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

Introducción

The Federal Reserve must have a fantastic press agent. While critical inquiries into government burcaus 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 both in 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. We would investigate whether the timing of elections or of Fed Chair appointments affect monetary policy.

Here we take up exactly this task. We ask the question; how much explanatory leverage on monetary policy can we achieve by modeling the Fed exactly as we would model the FTC or the ITC or the SEC or the EPA?

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 of 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. Finally, we find that the real rate is significantly lower in presidential elections when the Chair of the Fed us up for re-appointment.

Section I below is a review of the literature on empirical models of bureaucratic

behavior, concentrating on those few heretics that have examined the Fed as a bureau. 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. Section V shows that our political influence results hold up if we use the nominal Fed Funds rate as our policy indicator with the inflation rate included on the right hand side of the model as an endogenous regressor. Section VI contains our conclusions.

Politics and the Federal Bureaucracy

General

The question of what determines the policy outcomes generated by bureaucracies has produced a huge literature that, to date, has not convincingly resolved the issue. The purely theoretical literature on bureaucratic control is voluminous and a review of it is beyond the scope of this paper.¹ Turning to the statistical evidence, Wood and Waterman (1994) and Krause (1996) each present an excellent review of the overall empirical literature. While early work emphasized a monocausal theory of bureaucratic policy, such as agency independence, or congressional dominance or presidential control, the best empirical work allows for multiple influences on bureaucratic outcomes.²

The Federal Reserve

Empirical models of political influence on the Fed do exist, but they are frequently monocausal models, and generally do not enjoy widespread credibility in either the

¹ See Hammond and Knott (1996) and Morris and Munger (1997) for recent reviews of and contributions to this literature.

For example see Krause (1996), Carpenter (1996), and Ringquist (1995).

economics or political science arena. There are four general classes of models considered here: Bureaucratic Independence, Presidential Partisan, Election Cycle, and Congressional Partisan.³ The variables used to measure policy outputs are also varied, with money growth or interest rates (both nominal and real) the most common choices.⁴

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. Toma (1982), Friedman (1982) and Shughart and Tollison (1983) are all examples of this approach, which frequently concludes that bureaucratic autonomy imparts an inflationary bias to monetary policy.

The power of the Fed Chairman is an important factor in a third class of independent bureau models. Besides non-technical 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. Hakes (1990) makes this type of argument and

³ There is also a considerable literature investigating the voting behavior of member of the Board of Governors or the entire FOMC. See Chappell, Havrilesky and McGregor (1993) and Krause (1994). However, this literature has yet to make the leap from factors affecting the probablility of dissenting votes to how those votes actually influence monetary policies.

⁴ Munger and Roberts (1990) and Woolley (1994) contain excellent reviews of the literature on politics and the Fed.

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.

Rogoff (1985) and Lohman (1992) argue that the preferences of the Fed Chair will determine future policies and discuss what type of person is best suited to hold the job from a societal viewpoint. This analysis suggests that the power to appoint the Chair is important and since that power is shared by the President and the Senate, it leads to a consideration of more overtly political models of monetary policy.

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 U.S. presidency, Democratic presidents are considered liberal relative to Republicans. Hibbs (1977) develops a such a partisan model assuming an exploitable Phillips curve. He was the first to present regression evidence that monetary policy is significantly easier under Democratic Presidents. Later, Chappell and Keech (1986) in the political science literature and Alesina (1987) in economics modify the Partisan model to allow for rational expectations. However, their predictions about monetary policy are unchanged from Hibbs' original model: Democratic presidents will be associated with more expansionary policies.

Beck (1982) 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 only using a party dummy. In the economics literature, Luckett and Potts (1978), Weintraub (1978) and Hakes (1990) also argue that presidential influence on the Fed is administration specific. This is an important issue because a party-based model has predictive content while administration specific dummies cannot be used to predict the behavior of future presidents. Both the original political business cycle models of Nordhaus (1975) and MacRae (1977) and the newer, rational PBC models of Rogoff (1990) and Persson and Tabelini (1991) imply that presidents seek movements in real economic activity to increase their chances of re-election. Pre-election prosperity improves an incumbent's re-election hopes either because voters are myopic or because it is a signal of competence to a forward looking electorate. A corresponding cycle in economic policy variables that affect real activity is a natural corollary to PBC theory.

Edwin Tufte's (1978) suggestion that monetary policy was significantly looser before presidential elections was in some sense the jumping off point for the empirical study of election cycles in monetary policy. Luckett and Potts (1980) in economics and Beck (1987) in political science are early critics of the existence of monetary election cycles. Grier (1987, 1989) shows that allowing for a 16 quarter cycle in money growth rather than simply a discrete jump near elections produces a significant monetary election cycle in the US through the early 1980's.⁵

Haynes and Stone (1989) also find a significant monetary election cycle in the U.S., while Alesina, Cohen and Roubini (1992) find evidence of pre-election easing in monetary policy in a panel of industrialized countries. Alt (1991) argues that the re-appointment status of the Fed Chair is a critical variable for determining whether or not the Fed will accommodate the electoral policy desires of the president.

Congressional partisan models are simply the legislative branch counterparts to presidential partisan models.⁶ Most of the literature on congress and the Fed is a

⁵ Luckett and Potts use a qualititative dependent variable measuring stated policy intentions, Beck uses a nominal interest rate, and Grier uses money growth.

⁶ Interestingly the existing presidential partisan models typically ignore even the possibility of congressional influence on the Fed. Woolley (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

litany of the infrequent, unsophisticated oversight and a recounting of proposed legislation attacking the Fed that is never passed. However, Grier (1991, 1996), drawing on Weingast and Moran (1984), McCubbins and Schwartz (1984) and Weingast and Marshall (1988), argues that a lack of overt, organized congressional attention to monetary policy is not the same as a lack of influence. Grier argues that liberal legislators will prefer more expansionary policies and offers as supporting evidence that Union 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 ADA scores, is positively correlated with money growth in a variety of models and samples up to the mid 1980's. Havrilesky (1993) 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.

Not all empirical work on the politics of monetary policy takes a monocausal point of view. Hakes (1990) looks at the effect of both presidents and Fed chairs on an index of monetary policy intentions, Grier (1991, 1996) includes a variable for Republican presidents in his studies of congressional influence on money growth. Havrilesky looks at both executive and banking committee signals in a single regression. Caporale and Grier (1997) argue that changes in presidential administrations explain real treasury bill rate shifts better than do Fed Chair switches. 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.

representing both congressional and presidential political characteristics in their studies is a telling failure."

The Real Fed Funds Rate as a Monetary Policy Measure

We argue that the best method of identifying changes in monetary policy is by looking at the behavior of the inflation adjusted (i.e. real) Federal Funds rate. There is a large political science literature (see, for example, Beck (1982, 1987) and Woolley (1988)) which argues that the Federal Funds rate is the instrument most often used by the FOMC to achieve its macroeconomic objectives. Studies by Pierce (1978) and Hetzel (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 FOMC. Therefore, the Federal Funds rate has generally been a preferred measure of monetary policy in most political science studies since it is both easily manipulated with open market operations and correlated with macroeconomic aggregates of ultimate interest to policy makers (Beck, 1982).

The use of the funds rate as a policy measure has recently been gaining wider acceptance by macroeconomists. Sims' (1980) demonstration of the strong predictive power of interest rates for real output re-opened the use of interest rates as policy indicators. McCallum (1983, 1986) argues that Sims' VAR results are consistent with monetary theories of the business cycle by suggesting that interest rates, rather than monetary growth rates, properly capture Federal Reserve actions. There are now a number of papers (Stock and Watson (1989), Friedman and Kuttner (1992), Bernanke and Blinder (1992)) showing that interest rates and interest rate spreads are robust predictors of economic activity. Bernanke (1990) argues that these variables work well because they contain information about the stance of monetary policy. In fact, Bernanke and Blinder (1992) show that over much of the past thirty years that the Fed has implemented policy changes primarily through changes in the Federal Funds rate. They conclude that the Funds rate may therefore be used as an indicator of policy stance.⁷

There is, however, a serious confusion in the literature looking at the Funds rate as a policy measure, namely the general lack of concern about the effects of inflation and the potentially important differences between real and nominal interest rates.

In this paper 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. This point is clearly made by Bernanke and Blinder (1992, p.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."

Nominal interest rates can be misleading policy indicators. As Friedman (1968) pointed out in his presidential address to the Amercian Economic Association, nominal interest rates contain little information concerning the ease or tightness of monetary policy in the presence of inflation. For example, in 1979, three month Treasury bills averaged a return of about 10%, yet with a corresponding inflation rate of almost 12.5%, people holding those bills actually became poorer. In contrast, the average nominal return on three month bills in 1986 was about 6%. However, given the inflation rate of 1.2%, the average real return to holding Treasury bills was 4.8%. 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 1970's there is actually a negative and significant correlation between nominal and real interest rates.

⁷ A similar conclusion was reached by Laurent (1988). More recently, Bernanke and Mihov (1995) attempted to obtain a measure of monetary policy innovations by employing a "semistructural" VAR model. Using a monthly sample from 1966-1994 they were unable to reject the identifying restriction of Federal Funds rate targeting. They argue that this provides further evidence that the Fed Funds rate is the best indicator of monetary policy.

Real interest rates are what economic and political actors care about (i.e. what affects the macoeconomy) and nominal rates may often be poor indicators of real rate movements. 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 Fama (1975) argued that the real interest rate was constant, at least over the 1953 - 1971 sample period he studied. Fama's work inspired a stream of papers showing 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 rate as follows, "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...(emphasis added)".

Statistical models of the real rate have evolved from Fama's (1975) famous piece claiming the real rate was basically constant, to Schwert (1986) and Antonjic (1986) who argue that the real interest rate is actually non-stationary, to Perron (1990) and Garcia and Perron (1996) who show that the real rate is constant over substantial periods of time but subject to infrequent shifts in its mean. Caporale and Grier (1997) 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 - 1986.

In the empirical work presented below, we expand the sample to also include the decade 1987 - 1996, we switch from considering the real treasury bill rate to the real federal funds rate, and most importantly, we seek to improve upon Caporale and Grier by creating an empirical model with ex-ante predictive power. The following section sets out the specific hypotheses we will examine.

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Hypotheses

In our empirical work, we investigate 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 four hypotheses of particular interest.

(1). Do changes in the executive affect the real funds rate, and if so, does party adequately capture these effects?

(2). Is the real fed funds rate lower near presidential elections or does the reappointment status of the Federal Reserve Chair affect the existence of an electoral cycle in real interest rates?

(3). 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?

(4).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.

Results

Table I begins by estimating a simple political model of the real Federal Funds rate. We use dummy variables for each presidential administration and each fed chair except for Kennedy-Johnson and Martin, whose effects are measured by the intercept. For Congress, rather than using the party control dummy employed in Caporale and Grier (1997), we use the measure of Banking Committe preferences for monetary policy developed by Grier (1991, 1996). We take the average ADA score of each member for the length of time they serve on the committee and use 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 appendix 2 and 3 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 presidential administration variables are jointly significant at the 0.01 level. Specifically, the Nixon-Ford administration dummy is positive and significant at the 0.05 level, while the Reagan-Bush dummy is positive but significant only at the 0.10 level. The Carter and Clinton dummies are insignificant. The Fed chair dummies are also jointly significant at the 0.05 level, with the Burns and Miller dummies each negative and significant. This simple political model accounts for about 60% of the variation in the real rate over the 36 years from 1961 - 1996.

Does Party adequately capture executive influence?

Equation 2 constrains the Nixon-Ford and Reagan-Bush dummies to be equal and the Carter and Clinton dummies to be zero by replacing the administration dummies with a single dummy variable for Republican presidents. The Republican dummy is positive and significant at the 0.01 level, Senate Banking committe leadership is still negative and significant at the 0.01 level and the House committee leadership is still insignificant. The R^2 falls by only 0.005, and a formal F-test cannot begin to reject the null hypothesis that the presidential administrations can be replaced with a simple party dummy variable.

The ability to replace individual administration with a party variable supports earlier work of Hibbs (1977) and, as he stressed, converts the model from mere expost explanation to one with that can make ex-ante predictions. The success of Party here also supports the partisan models common in the Economics literature that use presidential party as the organizing political force.

Searching for predictive content in the Fed Chair dummies

In equation 3 we test the hypothesis that Fed chairs can be grouped by whether or not they had previous Fed experience. We replace the 4 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.

We also considered whether or not 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 potential hypothesis can be clearly seen by examining the individual coefficient 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 R² of the model to 0.43. This is a sufficiently large decline in fit so that 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.

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 Wood and Waterman (1994) point out, committee personnel change is often correlated with larger congressional change.⁸ Therefore, it 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.

In equation 1 of Table 2 we replace our committe 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. In equation 2, we consider the entire congress. Since average the 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 Democrat % in the Senate is negative and significant at the 0.01 level, while the 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 Democrat % in the Senate as an influence on the real rate. The committee leadership variable is negative and

⁸ Wood and Waterman 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 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.

significant at the 0.01 level, while the broader measure is completely insignificant. We realize that we have not exhausted the possibilities of measuring Congressional influence, but we have gone much further than previous work in showing that the Senate is the body that matters, and the banking committee leadership seems to be the decisive group.

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 we have a number of dummy variables that cannot be estimated (because they equal zero throughout) over many sub-samples. 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 our Senate Banking committee variable. If the significance of our committee variable is being driven by the changes in the party controlling the Senate in 1980, 1986 and 1994, then we might expect the interaction term to be negative and significant, and the original coefficient insignificant.

However, this is not the case. When we estimate 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.

Presidential elections and Fed Chair reappointments

In Table 3 we consider PMC effects on the real rate. We begin by adding electoral dummy variables to our political model. PBC4 equals 1.0 in the year of a presidential election and 0.0 otherwise, while PBC8 equals 1.0 in the second half of

a presidential election cycle and 0.0 otherwise. Equations 1 and 3 in Table 4 show no evidence that the real rate moves systematically around elections. Recall however, Alt's (1991) argument that any electoral cycle in monetary policy should consider also the Fed Chair's desire for re-appointment. In the nine presidential elections in our sample, there are four elections where the Fed Chair was up for and received reappointment, 1976, 1984, 1992 and 1996.⁹ We therefore create an additional dummy variable for these for elections where, in some sense both the president and the Fed chair are up for re-election. Equations 2 and 4 in Table 4 show that it is precisely these cases where there is some evidence of a Political Monetary Cycle. Both the specification where the effects are in the year of the election and the specification where the effect are in the entire second half of the administration show a negative and significant effect of presidential elections on the real rate, but only during election cycles when the Fed Chair is up for reappointment.

Specification Tests

In order to gauge the adequacy of our political model, we conduct some general specification tests on equation 2 of Table 1. The Ramsey reset test adds powers of the predicted values from the regression back into the regression. For example, if the model is $y = xB + \mu$ and y' is the vector of fitted values, the Ramsey test estimates the model $y = xB + \Sigma \gamma_i y'' + \mu$. If the γ_i s are jointly significant, we conclude there is a problem with the specification. We have conducted Ramsey tests with i equal to 2, 3, and 4. In each case we find no evidence against our specification. Another test uses the cumulative residuals or squared residuals to test specification adequacy. We have conducted these tests on equation 2 of Table 1 and again we find no evidence against our specification adequacy.

⁹ Arthur Burns was reappointed in 1974, Paul Volcker was reappointed in 1983, and Alan Greenspan was re-appointed in 1992 and again in 1996.

Macro Variables

We now proceed to consider macroeconomic indicators as additional regressors in our real rate model. Table 4 incorporates eight lags of inflation. These variables are significant at the 0.01 level, but more importantly 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 the Fed Chair dummies are still significant at the 0.01 level with the Burns and Miller coefficients significantly negative.

Next, we consider some other relevant macroeconomic factors affecting real interest rates. Economic theory suggests that the both the supply and demand of investment funds should influence 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. Appendixes 1A and 1B 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.¹⁰ 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 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

¹⁰ Our macro variables are largely based on the model found in Barro and Sala-i-Martin (1990). Like them, we use real stock returns rather than real GNP as the relevant variable affecting the demand for investment. Mishkin (1981) and Diba and Oh (1991) both find that GNP does not significantly affect the real interest rate.

real interest rate. A major controversy in macroeconomics is whether deficits do raise real interest rates and the empirical evidence is mixed.¹¹ 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 continously compounded growth rates and the spending variables as a percentage of GNP. To lessen any potential simulteneity problems, we lag each variable one quarter.

Table 5 adds the six macro variables discussed above, each lagged one quarter, to our basic political model. The six variables are jointly significant at the 0.01 level and raise the R2 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 1.10 level, while the other three variables have the expected signs but are not individually significant. The equation reported in Table 5 produces the same set of conclusions regarding our 4 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 sub-section above.

Discussion

We have argued that nominal interest rates are poor indicators of the stance of monetary policy over time because they do not take into account time varying inflation premia. Given this shortcoming, we concentrate on the real interest rate. As long as there are nominal rigidities in the economy, that is, as long as wages and prices are not perfectly flexible, then in the short run, movements in real and

¹¹ Barro (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. Bernheim (1987) presents a good survey of the empirical evidence on crowding out.

nominal rates will be very similar. The ability of the Fed to act more rapidly than individual price and wage setters in the economy make its short term nominal rate changes into short term real rate changes.

However, one viable alternative empirical strategy would be to estimate a regression equation for the nominal interest rate, including an inflation coefficient on the right hand side along with our political regressors. This allows for the inevitable effect of inflation on the real interest rate without pre-assigning inflation to have a unitary coefficient as our method does. Quinn and Shapiro (1991) use this strategy, but they estimate the equation with ordinary least squares. In Table 6 below, we report estimates of a nominal Fed Funds rate equation with the inflation rate 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 results are strongly supportive of our work in Tables 1 through 5. 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 impose such a value on the coefficient, it is important to show that the data do not reject it. One can thus consider our results either as showing the effect of political influence on the real rate of interest, or equivalently, the effect of political influence on the nominal interest rate holding constant the effects of inflation on the nominal rate.

Conclusion

Our empirical work above demonstrates that the Federal Reserve is not so different from the ITC or the FTC 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, and 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 the lack of overt mechanisms of control. Politics matters, and knowledge about political changes can help forecast monetary policy.

We find Presidential influence can be summarized with a Party variable, supporting the Partisan models of Hibbs, Chappell and Keech, and Alesina. We find Congressional influence comes through the leadership of the Senate Banking Committee supporting previous work by Grier and Havrilesky. We find that any evidence of a political monetary cycle occurs only in elections where the Fed Chair is also up for re-appointment. Finally, we find that holding constant political changes, changes in the identity of the Fed Chair changes monetary policy. However, while monetary policy under Fed Chair insiders is tighter than under outsiders, the data do not fully accept the restriction; individual Chairman dummies fit the data better. Finally, we show that our results are unaffect if we switch from regressions on the real interest rate to regressions on the nominal rate with inflation included as an endogenous regressor.

Our work illustrates that political economy models cannot be based on outward appearance or common knowledge or the internal propaganda of the organization under study. As Mark Twain once said, "Its not what you don't know that hurts you, its what you do know that ain't true". Our results here demonstrate that many of the things we "know" about the Fed and monetary policy are in fact not true.

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Variable Constant	Equation 1 6.59 (2.29)	Equation 2 3.95 (1.45)	Equation 3 1.54 (0.59)
Log(Senate Com. Leadership)	-1.19 (2.74)	-1.30 (4.60)	-1.58 (6.25)
Log(House Com. Leadership)	-0.17 (0.21)	0.57 (0.69)	1.06 (1.57)
Nixon-Ford Dummy	1.19		
Carter Dummy	0.31		
Reagan-Bush Dummy	2.47		
Clinton Dummy	0.07 (0.03)		
Republican Pres. Dummy		1.84	1.70
Burns Dummy	-2.07 (3.45)	-2.57 (4.90)	
Miller Dummy	-2.23 (1.98)	-2.16 (4.12)	
Volcker Dummy	0.48 (0.44)	0.75 (1.33)	
Greenspan Dummy	-0.43 (0.27)	-0.02 (0.07)	
Fed Insid er Dum my			1.41
R ²	.602	.597	.493

Table 1: Executive, Legislative and Bureaucratic Influences on the Real Fed Funds Rate: 1961-96

In each equation, 3 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.

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Variable	Equation 1	Equation 2	Equation 3
Constant	19.15	14.46	6.47
	(2.29)	(4.30)	(0.59)
Log(Senate Com.			-1.11
Leadership)			(2.69)
Log(House Com.			0.64
Leadership)			(0.62)
Log(Full Senate	-2.49		
Com. Average)	(1.22)		
Log(Full House	-1.99		
Com. Average)	(1.10)		
%Dem in Senate		-2.21	-0.61
		(2.62)	(0.66)
%Dem in House		0.22	0.08
		(0.40)	(0.14)
Republican Pres. 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	-0.69	0.10
·	(2.11)	(0.47)	(0.11)
Greenspan Dummy	-0.37	-2.25	-0.63
2	(0.68)	(2.24)	(0.67)
R ²	.536	.575	.599

Table 2 : Other Measures of Legislative Influence on the Real Fed Funds Rate: 1961-96

In each equation, 3 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.

Variable	Eq.1	Eq. 2	Eq. 3	Eq. 4
Constant	4.45	4.04	4.82	3.36
	(1,51)	(1.58)	(1.31)	(0.96)
Election Year	-0.24	0.33		
	(0.68)	(1.01)		
Election Year X		-1.23		
Fed Reappointment		(2.11)		
2nd half of term			-0.17	0.35
			(0.45)	(0.82)
2nd half of term X				-0.92
Fed Reappointment				(2.00)
Log(Senate Com.	-1.25	-1.43	-1.22	-1.54
Leadership)	(4.16)	(4.88)	(3.53)	(4.07)
Log(House Com.	0.42	0.65	0.30	0.81
Leadership)	(0.46)	(0.81)	(0.27)	(0.83)
Republican Pres. Dummy	1.83	1.92	1.84	1.93
•	(5.17)	(5.92)	(5.15)	(6.02)
Burns Dummy	-2.55	-2.46	-2.55	-2.40
-	(4.78)	(4.78)	(4,80)	(4.97)
Miller Dummy	-2.17	-2.05	-2.07	-2.19
	(4.15)	(4.01)	(3.62)	(3.80)
Volcker Dummy	0.87	0.69	0.93	0.54
_	(1.34)	(1.23)	(1.25)	(0.77)
Greenspan Dummy	0.01	0.18	0.01	0.30
2	(0.04)	(0.63)	(0.04)	(0.90)
R ²	.598	.608	.598	.606

Table 3 : Presidential Elections, Fed Chair Reappointments and the Real Fed Funds Rate: 1961-96

In each equation, 3 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. The 1976, 1984, 1988 and 1992 Presidential election cycles feature a Fed Chair reappointment.

Variable	Coefficient	T-Statistic
Constant Log(Senate Com. Leadership)	4.57 -1.35	1.58 4.15
Log(House Com. Leadership)	0.38	0.43
Republican Pres. Dummy	1.94	4.96
Burns Dummy	-3.15	4.58
Miller Dummy	-2.70	4.06
Volcker Dummy	0.14	0.18
Greenspan Dummy	-0.20	0.52
Inf(-1)	0.15	2,51
Inf(-2)	0.03	1.05
Inf(-3)	-0.05	1.37
Inf(-4)	-0.08	2.15
Inf(-5)	-0.08	2.38
Inf(-6)	-0.04	1.79
Inf(-7)	0.04	1.03
Inf(-8) R ²	0.16 .625	1.90

Table 4: Politics, Lagged Inflation and the Real Federal Funds Rate

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. Inflation coefficients were constrained to lie on a second degree polynomial and are jointly significant at the 0.01 level.

Table 5: Politics in a Reduced Form Macro Model of the Real Federal Funds Ra
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Variable	Coefficient	T-Statistic
Constant	-11.07	1.30
Log(Senate Com. Leadership)	-1.25	3.56
Log(House Com. Leadership)	1.04	1.13
Republican Pres. 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	-0.02	3.21
Monetary Base Growth t-1	-0.10	1.53
Real Stock Returns t-1	0.01	1.21
Govt Spending/GNP 1-1	0.37	1.23
Investment/GNP t-1	0.32	1.92
Deficit/GNP _{t-1} R ²	0.28 .651	2.10

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.

Variable	Coefficient	T-Statistic
Constant	3.94	1.43
Inflation Rate	1.01	10.23
Log(Senate Com. Leadership)	-1.31	4.07
Log(House Com. Leadership)	0.58	0.68
Republican Pres. Dummy	1.85	5.02
Burns Dummy	-2.60	4.63
Miller Dummy	-2.22	2.46
Volcker Dummy	0.71	0.84
Greenspan Dummy	-0.03	0.09
R ²	.722	

Table 6: A Political Model of the Nominal Fed Funds Rate with Inflation as an Endogenous Regressor

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. The equation is estimated via two stage least squares with inflation as an endogenous regressor. Five lags each of inflation and output growth are used to (over)identity the nominal Fed Funds equation.

Appendix 1A: Data Definitions and Sources of Variables

Real Rate	•The ex-post real Federal Funds rate. Data on the end of month funds rate was 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 non-seasonally adjusted consumer price index was 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 CPI (PZUNEW).
Money Base Growth	The annualized growth rate in the monetary base taken from citibase (FMBASE)
Investment Ratio	Gross investment as a percentage of GNP. The ratio of Citibase variables GPI to GNP 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 multiplied by 100.
Deficit	The ratio of the federal budget deficit to GNP. The ratio of the Citibasevariables Ratio GGFNET to GNP multiplied by 100.
Energy Variable	The annualized growth rate of the real price of crude petroleum. The relative price of petroleum was obtained by dividing the its PPI (PW57) by the overall PPI (PW).
Committee Leadership Variables	The average ADA scores for the Senate and House Chairs of the Banking Committee and two Subcommittees that oversee the FED over the full period that the elected officials held a leadership position.
Full Committee Variables	The year to year average ADA scores of the entire Senate and House Banking Committees.

Appendix 1B: Summary Statistics 1961.1-1996.4

Variable	Mean	Standard Deviation
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	0.16	0.02
Spending Ratio	0.21	0.01
Deficit Ratio	-0.02	0.02
Real Oil Price Growth	0.88	28.06
Senate Committee Leadership ADA	51.06	27.39
House Committee Leadership ADA	65.07	15.13
Senate Banking Committee Average ADA	50.12	5.35
House Banking Committee Average ADA	50.79	6.09
Percentage Democrats in the Senate	0.57	0.07
Percentage Democrats in the House	0.60	0.05

Appendix 2: Senate Banking Committee Leadership 1961-1996

Committee Chair: 1961-1966 Robertson (VA) 2.75 1967-1974 Sparkman (AL) 9.62 1975-1980 Proxmire (WS) 64.50 1981-1986 Garn (UT) 1.25 1987-1988 Proxmire (WS) 85 1989-1994 Riegle (MI) 87.17 1995-1996 D'Amato (NY) 25

Financial Institutions Subcommittee Chair:

1961-1962 No such subcommittee formed 1963-1966 Robertson (VA) 5.50 1967-1972 Proxmire (WS) 76.67 1973-1978 McIntyre (NJ) 61.50 1979-1980 Cranston (CA) 83.50 1981-1982 Tower (TX) 10.00 1983-1984 Armstrong (CO) 7.50 1985-1986 Gorton (WA) 30.00 1987-1988 Reigle (MI) 95.00 1989-1994 Dodd (CT) 71.83 1995-1996 Gramm (TX) 0.00

Production and Stabilization Subcommittee Chair:

1961-1966 Douglas (IL) 98.60 1967-1968 Long (MO) 56.00 1969-1970 Mondale (MN) 97.00 1971-1972 Cranston (CA) 89.50 1973-1974 Johnston (LA) 24.50 1975-1978 Cranston (CA) 89.50 1979-1980 Reigle (MI) 81.00 1981-1982 Armstrong (CO)** 7.50 1983-1984 Gorton (WA) 35.00 1985-1986 Mattingly (GA) 0.00 1987-1992 Sarbanes (MA) 93.00 1993-1994 Sasser (TN)** 75.00 1995-1996 Bond (MI) 7.50

* 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 3: House Banking Committee Leadership 1961-1996

Committee Chair:

1961-1962 Spence (KY) 73.17 1963-1974 Patman (TX) 40.67 1975-1980 Reuss (WI) 89.83 1981-1988 St. Germain (RI) 75.50 1989-1994 Gonzalez (TX) 81.66 1995-1996 Leech (IA) 35.00

Domestic Finance:

1961-1964 no such subcommittee formed 1965-1976 Patman (TX) 32.17 1977-1980 Mitchell (MD) 92.25 1981-1986 Fountroy (DC)^{*} 68.67 1987-1992 Neal (NC) 66.00 1993-1994 Kanjorski (PA)^{**} 62.50 1995-1996 Roukema (NJ)^{***} 42.50

Bank Supervision and Insurance:

1961-1964 no such subcommittee formed 1965-1966 Multer (NY) 89.00 1967-1968 Moorehead (PA) 92.50 1969-1988 St. Germain (RI) 77.75 1989-1992 Annuzio (IL) 67.75 1993-1994 Neal (NC) 66.00 1995-1996 Castle (DEL) 15.00

* 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."