The Politics of Speculative Attacks in Industrial Democracies

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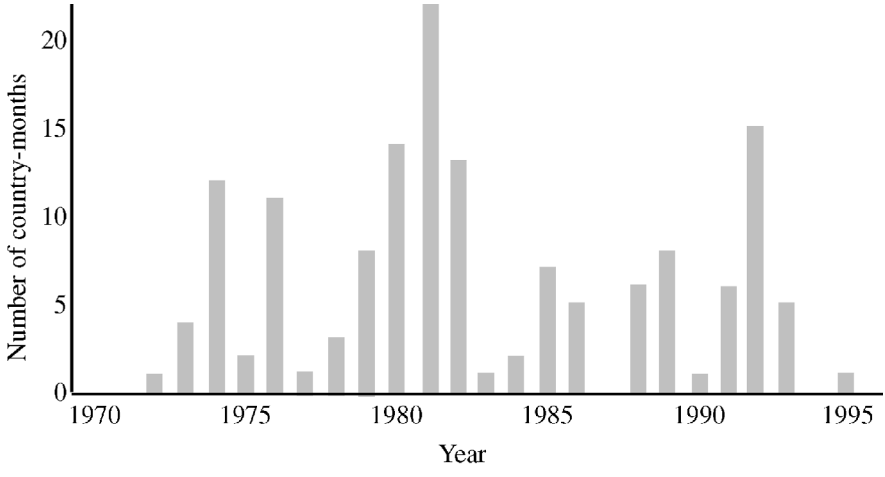
In the past twenty-five years, the volume of international exchange-rate markets has increased exponentially. In 1996, transactions in these markets totaled well over $1 trillion each day. Consequently, the collective impact of decisions by currency traders can place tremendous pressure on a country's exchange rate. Most famously, speculative attacks on national exchange rates swept across Europe in 1992, Mexico in 1994–95, Asia in 1997–98, and Brazil in 1998–99. But intense speculative activity has not been limited to these periods. Figure 1 graphs the number of country-months in which speculative currency attacks occurred in parliamentary democracies from 1970 to 1995. Although the greatest number of attacks occurred in 1981, when most industrial nations raised their interest rates, and during the 1992 European Monetary System (EMS) crisis, speculative attacks occurred relatively regularly throughout the period.

When confronted with speculation against its currency, a government has three options: (1) spend foreign exchange reserves to maintain the value of the currency, (2) raise domestic interest rates to attract capital or to dissuade it from leaving, or (3) allow the currency to depreciate. Each option has major consequences for economic policy and performance. Raising interest rates to defend the currency, for example, may choke off economic growth. Allowing the currency to depreciate, on the other hand, risks higher inflation and potential retaliation from trading partners.

These attacks affect not only economic performance but also politics. The economic consequences of responding to an attack, for instance, may provoke a decline in the popularity of the government. Moreover, the specter of future attacks has forced state leaders to reconsider the limits of national sovereignty and the appropriate organization of nation-states. In Europe, for instance, the possibility of speculative attacks in the EMS pushed member states to consider a single currency, a large

For helpful comments, we thank D. Scott Bennett, Lawrence Broz, Michele Chang, William Clark, Rob Franzese, John Freeman, Jim Granato, Mark Halleberg, Torben Iversen, William Keech, Sofia Perez, Andrew Sobel, Christopher Way, Chris Zorn, two anonymous referees, and seminar participants at the European Union Center of Georgia Tech, the Stern School of Business at New York University, Washington University, and Yale University. We also thank Sang-Hyun Lee for research assistance.

International Organization 54, 2, Spring 2000, pp. 291–324



Note: Observations are the number of country-months in which a speculative currency attack occurred. The sample includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Japan, the Netherlands, New Zealand, Norway, Sweden, and the United Kingdom. The measure of speculative attacks is defined in the text.

FIGURE 1. *Speculative attacks in parliamentary democracies, 1970–95*

step toward political integration.[1] More recently, political leaders in Argentina have publicly mused about the possibility of formally adopting the U.S. dollar as the nation's currency.[2]

Given the economic and political consequences of speculative currency attacks, it is vital to understand their origins. What precipitates these attacks on exchange rates? One set of economists emphasizes economic fundamentals such as current account deficits, inflation, and real exchange-rate overvaluation. More recent models of speculative currency crises contend that market expectations of policy behavior can precipitate exchange-rate volatility. An expectation that the government is unwilling to maintain the exchange rate can trigger a speculative currency attack. We argue that politics affect how markets evaluate a government's commitment to maintain the exchange rate and, in turn, the probability of a speculative attack. In particular, we contend that market actors will use information about political processes and partisan objectives to determine the risk of a policy change inconsistent with maintaining the level of the exchange rate.

1. Edmund L. Andrews, 11 Countries Tie Europe Together in One Currency, *New York Times*, 1 January 1999.

2. Clifford Krauss, Buck Doesn't Stop: Now Argentina May Adopt It, *New York Times*, 25 February 1999.

First, market actors can anticipate periods when the partisan identity of the government may change—through an election or, in parliamentary systems, a cabinet collapse. The prospect of a change in the government's identity may raise questions about the new government's policy objectives and, as a result, increase speculation against a currency. Further, market expectations of political change will condition how the market responds to an actual cabinet dissolution. A snap election or a sudden cabinet collapse may create more immediate doubts about the government's commitment to the exchange rate. Therefore, we contend that unanticipated cabinet dissolutions increase the probability of a speculative attack more than anticipated political events.

Second, market actors can also gauge the likely policy consequences of a change in the government's identity. Although currency traders may be unsure about the commitment of any new government to the exchange rate, they can use the party label as a cue to the policy objectives of a potential government. The partisanship literature implies that Left parties are less likely to maintain the level of the exchange rate. Consequently, if currency traders anticipate that an election or a cabinet collapse is likely to produce a new government composed of Left parties and a consequent leftward shift in economic policies, the probability of a speculative attack will increase.

We argue that markets will use this information about the expected periods of government change and its likely partisan direction to gauge the government's commitment to the exchange rate. If currency traders anticipate a decline in the government's willingness to defend the exchange rate, speculative activity will increase. Consequently, the probability of a speculative attack will be higher when the probability of a cabinet dissolution (either through an election or a cabinet collapse) is high and when the partisan identity of a new government is likely to pull policy leftward.

In the following section we develop the logic of our argument. We briefly review the political economy literature on currency crises and then extend the argument to the relationship between cabinet duration, partisanship, and exchange-rate expectations. In the second section we discuss the operationalization of the variables used to capture market expectations about political events and partisan change. We construct a discrete-time hazard model of cabinet duration using monthly data for parliamentary democracies from 1970 to 1995. This model provides monthly probabilities that a cabinet will end through either a government collapse or mandatory elections. We contend that these probabilities represent proxies for market expectations of periods of potential political change. We use partisan dummy variables to capture market expectations about the possible direction of policy change in a new government. In the third section we employ these variables to help explain cross-national and cross-temporal variation in speculative attacks in fifteen OECD countries from 1970 to 1995.

Market Expectations, Political Processes, and Speculative Attacks

Economic Models of Currency Crises and Speculative Attacks[3]

Two generations of economic models attempt to explain currency crises. The currency crises in Mexico (1973–82) and Argentina (1978–81) motivated the first generation of models. Building on Stephen Salant and Dale Henderson's model of how anticipated government activity influences the price of gold, Paul Krugman argues that exchange-rate crises occur when economic fundamentals deteriorate beyond a point that is consistent with the maintenance of a currency peg.[4] According to Krugman, excessive creation of domestic credit and public sector debt leads to a decline in confidence by international capital, increased speculation against the currency, a continual loss of foreign exchange reserves, and an eventual collapse of the peg. Krugman's model implies that currency crises are predictable: market participants view government policies and identify the level of reserves below which the central bank cannot defend the peg.

First-generation models, however, did not adequately explain or predict the crises in either the EMS (1992–93) or Mexico (1994–95). In these crises, economic fundamentals were strong and the real exchange rates were not tremendously overvalued. Consequently, a second generation of models was developed to explain these events. These models argued that speculative attacks could occur even when economic fundamentals were sound and foreign exchange reserves were adequate.[5]

Second-generation models build on Douglas Diamond and Philip Dybvig's model of a bank run.[6] The Diamond and Dybvig model shows how a bank run can occur even when a bank is solvent. In a situation (with no deposit insurance) where depositors believe that a bank is insolvent they will withdraw their money. As depositors see other depositors flocking to withdraw their money, they do likewise in an attempt to salvage their deposits. The result is an equilibrium where all depositors demand their deposits and the bank is forced to default.

In a groundbreaking paper on currency crises, Maurice Obstfeld extends this argument to currency speculation.[7] He argues that currency speculators recognize that governments with a currency peg face a set of clearly incompatible preferences. On the one hand, maintaining the currency peg helps facilitate international trade and increases anti-inflationary credibility. On the other hand, abandoning the currency peg could help inflate away a debt burden or allow expansionary monetary policies.

3. The already voluminous literature on currency crises continues to grow. Links to articles from the popular press, the World Bank, the International Monetary Fund, and recent unpublished academic working papers can be found on Nouriel Roubini's Web page (updated regularly): http://www.stern.nyu.edu/~nroubini/asia/AsiaHomepage.html.

4. See Salant and Henderson 1978; and Krugman 1979. Robert Flood and Peter Garber provide important extensions to the original Krugman model. Flood and Garber 1984.

5. See Obstfeld 1994 and 1996; Dornbusch, Goldfajn, and Valdes 1995; Krugman 1996; and Sachs, Tornell, and Velasco 1996.

6. Diamond and Dybvig 1983.

7. Obstfeld 1994.

The incompatibility of these two objectives generates unstable expectations among economic agents, including currency traders. If economic agents expect the government to abandon or devalue the currency peg, they will seek to convert their domestic currency into foreign currency as quickly as possible. If a sufficient quantity of domestic currency is converted, the central bank will run out of foreign exchange reserves and be forced to devalue the domestic currency. In this way, the crisis becomes self-fulfilling. Moreover, crises can occur even if the central bank is not in a particularly vulnerable position—that is, even if it has sufficient reserves to carry out day-to-day operations.[8]

Political Processes and Speculative Attacks

Expectations about the government's policy behavior, therefore, play an important role in these models. If economic agents doubt the government's commitment to defend the exchange rate, they may end up forcing a devaluation. How do currency traders evaluate the government's commitment to the exchange rate? Economic actors incorporate information from a variety of sources into their expectations about the government's commitment. This information may be economic (such as data regarding unemployment or inflation) or political (such as the timing of elections or the policy preferences of governing parties).

A number of political economists, for instance, argue that elections can generate uncertainty about the government's objectives—and, as a result, may trigger changes in exchange rates or even a speculative attack. Bento Lobo and David Tufte, for instance, find that exchange-rate volatility is higher in the run-up to an election in the United States than at other times.[9] Jeffry Frieden also shows that exchange-rate volatility increases in the periods surrounding an election.[10] Similarly, S. Brock Bloomberg and Gregory Hess find that changes in the partisan composition of a government following an election influence the level of an exchange rate.[11] On the other hand, Barry Eichengreen, Andrew Rose, and Charles Wyplosz find no relationship among partisan changes, elections, and speculative attacks. They conclude that "political uncertainty per se does not seem to provoke attacks."[12]

We extend the type of political information that influences market expectations in two ways. First, we argue that currency traders anticipate periods of potential change in the partisan identity of the cabinet. Since a change in the cabinet's identity may affect the government's policy objectives, markets may become more circumspect about the government's commitment to the exchange rate around these periods, in-

8. Extensions of these second-generation models take into account "contagion effects." Stefan Gerlach and Frank Smets and Eichengreen, Rose, and Wyplosz argue that crises are transmitted from country to country through foreign trade links. A devaluation in one country leads its trading partner to devalue or risk the loss of competitiveness. See Gerlach and Smets 1994; and Eichengreen, Rose, and Wyplosz 1996. For an examination of financial channels as avenues for contagion, see Calvo and Reinhart 1996.

9. Lobo and Tufte 1998.

10. Frieden 1998.

11. Bloomberg and Hess 1997.

12. Eichengreen, Rose, and Wyplosz 1995, 289.

creasing the probability of a speculative attack. Second, currency traders can use party labels as information cues about the policy objectives of a potential government. These two pieces of information help currency traders to estimate the risk of a policy change inconsistent with maintaining the exchange rate.

Consider first the periods of potential change in the identity of government actors. In parliamentary democracies, cabinets end for two reasons: a loss of confidence or an election.[13] First, in parliamentary democracies, the government must maintain the support of a legislative majority to remain in office. Cabinets may end because of a loss of legislative support or, in a multiparty government, parties may withdraw from the coalition. If the cabinet dissolves, parties must negotiate to form a new cabinet. In some instances, politicians may call for new elections in response to the crisis.

Cabinets may also end as the result of constitutionally mandated elections. In systems with exogenous electoral timing, elections occur at regular intervals. In many parliamentary systems, however, electoral timing is endogenous. That is, government leaders can call for an election at any time within a constitutionally mandated electoral term. As the end of a term approaches, government leaders will attempt to time the election to coincide with opportune conditions.

A cabinet dissolution can create tremendous uncertainty about the identity of the next cabinet and, as a result, the future course of economic policy. In some cases, a cabinet dissolution will result in new elections. These elections may change the distribution of legislative seats, and new parties may be tapped to form the next government. Even without a new election, however, a cabinet dissolution may produce a new government, composed of parties whose policy priorities differ from those of the previous government.

In a multiparty system, the bargaining between political parties in the government formation process may create even greater questions, not only about the identity of the new government but also about its policy priorities. First, the bargaining process can extend for months, leading to policy inactivity. Second, bargaining typically occurs behind closed doors, out of the public's view. This can make it difficult for economic agents to project the partisan identity of the government. Finally, it may be unclear what type of coalition bargain is struck. During negotiations, parties may make policy compromises or trade off responsibility for different issue dimensions.[14] The vague language of public coalition agreements often does not clarify responsibility for policy.

Although the policy consequences of a cabinet end are not often clear, we argue that economic agents can have fairly accurate expectations about when a dissolution will occur. Newspaper and media accounts often report when backbench legislators or, in a multiparty government, coalition parties are dissatisfied with the current cabinet, creating the conditions for a vote of no confidence. Economic agents can

13. Defining the "end" of a cabinet remains a point of controversy in the literature. Laver and Schofield 1990. Lijphart, for instance, argues that a cabinet ends only with a change in the party membership of the cabinet. Lijphart 1984a. Other political scientists count a change in the prime minister, a formal government resignation, and elections as an end to the cabinet.

14. See Laver and Schofield 1990; Laver and Shepsle 1996; and Strom and Leipart 1993.

also recognize when coalition parties have incompatible policy preferences and, thus, are less likely to maintain the coalition. Finally, economic agents are also aware of when constitutionally mandated elections are due. In systems with endogenous timing, there is often extensive discussion about how long the government will wait to call elections. On the basis of this information, economic agents will form expectations of when the cabinet is likely to end.

These expectations about political events, in turn, affect economic behavior. If economic agents are fairly confident that the cabinet will survive, they can make projections about the government's economic objectives. As economic agents come to believe that a cabinet is likely to end, however, they recognize that the government's commitment to the exchange rate may change. An incumbent cabinet may be tempted to pursue policies for short-term electoral gain that are inconsistent with the maintenance of the exchange rate. Additionally, the composition of the government could change, bringing in a cabinet with different policy priorities. These possibilities will manifest themselves in speculative activity—economic agents are more likely to trade the currency. Consequently, we argue that as markets become more confident that the cabinet is going to end—either through an election or a cabinet collapse—the probability of a speculative attack increases.

Hypothesis 1: Speculative attacks are more likely as the probability of a cabinet ending increases.

Further, we expect that the effect of an actual cabinet dissolution on speculative activity will vary according to whether the event was anticipated. Markets may not expect a cabinet dissolution. Predicting a cabinet collapse or the date of elections is an imperfect science. A variety of political shocks may cause the sudden collapse of a cabinet: scandal, a foreign policy crisis, a change in party leadership, death of a minister, snap elections. A cabinet dissolution, therefore, may surprise economic agents. If economic agents have not anticipated the cabinet dissolution, their evaluation of the government's commitment to the exchange rate may suddenly change. Prior to the dissolution, currency traders would expect the current government's policies to be in place. An unanticipated dissolution, however, raises the possibility of a new government with different policy priorities. Therefore, if a cabinet ends when markets did not anticipate a dissolution, we expect that event to increase the probability of a speculative attack.

Hypothesis 2: The effect of a cabinet dissolution on speculative activity will vary according to whether the event was anticipated. An unanticipated dissolution will increase the probability of a speculative attack more than will an anticipated dissolution.

In addition to information about the probability of a cabinet dissolution, markets also have information about the partisan composition—and policy priorities—of the incumbent government and likely alternative governments. The partisanship literature assumes that Right parties are more concerned with controlling inflation, whereas

Left parties place more emphasis on employment and wealth redistribution.[15] This assumption implies that Left parties will be less likely to maintain the level of the exchange rate. Geoffrey Garrett, for example, argues that Left parties possess little anti-inflation credibility with financial and capital markets, contributing to higher risk premia and the possibility of capital flight.[16] Other political economists suggest that partisan shifts to the left leave the government vulnerable to volatile economic behavior.[17]

We contend that information about government partisanship will influence how market expectations of a government collapse affect the probability of a speculative attack. In particular, if markets expect that a cabinet dissolution is likely to produce a leftward shift in the government's partisanship, currency traders will expect the government to have less commitment to the exchange rate in the future. Consequently, speculative activity should increase, creating a higher probability of a speculative attack. On the other hand, if markets expect the cabinet dissolution to maintain the policy status quo or shift the composition of the new government to the right, they will have less concern about the potential policy consequences of a cabinet dissolution. Consequently, the probability of a speculative attack will not increase as much.

> Hypothesis 3: The effect of market expectations of a cabinet dissolution on the probability of a speculative attack will depend on market expectations about the partisanship of a future government. Market expectations of a cabinet dissolution will increase the probability of a speculative attack more if the dissolution is likely to produce a leftward, rather than a rightward, shift in the composition of the government.

We argue that market expectations of a cabinet dissolution and the policy consequences of that dissolution affect how markets evaluate the government's commitment to the exchange rate. These expectations, in turn, can influence the probability of a speculative attack. Our next step is to provide an operationalization of those expectations. To do this, we first employ a simple model of cabinet dissolution. This model provides a predicted probability of cabinet dissolution for each month in our sample series. These probabilities serve as a proxy of market expectations of a cabinet dissolution. We then discuss how these probabilities interact with government partisanship.

Estimating Market Expectations

We draw on the extensive literature on cabinet durability to model the probability that the cabinet will end.[18] Typically, political scientists have compared the durability of governing coalitions based on coalition attributes (such as the majority status of

15. See Alesina 1989; Alesina and Sachs 1988; Hibbs 1987; and Havrilesky 1987.
16. Garrett 1998.
17. See Eichengreen, Rose, and Wyplosz 1995; and Alesina, Roubini, and Cohen 1997.
18. For reviews, see Laver and Schofield 1990; and Warwick 1994.

the government and the number of parties in the government), regime attributes (such as fragmentation of the political system and political polarization), and bargaining situation (such as the number of formation attempts). Arend Lijphart, for instance, compares the durability of governments based on their coalition attributes. He finds that single-party majority cabinets are the most durable and minimum-winning coalitions are slightly less durable.[19] Minority and oversized cabinets tend to have the shortest life spans.

We argue that the probability that the cabinet will end is a function of five sets of variables: the duration of the cabinet to that point, the time remaining before constitutionally mandated elections, whether the system has exogenous electoral timing, government type, and party system attributes. First, consider the duration of the cabinet to that point. Coalition bargains tend to be fragile in the months just after cabinet formation. As cabinets survive over time, however, they are less likely to fall over a policy disagreement.[20] That is, cabinets that have survived twenty-four months are very likely to survive another month, whereas cabinets that have survived only a month are not as likely to make it to a second month. Therefore, we include a variable for cabinet duration that counts the number of months the cabinet has existed to that point. We also include a square of that term. We expect the overall effect of these variables to have a negative probability on cabinet dissolution.

Second, we also count elections as instances of cabinet dissolution. Most parliamentary systems have endogenous electoral timing. As constitutionally mandated elections approach, government leaders will attempt to dissolve the government at the most optimal time. We include a variable, electoral clock, counting down the time to when an election must, by law, be called.[21] We also include a square of this term. The time until mandated elections will have a higher probability of a cabinet dissolution as it approaches zero. Consequently, we expect the squared term to have a positive estimate.

Third, we include a dummy variable for systems with exogenous electoral timing. In these systems, electoral timing is constitutionally mandated. Governing politicians cannot call elections at opportune times. Since politicians know that they must work within the distribution of legislative seats, they may be less likely to dissolve the cabinet. Exogenous electoral timing, therefore, is likely to prolong cabinet durability.

Fourth, we include dummy variables for government type: single-party majority, minimum-winning coalition, oversize coalition, single-party minority, and coalition minority. Following the literature, we expect that single-party majority governments will be most durable, minimum-winning coalitions slightly less durable, and oversize

19. Lijphart 1984a,b.

20. See King et al. 1990; Alt and King 1994; and Warwick 1994.

21. Countries have different constitutionally mandated election periods: thirty-six, forty-eight, or sixty months. We normalized the electoral clock variable to reflect these different periods. The formula for the electoral clock variable is: (number of months until election must be called)/(constitutional electoral period). The electoral clock variable runs from 1 (full electoral period remaining) to zero (no time remaining). A value of 0.5 indicates that half the electoral period remains before elections must be called.

and minority governments least durable. We also expect that the government type will have an interactive effect with the time-dependent variables (duration, electoral clock). For instance, the probability of a cabinet dissolution with single-party majority governments will be very low and relatively constant throughout most of the term. This probability will increase sharply as mandated elections approach. We expect a similar pattern with minimum-winning coalitions, except that the probability of cabinet dissolution will be slightly higher just after the coalition forms. With the minority and oversize coalitions, the probability of a cabinet dissolution will be high early in the terms. We include interactive terms to capture these relationships.

Fifth, we include two attributes of the party system: fractionalization and polarization. Political scientists argue that the more fragmented and polarized the political system, the shorter the expected cabinet duration. We include a variable for party system fractionalization that measures the number of effective political parties in the system.[22] This variable should have a negative effect on cabinet durability. Polarization is measured by the electoral support for extremist parties.[23] More support for extremist parties also implies shortened duration.

Finally, following Gary King, James Alt, Nancy Burns, and Michael Laver, we include a set of nation dummy variables. The dummy variables account for country-specific factors that influence the probability of cabinet dissolution.[24] Table 1 provides descriptive statistics for the variables.

Sample, Dependent Variable, Methodology

We examine the duration of cabinets in a set of sixteen parliamentary democracies for the period from January 1970 to December 1995. The countries include Australia, Austria, Belgium, Britain, Canada, Denmark, Finland, France, Germany, Ireland, Israel, Japan, the Netherlands, New Zealand, Norway, and Sweden.[25] We include only cabinets that began on or after January 1970. Cabinets that did not end before January 1996 are right censored. Overall, the sample includes 208 cabinets. The number of cabinet collapses varies substantially across the countries in our sample. Canada and New Zealand had the fewest governments (respectively, ten and eleven each), and Belgium had the most governments (twenty-one).

22. Rae 1967.

23. Following Powell, we measure polarization as the percentage of electoral support for extremist parties. According to Powell, extremist parties exhibit one of the following characteristics: (1) a well-developed nondemocratic ideology; (2) a proposal to break up or fundamentally alter the boundaries of the nation; or (3) diffuse protest, alienation, and distrust of the existing political system. We follow Powell's classifications with the exception of including France's National Front. Powell 1982.

24. We have not incorporated other time-constant covariates suggested by the literature (such as the number of formation attempts). We did include the variables suggested by King and his colleagues for cases that overlapped with ours. King et al. 1990. Although the sample was limited, the nation dummy variables absorbed much of the variation that was attributable to these other time-constant covariates.

25. Italy was excluded from the analysis because of constraints on data availability for the subsequent model of speculative attacks. Switzerland was excluded because of the permanent oversize status of its executive council.

TABLE 1. *Descriptive statistics for model of cabinet duration*

Variable	*Mean*	*Standard deviation*	*Min.*	*Max.*
End	0.046	0.201	0	1
Single-party majority	0.308	0.462	0	1
Minimum-winning coalition	0.284	0.451	0	1
Oversize majority	0.171	0.377	0	1
Single-party minority	0.166	0.372	0	1
Coalition minority	0.701	0.255	0	1
Electoral clock	0.583	0.269	0	1
(Electoral clock)^2	0.413	0.302	0	1
Cabinet duration	15.940	11.97	1	58
(Cabinet duration)^2	397.38	521.83	1	3,364
Fractionalization	0.673	0.111	0.41	0.88
Polarization	0.075	0.079	0	0.299
Exogenous electoral timing	0.183	0.387	0	1
N	4,512			

The dependent variable, end, is a dummy variable, coded 1 for each instance of cabinet dissolution, owing either to election or to a change in the composition of the parties in government, and coded zero, otherwise. Of the 208 cabinets, 127 end with an election, and 81 end without an election.[26]

Recent work on cabinet duration uses event-history analysis. Event-history models estimate the underlying hazard of an event (that is, a cabinet ending) and analyze the influence of covariates on the length of time a cabinet remains in power. Typically, these models have estimated continuous-time survival models of cabinet duration with time-constant covariates.[27] That is, they assume that cabinet duration is a function of variables that are measured at the time of cabinet formation. This approach is similar to a cross-sectional data set where the dependent variable is the number of months the cabinet is in power.

Instead, we want to employ a statistical model that allows us to estimate the probability that a cabinet will end (or survive) in any given month. This probability is a function of both time-constant covariates (such as government type and country dummy variables) and time-varying covariates (such as cabinet duration and electoral clock). Consequently, we use a discrete-time hazard model with a probit specification.[28] Here, the hazard rate represents the probability that a cabinet will end at a particular time, given that the cabinet has survived to that point. We observe only whether a cabinet survives or ends; the actual probability of a cabinet ending in any particular month is latent. Inclusion of the electoral clock and cabinet duration vari-

26. The data are from Woldendrop, Keman, and Budge 1993 and supplemented by annual issues of the *European Journal of Political Research.*

27. See King et al. 1990; Alt and King 1994; Beck 1997; and Warwick 1994.

28. See Allison 1984; and Beck, Katz, and Tucker 1998.

ables helps control for duration dependence in the analysis. This model provides predicted probabilities of cabinet dissolution for each month included in the sample.[29]

Results

Table 2 contains the results of the discrete-time hazard model. This model was estimated with a set of fifteen country-specific dummy variables, the results of which are not included in the table. A log-likelihood ratio test rejects the null hypothesis that, as a whole, the model is not statistically different from zero. The model does a good job of predicting when a government is going to survive (98 percent of the cases correctly specified) and when a government is going to end (84 percent of the cases correctly specified).[30]

Maximum-likelihood parameter estimates are in the first column and robust standard errors (adjusted for unequal error variances across countries) are in the second. There is extensive collinearity among many of the independent variables, resulting from the construction of the duration and electoral clock variables and their interactions with government-type variables. Consequently, it is not surprising that most of the independent variables are individually statistically indistinguishable from zero.[31] As a result, we report a set of log-likelihood ratio tests that test for the joint significance of each government type and its interaction with the duration and electoral clock variables. These results, presented at the bottom of Table 2, indicate that we can reject the null hypothesis that none of the sets of variables has any statistically significant influence on the dependent variable at the .10 level, except single-party minority governments.

The exogenous electoral timing variable is statistically significant but positive, contrary to our expectations. This result probably reflects the fact that only three countries in our sample have exogenous timing (Sweden, Israel, and Norway).

Fractionalization and polarization are not statistically significant. In specifications that did not include the country dummies, however, polarization was statistically significant, but fractionalization was not.

Finally, a number of the country dummies are statistically significant. Britain, Austria, Norway, and Canada have negative and statistically significant country dum-

29. We also estimated the cabinet duration model using continuous-time duration models, including both Weibull and Cox models. Although it is difficult to compare coefficients across models, parameter estimates are statistically significant and in the same direction across all three specifications. The correlation between the predicted hazard from the Weibull model and the probit specification is 0.87. The correlation between the predicted hazard from the Cox specification and the probit specification is 0.84. Both correlations are statistically significant at the 0.05 level.

30. Given that we observe only 208 episodes during which a government ends, it would not be surprising if the model produced skewed results. Therefore, we take a case to be correctly predicted if the estimated probability is greater than or equal to the mean of the dependent variable in the sample. That is, we count a case as being correctly predicted if the predicted probability from the model is greater than 0.046.

31. This would be a problem if we argued only that different government types had different intercepts. Instead, we contend that there is an interaction between government type and the length of time a cabinet has been in power.

TABLE 2. *Discrete-time hazard model probit specification (dependent variable: government end)*

Variable	*Coefficient*	*Robust standard error*	*Marginal effect*
Constant	−5.17*	2.55	
Single-party majority (d)	0.46	2.40	0.02
Minimum-winning coalition (d)	0.67	2.31	0.04
Oversize coalition (d)	2.14	2.26	0.34
Single-party minority (d)	0.19	2.49	0.01
Electoral clock	−4.68	4.18	−0.06
(Electoral clock)^2	8.96*	2.71	0.20
Cabinet duration	0.25*	0.10	0.24
(Cabinet duration)^2	−0.004*	0.002	−0.10
Clock ∗ single-party majority	0.84	4.77	0.01
Clock ∗ minimum winning coalition	3.70	5.16	0.05
Clock ∗ single-party minority	−0.08	3.75	−0.001
Clock ∗ oversize coalition	0.89	4.60	0.008
Clock^2 ∗ single-party majority	−2.06	3.39	−0.02
Clock^2 ∗ minimum-winning coalition	−4.84	4.60	−0.05
Clock^2 ∗ oversize coalition	−3.30	3.79	−0.02
Clock^2 ∗ single-party minority	−0.89	3.36	−0.007
Duration ∗ single-party majority	−0.06	0.09	−0.03
Duration ∗ minimum-winning coalition	−0.12	0.11	−0.06
Duration ∗ oversize coalition	−0.14	0.12	−0.05
Duration ∗ single-party minority	0.02	0.13	0.003
Duration^2 ∗ single-party majority	0.002	0.002	0.02
Duration^2 ∗ minimum-winning coalition	0.002	0.002	0.04
Duration^2 ∗ oversize coalition	0.002	0.002	0.02
Duration^2 ∗ single-party minority	−0.001	0.003	−0.004
Exogenous electoral timing (d)	0.51*	0.23	0.04
Fractionalization	−0.74	1.15	−0.003
Polarization	1.30	1.39	0.004
N	4,512		
Correlation (y, $\hat{y}$)	0.684		
Percentage correct when end = 0	98		
Percentage correct when end = 1	84		

Log-likelihood ratio tests	χ^2	*p-value*
Entire model	812.63	0.0000
Nation dummy variables	57.70	0.0000
Single-party majority	10.04	0.0741
Minimum-winning coalition	10.56	0.0608
Oversize coalition	11.03	0.0507
Single-party minority	6.44	0.2656
Electoral clock	509.56	0.0000
Duration	322.07	0.0000

Note: (d) = dummy variable. Robust standard errors are based on clustering according to country. Model estimated with a set of nation dummy variables. For dichotomous independent variables, the partial effect is computed for a one-unit change in the independent variable, holding all other variables at their means. For continuous independent variables, the partial effect is computed for a change of one-half of one standard deviation from the mean of that variable, holding all other variables at their means.

*$p < .05$, two-tailed z-test.

TABLE 3. *Predicted probabilities of cabinet dissolution by government type*

Government type	*N*	*Mean*	*Standard deviation*	*Min.*	*Max.*
Single-party majority	1,390	0.035	0.123	9.76e-10	0.983
Minimum-winning coalition	1,281	0.044	0.109	1.92e-06	0.967
Oversize coalition	775	0.058	0.095	0.0003	0.815
Single-party minority	750	0.051	0.142	6.12e-09	0.980
Coalition minority	316	0.077	0.165	1.23e-10	0.999

mies. The dummy variables for Belgium, France, Japan, and Australia are positive and significant. The other country dummy variables were not significant.

Given that few of the independent variables are individually significant, how can we be confident that the results are consistent with the literature on cabinet durability? The discrete-time hazard model using the probit specification provides predicted probabilities of a cabinet dissolution for each month. We first compare the average predicted probabilities of a cabinet dissolution by government type (Table 3). As expected, the average probability of a single-party majority cabinet falling is lowest, and the average probability of a minimum-winning coalition falling is only slightly higher. Single-party minority governments and oversize coalitions have higher average probabilities of collapsing, and coalition minority governments have the highest average probability of coming to an end. These results square with the findings contained in the literature.

The average probabilities reported in Table 3, however, are static. Instead, we argue that government type and the time-dependent variables have an interactive effect with the time-dependent variables (duration, electoral clock). To get a sense of this dynamic interaction, we perform a simulation to see how the predicted probabilities of cabinet dissolution for different government types change over the course of an electoral period. The results, presented in Figure 2, plot the probability of cabinet collapse (on the *y*-axis) against the number of months the cabinet has been in power (on the *x*-axis). For the sake of presentation, we assume a forty-eight-month electoral clock. These results conform relatively well with our expectations. For single-party majority governments, for example, the probability of dissolution stays low and stable throughout most of the term and increases sharply at the end of the electoral period. Minimum-winning coalitions tend to be least stable at the beginning of their terms. As they survive, they are less likely to collapse until elections have to be called. Single-party minority governments become more unstable in the medium-term. Oversize coalitions have the highest probability of collapsing throughout almost the entire term. Overall, the data in Figure 2 suggest that the model provides a reasonable approximation of our expectations concerning the interaction between government type, the electoral clock, and the time that a government has already spent in office.

Finally, Table 4 reports these probabilities for periods when a cabinet survives (end = 0) and when a cabinet ends (end = 1). As expected, the mean probability of a

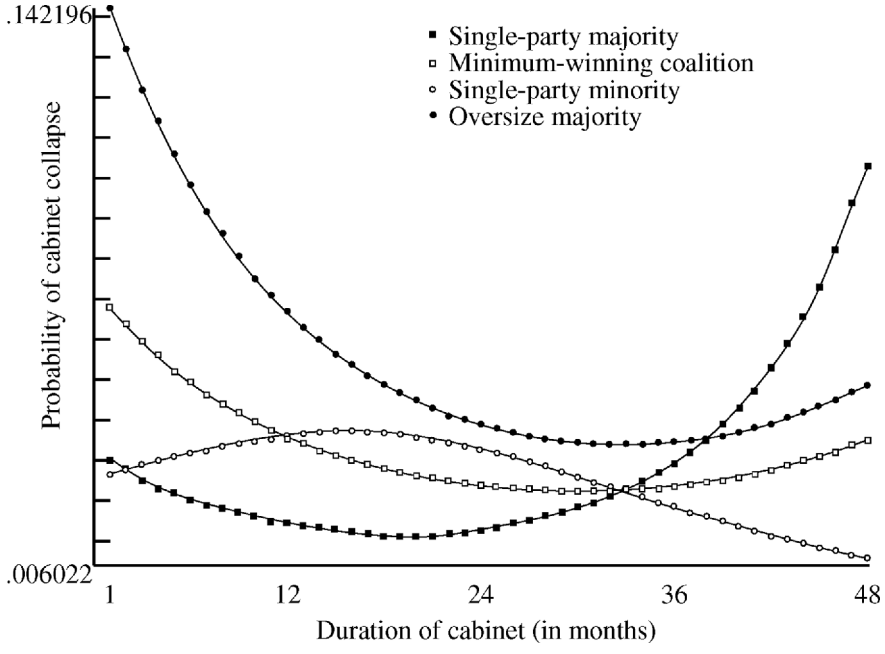


FIGURE 2. *Simulated probabilities of cabinet dissolution*

TABLE 4. *Predicted probabilities of cabinet dissolution*

Situation	*N*	*Mean*	*Standard deviation*	*Min.*	*Max.*
All periods	4,512	0.047	0.122	1.23e-10	0.999
When cabinet survives (end = 0)	4,304	0.029	0.035	1.23e-10	0.220
When cabinet fails (end = 1)	208	0.426	0.385	5.69e-06	0.999

cabinet dissolution is substantially higher in periods when the cabinet ends than when it survives. In fact, when a cabinet survives, the predicted probability of cabinet dissolution never exceeds 0.22. The predicted probabilities for when a cabinet dissolves, however, range from (essentially) zero to (essentially) 1. Where the predicted probability of cabinet dissolution is low, we argue that a cabinet dissolution is unanticipated.

Discussion

These predicted probabilities are a proxy for market expectations of periods of political change in parliamentary democracies. Market actors are likely to have more detailed information and more sophisticated, if intuitive, beliefs about cabinet stabil-

ity. We use the predicted probabilities from our model of cabinet duration as an independent variable, Expectations, in our model of speculative attacks.[32] We expect the expectations variable to have a positive effect on the probability of speculative attacks.

Further, we argue that the effect of an actual cabinet dissolution on speculative activity will be contingent on expectations of a cabinet collapse. We include an interaction between the dummy variable for a cabinet dissolution and the predicted probability of cabinet dissolution (end*expectations). Higher values indicate that the cabinet dissolution was anticipated. Lower values suggest the cabinet dissolution was a surprise. Since we hypothesize that unanticipated cabinet events have a greater effect on the likelihood of speculative attacks, this interactive term should have a negative estimate.

Finally, we argue that market expectations of a cabinet dissolution will more sharply increase the probability of a speculative attack if the dissolution is likely to produce a leftward shift in the composition of the government. Determining expectations of the type of government likely to form after a cabinet collapse, however, presents some serious difficulties. In the U.S. context, political economists have used polling data to gauge market expectations of government composition after an election. Alberto Alesina, Nouriel Roubini, and Gerald D. Cohen, for instance, construct an electoral option model that measures the probability that the Democrats will win a congressional majority.[33] In most countries, however, regular and frequent polling data on the popularity of different parties does not exist. Moreover, in multiparty parliamentary systems, electoral outcomes (and public approval ratings) do not directly determine which parties serve in government. Instead, bargaining between the parties determines cabinet composition.

To evaluate the argument, therefore, we begin with the fact that markets know the partisanship of the incumbent government. From that, economic agents will also be able to calculate the composition of likely alternative governments. If, for instance, a Left government is currently in office, markets will figure that any opposition coalition is likely to involve Right parties. Consequently, they know that a cabinet dissolution is likely to result in either a reformed Left government—and a continuation of the policy status quo—or a new Right government—with a consequent rightward shift in economic policy. These possibilities imply that any new government is likely to remain committed to maintaining the exchange rate. (At worst, they preserve the status quo.)

On the other hand, if a Right government currently occupies the cabinet, a cabinet dissolution is likely to produce either a continued Right government or a new Left government—and a leftward shift in policy. From the perspective of a currency trader, the potential leftward shift in policy raises doubts about the maintenance of the ex-

32. This approach was developed in Bernhard and Leblang 1998 and used by Freeman, Hayes, and Stix 1998 to explain exchange-rate volatility.

33. Alesina, Roubini, and Cohen 1997.

change rate. Consequently, the probability of a Right cabinet coming to an end will increase the probability of a speculative attack more than the probability of a Left cabinet coming to an end. Further, an unanticipated end to a Right cabinet will cause a greater increase in the probability of a speculative attack than an unanticipated dissolution of a Left cabinet.

To test the influence of government partisanship, we first created a measure of Left government strength based on work by David Cameron.[34] This measure multiplies the percentage of cabinet seats held by Left parties by the percentage of a legislative majority held by Left parties in the legislature for each year in each country. Higher values indicate increased Left influence in government. A score of 1.0 indicates that Left parties controlled all cabinet portfolios and held a (bare) majority of seats in the legislature.[35]

Using this index, we created two dummy variables to distinguish whether a cabinet was Right-dominated or Left-dominated. First, we classified a cabinet as *Right* if it had a Left government score rating of equal to or less than 0.3. Of the 156 cabinets included in our model of speculative attacks, 92 are classified as Right. Second, we classified a cabinet as *Left* if it had a Left government score rating of equal to or more than 0.7. This included 51 cabinets. The remaining 13 cabinets, with a Left government score between 0.3 and 0.7, are centrist. For these cabinets, the partisan identity of an alternative government is unclear.

We then interacted the Right and Left dummy variables with end, expectations, and end*expectations. We expect the coefficients for the Right*end and Right*expectations variables to be larger than the Left*end and Left*expectations variables and the Right*end*expectations variable to be more negative than Left*end*expectations.

We also included a number of alternative partisanship measures in the model of speculative attacks. First, we employed the level of Left influence in government itself. Simple partisanship arguments would suggest that higher levels of Left influence in government will increase the probability of a speculative attack. Second, we included three measures designed to capture partisan shifts between cabinets. The first of these measures, shift, simply subtracts Left government strength at time t from Left government strength at time $t + 1$. Positive values indicate that Left influence increased; negative values indicate that Left influence decreased. The partisanship literature suggests that a shift to the Left increases the probability of an attack, and a shift to the Right decreases the probability of an attack. Consequently, this variable should have a positive coefficient. Based on the logic described earlier, however, the effect of a shift to the Left and to the Right will have different effects on the probability of a speculative attack. Consequently, we divide the shift variable into Left shift, which includes only positive values of the shift variable, and Right shift, which includes only negative values of the shift variable. We expect Left shift to be positive. We do not expect Right shift to be statistically significant.

34. Cameron 1984.
35. The data are from the *European Journal of Political Research,* various years.

TABLE 5. *Summary statistics for speculative attack models*

Variable	*Mean*	*Standard deviation*	*Min.*	*Max.*
Speculative attack	0.033	0.180	0	1
Speculative attack$_{t-1}$	0.033	0.180	0	1
Current account deficit	0.493	0.500	0	1
Inflation	6.445	4.556	−1.443	26.978
Log (exports + imports)	22.637	1.146	19.724	25.237
RER overvaluation	−0.001	2.399	−13.725	17.233
Capital controls	0.586	0.492	0	1
Partisan shift to the Left	0.005	0.062	0	1.31
Change in unemployment	0.019	0.709	−4.020	3.020
Political expectations	0.044	0.122	0	0.989
Government end	0.042	0.201	0	1
Expectations * end	0.019	0.122	0	0.989
Exchange-rate realignment	0.009	0.098	0	1
EMS membership	0.227	0.419	0	1

A Multivariate Model of Speculative Attacks

To test the influence of political uncertainty, we estimate models of speculative attacks on a sample of fifteen OECD countries using monthly data over the period January 1973–December 1995.[36] Table 5 contains descriptive statistics for all variables.

Dependent Variable: Speculative Attacks

Following Lance Girton and Don Roper, Eichengreen, Rose, and Wyplosz develop a measure to identify episodes of excessive "speculative pressure."[37] They first construct an index of speculative pressure as a "weighted average of exchange rate changes, interest rate changes, and [the negative of foreign exchange] reserve changes." Symbolically, the index of exchange market pressure (EMP) with country-specific weights is:

$$EMP_{j,t} = \frac{\Delta s_{j,t}}{\sigma_{\Delta s_j}} - \frac{\Delta r_{j,t}}{\sigma_{\Delta r_j}} + \frac{\Delta i_{j,t}}{\sigma_{\Delta i_j}}$$

36. The sample of countries remains the same as in the prior section, except that Israel is excluded because of limitations on data availability.

37. See Girton and Roper 1977; and Eichengreen, Rose, and Wyplosz 1995.

where s is the bilateral exchange rate of country j with the United States, r is the nongold international reserves in the central bank, and i is the domestic short-term interest rate on deposits.[38]

The intuition behind the index reflects the following logic. A government can respond to speculation against its exchange rate by (1) allowing the exchange rate to depreciate, (2) raising domestic interest rates in an attempt to attract foreign currency, and/or (3) spending foreign currency reserves in international capital markets to buy domestic currency. If the currency were under attack, the exchange rate would depreciate (an increase in s), the central bank would sell foreign currency to support the exchange rate (a decrease in r), or the interest rate would be raised to ward off the attack (an increase in i). Consequently, changes in the index reflect changes in speculative activity: higher values indicate speculative pressure on the currency.

In order to prevent the volatility of one part of the index from swamping the others, Eichengreen, Rose, and Wyplosz weight changes in the exchange rate, the interest rate, and reserves by their conditional volatilities. While Eichengreen, Rose, and Wyplosz weight the components by the volatility for the entire sample, we derive country-specific weights.

Eichengreen, Rose, and Wyplosz define speculative attacks—crises—as periods when this index of speculative pressure reaches "extreme" values—that is, when values of the exchange-market pressure are "at least two standard deviations above the mean."[39] Exchange-market pressure, therefore, constitutes a speculative attack when:

$$\text{Speculative Attack}_{j,t} = 1 \text{ if } EMP_{j,t} > 1.96^{*}\sigma_{EMPj} + \mu_{EMPj}$$

$$= 0 \text{ otherwise}$$

where σ_{EMP} and μ_{EMP} are, respectively, the sample mean and standard deviation of EMP. We use this discrete measure of a speculative attack as the dependent variable.

The data for exchange rates, foreign exchange reserves minus gold, and money market interest rates are from the International Monetary Fund's International Financial Statistics CD-ROM. The sample of sixteen countries includes 3,665 usable observations, 124 instances of speculative attacks, and 156 cabinets.

Independent Variables

In addition to the expectations and partisanship variables, we include a number of other variables in the models of exchange-rate volatility, covering both economic factors and institutional arrangements.

38. The change in reserves is computed as the ratio of reserves to the monetary base, M1, in country j minus the ratio of reserves to the monetary base in the center country. The change in interest rates is measured as the change in the local interest rate minus the change in the interest rate of the center country. As a check on the robustness of the results, we also computed an exchange market pressure index using the deutsche mark as the anchor for European countries and the U.S. dollar as the anchor for Germany and the rest of the world. These results, available on request, did not substantively differ from those presented later.

39. Eichengreen, Rose, and Wyplosz 1995, 279.

Economic variables. Empirical tests of first- and second-generation models include various indicators of economic fundamentals, including the (over)valuation of the real exchange rate, the fiscal balance, and the rate of domestic credit growth.[40] Drawing on these studies, we include the following variables: real exchange-rate overvaluation, vulnerability to external shocks, inflation, and unemployment.

Real exchange rate overvaluation. The real exchange rate is the nominal exchange rate adjusted for the price level both at home and in the country's major trading partners.[41] A recent study by the International Monetary Fund concluded that "overvaluation of the real exchange rate was one of the earliest and most persistent signals of vulnerability [of the exchange rate]."[42] In the long run, real exchange-rate overvaluation reduces competitiveness and produces large current account balances. Consequently, an overvalued exchange rate can render a currency susceptible to attacks as speculators attempt to profit by pulling the exchange rate back to its perceived equilibrium.

We follow Stephen Radelet and Jeffrey Sachs and Ilan Goldfajn and Rodrigo Valdes and measure real exchange-rate overvaluation as the difference in the monthly value of the real exchange rate from a country-specific twelve-month moving average.[43] Because of potential endogeneity issues, we lag this variable one month. Since real exchange-rate overvaluation increases the probability of a speculative attack, the coefficient should be positive. The trade- and inflation- adjusted real exchange-rate data are from J. P. Morgan.[44]

Vulnerability to external shocks. Both first- and second-generation models of speculative attacks argue that exposure to the international economy increases a country's vulnerability to changes in external economic conditions. Higher levels of economic openness, therefore, will increase the probability of a speculative attack.

We use two variables to measure a country's vulnerability to external shocks. First, we include an aggregate measure of total trade (imports plus exports) in constant U.S. dollars. Because of the tremendous variation across countries in their level of economic openness, we log this variable. Second, we use a dummy variable indicating whether a country is running a deficit in the current account.[45] We expect both

40. See Eichengreen, Rose, and Wyplosz 1995 and 1996; Goldfajn and Valdes 1997; Jeanne 1997; Masson 1998; and Radelet and Sachs 1998.

41. The real exchange rate is the purchasing-power parity adjusted exchange rate of the local currency versus a basket of currencies of its major trading partners.

42. IMF 1998.

43. See Radelet and Sachs 1998; and Goldfajn and Valdes 1997.

44. Data source: <www.jpmorgan.com/MarketDataInd/Forex/currIndex.html>.

45. Typically, measures of trade openness and the current account are expressed as proportions of GDP. However, monthly GDP figures are unavailable for much of the sample. In alternative specifications, we did express the monthly trade and current account variables as proportions of annual GDP. The results were not affected. We also created a dummy variable, coded 1 if a country had higher than the sample median level of trade openness, to capture trade openness. This variable did not have a statistically significant effect on speculative behavior.

variables to be positive; increased vulnerability to exogenous shocks should increase the probability of a speculative attack against a currency.[46]

Inflation. Recent models argue that the root cause of currency crises is monetary disequilibria, which leaves the economy vulnerable to a financial panic.[47] Excessive money creation in the domestic economy provides speculators with the incentive to convert their domestic money holdings into foreign currency. We use inflation as a proxy for excessive money creation. We expect that increases in inflation will increase the likelihood of a speculative attack.[48]

Unemployment. As unemployment increases, a government may face increasing pressure to implement redistributive policies or to help smooth consumption by using unemployment insurance. Consequently, the government may become more vulnerable to capital flight and speculation. We use the monthly change in the standardized unemployment rate from the OECD's main economic aggregates.

Institutional arrangements. The political economy literature suggests a number of institutions that may condition the probability of a speculative attack, including an independent central bank, capital controls, and an exchange-rate peg.

Central bank independence. Recent research argues that independent central banks insulate monetary policy from political pressures, producing more stable monetary policy. Independent central banks are empirically associated with superior inflation performance.[49] Consequently, these arguments imply that countries with independent central banks are likely to face less speculative pressure.

To measure central bank independence we use the scale developed by Alex Cukierman, Steven B. Webb, and Bilin Neyapti.[50] This variable should have a negative coefficient.

Capital controls. A sizable literature argues that the desire to limit volatile capital flows and prevent speculative attacks is one of the primary motivations for capital controls.[51] Countries will also limit the movement of short-term capital to maintain domestic monetary autonomy and exchange-rate stability.

46. The data are from the IMF's *International Financial Statistics* CD-ROM, various years.

47. Calvo suggests that reserves be compared with a broad measure of liquid monetary assets such as M2. Calvo 1995. Sachs, Tornell, and Velasco argue that the growth of M2 should be included. Sachs, Tornell, and Velasco 1996. Alternative specifications using these measures rather than inflation were estimated, but these variables were statistically insignificant. The results, not reported, are available from the authors on request.

48. The data are from IMF, *International Financial Statistics,* various years.

49. See Alesina 1989; Alesina and Summers 1993; and Grilli, Masciandaro, and Tabellini 1991.

50. Cukierman, Webb, and Neyapti 1992.

51. See Alesina, Grilli, and Milese-Ferretti 1994; Quinn and Inclan 1997; and Leblang 1997.

TABLE 6. *Exchange-rate regime and speculative attacks*

Speculative attack	*Fix*	*Snake*	*EMS*	*Float*
Yes	34	10	29	51
No	1,105	163	805	1,468
N	1,139	173	834	1,519

Note: Cell entries indicate number of country-months.

We measure capital controls in two ways. First, we employ a dummy variable coded 1 if a country has controls on short-term capital and coded zero otherwise.[52] Second, we use an annual measure of capital openness from Dennis Quinn and Carla Inclan.[53]

Exchange-rate commitments. Although first-generation crisis models focused only on the ability of governments to defend pegged or fixed exchange-rate regimes, currencies can come under attack under any exchange-rate arrangement. Even a government that has a freely floating exchange rate may intervene in currency markets to defend the value of its currency vis-à-vis its trading partners or to protect its domestic industries if the value of the currency fluctuates sharply. Table 6 compares the number of speculative attacks for countries with fixed exchange rates and those with floating exchange rates. Countries with fixed exchange rates appear to be just as vulnerable to speculative attacks as those with floating exchange rates.

One of the rationales behind creating the EMS, however, was the fragility of an individual currency peg against currency speculation. The EMS established institutions to facilitate member state intervention in exchange markets as well as explicit rules governing currency realignments. The institutionalized cooperation of the member states was designed to help deter speculative activity.

We pursue a variety of strategies to gauge the influence of the EMS. First, we include a dummy variable for countries that participated in the EMS. If membership did deter speculative activity, this dummy variable should have a negative coefficient. Second, we divide participation in the EMS into two periods. During the first years of the EMS, currency realignments occurred relatively often. As European economies converged during the 1980s, however, the frequency of realignments declined and the EMS ''hardened'' into a quasi-fixed exchange-rate regime. Consequently, we include two dummy variables to capture these different periods. The first, ''soft'' EMS, is coded 1 from the beginning of the EMS through January 1987, the month of the final realignment prior to the 1992 crisis. The second, ''hard'' EMS, is coded 1 from February 1987 until the end of the sample period. We expect the ''hard''

52. The data are from IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions,* various years.

53. Quinn and Inclan's variable is available only through 1993.

EMS variable to have a more negative effect on the probability of a speculative attack than the "soft" EMS variable. Third, we include dummy variables for months in which EMS members realigned their currencies. Because realignments/devaluations constitute large changes in a country's exchange rate, we expect this variable to be positive.[54]

Other variables. We also include two other control variables, a lagged endogenous variable and U.S. interest rates.

Lagged endogenous variable. Because speculative activity may continue over a number of months, we include a lagged endogenous variable. We expect this variable to be positive, indicating that a speculative attack in the prior period makes an attack in the present period more likely.

U.S. interest rates. Research on currency crises in the developing world finds that higher interest rates in OECD countries lead to capital flight and, thus, currency crashes. Since the United States is the "center" country in this sample, we include U.S. short-term money market interest rates. This variable should have a positive coefficient, indicating that higher U.S. interest rates increase the possibility of a speculative attack among other OECD countries.

Empirical Results

We use probit models to estimate the effect of the independent variables on the probability of a speculative attack against an exchange rate (see Table 7). Due to the high likelihood of serial correlation in the residuals, we checked for temporal dependence by adding a set of linear splines to all the models.[55] In no case were the splines statistically different from zero, indicating that there is no significant serial correlation in the residuals. The results reported here are estimated without any linear splines.[56]

Column 1 of Table 7 contains the baseline model of speculative attacks. Column entries are probit coefficients obtained by maximum likelihood; robust standard errors are in parentheses below the coefficients. Because probit coefficients are difficult to interpret, we also include the partial effects in square brackets. The partial effects

54. The data are from IMF, *Annual Report on Exchange Arrangements and Exchange Restriction,* various years; Gros and Thygesen 1992; and Cobham 1994.

55. Beck, Katz, and Tucker 1998.

56. Models using panel data often have serially correlated errors. One solution is to include of a set of temporal dummy variables in the model. Since the sample contains monthly data for a twenty-five year period, this would necessitate using over three hundred individual dummy variables. In contrast, Beck, Katz, and Tucker recommend using a set of natural cubic splines. Beck, Katz, and Tucker 1998. This setup treats the time since the last event (in this case, the last speculative crisis) as the baseline hazard and fits cubic polynomials to subintervals of the data. The polynomials are joined at a number of "knots" determined by the analyst. In the models presented we experimented with five to twelve splines. In no case were the splines statistically significant. To deal with the issue of heteroskedasticity, we report Huber/White robust standard errors.

TABLE 7. *Probit models of speculative attacks*

Variable	*Baseline model*	*Political economy model*
Constant	−4.436*	−4.127*
	(1.020)	(1.089)
Speculative attack$_{t-1}$	0.546*	0.546*
	(0.216)	(0.217)
	[0.057]	[0.056]
Current account deficit (d)	0.164*	0.171*
	(0.080)	(0.086)
	[0.011]	[0.011]
Inflation	0.023*	0.022*
	(0.009)	(0.009)
	[0.007]	[0.007]
Log (exports + imports)	0.098*	0.082*
	(0.044)	(0.047)
	[0.007]	[0.006]
RER overvaluation$_{t-1}$	0.061*	0.059*
	(0.013)	(0.013)
	[0.010]	[0.010]
Capital controls (d)	0.080	0.063
	(0.107)	(0.113)
	[0.005]	[0.004]
Partisan shift to the Left	1.223*	1.252*
	(0.278)	(0.274)
	[0.005]	[0.005]
Change in unemployment	0.156*	0.154*
	(0.054)	(0.056)
	[0.001]	[0.001]

indicate the change in the predicted probability of a speculative attack for a one-unit change in a dichotomous independent variable or for a change of one-half of one standard deviation of a continuous independent variable. A log-likelihood ratio test allows us to reject the null hypothesis that, taken together, none of the independent variables is statistically significant.

Substantively, the results in column 1 square with the results of prior research. The lagged endogenous variable is positive and statistically significant. Countries that experienced speculative attacks in the prior month were 5.7 percent more likely to have that attack continue.[57] Real exchange rate overvaluation, the current account deficit, the log of (exports plus imports), inflation, and unemployment are all statistically significant and positive. Increasing the change in unemployment, for example, from 0.019 to 1.43, increases the probability of a speculative attack by 1.4 percent.[58]

57. The optimal number of lags was determined using likelihood ratio tests. Adding a two-period lag, although individually significant, did not improve the model as indicated by the Akaike Information Criteria. Lags beyond two periods were not individually significant.

58. In alternative specifications we included the rates of change in both inflation and real exchange-rate overvaluation. Using rates of changes rendered these variables statistically insignificant but did not change the magnitude or significance of the political variables. Results are available on request from the authors.

TABLE 7. *continued*

Variable	*Baseline model*	*Political economy model*
Realignment (d)	.789*	.762*
	(0.152)	(0.159)
	[0.102]	[0.096]
Member of the EMS (d)	−0.026	−0.051
	(0.056)	(0.061)
	[−0.001]	[−0.001]
Expectations		1.645*
		(0.552)
		[−0.001]
Government end (d)		0.419*
		(0.202)
		[0.039]
Expectations * end		−2.112*
		(0.651)
		[−0.017]
N	3665	3665
Model χ^2	688.10**	788.93**
Expectations variables χ^2		210.83**

Note: The dependent variable is coded 1 if the speculative attack index for country *j* exceeds that country's average speculative attack by two standard deviations; zero otherwise. Cell entries are probit estimates obtained using maximum likelihood. Numbers in parentheses are robust Huber/White standard errors. Numbers in brackets are partial effects. For dichotomous independent variables, the partial effect is computed for a one-unit change in the independent variable, holding all other variables at their means. (d) indicates that the variable is dichotomous. For continuous independent variables, the partial effect is computed for a change of one-half of one standard deviation from the mean of that variable, holding all other variables at their means. All models were initially estimated with a series of five to twelve linear splines; in no case were the splines, as a whole, statistically different from zero. The models shown here were estimated without linear splines.

*$p < .05$, two-tailed *z*-test.

**$p < .05$, joint-significance test.

Somewhat surprisingly, the capital controls variable is not statistically significant. In alternative specifications (not reported), we replaced the dichotomous measure of capital controls with Quinn and Inclan's measure of capital account openness. This measure is also statistically insignificant. Although capital controls may allow countries some breathing space when their currencies come under attack, they do not seem to deter speculative behavior.

The dummy variable indicating EMS membership is not statistically significant. Additionally, dummy variables for the "soft" and "hard" EMS were not statistically significant (results not reported). EMS membership did not have any effect on the probability of a speculative attack. The dummy variable for realignments/devaluations within the EMS, however, is, as expected, positive and statistically significant. This finding can be interpreted in two ways. First, it might be possible that a realignment caused the exchange rate to change by such a large degree that it pulled the measure of speculative activity above the two-standard-deviations threshold. Although this situation is plausible, there are only nine episodes during which a country

experienced both a realignment and a speculative attack in the same month. The second interpretation is that a realignment made the market skeptical about the possible course of future economic policy and thus, along with an realignment of the exchange rate, governments also expended reserves and increased interest rates.

In alternative specifications, we tested the effect of partisanship in a variety of ways: the level of Left influence in government, a shift in government partisanship, a shift to the Left, and a shift to the Right. The level of Left influence variable was not statistically significant, although the shift variable was positive and significant. We next broke the shift variable into Left shift and Right shift. As reported in Table 6, the Left shift variable is positive and significant. If the level of Left influence increases from zero (no Left influence) to 1 (Left majority government), then the probability of a speculative attack in that month increases by 23 percent. Interestingly, the Right shift variable (not reported) is not statistically significant. When the Left influence in government decreases, there is no effect on the probability of a speculative attack.

We also included two other variables in our baseline and political models. First, we added a measure of central bank independence, but it was never statistically significant (not reported). It is possible that inclusion of the inflation variable preempts the effect of central bank independence. Additionally, the measure of central bank independence is constant over time for each country. Consequently, there may be insufficient variation with which to make inferences. Second, we included the money market interest rate in the United States (not reported). This variable is statistically significant and positive, indicating that higher interest rates in the United States increase the likelihood of speculative attacks in other OECD countries, all other things being equal. Interpretation of this variable, however, requires a great deal of caution. Given relatively open capital markets for much of our sample, the law of one price implies that interest rates across countries should equalize. Since changes in domestic interest rates are a component of the dependent variable, endogeneity may be an issue.

Column 2 of Table 7 reports the results when we include the expectations, end, and end*expectations variables. Inclusion of these variables does not affect the direction or significance of the parameter estimates in the baseline model, with the exception of the log(exports plus imports) variable, which becomes insignificant. First consider the expectations variable. As predicted, the parameter estimate is positive and statistically significant. As market expectations of a cabinet collapse increase, the probability of a speculative attack also increases. If uncertainty increases from its mean of 0.044 to 0.288, a two standard deviation increase, the likelihood of a speculative attack increases by 2.6 percent, holding all other variables constant.

Further, we argued that the effect of an actual cabinet dissolution on the probability of a speculative attack would vary according to whether it was anticipated. We included two variables, end and end*expectations, to test this hypothesis. The end variable is positive and statistically significant. In months where a cabinet ends, the probability of a speculative attack is 4 percent higher than in months where the cabinet survives, holding all other variables at their means. Finally, the expectations*end variable is, as predicted, negative and significant.

Although the parameter estimates for all three variables are in the predicted sign, we need to consider their joint effect on the probability of a speculative attack in order to evaluate Hypothesis 2. Table 8 reports the overall probability of a speculative attack for different values of the expectations and end variables. We cut off the expectations variable at 0.20 since that is approximately the highest value of the expectations variable when the cabinet continues in office—that is, when the end variable is zero. Row 1 reports the expected probability for different levels of expectations given that the cabinet survives (end variable is zero). The confidence intervals surrounding those predicted probabilities are in parentheses.[59] Row 2 reports the expected probability for different levels of expectations when the cabinet dissolves (end variable is 1), with the confidence intervals in parentheses. Row 3 reports the difference between the expected probability of a speculative attack when the cabinet survives and when the cabinet ends (that is, Row 2 to Row 1), holding the expectations variable constant.

According to Hypothesis 2, the overall probability of a speculative attack should increase when a cabinet dissolution is unanticipated. Consider the column where the expectations variable is zero—that is, where markets do not anticipate a government collapse. The probability of a speculative attack is 2.5 percent when the cabinet survives. If the cabinet were to end, however, the predicted probability of a speculative attack is 6.3 percent—an absolute increase of 3.8 percent. In other words, if a cabinet collapse occurs when it is completely unanticipated, the probability of a speculative attack more than doubles! This difference is statistically significant.

Looking across Row 3, we see that the difference between the probability of a speculative attack given a cabinet survival and the probability of an attack given a cabinet dissolution decreases as the expectations variable increases. In other words, as markets anticipate a cabinet collapse, the impact of an actual collapse declines. When the expectations variable is greater than 0.044, the difference between the predicted probabilities becomes statistically indistinguishable. Although the range of values for which the difference is statistically significant may seem small (when the expectations variable is less than 0.045), it actually includes 2,947 observations—over 80 percent of the total sample. This subsample contains forty-seven cabinet dissolutions. These "unanticipated" dissolutions produced a jump in the probability of a speculative attack.

Table 9 tests Hypothesis 3 concerning the interaction between partisanship and cabinet dissolutions. Because collapse of a Right cabinet implies a possible reduction in the government's commitment to the exchange rate, we expect the political expectations variables to have a larger effect on the probability of a speculative attack when a Right cabinet is in office than when Left parties control the cabinet. To test this, we interact our partisan dummies with the expectations, end, and expectations*end variables and then include them with the baseline variables. The

59. Confidence intervals were computed using methods suggested by King, Tomz, and Wittenberg 1998.

TABLE 8. *Predicted probabilities of a speculative attack*

	Values of expectations variable				
Situation	*0*	*0.0168*	*0.044*	*0.10*	*0.20*
Cabinet survives (end = 0)	0.025 (0.021, 0.029)	0.027 (0.023, 0.030)	0.029 (0.025, 0.034)	0.036 (0.028, 0.044)	0.050 (0.031, 0.075)
Cabinet ends (end = 1)	0.063 (0.028, 0.12)	0.062 (0.029, 0.12)	0.061 (0.030, 0.113)	0.057 (0.031, 0.104)	0.051 (0.026, 0.09)
Difference	0.038*	0.035*	0.032*	0.021	0.001

Note: Cell entries are the predicted probability of a speculative attack. Confidence intervals are in parentheses. Probabilities, standard errors, and confidence intervals calculated using CLARIFY (Tomz, Wittenberg, and King 1998).

*$p < .05$.

parameter estimates for our baseline variables remain relatively unchanged in this new specification.[60]

The results in Table 9 support our argument. The two dummy variables for Left and Right cabinets are not individually or jointly significant, indicating that the level of partisanship has no statistically discernable effect on the probability of a speculative attack. Interestingly, there are tremendous differences in the interactive terms between Left and Right. When the political uncertainty variables are limited to Right governments only, the estimates for the Right*expectations, Right*end, and Right*expectations*end variables are statistically significant and in a similar pattern to the political model. As uncertainty about the survival of a Right cabinet increases from 0.044 to 0.288, the likelihood of a speculative attack more than doubles, holding all other variables constant (Table 10). If a Right cabinet ends unexpectedly (that is, expectations is zero), then the probability of a speculative attack jumps from 2.2 percent to 11.1 percent, a statistically significant difference. Clearly, the possibility that a Right government might lose office makes currency markets jittery. The end of a Right government raises the possibility that a new (presumably) Left government will not remain committed to the exchange rate.

When the political uncertainty variables are limited to Left cabinets, however, they are individually and jointly statistically insignificant. Political uncertainty about the survival of a Left cabinet has no effect on the probability of a speculative attack.

60. In alternative specifications, we included a dummy variable to test for contagion effects—that is, the possibility that a speculative attack was provoked by an exchange-rate crisis in another country. The contagion dummy variable was coded 1 if a speculative attack occurred in another country in the previous month, and zero otherwise. In these specifications, the contagion dummy variable was statistically significant and positive, indicating that an exchange-rate crisis increased the probability of a speculative attack across borders in the following month. However, the results on expectations, end, end * expectations, and the partisan interactions remained significant and in the predicted directions. Additionally, we ran the models with a full set of country dummy variables. The results did not change appreciably.

TABLE 9. *Partisan model of speculative attacks*

Variable	*Probit coefficient*	*Robust standard error*[a]	*Marginal effect*
Constant	−4.308*	1.167	
Speculative attack$_{t-1}$ (d)	0.541*	0.217	0.055
Current account deficit (d)	0.169*	0.086	0.011
Inflation	0.023*	0.010	0.007
Log (exports + imports)	0.093*	0.048	0.007
RER overvaluation$_{t-1}$	0.059*	0.013	0.010
Capital controls (d)	0.062	0.106	0.003
Partisan shift to the Left	1.157*	0.297	0.005
Change in unemployment	0.152*	0.056	0.007
Realignment (d)	0.788*	0.169	0.100
Member of the EMS (d)	−0.032	0.063	−0.001
Left (d)	−0.003	0.144	−0.0002
Left ∗ political expectations	0.484	1.105	0.003
Left ∗ government end (d)	0.055	0.445	0.0004
Left ∗ (expectations ∗ end)	−0.216	1.413	−0.001
Right (d)	−0.137	0.126	−0.008
Right ∗ political expectations	1.986*	0.739	0.012
Right ∗ government end (d)	0.756*	0.229	0.092
Right ∗ (expectations ∗ end)	−3.518*	1.123	−0.020
N	3665		
Model χ^2	98.66**		

Notes: The dependent variable is coded 1 if the speculative attack index for country *j* exceeds that country's average speculative attack by two standard deviations; zero otherwise. Cell entries are probit estimates obtained using maximum likelihood. For dichotomous independent variables, the partial effect is computed for a one-unit change in the independent variable, holding all other variables at their means. (d) indicates that the variable is dichotomous. For continuous independent variables, the partial effect is computed for a change of one-half of one standard deviation from the mean of that variable, holding all other variables at their means. The model was initially estimated with a series of five to twelve linear splines; in no case were the splines, as a whole, statistically significant. The model shown here was estimated without linear splines.

[a]Huber/White robust standard errors.

*$p < .05$, two-tailed z-test.

**$p < .05$, joint-significance test.

Currency markets do not seem to care whether the Left government survives or perishes. If the Left government survives, markets can be fairly certain that status quo policies will remain in place. If the Left government is replaced, markets can be confident that a new (presumably) Right government will pursue policies consistent with the maintenance of the exchange rate.

Causality Tests

We have argued that political uncertainty has a causal effect on the probability of speculative attacks. One could plausibly question, however, whether the causal arrow might run in the other direction. That is, a speculative attack could conceivably

TABLE 10. *Predicted probabilities of a speculative attack for a Right cabinet*

	Values of expectations variable				
Situation	*0*	*0.0168*	*0.044*	*0.10*	*0.20*
Cabinet survives	0.022	0.024	0.027	0.036	0.060
(end = 0)	(0.013, 0.033)	(0.005, 0.034)	(0.017, 0.038)	(0.019, 0.060)	(0.017, 0.143)
Cabinet ends	0.111	0.106	0.098	0.083	0.063
(end = 1)	(0.031, 0.239)	(0.031, 0.226)	(0.029, 0.207)	(0.015, 0.116)	(0.018, 0.135)
Difference	0.080*	0.082*	0.072*	0.047	0.003

Note: Cell entries are the predicted probability of a speculative attack. Confidence intervals are in parentheses. Probabilities, standard errors, and confidence intervals calculated using CLARIFY (Tomz, Wittenberg, and King 1998).

*$p < .05$.

contribute to a cabinet collapse. In order to evaluate this logic, we examined the effect of speculative attacks on both cabinet ends and the expectations variable. Columns 1–3 of Table 11 are probit models of cabinet end as a function of speculative attacks. Since there is no theory for determining Granger causality for probit or panel probit models, we examine the effect of both contemporaneous and lagged values of speculative attacks. The speculative attack variable is never statistically significant. Columns 4–6 report the results from using expectations as the dependent variable. Again, neither contemporaneous or lagged values of the speculative attack variable have a statistically discernable effect. As a result, we are reasonably confident that political uncertainty causes speculative behavior and not the other way around.

Conclusion

Over the past decade, political economy models have emphasized how market expectations of a government's policy behavior strongly influence economic policy outcomes, both domestically and internationally.[61] Recent models of speculative currency attacks contend that market expectations of a change in a government's commitment to the exchange rate can trigger a speculative attack—even if economic fundamentals are sound. To explain these economic outcomes, therefore, we must understand how market actors form expectations about a government's policy objectives and behavior.

It is widely accepted that market actors incorporate information from a variety of sources into their expectations. Until recently, however, the political information used in economic models has been limited to electoral timing or government partisan-

61. For domestic policy outcomes, see, for example, Alesina, Roubini, and Cohen 1997; and Alesina and Sachs 1988. For international policy outcomes, see, for example, Obstfeld 1994.

TABLE 11. *Causality tests*

	Probit coefficients			*GLS estimates*		
	Cabinet end	*Cabinet end*	*Cabinet end*	*Expectations*	*Expectations*	*Expectations*
Constant	−1.73*	−1.72*	−1.73*	0.041*	0.042*	0.042*
	(0.038)	(0.037)	(0.038)	(0.002)	(0.002)	(0.002)
Speculative attack$_t$	0.276	—	0.279	0.003	—	0.003
	(0.172)	—	(0.173)	(0.011)	—	(0.011)
Speculative attack$_{t-1}$	—	−0.022	−0.047	—	−0.005	−0.006
	—	(0.207)	(0.209)	—	(0.011)	(0.001)
	—	—	—	—	—	—
N	3,665	3,665	3,665	3,665	3,665	3,665
χ^2	2.56	0.01	2.61	0.10	0.28	0.37
Probability $> \chi^2$	0.1098	0.9145	0.2715	0.7564	0.5997	0.8291

Note: Coefficients in columns 1–3 are probit coefficients estimated using maximum likelihood; robust standard errors are in parentheses. Coefficients in columns 4–6 are GLS estimates; panel corrected standard errors are in parentheses.

ship. Economic actors, however, are likely to have a much richer knowledge of political processes and behavior. Consequently, political science models may shed light on how markets use the political information available to them.

We combine political science arguments about coalition bargaining, cabinet duration, and partisanship to estimate market evaluations about a government's commitment to the exchange rate. The results indicate that these political factors strongly influence the probability of a speculative attack, suggesting that currency traders do incorporate political information into their expectations. The next challenge is to develop more sophisticated models not only of political processes and behavior but also of how economic agents process this political information.

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