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A Political Model of Monetary Policy with Application to the Real Fed Funds Rate

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A POLITICAL MODEL OF MONETARY POLICY WITH APPLICATION TO THE REAL FED FUNDS RATE*

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ABSTRACT

We construct an empirical model of U.S. monetary policy assuming that the Federal Reserve is an ordinary federal bureaucracy. We use the real Federal Funds rate as our policy measure and show the existence of significant executive, legislative, and bureaucratic influence on the real rate of interest from 1961 to 1996. We find that presidential party is an adequate statistical measure of executive influence and that the voting scores of the Senate Banking Committee leadership best represent legislative influence. We argue that political changes cause systematic and predictable changes in monetary policy.

THE Federal Reserve must have a fantastic press agent. While critical inquiries into government bureaus abound, and citizen cynicism and distrust of elected officials and institutions run high, the Fed enjoys almost a free pass. We all know that the Fed is different, independent, apolitical. Indeed, usual scientific models of bureaucracy based on self-interest are generally assumed not to apply to the monetary bureaucracy.

If the Fed did not enjoy this special status, how would we model its behavior? Presumably we would be guided by the positive models of bureaucratic behavior that exist in both the economics and political science literature. We would examine the effect of presidential influence on Fed decisions. We would look for evidence of congressional influence and investigate whether changes in internal Fed leadership affect policy outcomes. Here we take up exactly this task. We ask the question, How much explanatory leverage on monetary policy can we achieve by modeling the

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Fed exactly as we would model the Federal Trade Commission or the International Trade Commission or the Securities Exchange Commission or the Environmental Protection Agency?

It turns out that we can explain a lot about monetary policy by applying usual models of bureaucratic behavior. Using the real Fed Funds rate to measure monetary policy, we find that Republican presidents and more conservative leadership of the Senate Banking Committee are significantly correlated with tighter monetary policy. We also find that changes the chairmanship of the Fed are significantly correlated with changes in monetary policy.

Section I below is a review of the empirical literature of political models of Fed behavior. Section II explains our choice of monetary policy indicator. Section III presents the specific hypotheses we will test. Section IV contains our main empirical results and some specification tests, and Section V contains our conclusions.

I. Politics and the Federal Reserve

Empirical models of political influence on the Fed do exist, but they are frequently monocausal models, and to date, they have not had much effect on empirical macroeconomics. There are three general classes of models considered here: bureaucratic independence, presidential partisan, and congressional partisan.[1]

Perhaps the most widely held view in both economics and political science is that the Fed is an independent bureau. There are at least three versions of this model. First, the traditional macroeconomic version is that the Fed has some well-defined loss function made up entirely of macroeconomic variables that is minimized subject to the constraints inherent in the economy. This loss function is viewed as impervious to politics. Virtually all macroeconomic analyses of monetary policy proceed with this assumption.

Second, the public choice version is based on the Niskanen model of bureaucratic independence and argues that the Fed is free to pursue power, wealth, or the interests of commercial banks independent of any political control.[2] Mark Toma, Milton Friedman, and William Shughart and Robert

[1] There is also a considerable literature investigating the voting behavior of members of the Board of Governors or the entire Federal Open Market Committee. See, for example, Henry Chappell, Jr., Thomas Havrilesky, & Rob Roy McGregor, Partisan Monetary Policies: Presidential Influence through the Power of Appointment, 108 Q. J. Econ. 185 (1993); and George Krause, Federal Reserve Policy Decision Making: Political and Bureaucratic Influences, 38 Am. J. Pol. Sci. 124 (1994). However, this literature has yet to make the leap from factors affecting the probability of dissenting votes to how those votes actually influence monetary policies.

[2] William Niskanen, Bureaucracy and Representative Government (1971).

Tollison all provide examples of this approach, which frequently concludes that bureaucratic autonomy imparts an inflationary bias to monetary policy.[3]

The power of the Fed chairman is an important factor in a third class of independent bureau models. Besides nontechnical analyses of the ''Volcker recession'' and the ''Greenspan bull market,'' there is an economic literature that views the identity and preferences of the chairman as the major factor determining subsequent monetary policy. David Hakes makes this type of argument and presents supporting empirical work showing that a monetary policy reaction function has significantly different coefficients during the Burns years as Fed chair than during either the Martin or Volcker years.[4]

Presidential partisan models are built on the assumption that liberal politicians are more concerned with unemployment (or growth) and less with inflation than are their conservative opponents and will thus pursue more expansionary policies. When applied to the United States, Democratic presidents are considered liberal relative to Republicans. Douglas Hibbs develops a such a model assuming an exploitable Phillips curve. He presents regression evidence that monetary policy is significantly easier under Democratic presidents. Later, Henry Chappell and William Keech and Alberto Alesina modify the partisan model to allow for rational expectations.[5] However, their predictions about monetary policy are unchanged from Hibbs's original model: Democratic presidents will be associated with more expansionary policies.

Nathaniel Beck challenges Hibbs by arguing that not all Democrats are alike and that a model using dummy variables for individual presidential administrations fits the data significantly better than does a model using only a party dummy. Dudley Luckett and Glenn T. Potts, Robert E. Weintraub, and Hakes also argue that presidential influence on the Fed is administration specific.[6] This is important because a party-based model has pre-

[3] Mark Toma, Inflationary Bias of the Federal Reserve System: A Bureaucratic Perspective, 10 J. Monetary Econ. 163 (1982); Milton Friedman, Monetary Policy: Theory and Practice, 14 J. Money, Credit, & Banking 98 (1982); William F. Shughart II & Robert Tollison, Preliminary Evidence on the Use of Inputs by the Federal Reserve System, 73 Am. Econ. Rev. 291 (1983).

[4] David Hakes, The Objectives and Priorities of Monetary Policy under Different Federal Reserve Chairmen, 22 J. Money, Credit, & Banking 327 (1990).

[5] Douglas Hibbs, Political Parties and Macroeconomic Policy, 71 Am. Pol. Sci. Rev. 1467 (1977); Henry Chappell, Jr., & William Keech, Policy Motivation and Party Differences in a Dynamic Spatial Model of Party Competition, 80 Am. Pol. Sci. Rev. 881 (1986); Alberto Alesina, Macroeconomic Policy in a Two-Party System as a Repeated Game, 102 Q. J. Econ. 651 (1987).

[6] Nathaniel Beck, Presidential Influence on the Federal Reserve, 26 Am. J. Pol. Sci. 415 (1982); Dudley G. Luckett & Glenn T. Potts, Monetary Policy and Partisan Politics, 12 J.

dictive content while administration dummies cannot be used to predict the behavior of future presidents.

Congressional partisan models are simply the legislative branch counterparts to presidential partisan models.[7] Most of the literature on Congress and the Fed is a litany of the infrequent, unsophisticated oversight and a recounting of proposed legislation attacking the Fed that is never passed. However, Kevin Grier, drawing on Barry Weingast and Mark Moran, Matthew McCubbins and Thomas Schwartz, and Weingast and William Marshall, argues that a lack of overt, organized congressional attention to monetary policy is not the same as a lack of influence.[8]

Grier argues that liberal legislators will prefer more expansionary policies and offers as supporting evidence that union political action committees (PACs) give more money to more liberal congressmen while corporate PACs give more to conservative congressmen. He shows that changes in the liberality of the Senate Banking Committee leadership, as measured by average Americans for Democratic Action (ADA) scores, are positively correlated with money growth in a variety of models and samples up to the mid 1980s.[9] Thomas Havrilesky constructs an index of Senate Banking Committee signals about more expansionary policy and shows that this index is negatively correlated with the Fed Funds rate.[10]

Not all empirical work on the politics of monetary policy takes a monocausal point of view. Hakes looks at the effect of both presidents and Fed chairs on an index of monetary policy intentions, and Grier includes a variable for Republican presidents in his studies of congressional influence on money growth. Havrilesky includes both executive and Banking Committee

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Money, Credit, & Banking 540 (1980); Robert E. Weintraub, Congressional Supervision of Monetary Policy, 4 J. Monetary Econ. 341 (1978); Hakes, *supra* note 4.

[7] Interestingly, the existing presidential partisan models typically ignore even the possibility of congressional influence on the Fed. John Woolley, The Politics of Monetary Policy: A Critical Review, 14 J. Pub. Pol'y 57, 73 (1994) remarks, ''In typical models . . . changes in Congress have little or no impact on the partisan character of monetary policy in addition to the impacts caused by the president. . . . The general failure of most scholars to incorporate terms representing both congressional and presidential political characteristics in their studies is a telling failure.''

[8] Kevin Grier, Congressional Influence on U.S. Monetary Policy, 28 J. Monetary Econ. 201 (1991); Kevin Grier, Congressional Oversight Committee Influence on U.S Monetary Policy Revisited, 38 J. Monetary Econ. 571 (1996); Barry Weingast & Mark Moran, Bureaucratic Discretion or Congressional Oversight? Regulatory Policy-Making by the Federal Trade Commission, 91 J. Pol. Econ. 765 (1983); Matthew McCubbins & Thomas Schwarts, Fire Alarms and Police Patrols, 28 Am. J. Pol. Sci. 165 (1984). Barry Weingast & William Marshall, The Industrial Organization of Congress, 96 J. Pol. Econ. 132 (1988).

[9] Grier, Congressional Influence on U.S. Monetary Policy, *supra* note 8; and Congressional Oversight Committee Influence on U.S Monetary Policy Revisited, *supra* note 8.

[10] Thomas Havrilesky, The Pressures on American Monetary Policy (1993).

signals in a single regression.[11] Tony Caporale and Grier argue that changes in presidential administrations explain real Treasury-bill rate shifts better than do Fed chair switches.[12] Their final model contains dummies for presidential administration along with a dummy for Republican party control of the Senate. However, there is no existing empirical work that allows for simultaneous executive, congressional, and bureaucratic influence on monetary policy. We take up this task in Section IV below after explaining our choice of policy variable and elucidating the specific hypotheses of interest.

II. The Real Fed Funds Rate as a Monetary Policy Measure

Choosing an empirical measure of monetary policy is not an easy task. There is a trade-off between picking a variable over which the Fed has direct and complete control (for example, the discount rate) and one that has important implications for the macro economy but is only very imperfectly controlled by the Fed in the short run (for example, the inflation rate). Historically, the debate has centered on the choice of a monetary aggregate versus an interest rate. However, given the breakdown of the relationship between narrow monetary aggregates and economic activity that began in the mid 1980s, the use of interest rates or interest-rate spreads to measure monetary policy is gaining widespread acceptance in empirical macroeconomics.

A number of recent papers show that interest rates and interest-rate spreads are robust predictors of economic activity.[13] Ben Bernanke argues that these variables work well because they contain information about the stance of monetary policy.[14] In fact, Bernanke and Alan Blinder show that

[11] Hakes, *supra* note 4; Grier, Congressional Influence on U.S. Monetary Policy, *supra* note 8; and Congressional Oversight Committee Influence on U.S Monetary Policy Revisited, *supra* note 8; Havrilesky, *supra* note 10.

[12] Tony Caporale & Kevin Grier, Political Regime Change and the Real Interest Rate (photocopy, Tulane University, Murphy Institute of Political Economy, 1997).

[13] James Stock & Mark Watson, Interpreting the Evidence on Money-Income Causality, 40 J. Econometrics 161 (1989); Benjamin Friedman & Kenneth Kuttner, Money, Income, Prices, and Interest Rates, 82 Am. Econ. Rev. 472 (1992); Ben Bernanke & Alan Blinder, The Federal Funds Rate and the Channels of Monetary Transmission, 82 Am. Econ. Rev. 901 (1992).

[14] Ben Bernanke, On the Predictive Power of Interest Rates and Interest Rate Spreads, 1990 New Eng. Econ. Rev. 51. A similar conclusion was reached by Robert Laurent, An Interest Rate-Based Indicator of Monetary Policy, 12 Econ. Persp. 3 (1988). More recently, Ben Bernanke & Ilian Mihov, Measuring Monetary Policy (Working Paper No. 5145, National Bureau of Economic Research, Cambridge, Mass. 1995), attempted to obtain a measure of monetary policy innovations by employing a ''semistructural'' vector autoregression model. Using a monthly sample from 1966 to 1994, they were unable to reject the identifying restriction of Federal Funds rate targeting. They argue that this provides further evidence that

over much of the past 30 years the Fed has implemented policy changes primarily through changes in the Federal Funds rate.[15] They conclude that the Funds rate may therefore be used as an indicator of policy stance. In this article we use the real Federal Funds rate, defined simply as the nominal rate less the actual inflation rate, as our measure of monetary policy. Using real rates is consistent with the empirical macroeconomic literature cited above since lags of the price level are included in those empirical studies.[16]

Real interest rates are what affect the macro economy, and nominal rates may often be poor indicators of real rate movements.[17] Yet one possible objection to using real rates to measure monetary policy is the argument that real interest rates are not affected by systematic economic policies. In fact, Eugene Fama argued that the real interest rate was constant, at least over the 1953–71 sample period he studied.[18] Fama's work inspired a stream of papers showing that the real rate does vary, and many of those papers show that policy affects real rates. Fed Chairman Alan Greenspan, in 1993 congressional testimony, acknowledged the Fed's influence over the real rates: ''Currently, *short-term real rates, most directly affected by the Federal Reserve,* are not far from zero; long-term rates, set primarily by the market, are appreciably higher.''[19]

Statistical models of the real rate have evolved from Fama's famous piece, claiming the real rate was basically constant, to William Schwert and

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the Fed Funds rate is the best indicator of monetary policy. Finally, studies by James Pierce, The Myth of Congressional Supervision of Monetary Policy, 4 J. Mon. Econ. 363 (1978); and Robert Hetzel, The Federal Reserve System and the Control of the Money Supply in the 1970s, 13 J. Money, Credit, & Banking 31 (1981), have shown that the open-market desk of the New York Fed is able to keep the Funds rate within the band set by the Federal Open Market Committee.

[15] Benanke & Blinder, *supra* note 13.

[16] This point is clearly made by *id.* at 905: ''Lags of the price level are included for comparability with previous literature and because it is presumably real money or real interest rates that effect real variables.''

[17] For example, in 1979, 3-month Treasury bills averaged a return of about 10 percent, yet with a corresponding inflation rate of almost 12.5 percent, people holding those bills actually became poorer. In contrast, the average nominal return on 3-month bills in 1986 was about 6 percent. However, given the inflation rate of 1.2 percent, the average real return to holding Treasury bills was 4.8 percent. Simply looking at nominal rates would lead one to the odd conclusion that policy was much more restrictive in 1979 than it was in 1986. Throughout the decade of the 1970s there is actually a negative and significant correlation between nominal and real interest rates.

[18] Eugene Fama, Short-Term Interest Rates as Predictors of Inflation, 65 Am. Econ. Rev. 269 (1975).

[19] Alan Greenspan, Statement before the Subcommittee on Economic Growth and Credit Formation of the Committee on Banking, Finance, and Urban Affairs, U.S. House of Representatives, July 20, 1993, 79 Fed. Res. Bull. 849, 853 (1993) (emphasis added).

Madelyn Antoncic, who argue that the real interest rate is actually nonstationary, to Pierre Perron and Rene Garcia, who show that the real rate is constant over substantial periods of time but subject to infrequent shifts in its mean. Caporale and Grier show that big political changes predict real rate shifts better than the time-series method used by Garcia and Perron over the Garcia-Perron sample period of 1961–86.[20]

In the empirical work presented below, we expand the sample to also include the decade 1987–96, we switch from considering the real Treasury-bill rate to the real Federal Funds rate, and most important, we seek to improve on Caporale and Grier by creating an empirical model with ex ante predictive power. The following section sets out the specific hypotheses we will examine.

III. Hypotheses

Our empirical work investigates the effects of bureaucratic structure, executive influence, both partisan and electoral, and the influence of Congress in an integrated political model of monetary policy. There are three hypotheses of particular interest.

Hypothesis 1. Do changes in the executive branch affect the real Funds rate, and if so, does party adequately capture these effects?

Hypothesis 2. Do changes in the composition of Congress affect real rates, and if so, is it in the overall Congress, the banking committees, or the committee's leadership?

Hypothesis 3. Do changes in the Fed chairmanship affect the real Funds rate, and if so, are chairs with previous Fed experience systematically different from chairs appointed from the outside, or are chairs appointed by Democrat presidents different from those appointed by Republicans?

The next section begins sorting out these hypotheses in a politics-only regression model and then proceeds to investigate the robustness of our results with a set of specification tests and by adding sets of macroeconomic variables. It is important to emphasize, however, that all our conclusions about political influence drawn from the politics-only model continue to hold in our later, macro-variables-included models. We use the two stages here only for convenience of exposition, not to influence the results.

[20] *Id.;* G. William Schwert, The Time Series Behavior of Real Interest Rates: A Comment, 24 Carnegie-Rochester Conference Series on Public Policy 275 (1986); Madelyn Antoncic, High and Volatile Real Interest Rates: Where Does the Fed Fit In? 18 J. Money, Credit, & Banking 18 (1986); Pierre Perron, Testing for a Unit Root in a Time Series with a Changing Mean, 8 J. Bus. & Econ. Stat. 153 (1990); Rene Garcia & Pierre Perron, An Analysis of the Real Interest Rate under Regime Shifts, 78 Rev. Econ. & Stat. 111 (1996); Caporale & Grier, *supra* note 12.

TABLE 1

EXECUTIVE, LEGISLATIVE, AND BUREAUCRATIC INFLUENCES ON THE REAL FED FUNDS RATE, 1961–96

Variable	Equation (1)	Equation (2)	Equation (3)
Constant	3.95	6.59	1.54
	(1.45)	(2.29)	(.59)
log(Senate committee leadership)	−1.30	−1.19	−1.58
	(4.60)	(2.74)	(6.25)
log(House committee leadership)	.57	−.17	1.06
	(.69)	(.21)	(1.57)
Nixon-Ford dummy	...	1.19	...
		(2.18)	
Carter dummy	...	.31	...
		(.29)	
Reagan-Bush dummy	...	2.47	...
		(1.78)	
Clinton dummy	...	.07	...
		(.03)	
Republican president dummy	1.84	...	1.70
	(5.15)		(3.78)
Burns dummy	−2.57	−2.07	...
	(4.90)	(3.45)	
Miller dummy	−2.16	−2.23	...
	(4.12)	(1.98)	
Volcker dummy	.75	.48	...
	(1.33)	(.44)	
Greenspan dummy	−.02	−.43	...
	(.07)	(.27)	
Fed insider dummy	...	...	1.41
			(3.44)
R^2	.597	.602	.493

NOTE.—In each equation, three seasonal dummies are estimated but not reported to conserve space. Sample is 1961.1–1996.4, 144 quarterly observations. Numbers in parentheses are heteroskedasticity and autocorrelation consistent *t*-statistics computed with a lag truncation parameter of 4. Fed insider chairs are Martin and Volcker.

IV. RESULTS

Equation (1) of Table 1 presents a simple political model of the real Federal Funds rate. We use a dummy variable for Republican presidents and for each Fed chair except for Martin. The intercept thus measures the combined coefficients for Martin and Democratic presidents. To represent Congress we use an updated measure of Banking Committee preferences for monetary policy developed by Grier.[21] We take the average ADA score of each member for the length of time they serve on the committee and use

[21] Grier, Congressional Influence on U.S. Monetary Policy, *supra* note 8; and Congressional Oversight Committee Influence on U.S Monetary Policy Revisited, *supra* note 8.

that as fixed measure of their preferences. We then take an average of this average preference across the committee chair and the relevant subcommittee chairs (see appendices A and B for a listing of the members and their average ADA scores). Voting scores, if significant, provide more ex ante predictions than do party dummy variables.

Equation 1 of Table 1 shows that a more liberal Senate Banking Committee leadership is significantly negatively correlated (at the 0.01 level) with the real interest rate, while the House leadership has no significant effect. The coefficient for the Senate indicates that a 1-SD increase in the average ADA of the Senate committee leadership reduces the real Fed Funds rate by 0.98 percentage points, other factors held constant.

The Republican president dummy variable has a coefficient of 1.84 and is significant at the 0.01 level. Ceteris paribus, the real Fed Funds rate is almost 2 percentage points higher under Republicans. The Fed chair dummies are jointly significant at the 0.05 level, with the Burns and Miller dummies each negative and significant.

We find strong statistical evidence of systematic, predictable influence of politics on monetary policy. Perhaps the most surprising result here is that this simple political model accounts for about 60 percent of the quarterly variation in the real rate over the 36 years from 1961 to 1996.

A. Does Party Adequately Capture Executive Influence?

Equation (2) relaxes the constraint that all Republican administrations are alike and that all Democratic administrations are alike by replacing the Republican president dummy with separate administration-specific dummy variables. The Kennedy-Johnson administration is measured by the intercept (along with Fed Chair Martin) and Nixon-Ford, Carter, Reagan-Bush, and Clinton dummies are in the regression. The administration dummies do not add much to the party model in equation (1). The R^2 of equation (2) is only 0.005 higher, and a formal F-test cannot begin to reject the null hypothesis that the simple party dummy variable fits the data as well as the individual administration dummies.

In equation (2), the Senate Banking Committee leadership is still negative and significant at the 0.01 level, and the House committee leadership is still insignificant. The Fed chair dummies are still significant at the 0.05 level, and their coefficients and significance levels are little changed.

The ability to use a party variable supports earlier work of Hibbs and, as he stressed, converts the model from mere ex post explanation to one that can make ex ante predictions. The success of the party variable here also supports the partisan models common in the literature that take presidential party as the organizing political force.

B. Searching for Predictive Content in the Fed Chair Dummies

So far the model has ex ante predictions for the effect of legislative and executive branch changes on monetary policy. Here we examine whether there exists ex ante predictability for Fed chair changes. Equation (3) tests the hypothesis that Fed chairs can be grouped by whether or not they had previous Fed experience. We replace the four Fed chair dummies with a Fed Insider dummy that equals 1.0 for the Martin and Volcker years and 0.0 for the rest of the sample. The Fed Insider variable is positive and significant at the 0.01 level, indicating that the real rate is significantly higher under a Fed chair with previous fed experience. However, the fit of the model is significantly worse in equation (3) than in equation (2). An *F*-test for the appropriateness of grouping Fed chairs by insider-outsider status rejects that hypothesis at the 0.01 level.

A second possibility is that Fed chairs could be grouped according to the party of the president that appointed them. Martin, Miller, and Volcker were appointed by Democratic presidents, while Burns and Greenspan were Republican president appointees. The weakness of this hypothesis can be clearly seen by examining the individual coefficients in equation (2) of Table 1. Both Burns and Miller have negative and significant coefficients, but one is a Republican-appointed chair, and the other a Democrat appointee. Replacing the individual Fed chair dummies with a Democrat appointee dummy lowers the R^2 of the model to 0.43. An *F*-test convincingly rejects the null hypothesis that the party of the appointing president can predict what effect a Fed chair will have on the real interest rate.

This last result indicates that the theoretical literature emphasizing the power of appointment may be in error. Fed policy is affected by the election of a Democratic president, even if the chair was previously appointed by a Republican. It also can help to explain why Volcker and Greenspan were reappointed by presidents of the opposite party that originally appointed them.

C. Is Banking Committee Leadership the Right Measure of Congressional Preference?

In Table 2 we take a closer look at the effect of congressional change on the real rate. We have constructed our committee leadership variable so that only changes in personnel will change our measure of committee preference. As Dan Wood and Richard Waterman point out, committee personnel change is often correlated with larger congressional change.[22] Therefore, it

[22] Dan Wood & Richard W. Waterman, Bureaucratic Dynamics 143 (1994), say, ''When Congress changes, so do the parts of Congress. Thus it is impossible to determine whether bureaucratic responses are due to the entire body, one or more oversight committees or a

TABLE 2

OTHER MEASURES OF LEGISLATIVE INFLUENCE ON THE REAL FED FUNDS RATE, 1961–96

Variable	Equation (1)	Equation (2)	Equation (3)
Constant	19.15	14.46	6.47
	(2.29)	(4.30)	(.59)
log(Senate committee leadership)	...	...	−1.11
			(2.69)
log(House committee leadership)	...	...	.64
			(.62)
log(full Senate committee average)	−2.49	...	...
	(1.22)		
log(full House committee average)	−1.99	...	...
	(1.10)		
Percent Democrats in Senate	...	−2.21	−.61
		(2.62)	(.66)
Percent Democrats in House	...	.22	.08
		(.40)	(.14)
Republican president dummy	1.65	1.04	1.63
	(2.82)	(2.01)	(3.14)
Burns dummy	−2.99	−3.66	−2.86
	(4.26)	(4.32)	(3.91)
Miller dummy	−3.12	−3.78	−2.64
	(5.05)	(4.00)	(3.08)
Volcker dummy	1.97	−.69	.10
	(2.11)	(.47)	(.11)
Greenspan dummy	−.37	−2.25	−.63
	(.68)	(2.24)	(.67)
R^2	.536	.575	.599

NOTE.—In each equation, three seasonal dummies are estimated but not reported to conserve space. Sample is 1961.1–1996.4, 144 quarterly observations. Numbers in parentheses are heteroskedasticity and autocorrelation consistent *t*-statistics computed with a lag truncation parameter of 4.

is not enough to show that our variable is significant; we need to investigate whether other congressional variables are also significant and, if so, which fit the data best.

Equation (1) of Table 2 replaces the committee leadership ADA scores with the average ADA score of the entire committee. Both of these variables have negative coefficients, but they are individually and jointly insignificant. Equation (2) considers the composition of the entire Congress. Since the average ADA score for a full chamber shows little time variation, we use instead the percentage of the chamber that belongs to the Democratic party. The percent Democrat in the Senate is negative and significant

multiplicity of forces in the environment of the agency.'' We would of course replace the word ''impossible'' with the word ''important'' and argue that, for the Fed at least, we are doing exactly that.

at the 0.01 level, while the percent Democrat in the House is completely insignificant.

To investigate which measure is the appropriate one, we simply put both in the same equation. These results are shown in equation (3) of Table 2. The Senate Banking Committee leadership dominates the percent Democrat in the Senate as an influence on the real rate. The committee leadership variable is negative and significant at the 0.01 level, while the broader measure is completely insignificant.

Another way to gauge the appropriateness of our selection of the Senate Banking Committee as the major congressional influence variable is to consider the stability of its coefficient over time. It is difficult to conduct a straightforward Chow test for the stability of the overall equation because the model contains a number of dummy variables that cannot be estimated (because they equal zero throughout) over many subsamples. However, we can investigate the stability of our Congress variable by creating another dummy variable that equals 1.0 in the second half of our sample (from 1979.1–1996.4) and 0.0 in the first half, then interacting it with the Senate Banking Committee variable. If the significance of the committee variable is being driven by the changes in the party controlling the Senate in 1980, 1986, and 1994, then the interaction term might be negative and significant, and the original coefficient insignificant.

However, this is not the case. In the regression described above, the coefficient on the Senate Banking Committee leadership is −1.20 with a *t*-statistic of 3.23, and the slope-shifting interaction term has a coefficient of −0.10 with a *t*-statistic of 0.45. We thus find no evidence that the effect of Senate Banking Committee leadership preferences on the real rate changes after 1978.[23]

D. Specification Tests

The political variables we use in our analysis are generally significant and together explain a substantial fraction of the variation in the real interest rate. Of course, it may well be the case that we have left relevant variables out. For example, we ignore the overall composition of the Board of Governors, and we do not explicitly consider the alleged 1979 experiment

[23] We also estimated a nominal Fed Funds rate equation with the inflation rate included on the right-hand side. Rather than using least squares, though, we recognize that inflation and the nominal rate are simultaneously determined and thus use two-stage least squares with the inflation rate as an endogenous regressor. The basic results shown in Tables 1 and 2 are unaffected by this change. The political variables have the same signs, magnitudes, and significance levels as they did in our real rate equations, and the now freely estimated coefficient on inflation is almost exactly equal to 1.0. Given that our previous equation imposes such a value on the coefficient, it is important to show that the data do not reject it.

with monetarism undertaken by the Fed. One good way to check the validity of a model against some unspecified alternatives is to use a general specification test. If the equation fails, one can conclude that important factors are missing from the model. Here we perform the Ramsey RESET test[24] on equation (1) of Table 1. The RESET test adds powers of the predicted values from the regression model in question into a new augmented model. For example, if the original model is $y = xB + \mu$ and y' is the vector of fitted values from that regression, the Ramsey test estimates the model $y = xB + \sum\gamma^i y'^i + \mu$. If the γ_is are jointly significant, we conclude that the existing model is inadequate. We have conducted Ramsey tests with i equal to 2, 3, and 4. In each case the test statistic is insignificant, indicating that we have not made an egregious error of omission.

E. Macro Variables

Finally, we show that our results about systematic political influence on monetary policy are robust to the inclusion of macroeconomic variables as additional regressors. Economic theory suggests that both the supply and demand of investment funds should influence the real interest rate. To control for factors affecting the demand for investment funds, we use real stock returns, relative energy prices, and lagged investment. To control for the supply of loanable funds, we use the federal deficit, government spending, and growth in the monetary base. Appendices C and D give the exact definitions, sources, and summary statistics for all our variables.

Consider the demand for investment funds. In an efficient-market model, stock prices are based on the present value of expected future profits. Increases in the rate of return to the stock market are thus signals of increases in expected future economic growth and profits. Higher expected growth raises investment demand and the interest rate, assuming that other relevant factors are held constant.[25] Increases in the real price of energy are negative supply shocks that imply lower levels of future economic activity and therefore will reduce investment demand and lower the real rate of interest.

Turning to the supply side, traditional Keynesian macro models predict

[24] James Ramsey, Tests for Specification Errors in Classical Linear Least Squares Regression Analysis, 31 J. Royal Stat. Soc'y 350 (1969).

[25] Our macro variables are largely based on the model found in Robert Barro & Xavier Sala-i-Martin, World Real Interest Rates, NBER Macroeconomics Annual 15 (Olivier Blanchard and Stanley Fischer eds. 1990). Like them, we use real stock returns rather than real GNP as the relevant variable affecting the demand for investment. Frederic Mishkin, The Real Interest Rate: An Empirical Investigation, 15 Carnegie-Rochester Conf. Series on Pub. Pol'y 151 (1981); and Behzad Diba & Seonghwan Oh, Money, Output, and the Expected Real Interest Rate, 47 Rev. Econ. & Stat. 10 (1991), both find that GNP does not significantly affect the real interest rate.

TABLE 3

POLITICS IN A REDUCED-FORM MACRO MODEL OF THE REAL FED FUNDS RATE

Variable	Coefficient	*t*-Statistic
Constant	−11.07	1.30
log(Senate committee leadership)	−1.25	3.56
log(House committee leadership)	1.04	1.13
Republican president dummy	1.52	3.91
Burns dummy	−1.16	1.43
Miller dummy	−1.62	1.57
Volcker dummy	2.26	2.13
Greenspan dummy	2.47	2.15
Real oil price growth$_{t-1}$	−.02	3.21
Monetary base growth$_{t-1}$	−.10	1.53
Real stock returns$_{t-1}$	.01	1.21
Government spending/GNP$_{t-1}$	.37	1.23
Investment/GNP$_{t-1}$	.32	1.92
Deficit/GNP$_{t-1}$	.28	2.10
R^2	.651	

NOTE.—Three seasonal dummies are estimated but not reported to conserve space. Sample is 1961.1–1996.4, 144 quarterly observations. Numbers in parentheses are heteroskedasticity and autocorrelation consistent *t*-statistics computed with a lag truncation parameter of 4. GNP = gross national product.

that government borrowing to finance a deficit will reduce the amount of savings available for private investment. The reduction in the supply of loanable funds will tend to raise the real interest rate. A major controversy in macroeconomics is whether deficits do raise real interest rates, and the empirical evidence is mixed.[26] We include the deficit variable here without making any strong a priori prediction about its sign or significance. Finally, if the price level does not adjust instantly to increases in money, then a monetary expansion at least temporarily increases the real supply of funds (liquidity) in the economy, tending to lower the real rate of interest until the price level fully adjusts. We use monetary base (M0) growth as our liquidity variable. We measure the financial variables as continuously compounded growth rates and the spending variables as a percentage of gross national product (GNP). To lessen any potential simultaneity problems, we lag each variable one quarter.

Table 3 adds the six macro variables discussed above, each lagged one

[26] Robert Barro, Are Government Bonds Net Wealth? 82 J. Pol. Econ. 1095 (1974), makes the Ricardian equivalence argument that, for a given level of government spending, the choice between tax or deficit financing has no effect on real variables. Douglas Bernheim, Ricardian Equivalence: An Evaluation of Theory and Evidence, NBER Macroeconomics Annual 263 (Stanley Fischer ed. 1987), presents a good survey of the empirical evidence on crowding out.

quarter, to our basic political model. The six variables are jointly significant at the 0.01 level and raise the R^2 of the model from 0.597 to 0.653. Relative energy price growth is negative and significant at the 0.01 level, and the deficit is positive and significant at the 0.05 level. Investment is positive and significant at the 0.10 level, while the other three variables have the expected signs but are not individually significant. The equation reported in Table 3 produces the same set of conclusions regarding our three political hypotheses as does the politics-only models we have reported, and it passes the same set of specification tests applied to the politics-only model in the subsection above.[27]

V. Conclusion

The empirical work above demonstrates that the Federal Reserve is not so different from the International Trade Commission or the Federal Trade Commission or any other federal bureau in that at least one of its outputs, monetary policy, is significantly affected by political changes. While it is true that presidents have a lot of other things to do, that formal congressional oversight is sporadic and unsophisticated, and that the Fed scores reasonably high in cross-national indexes of legal independence, our results are too strong to be swept aside by quibbles over the lack of overt control. Politics matters and knowledge about political changes can help forecast monetary policy.

In the 1961–96 sample studied here, presidential influence can be adequately captured with a party variable, supporting the partisan models of Hibbs, Chappell and Keech, and Alesina. Congressional influence comes through the leadership of the Senate Banking Committee, supporting previous work by Grier and Havrilesky. Finally, although we show that changes in the identity of the Fed chair significantly change monetary policy, the direction of these changes are not ex ante predictable. We find that monetary policy under Fed chair insiders is tighter than under outsiders, but the data do not fully accept the restriction; individual chairman dummies fit the data better.

Our work illustrates the utility of political economy models in empirical macroeconomics. Models of Fed behavior can no longer be based on out-

[27] We also investigate using eight lags of inflation along with our political variables. The inflation variables are significant at the 0.01 level, but more important for our purposes, they do not change the signs, magnitudes, or significance levels of the coefficient on our political regressors. Senate Banking Committee leadership continues to have a significant negative association with the real rate, Republican presidents still have a significant positive association, and the Fed chair dummies are still significant at the 0.01 level with the Burns and Miller coefficients significantly negative.

ward appearances or ''common knowledge'' or the internal propaganda of the organization. In the spirit of Will Rogers, it's not what you don't know that hurts you, it's what you think you know that ain't so. Our results demonstrate that many of the things we ''know'' about the Fed and monetary policy are in fact not true.

APPENDIX A

TABLE A1

SENATE BANKING COMMITTEE LEADERSHIP, 1961–96

Date	Leader	ADA Scores
Committee chair:		
1961–66	Robertson (Va.)	2.75
1967–74	Sparkman (Ala.)	9.62
1975–80	Proxmire (Wis.)	64.50
1981–86	Garn (Utah)	1.25
1987–88	Proxmire (Wis.)	85
1989–94	Riegle (Mich.)	87.17
1995–96	D'Amato (N.Y.)	25
Financial Institutions subcommittee chair:		
1961–62	No such subcommittee formed	
1963–66	Robertson (Va.)	5.50
1967–72	Proxmire (Wis.)	76.67
1973–78	McIntyre (N.J.)	61.50
1979–80	Cranston (Calif.)	83.50
1981–82	Tower (Tex.)	10.00
1983–84	Armstrong (Colo.)	7.50
1985–86	Gorton (Wash.)	30.00
1987–88	Reigle (Mich.)*	95.00
1989–94	Dodd (Conn.)	71.83
1995–96	Gramm (Tex.)	.00
Production and Stabilization subcommittee chair:		
1961–66	Douglas (Ill.)	98.60
1967–68	Long (Mo.)	56.00
1969–70	Mondale (Minn.)	97.00
1971–72	Cranston (Calif.)	89.50
1973–74	Johnston (La.)	24.50
1975–78	Cranston (Calif.)	89.50
1979–80	Reigle (Mich.)	81.00
1981–82	Armstrong (Colo.)†	7.50
1983–84	Gorton (Wash.)	35.00
1985–86	Mattingly (Ga.)	.00
1987–92	Sarbanes (Mass.)	93.00
1993–94	Sasser (Tenn.)‡	75.00
1995–96	Bond (Mich.)	7.50

NOTE.—ADA = Americans for Democratic Action. See text.

* After 1986 this subcommittee was called ''Securities.''

† After 1981 this subcommittee was called ''Economic Policy.''

‡ After 1993 this subcommittee was called ''International Finance and Monetary Policy.''

APPENDIX B

TABLE B1

HOUSE BANKING COMMITTEE LEADERSHIP, 1961–96

Date	Leader	ADA Scores
Committee chair:		
1961–62	Spence (Ky.)	73.17
1963–74	Patman (Tex.)	40.67
1975–80	Reuss (Wis.)	89.83
1981–88	St. Germain (R.I.)	75.50
1989–94	Gonzalez (Tex.)	81.66
1995–96	Leech (Iowa)	35.00
Domestic Finance:		
1961–64	No such subcommittee formed	
1965–76	Patman (Tex.)	32.17
1977–80	Mitchell (Md.)	92.25
1981–86	Fountroy (D.C.)*	68.67
1987–92	Neal (N.C.)	66.00
1993–94	Kanjorski (Pa.)†	62.50
1995–96	Roukema (N.J.)‡	42.50
Bank Supervision and Insurance:		
1961–64	No such subcommittee formed	
1965–66	Multer (N.Y.)	89.00
1967–68	Moorehead (Pa.)	92.50
1969–88	St. Germain (R.I.)	77.75
1989–92	Annuzio (Ill.)	67.75
1993–94	Neal (N.C.)	66.00
1995–96	Castle (Del.)	15.00

NOTE.—ADA = Americans for Democratic Action. See text.

* Since Fountroy is a D.C. delegate and does not vote, he is not assigned an ADA score. We deal with this problem by assigning him the Democratic average.

† After 1993, this subcommittee was called ''Economic Growth and Consumer Credit.''

‡ After 1995, this subcommittee was called ''Domestic and International Monetary Policy.''

APPENDIX C

DATA DEFINITIONS AND SOURCES OF VARIABLES

Real Rate: The ex post real Federal Funds rate. Data on the end-of-month Funds rate were taken from the Citibase databank (FYFF). The rate was subtracted by the annualized inflation rate.

Inflation: The rate of inflation calculated as the annualized growth rate of the consumer price index. Data on the nonseasonally adjusted consumer price index were obtained from Citibase (PZUNEW).

Real Stock Returns: The annualized growth rate of the real Dow Jones price index. The nominal index was obtained from Citibase (FSDJ). It was deflated by the consumer price index (PZUNEW).

M0 Growth: The annualized growth rate in the monetary base was taken from Citibase (FMBASE).

Investment Ratio: Gross investment as a percentage of GNP. The ratio of Citibase variables GPI to GNP is multiplied by 100.

Spending Ratio: Government spending on goods and services as a percentage of GNP. The ratio of the Citibase variables GGE to GNP is multiplied by 100.

Deficit Ratio: The ratio of the federal budget deficit to GNP. The ratio of the Citibase variables GGFNET to GNP is multiplied by 100.

Energy: The annualized growth rate of the real price of crude petroleum. The relative price of petroleum was obtained by dividing its producer price index (PW57) by the overall producer price index (PW).

Committee Leadership: The average ADA scores for the Senate and House chairs of the Banking Committee chair and two subcommittees that oversee the Fed over the full period that the elected officials held a leadership position (from the Congressional Quarterly and the ADA).

Full Committee: The year-to-year average ADA scores of the entire Senate and House Banking Committees.

Percent Democrat: The percentage of seats in the Senate and House held by legislators from the Democratic party (from the Congressional Quarterly).

APPENDIX D

TABLE D1

SUMMARY STATISTICS, 1961.1–1996.4

Variable	Mean	SD
Real rate	2.16	2.86
Nominal Fed Funds rate	6.81	3.46
Inflation	4.65	3.43
Money base growth	6.67	2.61
Real stock price growth	2.26	30.12
Investment ratio	.16	.02
Spending ratio	.21	.01
Deficit ratio	−.02	.02
Real oil price growth	.88	28.06
Senate committee leadership ADA	51.06	27.39
House committee leadership ADA	65.07	15.13
Senate Banking Committee ADA	50.12	5.35
House Banking Committee ADA	50.79	6.09
Percent Democrats in the Senate	.57	.07
Percent Democrats in the House	.60	.05

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