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PRESIDENTIAL ELECTIONS AND REAL GDP GROWTH IN THE USA, 1961-1969

#### I. Introduction

**P**olitical influences on macroeconomic policies and outcomes are again widely studied phenomena. The two major theories of such influence are, (1) competing parties with differing policy preferences and (2) the political business cycle (PBC).<sup>1</sup> Most recent empirical work concludes that the PBC does not affect output or unemployment, though it may affect policy variables.<sup>2</sup> In this paper, I present significant evidence of a PBC in U.S. output growth. The estimated cycle is significant during both Democratic and Republican administrations and has stable coefficients across the 1961 - 1996 sample period. I also develop a new test to discriminate between first and second generation PBC theories, and find support for the new theory based on rational, forward looking voters. Finally, my results also confirm the importance of temporary, post-election rational partisan effects as developed by Chappell & Keech (1986), Alesina (1987) and Alesina & Sachs (1988).

Because of the wide-spread belief that the PBC does not systematically influence output, I begin the paper with my empirical evidence showing a significant PBC, then work backward to discussing theories of the PBC. Section II summarizes recent results and techniques used in testing the PBC hypothesis. Section III contains my initial tests and results. Section IV discusses the difficulty of obtaining precise empirical predictions from current game-theoretic PBC models, and presents a new test designed to help distinguish between traditional and new PBC theories. Section V contains a discussion of possible new directions to take in exploring the coexistence of rational voters and PBC's and Section VI provides a brief summary and conclusion.

<sup>1</sup>The party policy differences model is originally due to Hibbs (1977). He argued that differing party preferences can have permanent effects on output. Chappell and Keech (1986) and Alesina (1987) modify the theory using rational expectations and a macro model along the lines of Fischer (1977). Their work predicts that the real effects of party differences will be temporary and occur shortly after an uncertain election. The PBC model is originally due to Nordhaus (1975) and MacRae (1977). This too has been modified by a number of authors using rational expectations, a macro model along the lines of Lucas (1972) and a signalling game with imperfect or asymmetric information.

<sup>2</sup>There is more widely accepted evidence that elections effect policy variables, such as money growth, inflation, or public expenditures. See Grier (1987, 1989), Haynes & Stone (1989), Alesina, Cohen & Roubini (1993), and Gamber & Hakes (1997).

#### II. Recent Empirical Evidence on PBC's

There is a long list of papers that do not find a PBC in real macroeconomic outcomes. McCallum (1978), Paldam (1979), Golden & Porterba (1980), Beck (1982), Alt (1985), Hibbs (1987), Alesina (1989), Williams (1990), Alesina & Roubini (AR, 1992), Alesina, Cohen & Roubini (ACR, 1992) all find little or no support for a PBC in output or unemployment. Nordhaus (1989) and Haynes & Stone (1989,1990, 1994) on the other hand, do report evidence in favor of the PBC However, their results have been criticized by Alesina, Cohen & hypothesis. Roubini (ACR), who argue that what Haynes & Stone and Nordhaus call a PBC can be better explained with their party differences model. As ACR point out, elections where Republican administrations are re-elected will show rising GNP growth over the second half of the term and a post-election recession in their pure rational partisan model. Havnes and Stone and Nordhaus ignore temporary partisan effects in their models, so their conclusions may be driven by Republican domination of the White House in a Chappell-Keech/Alesina world rather than by an opportunistic electoral cycle. In fact, when Haynes and Stone (1990) do include temporary partisan dummies in their model, they only report evidence of PBC behavior under Republican administrations.<sup>3</sup>

There are two main types of PBC tests in the literature. The first type constructs a variable that has the "shape" the author thinks a PBC should have. Then the PBC variable is regressed on output growth or inflation and tested for significance. The papers by McCallum, Nordhaus and Williams all use this technique. The second type of test involves choosing a period where PBC activity is thought to be present, and then creating a dummy variable that equals 1.0 in the hypothesized period and 0.0 everywhere else. The PBC dummy is then regressed on output growth or inflation and tested for significance. Alesina & Roubini and Alesina, Cohen & Roubini use this technique. Obviously, either type of tests is a valid test of the existence of the PBC only if the chosen shape or timing is correct. That is, one cannot easily separate out whether the PBC is rejected because it does not exist or because the researcher has chosen the wrong form or timing of the cycle. In the next section, I present empirical tests of the PBC that are far less restrictive.<sup>4</sup> These tests control for oil shocks, interest rates, and temporary partisan effects and show significant PBC patterns in real output growth under both Democratic and Republican administrations. I begin the empirical work by showing that using my

<sup>&</sup>lt;sup>3</sup>Gamber & Hakes (1997) argue that monetary policy responds more strongly to pre-electoral shocks under Democratic administrations and Klein (1996) in his investigation of elections and the macroeconomy using duration analysis finds the probablity of a contraction ending before an election is significantly higher only under Democratic administrations.

<sup>&</sup>lt;sup>4</sup>Grier (1987, 1989) makes this point about testing for political cycles in money growth. Haynes & Stone (1989, 1990, 1994) make the same point.

sample and data, I can replicate the "no PBC" results obtained by AR and ACR using their dummy variables.

#### **III. Statistical Analysis**

The sample under consideration here consists of 144 quarterly observations from 1961.1 - 1996.4, spanning 9 presidential election cycles. The dependent variable is the change in the log of real GDP growth. The other exogenous economic variables are a four quarter moving average of the growth in real energy prices to account for oil shocks and the lagged Federal Funds interest rate. All the economic variables are constructed from the CITIBASE databank and are discussed further in the appendix.

#### A. Initial Models and Dummy Variables

Table 1 shows that using my sample and variables along with the AC and ACR PBC dummy variables, replicates their "no cycle" results. Equation 1 is a regression of real GNP growth on two temporary partisan dummies and real energy price growth. The first two years of Republican administrations have significantly lower than average growth and the first two years of Democratic administration have significantly higher growth, as predicted by the party differences model. Higher relative energy prices are negative and significant in the equation. Equations 2 and 3 add the dummy variables PBC4 and PBC6. PBC4 equals 1.0 in the election year and 0.00 elsewhere. PBC6 equals 1.0 in the 5 guarters before the election and the election quarter and 0.00 elsewhere. While each of the PBC dummies are positive, they are both insignificantly different from zero. These non-results correspond closely to those of AR and ACR. For example, ACR report a t-statistic of 1.22 for PBC6 in the U.S. using quarterly data from 1960.1 - 1987.4.<sup>5</sup> The analogous t-statistic in my equation 2 is 1.62. However, as noted above, any such test is actually a joint test of the existence of a PBC and the validity of the chosen structure. In what follows below, instead of manufacturing other types of election period intercept shift variables, I test for a 16 quarter electoral cycle in real GNP growth.

#### **B.** Testing for a 16 quarter PBC

Below I present 2 different types of statistical tests for a 16 quarter electoral cycle. One type uses 16 freely estimated electoral dummy variables. This method avoids pre-imposing any structure on the PBC at all. However, it requires dropping

<sup>&</sup>lt;sup>5</sup>Besides the difference in sample periods, ACR define output growth as  $log(x_t / x_{t-4})$ , while I follow the bulk of the empirical literature and use  $log(x_t / x_{t-1})$ .

one of the temporary partisan dummy variables.<sup>6</sup> The other test constrains the 16 electoral dummies to lie on a polynomial function. The Almon lag structure forces the coefficients on the electoral dummy variables to change smoothly (i.e. to lie on an nth degree polynomial and have at most n-1 turning points).<sup>7</sup>

In Table 2, I present results using a 4th order polynomial model of the PBC. I can easily test the no PBC hypothesis by comparing the fit of equation 1 in Table 1 to the model reported in Table 2. Equation 1 in Table 1 constrains the electoral dummy variables to be constant by only estimating a single intercept term. In Table 2 the fixed intercept is replaced by 16 electoral dummies constrained to lie on a 4th order polynomial. The null hypothesis of no PBC is simply the null hypothesis that the fixed intercept model fits the data no worse than the PDL-PBC model in Table 2. Panel A of Table 5 shows that this hypothesis is rejected at the 0.01 level. *Controlling for oil shocks, interest rates and temporary partisan effects, there is a statistically significant PBC in U.S. GNP growth from 1961 through 1996.* 

In Table 3, I put an additional piece of structure on the estimation by imposing endpoint constraints on the polynomial function.<sup>8</sup> As before, the hypothesis of no PBC is rejected at the 0.01 level and the null hypothesis that the endpoint constrained model in Table 3 fits the data as well as the unconstrained model in Table 2 cannot be rejected at any conventional significance level (see Panel B of Table 5). Figure 1 displays the PBCs estimated by the two PDL models. They are virtually identical with the following exceptions: The unconstrained model troughs and peaks one quarter later than the endpoint constrained model.<sup>9</sup> The correlation coefficient for the 2 series is 0.87.

Table 4 tests for a PBC by using 16 freely estimated electoral dummy variables. As noted above, this requires dropping one of the temporary partisan effects dummies. Since the Republican variable has a larger t-statistic in Table 3

<sup>7</sup>The investigator must choose the degree of the polynomial used in the equations. Here I have chosen a 4th order polynomial model. I examined 2nd through 6th order models and the 4th order model is both the best fitting and the only one to "pass" a Ramsey RESET test for mis-specification.

<sup>8</sup>A far endpoint constraint forces the coefficient polynomial to hit zero the period after the last lag. A near endpoint constraint force the coefficient polynomial to hit zero the period before the first lag. Since my 16 lags repeat over and over, the period after the last lag and the period before the first lag are actually the same time period. Thus imposing the two constraints forces the electoral PDL to not take a discrete jump from the election quarter to the quarter after the election. In a sense, it forces the beginning and end of the electoral cycle to "connect". I believe this is a sensible restriction, and the data do not reject it.

<sup>9</sup>In both of these PDL-PBC models, oil prices are negative and significant at the 0.01 level, and, even though some individual t-statistics are insignificant, the temporary partisan effects variables arc correctly signed and significant as a group at the 0.01 level.

<sup>&</sup>lt;sup>6</sup>The Alesina-type temporary partisan dummies equal 1.0 for the first half of the election cycle when added together, as do the first eight electoral dummy variables. To estimate the dummies freely, I must remove one of the temporary partisan dummies in order to avoid exact colinearity problems.

than the Democrat variable, I retain it.<sup>10</sup> The results of this exercise are reported in Table 4. The null hypothesis of no PBC can be rejected at the 0.05 level (see panel C of Table 5). The estimated PBC from the 16 dummies is displayed in Figure 2 along with the endpoint-constrained PDL PBC. While the freely estimated dummies move more abruptly, the two cycles are quite similar, with a linear correlation coefficient of 0.76. Formally, the null hypothesis that an otherwise equivalent endpoint constrained PDL model fits the data as well as the freely estimated dummy variable model cannot be rejected at any conventional significance level (see panel D of Table 5).

The regressions in Tables 1 though 4 and the hypothesis tests in Table 5 present a consistent and convincing story. While there are significant temporary partisan effects on real GNP growth, there is also a strong PBC effect in the data. A fourth order, endpoint constrained PDL is an acceptably parsimonious way to represent the cycle. In this representation, GNP growth falls for 5 quarters, beginning 3 quarters after the election and troughs at the time of the mid-term election. GNP growth then rises for 6 quarters and peaks 2 quarters before the election. The trough to peak

change in GNP growth is estimated to be 3.4 percentage points. The final hypothesis test in Table 5 (panel D) shows that the endpoint constrained PDL-PBC model in Table 3 passes a Chow test for coefficient stability when the sample is split at the midpoint.

#### C. Does the PBC vary between Republican and Democratic administrations?

Nordhaus (1989) and Haynes & Stone (1989, 1990, 1994) are the only papers in recent memory to present evidence of a PBC in postwar output growth or unemployment rates.<sup>11</sup> However, Alesina, Cohen & Roubini (ACR, 1992) have criticized these works for not properly modeling temporary partisan effects. Further, Haynes & Stone (1990, 1994) only find evidence of PBCs during Republican presidential administrations.

On the other hand, Jonsson (1997) studies a game-theoretic model with persistent unemployment where, if the government can influence its re-election probability, right wing governments contract the economy before the election and

<sup>11</sup>Davidson, Fratianni & VonHagen (1992) is an interesting examination of PBC behavior from the turn of the century. Also, though AC, ACR, and this paper examine output growth, most of Haynes & Stone's tests for the PBC are on the level of output.

<sup>&</sup>lt;sup>10</sup>However, the following result, that the 16 freely estimated electoral cycle dummies are significant at the 0.05 level, still obtains if the temporary republican partisan term is dropped and the temporary democratic partisan term retained. The electoral dummies are also significant at the 0.05 level if a permanent partisan term (as in Hibbs) is used instead of the temporary terms used in the rest of the paper.

left wing governments expand the economy.<sup>12</sup> Klein (1996) reports, using duration analysis, that the probability of a recession ending before an election is significantly higher only under Democratic administrations. I investigate this issue by estimating a separate PDL-PBC for incumbent Republicans and Democrats. These results are presented in Table 6.<sup>13</sup> The party-specific PBC's implied by the PDL coefficients in Table 6 are graphed in Figure 3.

Part 1 of Table 8 contains some relevant hypothesis tests about the partyspecific PBC model. First, both the Republican and Democratic party PBC's are individually statistically significant at the 0.05 level (see Panels 1A and 1B of Table 8). That is, there is a significant PBC under Democratic presidents, contrary to Haynes & Stone's finding of no Democratic party PBC and to ACR's argument that any detected PBC effect is probably an ill-modelled partisan effect. There is also a significant PBC under Republican Presidents, contrary to the arguments of Jonsson.

Second, though the shapes of the two parties's cycles are not exactly alike (correlation coefficient of 0.70), they are not statistically significantly different from each other. Panel 1C of Table 8 shows that the null hypothesis that the single cycle model of Table 3 fits the data as well as the party specific cycle model of Table 6 cannot be rejected at the .05 level.

My results about PBC's are not due to unmodelled temporary partisan effects, nor are they due to the strength of PBC behavior during the infamous 1972 Nixon reelection campaign. There is a significant cycle for Democratic administrations as well as Republicans.

## IV. Back to the Theory

The statistical analysis above shows that, while there are significant postelection temporary partisan effects on real GNP growth, there is also a highly significant 16 quarter PBC. However, there are 2 diametrically opposed PBC theories extant in the literature. In this section, I discuss the difficulty of uncovering empirically testable differences between the two theories and then develop one such test.

<sup>&</sup>lt;sup>12</sup>The reason for this result is that in Jonsson's model, high (low) unemployment increases (decreases) the temptation for surprise inflation making the right (left) wing government more valuable in the future. In his model, voters do not evaluate incumbents on past economic performance.

<sup>&</sup>lt;sup>13</sup>Again here, as throughout the regressions in this paper, the temporary partisan dummies are still correctly signed and significant as a group at the 0.01 level, and oil shocks are still negative and significant at the 0.01 level.

#### A. Are there sharply differing implications between old and new PBC theories?

As is now well known, traditional PBC theory (Nordhaus 1975, McRae 1977), is based on a systematically exploitable Phillips curve and myopic, backwardlooking voters. The theory implies a post-election policy tightening and fall in output growth to lower inflationary expectations, then a pre-election acceleration of output growth to convince voters (who only use data from right before the election) to re-elect the incumbent party. The PDL-PBC estimated above is broadly consistent with the traditional PBC story. The only exceptions are that the post-election decline does not happen until 3 quarters after the election, and the pre-election acceleration peaks 2 quarters before the election.

The new PBC theory, (Cuikerman & Meltzer (1986), Rogoff & Scibert (1988), Rogoff (1990), and Persson & Tabellini (1991) Seig (1997)) has at its core a signalling game between the incumbent politician and the voters.<sup>14</sup> In separating equilibria, politicians may strategically manipulate policy instruments or real outcomes to reveal valuable information about themselves to voters. Persson & Tabellini, for example, study politicians with differing levels of competence, defined as differing natural rates of output/employment. Competence is private information to the incumbent and evolves over time according to a stochastic MA1 process. Ceteris paribus, incompetent incumbents have incentives to create unexpected inflation to raise output up to the natural level of a competent incumbent. However, in the separating equilibrium, competent incumbents create some unexpected inflation and raise output/employment to a level that is too costly for an incompetent incumbent to achieve. In this case, high output perfectly signals high competence, so voters reelect politicians who produce a boom in order to enjoy the higher natural rate of employment flowing from having competent government in the post-election period.

It is extremely difficult to make real world empirical predictions based on this model. All of the action in the model happens in one period. The incumbent (who was not previously elected) finds out his competence, chooses what amount of unexpected inflation to create, output /employment is observed, votors make an inference about incumbent competence and then vote. These signalling models are silent about when a boom will occur and how long it will last in a 4 year election cycle. Alesina & Roubini and Alesina, Cohen & Roubini (AR & ACR) interpret the signalling game PBC model to imply that output would only jump immediately

<sup>&</sup>lt;sup>14</sup>There is one other line of rational PBC theory, the work of Boylan & McKelvey (1995). They use the neo-classical growth model to provide the structure of the economy and allow the incumbent government to credibly commit to multi-period investment plans. They show that a plan with a constant growth rate is decisively defeated by a coalition of patient and impatient voters who prefer an initial burst of consumption and then a large amount of investment, i.e. a political business cycle. Simulations of their model predict both a pre and post election boom, which is consistent with the shape of the PBC I find in the U.S. data.

before the election. However, there is nothing in existing models that requires such an effect, and more empirically explicit models await construction. I believe it is best to view the signalling game PBC models as specific examples of a general point: *PBC's are not inconsistent with rational behavior as long as pre-election incumbent performance provides new information on likely post election outcomes.* 

# B. Do winning and losing incumbent parties have different PBC's?

If a separating equilibrium occurs, the signalling game PBC model predicts a pre-election boom under competent administrations (which win reelection) and a pre-election recession under incompetent administrations (which lose the election). Presumably, traditional PBC theory implies that all administrations act the same in terms of creating a PBC. I investigate this hypothesis by estimating separate PBCs for the five elections where the incumbent party wins (1964, 1972, 1984, 1988, 1996) and those four where the incumbent party loses (1968, 1976, 1980, 1992). As with the party-specific PBC model estimated above, I test whether each group's PBC is statistically significant and then whether the two groups are significantly different from each other. Statistically indistinguishable cycles support the traditional PBC model where all presidents act alike. Significantly different cycles where winning party growth is superior to losers' support the signalling model PBC where (in a separating equilibrium) winners and losers send different signals through output. The regression is reported in Table 7, the specific estimated cycles are graphed in Figure 4, and the hypothesis test results are reported in part B of Table 8.

As reported in Table 8, Panel 2A and 2B, the winning party cycle is statistically significant at the 0.01 level while the losing party cycle is insignificant at the 0.05 level. Further, the null hypothesis that the two are statistically indistinguishable is rejected at the 0.05 level (see Panel 2C of Table 8). Figure 4 reveals that the winning party election cycle shows strongly increasing GDP growth from the midterm election until 2 quarters before the election, while the losing party cycle has much less amplitude. The linerar correlation between the 2 cycles is only 0.48.

The experiment generally supports the new signalling game PBC theories in that competent parties (i.e. winners) are sending systematically different signals via higher prc-election real GDP growth than incompetent parties (losers). While there is a significant 16 quarter cycle over the full sample that is invariant between Democrats and Republicans, the cycle does vary significantly between winners and losers in the way the new PBC theories predict.

## V. On Rationality, the PBC, and Welfare

Contrary to the arguements of Alcsina and Rubini, the finding of a 16 quarter cycle in real GDP is in no way inconsistent with rational behavior. As Arrow (1986) discusses, there are no aggregate testable implications arising from the assumption of individual rationality alone. Specific additional assumptions about (1) the specific social welfare function used by the incumbent, (2) the Lucas supply curve, and (3) the exact nature of the private information are also necessary to give any game theoretic PBC model empirical bite. Changing these assumptions can easily lead to different predictions about rational political behavior.

For example, consider the effect that using the Lucas supply curve has on PBC modelling. The Lucas supply curve restricts systematic policies to have no real effects. Thus, the only way a known event (i.e. the election) can produce output changes is if voters are surprised. The only way rational voters can be surprised is if there is some asymmetric information. But we know that predictable monetary policy does have real effects! The statistical work of Mishkin (1983), the historical study and statistical analyses of Romer & Romer (1989), the VAR evidence that the fed funds rate systematically has real effects (Friedman & Kuttner (1992), Bernanke & Blinder (1992)) all point to the inescapable conclusion that the Lucas supply curve embodies an inappropriate restriction on the effect of policy. Once anticipated policy is allowed to have real effects, the absolute necessity of asymmetric information to produce a PBC when voters are rational and forward looking is eliminated.

To see this point, consider the welfare economics of the best existing model of systematic monetary non-neutrality: the so called "New Keynesian" model.<sup>15</sup> In this class of models equilibrium output is too low due to pervasive imperfect competition. Monetary policy can only raise output temporarily, but that temporary rise in output is socially valued as it lessens the social welfare loss arising from ubiquitous market power. In the new Keynesian world, voters would indeed be happy with increased output, near the election or at any other time. However, increased output all the time is not an option. Output will only rise in the models for as long as firms do not adjust their prices. Further, the speed of price adjustment depends on the existing state of the economy and the size of the policy action. Nominal policy can have socially valuable real effects, but the optimal policy in any situation is subtle and depends on initial conditions.

Replacing the Lucas supply curve economy with a new Keynesian one may even change the welfare economics of the PBC. Let us define a politician's competence as the ability to design effective, output raising, policies. A pre-

<sup>&</sup>lt;sup>15</sup>There is not a single set of equations that comprise the new Keynesian paradigm, but Akerlof & Yellen (1985), Mankiw (1985), Blanchard & Kiyotaki (1987) Ball, Mankiw & Romer (1988), and Ball & Romer (1990) are among the major relevant papers.

electoral boom shows competence and the longer the boom lasts, the greater amount of competence is attributed to the incumbent.<sup>16</sup> Retrospective voting is rational because the size and strength of the pre-election boom allows voters to judge the incumbent's competence. Further, there is nothing an incompetent incumbent can do to emulate a competent one. Surprise inflation does not substitute for ability. There are no distorting signals to be sent and the pre-election boom sorts incumbents perfectly. The PBC could be good.

Another possible source for PBC behavior in a new Keynesian economy could come from the work of Barro (1973) and Ferejohn (1986) who study models where, once elected, incumbent politicians' incentives systematically differ from those of the electorate. Applied to the PBC, the idea is that, while the incumbent can raise output temporarily with a well-designed policy, he may have little incentive to do so. That is, voters may have little control over their agent once he is placed in office.

However, Barro and Ferejohn show that the possibility of reelection when voters are rationally retrospective can induce the incumbent to at least partly act in accordance with voter interests. In the PBC context, retrospective voting on the preelection economy provides an otherwise unwilling politician incentives to create and implement a socially desirable temporary output increase. Given the retrospective rule employed by the voters, the incumbent observes the state of nature and then compares his utility from pleasing the voters and getting re-elected with that of ignoring the voters and losing the election. In this world, retrospective voting is a rational method of controlling incumbent politicians's actions. Voters do not learn anything valuable about the incumbent from the pre-election boom. Instead voters desire increased output and will only re-elect the incumbent if he delivers. Without this ex-post settling up, the Barro-Ferejohn incumbent would not deliver.<sup>17</sup> Note that in this model as well, we should see significant differences in PBC's between winners and losers even if all incumbents have the same competence level due to the possibility of adverse states of nature.

The empirical PBC results presented in section II of this paper are, in my opinion, consistent with existing signalling-game PBC models. Alesina & Roubini and Alesina, Cohen & Roubini disagree. They claim that 4 year cycles in output are not consistent with the new PBC models. I have argued in this section that, the inconsistency, if it exists, is due to violations of other parts of the model than the rationality assumption. The assumptions that systematic monetary policy can temporarily effect output, even with rational economic agents, and that equilibrium

<sup>&</sup>lt;sup>16</sup>Recall from Table 7 and Figure 4 that the major differences in the PBC's of winners and losers are that the winners pre-election boom lasts longer and peaks at a higher point than the losers cycle does.

<sup>&</sup>lt;sup>17</sup>While any absolute statement about welfare requires a worked-out model, it may well be the case that PBC's are welfare *enhancing* in non-Lucas supply curve economies with rational voters.

output is inefficiently low due to pervasive market power provide potentially rich avenues to model PBC behavior along the lines sketched out above.

## VI. Conclusion

Research on the theory of the PBC is resurgent. However, many now take as given the proposition that real output does not systematically move with the election cycle. In this paper, I show that this "fact" is not true. There is a sizable, statistically significant PBC in U.S. real GNP growth that cannot be considered a misinterpreted rational partisan model effect. I find that both the rational partisan model and PBC theory are important predictive factors in real GNP fluctuations.

Further, my work provides support for the new theories of the PBC over the traditional models. While AR and ACR have tried to stress that the main difference between the two theories is the timing of the PBC effect, I argue that, since the new PBC models are actually 1 period models, they contain no predictions about the timing of PBC effects. Rather, the testable difference I stress is that, unlike the traditional PBC theory, only competent incumbents create a pre-election boom in a separating equilibrium.

Upon testing this implication, I find that the estimated PBC's for winning and losing incumbent parties are statistically distinct, with the winning party PBC much stronger and well-defined. I also argue that the path to progress in the study of the theory of the PBC involves discontinuing the use of the Lucas supply curve as the model of the economy. The market clearing rational expectations model with no propagation mechansism that predicts only current monetary surprises affect output has been rejected empirically for more than a decade. PBC theory is not well served by its continued use.<sup>18</sup>

<sup>&</sup>lt;sup>18</sup>Congressional policy preferences and mid-term elections are important factors that need to be accounted for in political models of macroeconomics. See Alesina and Rosenthal (1989) and Grier (1991, 1996)

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Replicating Alesina et. al.'s Evidence that Election Period Dummies are Insignificant in a Real GDP growth Regression 1961 - 1996

Variable	Equation 1	Equation 2	Equation 3
Constant	5.668	5.126	4.474
	(7.59)	(6.24)	(4.19)
1st Half of Term:	0.396	0.939	1.539
Democrats	(0.52)	(1.11)	(1.44)
1st Half of Term:	-1.456	-0.908	-0.380
Republicans	(1.82)	(1.01)	(0.37)
Lagged Federal	-0.322	-0.323	-0.311
Funds Rate	(2.82)	(2.84)	(2.74)
Relative Energy Price	-0.075	-0.078	-0.084
Growth	(1.48)	(1.52)	(1.65)
PBC4: clection year dummy		1.093 (1.51)	
PBC6: election year and a half dummy	-		1.494 (1.62)
R <sup>2</sup>	0.237	0.248	0.253
Adjusted R <sup>2</sup>	0.216	0.221	0.226

Numbers in parentheses are autocorrelation and heteroskedasticity consistent t-statistics. Dependent Variable is real GDP growth. Sample is quarterly from 1961.1 - 1996.4 GDP, the Federal Funds Rate and the Energy price variable all are from CITIBASE. See the data appendix for details.

Testing for a PBC using a 4th order PDL to Represent the Election Cycle

Variable	Coefficient	T-Statistic
1st Half of Term: Democrats	0.925	0.63
1st Half of Term: Republicans	-1.299	0.87
Lagged Federal Funds Rate	-0.258	2.28
Real Energy Price Growth	-0.017	2.17

Election Cycle Polynomial Distributed Lag:

PDL0	3.404	2.33
PDL1	-0.109	0.38
PDL2	0.178	3.38
PDL3	0.002	0.35
PDL4	-0.003	3.34
R <sup>2</sup>	0.319	
Adjusted R <sup>2</sup>	0.278	

Individual Election Cycle Dummies Derived from the 4th Order PDL above:

Lag	Coef.	T-stat	Lag	Coef.	T-stat
0	5.94	5.27	8	3.47	2.77
1	6.65	6.10	9	3.87	3.73
2	6.51	4.59	10	4.52	5.18
3	5.88	3.56	11	5.28	6.51
4	5.07	2.89	12	5.95	7.12
5	4.27	2.47	13	6.25	7.33
6	3.69	2.26	14	5,86	7.39
7	3.40	2.33	15	4.39	5,30

Numbers in parentheses are autocorrelation and heteroskedasticity consistent t-statistics. Dependent Variable is real GDP growth. Sample is quarterly from 1961.1 - 1996.4. PBC coefficients are constrained to lie on a 4th degree PDL with no endpoint restrictions.GDP, the Federal Funds Rate and the Energy price variable all are from CITIBASE. See the data appendix for details.

Testing for a PBC using a 4th order PDL with both Enpoints Constrained

Variable	Coefficient	T-Statistic
1st Half of Term: Democrats	0.260	0.21
1st Half of Term: Republicans	-2.284	1.77
Lagged Federal Funds Rate	-0.204	2.00
Real Energy Price Growth	-0.122	2.59

Election Cycle Polynomial Distributed Lag:

5.735	7.30
-1.462	8.27
0.130	8.14
0.303	
0.273	
	5.735 -1.462 0.130 0.303 0.273

Individual Election Cycle Dummies Derived from the 4th Order PDL above:

Coef.	T-stat	Lag	Coef.	T-stat
4.39	6.58	8	3.27	3.01
6.60	6.30	9	3.54	3.77
7.25	5.63	10	4.17	5.03
6.89	4.89	11	4.99	6.24
6.01	4,15	12	5.75	6.87
4.97	3.47	13	6.12	7.02
4.05	2.99	14	5.65	7.01
3.45	2.79	15	<b>3.8</b> 1	6.96
	Coef. 4.39 6.60 7.25 6.89 6.01 4.97 4.05 3.45	Coef. T-stat   4.39 6.58   6.60 6.30   7.25 5.63   6.89 4.89   6.01 4.15   4.97 3.47   4.05 2.99   3.45 2.79	Coef. T-stat Lag   4.39 6.58 8   6.60 6.30 9   7.25 5.63 10   6.89 4.89 11   6.01 4.15 12   4.97 3.47 13   4.05 2.99 14   3.45 2.79 15	Coef.T-statLagCoef.4.396.5883.276.606.3093.547.255.63104.176.894.89114.996.014.15125.754.973.47136.124.052.99145.653.452.79153.81

Numbers in parentheses are autocorrelation and heteroskedasticity consistent t-statistics. Dependent Variable is real GDP growth. Sample is quarterly from 1961.1 - 1996.4. PBC coefficients are constrained to lie on a 4th degree PDL with near and far endpoint restrictions. GDP, the Federal Funds Rate and the Energy price variable all are from CITIBASE. See the data appendix for details.

Testing for a PBC using 16 Unconstrained Dummy Variables

Variable	Coefficient	T-Statistic
1st Half of Term: Republicans	-2.232	2.14
Lagged Federal Funds Rate	-0.257	2.37
Real Energy Price Growth	-0.102	2.21
Elect	5.82	5.27
Elect(-1)	8.38	5.19
Elect(-2)	6.28	6.63
Elect(-3)	7.02	6.79
Elect(-4)	5.78	4.13
Elect(-5)	5.09	3.77
Elect(-6)	6.13	3.85
Elect(-7)	4.18	5.11
Elect(-8)	3.46	3.64
Elect(-9)	3.64	2.20
Elect(-10)	4.55	4.13
Elect(-11)	5.93	5.68
Elect(-12)	4.68	4.23
Elect(-13)	7.78	6.27
Elect(-14)	5.20	4.03
Elect(-15)	4.40	5.49
R <sup>2</sup>	0.365	
Adjusted R <sup>2</sup>	0.274	

Numbers in parentheses are autocorrelation and heteroskedasticity consistent t-statistics. Dependent Variable is real GDP growth. Sample is quarterly from 1961.1 - 1996.4. GDP, the Federal Funds Rate and the Energy price variable all are from CITIBASE. See the data appendix for details. As noted in the text, to avoid perfect collinearity, only 1 partisan dummy variable can be included. The results do not depend on which one is left out.

Some PBC Hypothesis Tests

A: The 4th order, unconstrained PDL-PBC model (Table 2) does not fit the data any better than a fixed intercept model (equation 1, Table 1).

F  $_{4.135}$  = 4.03; Reject the null hypothesis at the 0.01 level.

B: The unconstrained PDL-PBC model (Table 2) does not fit the data any better than the PDL-PBC model with both endpoints constrained (Table 3).

 $F_{2,135} = 1.57$ ; Do Not Reject the null hypothesis at any conventional level.

C: 16 freely estimated dummy variable PBC model (Table 4) does not fit the data any better than a fixed intercept model.

F  $_{15,125} = 1.73$ ; Reject the null hypothesis at the 0.05 level.

D: 16 freely estimated dummy variable PBC model (Table 4) does not fit the data any better than a PDL-PBC model with both endpoints constrained.

F  $_{12,125} = 0.946$ ; Do Not Reject the null hypothesis at any conventional level.

E. The Endpoint-Constrained PDL-PBC coefficients are stable over the sample (Chow test on the PDL coefficients only with sample split at the midpoint, 1978.4).

F  $_{3,135}$  = 1.469; Do Not Reject the null hypothesis at any conventional level.

Testing for a PBC by Incumbent Party: 1961 - 1996

Variable	Coefficient	T-Statistic
Constant	2.713	1.81
1st Half of Term: Democrats	0.311	0.25
1st Half of Term: Republicans	-1.834	1.44
Lagged Federal Funds Rate	-0.280	2.40
Real Energy Price Growth	-0.088	1.90

# Election Cycle Polynomial Distributed Lag's:

Republican Incur	nbents	
PDL0	3.479	2.73
PDL1	-0.900	2.94
PDL2	0.078	2.85
Democratic Incu	nbents	
PDL0	4.412	3.09
PDL1	-1.238	3.54
PDL2	0.116	3.75
$\mathbf{R}^2$	0.346	
Adjusted R <sup>2</sup>	0.297	

Numbers in parentheses are autocorrelation and heteroskedasticity consistent t-statistics. Dependent Variable is real GDP growth. Sample is quarterly from 1961.1 - 1996.4. PBC coefficients are constrained to lie on a 4th degree PDL with near and far endpoint restrictions. GDP, the Federal Funds Rate and the Energy price variable all are from CITIBASE. See the data appendix for details.

Testing for a PBC by Winning and Losing Incumbent Party: 1961 - 1996

Variable	Coefficient	T-Statistic
Constant	2.261	1.51
1st Half of Term: Democrats	0.636	0.52
1st Half of Term: Republicans	-2.031	1.59
Lagged Federal Funds Rate	-0.242	2.28
Real Energy Price Growth	-0.118	2.47

# Election Cycle Polynomial Distributed Lag's:

Elections where i	ncumbent party win:	5
PDL0	5,163	3.99
PDL1	-1.373	4.52
PDL2	0.120	4.44
Elections where i	ncumbent party lose	5
PDL0	2.949	2.23
PDL1	-0.797	2.41
PDL2	0.075	2.49
R <sup>2</sup>	0.353	
Adjusted R <sup>2</sup>	0.305	

Numbers in parentheses are autocorrelation and heteroskedasticity consistent t-statistics. Dependent Variable is real GDP growth. Sample is quarterly from 1961.1 - 1996.4. PBC coefficients are constrained to lie on a 4th degree PDL with near and far endpoint restrictions. GDP, the Federal Funds Rate and the Energy price variable all are from CITIBASE. See the data appendix for details.

Additional PBC Hypothesis Tests

1. Party-Specific Cycle model

A: The 4th endpoint constrained Democratic Party PDL-PBC model is not significant

F  $_{3,134} = 3.71$ ; Reject the null hypothesis at the 0.05 level.

B: The 4th endpoint constrained Republican Party PDL-PBC model is not significant

F  $_{3,134} = 2.95$ ; Reject the null hypothesis at the 0.05 level.

C. The Democratic and Republican PDL-PBC's are not significantly different.

F  $_{3,134} = 2.20$ ; do not reject the null hypothesis at the 0.05 level

2. Outcome-Specific Cycle model

A: The 4th endpoint constrained Winning Party PDL-PBC model is not significant

F  $_{3,134} = 6.38$ ; Reject the null hypothesis at the 0.01 level.

B: The 4th endpoint constrained Losing Party PDL-PBC model is not significant

F  $_{3,134}$  = 1.99; Do Not Reject the null hypothesis at the 0.05 level.

C. The Winning and Losing Party PDL-PBC's are not significantly different.

F  $_{3,134} = 2.74$ ; Reject the null hypothesis at the 0.05 level

## Data Appendix

Variable	Mean	Std. Deviation	Maximum	Minimum
Real GDP Growth	3.18%	3.70	14.52	-9.67
Fed Funds Rate	6.80	3.45	19.0 <b>8</b>	1.16
Relative Energy Price Growth	-0.23	6.15	22.51	-21.61

Real GDP growth = log(GDPQ/GDPQ(-1))\*400 (GDPQ is CITIBASE variable name)

Fed Funds Rate = FYFF (FYFF is CITIBASE variable name)

Rel. Energy Price Growth\* = Log((Pt

Growth\* = Log((PU803/PUNEW)/(PU803(-1)/PUNEW(-1)))\*400.

\*The regressions in the paper use a 4 quarter moving average of this variable (PU803, PUNEW are CITIBASE variable names)





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