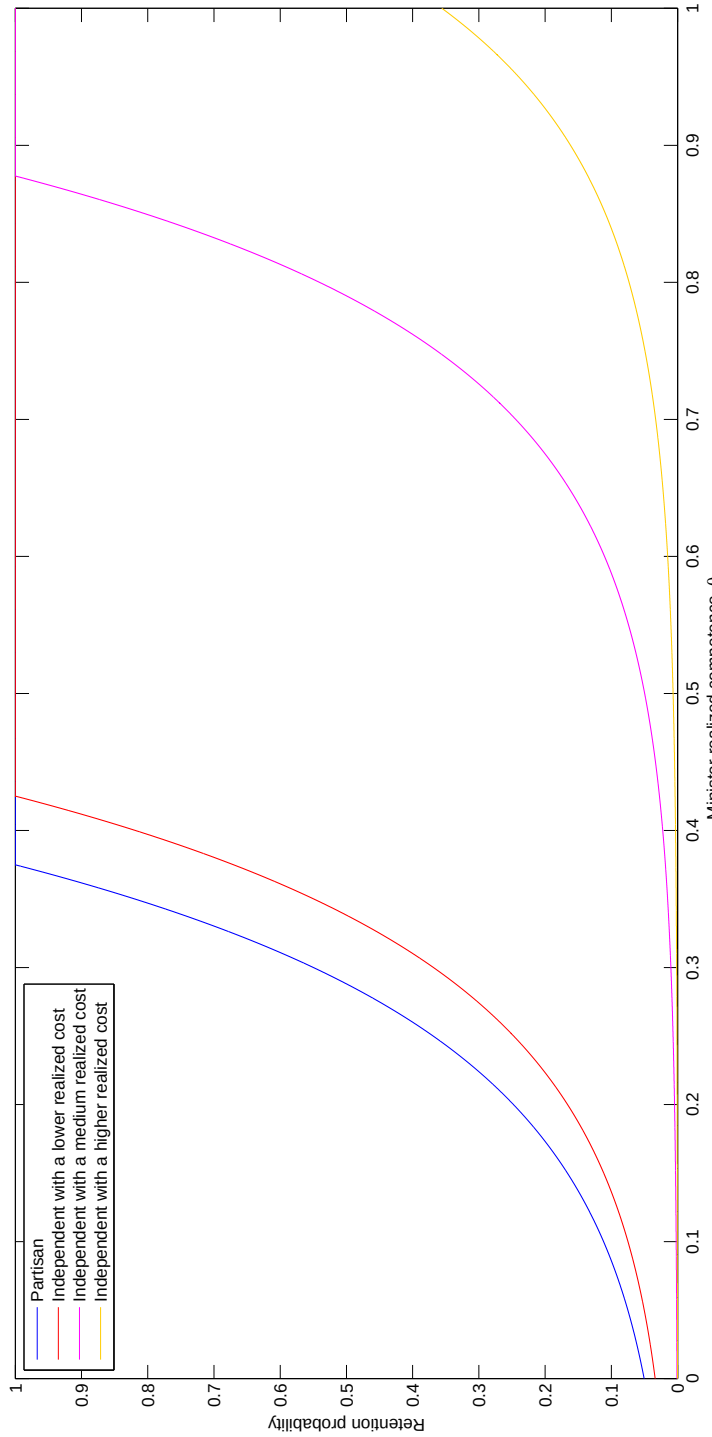


Figure 5.2: Retention probability as $\bar{c}$ changes

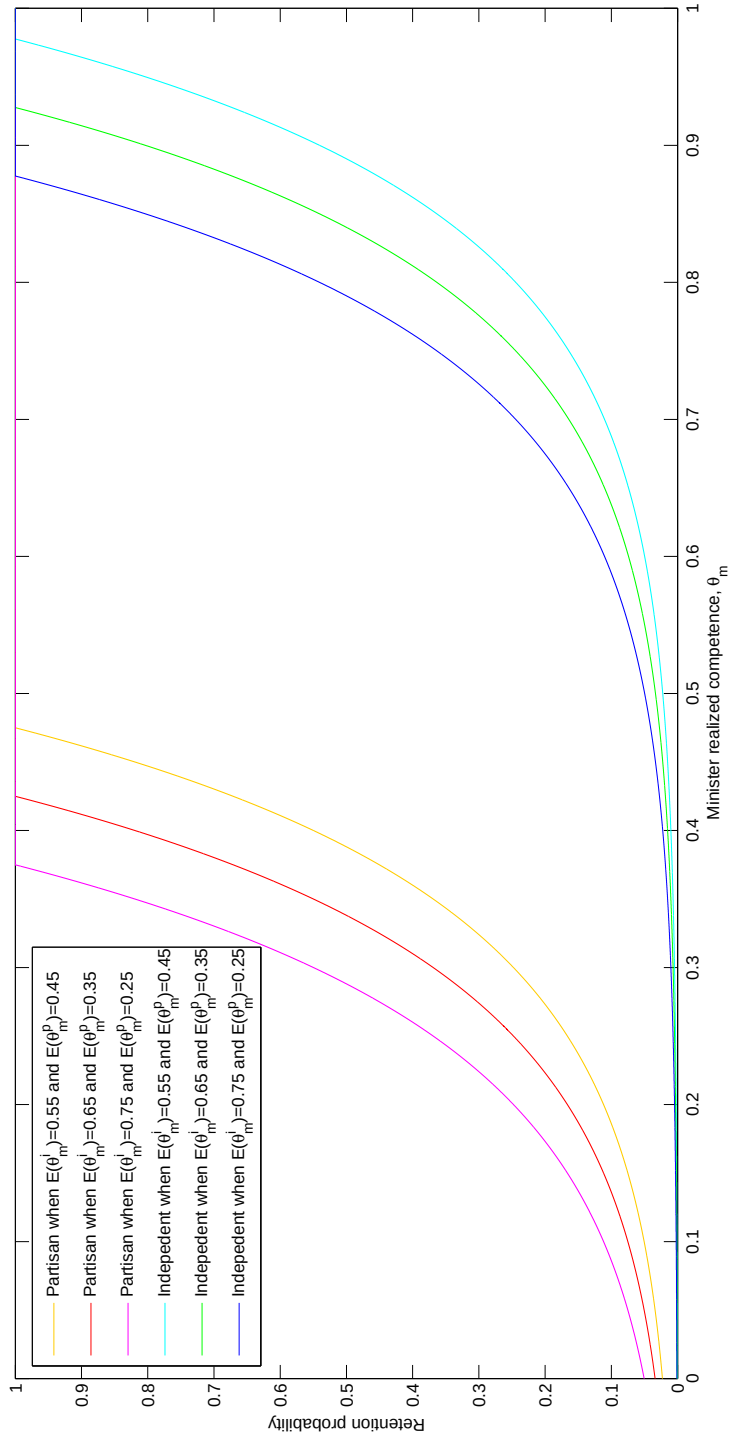


Figure 5.3: Retention probability as expected competence changes, for a partisan and an independent minister

5.4 Data and empirical strategy

The data set used in this work was especially constructed for "Paths to power and ministers' durability: The Portuguese case", from 1976 to the present, except the ones formed by presidential initiative (governments formed between 1978 and 1980 by presidential initiative were excluded, since they do not allow to study the relationship between the PM or the parties and her ministers). The information was collected from several sources: biographical dictionaries, official directories, newspapers, published CV, etc. We identify every minister that was in government and has the possibility of remaining in the next one. Two cases are considered, one when the PM remains in office and the other when the same party remains in office. For the first case there are 92 observations, and for the second 122.

First of all, in order to understand our arguments as well as the empirical treatment, it is important to present a few main characteristics of the Portuguese political system regarding the nomination and dismissal of ministers by the PM:[9]

- The number of terms a PM can be appointed is not restricted. A legislature lasts four years.

- The number and distribution of portfolios is decided by the PM. Ministers can be appointed by the PM without any particular restrictions. However, as to "Independents" the case is that they can be appointed to the government as ministers but cannot run in elections for deputies on their initiative; in fact, parties have the monopoly of parliamentary representation.

- Equally, the PM has discretion as regards cabinet reshuffles and de-selection of individual ministers, even though formally it is the President of the Republic who nominates ministers and "junior ministers", usually in charge of a sub-portfolio of a minister's office that in several political systems is referred to as "secretaries of State").

[9]For a complete historical survey of the political circumstances regarding the period of 1974-2011, covered in our study, see Costa Pinto and Tavares de Almeida (2009).

- Parliamentary groups do not have a powerful position within the parties' internal structure (see Tavares de Almeida and Costa Pinto, 2002, p.32)).

- The political parties to which PMs belonged in the period covered are: Partido Socialista, a member of the Group of the Progressive Alliance of Socialists & Democrats in the European Parliament; and Partido Social Democrata, a member of the European People's Party.

- The average number of ministers per government is around 20.

The dependent variable, defined as *Cont*, is a dummy variable that is equal to 1 if the minister is re-appointed and 0 otherwise.

Then, the ministers are classified as either partisan or independent:

- A minister will be considered to attain power through the party if he is strongly connected with it. There are several situations where we consider that a minister is connected to the party:

  - he is a party member;
  - he has run for the party in an election;
  - he has been previously elected as a deputy for that party;
  - he has strongly and publicly demonstrated support for the party's candidates or policies.

- A minister will be considered independent if he is not a partisan. Our notion of independence is residual.

As to the main explanatory variable, a dummy variable P is defined with value 1 if the minister is a partisan and 0 otherwise, that is, when the minister is independent (see table 5.1):

Regarding the empirical strategy, as already mentioned, two situations in which the minister is re-selected are considered: one, when a new government is formed and the PM is the

Table 5.1: Main variables

Dependent variable	Definition
Continued (**Cont**)	Dummy variable that is equal to 1 if the minister is re-appointed and 0 otherwise
Main explanatory variable	**Definition**
Partisan (**P**)	Dummy variable that is equal to 1 if the minister is a partisan and 0 otherwise

same as in the previous government; and another when the party remains in power independently of the PM remaining or not.

As mutually exclusive binary outcomes are present, that is, the minister is either re-selected or not, the model focuses on the determinants of the probability of the occurrence of one of the two outcomes, in this case, the probability of the minister to be re-selected, rather than the alternative outcome. The two standard binary outcome models are the logit and the probit model. They differ in the specification of the functional forms of the probability of the minters to be re-selected. These models are fitted by maximum likelihood. Our option was for the probit model. The econometric tests were repeated using the logit model and the results did not differ.

As the information is organized in multiple record data, the observations for the same subject are not conditionally independent (Box-Steffensmeier and Jones, 2004). This effect produces incorrect standard errors. In order to address this problem, and given the setting established here, we use Huber/White standard errors clustered on each minister (see Huber, 1967; White, 1980). This procedure relaxes the assumption that observations for the same minister are independent, and produces a robust variance-covariance matrix and correct standard errors without changing the coefficient estimates.

Thus, the probability of re-selection is given by:

$$\Pr\left(Cont = 1\right) = F\left(P'\alpha\right) \tag{5.9}$$

Table 5.2: Personal characteristics of the ministers

Variables	**Definitions**
Experience as Minister (**Em**)	Dummy variable 1 if the minister was minister in any government but the previous; 0 otherwise.
Experience as "Junior Minister" (**Es**)	Dummy variable 1 if the minister was "junior minister" in any government but the previous; 0 otherwise.
Served as "Junior Minister" in the previous government (**Ss**)	Dummy variable 1 if the minister was a "junior minister" in the previous government; 0 otherwise.
Past re-selection (**Past**)	Dummy variable 1 if the minister has been re-selected in consecutive governments.
Master or Ph.D. (**MD**)	Dummy variable 1 if the minister has a master's or a Ph.D. degree; 0 otherwise.
Age	Age of the minister at the time of the re-selection.

It may also be the case that the duration of a minister in a government depends on his personal characteristics.

Governmental experience is introduced as it shows that a minister was able to stay in office and probably had a good performance. The master's and the Ph.D. degrees are also used as they may represent a signal of competence of ministers, who were able to take an extra step in their education. We also add to our model the age of the minister at the time of the re-selection and that age squared.[10] These personal characteristics variables are defined in table 5.2.

Moreover, the re-selection probability of ministers may also depend on the initial features that characterize the government. Thus, we also add to the specification some political characteristics of the government in which the minister belongs, as presented in table 5.3.[11]

[10]Other variables were used, such as the gender of the ministers, if he has studied in Lisbon or Porto, the profession of the minister, experience (measured in days) instead of a dummy but they showed no significance.

[11]Other variables could be used regarding a change in the political environment of the PM or party, namely minority/majority and coalition/non-coalition. However, that analysis would be redundant, since the PM's fixed terms capture all these changes. The following cases happen: the political environments in Soares/Soares

Table 5.3: Political characteristics of the governments

Variables	**Definitions**
Parliamentary support	3 dummy variables that represent the combinations of parties that support the government (Partido Socialista (**GPS**); Partido Social Democrata (**GPSD**); Partido Social Democrata and Centro Democrático Social(**GPSDCDS**). When we condition on this variable in the regression analysis we use 2 dummies, in order to avoid collinearity.
Term	Until today, the maximum amount of terms in the period under analysis in Portugal was three. In this case, we will have a dummy for the passage from terms 1 to 2 and another for the passage from terms 2 to 3. Thus, when we condition on this variable in the regression analysis, we only use one dummy.
Transition identifiers (**TI**)	i) Transition between governments with the same PM: there are 5 identifiers. ii) Transition between governments with of the same party we add 2 more dummies (from one PM to the next). Thus, in the regressions, we use 4 and 6 dummies, respectively.

Table 5.4: Main variables summary statistics - when PMs remain in power

Variable	Mean	Std. Dev.
Cont	0,59	0,50
P	0,72	0,45

In conclusion, adding the individual and governmental characteristics and also a constant, c, the model becomes:

$$\Pr\left(Cont = 1\right) = F\left(P'\alpha + x'\beta + \lambda_0 X_{ig} + \gamma_0 Y_g + c\right) \tag{5.10}$$

where X_{ig} a vector of the individual characteristics (see table 5.2) and Y_g a vector of the government characteristics (see table 5.3).

5.5 Descriptive analysis

The percentage of ministers who remain in office in consecutive governments with the same PM is 59%, and with the same party is 56%, as is shown in table 5.4. The difference in percentage may indicate that the relation between a minister and the PM is stronger than his relation with the party.

Of the incumbent ministers, the majority are partisan, 72% if we consider the permanence of the PM, and 75% the permanence of the parties. Independent ministers represent 28% or 25% which is a very significant proportion according to Tavares de Almeida and Costa Pinto (2002) and to Costa Pinto and Tavares de Almeida (2009).

Relating the main variables under analysis with the personal characteristics of ministers, from tables 5.6 and 5.7 the following conclusions are allowed: (i) ministers with experience as junior ministers have a higher probability of being re-selected, which may be related with

governments and Sá Carneiro/Balsemão governments are the same. Cavaco's government from the first term to the second has gained a majority and between the second and the third has kept it. Guterres had a minority in both governments, and Sócrates has lost the majority. These governments were supported by a single party, with the exception of the Sá Carneiro and the Balsemão governments.

Table 5.5: Main variables summary statistics - when parties remain in power

Variable	Mean	Std. Dev.
Cont	0,56	0,50
P	0,75	0,43

Table 5.6: Main variables and personal characteristics of ministers - when PMs remain in power

Personal Characteristics	Nr of ministers	Main variables	
		Cont	P
Em	22	0,50	0,73
Es	23	0,70	0,78
Ss	18	0,74	0,89
Past	14	0,63	0,94
MD	23	0,68	0,57
All	92	0,59	0,72

the fact that this type of ministers (experienced) are quite likely to be partisans (89%); (ii) ministers with consecutive renominations are likely to be partisan (94%) and their probability of re-selection is similar to the average; (iii) ministers with a master's or a Ph.D. degree have a higher chance of re-selection than average, with 68% or 65% kept when the PM or the party remain in power, respectively; (iv) partisan ministers have lower academic degrees, which is expected, as independents are associated with a higher education.

Table 5.7: Main variables and personal characteristics of ministers - when parties remain in power

Personal Characteristics	Nr of ministers	Main variables	
		Cont	P
Em	31	0,45	0,81
Es	33	0,58	0,82
Ss	19	0,74	0,89
Past	18	0,63	0,94
MD	28	0,65	0,63
All	122	0,56	0,75

Table 5.8: Main variables and governments - when PMs remain in power

Government	Nr of ministers	Main variables	
		Cont	P
PS	47	0,51	0,64
PSD	29	0,76	0,79
PSD/CDS	16	0,50	0,81
All	92	0,59	0,72

Table 5.9: Main variables and governments - when parties remain in power

Government	Nr of ministers	Main variables	
		Cont	P
PS	47	0,51	0,64
PSD	29	0,76	0,79
PSD/CDS	46	0,48	0,85
All	122	0,56	0,75

Relating the variables under analysis with the characteristics of the governments, it can be seen that: (i) in PSD governments (coincident with Cavaco Silva as PM), ministers have a higher probability of being re-selected, as can be seen in tables 5.8 to 5.11;[12] (ii) right-wing governments have a stronger presence of partisan ministers, which can be seen by the fact that 79% of the ministers are from this type in PSD or Cavaco Silva governments, and 81% or 85% when PSD and CDS governments are considered and when the PM or the party remain, respectively (see tables 5.8 and 5.9).

Finally, it can be concluded from tables 5.12 and 5.13 that between the first and the second terms no difference is found. Regarding the third term no conclusion is allowed, given that it only happened once (Cavaco Silva's terms: 1985-87; 1987-91; 1991-95).

[12] Another case where a high probability of re-selection is found is between the Sá Carneiro and the Balsemão governments which is 62% (see table 5.11).

Table 5.10: Main variables and Prime-Ministers - when PMs remain in power

PM	Nr of ministers	Main Variables	
		Cont	P
Sócrates	15	0,53	0,40
Guterres	16	0,69	0,75
Cavaco	29	0,76	0,79
Soares	16	0,31	0,75
Balsemão	16	0,50	0,81
All	92	0,59	0,72

Table 5.11: Main variables and Prime-Ministers - when parties remain in power

PM	Nr of ministers	Main variables	
		Cont	P
Sócrates	15	0,53	0,40
Guterres	16	0,69	0,75
Cavaco	29	0,76	0,79
Soares	16	0,31	0,75
Balsemão	16	0,50	0,81
Sá Carneiro-Balsemão	13	0,62	0,92
Durão-Santana	17	0,35	0,82
All	122	0,56	0,75

Table 5.12: Main variables and terms - when PMs remain in power

Term	Nr of ministers	Main Variables	
		Cont	P
T1-T2	75	0,55	0,71
T2-T3	17	0,76	0,76
All	92	0,59	0,72

Table 5.13: Variables and terms - when parties remain in power

Term	Nr of ministers	Main variables	
		Cont	P
T1-T2	105	0,52	0,75
T2-T3	17	0,76	0,76
All	122	0,56	0,75

5.6 Determinants of ministers' re-selection

The results of the probit models explaining the probability of retention as a function of the ministers' type are displayed in table 5.14 for the situation when the PMs remain in power, and in table 5.15 when parties remain in power.

In both tables, model (1) uses the main variables. Model (2) uses these variables together with ministers' personal characteristics. Model (3) uses the political characteristics of the government the ministers belong to, instead of their personal characteristics. Model (4) merges models (2) and (3). Model (5) adds to model (4) the terms variables. Model (6) adds to model (5) the PM fixed effects, but removes the political characteristics of the government, since the goal in this case is to specify for each PM a hazard rate. Finally, model (7) uses the personal characteristics and an interaction between the PM and terms.

From both tables, it can be concluded that a partisan minister has a higher probability of retention than an independent minister. Actually, this is expected: as a partisan minister does not imply a cost, he should be retained with a higher probability by the PM.

This result holds in the situations when the PMs or the parties remain. However, this relation is less strong in case the party remains (see the difference in the p-value between tables 5.14 and 5.15). This fact may mean that, in Portugal, a minister has a stronger relation with the PM than with the party.

In light of the theoretical model, there are two possible explanations for a partisan minister to be re-selected with a higher probability than an independent one. First, as the ministers that we are considering for re-selection have already survived a government without being

reshuffled, it should be expected their competence is at least as high as some threshold. Actually, if a partisan minister has a revealed competence value higher than the overall expected competence value at the time of selection he will be reappointed with a probability not lower to that of an independent whatever the competence of this one. This is more likely when the average competence of a partisan minister is closer to the overall expected value of competence of ministers (see the yellow line in figure 5.3). Second, even in case the revealed competence of a partisan minister is equal to the *ex ante* expected competence of his type, the difference in competence between independent and partisan ministers is not enough to compensate for the cost of having an independent minister.

Table 5.14: Ministers' re-selection by minister type in a probit model - when PMs remain in power

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Partisan	0.724**	1.086***	0.696**	1.079***	1.074***	1.239***	1.243***
	(0.312)	(0.400)	(0.328)	(0.417)	(0.417)	(0.436)	(0.436)
Constant	-0.293	-14.75**	-0.563	-16.58***	-17.03***	-16.48**	-15.85**
	(0.266)	(6.058)	(0.441)	(6.233)	(6.404)	(6.682)	(6.526)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Transition identifiers	No	No	No	No	No	Yes	No
Terms×TI	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0,0203	0,0304	0,0542	0,0332	0,0501	0,0003	0,0003
Observations	92	92	92	92	92	92	92

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Table 5.15: Ministers' re-selection by minister type in a probit model - when parties remain in power

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Partisan	0.529*	0.694**	0.562*	0.805**	0.798**	0.906**	0.913**
	(0.286)	(0.339)	(0.315)	(0.377)	(0.375)	(0.389)	(0.391)
Constant	-0.253	-11.63**	-0.530	-13.91**	-14.33**	-13.85**	-13.31**
	(0.255)	(5.601)	(0.356)	(6.027)	(6.170)	(6.426)	(6.333)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Transition identifiers	No	No	No	No	No	Yes	No
Terms×TI	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0,064	0,0092	0,0311	0,0045	0,0068	0,0001	0,0001
Observations	122	122	122	122	122	122	122

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

5.6.1 Interaction variables

It is important to capture differences in re-selection between types in particular situations. For this purpose, interaction variables between the type of minister and characteristics of the ministers or of the governments are introduced. Great attention has to be given to the possibility of collinearity between those new interaction variables and the variables that are used to control. This is the reason why the results of the analysis are presented on a case by case basis, and this is also the reason to opt to present only those configurations of interaction variables, which not only seem more interesting, but also show positive results.

- Minister's type $\times$ Experience or no-experience

The first situation regards the interaction between ministers' type and experience. In this case, there is an obvious collinearity between this interaction variable and the variables concerning experience. For that reason those variables are dropped. The results are presented in Annex 5.A. It is possible to conclude that independent ministers with experience last less than partisans regardless of experience when PM or parties remain in power (see tables 5.18 and 5.19, respectively). Considering the case when the PM remains in power, it is possible to conclude that independent ministers without experience have a smaller probability of re-selection than partisans with experience in all models, and than partisan without experience in models (6) and (7) (see table 5.20).

- Minister's type $\times$ Master's or Ph.D. degree or no master's nor Ph.D degree

It is also interesting to see the interaction between ministers' type and education. In this case, there is an obvious collinearity between this interaction variable and the variables concerning education. For that reason those variables are dropped. The results are presented in Annex 5.B. It is possible to conclude that partisan ministers with a master's or a Ph.D. degree are re-selected with a higher probability than independents with or without a master's or a Ph.D degree, and than partisans without a master's or a Ph.D degree. This happens when the PMs or parties remain in power (see tables 5.21 and 5.22, respectively).

This can be explained by the fact that a partisan with a higher education implies no cost for the PM and the academic background signals a good performance. For these reasons, the PM will have a higher incentive in re-appointing him.

- Minister's type $\times$ Left or right-wing government

It may also be interesting to study re-selection within left or right-wing governments. In this case, an obvious collinearity exists between the party that supports the government and the new interaction variables. For this reason, that variable (party that supports the government) will be dropped and models (3) and (4) are irrelevant. Another possible correlation is with the PM, but this correlation is possibly less severe. The results are presented in Annex 5.C using the PM fixed effects, but aware of the limitation.

When the PM remains in power, independent ministers in left-wing governments will be re-selected with a lower probability than partisans in left or right-wing governments (see table 5.23). Otherwise, when parties remain in power, independent ministers from left-wing governments are re-selected with a lower probability than partisans in right-wing governments; and in models (6) and (7) they are also re-selected with a lower probability than partisans in left-wing governments (5.24).

Considering only the case when the PM remains in power, independents in right-wing governments have a lower probability of re-selection than partisans of in right-wing governments in models (2), (5), (6) and (7); such relation between an independent in a right-wing government and a partisan in a left-wing government only holds for models (2) and (5) (see table 5.25).

- Main conclusions

The main conclusion is that partisan ministers have a higher probability of re-selection than independent ministers for most situations. This conclusion is more evident when the PM remains in power, as happens in the general case (tables 5.14 and 5.15).

5.7 Conclusion

This work addresses the relation of the PM with her ministers, and focuses on the capacity of ministers with different characteristics to build up their political careers. To this purpose, a model of re-selection of ministers has been constructed and an empirical analysis was carried out.

The theoretical model predicts, first, that a partisan minister will be maintained with a higher probability than an independent minister; and, second, that a higher realized competence of a minister will increase his chances of being re-selected.

In the empirical analysis, the influence of explanatory variables is verified, namely of ministers' type (partisan *vs* independent), as well as of personal characteristics of the ministers and of the government environment in which reselection takes place. It is possible to conclude that a partisan minister has a higher probability of retention than an independent minister.

This work has a limitation due to the difficulty of measuring competence. The theoretical model operates with *ex post* competence but this cannot be measured given the limitation of our database. There are two main possibilities to measure performance of an individual minister in a government. One is to address performance directly and this can be proxied by a positive (e.g. quality of the policies) or a negative (e.g. scandals) variable. For instance, Berlinski et al. (2010) study whether the number of resignation calls affect the ministerial tenure. In order to carry out a complete study of the effect of scandals or of competence it would be necessary to pay attention to all ministers, those who were kept and those who were not kept in the following government. A complete data set regarding scandals is a quite heavy task that was not feasible within the scope of the present work.

Another less direct way of measuring competence would be to look for personal characteristics of ministers, correlated with competence. The analysis indicates that a master's or a Ph.D degree affect positively the probability of reelection in some models; however, experience does not have any influence on re-selection (see tables 5.26 and 5.27 in Annex 5.D). Even though they may acceptably signal competence, their *ex-ante* nature may involve

a model misidentification and, therefore, the findings regarding the influence of education and experience should be read with caution.

Another way to enrich our model would be to analyse how the value of holding office by a PM affects the probability of re-selection. However, there are few studies that evaluate the PM's benefit of holding office. Black (1972) studies 435 city councilmen in the San Francisco Bay Area. Using surveys, he predicts that there is a rationalistic explanation of the career choice process of a politician and that the political choice depends on the immediate environment of the political actor rather than on the social background; finally, the author also infers that political ambitions for office increases as they invest more in their political activity. Enemark et al. (2013) find, in a laboratory experiments with Zambian politicians who won or lost elections for district councils by small margins, that holding office changes the politicians' behavior.

Finally, it should be noticed that the aim of the present work was not to deal with the much wider question of selection of individual ministers by a PM when a new government is formed or a reshuffle takes place. Basically, the treatment of the selection problem empirically is a very heavy task because it requires knowledge notably about the actual choice of the ministers by the PM but also of other candidates considered as well. In the same line, an interesting extension would be to analyse selection and re-selection of ministers not only in individual terms, but inserted in a broader framework of decision, namely as a portfolio choice.

Appendix

Appendix 2.A

Proof of Proposition 1. Based on (2.15) the first-order condition for the optimal choice of $\beta_{t,T}^{A}$ will lead to:

$$\beta_{t,T}^{A} = \frac{1}{2} + \frac{1}{4}\left(\frac{f^{T-t} - \delta^{T-t}v^{T-t}\left(1+2v_0\right)}{f\delta^{T-t}v^{T-t}}\right) \tag{2.19}$$

Therefore, $\beta_{t,T}^{A} = 0$ if $(\delta v)^{T-t} > \frac{f^{T-t}}{1-2f+2v_0}$ and $\beta_{t,T}^{A} = 1$ if $(\delta v)^{T-t} \leq \frac{f^{T-t}}{1+2f+2v_0}$. For the optimal choice of party B we simply have to substitute $+v_0^j = +v_0^A$ for $+v_0^B = -v_0^A$ in (2.15). Thus, $\beta_{t,T}^{B} = \frac{1}{2} + \frac{1}{4}\left(\frac{f^{T-t}-\delta^{T-t}v^{T-t}(1-2v_0)}{f\delta^{T-t}v^{T-t}}\right)$ with $\beta_{t,T}^{B} = 0$ if $(\delta v)^{T-t} > \frac{f^{T-t}}{1-2f-2v_0}$ and $\beta_{t,T}^{B} = 1$ if $(\delta v)^{T-t} \leq \dfrac{f^{T-t}}{1+2f-2v_0}$ □

Proof of Corollary 1. Given equation (2.19), T and T' with $T > T'$, $\beta_{t,T}^{A} > \beta_{t,T'}^{A}$ if $\frac{1}{2} + \frac{1}{4}\left(\frac{f^{T-t}-\delta^{T-t}v^{T-t}(1+2v_0)}{f\delta^{T-t}v^{T-t}}\right) > \frac{1}{2} + \frac{1}{4}\left(\frac{f^{T'-t}-\delta^{T'-t}v^{T'-t}(1+2v_0)}{f\delta^{T'-t}v^{T'-t}}\right)$ □

Proof of Corollary 2. We will make this proof by presenting counter examples.

- For case (a). We know from proposition 1 that $f < \delta v\ \sqrt[T-t]{1-2f-2v_0}$. Given T, T' with $T > T'$, a $\beta_{t,T}^{A}$ and $\beta_{t,T}^{B}$ in this NE, we can have: $\delta v\ \sqrt[T'-t]{1-2f-2v_0} < f < \delta v\ \sqrt[T-t]{1-2f-2v_0} < \delta v$ which means that $\beta_{t,T'}^{B} \in (0,1)$. Thus $\beta_{t,T'}^{B}$ may be different from 0. It is also possible to have $\delta v\ \sqrt[T'-t]{1-2f+2v_0} < f < \delta v\ \sqrt[T-t]{1-2f-2v_0} < \delta v$ which means that $\beta_{t,T'}^{A} \in (0,1)$. Thus $\beta_{t,T'}^{A}$ may be different from 0.

- For case (i). We know from proposition 1 that $f < \delta v\ \sqrt[T-t]{1-2f-2v_0}$. Given T, T' with $T > T'$, a $\beta_{t,T}^{A}$ and $\beta_{t,T}^{B}$ in this NE, we can have: $\delta v\ \sqrt[T'-t]{1-2f-2v_0} < f <$

$\delta v\ ^{T-t}\sqrt{1-2f-2v_0} < \delta v$ which means that $\beta^B_{t,T'} \in (0,1)$. Thus $\beta^B_{t,T'}$ may be different from 0. It is straightforward to see that $\beta^A_{t,T'}$ will remain 0.

- For case (b). We know from proposition 1 that $f < \delta v\ ^{T-t}\sqrt{1-2f+2v_0}$. Given T, T' with $T > T'$, a $\beta^A_{t,T}$ and $\beta^B_{t,T}$ in this NE, we can have: $\delta v\ ^{T'-t}\sqrt{1-2f+2v_0} \leq f < \delta v\ ^{T-t}\sqrt{1-2f+2v_0} < \delta v$ which means that $\beta^A_{t,T'} \in (0,1)$. Thus $\beta^A_{t,T'}$ may be different from 0. It is straightforward to see that $\beta^B_{t,T'} \in (0,1)$

- For case (ii). We know from proposition 1 that $f < \delta v\ ^{T-t}\sqrt{1+2f-2v_0}$. Given T, T' with $T > T'$, a $\beta^A_{t,T}$ and $\beta^B_{t,T}$ in this NE, $\delta v\ ^{T'-t}\sqrt{1+2f-2v_0} \leq f < \delta v\ ^{T-t}\sqrt{1+2f-2v_0} < \delta v$ which means that $\beta^B_{t,T'}$ is 1. Thus $\beta^B_{t,T'}$ may not be between 0 and 1. It is straightforward to see that $\beta^A_{t,T'}$ will remain 0.

- For case (c). Given T, T' with $T > T'$, a $\beta^A_{t,T}$ and $\beta^B_{t,T}$ in this NE, it is straightforward to see that both $\beta^A_{t,T'}$ and $\beta^B_{t,T'}$ will remain between 0 and 1.

- For case (iii). Given T, T' with $T > T'$, a $\beta^A_{t,T}$ and $\beta^B_{t,T}$ in this NE, it is straightforward to see that both $\beta^A_{t,T'}$ and $\beta^B_{t,T'}$ will remain 0 and 1, respectively.

- For case (d). we know from proposition 1 that $f \geq \delta v\ ^{T-t}\sqrt{1+2f+2v_0}$. Given T, T' with $T > T'$, a $\beta^A_{t,T}$ and $\beta^B_{t,T}$ in this NE, we can have: $\delta v < \delta v\ ^{T-t}\sqrt{1+2f-2v_0} \leq f < \delta v\ ^{T'-t}\sqrt{1+2f-2v_0}$, which means that $\beta^B_{t,T'} \in (0,1)$. Thus $\beta^B_{t,T'}$ may be different from 1. It is straightforward to see that $\beta^A_{t,T'} \in (0,1)$.

- For case (iv). we know from proposition 1 that $f \geq \delta v\ ^{T-t}\sqrt{1+2f+2v_0}$. Given T, T' with $T > T'$, a $\beta^A_{t,T}$ and $\beta^B_{t,T}$ in this NE, we can have: $\delta v < \delta v\ ^{T-t}\sqrt{1-2f+2v_0} \leq f < \delta v\ ^{T'-t}\sqrt{1-2f+2v_0}$, which means that $\beta^A_{t,T'}$ is 0. Thus $\beta^A_{t,T'}$ may not be between 0 and 1. It is straightforward to see that $\beta^B_{t,T'}$ will remain 1.

- For case (e). We know from proposition 1 that $f \geq \delta v\ ^{T-t}\sqrt{1+2f+2v_0}$. Given T, T' with $T > T'$, a $\beta^A_{t,T}$ and $\beta^B_{t,T}$ in this NE, we can have $\delta v < \delta v\ ^{T-t}\sqrt{1+2f+2v_0} \leq f < \delta v\ ^{T'-t}\sqrt{1+2f+2v_0}$ which means that $\beta^A_{t,T'} \in (0,1)$. Thus $\beta^A_{t,T'}$ may be different from

1. It is also possible to have $\delta v < \delta v \sqrt[T-t]{1+2f+2v_0} \leq f < \delta v \sqrt[T'-t]{1+2f-2v_0}$ which means that $\beta^B_{t,T'} \in (0,1)$. Thus $\beta^B_{t,T'}$ may be different from 1.

- For case (v). We know from proposition 1 that $f \geq \delta v \sqrt[T-t]{1+2f+2v_0}$. Given T, T' with $T > T'$, a $\beta^A_{t,T}$ and $\beta^B_{t,T}$ in this NE, we can have $\delta v < \delta v \sqrt[T-t]{1+2f+2v_0} \leq f < \delta v \sqrt[T'-t]{1+2f+2v_0}$ which means that $\beta^A_{t,T'} \in (0,1)$. Thus $\beta^A_{t,T'}$ may be different from 1. It is straightforward to see that $\beta^B_{t,T'}$ will remain 1.

□

Proof of Proposition 2. Given equation (2.16), we get:

$$\beta^A_{t,T} = \begin{cases} \frac{1}{2} + \frac{1}{4}\left(\frac{f^{T-t} - \delta^{T-t}v^{T-t}(1+2v_0)}{f\delta^{T-t}v^{T-t}} + \frac{\delta^{T-t}v^{T-t-1}}{\delta^{T-t}v^{T-t}}\rho^{Inc}\right) \; if \; \Pi^A_{t,T} < \frac{1}{2} \\ \frac{1}{2} + \frac{1}{4}\left(\frac{f^{T-t} - \delta^{T-t}v^{T-t}(1+2v_0)}{f\delta^{T-t}v^{T-t}} + 2\frac{\delta^{T-t}v^{T-t-1}}{\delta^{T-t}v^{T-t}}\rho^{Inc}\right) \; if \; \Pi^A_{t,T} \geq \frac{1}{2} \end{cases} \tag{2.20}$$

Therefore, we get:

$$\frac{\partial \beta^A_{t,T}}{\rho^{Inc}} = \begin{cases} \frac{1}{4v} \; if \; \Pi^A_{t,T} < \frac{1}{2} \\ \frac{1}{2v} \; if \; \Pi^A_{t,T} \geq \frac{1}{2} \end{cases} \tag{2.21}$$

□

Proof of Proposition 3. Using equation (2.18), we get:

$$\frac{\partial \beta^A_{t,T}}{\partial k} = -\frac{1}{2k^2} + \frac{1}{4}\left(-\frac{(T-t)\,f^{T-t-1}}{\delta^{T-t}v^{T-t}k^{T-t+1}} + \frac{4E\left(\beta^{Ex}_t\right)}{k^2}\right) \tag{2.22}$$

Thus, in order to have $\frac{\partial \beta^A_{t,T}}{\partial k} < (>)\, 0$ we must have $E\left(\beta^{Ex}_{t,T}\right) < (>)\, \frac{1}{2} + \frac{(T-t)}{4}\frac{f^{T-t-1}}{\delta^{T-t}v^{T-t}k^{T-t-1}}$. To ensure that we always observe $E\left(\beta^{Ex}_{t,T}\right) < 0$, we must guarantee that $(T-t)\left(\frac{f}{\delta v k}\right)^{T-t} > 2\frac{f}{k}$

We also get:

$$\frac{\partial \beta^A_{t,T}}{E\left(\beta^{Ex}_{t,T}\right)} = -\frac{(1-k)}{k} \tag{2.23}$$

□

Proof of Corollary 3. Given equation (2.22), T, T' with $T > T'$, we get that:

$$\frac{\partial \beta_{t,T}}{\partial k} > \frac{\partial \beta_{t,T'}}{\partial k} \Leftrightarrow \frac{T-t}{T'-t} f^{T-T'} < (\delta v k)^{T-T'} \Leftrightarrow \left(\frac{\delta v k}{f}\right)^{T-T'} > \frac{T-t}{T'-t} \tag{2.24}$$

□

Appendix 3.A

Proof of Proposition 1. Based on (3.14), the first order condition for the optimal choice of β is given by:

$$\frac{\partial \Theta}{\partial \beta} = 0 \Leftrightarrow \beta = \frac{mW\left(\frac{1}{2} - f - v\right) + 2\left[(1-m)Z + mW\right][f+v]}{4mW\left[f+v\right]} \tag{3.19}$$

Therefore, we have $\beta = 0$ if $mW\left(\frac{1}{2} - 3\left(f+v\right)\right) \geq 2\left(1-m\right)Z\left(f+v\right)$ and $\beta = 1$ if $mW\left(\frac{1}{2} + f + v\right) \leq 2\left(1-m\right)Z\left(f+v\right)$. Using the definitions for the probabilities, we reach proposition 1. □

Proof of Proposition 2. Using (3.15), we get:

$$\frac{\partial \beta}{\partial \Omega} = \frac{-mW}{4m\left[f+v\right]} < 0 \tag{3.20}$$

□

Proof of Proposition 3. Using (3.17), we get:

$$\frac{\partial \beta}{\partial k} = -\frac{(1-m)Z}{2mWk^2} - \frac{\left(1 - E\left(\beta^{ex}\right)\right)}{2k^2} + \frac{v\left[\frac{1}{2} - \left(f+v\right)\left(1 - 2E\left(\beta^{ex}\right)\right)\right]}{2\left(f+vk\right)^2} \tag{3.21}$$

Thus, as $f + v < \frac{1}{2}$ we can either have $\frac{\partial \beta}{\partial k} < 0$ or $\frac{\partial \beta}{\partial k} > 0$.

We can also deduce:

$$\frac{\partial \beta}{\partial E\left(\beta^{ex}\right)} = -\frac{(1-k)\left(f+2vk\right)}{2k\left(f+vk\right)} < 0, \text{ for all } k \text{ with } 0 < k < 1 \tag{3.22}$$

□

Proof of Proposition 4. Using (3.18), we get:

$$\frac{\partial \beta}{\partial g} = \begin{cases} \dfrac{\frac{1}{2} - (f+v) + 2\beta^* (f+v)}{2\left[2(f+v)+g\right]^2} > 0 \text{ if } \beta < \beta^* \\ \\ \dfrac{-\left[\frac{1}{2} - (f+v) + 2\beta^* (f+v)\right]}{2\left[2(f+v)+g\right]^2} < 0 \text{ if } \beta > \beta^* \end{cases} \tag{3.23}$$

□

Appendix 5.A

Variables of the model

Table 5.16: Variables of the model and respective values in the graphical analysis as in Quiroz Flores and Smith (2011) - Part 1

Variable	Description	Figure 1	Figure 2	Figure 3	Why this value?
α_{PM}	PM's policy position	0,5	0,5	0,5	It is equal to the expected value. This way, this variable has no influence on our results.
θ_{PM}	PM's competence	0,5	0,5	0,5	It is equal to the expected value. This way, this variable has no influence on our results.
λ	Influence of PM competence relative to minister competence on the production of public goods	0,75	0,75	0,75	It is assumed that the PM has a superior influence than the minister.
ρ	Relative benefit of ideology proximity on voters' utility	1	1	1	The same relative benefit is assigned to ideology and competence.
γ	Relative benefit of competence on voters' utility	1	1	1	The same explanation as above.

Table 5.17: Variables of the model and respective values in the graphical analysis - Part 2

Variable	Description	Figure 1	Figure 2	Figure 3	Why this value?
v	Benefit of the PM from holding office	15/20/25	20	20	For graphical convenience; this coefficient affects mainly the convexity of the curves.
$\bar{c}$	Cost to the PM from having independent ministers in office	1	0,1/1/3	1	As the average is set to one, this value is assumed. In figure 2, we assume 3 situations a value below and other above.
$E(\theta_i)$	Expected competence of independent ministers	0,75	0,75	0,75/0,65/0,55	We assume that the expected competence of independent ministers is higher than of partisans. In figure 3, the difference between $E(\theta_i)$ and $E(\theta_p)$ is diminished.
$E(\theta_p)$	Expected competence of partisan ministers	0,25	0,25	0,25/0,35/0,45	The same explanation as above.

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Annex

Annex 4.A

All ministers considered

Table 4.11: Hazard rates for Cox models for all ministers - "Public Service" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.772	0.783	0.799	0.810	0.792	0.583	0.570
	(0.416)	(0.445)	(0.454)	(0.473)	(0.465)	(0.330)	(0.327)
pp	1.262	1.412	1.528	1.614	1.615	1.090	1.058
	(0.695)	(0.798)	(0.867)	(0.915)	(0.923)	(0.604)	(0.591)
i	1.008	1.120	1.067	1.123	1.106	0.989	0.941
	(0.616)	(0.712)	(0.663)	(0.713)	(0.704)	(0.606)	(0.590)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.3312	0.0967	0	0	0	0	0
Observations	302	302	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.12: Hazard rates for Cox models for all ministers - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.612*	0.554*	0.523*	0.502**	0.490**	0.535*	0.539*
	(0.164)	(0.169)	(0.174)	(0.174)	(0.178)	(0.197)	(0.194)
sp	0.793	0.708	0.655	0.620	0.619	0.918	0.945
	(0.437)	(0.400)	(0.372)	(0.351)	(0.354)	(0.509)	(0.528)
i	0.799	0.793	0.699	0.696	0.685	0.908	0.890
	(0.318)	(0.321)	(0.276)	(0.285)	(0.281)	(0.368)	(0.358)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.3312	0.0967	0	0	0	0	0
Observations	302	302	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.B

Sub-sample: Ministers who entered at the start of government

Table 4.13: Hazard rates for Cox models for ministers who entered at the start of government - "Independent" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.715	0.632	0.654	0.639	0.599	0.502	0.512
	(0.299)	(0.272)	(0.278)	(0.278)	(0.267)	(0.219)	(0.228)
pp	1.237	1.230	1.472	1.477	1.490	1.208	1.211
	(0.542)	(0.529)	(0.649)	(0.650)	(0.646)	(0.513)	(0.520)
sp	0.612	0.526	0.591	0.535	0.492	0.501	0.575
	(0.465)	(0.420)	(0.470)	(0.441)	(0.425)	(0.445)	(0.530)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.2116	0.051	0	0	0	0	0
Observations	240	240	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.14: Hazard rates for Cox models for ministers who entered at the start of government - "Public Service" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	1.168	1.203	1.105	1.196	1.218	1.002	0.891
	(0.797)	(0.885)	(0.816)	(0.932)	(0.991)	(0.843)	(0.774)
pp	2.021	2.340	2.489	2.764	3.029	2.412	2.107
	(1.391)	(1.691)	(1.825)	(2.093)	(2.441)	(2.042)	(1.843)
i	1.634	1.903	1.691	1.871	2.033	1.996	1.739
	(1.242)	(1.521)	(1.342)	(1.545)	(1.758)	(1.775)	(1.604)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.2116	0.051	0	0	0	0	0
Observations	240	240	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.15: Hazard rates for Cox models for ministers who entered at the start of government - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.578**	0.514**	0.444**	0.433**	0.402**	0.415**	0.423**
	(0.158)	(0.163)	(0.148)	(0.155)	(0.158)	(0.165)	(0.165)
sp	0.495	0.427	0.402	0.362	0.330	0.415	0.475
	(0.340)	(0.309)	(0.295)	(0.274)	(0.266)	(0.351)	(0.415)
i	0.808	0.813	0.679	0.677	0.671	0.828	0.826
	(0.354)	(0.350)	(0.299)	(0.298)	(0.291)	(0.351)	(0.354)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.2116	0.051	0	0	0	0	0
Observations	240	240	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.C

Sub-sample: Experienced ministers

Table 4.16: Hazard rates for Cox models for experienced ministers - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.476**	0.415**	0.460*	0.438*	0.414*	0.418*	0.423*
	(0.160)	(0.147)	(0.209)	(0.206)	(0.205)	(0.210)	(0.209)
sp	0***	0***	0***	0***	0***	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)
i	0.681	0.657	0.696	0.714	0.705	0.792	0.794
	(0.346)	(0.349)	(0.362)	(0.391)	(0.387)	(0.436)	(0.437)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0	0	0	0	0	0	0
Observations	193	193	193	193	193	193	193

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.17: Hazard rates for Cox models for experienced ministers who entered at the start of government - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.453**	0.393**	0.355**	0.352**	0.311**	0.291**	0.290**
	(0.157)	(0.145)	(0.157)	(0.166)	(0.163)	(0.152)	(0.146)
sp	0***	0***	0***	0***	0	0***	0***
	(0)	(0)	(0)	(0)	(0)	(0)	(0)
i	0.603	0.594	0.551	0.573	0.567	0.571	0.585
	(0.341)	(0.331)	(0.320)	(0.339)	(0.333)	(0.349)	(0.378)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0	0	0	0	0	0	0
Observations	155	155	155	155	155	155	155

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.D

Sub-samples: First term and other than the first term

Table 4.18: Hazard rates for Cox models for the first term - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.498*	0.504	0.546	0.523	0.523	0.520	0.520
	(0.203)	(0.227)	(0.238)	(0.259)	(0.259)	(0.257)	(0.257)
sp	1.126	1.021	1.238	1.136	1.136	1.178	1.178
	(0.649)	(0.602)	(0.707)	(0.665)	(0.665)	(0.651)	(0.651)
i	0.557	0.572	0.526	0.522	0.522	0.608	0.608
	(0.303)	(0.310)	(0.289)	(0.288)	(0.288)	(0.322)	(0.322)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.2725	0.6313	0.0802	0	0	0	0
Observations	173	173	173	173	173	173	173

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.19: Hazard rates for Cox models for first term ministers who entered at the start of government - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.384**	0.383*	0.416*	0.374*	0.374*	0.368*	0.368*
	(0.172)	(0.190)	(0.195)	(0.210)	(0.210)	(0.199)	(0.199)
sp	0.839	0.763	0.950	0.861	0.861	0.883	0.883
	(0.548)	(0.507)	(0.619)	(0.577)	(0.577)	(0.620)	(0.620)
i	0.559	0.586	0.502	0.480	0.480	0.541	0.541
	(0.343)	(0.357)	(0.327)	(0.323)	(0.323)	(0.323)	(0.323)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.1822	0.4030	0.0812	0	0	0	0
Observations	146	146	146	146	146	146	146

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.20: Hazard rates for Cox models for other terms than the first - "Independent" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.448*	0.511	0.479	0.559	0.505	0.435	0.435
	(0.207)	(0.272)	(0.241)	(0.326)	(0.306)	(0.268)	(0.268)
pp	0.811	0.980	0.719	0.871	0.874	0.672	0.672
	(0.438)	(0.561)	(0.420)	(0.553)	(0.553)	(0.398)	(0.398)
sp	0.333	0.424	0.286	0.418	0.394	0.452	0.452
	(0.391)	(0.497)	(0.342)	(0.510)	(0.491)	(0.589)	(0.589)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.2258	0.3905	0	0	0.1768	0.4646	0.4646
Observations	129	129	129	129	129	129	129

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.21: Hazard rates for Cox models for ministers who entered at the start of government in other terms than the first - "Independent" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.502	0.557	0.481	0.517	0.387	0.334*	0.334*
	(0.249)	(0.312)	(0.259)	(0.301)	(0.249)	(0.212)	(0.212)
pp	0.844	0.952	0.753	0.806	0.755	0.590	0.590
	(0.488)	(0.571)	(0.474)	(0.546)	(0.507)	(0.374)	(0.374)
sp	0***	0***	0***	0	0	0***	0***
	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0	0	0	0	0	0	0
Observations	94	94	94	94	94	94	94

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.E

Sub-samples: Left and right-wing governments

Table 4.22: Hazard rates for Cox models for right-wing governments - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.470*	0.496	0.503	0.545	0.501	0.588	0.576
	(0.195)	(0.249)	(0.240)	(0.279)	(0.282)	(0.333)	(0.319)
sp	0.610	0.753	0.487	0.595	0.564	0.796	0.768
	(0.542)	(0.669)	(0.401)	(0.488)	(0.476)	(0.685)	(0.655)
i	0.843	0.930	0.778	0.832	0.800	1.070	1.017
	(0.536)	(0.644)	(0.492)	(0.575)	(0.525)	(0.728)	(0.696)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.2448	0.2651	0.0938	0.0958	0	0	0
Observations	155	155	155	155	155	155	155

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.23: Hazard rates for Cox models for ministers who entered at the start of government in right-wing governments - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.507	0.486	0.530	0.538	0.470	0.569	0.551
	(0.210)	(0.251)	(0.250)	(0.273)	(0.283)	(0.351)	(0.336)
sp	0.393	0.410	0.318	0.348	0.289	0.402	0.391
	(0.457)	(0.523)	(0.352)	(0.409)	(0.361)	(0.525)	(0.506)
i	0.934	0.997	0.878	0.903	0.893	1.249	1.130
	(0.623)	(0.712)	(0.568)	(0.631)	(0.587)	(0.856)	(0.793)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.2756	0.4371	0.0906	0.1785	0	0	0
Observations	155	155	155	155	155	155	155

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.24: Hazard rates for Cox models for left-wing governments - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.539	0.528	0.582	0.542	0.544	0.510	0.513
	(0.222)	(0.224)	(0.256)	(0.248)	(0.250)	(0.242)	(0.240)
sp	0.870	0.711	0.902	0.769	0.766	1.124	1.219
	(0.608)	(0.518)	(0.621)	(0.561)	(0.557)	(0.710)	(0.764)
i	0.727	0.694	0.678	0.666	0.662	0.879	0.865
	(0.341)	(0.328)	(0.332)	(0.334)	(0.333)	(0.400)	(0.389)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.5036	0.6059	0	0	0	0	0
Observations	147	147	147	147	147	147	147

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.25: Hazard rates for Cox models for left-wing governments whose ministers entered at the start of government - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.396**	0.392*	0.416*	0.382*	0.382*	0.331**	0.332**
	(0.184)	(0.189)	(0.203)	(0.199)	(0.196)	(0.174)	(0.173)
sp	0.518	0.412	0.537	0.454	0.454	0.557	0.738
	(0.417)	(0.337)	(0.421)	(0.370)	(0.365)	(0.442)	(0.725)
i	0.686	0.643	0.617	0.600	0.611	0.698	0.728
	(0.371)	(0.336)	(0.367)	(0.357)	(0.368)	(0.364)	(0.373)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.2279	0.1745	0	0	0	0	0
Observations	114	114	114	114	114	114	114

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.F

Sub-samples: Minority and majority governments

Table 4.26: Hazard rates for Cox models for minority governments - "Public Service" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.360*	0.451	0.490	0.614	0.615	0.317*	0.318*
	(0.220)	(0.288)	(0.294)	(0.398)	(0.389)	(0.216)	(0.204)
pp	0.485	0.604	0.496	0.665	0.666	0.312**	0.301***
	(0.265)	(0.349)	(0.280)	(0.388)	(0.383)	(0.150)	(0.128)
i	0.465	0.612	0.450	0.567	0.567	0.351*	0.321**
	(0.301)	(0.417)	(0.286)	(0.370)	(0.370)	(0.220)	(0.183)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.3929	0.7021	0	0	0	0	0
Observations	132	132	132	132	132	132	132

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.27: Hazard rates for Cox models for minority governments whose ministers entered at the start of government - "Public Service" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.477	0.610	0.643	0.736	0.732	0.327*	0.241**
	(0.313)	(0.407)	(0.445)	(0.514)	(0.501)	(0.205)	(0.158)
pp	0.953	1.172	1.030	1.339	1.332	0.512*	0.354*
	(0.515)	(0.668)	(0.604)	(0.805)	(0.795)	(0.200)	(0.189)
i	0.632	0.842	0.622	0.776	0.778	0.458	0.306
	(0.476)	(0.670)	(0.482)	(0.627)	(0.626)	(0.351)	(0.263)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.5969	0	0	0	0	0	0
Observations	109	109	109	109	109	109	109

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.28: Hazard rates for Cox models for majority governments - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.485**	0.393**	0.347**	0.345**	0.323**	0.360**	0.360**
	(0.165)	(0.164)	(0.143)	(0.152)	(0.149)	(0.170)	(0.170)
sp	0.415	0.346	0.330	0.354	0.334	0.393	0.393
	(0.337)	(0.305)	(0.276)	(0.298)	(0.286)	(0.342)	(0.342)
i	0.649	0.661	0.588	0.596	0.582	0.768	0.768
	(0.334)	(0.338)	(0.307)	(0.321)	(0.310)	(0.404)	(0.404)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.1856	0.1009	0	0	0	0.2049	0.2049
Observations	170	170	170	170	170	170	170

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.29: Hazard rates for Cox models for majority governments whose ministers entered at the start of government - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.515*	0.385**	0.365**	0.347**	0.306**	0.333**	0.333**
	(0.174)	(0.159)	(0.154)	(0.157)	(0.150)	(0.167)	(0.167)
sp	0.290	0.202	0.210	0.204	0.167	0.193	0.193
	(0.317)	(0.250)	(0.243)	(0.252)	(0.215)	(0.252)	(0.252)
i	0.879	0.833	0.737	0.702	0.681	0.865	0.865
	(0.473)	(0.450)	(0.402)	(0.403)	(0.385)	(0.477)	(0.477)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.1626	0.0981	0	0	0	0.1552	0.2049
Observations	131	131	131	131	131	131	131

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.30: Hazard rates for Cox models for majority governments whose ministers entered at the start of government - "Independent" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.586	0.462	0.495	0.494	0.449	0.386*	0.386*
	(0.276)	(0.240)	(0.236)	(0.263)	(0.246)	(0.201)	(0.201)
pp	1.137	1.201	1.356	1.424	1.468	1.156	1.156
	(0.612)	(0.649)	(0.738)	(0.818)	(0.830)	(0.637)	(0.637)
sp	0.329	0.243	0.285	0.290	0.245	0.223	0.223
	(0.372)	(0.303)	(0.337)	(0.367)	(0.319)	(0.290)	(0.290)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.1626	0.0981	0	0	0	0.1552	0.2049
Observations	131	131	131	131	131	131	131

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.G

Sub-samples: Coalition and non-coalition governments

Table 4.31: Hazard rates for Cox models for non-coalition governments whose ministers entered at the start of government - "Parliament" as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.635	0.542*	0.454**	0.428**	0.378**	0.392**	0.408**
	(0.198)	(0.184)	(0.175)	(0.163)	(0.168)	(0.181)	(0.186)
sp	0.366	0.305	0.307	0.252	0.218	0.279	0.347
	(0.327)	(0.288)	(0.302)	(0.255)	(0.240)	(0.329)	(0.430)
i	0.801	0.829	0.717	0.704	0.678	0.813	0.809
	(0.399)	(0.415)	(0.354)	(0.352)	(0.337)	(0.407)	(0.409)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.3998	0.2584	0	0.1104	0	0.0622	0
Observations	143	143	143	143	143	143	143

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.H

Interaction: Ministers with and without experience

Table 4.32: Hazard rates for Cox models for interaction variables between paths to power and experience - "Party" with experience as base

Variables	(1)	(3)	(5)	(6)	(7)
p without experience	1.196	1.326	1.443	1.663	1.756
	(0.527)	(0.642)	(0.691)	(0.807)	(0.836)
pp with experience	2.049**	2.496**	2.543**	2.653**	2.628**
	(0.675)	(1.031)	(1.147)	(1.228)	(1.197)
pp without experience	1.145	1.469	1.660	1.431	1.516
	(0.505)	(0.774)	(0.924)	(0.783)	(0.817)
sp with experience	0	0***	0***	0	0***
	(0)	(0)	(0)	(0)	(0)
sp without experience	2.187	2.355	2.730*	3.547**	3.711**
	(1.130)	(1.353)	(1.620)	(1.954)	(2.129)
i with experience	1.419	1.610	1.780	2.096*	2.098*
	(0.640)	(0.739)	(0.845)	(0.930)	(0.936)
i without experience	1.285	1.309	1.485	2.114	2.194
	(0.678)	(0.828)	(0.934)	(1.259)	(1.293)
Political Char.	No	Yes	Yes	No	No
Terms	No	No	Yes	Yes	No
Prime Ministers	No	No	No	Yes	No
Terms×PM	No	No	No	No	Yes
Wald statistic (p-value)	0.4143	0	0	0	0
Observations	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.33: Hazard rates for Cox models for all ministers who entered at the start of government with interaction variables between paths to power and experience - "Party" with experience as base

Variables	(1)	(3)	(5)	(6)	(7)
p without experience	1.125	1.588	1.797	2.156	2.426*
	(0.535)	(0.832)	(0.896)	(1.072)	(1.160)
pp with experience	2.148**	3.178***	3.536***	3.801***	3.685***
	(0.723)	(1.288)	(1.666)	(1.807)	(1.730)
pp without experience	1.183	1.812	2.223	2.136	2.377
	(0.527)	(1.011)	(1.335)	(1.264)	(1.377)
sp with experience	0***	0	0***	0***	0
	(0)	(0)	(0)	(0)	(0)
sp without experience	1.315	1.845	2.387	3.492*	3.961*
	(0.864)	(1.373)	(1.841)	(2.604)	(3.237)
i with experience	1.313	1.613	1.975	2.194	2.228
	(0.673)	(0.806)	(1.016)	(1.088)	(1.116)
i without experience	1.582	2.053	2.510	3.631**	3.944**
	(0.888)	(1.398)	(1.669)	(2.257)	(2.410)
Political Char.	No	Yes	Yes	No	No
Terms	No	No	Yes	Yes	No
Prime Ministers	No	No	No	Yes	No
Terms×PM	No	No	No	No	Yes
Wald statistic (p-value)	0	0	0	0	0
Observations	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.I

Interaction: Term of the government

Table 4.34: Hazard rates for Cox models for interaction variables between paths to power and terms - "Party" in the first term as base

Variables	(1)	(2)	(3)	(4)	(6)
p in other terms	1.632	1.548	1.768	1.675	1.883
	(0.659)	(0.725)	(0.944)	(0.968)	(0.979)
pp in first term	2.009*	2.073	2.159*	2.306*	2.211*
	(0.851)	(0.933)	(0.998)	(1.113)	(1.063)
pp in other terms	2.570**	2.389	2.601*	2.465	2.412
	(1.208)	(1.287)	(1.422)	(1.544)	(1.428)
sp in first term	2.182	1.900	2.015	1.808	2.800
	(1.413)	(1.276)	(1.382)	(1.287)	(1.806)
sp in other terms	1.072	1.004	1.033	1.014	1.433
	(1.207)	(1.196)	(1.212)	(1.269)	(1.787)
i in first term	1.078	1.096	0.929	0.928	1.347
	(0.649)	(0.672)	(0.574)	(0.587)	(0.815)
i in other terms	3.130**	2.641*	3.384**	2.886*	3.496**
	(1.555)	(1.416)	(1.846)	(1.706)	(1.984)
Personal Char.	No	Yes	No	Yes	Yes
Political Char.	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	Yes
Wald statistic (p-value)	0.2791	0.2714	0.0038	0.0006	0
Observations	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.35: Hazard rates for Cox models for interaction variables between paths to power and terms - "Independent" in other terms than the first as base

Variables	(1)	(2)	(3)	(4)	(6)
p in first term	0.319**	0.379*	0.296**	0.347*	0.286**
	(0.159)	(0.203)	(0.161)	(0.205)	(0.162)
p in other terms	0.521	0.586	0.522	0.580	0.539
	(0.219)	(0.274)	(0.239)	(0.286)	(0.272)
pp in first term	0.642	0.785	0.638	0.799	0.633
	(0.289)	(0.379)	(0.298)	(0.395)	(0.321)
pp in other terms	0.821	0.904	0.769	0.854	0.690
	(0.401)	(0.460)	(0.386)	(0.450)	(0.363)
sp in first term	0.697	0.719	0.595	0.627	0.801
	(0.468)	(0.497)	(0.402)	(0.436)	(0.489)
sp in other terms	0.343	0.380	0.305	0.351	0.410
	(0.388)	(0.442)	(0.351)	(0.416)	(0.492)
i in first term	0.344*	0.415	0.274**	0.321*	0.385
	(0.200)	(0.256)	(0.167)	(0.211)	(0.245)
Personal Char.	No	Yes	No	Yes	Yes
Political Char.	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	Yes
Wald statistic (p-value)	0.2791	0.2714	0.0038	0.0006	0
Observations	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.36: Hazard rates for Cox models for ministers who entered at the start of government with interaction variables between paths to power and terms - "Party" in the first term as base

Variables	(1)	(2)	(3)	(4)	(6)
p in other terms	2.306*	1.900	2.405	1.993	2.141
	(1.036)	(0.969)	(1.380)	(1.241)	(1.157)
pp in first term	2.625**	2.702**	2.947**	3.138**	3.113**
	(1.221)	(1.326)	(1.479)	(1.651)	(1.619)
pp in other terms	3.318**	2.856*	3.634**	3.154*	3.197*
	(1.679)	(1.685)	(2.101)	(2.134)	(1.974)
sp in first term	2.200	2.015	2.159	2.073	2.957
	(1.643)	(1.581)	(1.715)	(1.733)	(2.353)
sp in other terms	0	0	0	0***	0
	(0)	(0)	(0)	(0)	(0)
i in first term	1.398	1.454	1.193	1.201	1.646
	(0.974)	(1.023)	(0.846)	(0.874)	(1.123)
i in other terms	4.011**	3.308**	4.552***	3.808**	4.576**
	(2.215)	(2.001)	(2.655)	(2.494)	(2.859)
Personal Char.	No	Yes	No	Yes	Yes
Political Char.	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	Yes
Wald statistic (p-value)	0.1692	0.1216	0.0001	0	0
Observations	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.37: Hazard rates for Cox models for ministers who entered at the start of government with interaction variables between paths to power and terms - "Independent" in other terms than the first as base

Variables	(1)	(2)	(3)	(5)	(6)
p in first term	0.249**	0.302**	0.220***	0.263**	0.219**
	(0.138)	(0.183)	(0.128)	(0.172)	(0.136)
p in other terms	0.575	0.574	0.528	0.523	0.468
	(0.259)	(0.281)	(0.262)	(0.268)	(0.241)
pp in first term	0.655	0.817	0.647	0.824	0.680
	(0.316)	(0.428)	(0.323)	(0.444)	(0.380)
pp in other terms	0.827	0.863	0.798	0.828	0.699
	(0.430)	(0.461)	(0.422)	(0.454)	(0.400)
sp in first term	0.548	0.609	0.474	0.544	0.646
	(0.418)	(0.483)	(0.373)	(0.443)	(0.496)
sp in other terms	0***	0***	0***	0***	0
	(0)	(0)	(0)	(0)	(0)
i in first term	0.349	0.440	0.262*	0.315	0.360
	(0.231)	(0.310)	(0.191)	(0.249)	(0.266)
Personal Char.	No	Yes	No	Yes	Yes
Political Char.	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	Yes
Wald statistic (p-value)	0.1692	0.1216	0.0001	0	0
Observations	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.J

Interaction: Left and right-wing governments

Table 4.38: Hazard rates for Cox models for interaction variables between paths to power and type of government - "Parliament" in a left-wing government as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p left gov.	0.519	0.494	0.505	0.457	0.463	0	0.499
	(0.221)	(0.222)	(0.242)	(0.225)	(0.224)	(0.241)	(0.242)
p right gov.	0.688	0.610	0.202*	0.191*	0.458*	2.59e-10***	8.08e-11***
	(0.212)	(0.217)	(0.186)	(0.184)	(0.193)	(3.02e-10)	(6.58e-11)
pp right gov.	1.086	0.929	0.343	0.301	0.969	4.05e-10***	1.31e-10***
	(0.459)	(0.391)	(0.311)	(0.276)	(0.412)	(4.96e-10)	(1.12e-10)
sp left gov.	0.821	0.669	0.772	0.641	0.638	1.154	1.280
	(0.597)	(0.507)	(0.572)	(0.496)	(0.483)	(0.750)	(0.838)
sp right gov.	0.799	0.701	0.210	0.191	0.538	3.20e-10***	9.95e-11
	(0.642)	(0.573)	(0.250)	(0.228)	(0.471)	(4.23e-10)	(0)
i left gov.	0.713	0.678	0.605	0.576	0.624	0.859	0.865
	(0.349)	(0.339)	(0.304)	(0.299)	(0.302)	(0.418)	(0.411)
i right gov.	1.151	0.995	0.339	0.291	0.698	4.04e-10***	1.18e-10***
	(0.598)	(0.544)	(0.333)	(0.287)	(0.393)	(4.62e-10)	(1.13e-10)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.7499	0.3272	0	0	0	0	0
Observations	302	302	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.39: Hazard rates for Cox models for ministers who entered at the start of government with interaction variables between paths to power and type of government - "Parliament" in a left-wing government as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p left gov.	0.382**	0.369**	0.359*	0.321**	0.327**	0.309**	0.318**
	(0.183)	(0.184)	(0.193)	(0.175)	(0.173)	(0.167)	(0.169)
p right gov.	0.709	0.612	0.185*	0.153*	0.414*	1.90e-10***	6.67e-11***
	(0.221)	(0.226)	(0.186)	(0.169)	(0.195)	(2.30e-10)	(7.92e-11)
pp right gov.	1.019	0.918	0.304	0.240	0.926	3.04e-10***	1.10e-10***
	(0.437)	(0.394)	(0.300)	(0.253)	(0.401)	(3.99e-10)	(1.42e-10)
sp left gov.	0.488	0.422	0.485	0.430	0.419	0.619	0.830
	(0.415)	(0.366)	(0.430)	(0.388)	(0.375)	(0.521)	(0.854)
sp right gov.	0.502	0.407	0.123	0.0907	0.269	1.20e-10	0
	(0.539)	(0.464)	(0.178)	(0.139)	(0.348)	(0)	(0)
i left gov.	0.659	0.648	0.546	0.527	0.599	0.697	0.751
	(0.374)	(0.366)	(0.330)	(0.324)	(0.327)	(0.380)	(0.406)
i right gov.	1.224	1.106	0.327	0.263	0.764	3.82e-10***	1.20e-10***
	(0.656)	(0.614)	(0.357)	(0.293)	(0.415)	(5.04e-10)	(1.56e-10)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.5167	0.1647	0	0	0	0	0
Observations	240	240	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.K

Interaction: Minority and majority governments

Table 4.40: Hazard rates for Cox models for interaction variables between paths to power and type of government - "Public Service" in a minority government as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p with majority	0.388*	0.425	0.348*	0.400	0.374	0.374	0.0839***
	(0.198)	(0.248)	(0.199)	(0.249)	(0.243)	(0.240)	(0.0688)
p with minority	0.371	0.403	0.358	0.405	0.474	0.360	0.270*
	(0.234)	(0.272)	(0.235)	(0.279)	(0.324)	(0.231)	(0.183)
pp with majority	0.771	0.940	0.822	0.977	1.020	0.971	0.220*
	(0.427)	(0.551)	(0.462)	(0.582)	(0.618)	(0.664)	(0.190)
pp with minority	0.505	0.562	0.533	0.597	0.646	0.408*	0.273***
	(0.288)	(0.346)	(0.312)	(0.373)	(0.406)	(0.210)	(0.133)
sp with majority	0.331	0.339	0.292	0.315	0.318	0.435	0.0948**
	(0.286)	(0.307)	(0.249)	(0.277)	(0.286)	(0.424)	(0.108)
i with majority	0.527	0.604	0.444	0.498	0.515	0.746	0.154**
	(0.332)	(0.405)	(0.289)	(0.347)	(0.360)	(0.538)	(0.140)
i with minority	0.469	0.544	0.490	0.573	0.577	0.401	0.285**
	(0.318)	(0.393)	(0.340)	(0.418)	(0.417)	(0.262)	(0.182)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.3885	0.1076	0.0003	0.0001	0.0130	0	0
Observations	302	302	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.41: Hazard rates for Cox models for interaction variables between paths to power and type of government - "Parliament" in a majority government as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p with majority	0.503**	0.452**	0.423**	0.409**	0.367**	0.385**	0.382**
	(0.170)	(0.178)	(0.160)	(0.168)	(0.165)	(0.178)	(0.170)
p with minority	0.482	0.429	0.435*	0.414*	0.464	0.371	1.231
	(0.242)	(0.222)	(0.208)	(0.202)	(0.231)	(0.224)	(0.991)
pp with minority	0.656	0.598	0.648	0.611	0.633	0.420	1.244
	(0.284)	(0.262)	(0.285)	(0.274)	(0.291)	(0.292)	(1.001)
sp with majority	0.429	0.360	0.356	0.322	0.312	0.447	0.432
	(0.347)	(0.302)	(0.289)	(0.269)	(0.268)	(0.383)	(0.361)
sp with minority	1.298	1.064	1.217	1.023	0.980	1.029	4.555*
	(0.720)	(0.623)	(0.684)	(0.609)	(0.593)	(0.704)	(3.933)
i with majority	0.684	0.642	0.540	0.510	0.505	0.768	0.701
	(0.348)	(0.329)	(0.269)	(0.263)	(0.261)	(0.412)	(0.373)
i with minority	0.608	0.579	0.596	0.586	0.565	0.413	1.299
	(0.348)	(0.340)	(0.340)	(0.354)	(0.343)	(0.293)	(1.089)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.3885	0.1076	0.0003	0.0001	0.0130	0	0
Observations	302	302	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.42: Hazard rates for Cox models for ministers who entered at the start of government with interaction variables between paths to power and type of government - "Public Service" in a minority government as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p with majority	0.791	0.804	0.681	0.750	0.664	0.496	0.0685***
	(0.435)	(0.530)	(0.437)	(0.540)	(0.536)	(0.316)	(0.0631)
p with minority	0.497	0.504	0.463	0.505	0.592	0.398	0.178**
	(0.352)	(0.387)	(0.346)	(0.396)	(0.493)	(0.257)	(0.128)
pp with majority	1.485	1.846	1.571	1.906	1.985	1.468	0.197*
	(0.858)	(1.184)	(0.961)	(1.287)	(1.478)	(0.961)	(0.188)
pp with minority	1.013	1.013	1.051	1.059	1.125	0.716	0.275**
	(0.604)	(0.691)	(0.652)	(0.732)	(0.845)	(0.363)	(0.178)
sp with majority	0.444	0.389	0.388	0.368	0.329	0.300	0.0440**
	(0.516)	(0.503)	(0.456)	(0.476)	(0.462)	(0.416)	(0.0659)
i with majority	1.363	1.511	1.082	1.213	1.263	1.233	0.159*
	(0.930)	(1.129)	(0.808)	(0.989)	(1.096)	(0.914)	(0.158)
i with minority	0.621	0.701	0.634	0.730	0.729	0.514	0.225*
	(0.498)	(0.603)	(0.520)	(0.630)	(0.652)	(0.379)	(0.195)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.4158	0.0355	0	0	0.0001	0	0
Observations	240	240	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.43: Hazard rates for Cox models for ministers who entered at the start of government with interaction variables between paths to power and type of government - "Parliament" in a majority government as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p with majority	0.533*	0.435**	0.434**	0.394**	0.335**	0.338**	0.347**
	(0.179)	(0.174)	(0.163)	(0.168)	(0.163)	(0.169)	(0.171)
p with minority	0.335*	0.273**	0.294**	0.265**	0.298**	0.271**	0.902
	(0.193)	(0.155)	(0.162)	(0.143)	(0.164)	(0.179)	(0.790)
pp with minority	0.682	0.549	0.669	0.556	0.566	0.488	1.392
	(0.289)	(0.244)	(0.285)	(0.259)	(0.269)	(0.335)	(1.126)
sp with majority	0.299	0.211	0.247	0.193	0.166	0.205	0.223
	(0.325)	(0.247)	(0.270)	(0.228)	(0.209)	(0.266)	(0.279)
sp with minority	0.673	0.542	0.636	0.525	0.504	0.681	5.066*
	(0.389)	(0.348)	(0.389)	(0.354)	(0.375)	(0.446)	(4.834)
i with majority	0.917	0.818	0.688	0.637	0.636	0.840	0.808
	(0.484)	(0.432)	(0.363)	(0.347)	(0.345)	(0.458)	(0.445)
i with minority	0.418	0.380	0.403	0.383	0.367	0.350	1.140
	(0.290)	(0.266)	(0.275)	(0.270)	(0.257)	(0.258)	(1.002)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.4158	0.0355	0	0	0.0001	0	0
Observations	240	240	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.L

Interaction: Coalition and non-coalition governments

Table 4.44: Hazard rates for Cox models for interaction variables between paths to power and type of government - "Parliament" in a non-coalition government as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p in non-coalition	0.678	0.611	0.586	0.566	0.548	0.628	0.640
	(0.204)	(0.199)	(0.228)	(0.217)	(0.226)	(0.269)	(0.274)
p in coalition	0.525	0.578	0.257**	0.366	0.635	0.319	0.268*
	(0.270)	(0.314)	(0.175)	(0.264)	(0.490)	(0.226)	(0.193)
pp in coalition	1.169	1.254	0.569	0.820	1.377	0.738	0.610
	(0.477)	(0.562)	(0.408)	(0.670)	(1.167)	(0.598)	(0.492)
sp in non-coalition	0.571	0.495	0.507	0.453	0.446	0.701	0.745
	(0.419)	(0.375)	(0.393)	(0.353)	(0.353)	(0.535)	(0.575)
sp in coalition	1.540	1.559	0.733	1.066	1.885	1.061	0.886
	(1.157)	(1.183)	(0.736)	(1.130)	(2.052)	(1.131)	(0.944)
i in non-coalition	0.786	0.800	0.751	0.756	0.731	0.924	0.899
	(0.341)	(0.356)	(0.323)	(0.337)	(0.325)	(0.418)	(0.401)
i in coalition	1.267	1.138	0.609	0.699	1.219	0.611	0.487
	(0.958)	(0.882)	(0.578)	(0.694)	(1.261)	(0.602)	(0.491)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.6616	0.2730	0.5865	0.1984	0.3821	0	0
Observations	302	302	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Table 4.45: Hazard rates for Cox models for ministers who entered at the start of government with interaction variables between paths to power and type of government - "Parliament" in a non-coalition government as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p in a non-coalition	0.635	0.535*	0.460**	0.442**	0.391**	0.398**	0.414*
	(0.196)	(0.179)	(0.174)	(0.168)	(0.173)	(0.181)	(0.188)
p in a coalition	0.529	0.653	0.180**	0.347	0.664	0.301*	0.256*
	(0.274)	(0.363)	(0.124)	(0.263)	(0.544)	(0.215)	(0.185)
pp in a coalition	1.184	1.445	0.406	0.806	1.501	0.674	0.560
	(0.484)	(0.662)	(0.303)	(0.717)	(1.384)	(0.572)	(0.465)
sp in a non-coalition	0.368	0.298	0.310	0.255	0.211	0.255	0.318
	(0.329)	(0.292)	(0.307)	(0.267)	(0.241)	(0.306)	(0.403)
sp in a coaltion	0.887	1.031	0.303	0.613	1.245	0.631	0.514
	(0.915)	(1.076)	(0.371)	(0.793)	(1.660)	(0.830)	(0.667)
i in a non-coaltion	0.780	0.844	0.716	0.758	0.728	0.816	0.828
	(0.380)	(0.407)	(0.346)	(0.367)	(0.348)	(0.391)	(0.403)
i in a coalition	1.335	1.340	0.445	0.651	1.274	0.570	0.451
	(1.022)	(1.057)	(0.414)	(0.654)	(1.360)	(0.549)	(0.443)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.5942	0.1634	0.4301	0.098	0.2281	0	0
Observations	240	240	240	240	240	240	240

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 4.M

Complete results

Table 4.46: Hazard rates for Cox models for all variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p	0.765	0.699	0.749	0.721	0.716	0.589	0.605
	(0.287)	(0.282)	(0.297)	(0.302)	(0.303)	(0.243)	(0.251)
pp	1.251	1.261	1.431	1.437	1.460	1.102	1.124
	(0.497)	(0.510)	(0.565)	(0.588)	(0.599)	(0.447)	(0.453)
sp	0.992	0.893	0.937	0.890	0.904	1.011	1.063
	(0.606)	(0.567)	(0.582)	(0.565)	(0.575)	(0.620)	(0.666)
Em		0.555*		0.540**	0.545*	0.549*	0.555*
		(0.169)		(0.166)	(0.170)	(0.178)	(0.181)
Es		1.232		1.244	1.287	1.499	1.460
		(0.365)		(0.381)	(0.398)	(0.487)	(0.465)
Sm		1.569*		1.546	1.271	1.235	1.185
		(0.416)		(0.435)	(0.424)	(0.405)	(0.403)
Ss		0.808		0.809	0.710	0.649	0.599
		(0.282)		(0.312)	(0.286)	(0.247)	(0.234)
Maj			1.035	1.032	1.023		
			(0.0242)	(0.0250)	(0.0280)		
Min			0.526	0.500	0.469		
			(0.289)	(0.270)	(0.259)		
Pmin			0.936***	0.946**	0.950**		
			(0.0209)	(0.0209)	(0.0220)		
GPS			0.249*	0.235*	0.191*		
			(0.182)	(0.181)	(0.166)		
GPSD			0.249**	0.211**	0.135**		
			(0.162)	(0.154)	(0.115)		
GPSDCDS			0.418	0.377	0.315		
			(0.329)	(0.303)	(0.280)		
Terms	No	No	No	No	Yes	Yes	No
Prime Ministers	No	No	No	No	No	Yes	No
Terms×PM	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0.3312	0.0967	0	0	0	0	0
Observations	302	302	302	302	302	302	302

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables 4.3, 4.4 and 4.5 for the definition of the variables.

Annex 5.A

Interaction: With and without experience

Table 5.18: Ministers' re-selection in a probit model: Interaction variables between minister type and experience when PMs remain in power - Independents with experience as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Partisan with experience	0.997**	1.709***	1.492***	1.670***	1.674***	1.732***	1.722***
	(0.430)	(0.521)	(0.467)	(0.547)	(0.549)	(0.600)	(0.597)
Partisan without experience	0.641	1.238**	1.102**	1.363**	1.373**	1.652***	1.638***
	(0.462)	(0.523)	(0.509)	(0.567)	(0.572)	(0.615)	(0.615)
Independent without experience	0.251	0.639	0.635	0.721	0.741	0.709	0.687
	(0.474)	(0.588)	(0.547)	(0.633)	(0.639)	(0.671)	(0.669)
Constant	-0.431	-16.78***	-1.128**	-18.39***	-18.88***	-18.58***	-17.82***
	(0.376)	(6.470)	(0.558)	(6.499)	(6.750)	(7.041)	(6.810)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Transition identifiers	No	No	No	No	No	Yes	No
Terms×TI	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0,0049	0,01	0,0129	0,0332	0,0224	0,0005	0,0005
Observations	92	92	92	92	92	92	92

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Table 5.19: Ministers' re-selection in a probit model: Interaction variables between minister type and experience when parties remain in power - Independents with experience as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Partisan with experience	0.900**	1.231***	0.983**	1.363***	1.363***	1.480***	1.476***
	(0.402)	(0.436)	(0.422)	(0.470)	(0.470)	(0.482)	(0.481)
Partisan without experience	0.604	0.747*	0.812*	1.031**	1.031**	1.228**	1.226**
	(0.422)	(0.441)	(0.454)	(0.481)	(0.481)	(0.499)	(0.498)
Independent without experience	0.429	0.492	0.597	0.669	0.680	0.670	0.657
	(0.464)	(0.493)	(0.494)	(0.547)	(0.547)	(0.559)	(0.560)
Constant	-0.502	-12.43**	-0.884**	-15.11**	-15.53**	-15.13**	-14.48**
	(0.366)	(5.738)	(0.433)	(5.989)	(6.172)	(6.523)	(6.320)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Transition identifiers	No	No	No	No	No	Yes	No
Terms×TI	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0,1301	0,0011	0,0369	0,0011	0,0022	0,0001	0
Observations	122	122	122	122	122	122	122

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Table 5.20: Ministers' re-selection in a probit model: Interaction variables between minister type and experience when PMs remain in power - Independents without experience as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Partisan with experience	0.746*	1.070**	0.857*	0.949*	0.932*	1.023*	1.035*
	(0.397)	(0.508)	(0.488)	(0.529)	(0.528)	(0.548)	(0.552)
Partisan without experience	0.390	0.599	0.467	0.641	0.632	0.943*	0.951*
	(0.431)	(0.512)	(0.504)	(0.533)	(0.532)	(0.560)	(0.562)
Independent with experience	-0.251	-0.639	-0.635	-0.721	-0.741	-0.709	-0.687
	(0.474)	(0.588)	(0.547)	(0.633)	(0.639)	(0.671)	(0.669)
Constant	-0.180	-16.14**	-0.493	-17.67***	-18.14***	-17.87***	-17.13***
	(0.339)	(6.371)	(0.571)	(6.388)	(6.618)	(6.854)	(6.639)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Transition identifiers	No	No	No	No	No	Yes	No
Terms×TI	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0,0049	0,01	0,0129	0,0332	0,0224	0,0005	0,0005
Observations	92	92	92	92	92	92	92

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Annex 5.B

Interaction: With a master's or a Ph.D. degree or without

Table 5.21: Ministers' re-selection in a probit model: Interaction variables between minister type and education when PMs remain in power - Partisans with a master's or a Ph.D degree as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Partisan without a master or a Ph.D.	-0.871**	-1.041**	-0.892**	-1.062**	-1.062**	-0.925**	-0.928**
	(0.396)	(0.425)	(0.385)	(0.423)	(0.425)	(0.451)	(0.451)
Independent without a master or a Ph.D.	-1.592***	-1.820***	-1.481***	-1.769***	-1.777***	-1.651**	-1.639**
	(0.545)	(0.626)	(0.557)	(0.635)	(0.640)	(0.666)	(0.664)
Independent with a master or a Ph.D.	-1.225**	-1.493***	-1.259**	-1.587***	-1.569***	-1.988***	-2.019***
	(0.488)	(0.566)	(0.501)	(0.600)	(0.597)	(0.623)	(0.623)
Constant	1.068***	-13.35**	0.848*	-15.26**	-15.51**	-15.12**	-14.71**
	(0.348)	(5.872)	(0.435)	(5.974)	(6.095)	(6.561)	(6.457)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Transition identifiers	No	No	No	No	No	Yes	No
Terms×TI	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0,0163	0,0251	0,008	0,0167	0,0263	0,0002	0,0002
Observations	92	92	92	92	92	92	92

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Table 5.22: Ministers' re-selection in a probit model: Interaction variables between minister type and education when parties remain in power - Partisans with a master's or a Ph.D degree as base

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Partisan without a master or a Ph.D.	-0.602**	-0.551*	-0.611**	-0.555*	-0.555*	-0.350	-0.356
	(0.300)	(0.317)	(0.300)	(0.321)	(0.321)	(0.336)	(0.335)
Independent without a master or a Ph.D.	-1.204**	-1.212**	-1.134**	-1.224**	-1.231**	-1.007*	-1.002*
	(0.498)	(0.526)	(0.525)	(0.549)	(0.551)	(0.566)	(0.564)
Independent with a master or a Ph.D.	-0.776*	-0.729	-0.886**	-0.968*	-0.945*	-1.215**	-1.245**
	(0.417)	(0.466)	(0.441)	(0.504)	(0.500)	(0.516)	(0.517)
Constant	0.702***	-10.41*	0.481	-12.76**	-13.11**	-12.87**	-12.43**
	(0.261)	(5.488)	(0.308)	(5.879)	(6.016)	(6.238)	(6.136)
Personal Char.	No	Yes	No	Yes	Yes	Yes	Yes
Political Char.	No	No	Yes	Yes	Yes	No	No
Terms	No	No	No	No	Yes	Yes	No
Transition identifiers	No	No	No	No	No	Yes	No
Terms×TI	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0,0597	0,0153	0,0122	0,0044	0,0072	0,0001	0,0001
Observations	122	122	122	122	122	122	122

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Annex 5.C

Interaction: Left and Right-wing governments

Table 5.23: Ministers' re-selection in a probit model: Interaction variables between minister type and term of government when PMs remain in power - Independents in left-wing governments as base

Variables	(1)	(2)	(5)	(6)	(7)
Partisan in a right-wing government	0.967**	1.275**	1.195**	1.632**	1.609**
	(0.414)	(0.521)	(0.544)	(0.740)	(0.734)
Partisan in a left-wing government	0.631	0.841*	0.840*	1.161**	1.156**
	(0.417)	(0.482)	(0.479)	(0.541)	(0.537)
Independent in a right-wing government	0.238	-0.104	-0.209	0.339	0.301
	(0.545)	(0.612)	(0.659)	(0.896)	(0.901)
Constant	-0.377	-15.22**	-14.89**	-17.40***	-16.75***
	(0.346)	(6.057)	(6.108)	(6.504)	(6.353)
Personal Char.	No	Yes	Yes	Yes	Yes
Terms	No	No	Yes	Yes	No
Transition identifiers	No	No	No	Yes	No
Terms×TI	No	No	No	No	Yes
Wald statistic (p-value)	0,0953	0,0294	0,0428	0,0005	0,0005
Observations	92	92	92	92	92

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Table 5.24: Ministers' re-selection in a probit model: Interaction variables between minister type and term of government when parties remain in power - Independents in left-wing governments as base

Variables	(1)	(2)	(5)	(6)	(7)
Partisan in right-wing government	0.664*	0.736*	0.670	1.596**	1.578**
	(0.379)	(0.437)	(0.441)	(0.712)	(0.708)
Partisan in left-wing government	0.631	0.700	0.719	1.126**	1.126**
	(0.417)	(0.459)	(0.455)	(0.520)	(0.517)
Independent in right-wing government	0.281	0.0668	-0.0803	0.854	0.826
	(0.514)	(0.530)	(0.570)	(0.841)	(0.840)
Constant	-0.377	-11.61**	-11.16**	-14.73**	-14.15**
	(0.346)	(5.607)	(5.631)	(6.369)	(6.278)
Personal Char.	No	Yes	Yes	Yes	Yes
Terms	No	No	Yes	Yes	No
Transition identifiers	No	No	No	Yes	No
Terms×TI	No	No	No	No	Yes
Wald statistic (p-value)	0,2963	0,022	0,0182	0,0002	0,0002
Observations	122	122	122	122	122

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Table 5.25: Ministers' re-selection in a probit model: Interaction variables between minister type and term of government when PMs remain in power - Independents in right-wing governments as base

Variables	(1)	(2)	(5)	(6)	(7)
Partisan in a right-wing government	0.729	1.378**	1.404**	1.294**	1.308**
	(0.479)	(0.608)	(0.626)	(0.651)	(0.663)
Partisan in a left-wing government	0.393	0.945*	1.049*	0.822	0.855
	(0.482)	(0.569)	(0.618)	(0.781)	(0.790)
Independent in a left-wing government	-0.238	0.104	0.209	-0.339	-0.301
	(0.545)	(0.612)	(0.659)	(0.896)	(0.901)
Constant	-0.140	-15.32**	-15.10**	-17.07***	-16.45**
	(0.422)	(5.993)	(6.016)	(6.558)	(6.421)
Personal Char.	No	Yes	Yes	Yes	Yes
Terms	No	No	Yes	Yes	No
Transition identifiers	No	No	No	Yes	No
Terms×TI	No	No	No	No	Yes
Wald statistic (p-value)	0,0953	0,0294	0,0428	0,0005	0,0005
Observations	92	92	92	92	92

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Annex 5.D

Complete results

Table 5.26: Ministers' re-selection for all variables in a probit model - when PMs remain in power

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Partisan	0.724**	1.086***	0.696**	1.079***	1.074***	1.239***	1.243***
	(0.312)	(0.400)	(0.328)	(0.417)	(0.417)	(0.436)	(0.436)
Em		-0.124		-0.261	-0.279	-0.302	-0.295
		(0.342)		(0.358)	(0.361)	(0.371)	(0.373)
Es		0.191		0.0855	0.0900	-0.104	-0.104
		(0.319)		(0.324)	(0.322)	(0.328)	(0.327)
Ss		0.233		0.116	0.120	0.233	0.219
		(0.395)		(0.389)	(0.389)	(0.397)	(0.394)
Past		-0.322		-0.270	-0.258	-0.0563	-0.0816
		(0.448)		(0.491)	(0.500)	(0.521)	(0.512)
MD		0.754**		0.690**	0.706**	0.376	0.365
		(0.331)		(0.340)	(0.343)	(0.361)	(0.360)
Age		0.588**		0.652***	0.662***	0.669**	0.657**
		(0.238)		(0.246)	(0.250)	(0.261)	(0.255)
$Age\hat{2}$		-0.00606***		-0.00669***	-0.00681***	-0.00734***	-0.00719***
		(0.00234)		(0.00243)	(0.00248)	(0.00258)	(0.00252)
GPS			0.144	0.231	0.225		
			(0.391)	(0.447)	(0.447)		
GPSD			0.753*	0.860*	0.975*		
			(0.428)	(0.451)	(0.515)		
Constant	-0.293	-14.75**	-0.563	-16.58***	-17.03***	-16.48**	-15.85**
	(0.266)	(6.058)	(0.441)	(6.233)	(6.404)	(6.682)	(6.526)
Terms	No	No	No	No	Yes	Yes	No
Transition identifiers	No	No	No	No	No	Yes	No
Terms×TI	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0,0203	0,0304	0,0542	0,0332	0,0501	0,0003	0,0003
Observations	92	92	92	92	92	92	92

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.

Table 5.27: Ministers' re-selection for all variables in a probit model - when parties remain in power

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Partisan	0.529*	0.694**	0.562*	0.805**	0.798**	0.906**	0.913**
	(0.286)	(0.339)	(0.315)	(0.377)	(0.375)	(0.389)	(0.391)
Em		-0.215		-0.302	-0.315	-0.346	-0.340
		(0.290)		(0.303)	(0.301)	(0.308)	(0.307)
Es		0.0716		0.0199	0.0282	-0.0427	-0.0484
		(0.262)		(0.270)	(0.269)	(0.283)	(0.282)
Ss		0.377		0.0920	0.102	0.291	0.273
		(0.350)		(0.359)	(0.361)	(0.379)	(0.377)
Past		-0.0338		-0.168	-0.152	0.0713	0.0450
		(0.383)		(0.410)	(0.418)	(0.496)	(0.487)
MD		0.530*		0.458	0.469	0.169	0.164
		(0.277)		(0.289)	(0.290)	(0.304)	(0.304)
Age		0.478**		0.563**	0.572**	0.575**	0.567**
		(0.220)		(0.238)	(0.241)	(0.252)	(0.249)
Age$\hat{2}$		-0.00504**		-0.00592**	-0.00602**	-0.00638**	-0.00627**
		(0.00215)		(0.00234)	(0.00239)	(0.00249)	(0.00246)
GPS			0.197	0.312	0.308		
			(0.284)	(0.316)	(0.317)		
GPSD			0.818**	0.937***	1.057**		
			(0.330)	(0.362)	(0.417)		
Constant	-0.253	-11.63**	-0.530	-13.91**	-14.33**	-13.85**	-13.31**
	(0.255)	(5.601)	(0.356)	(6.027)	(6.170)	(6.426)	(6.333)
Terms	No	No	No	No	Yes	Yes	No
Transition identifiers	No	No	No	No	No	Yes	No
Terms×TI	No	No	No	No	No	No	Yes
Wald statistic (p-value)	0,064	0,0092	0,0311	0,0045	0,0068	0,0001	0,0001
Observations	122	122	122	122	122	122	122

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

See tables See tables 5.1, 5.2 and 5.3 for the definition of the variables.