DEPARTMENT OF ECONOMICS

UNIVERSITY OF MILAN - BICOCCA

WORKING PAPER SERIES

Political, Institutional and Economic Determinants of Coalition Cabinets Survival

Fabrizio Carmignani

No. 24 - July 1999

Dipartimento di Economia Politica
Università degli Studi di Milano - Bicocca
http://dipeco.economia.unimib.it

POLITICAL, INSTITUTIONAL AND ECONOMIC DETERMINANTS OF COALITION CABINETS SURVIVAL.

Fabrizio Carmignani[1]

University of Glasgow

Abstract

Event history analysis is used to investigate the determinants of cabinet duration in a sample of 14 western European parliamentary democracies. A broad set of covariates is considered in order to account for the impact of political, institutional, environmental and economic factors.
It turns out that the probability for a government to collapse increases the higher the degree of ideological heterogeneity of coalition partners, the higher the degree of polarisation of the system, the lower the rate of survival of the legislature, the shorter the time horizon to next mandatory elections and the worse the overall economic conditions of the country. Some other institutional and political variables do play some role. Finally there is clear evidence of positive duration dependence: the longer the cabinet has stayed in power, the higher the probability it will collapse in the near future.

Fabrizio Carmignani
Department of Economics,
Adam Smith Building,
University of Glasgow,
Glasgow G12 8RT
UK
E-mail: 9322561c@student.gla.ac.uk
fabrizio.carmignani@unimi.it

[1]I wish to acknowledge helpful comments and suggestions from Julia Darby, Paolo Manasse, Anton Muscatelli, Patrizio Tirelli, Ulrich Woitek and an anonymous referee. Of course, I am solely responsible for all remaining errors and inconsistencies.

Introduction

A key feature of democratic political competition is that different parties should alternate in power according to the preferences expressed by voters in free and regularly held elections. Thus, in democratic systems, the life of cabinets (and legislatures) must necessarily come to an end, the "death date" being determined by constitutional provisions. It is also perfectly acceptable that under some political and institutional circumstances a democratic government resigns even before the mandatory fixed death date. However, especially in some countries (namely, Italy, Finland, Belgium, France), the frequency of "early terminations" is such that the issue of cabinet stability has become a reason of major concerns. The shorter time horizon of a short lived cabinet can distort the decision making process in the sense of favouring the formation of *myopic* economic policies. This means that, faced with a high probability of collapsing in the near future, the cabinet has an incentive to undertake policies that should guarantee immediate political survival, but at the same time could push the economy on inefficient paths of investment and debt accumulation. Moreover, a high cabinet turnover generates policy volatility, especially if the political system is polarised and cabinet changes involve significant ideological shifts. In such circumstances, agents in the economy face a considerable degree of uncertainty about the future course of economic policy and hence they tend to limit private investments[2]. Notice that, as long as the incumbent cannot place a credible constraint on the policy of next governments, short lived cabinets cannot reduce uncertainty about future policy since they are unable to commit to a future course of actions that extends over the long-run.[3] All in all, cabinet duration matters because it affects the ability of the executive to complete successfully the process of policy formation and to undertake credible policies to support long-run growth and development. Excessive cabinet turnover can thus be regarded as a distortion to the ideal path of democratic political cycle and the analysis of

[2]Myopia in decision making and the perverse effects of policy uncertainty have been the object of a voluminous literature, see *inter alia* Calvo and Drazen (1997); Deveraux and Wen (1996); Darby, Li and Muscatelli (1998) and Persson and Tabellini (1998) for a survey of earlier contributions.

[3] In fact, Alesina and Tabellini (1990) show how the debt level can be used strategically to bind the hands of succeeding governments with different political preferences. However, their two-period model typically applies to two party competition in political systems where a simple majority rule is in place. In more sophisticated multiparty systems it is more difficult for the incumbent to affect policy decisions much beyond its political death.

determinants of cabinet duration is of interest to better understand the interactions between economic and political cycles.

It seems natural to link cabinet duration to some key attributes of the cabinet itself. Probably, the most obvious of these attributes is the number of parties in the supporting coalition: there is no need to consider sophisticated models of game theory to argue that the strategic interaction among several parties can make a coalition government more unstable than a single party government. Such a simple idea would be confirmed by the observation that in all the countries traditionally regarded as examples of instability and low duration, cabinets are typically in the form of coalitions. However, since coalitions tend to represent the norm even in countries that are often mentioned as cases of stability (Luxembourg, Austria, Germany), it must be that duration is a function of some other factors. Researchers have soon realised that, and a variety of theoretical models have been proposed to explain the formation and the termination of governments in parliamentary democracies. These models have pointed out the important role of additional attributes of the cabinet (for example, the degree of ideological heterogeneity of coalition partners, the majority or minority status, the time horizon at the moment of formation, etc..) as well as the need to include attributes of the legislature as possible determinants of duration. In effect, the essence of a parliamentary democracy is that the executive must be supported by a majority in the legislature and the legislature always has the power to cast votes of no-confidence against the government (thus terminating its life). It is therefore clear that features such as the degree of polarisation of the legislature and its grade of fragmentation might well contribute to determine how long a cabinet will last. Moreover, the impact of these attributes of the parliament on cabinet durability might depend upon the specific procedures that in each country regulate the relationship between the executive and the legislature. Therefore, cross-countries differences in the institutional design could be of some importance as well.

The empirical side of the research has grown together with the theoretical contributions, basically tackling two key issues: the definition of good proxies for the attributes indicated as potential determinants of duration by theoretical models and the development of suitable statistical tools for the analysis of duration data.[4]

There are good reasons to believe that not only political and institutional factors determine cabinet durability. First, the expertise and the information accumulated over time by the prime minister and/or by the political leaders of the parties supporting the government is a valuable asset for the coalition as a whole; it could be well the case that such expertise and additional information contribute to lengthen duration. Second, political leaders do not operate in an economic vacuum. The idea that political events can determine economic events is well established in the literature since the seminal work by Nordhaus (1975). Indeed, it is plausible to believe that the relationship between politics and economics is not just one but two ways; that is, economic events might determine political fortunes and increase (or reduce) the probability of government collapse. Finally, as noted by Browne *et al.* (1986), cabinet terminations and dissolutions are not necessarily triggered by structural factors: unpredictable events (such as major scandals or illness of the prime minister) can be at the origin of government collapse and hence the history of a cabinet should be represented essentially by a stochastic process.

Thus, a more comprehensive analysis of determinants of cabinet duration must look not just at the empirical impact of basic attributes, but also at the role played by economic and environmental variables and reconciliate the "casual approach" (focused on the link between durability and structural factors) with the "event approach" suggested by Browne *et al.* (1986). Two important contributions have shown the lines along which such a task can be performed. King *et al.* (1990) propose the use of *event history analysis* to embed structural factors within the context of a stochastic process. Warwick (1994) estimates a model derived from the event history approach that includes economic variables. In addition to those two, a valuable piece of related work is the one by Merlo (1998), who estimates the relationship between economic dynamics and government stability in post-war Italy.

[4]Two very good surveys of the theoretical and empirical results in modelling cabinet durability and termination are: Grofman and Van Roozendaal (1997) and Warwick (1994). Theoretical models of making and breaking governments are surveyed in Laver and Schofiled (1990) and Laver and Shepsle (1996a), who also propose a very interesting and original model of formation.

This paper is an attempt to estimate a comprehensive model of cabinet duration in countries characterised by significant experiences of multi-party government. Key findings can be summarised as follows. Cabinet attributes that seem to have greatest explanatory power are the degree of *ideological diversity of coalition partners* and the *time horizon to next elections*. In particular, coalition cabinets last longer the less ideologically diverse partners are and the longer the time left to the next mandatory election. Turning to attributes of the parliament as a whole, *polarisation* does act in the sense of reducing duration significantly, whilst more stable legislatures (i.e. legislatures that last longer) are able to produce more stable cabinets. Variables aimed at capturing the effect of the process of accumulation of information and expertise of political leaders fail to be significant at usual confidence level. Economic conditions do matter: higher *inflation* and lower *industrial production* increase the chances of government collapse. Finally, the process that represents the history of a cabinet tend to be characterised by *positive duration dependence*. This means that the longer a cabinet has stayed in power, the higher the probability it will terminate in the near future. All of these results appear to be rather robust.

The rest of the paper is organised as follows. Section 1 discusses the statistical model. Results are presented in Section 2. Further comments and conclusions are included in Section 3. The tables with the econometric results can be found in the Appendix.

Section 1. Statistical models for the analysis of cabinet duration data.

The history of a generic cabinet *i* in a multiparty democracy can be represented as a simple single-spell duration model known as "death process". This is a stochastic process X_t which takes its values in the discrete space $\{E_0, E_1\}$. At time $t = 0$ (the *birth date*) the process is in state E_0. Transition to state E_1 occurs just once in a lifetime at time τ (the *death date*). Technically, transition to E_1 is called *failure.* The state E_0 corresponds to the state "in office" for the incumbent government and the transition to state E_1 represents the termination of the cabinet. T, the time period spent in state E_0, is called "duration" and it is in the nature of a positive random variable. Let $F(t) \in [0,1]$ be the distribution function of T. F(t) is such that given two points in time $t_1 > t_2$, $F(t_1) \geq F(t_2)$. Moreover, it can be assumed that F(0) = 0 and $\lim_{t \to \infty} F(t) = 1$. The probability of T being larger than or equal to *t* is known as the *survivor function S(t)* and it is given by:

(1) $P(t \leq T) = 1 - F(t) = S(t)$

The derivative of F(t) w.r.t. time is the density function of the random variable T and it represents the instantaneous probability of death (failure):

(2) $f(t) = \lim_{\Delta \to 0} \dfrac{P[t < T \leq t + \Delta]}{\Delta} = \dfrac{dF(t)}{dt} = -\dfrac{dS(t)}{dt}$

Of particular interest for *event history analysis* (also called *duration analysis*) is the probability that a spell will be completed at time t_+ given that it has lasted until time t_- ; that is, the instantaneous probability of failure (2) conditional upon T ≥ t:

(3) $l(t) = \lim_{\Delta \to 0} \dfrac{P[t < T \leq t + \Delta | T \geq t]}{\Delta} = \dfrac{f(t)}{S(t)}$

λ(t) is called the *hazard function* and it can be interpreted as the probability of observing a change of status between t_- and t_+ (that is, at time *t*). The hazard function is used to characterise a process in terms of duration dependence. If the derivative of λ(t) w.r.t. time evaluated at $t = t^*$ is positive, then the process is said to exhibit positive duration dependence at t^*. If instead, the derivative is negative, then the process exhibits negative duration dependence at t^*. Positive duration dependence means that the probability of observing a cabinet termination at some point t^* increases the more distant such t^* is from the birth date. In other words, with positive duration dependence the longer the tenure of the cabinet, the higher the probability it will terminate in the near future. The opposite is true with negative duration dependence. A simple and convenient way to asses duration dependence is to look at the curvature of the *integrated hazard function:*

(4) $\Lambda(t) = \int_{0}^{t} l(u)du$

When plotted against time the integrated hazard function will be convex if the hazard function is increasing w.r.t. time; that is, if there is positive duration dependence. If instead the integrated hazard function is concave, then the process exhibits negative duration dependence.

To embed structural factors in the model, let *z* be the set of covariates (explanatory variables such as *polarisation, effective number of parties in the coalition, degree of conflict of interest, time left to next election,* etc.). Define $\lambda_0(t)$ as an arbitrary unspecified "baseline" hazard function for the representative or reference cabinet in the sample (i.e. the cabinet for which either $z = 0$ or $E(z) = 0$). Then each individual covariate in *z* can be assumed to have a multiplicative effect on the baseline hazard (Proportional Hazards Model) or, alternatively, to rescale time directly (Accelerated Lifetime Model). Estimation of both classes of models might proceed by choosing a functional form for the baseline hazard function (say, for example, the exponential distribution) and then maximising the resulting likelihood function. However, since *a-priori* information about the underlying distribution of cabinet duration data is very limited, the choice of the functional form for the baseline hazard function is a matter of subjective prior beliefs or *ad hoc* considerations. Misleading results can be obtained when distributional assumptions are not correctly formulated. It would be therefore desirable to have an estimation method which does not require to determine the form of the underlying distribution of cabinet failure time data. Such method has been developed for the Proportional Hazards Model by Cox (1972 and 1975) and it is based on the Partial Likelihood Function (PL). Because of its flexibility, the PL method is the one used in this paper.[5]

The *Proportional Hazards Model* is specified as follows:

(5) $l(t;z) = l_0(t)y\ (z,b)$

[5]King et al. (1990) specify a functional form for the underlying distribution. They choose the exponential distribution. However, as discussed by Warwick (1992) this choice is arbitrary and basically incorrect. Warwick (1994) chooses the flexible approach developed by Cox. Merlo (1998) adopts a flexible parametric functional form for the hazard function that allows him to handle various forms of time and duration dependence.

where λ_0(t) is the baseline hazard function, ψ is a known function expressing the relationship between covariates *z* and (unknown) regression parameters β. [6]

As just mentioned, model (5) can be estimated using the flexible PL approach developed by Cox (1972 and 1975). With the PL method, the function ψ in model (5) is taken to be exponential, so that the hazard function can be written as:

(6) $l(t;z) = \exp(zb)\ l_0(t)$

A typical problem with cabinet duration data is right-censoring of some observations. Censoring occurs when the cabinet terminates either because mandatory (non-anticipated) elections have to be held or because the Prime Minister resigns as a consequence of health problems. In the first case the censoring time is known in advance, since the time between two successive elections is fixed by the constitution[7], whilst in the second case it represents the realisation of a random process.[8] However, in both cases the censoring mechanism is independent from the failure mechanism and the only information incorporated in a censored observation is that the failure time of the censored cabinet is larger than the censoring time. This form of *independent* and *non-informative* censoring is fully accounted for by the PL procedure described below, which therefore appears to be particularly suitable for the analysis of cabinet duration data.

---

[6]In the above formulation, covariates are taken to be time independent; that is, they remain constant throughout the life of the cabinet. This is certainly true for cabinet and parliament attributes. Economic variables should indeed vary over the term of office of the cabinet. However, if averages of such economic variables over the relevant period are taken, then the procedure developed for time independent covariates can still be applied. Kalbfleisch and Prentice (1980) discuss extension of the model to time-dependent covariates. The results I present in this paper are those obtained using averages for the economic variables. However, I have re-estimated the models letting economic variables be time dependent and results are surprisingly similar in the two cases.

[7] Observations are censored only if they refer to terminations due to non-anticipated elections. In that case, the censoring time is effectively known *a priori* and fixed by the constitution. Terminations due to anticipated elections (i.e. elections that take place before the maximum term of office of the legislature has expired) do not give rise to censored observations and hence the fact that the election date is not known in advance is not relevant. The reason why the two cases must be treated differently is that whilst non-anticipated elections are held independently from the existence of an underlying political struggle, anticipated elections are called with the explicit purpose of solving a political stalemate or conflict and hence they are related to some form of political instability. It then follows that the associated cabinet terminations must be considered as generated by political factors and hence they give rise to observations that have to be treated as non-censored.

[8] Technically, the first is a case of *type I censoring* and the second of *random censoring.*

Cox (1975) gives the general definition of PL as follows. Consider the sequence of pairs of random quantities $(X_1, S_1, X_2, S_2 ....X_m, S_m)$[9]. The full likelihood for this sequence is:

$$(7) \quad L = \prod_{j=1}^{m} f_{X_j | X^{(j-1)}, S^{(j-1)}} \left(x_j | x^{(j-1)}, s^{(j-1)}; q \right) \prod_{j=1}^{m} f_{S_j | X^{(j)}, S^{(j-1)}} \left(s_j | x^{(j)}, s^{(j-1)}; q \right)$$

where $x^{(j)} = (x_1 ....x_j)$ and $s^{(j)} = (s_1 .....s_j)$.

The PL based on S in the sequence $\{X_j, S_j\}$, with $j = 1, 2, ….m$, is the second product on the r.h.s. of (7).

The use of the PL function for the estimation of the parameters β in model (6) is based on the following argument. Consider the sequence of failure times $t_1 < ...... < t_m$. Let R_j denote the set of all cabinets still alive at time t_j (i.e. the *risk set* at time t_j). Assuming that there are no ties in the data and hence that only one failure is observed at t_j, the conditional probability that the generic item k in R_j fails at t_j *is:*

$$(8) \quad \frac{l(t_j; z_j)}{\sum_{k \in R_j} l(t_j; z_{(k)})} = \frac{\exp(z_j b)}{\sum_{k \in R_j} \exp(z_{(k)} b)}$$

where z_j is the value of z for the item failing at time t_j and $z_{(k)}$ is the value of z for the generic kth item.

Equation (8) represents the contribution of each failure time to the likelihood function. In addition to (8), the full likelihood should include the contribution steaming from the observation that between two successive failure times t_j and t_{j+1} no termination occurs. In other words, information about the parameters β should be inferred not only from the observation of failures occurring at times t_j, t_{j+1}, t_{j+2}......, but also from the observation that in the interval $[t_j, t_{j+1})$ none of the items in the risk set fails. However, because the baseline hazard function is left completely arbitrary, one can account for this second bit of information simply by taking $\lambda_0(t)$ to be very close to zero in the interval $[t_j, t_{j+1})$. In this way, no

[9] Given a random variable Y with density function $f_Y(y,\theta)$, where y is a vector of realisations of Y and θ is an unknown parameter, the sequence $(X_1, S_1, X_2, S_2, …….X_m, S_m)$ can be generated from a multivariate transformation (not depending on the unknown θ) of Y.

contribution needs to be registered from the observation that between any two failure times no termination has occurred. In the end, the likelihood is formed by taking the product over all failure times of (8) and it is in the nature of a PL. Such PL function has the form:

$$(9) \quad L(b) = \prod_{j=1}^{m} \left(\frac{\exp(z_j b)}{\sum_{k \in R_j} \exp\left(z_{(k)} b\right)} \right)$$

Estimation of β then proceeds by maximising (9). This will require the use of the Newton-Raphson iterative procedure. Cox (1972 and 1975) shows that under a broad set of conditions, usual properties of maximum likelihood estimators extend to maximum "partial" likelihood estimators.

Finally, equation (9) refers to a continuous case where no ties in the data occur. In the discrete case more than one failure at each time t_j might be observed. The PL can be written in such a way to account for these ties:

$$(10) \quad L(b) = \prod_{j=1}^{m} \left(\frac{\exp(s_j b)}{\sum_{k} \exp\left(s_{(k)} b\right)} \right)$$

where s_j is the sum of z for all the items failing at t_j, l_j is the number of items failing at t_j and the sum is taken over $k \in R_{t_j, l_j}$.

Notice that both (9) and (10) are specific forms of the general definition of Partial Likelihood given in (7), where X_j can be taken to specify the censoring information in the interval [$t_{(j-1)}$, $t_{(j)}$) together with the information that a failure occurs at time $t_{(j)}$ and S_j specifies the particular item with covariate z_j failing at t_j.

Section 2: PL estimates of determinants of cabinet duration.

Before turning to the analysis of the results reported in Table 1 and 2 of the Appendix, a note on the interpretation of the coefficients must be given. First of all, since the hazard indicates the likelihood of observing a cabinet termination, negative signs on coefficients indicate longer cabinet durations, positive signs indicate shorter durations. In addition to that, within the Proportional Hazards Model, coefficients can be given a partial-derivative interpretation analogous to that given to regression coefficients in the linear model. To see this, simply consider that when the model is formulated as in (6), the following relationship holds:

$$(11) \quad \frac{\partial \ln \lambda(t;z)}{\partial z} = \frac{\partial \ln \psi(z;\beta)}{\partial z} = \beta$$

According to (11), when z is not time dependent[10], its proportional effect on the hazard function is not dependent on duration and it is equal to β. Therefore, a one-unit change in a certain covariate has an estimated effect on the hazard (i.e. on the conditional probability of "death") which is given by the estimated coefficient raised to the exponential power.

The econometric analysis is based on a sample of 369 cabinets formed in 14 countries[11] throughout the period 1950-1995. A definition of the variables is given in the box next page. A full description of the political data set can be found in Carmignani (1999).

[10]See footnote 6

[11] Australia, Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway and Sweden.

Description of the variables used in the econometric analysis.
Share of seats (SHARE): share of seats controlled by the parties supporting the coalition as a proportion of total seats in the parliament. **Effective number of parties in the coalition (ENP)**: inverse of the sum of squared share of seats controlled by all the parties in the governing coalition (Laasko and Taagepera, 1979). **Alternation**: share of seats held by parties leaving the government plus the share of seats held by parties entering the government (Strom, 1984) **Concentration of the opposition (OPP):** number of seats held by parties on the numerically largest side of the opposition as a proportion of the total number of opposition seats (Strom, 1984) **Conflict of Interest (CI):** variance of the locations coalition partners occupy on a left-right ideological continuum. **Ideological location (LOC):** dummy variable taking value 1 if the weighted average location of the coalition is to the right of the median point 5.5 (weights are the shares of seats of coalition partners) **Total portfolio volatility (TPV):** sum of (i) the number of changes in individuals controlling portfolios (independently from the partisanship of the individuals), (ii) the number of portfolios eliminated, (iii) the number of portfolios added (Huber, 1998). When item (i) is replaced by (iv) number of changes in the party controlling portfolios, the measure of **Party Portfolio Volatility (PPV)** is obtained. **Ideological Portfolio Volatility (IPV):** sum of the Euclidean distances for each portfolio change divided by the total number of portfolios transferred (Huber, 1998). **Time horizon to next elections (TH):** ratio of time left to next scheduled election over total parliamentary term fixed by the constitution **Coalition expertise (COAL):** cumulative duration of all previous governments controlled by the same coalition (Merlo, 1998) **Prime minister expertise (PM):** cumulative duration of all previous governments headed by the same prime minister. (Merlo, 1998). **Compatibility index (COMP):** sum of *n* terms (one for each coalition partner), each term is given by the difference between the share of votes received by party *i* and the share of portfolios controlled by the same party *i*. **Fractionalisation of the legislature (FRA):** effective number of parties of the legislature as a whole. **Parliamentary volatility (VOL):** sum of the share of seats added or lost by each party in present elections respect to previous elections, divided by two (Powell, 1982) **Polarisation (POL):** share of support expressed by voters for "extremist" parties (Powell, 1982) **Survival of the parliament (SURV):** effective duration of the legislature as a proportion of the constitutionally established maximum term. **Duration (DUR):** *log* of days of office of the cabinet; criteria to compute duration follows those outlined in Woldendorp et al. (1993 and 1995). **Inflation rate (Inflation):** average inflation (computed from the monthly series of the CPI index) over the life of a cabinet (source: OECD Economic Outlook and IFS/IMF) **Volatility of Inflation (Vol. Inflation):** standard deviation of the monthly inflation rate over the life of the cabinet (source: OECD Economic Outlook and IFS/IMF) **Industrial Production (IP):** average of the IP index (monthly series) over the life of a cabinet (source: OECD Economic Outlook and IFS/IMF) **Industrial Production Growth rate (IP growth):** average rate of growth of industrial production over the life of a cabinet (source: OECD Economic Outlook and IFS/IMF)

In Model 1 of Table 1 only cabinet attributes are entered as covariates. Such attributes include political measures of *fragmentation of the coalition* (ENP), *portfolio volatility* (TPV and IPV), *conflict of interest* (CI), *time horizon* (TH), *share of supporting seats* (SHARE) and

ideological location of the coalition (LOC). In addition to that, the two variables aimed at capturing the impact of the
process of *accumulation of information and expertise* (COAL and PM) and the lagged value of duration are included. A few of these covariates have a significant impact. I would argue that the signs of the coefficients tend to be consistent with *a priori* theoretical expectations. In particular it is interesting to notice that the larger the degree of *alternation* (ALT), the longer the expected duration. Indeed, high alternation implies low returnability; that is, low probability to be included in the next governing coalition. Under these circumstances, parties in the incumbent coalition have little incentive to break the agreement and hence the incumbent government should last longer. Of the two measures of portfolio volatility, only TPV is significant at usual confidence levels and its coefficient is positive. I find this result not surprising. High TPV implies that each minister stays in office for a relatively short period and cannot really accumulate much of the knowledge and expertise needed to run his department. It then follows that relatively inexpert ministers, especially if not fully supported by the bureaucracy, end up undertaking "wrong" policies that expose the whole cabinet to criticisms, undermining its stability. The result concerning the two "informational" variables COAL and PM is a bit disappointing: the two coefficients are of opposite sign (whilst I would believe they should work in the same direction) and none of the two is significant. Finally, it is important to point out the role of time horizon: a longer TH at the moment of formation increases expected duration.

Model 2 of Table 1 includes only attributes of the parliament as a whole as covariates. The degree of *concentration of opposition* (OPP) has a positive impact on duration. There are two ways in which this result can be interpreted. The first one is that a strong opposition may encourage coalition cohesion if coalition partners are afraid to let the opposition into power. The second one is that concentrated oppositions are more likely to act responsibly and play a constructive role in the process of policy formation, thus “supporting” the cabinet. The *rate of survival of the parliament* (SURV) has a negative impact on the hazard: more stable legislatures seem to be able to generate more stable cabinets. The positive sign attached to the degree of *polarisation* (POL) is probably not a very intuitive result; indeed it is at odds with some theoretical approaches to cabinet formation and duration. According to these theories, the larger the number of viable coalitions alternative to the incumbent one, the higher the probability that the incumbent will be beaten in a confidence vote. Since POL measures the support for "extremist" (and thus non-coalitionable) parties, a higher value, reducing the number of viable coalitions, should be associated to lower hazards. Warwick (1994) challenges this view suggesting that what a measure like POL actually reflects is the overall degree of ideological diversity within the system. Then the argument goes by claiming that cabinet survival in a more ideologically fragmented "political arena" is more difficult and hence a positive coefficient for POL should be expected. Indeed, my analysis supports this view.

Model 3 is a combination of Models 1 and 2. With the exception of TPV, all variables significant in Models 1 and 2 retain significance in the combined Model 3. Moreover, almost all variables have in Model 3 the same sign they have in Models 1 and 2. A rather surprising result is that now the dummy variable LOC (*ideological location of the coalition*), which takes value 1 for governments ideologically located to the right of 5.5 on a policy scale spanning from 1 to 10, has a significant, negative coefficient. According to this result, "right-wing" coalitions should last longer than "left-wing" coalitions. However, some caution is necessary for at least two reasons. First of all, the result is not very robust, since the coefficient becomes significant only in the combined model. Second, and probably more important, it can be rather difficult to locate the coalition on the ideological scale. The method followed in this paper is rather simple. LOC is a weighted average of the locations of the parties that compose it; the following formula is thus applied:

$$(12) \quad W = \sum_{i=1}^{n} (p_i L_i)$$

where p_i is the share of seats held by generic coalition partner i as a proportion of the total number of seats held by the coalition, L_i is the location of i on the left-right political scale and n is the total number of parties in the coalition.

LOC takes value 0 if W is smaller or equal to the median value 5.5. Of course, other measures of location might be suggested. For example, following the argument proposed by Laver and

Shepsle (1996a) a more precise indicator could be obtained by looking at the ideological location of those parties in control of "key" portfolios; that is, parties controlling portfolios whose jurisdiction include the dimensions of the policy space that are regarded as the most important-ones in each specific country.[12] It has to be noticed that Warwick (1994) adopts a measure of ideological location of the coalition very similar to the one I have used, but he finds that the coefficient is not significant at usual confidence levels.

Model 3 is in some sense a "final model" whose adequacy should be assessed. In duration analysis the traditional measure of adequacy R^2 is not available. Thus other ways have to be explored. Kiefer (1988) discusses some formal and informal specification checks. A first possible alternative is to use the PL estimates of the Proportional Hazards Model to estimate the baseline-integrated hazard function. From the estimated baseline-integrated hazard, generalised residuals can be computed for individual items in the risk set at any time t_j. If the model is appropriate, then the generalised residuals plotted against time should yield approximately a 45 degrees line. This method of specification checking is however misleading when data are heavily censored. A second alternative formal test of adequacy is the test of the null hypothesis $\beta = 0$. A proper test statistic can be defined as follows:

(13) $U'(0)I(b)U(0)$

where $U(\beta)$ is the score vector (the derivative of the log-likelihood w.r.t. β) and $I(\beta)$ is the information matrix. The test statistic in (13) is asymptotically distributed as χ^2 with p degrees of freedom, where p is the dimensionality of the vector of coefficients in the Proportional Hazards Model. For Model 3, the chi-squared test yields a p-value of 0. Thus the null hypothesis can be rejected. As noted by Kiefer (1988), low p-values are just a necessary, but not sufficient condition to conclude that the model is adequate. However, two other pieces of information are supportive of the idea that the model is adequate. First, I have split the sample into groups based on values of the explanatory variables and re-estimated Model 3 for each group separately. The estimated coefficients for each group are very similar to those reported

[12] I hope in some future work to be able to produce results using also this alternative measure.

in Table 1 . Second, the value of the Log-likelihood function for Model 3 (-1249.416) is higher than the value of the Log-likelihood for Models 1 and 2 (-1322.838 and -1301.722 respectively).

So far, economic variables have been left out of the picture. IMF and OECD provides monthly series of the Consumer Price Index (CPI) and the index of industrial production (IP) which can be used to evaluate the impact of economic conditions on the hazard. A major problem is that these series are for some countries incomplete (i.e. they do not go back too much in the past) and/or not comparable across time and space. This implies that a "high-quality" sample for the investigation with economic variables can include only 190 cabinets rather than the 369 cases used for Models 1, 2 and 3. A similar loss of observation is suffered by Warwick (1994)[13]. Given that the sample has been restricted so heavily, a first necessary step is to re-estimate Model 3 with the new smaller sample. Estimates are reported in Model 4, Table 2. Three key results established in Model 3 hold true. The time horizon to next elections has a strong negative impact on the hazard, more stable legislatures are able to produce more stable cabinets and the degree of polarisation of the system operates in the sense of making life harder for the cabinet. The insignificance of the role played by the variables capturing the accumulation of expertise and information is also confirmed. A new result appears in Model 4: the measure of *Conflict of Interest* (CI) within the coalition has a positive, significant coefficient (in Model 3 the coefficient was not significant, but still positive). CI is aimed at representing the degree of ideological heterogeneity of coalition partners, the positive coefficient implies that less ideologically diverse coalitions tend to last longer compared to coalitions with profound ideological gaps. This finding is perfectly intuitive: when parties have significantly different ideological positions, then conflicts over the policy to be undertaken are much more likely to occur and they can lead to a break down of the original agreement between the partners. The fact that both POL and CI are significant is a signal that whilst CI measures the degree of ideological diversity within the coalition, POL refers to ideological

[13] Merlo (1998) does not suffer from a comparable loss of observations since he focuses on Italy, one of the few countries for which the monthly time series of inflation and industrial production starts in 1950.

diversity within the parliament (and the political system) as a whole. Thus they reflect connected, but not mutually exclusive effects.

Finally, the contradictory findings concerning SHARE, ENP and ALT have to be stressed. Those three variables are significant and with the expected sign in the models estimated with the large sample, but in the model estimated with the small sample they are not significant and (amazingly) their signs are all inverted. With respect to the effective number of parties, the fact that the coefficient is not statistically different from zero is consistent with the idea that ENP and CI do account for the same underlying mechanism: the likelihood that a dissolution will occur as a consequence of internal disagreement. Since they both reflect the same effect, it is plausible that only one of the two is significant. With respect to the other two variables, I can only conclude that results previously found in Model 3 have to be regarded as not very robust (of course, this does not mean they have to be completely dismissed). Further work based on different samples could shed additional light on these issues.

Model 5 in Table 2 includes two economic measures as covariates: the *inflation rate* (INF) and the index of *industrial production* (IP). The inclusion of these two variables does not alter the signs of the coefficients of the political variables. Moreover, the same five political variables with significant coefficients in Model 4 (TH, SURV, POL, CI and COMP) retain significance in Model 5. Both INF and IP turns out to have rather precisely estimated coefficients, the sign of these coefficients being consistent with *a priori* expectations. INF tends to increase the hazard, whilst IP reduces the likelihood of government collapse. All in all, economic conditions do matter for cabinet survival: in countries where inflation is higher and industrial production lower, cabinets must expect to terminate earlier.

In Model 6 together with the "levels" of INF and IP, the rate of growth of IP and the volatility of INF are entered the basic specification. In fact, the rate of growth of IP has the expected negative sign, but the rather large standard error implies that the null hypothesis of a zero coefficient cannot be rejected at usual confidence levels. The volatility of inflation has an unexpected negative coefficient; that is, a more volatile inflation rate would increase expected cabinet duration. I find it quite difficult to provide an explanation for such a finding. A more volatile inflation has always been associated in the literature to higher costs of inflation, thus if any, it should have a positive effect on the hazard. However, the test of the null hypothesis of a zero restriction on its coefficient yields a p-value of 0.15338; that is, the coefficient is not significant at usual confidence levels.

Finally, in Model 7 three dummy variables aimed at reflecting various institutional arrangements[14] are entered with the full set of political variables and the two economic variables in "levels". Very little changes: all variables retain their original signs and levels of significance, of the three dummies, only the one referring to the "power" of the legislature over itself (LEG) passes the test of a zero restriction on its coefficient.

The same tests of model adequacy described for Model 3 are repeated for the Models of Table 2. The chi-squared test always generates p-values equal to 0. The procedure of grouping observations according to values of the covariates and re-estimating the models to check whether any significant change in the sign and the size of the coefficients occurs yields conforting results: the only significant change recorded is on the sign and the size of the coefficient of *lagged duration* in Models 5 and 6, however, the coefficient itself never passes the test of significance at usual confidence levels. The values of the Log-likelihood are as follows: -499.3572 (Model 4), -495.1441 (Model 5), -494.0379 (Model 6), -492.7731 (Model 7).

The last point to discuss is the one of duration dependence. As already noticed in Section 1, a simple way to asses the duration dependence of the process is to look at the curvature of the integrated hazard function when plotted against time. For Models 3, 4, 5, 6 and 7 the integrated hazard function is always convex thus the process exhibits positive duration dependence: the longer a government has stayed in power, the more likely it is to terminate in

---

[14]These three dummies are defined as follows. **Government power over the legislature (GOV)** takes value 1 if the government can dissolve the legislature; **Legislature power over itself (LEG)** takes value 1 if the legislature can dissolve itself; **Investiture** takes value 1 if a formal investiture vote is required (as in Belgium, Italy and Ireland, for example). The definition of these three variables is based on the discussion in Laver and Schofield (1990).

the near future[15]. This result has been obtained also by Warwick (1994) and by Merlo (1998) for the specific case of Italy.

Section 3. Discussion and conclusions

The key findings of this investigation can be summarised as follows.

Of the several political variables considered as covariates, some do have a strong, significant and robust effect on cabinet duration. These are: the *time horizon to next elections*, the *degree of polarisation* of the system, the *degree of ideological diversity* within the coalition and the *rate of survival of the parliament* as a whole. The result concerning polarisation is of some specific interest for the construction of theories of cabinet formation and disruption. A higher degree of polarisation, implying a larger share of votes and seats for extremist parties, has been often regarded as a factor increasing the chances of survival of the incumbent cabinet. The rationale behind this idea is that non extremist parties are non-coalitionable and hence the larger the share occupied by such parties, the smaller the number of viable coalitions alternative to the incumbent. This is turn would imply lower chances for the incumbent to be beaten by a no-confidence vote. The positive impact of polarisation on the hazard that results from my analysis would suggest that the mechanism linking polarisation and cabinet duration is rather different. Polarisation captures the overall degree of ideological heterogeneity within the system. It can therefore be taken as an indicator of the "toughness" of the political contest: in polarised systems survival is more difficult for any government.

The impact of ideological diversity of coalition partners is captured by two variables: the effective number of parties in the coalition and the measure of Conflict of Interest. Since they basically account for the same effect I find it not surprising that they fail being significant both at the same time. I will focus on the more direct of the two measures: the Conflict of Interest. The strong role it plays in determining the hazard seems to imply that theories of "making and breaking" governments that completely neglect the role of ideology (and ideological motivation of parties) miss an important feature of coalition politics. Most recent contributions in the field

[15]A plot of the integrated hazard against time is reported in Figure 1 of the Appendix for Model 7. Plots for the other models, available upon request, all look very similar to the one depicted in this Figure 1.

(such as Laver and Shepsle, 1996a) do assume that ideology matters and that parties look at the ideological location of potential partners when deciding whether to enter a coalition or not and whether to "hold out" for the control of some specific portfolios.

The fact that having a longer time horizon increases the chances of survival seems to be consistent with the basic arguments incorporated in economic models of *myopia* and political instability. Similarly, a long-lasting legislature could work as a guarantee of stability and hence make the time horizon of the incumbent longer. In this sense, I would have expected a significant role for lagged duration: when previous cabinets have lasted for a long time, the newly formed government can expect to stay in office longer and thus its time horizon should lengthen (a form of "duration contagion" proposed by Strom, 1988). However, lagged duration has a significant coefficient only in the models of Table 1 (those based on the large sample).

Another result which is consistent across the two samples is the one concerning the two variables meant to capture the accumulation of information and expertise in the hands of the prime ministers and of other political leaders. More information and expertise should guarantee longer duration, but the coefficients of these variables always fail to be significant at usual confidence level.

Economic variables do matter for duration. Bad economic conditions (summarised by high inflation and low industrial production) shortens the life of the incumbent. That is an important point to bear in mind when constructing models of political business cycle (or partisan business cycle). The assumption that poor economic performance will represent a burden for the incumbent only at the moment of next elections is too restrictive: poor economic performance is a liability that the incumbent might be called to pay for even before the constitutionally established term has expired. Since the probability to remain in office is a function of the level of inflation and industrial production, it would be sensible to have models of partisan or political business cycle in which an additional constraint is added to the problem of maximisation of political parties; this extra-constraint should be stated as $p(\pi,y) \geq \boldsymbol{p}$, where p is the probability of remaining in office expressed as a function of inflation π and output y and

p is some threshold (chosen as a function of the degree of risk-aversion of the party) below which the party is not ready to go.

The issue of the relationship between the ideological location of the cabinet and its survival is an open one. My dummy for ideological location is based on the weighted average of locations of coalition partners. The underlying hypothesis is a model of cabinet decision making in which the executive consists of members who are subject to the discipline of well organised political parties (Laver and Shepsle, 1996 b). In such a model of "party government", the legislature as a whole cannot tell the executive what to do, but the caucuses of those parties who are in the government can effectively impose policy upon "their" ministers. I have used the same dummy variable in a panel estimation of determinants of government consumption expenditure in the same sample of countries over the period 1965-1990 (Carmignani, 1999) and I have found that left-wing cabinets do tend to have higher consumption expenditure than right-wing cabinets. This means that ideological location is relevant in shaping the economic policy and hence in determining overall economic performance. Thus the link between cabinet duration and ideological location might well work indirectly via the impact that ideology has on policy choices. Some further work on this specific issue is certainly needed. Furthermore, as already noted, different assumptions about the decision making process would be consistent with alternative empirical definitions of ideological centre of the coalition. For example, Laver and Shepsle (1996a, b) point out that in several western European democracies a model of "ministerial government" rather than "party government" would be more appropriate: the policy of the cabinet would depend not much on the party composition of the coalition, but rather on the allocation of some key portfolios between partners. In this situation it is clear that a more appropriate measure of the ideological centre of the cabinet should be obtained by combining the ideological locations of parties in control of those two or three portfolios with jurisdiction over the relevant dimensions of the policy space.

A final technical note about the statistical method is required. The PL method for the estimation of the Proportional Hazards Model is convenient because it does not require a functional form for the baseline hazard to be chosen. However, the method has some drawbacks. In particular, as noted by Han and Hausmann (1988 and 1990), the baseline hazard function is treated as a nuisance function and constrained out of the PL function. Han and Hausmann (1990) develop an alternative estimation method which is based on the interpretation of the Proportional Hazards Model as a linear model for a transformed time dependent variable. In this approach, the *logs* of the integrated baseline hazard function are treated as unknown parameters and estimated along with the parameters β. Therefore, the use of this alternative procedure could provide some additional insights about the role played by the covariates.

Appendix 1. Econometric Results

Table 1 Partial Likelihood estimates of political models of cabinet duration

	Model 1	Model 2	Model 3
SHARE	-3.0685 (0.8567)		-1.7887 (1.0231)
ENP	0.20908 (.09138)		.46546 (.16559)
ALTERNATION	-.47639 (.27990)		-.53085 (.31572)
TPV	.021988 (.01066)		.005182 (.01108)
IPV	-.10572 (.08043)		.037202 (.08574)
OPP		-.89462 (.42316)	-.75709 (.45870)
COMP	-0.44731 (.81900)		.57322 (.80071)
CI	0.14556 (-0.9535)		.063315 (.1008)
TH	-1.7142 (.27314)		-2.9522 (.34228)
FRA		-.091597 (.06433)	-.27619 (.11654)
VOL		.28425 (.75670)	.77845 (.88024)
POL		3.0770 (.58552)	1.6179 (.65707)
SURV		-2.6205 (.29231)	-4.2871 (.38070)
LOC	-.10661 (.13206)		-.28602 (.14202)
Duration lagged	-.15943 (.06799)		-.17425 (.07263)
COAL	-.01838 (.01965)		-.00754 (.02059)
PM	-.001764 (-.01905)		-.01049 (.01976)

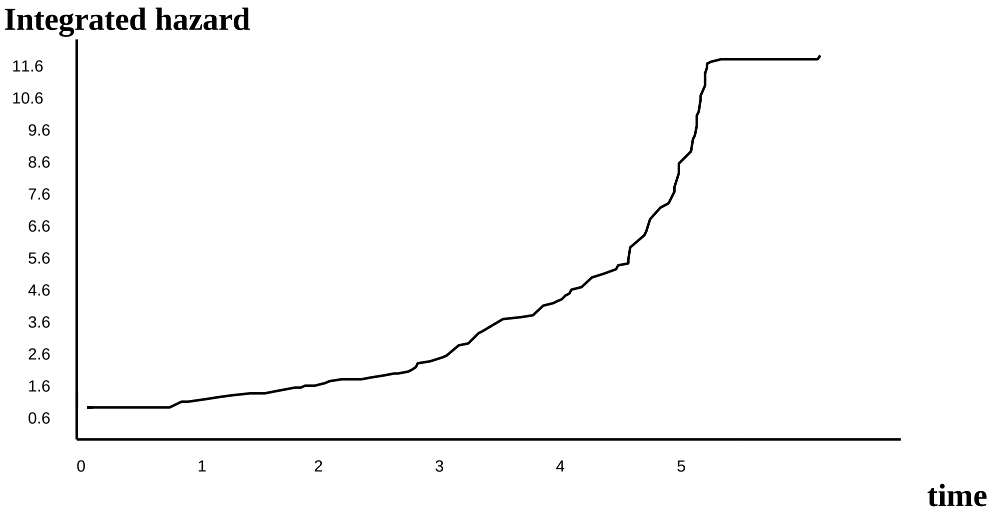
Notes. Duration variable is (log) duration, standard error in brackets. There are 369 observations in the sample, the sample period is 1950-1995. Variables are defined at page 13 of the paper.

Table 2 Partial Likelihood estimates of political-economic models of cabinet duration

	Model 4	Model 5	Model 6	Model 7
SHARE	.210 (1.7264)	.3215 (1.719)	.3175 (1.7734)	.2722 (1.7607)
ENP	-.006 (.2797)	-.0108 (.2683)	.0117 (.2728)	-.0697 (.2792)
ALTERNATION	.358 (.5444)	.0085 (.5729)	.7103 (.5779)	.3003 (.6110)
TPV	.002 (.0180)	.0241 (.0201)	.0223 (.0203)	.0142 (.0207)
IPV	-.179 (.1445)	-.1530 (.1443)	-.1680 (.1458)	-.1628 (.1472)
OPP	-.515 (.8675)	-.6042 (.8604)	-1.018 (.9080)	-.8191 (.8916)
COMP	2.241 (1.297)	2.4202 (1.365)	2.2360 (1.361)	2.2323 (1.432)
CI	0.357 (0.1998)	.3926 (.21054)	.4434 (.20484)	.5808 (.2274)
TH	-2.117 (0.465)	-2.000 (.4750)	-1.930 (.4787)	-1.9561 (.479)
FRA	-.039 (.1900)	-.0213 (.1849)	-.0431 (.1894)	-.05241 (.206)
VOL	-1.171 (1.396)	-.5959 (1.396)	-.8399 (1.454)	-.9469 (1.539)
POL	3.137 (.9640)	2.318 (1.0690)	1.7214 (1.158)	2.068 (1.1494)
SURV	-4.046 (.5899)	-4.133 (.5883)	-4.145 (.5831)	-4.165 (.6263)
LOC	-.098 (.2281)	-.0796 (.2384)	-.0832 (.2390)	-.1396 (.2521)
Duration lagged	-.031 (0.1151)	.0445 (.1211)	.04087 (.1199)	-.0720 (.1216)
COAL	-.029 (.0301)	-.0269 (.0307)	-.0112 (.0328)	-.0278 (.0313)
PM	-.0026 (.0321)	.0197 (.0328)	.0176 (.0329)	.0142 (.03372)
INFLATION		.5542 (.3310)	.8698 (.4035)	.5906 (.3329)
IP		-.9186 (.3472)	-1.067 (.3658)	-1.093 (.3729)
VOL. INFLATION			-.9387 (.6575)	
IP GROWTH			-.0259 (.0767)	
LEG				-.9209 (.5481)
GOV				.3956 (.38156)
INVESTITURE				.04184 (.3151)

Notes. Duration variable is (log) duration, standard error in brackets. There are 173 observations in the sample. Variables are defined at page 13 of the paper.

Figure 1. Plot of the integrated hazard function (against time) for Model 7 of Table 2 (on the horizontal axis duration in years is reported)



References.

Axlerod, R. (1970) Conflict of Interest Theory, Cambridge University Press.

Browne, E.C. , D. Gleiber and C. Mashoba (1984) "Evaluating Conflict of Interest Theory: Western European Cabinet Coalitions, 1945-80", *British Journal of Political Studies, 14, 1-32.*

Browne, E.C., J.P. Frendreis, D.W. Gleiber (1986) "The Process of Cabinet Dissolution: An Exponential Model of Duration and Stability in Western Democracies", *American Journal of Political Science, 30, 628-50.*

Calvo, G. and A. Drazen (1997). "Uncertain duration of reform: dynamic implications", *NBER Working Paper 5925*

Carmignani, F. (1999) "Measures if Political Instability in Multiparty Governments: a new Data Set with Econometric Applications", *University of Glasgow, Department of Economics Discussion Paper* (forthcoming).

Castles, F. and P. Mair (1984), "Left-Right Political Scales: Some Expert Judgements", *European Journal of Political Research, 73-88.*

Cox, D.R. (1972) "Regression Models and Life-Tables (with discussion)", *Journal of the Royal Statistics Society, 1972, B 34, 187-220.*

Cox, D.R. (1975) "Partial Likelihood", *Biometrika, 62 (2), 269-76*

Darby, J. , C.W. Li and V.A. Muscatelli (1998). "Political Uncertainty, Public Expenditure and Growth". *University of Glasgow, Department of Economics Discussion Paper No 9822.*

Deveraux, M. and J.F.Wen (1996). "Political uncertainty, capital taxation and growth". *Mimeo, University of British Columbia.*

Dodd, L.C. (1976) Coalitions in Parliamentary Government, Princeton University Press.

Grofman, B. and P. Van Roozendaal (1997) "Review Article: Modelling Cabinet Durability and Termination", *British Journal of Political Studies, 27, 419-451.*

Huber, J.D. (1998). "How Does Cabinet Instability Affect Political Performance ? Portfolio Volatility and Health Care Cost Containment in Parliamentary Democracies", *American Political Science Review, Vol.92, No. 3.*

Huber, J.D. and R. Inglehart (1998) "Expert Interpretations of Party Space and Party Locations in 42 Societies", *Party Politics, 1, 73-111.*

International Monetary Fund (IMF) International Financial Statistics, Various issues.

Laasko, M. and R. Taagepera (1979) "Effective Number of Parties: A Measure with Application to West Europe", *Comparative Political Studies, 12, 3-27.*

Kalblfeisch, J.D. and R.L. Prentice The Statistical Analysis of Failure Time Data New York: John Wiley and Sons, 1980.

Katz, P. and P. Mair (1990). Party Organisations.

Keesing's Archive Publication (1985) Political Parties of the World.

Kiefer, N.M. "Economic Duration Data and Hazard Functions", *Journal of Economic Literature, Vol XXVI, 646-679.*

King, G.J., E. Alt, N.E. Burns, M. Laver, (1990) "A unified model of cabinet dissolution in parliamentary democracies", *American Journal of Political Science 34, 846-871*

Koele, R. and P. Mair (eds.) "Political Data Yearbook", *European Journal of Political Research*, various issues.

Laver, M. and N. Schofield (1990) Multiparty Government, Oxford University Press.

Laver, M. and K.A. Shepsle (1996a). Making and Breaking Governments, Cambridge University Press.

Laver, M. and K.A. Shepsle (1996b). Cabinet Ministers and Parliamentary Governments, Cambridge University Press.

Mackie, T. and R. Rose (1991) The International Almanac of Electoral History, MacMillan.

Mackie, T. and R. Rose (1997) A decade of Election Results: updating the international almanac, Centre for the Study of Public Policy, Strathclyde University.

Merlo, A. (1998) "Economic Dynamics and Government Stability in Post-war Italy", *The Review of Economics and Statistics, 629-637.*

Organisation for Economic Co-operation and Development (OECD) Economic Outlook, Various Issues.

Persson, T. and G. Tabellini (1998). "Political Economics and Macroeconomic Policy", forthcoming in J.Taylor and M.Woodford (eds.), Handbook of Macroeconomics, Amsterdam: North-Holland

Powell, B. (1982) Contemporary Democracies, Cambridge, MA: Harvard University Press.

Roubini, N. and J. Sachs (1989) "Government Spending and Budget Deficits in the Industrialised Countries", *Economic Policy, 8, 99-132.*

Strom, K. (1984) "Party Goals and Government Performance in Parliamentary Democracies", *American Political Science Review, Vol. 79.*

Strom, K. (1988) "Contending Models of Cabinet Stability", *American Political Science Review, 82, 923-930.*

Taylor, M. and M. Laver (1973) "Government Coalitions in Western Europe", *European Journal of Political Research, 1, 205-248.*

Warwick, P. (1992) "Ideological Diversity and Government Survival in Western European Democracies", *Comparative Political Studies, 25, 332-361*.

Warwick, P. (1994) <u>Government Survival in Parliamentary Democracies</u>, Cambridge University Press.

Woldendorp, J. , H. Keman and I. Budge (1993) "Political Data 1945-1990. Party Government in 20 Democracies", *European Journal of Political Research, 24, 1-119* and "Party Government in 20 Democracies: an update (1990-1995), *European Journal of Political Research, 33, 1998.*