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BARGAINING OVER GOVERNMENTS IN A STOCHASTIC ENVIRONMENT

by

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Abstract

In this paper we structurally estimate a game-theoretic model of government formation in a multiparty parliamentary democracy. We focus on the timing and the terms of government agreements in the context of a *multilateral stochastic model of sequential bargaining with complete information* (Merlo and Wilson (1994, 1995)) where efficient delays may occur in the unique equilibrium. Besides showing that our model yields a good fit to the data on the duration of negotiations over government formation as well as government durations in postwar Italy, we use our estimates to quantify the advantage to proposing and to conduct policy experiments to evaluate the effects of changes in the bargaining procedure. We show that the gains from proposing tend to be quite large. Also, we show that changes in the proposer selection process would not affect either the duration of negotiations or government durations, while the imposition of a strict deadline would in general reduce the incentives to delay agreement as well as government durations.

JEL Classification Numbers: C41, C51, C73, C78, D72; Keywords: noncooperative bargaining, delay, government formation, structural estimation, duration models.

1. Introduction

Government formation in multiparty parliamentary democracies has long represented a natural application of bargaining theories. Since the appearance of Gamson's (1961) and Riker's (1962) original work, many bargaining models have been proposed to deal with this issue (see, e.g., Austen-Smith and Banks (1990), Baron (1991, 1993), Baron and Ferejohn (1989), and Laver and Shepsle (1990)). Existing models, however, are ill-equipped to explain the occurrence of delay for they uniformly yield equilibria with immediate agreement.

Delays are frequently observed in negotiations over the formation of a new government. In his study of 15 parliamentary democracies over the period 1945–1987, Strom (1990) reports that agreement is reached on the first proposal only in about 57% of the cases. Furthermore, he finds that the mean duration of the government formation process, measured by the number of weeks of negotiations before a government formed, is about 4 weeks (with standard deviation of about 5 weeks and maximum duration of 39 weeks). Hence, bargaining over governments takes time and failures to reach an agreement in the early stages of the process represent an important phenomenon which is not adequately studied in the literature.

In this paper, we focus on the timing and the terms of government agreements in the context of a *multilateral stochastic model of sequential bargaining with complete information* (Merlo and Wilson (1994, 1995)), where delays may occur in the unique equilibrium. Although delays in the formation of a new government are in general costly and inefficient from the point of view of society, for they interfere with the proper behavior of the democratic process, our analysis shows that they may be optimal from the point of view of the political parties involved in the negotiating process. When parties bargain over governments, the terms of agreement depend on aspects of the environment which may change stochastically during the negotiating period. As a consequence, the surplus to be divided may evolve over time according to a stochastic process, and if the discounted value of the surplus does not always decrease with time, the parties may find it in their interests to delay until better agreements can be implemented.[1]

Despite the extraordinary development of the theoretical literature on bargaining we have witnessed in the last decade (see, e.g., the surveys in Osborne and Rubinstein (1990) or Kennan and Wilson (1993)), little has been done to date to take these models to data. Notable exceptions are represented by the work of Cramton and Tracy (1992), Eckstein and Wolpin (1995), and Kennan and Wilson (1989). Eckstein and Wolpin (1995) structurally estimate a Nash-bargaining model to explain the observed relationship between duration to first job and accepted wages. Cramton and Tracy (1992) and Kennan and Wilson (1989) use strategic bargaining models with one-sided incomplete information to interpret strike duration data, but do not estimate the parameters of these models.

In this paper, we structurally estimate a noncooperative bargaining model of government formation in postwar Italy. Besides showing that our model yields a good fit to Italian data on the duration of negotiations as well as government durations, we use our estimates to quantify the advantage to proposing and to conduct policy experiments to evaluate the effects of changes in the bargaining procedure. In particular, we show that the gains

[1] For a discussion of alternative explanations of delays in bargaining that have been proposed in the literature see Merlo and Wilson (1994) and the references cited therein.

from proposing tend to be rather large. Also, we show that changes in the proposer selection process would not affect either the duration of negotiations or government durations, while the imposition of a strict deadline would in general reduce both the incentives to delay agreement and government durations.

The remainder of the paper is organized as follows. In Section 2, we present the issue under investigation. Section 3 contains a description of the bargaining model and a characterization of its equilibrium. Section 4 contains the results of the empirical analysis. Conclusions and comments are included in Section 5.

2. Bargaining over Governments in Postwar Italy

In this section of the paper, we briefly describe the process of government formation in a modern multiparty parliamentary democracy. Most of the general features of this process are common across many Western European countries, although the details vary across different political regimes. Rather than abstracting from institutional detail, we explicitly refer here to the Italian case which represents the focus of our empirical investigation.

After a referendum in 1946 which abolished the monarchy, Italy adopted a republican parliamentary form of constitution that went into effect in 1948, following a period of provisional government. The Italian political system is a parliamentary regime with a President, a bicameral legislature, and a government (i.e., a cabinet executive) headed by a Prime Minister. The President of the Republic is selected for a seven-year term by an electoral college consisting of both houses of Parliament (Senate and Chamber of Deputies). He is responsible for nominating the Prime Minister and may dissolve the Parliament and call new elections at any time prior to the last six months of a full parliamentary term, the constitutional duration of which is five years. Both houses of Parliament, which have equal legislative power, are chosen by direct universal suffrage under proportional representation and are subject to dissolution at the holding of new elections.[2] Many parties contest elections and win parliamentary seats. Since no single party ever held an absolute majority of seats in both houses of Parliament, all postwar Italian governments have been coalition governments.

To form a new government, the President selects a Prime Minister from one of the parties in the ruling coalition. Within a week of its appointment, the Prime Minister designate has to make a government proposal (i.e., an allocation of cabinet posts among the parties in the coalition) which can either be accepted or rejected by the coalition partners. If the proposal is accepted, a new government is inaugurated. If the proposal is rejected, the President appoints a new Prime Minister again from one of the parties in the ruling coalition (possibly even from the same party) to make a new government proposal. After multiple failed attempts to form a government, the President may call new elections.

Within ten days of its inauguration, a government has to be separately approved by both houses of Parliament. If a government fails on either vote it must resign. A government must also resign at any time if the Parliament withdraws its support to the government by a "no confidence" vote. When a

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[2] In 1994, a reform substantially modified Italy's electoral law, leading to a reorganization of the Italian political system. In particular, the new electoral rules prescribe that significant fractions of the representatives in both houses of Parliament be chosen under a majoritarian system instead of proportional representation. This study focuses on the period preceding the reform, known as *Italy's First Republic* (4/1948-3/1994).

Prime Minister resigns, the President can ask him to make an attempt to form a new government, designate a new Prime Minister, or dissolve the Parliament and call new elections.[3]

Before turning our attention to the specification of the model, a few remarks are in order. Note that the ruling coalition is always well defined when negotiations over the formation of a new government take place. Coalitions usually form before an election, which determines the winning coalition, and a change in the ruling coalition requires new elections. Also, although approval by the Parliament of a newly formed government involves majority voting, a government agreement entails unanimous approval of the members of the ruling coalition, and even a failure to obtain approval by the Parliament does not annul a government's official status (i.e., its existence in office).

The Italian constitution is quite vague about the details of the government formation process, which is mostly regulated by informal rules described in unofficial documents (Mershon (1991)). In particular, there is no clear rule for determining which party is assigned the right to make a proposal in the first or subsequent rounds of negotiations, although the larger parties in the ruling coalition are more likely to be selected.[4] Also, although there is no explicit deadline by which the members of the ruling coalition have to reach an agreement, they cannot disagree forever. The need for a government implicitly establishes the existence of a deadline by which

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[3] A more extensive description of the Italian political system can be found, for example, in Pasquino (1985). For a comparison with other political systems see, e.g., Laver and Schofield (1990).

[4] A member of the largest party in the ruling coalition was selected as a Prime Minister about 80% of the times over the horizon of our study.

either the coalition partners agree to form a government or new elections determine a realignment of the coalition members.

3. The Model

Existing models of government formation, building on the work of Rubinstein (1982), typically identify the object of bargaining with a fixed "cake" with a set number of pieces (i.e., the cabinet posts) the discounted value of which shrinks at a constant rate. Negotiations over government formation, however, entail bargaining among the member parties of the ruling coalition over the allocation of patronage, so that a more durable government implies a larger cake. If we assume that parties are risk neutral and a given level of surplus is available every period a government is in power, then the cake the coalition partners bargain over is given by the (possibly discounted) expected sum of surplus levels from the time a government forms until the (uncertain) time it dissolves. The *ex ante* value of a government agreement then depends on the expected duration of the government. Conditional on their information about the "state of the world" in any given period while bargaining over a new government, the parties form expectations about the duration of a government formed in that state. Assuming the parties in the ruling coalition share the same information, this determines the size of the cake (in expected utility terms) for that period. As the state of the world changes during the negotiating period or new information becomes available resolving key elements of uncertainty, the size of the cake would change accordingly.

Empirical studies (see, e.g., King et al. (1989) and Warwick (1992) for multi-country studies and Merlo (1991) for an analysis of the Italian case), have identified four important variables to explain government duration in multiparty parliamentary democracies. These variables are the size of the ruling coalition, the time horizon to the next election, the state of the economy at the time a government forms, and political and economic events occurring while a government is in power.[5] Together with the political climate in which negotiations take place (defined for example by the popularity of the ruling coalition), the size of the coalition, the time horizon to the next election, the current state of the economy, and expectations about the likelihood of future shocks can all be thought as defining the parties' relevant information while bargaining over governments. The size of the ruling coalition is fixed and does not change during the negotiating period. The time horizon to the next election decreases in a deterministic fashion with each rejected offer. The political climate and the state of the economy, however, change stochastically during the negotiating period and if we accept that certain states of the world may be more conducive to the formation of a stable government than others, this order of considerations leads us to consider a bargaining model where the cake to be divided follows a stochastic process.

3.1. The Game

Let $K = \{1,\ldots,k\}$, $k \geq 2$, denote the set of parties in the ruling coalition, with typical element i, and let $\Pi = (\pi_1,\ldots,\pi_k)$, $\pi_i \geq 0$, $\sum_{i=1}^{k}\pi_i = 1$,

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[5] In particular, upon specifying parametric functional forms for the stochastic processes generating the shocks, these studies find that a government tend to survive longer the larger the size of the coalition, the longer the time horizon to the next election, and the lower the inflation and unemployment rates both at the time of its formation and during its tenure in office.

denote the vector of the parties' shares in the coalition.[6] Let S denote the set of possible states of the world, with typical element s, and let σ denote a stationary Markov process with state space S and transition probability distribution function $P(\cdot|s)$. For $t = 0,1,\ldots,\bar{T} < H$ let $\sigma^t \equiv (\sigma_0,\ldots,\sigma_t)$ denote the t-period state-history with typical realization $(s_0,\ldots,s_t)$, where a period corresponds to a week, $\bar{T}$ denotes the ending time of the bargaining period, and H denotes the time horizon to the next scheduled election with respect to the time in which negotiations begin.

For any state $s \in S$ realized in period t, $t = 0,1,\ldots,\bar{T}$, let $c(s,t)$ be a nonnegative real number representing the *cake* to be divided among the coalition partners if they agree in that period. To be consistent with the specification we adopt for our empirical analysis, we suppose that the cake represents the expected duration of a government formed in period t when the state is s, so that $c(s,t) < H-t$ for any s and t.[7] More precisely, we assume that $c(s,t)$ is a realization of a random variable $C(s,t)$ with finite support $[0,\bar{c}(t)]$, $\bar{c}(t) < H-t$, and distribution function $G(\cdot|s,t)$. To simplify notation, we refer to $c(s,t)$ as c and we refer to the 3-tuple (s,t,c) as a *state*. For any state (s,t,c), let $X(s,t,c) \equiv \{x \in R^k\colon x_i \geq 0, \sum_{i=1}^k x_i \leq c\}$

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[6] For simplicity, we restrict our attention to the case of a unique parliamentary chamber so that $\pi_i = \omega_i/\sum_{j=1}^k \omega_j$, where ω_i is the seat share obtained by party i in the most recent election, and $\sum_{i=1}^k \omega_j$ is the size of the ruling coalition.

[7] In particular, we may either assume that a unitary level of surplus is available every period a government is in power and there is no discounting, or that the per-period level of surplus generated while a government is in power grows at the same rate as the rate at which parties discount future payoffs. In either case, the expected sum of surplus levels from the time a government forms untill the time it dissolves is equal to the expected duration of the government. This simplification, which is unnecessary for the theoretical analysis, plays an important role in the estimation of the model.

denote the set of feasible utility vectors to be allocated in that state. For an *allocation* $x \in X(s,t,c)$, x_i is the amount of surplus awarded to party i.

The game is played as follows. Upon the realization of state (s,0,c), party $i \in K$ is selected to make a government proposal with probability π_i.[8] The appointed proposer chooses either to *pass* or to propose an allocation in X(s,0,c). If it proposes an allocation, all the other parties in the coalition sequentially respond by either accepting or rejecting the proposal until either some party has rejected the offer or all parties have accepted it.[9] If the proposal is unanimously accepted by the parties in the ruling coalition a government is inaugurated and the game is over. If no proposal is offered and accepted by all parties in the coalition, state (s',1,c') is realized in the next period according to the Markov process σ and the distribution $G(\cdot|s',1)$, and a new proposer is selected with probabilities Π. The bargaining process continues until either a government agreement is reached or the deadline $\bar{T}$ expires without an agreement.

An *outcome* of this bargaining game is either a pair (τ,η), where $\tau \leq \bar{T}$ denotes the period in which a proposal is accepted and $\eta \in X(s_\tau,\tau,c)$ denotes the proposed allocation which is accepted in period τ, or disagreement. An outcome (τ,η) implies a *von Neumann-Morgenstern payoff* to party i, $\beta^\tau \cdot \eta_i$, where $\beta \in (0,1)$ is the common discount factor reflecting the parties' degree

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[8] A random selection rule was initially proposed by Binmore (1987) as an alternative to the alternating offer structure. It is also used by Baron and Ferejohn (1989) in their analysis of government formation. In our context, this specification of the proposer selection process seems appropriate given our remark at the end of Section 2. In any case, we show below that the main results of the paper are independent of the way the proposer is selected.

[9] Since the order in which parties respond does not matter we simply assume that in state (s,t) the parties respond in the order prescribed by $K-\{\iota(s,t)\}$, where $\iota(s,t)$ denotes the identity of the proposer in state (s,t).

of impatience. The payoff to disagreement is normalized to be a k-dimensional vector of zeros.[10]

A *history* is a specification of a finite sequence of realized states and proposers and the actions taken at each state in the sequence up to that point. A *strategy* for party i specifies a feasible action at every history at which it must act. A *strategy profile* is a k-tuple of strategies, one for each party. At any history, a strategy profile induces an outcome and hence a payoff for each party. A strategy profile is *subgame perfect* (SP) if, at every history, it is a best response to itself. We refer to the outcome and payoff functions induced by a subgame perfect strategy profile as an SP outcome and SP payoff respectively.

Before turning our attention to the solution of the model a few comments are in order. As we take electoral results and the ruling coalition as given, we ignore issues related either to the game between political parties and voters which determines the number, size, and platforms of parties in the political system or the game among the parties in the system determining size and composition of the ruling coalition.[11] Also, although negotiations over the formation of new governments are potentially linked through time, we study each bargaining episode in isolation. Hence, the game described here refers to a single negotiation over the formation of a new government.[12] Finally, we treat the stability of a government agreement as

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[10] We assume that if the parties cannot agree before the expiration of the deadline new elections will be called to determine a new ruling coalition.

[11] These questions are typically addressed in the political science literature in the context of spatial models or cooperative game-theoretic frameworks. See, e.g., the work by Austin-Smith and Banks (1988, 1990), Baron (1991, 1993), and Laver and Shepsle (1990).

[12] Solving a multilateral repeated bargainin model would involve complications that are outside the scope of this paper. For an attempt to deal with the issue of repeated contracts in a two-player bargaining framework with private information see Kennan (1994).

exogenous and rule out the possibility of renegotiation. Although extreme, this last assumption is not unreasonable since the collapse of a government which is necessary for a new negotiation to take place, may induce new elections and a realignment of the coalition members.[13] This implies that renegotiation may be extremely costly.

3.2. Characterization of Subgame Perfect Equilibria

The model we just described belongs to a class of stochastic bargaining models for which Merlo and Wilson (1994, 1995) provide general characterization results. We therefore rely on those papers for proofs of the arguments that are only informally presented here.

Since the game has a finite horizon it has a unique SP payoff that can be computed by backwards induction. Let $v_j(s,t,c,i)$ denote the *SP payoff* of party j in state (s,t,c) when party i is the proposer. The parties' SP payoffs are the unique solution to the following system of recursive equations:

$$[1]\quad \begin{cases} v_i(s,t,c,i) = \text{Max}\{c - \sum_{j\neq i} v_j(s,t,c,i), \\ \qquad \beta\cdot\int[\int[\sum_{j\neq i}\pi_j\cdot v_i(s',t+1,c',j) + \\ \qquad\qquad \pi_i\cdot v_i(s',t+1,c',i)]dG(c'|s',t+1)]dP(s'|s)\} \\ v_j(s,t,c,i) = \beta\cdot\int[\int[\sum_{l\neq j}\pi_l v_j(s',t+1,c',l) + \\ \qquad\qquad \pi_j\cdot v_j(s',t+1,c',j)]dG(c'|s',t+1)]dP(s'|s), \end{cases}$$

$i,j,l \in K$, $i \neq j$, $t = 0,1,\ldots,\bar{T}$, and $v_j(s,\bar{T}+1,c,i) = 0$, for any s, c, i and j. The interpretation of [1] is straightforward. In order to induce acceptance

[13] In Italy, even simple government "reshuffles" (i.e., reallocations of cabinet posts among the same coalition members) usually require a new negotiation, and after a government resigns the President always has the option of calling new elections.

of its proposal, the appointed proposer has to offer to each other party in the coalition its equilibrium continuation value. The proposer does so only if what is left over from the currently available surplus is at least as large as what it can guarantee itself by passing and hence delaying agreement. Therefore, delays may occur in the unique SP equilibrium.

Let $w(s,t,c,i) \equiv \sum_{j=1}^{k} v_j(s,t,c,i)$ denote the *SP total payoff* in state (s,t,c) when player i is the proposer. Given the structure of the game, if a party is not selected to make a proposal it is indifferent to the identity of the proposer (i.e., for any state (s,t,c), $v_j(s,t,c,i) = v_j(s,t,c,l)$, $i,j,l \in K$, $i \neq l \neq j$). Hence, it is straightforward to verify that in equilibrium, for any state (s,t,c), $w(s,t,c,i) = w(s,t,c,j) = w(s,t,c)$, $i,j \in K$, $i \neq j$, where

$$[2] \qquad w(s,t,c) = \max\{c, \beta\cdot\int[\int w(s',t+1,c')dG(c'|s',t+1)]dP(s'|s)\},$$

and regardless of the identity of the current proposer and the likelihood of its reappointment in the future, the parties agree in state (s,t,c) only if $c \geq \beta\cdot\int[\int w(s',t+1,c')dG(c'|s',t+1)]dP(s'|s)$ and delay agreement otherwise.

By rearranging the terms in [1] and exploiting [2] we obtain an expression for the *gains from proposing* as

$$[3] \qquad v_i(s,t,c,i) - v_i(s,t,c,j) = \max\{c - \beta\cdot\int[\int w(s',t+1,c')dG(c'|s',t+1)]dP(s'|s), 0\},$$

$i,j \in K$, $i \neq j$. If agreement is reached in state (s,t,c), then the gains to a player from being the proposer are equal to the difference between the current surplus level and the expected discounted value of the future surplus levels which will be agreed upon.

One striking implication of this characterization of the SP equilibrium is that the set of states in which the parties agree only depends on the discount factor, the Markov process σ, and the distribution of cake sizes, and is independent of the identity of the proposer in each state. Furthermore, the advantage to a player from being the proposer in a state where agreement occurs also only depends on β, G, and P, and is independent of Π. Π, however, together with P, G, and β, affects how the surplus is allocated in equilibrium. Merlo and Wilson (1994) refer to this result as the "separation principle" for generic stochastic bargaining games with complete information where the cake is a simplex of random size and the players share a common discount factor. Under these assumptions, that are satisfied here, the set of states in which agreement occurs in any SP outcome is determined as the solution to a dynamic programming problem whose objective is to maximize the expected discounted size of the cake. Hence, the unique SP payoff (and consequently any delay in agreement) must be Pareto efficient. Also, the separation principle implies that our results on the timing of government agreements and the advantage to proposing are robust with respect to misspecifications of the proposer selection process.

Note that the agreement rule, which is the solution to a standard optimal stopping problem, possesses a "reservation property." In any state (s,t,c), agreement occurs if and only if $c \geq c*(s,t)$, where

[4] $$c*(s,t) = \beta \cdot \int [\int w(s',t+1,c')dG(c'|s',t+1)]dP(s'|s).$$

Also, for any $s \in S$, $c*(s,\overline{T}) = 0$ and $c*(s,t+1) \leq c*(s,t)$, $t = 0,\ldots,\overline{T}-1$.

3.3. An Example

Before turning our attention to the empirical analysis contained in the paper, we present a simple example to illustrate the derivation of the SP payoffs. Suppose $K = \{1,2,3\}$, $\Pi = (\pi_1,\pi_2,\pi_3)$, σ is a Markov chain with $S = \{s_1,s_2\}$ and transition probabilities p_{ij}, $i,j = 1,2$, and $G(c|s_1,t)$ and $G(c|s_2,t)$ are degenerate time-invariant distributions assigning unitary probability mass on c_1 and c_2 respectively, with $c_1 > c_2 > 0$. Therefore, we may use [2] to express the SP total payoff as

$$w(c_i,t) = \max\{c_i,\beta\cdot(p_{i1}\cdot w(c_1,t+1)+p_{i2}\cdot w(c_2,t+1))\},$$

$i = 1,2$, $t = 0,1,\ldots,\bar{T}$. Since $c_1 > c_2$, the unique solution to this system of recursive equations is $w(c_1,t) = c_1$ and $w(c_2,t) = \max\{c_2,((1-(\beta\cdot p_{22})^{\bar{T}-t})/(1-\beta\cdot p_{22}))\cdot\beta\cdot p_{21}\cdot c_1+(\beta\cdot p_{22})^{\bar{T}-t}\cdot c_2\}$ for all t. Agreement always occurs when the cake size is c_1 and in the last period of the game regardless of what the cake size is. When the cake size is c_2 and $t < \bar{T}$, agreement is reached only if $c_2 \geq \beta\cdot p_{21}\cdot c_1/(1-\beta\cdot p_{22}) \equiv c^*$.

To determine the individual SP payoffs, we exploit [1] and [3] to obtain,

$$v_j(c_i,t,j) = \max\{c_i-\beta\cdot(p_{i1}\cdot w(c_1,t+1)+p_{i2}\cdot w(c_2,t+1)),0\} + v_j(c_i,t,j'),$$

$i = 1,2$, $j,j' = 1,2,3$, $j' \neq j$, $t = 0,1,\ldots,\bar{T}$. There are two cases to consider.

Case I: $w(c_2,t) = c_2 \geq c^*$. In this case, agreement occurs for both cake sizes, so that $v_j(c_i,t,j) = c_i - \beta\cdot(p_{i1}\cdot w(c_1,t+1)+p_{i2}\cdot w(c_2,t+1)) + v_j(c_i,t,j')$. Solving for the parties' SP payoffs in the initial period yields $v_j(c_i,0,j) =$

$c_i - \beta\cdot(1-\pi_j)\cdot[p_{i1}\cdot c_1+p_{i2}\cdot c_2]$ and $v_{j'}(c_i,0,j) = \beta\cdot\pi_{j'}\cdot[p_{i1}\cdot c_1+p_{i2}\cdot c_2]$, $i = 1,2$, $j,j' = 1,2,3$, $j \neq j'$.

Case II: $c_2 < c*$. In this case, for $t < \bar{T}$, agreement occurs only when the cake size is c_1, so that $v_j(c_1,t,j) = c_1 - \beta\cdot[p_{11}\cdot w(c_1,t+1)+p_{12}\cdot w(c_2,t+1)] + v_j(c_1,t,j')$ and $v_j(c_2,t,j) = v_j(c_2,t,j')$. Solving for the parties' SP payoffs in the initial period if cake size c_1 is realized yields $v_j(c_1,0,j) = c_1 - \beta\cdot(1-\pi_j)\cdot[p_{11}\cdot c_1+p_{12}\cdot((1-(\beta\cdot p_{22})^{\bar{T}-1})\cdot c*+(\beta\cdot p_{22})^{\bar{T}-1}\cdot c_2)]$ and $v_{j'}(c_1,0,j) = \beta\cdot\pi_{j'}\cdot[p_{11}\cdot c_1+p_{12}\cdot((1-(\beta\cdot p_{22})^{\bar{T}-1})\cdot c*+(\beta\cdot p_{22})^{\bar{T}-1}\cdot c_2)]$, $j,j' = 1,2,3$, $j \neq j'$.

In both cases, the SP payoffs to the parties are proportional to their probability of being selected as proposers. Under the maintained assumption that the probability of being selected as proposer is proportional to a party's size, this result is consistent with Gamson's (1961) original analysis as well as the empirical findings of Browne and Frendreis (1980), who show that the shares of cabinet posts assigned to the party members of the ruling coalition in almost all Western European countries in the postwar period are roughly proportional to the parties' relative sizes. Also, note that in the second case the gains from proposing in the only state where agreement occurs are larger the more impatient the parties (i.e., the smaller β), the more persistent the "bad state" (i.e., the larger p_{22}), and the less persistent the "good state" (i.e., the smaller p_{11}).

4. Empirical Analysis

The predictions of our bargaining model crucially hinge on its structural components (namely, the distributions G and P, the discount factor β, the probabilities Π, and the terminal time $\bar{T}$). However, since all of our results but the derivation of the individual equilibrium payoffs are independent of the proposer selection process (summarized by Π), and since measuring government payoffs to the parties is in general problematic (see, e.g., Browne and Frendreis (1980)), we abstract from them and focus on the estimation of the parameters of the model which determine the timing of government agreements and the distribution of governments that are agreed upon. This allows us to test our model by evaluating its performance in fitting observed durations of negotiations over the formation of new governments as well as government durations.

4.1. Data

The history of postwar Italy over the period 4/1948-3/1994 is characterized by a sequence of 47 governments which constitute our sample of observations. An element in the sample is defined by the duration of a negotiation over the formation of a new government and the duration of the government following that negotiation. For each element in the sample, we also observe the time horizon to the next scheduled election, the size of the ruling coalition, and the time series of inflation rates during the negotiating period until a government forms. Descriptive statistics of all the variables are reported in Table 1.[14]

Data on the duration of negotiations are summarized in Figure 1, which contains a plot of the Kaplan-Meier (KM) survival function.[15] Data on

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[14] Data on political variables are drawn from Banks (1970-1994), various issues of the *European Journal of Political Research*, Mallory (1948-1970), and Presidenza del Consiglio dei Ministri (1994). Economic data are monthly inflation rates from IMF-IFS and are transformed into weekly data by linear interpolation.

[15] The KM estimator is a well known nonparametric instrument for the analysis of duration data (see, e.g., Kalbfleisch and Prentice (1980) or Lancaster (1990)). If we let r_t denote the number of spells of events "at risk" at time t (i.e., the bargaining periods still lasting just prior to time t), and let e_t be the number of bargaining spells that end at time t, the KM estimator of the hazard rate at time t is $\hat{h}_t = e_t/r_t$, and the KM estimator of the survival function at time t is $\hat{S}_t = \Pi_{u=0}^{t}(1-\hat{h}_u)$.

government durations expressed as percentages of the time horizon to the next scheduled election with respect to the time a government formed are summarized in the histogram displayed in Figure 2. Since the time horizon to the next scheduled election represents the maximum potential duration of a government, this represents a useful normalization that allows us to compare the duration of governments formed under different circumstances. We refer to a government duration divided by its maximum potential duration as a *normalized government duration*.

We divide our sample of governments into two subsamples depending on the size of the ruling coalition. We do this by defining a binary variable m that takes the value 1 if a coalition is a "majority" coalition (i.e., it controls at least 50% of the seats in the Parliament) and 0 if it is a "minority" coalition (i.e., it holds less than 50% of the seats in the Parliament). We also transform the inflation rate into a discrete variable taking only the values "low" and "high" depending on whether a particular observation is below or above the median of the distribution of inflation rates over the time frame covered by our study (equal to 0.467). The intersection of these two variables identifies four cells in the data depending of whether a majority (minority) government formed when the inflation rate was low (high). For each cell, Table 2 reports the number of observations and the mean normalized government duration. As we can see from this table, after controlling for the time horizon to the next scheduled election, government duration tends to increase with the size of the coalition and to decrease with the inflation rate at the time of government formation, which is consistent with the findings reported in Section 3.

4.2. Estimation Specification

In order to estimate the model we make the following assumptions. Let $s \in S$ denote a state of the economy described by the inflation rate, and let σ be a Markov chain with state space $S = \{l,h\}$ (where l and h stand for "low" and "high" respectively), and transition probabilities matrix $p = \{p_{ss'}\}_{s,s'=l,h}$. We use the observed transition frequencies to obtain estimates of the weekly transition probabilities as $\hat{p}_{ss'} = n_{ss'}/n_s$, where $n_{ss'}$ is the frequency of (one-step) transitions $s \to s'$ in the data and $n_s = \sum_{s'=l,h} n_{ss'}$, $s,s' = l,h$.[16] The estimates we obtain (using 2,249 weekly observations) are

$\hat{p} =$

	l	h
l	0.930	0.070
h	0.071	0.929

which we assume to be known to the parties.

For any state of the economy s, $s = l,h$, realized in period t, $t = 0,1,\ldots,\bar{T}$, given the time horizon H to the next scheduled election with respect to the time in which negotiations begin, the type m of the ruling coalition, $m = 0,1$, and the political climate in that period (which we do not observe), we assume that the parties jointly extract a signal (which also we do not observe) about the expected duration of a government formed in that period. We model this by assuming that for any given s and t, the parties draw from a density $f(\cdot|s,t;H)$ with finite support $[0,H-t]$, the upper bound $\bar{d}(s,t;H)$ of the support of the conditional density $q(\cdot|\bar{d}(s,t;H);m)$ of

[16] The set of transition frequencies $n_{ss'}$ forms a sufficient statistic for the transition matrix p, and $\hat{p}_{ss'}$ is the maximum likelihood estimator of $p_{ss'}$. See, e.g., Basawa and Prakasa Rao (1980).

government durations, $D(s,t;H,m)$, formed in that period. Hence, the size of the cake in period t is given by $c(s,t;H,m) = E[D(s,t;H,m)|\bar{d}(s,t;H)]$.[17] This specification captures the fact that the actual duration of a government also depends on events that occur while a government is in power, and the probability distribution of these events is in the parties' information set while they bargain over the formation of a new government. Also, it takes into account the fact that the stability of a government depends, in part, on the size of the ruling coalition.

To minimize the number of free parameters that need to be estimated, we restrict our attention to a one-parameter family of distributions. In particular, we assume that $f(\cdot|s,t;H)$ is a power-function density, $f(\bar{d}|s,t;H) = \alpha_s\cdot(\bar{d}^{\alpha_s-1}/(H-t)^{\alpha_s})$, $0 \leq \bar{d} \leq H-t$, $\alpha_s > 0$, and, $q(\cdot|\bar{d}(s,t;H);m)$ is also a power-function density, $q(d|\bar{d}(s,t;H);m) = \gamma_m\cdot(d^{\gamma_m-1}/\bar{d}(s,t;H)^{\gamma_m})$, $0 \leq d \leq \bar{d}(s,t;H)$, $\gamma_m > 0$.[18] Hence, given H, for any s and t, the size of the cake for a coalition of type m in period t is given by $c(s,t;H,m) = (\gamma_m/(\gamma_m+1))\cdot\bar{d}(s,t;H)$, which can be viewed as a realization of a random variable $C(s,t;H,m)$, which also has a power-function density $g(c|s,t;H,m) = \alpha_s\cdot(c^{\alpha_s-1}/\bar{c}(t;H,m)^{\alpha_s})$, $0 \leq c \leq \bar{c}(t;H,m)$, $\alpha_s > 0$, where $\bar{c}(t;H,m) = (\gamma_m/(\gamma_m+1))\cdot(H-t)$.[19]

Under these assumptions, we can use [4] to compute the "reservation" cake sizes which characterize the agreement rule for a coalition of type m for

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[17] Alternatively, we could assume that for any state (s,t) the parties directly draw the mean of the distribution of government durations formed in that state. As we show below, the two specifications are equivalent.

[18] The class of power-function distributions is a subset of the family of Beta distributions (see, e.g., Johnson and Kotz (1970, pp. 37-56)). Note that a parameter value for a power-function distribution below (above) 1 implies a density function skewed to the left (right), while a parameter value of 1 identifies a uniform distribution.

[19] This follows form the fact that $c(s,t;H,m)$ is a linear function of $\bar{d}(s,t;H)$ and $f(\cdot|s,t;H)$ is a power-function density on $[0,H-t]$ with parameter α_s.

any s and t given H, $c^*(s,t;H,m)$. They are the solution to the following systems of recursive equations:

$$[5] \quad c^*(s,t;H,m) = \beta\cdot\textstyle\sum_{s'=1,h}\hat{p}_{ss'}[(\alpha_{s'}/(\alpha_{s'}+1))\cdot\bar{c}(t+1;H,m) + (1/(\alpha_{s'}+1))\cdot(c^*(s',t+1;H,m)^{\alpha_{s'}+1}/\bar{c}(t+1;H,m)^{\alpha_{s'}})],$$

$m = 0,1$, $s = 1,h$, $t = 0,1,\ldots,\bar{T}-1$, and $c^*(s,\bar{T};H,m) = 0$ for all s and m.

Since the model we estimate is analogous to a finite horizon search model, the econometric framework we use is similar to that contained in Wolpin (1987) except for the fact that we include a Markov structure for an underlying state of the economy indexing the distributions generating the surplus levels (see, e.g., Lippman and McCall (1979)).[20] Before we turn our attention to the specification of the likelihood function, note that it is possible to estimate the terminal time $\bar{T}$ separately from the other parameters and then condition the estimation of the model on such an estimate (treating it as a non-parameter). This is possible because the maximum of the sample of negotiation durations, τ_{MAX}, is a strongly consistent estimator of $\bar{T}$ which converges to $\bar{T}$ at a faster rate (N) than the maximum likelihood estimators of the other parameters ($\sqrt{N}$).[21] Hence, we replace $\bar{T}$ with $\hat{T} = \tau_{MAX} = 18$ weeks.

For a coalition of type m that begins negotiating over the formation of a new government H periods away from a scheduled election, if we let $\xi(t;H,m) = 1$ indicate agreement in period t and $\xi(t;H,m) = 0$ delay, the

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[20] Also, note that we do not need to introduce measurement error to reduce the influence of outliers in the observed government duration distribution on the estimated parameters (see Wolpin (1987, p. 803)).

[21] See, e.g., Balakrishnan and Cohen (1991). This result was first pointed out by Flinn and Heckman (1982), who use it to concentrate the likelihood function in their model of search unemployment.

probability that the parties will delay agreement in period t when the state of the economy is s, given that they have not agreed up to t is

[6] $$\Pr(\xi(t;H,m) = 0|\text{delay to } t,s) = \Pr(c(s,t;H,m) < c^*(s,t;H,m)) = (c^*(s,t;H,m)/\bar{c}(t;H,m))^{\alpha_s}.$$

Similarly, the joint probability of observing agreement in period t when the state of the economy is s and a government duration d following such agreement, given delay up to t is

[7] $$\Pr(\xi(t;H,m) = 1,d|\text{delay to } t,s) = \Pr(c(s,t;H,m) \geq c^*(s,t;H,m),d) = \gamma_m \cdot \alpha_s \cdot d^{\gamma_m - 1} \cdot (\gamma_m/(\gamma_m+1))^{\gamma_m} \cdot \bar{c}(t;H,m)^{-\alpha_s} \cdot (1/(\alpha_s - \gamma_m)) \cdot [\bar{c}(t;H,m)^{\alpha_s - \gamma_m} - \max\{c^*(s,t;H,m),(\gamma_m/(\gamma_m+1)) \cdot d\}^{\alpha_s - \gamma_m}].$$ [22]

Hence, given H, the probability of observing a negotiation lasting for τ periods followed by a government duration d for a coalition of type m conditional on the realized state-history $(s_0,\ldots,s_\tau)$ is

[8] $$\Pr(\tau,d;H,m) = \Pi_{t=0}^{\tau-1}\Pr(\xi(t;H,m) = 0|\text{delay to } t,s_t) \cdot \Pr(\xi(\tau;H,m) = 1,d|\text{delay to } \tau,s_\tau),$$

and the log-likelihood function is obtained by summing the logs of the RHS' of [8] over all the elements in the sample.

4.3. Results

Table 3 presents the maximum likelihood estimates of the parameters β, α_l, α_h, γ_0, and γ_1. Note that since β represents a weekly discount factor, a point estimate for β of 0.642 corresponds to a very low 0.170 monthly discount

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[22] The derivation of this joint probability is contained in the Appendix.

factor, which implies a fairly high degree of impatience on the part of the political parties. To interpret the estimates of the parameters α_l, α_h, γ_0, and γ_1 that we obtained, note that they have the following implications for the first two moments of the distributions of expected normalized government durations $\varsigma(s;m) \equiv C(s,t;H,m)/H-t$, $s = l,h$, $m = 0,1$.[23] $\hat{E}[\varsigma|l;1] = 0.099 > \hat{E}[\varsigma|h;1] = 0.066 > \hat{E}[\varsigma|l;0] = 0.048 > \hat{E}[\varsigma|h;0] = 0.032$, and $\hat{Var}[\varsigma|l;1] = 0.037 > \hat{Var}[\varsigma|h;1] = 0.026 > \hat{Var}[\varsigma|l;0] = 0.008 > \hat{Var}[\varsigma|h;0] = 0.006$. For any given H, t, and s, the mean expected government duration for a majority coalition is twice as large as the mean expected government duration for a minority coalition, and for any given H, t, and m, the mean expected duration of a government formed when the inflation rate is low is 1.5 times larger than the mean expected duration of a government formed when the inflation rate is high. Similar comparisons hold with respect to the estimated variances of the distributions of expected normalized government durations. Note that these values imply fairly short expected government durations since the upper bound on the averages is $\hat{E}[C|l,0;260,1] = 25.740$ weeks. When we compare this number with the mean observed government duration, which is equal to 45.468 weeks, this result suggests that a substantial selection is accomplished by delaying agreement. Also, note that the estimates in Table 3, together with $\hat{p}$, imply that $\hat{c}*(l,t;H,m) \geq \hat{c}*(h,t;H,m)$ for any given H, t, and m, and $\hat{c}*(s,t;H,1) \geq \hat{c}*(s,t;H,0)$ for any given H, s, and t, indicating that the selection is heavier when the inflation rate is low (the ruling coalition is a majority coalition) *vis a vis* when the inflation rate is high (the ruling coalition is

[23] It follows from our assumptions that $\varsigma(s;m)$ has a power-function density $g(\varsigma|s;m) = \alpha_s \cdot (\varsigma^{\alpha_s-1}/(\gamma_m/(\gamma_m+1))^{\alpha_s})$, $0 \leq \varsigma \leq (\gamma_m/(\gamma_m+1))$, $\alpha_s, \gamma_m > 0$, so that $E[\varsigma|s;m] = (\alpha_s/(\alpha_s+1)) \cdot (\gamma_m/(\gamma_m+1))$, and $Var[\varsigma|s;m] = (\alpha_s/((\alpha_s+2) \cdot (\alpha_s+1)^2)) \cdot (\gamma_m/(\gamma_m+1))^2$.

a minority coalition).

To assess the fit of the model to negotiation duration data in postwar Italy, in Table 4 we compare the KM estimate of the survival function to the survival function predicted by the model. The mean absolute difference between the two functions is only 0.026. The chi-square goodness-of-fit test does not reject the model at a 5% level. The predicted mean duration of the bargaining process differs by only 0.112 weeks from the estimate based on the KM survival function. Table 5 reports evidence on the fit of the model to the government duration data by comparing the predicted density of normalized government durations to the empirical density.[24] The chi-square goodness-of-fit test does not reject the model at a 5% level. The predicted mean normalized government duration underestimates the one observed in the data only by 0.3%, which corresponds to about 0.2 weeks. Once we divide the data into four cells depending on the majority status of the ruling coalition and the inflation rate at the time a government formed, we see that the model slightly underpredicts durations for minority (majority) governments formed when the inflation rate is low (high) and overpredicts government durations for the remaining two cells. Overall, we conclude that the model fits both the negotiation duration data and the government duration data quite well.

We use our estimates to quantify the advantage to proposing. For each element n in the sample, $n = 1,\dots,47$, let $\max((d_n - c^*(s_{\tau_n}, \tau_n; H_n, m_n))/d_n, 0)$ denote the *realized* gains from proposing expressed as a percentage of the realized surplus level. The estimates we obtain for the mean and standard deviation of the realized gains from proposing in our sample of governments

[24] The density of normalized government durations predicted by the model is derived in the Appendix.

are 0.547 and 0.316, respectively. Since larger parties are more likely to be selected as proposers, the gains from proposing represent a measure of the returns from "winning" an election. Our results indicate that such returns tend to be quite large on average.

5. Discussion and Concluding Remarks

Empirical studies (see, e.g., Barro (1991)) have shown that political instability has a detrimental effect on economic growth. For a democratic regime, political instability means short lived governments and long lasting negotiations. Hence, it seems reasonable to try to evaluate the effects of changes in the bargaining procedure on the distribution of negotiation and government durations.

To evaluate the empirical importance of the bargaining procedure we use our model to perform two experiments. Since the President has some control over the proposer selection process (see the discussion contained in Section 2), the first question we ask is whether the President could in principle select the extensive form of the bargaining game played by the political parties so as to minimize the instability of the political system. The answer to this question is negative and it follows directly from the separation principle described in Section 3. The only role played by the proposer selection process is to determine the equilibrium payoffs to the parties. Neither the duration of negotiations nor the distribution of governments that are agreed upon are affected either by the identity of the proposer or by the way the proposer is selected in each round of negotiations. Hence, this result implies the existence of an implicit limit to the actual power of the President.

The second experiment we consider consists of shortening the deadline by which the parties in the ruling coalition have to reach a government agreement. The predicted mean negotiation duration and mean normalized government durations are reported in Table 6 for $\overline{T} = 18$ (baseline case), 17, 9, and 4 weeks. As we can see from this table, a shorter deadline implies both shorter negotiations and shorter governments. For instance, replacing a deadline of 18 weeks with a deadline of 9 weeks would imply a reduction of the mean negotiation duration of about 0.7 weeks and also an 11.4% reduction in the mean normalized government duration, corresponding to about 5.8 weeks. This result is a direct consequence of the fact that in this model delays act as a selection mechanism and it suggests the existence of a trade-off between short lasting negotiations and long lasting governments. Although perhaps counterintuitive, this finding provides an explanation for the existence of a positive correlation between duration of the bargaining process and government duration which has been documented in the literature (see, e.g., King et al. (1989) and Merlo (1991)).

In this paper, we have attempted to interpret data on the process of government formation in a modern parliamentary democracy using a multilateral stochastic model of sequential bargaining. We have shown that our model fit postwar Italian data on the duration of negotiations over the formation of new governments and government durations well and we have provided an interesting economic interpretation for the observations. Our analysis has indicated that delays in the government formation process can be optimal from the point of view of the negotiating parties although our estimates have suggested that political parties tend to be fairly impatient. We have used the estimates of the structural parameters of the model to calculate the advantage to proposing and to evaluate the effects of changes in the bargaining procedure. We have found that the gains from proposing are in general significant. We have also shown that changes in the proposer selection process would only affect the equilibrium distribution of payoffs to the parties while leaving the distributions of negotiation and government durations unaffected. Finally, we have shown that the imposition of a strict deadline on the negotiations would not only diminish the incentives to delay agreement but also lower mean government duration. Whether implementing such a policy could be beneficial for a democratic society would in general depend on the relative costs imposed by each of these two aspects (short lasting governments *vs*. long lasting negotiations) of political instability.

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Appendix

In this Appendix we derive the joint density of (C,D) and the marginal density of normalized government durations $\Delta \equiv D/H-\tau$ implied by the model. To simplify notation we drop all subscripts and arguments referring to s, t, m, and H.

Note that since $C = (\gamma/(\gamma+1))\cdot\bar{D}$, D|C has a power-function density $f_{D|C}(d|c) = \gamma\cdot(d^{\gamma-1}/(((\gamma+1)/\gamma)\cdot c))^{\gamma})$, $0 \le d \le ((\gamma+1)/\gamma)\cdot c$, $\gamma > 0$. This follows from standard results on the transformation of random variables. Hence, the joint density of (C,D) is simply

$$f_{(C,D)}(c,d) = \gamma\cdot(d^{\gamma-1}/(((\gamma+1)/\gamma)\cdot c))^{\gamma})\cdot\alpha\cdot(c^{\alpha-1}/\bar{c}^{\alpha}),$$

$0 \le d \le ((\gamma+1)/\gamma)\cdot c$, $0 \le c \le \bar{c}$, $\gamma,\alpha > 0$. Integrating $f_{(C,D)}$ with respect to C over the interval $[\max\{c^*,(\gamma/(\gamma+1))\cdot d\},\bar{c}]$ we obtain [7] and dividing by $Pr(C\ge c^*)$ we obtain the predicted density of government durations, $f_D = \int_{\max\{c^*,(\gamma/(\gamma+1))\cdot d\}}^{\bar{c}} f_{(C,D|C\ge c^*)}dc = \int_{\max\{c^*,(\gamma/(\gamma+1))\cdot d\}}^{\bar{c}} [f_{(C,D)}/Pr(C\ge c^*)]dc$. Hence, the marginal density of normalized government durations implied by the model is given by

$$f_{\Delta}(\delta) = (\gamma\cdot\alpha/(\alpha-\gamma))\cdot\delta^{\gamma-1}\cdot[1 - \max\{\varsigma^*,(\gamma/(\gamma+1))\cdot\delta\}^{\alpha-\gamma}\cdot((\gamma+1)/\gamma)^{\alpha-\gamma}]/ [1-(\varsigma^*\cdot((\gamma+1)/\gamma))^{\alpha}],$$

$0 \le \delta \le 1$, $\gamma,\alpha > 0$, where $\varsigma^* \equiv c^*/H-\tau$.

Figure 1: KM SURVIVAL FUNCTION OF NEGOTIATION DURATIONS

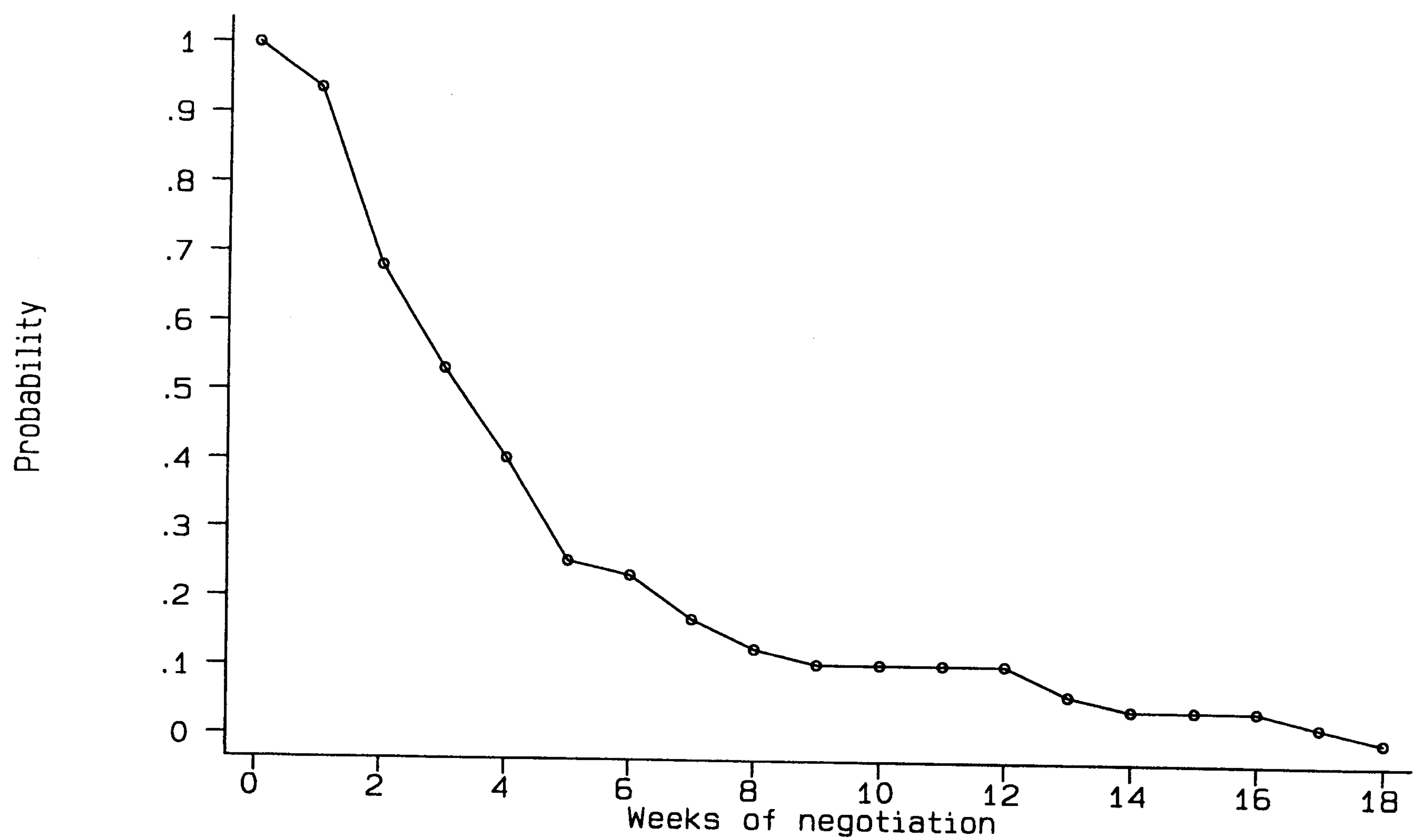

Figure 2: HISTOGRAM OF NORMALIZED GOVERNMENT DURATIONS

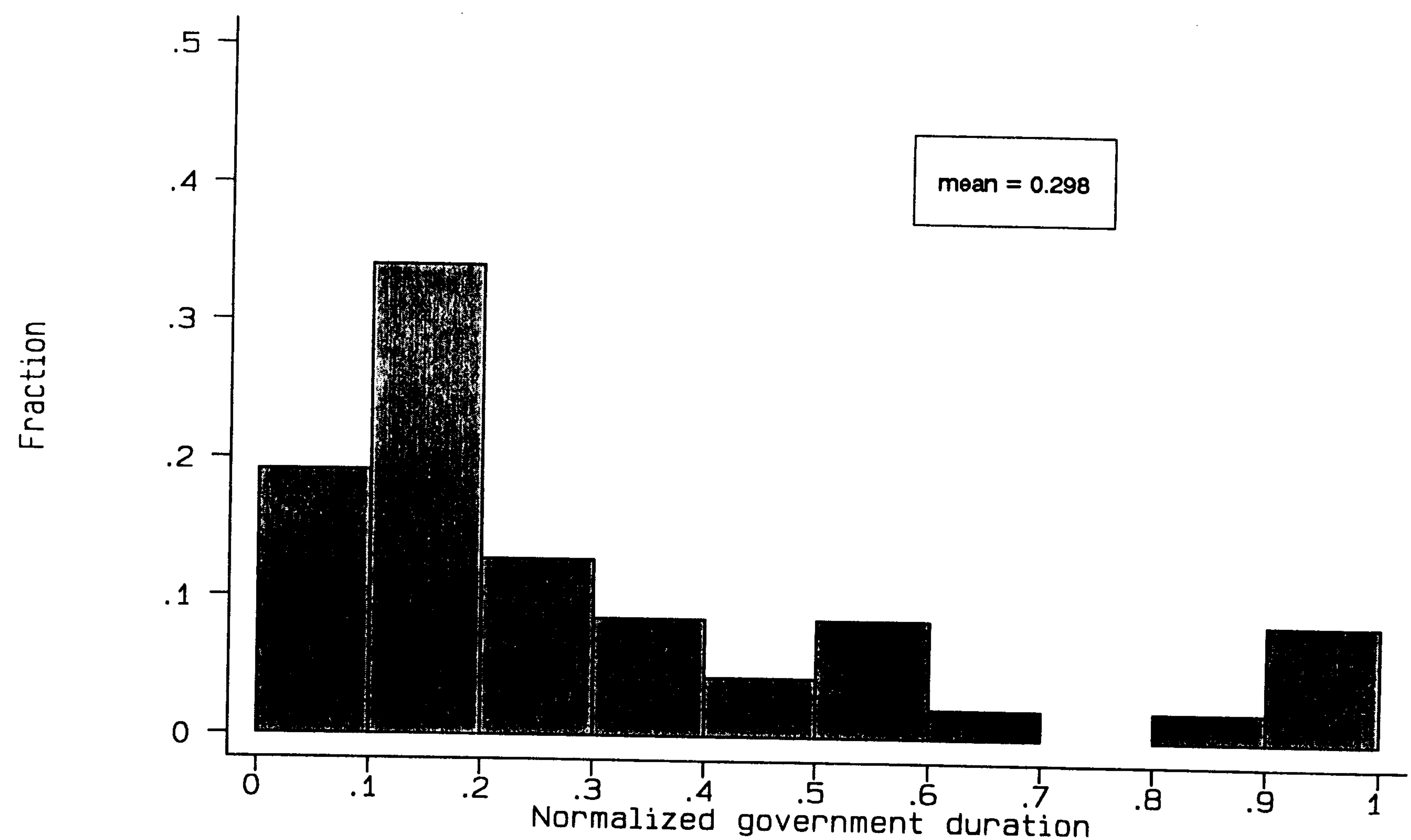

Table 1
Descriptive statistics

	Mean	St. dev.	Min.	Max.
Negotiation duration*	4.979	4.019	1.000	18.000
Government duration*	45.468	32.738	1.000	151.000
Time to next scheduled election*	180.234	67.421	57.000	260.000
Coalition size	0.517	0.072	0.360	0.640
Inflation rate 4/1948-3/1994	0.616	0.897	-4.835	8.952
Inflation rate at beginning of negotiations	0.538	0.771	-1.236	2.620
Inflation rate at government formation	0.440	0.708	-1.490	2.843

* In weeks

Table 2
Mean normalized government durations by level of inflation rate and coalition type

	s=l,m=0	s=l,m=1	s=h,m=0	s=h,m=1
Mean normalized government duration	0.193	0.434	0.187	0.254
Number of observations	12	18	7	10

Table 3
Estimated Parameters of the model

(asymptotic standard errors in parentheses)

Parameter	Estimate
β	0.642 (0.063)
α_1	0.127 (0.036)
α_h	0.081 (0.027)
γ_0	0.730 (0.216)
γ_1	7.513 (4.144)
Number of observations	47
Log-Likelihood	-338.468

Table 4
Survival functions of negotiation durations and goodness-of-fit test

Week	KM	Model
0	1.000	1.000
1	0.936	0.792
2	0.681	0.629
3	0.532	0.504
4	0.404	0.402
5	0.255	0.321
6	0.234	0.256
7	0.170	0.204
8	0.128	0.163
9	0.106	0.130
10	0.106	0.106
11	0.106	0.087
12	0.106	0.071
13	0.064	0.058
14	0.043	0.048
15	0.043	0.039
16	0.043	0.032
17	0.021	0.025
18	0.000	0.000
χ^2 test* ($\Pr\{\chi^2_{17} \geq 27.59\} = 0.05$)		20.628
Mean negotiation duration	4.979	4.867

(Table 4 cont'd)

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* Pearson's χ^2 statistic is defined as

$$N \cdot \sum_{t=1}^{T} [\hat{f}(t) - \tilde{f}(t)]^2/\tilde{f}(t) \sim \chi^2_{T-1},$$

where $\hat{f}(t)$ denote KM estimates of the density function of negotiation duration times, $\tilde{f}(t)$ denote ML estimates of $f(t)$, N is the number of observations, and T = 18. The degrees of freedom are an upper bound because we do not take into account that the parameters in the model are estimated.

Table 5
Density functions of normalized government durations and goodness-of-fit test

Interval	Data	Model
[0-0.1]	0.213	0.206
(0.1-0.2]	0.319	0.245
(0.2-0.3]	0.128	0.154
(0.3-0.4]	0.085	0.108
(0.4-0.5]	0.043	0.081
(0.5-0.6]	0.085	0.064
(0.6-0.7]	0.021	0.051
(0.7-0.8]	0.000	0.040
(0.8-0.9]	0.021	0.027
(0.9-1]	0.085	0.024
χ^2 test* ($\Pr\{\chi^2_9 \geq 16.89\} = 0.05$)		12.690
Mean normalized government duration	0.298	0.297

Mean normalized government duration	Data	Model
s=l,m=0	0.193	0.195
s=l,m=1	0.434	0.408
s=h,m=0	0.187	0.154
s=h,m=1	0.254	0.322

* See Table 4

Table 6
The effect of changes in the deadline

	$\bar{T}$=18*	$\bar{T}$=17	$\bar{T}$=9	$\bar{T}$=4
Mean negotiation duration	4.867	4.802	4.217	2.837
% change relative to baseline	-	-1.3	-13.4	-41.7
Mean normalized government duration	0.297	0.296	0.263	0.182
% change relative to baseline	-	-0.3	-11.4	-38.7

Mean normalized government duration	$\bar{T}$=18*	$\bar{T}$=17	$\bar{T}$=9	$\bar{T}$=4
s=l,m=0	0.195	0.194	0.174	0.123
s=l,m=1	0.408	0.406	0.363	0.257
s=h,m=0	0.154	0.153	0.133	0.089
s=h,m=1	0.322	0.320	0.279	0.186

* Baseline case

RECENT BULLETINS

96-1 Freeman, R. John, "A Computable Equilibrium Model for the Study of Political Economy, " February.