American And British Political Business Cycles: A Time Series Approach

Dr. Ronald S. Koot, Business Administration, Pennsylvania State University - University Park

Dr. J. Keith Ord, Business Administration, Pennsylvania State University - University Park

Dr. Peg Young, Business Administration, George Mason University

Abstract

Intervention analysis was employed to determine the existence of political business cycles in the United States and the United Kingdom; the two economic variables tested were unemployment and disposable personal income. The political intervention variables were the party in power, the timing of the elections, the incumbent running for re-election, and the existence of a state of war. The technique proved successful at showing significant interventions.

Introduction

Recent research in the economics and political science literature suggests that, in democratic societies, there is the potential for politically motivated business cycles. While macroeconomic policies are designed to eliminate economic fluctuations, a number of hypotheses have been generated in the literature to suggest that politically motivated actions occurring during the electoral process actually result in economic policies which induce, rather than eliminate, fluctuations. Thus, it is speculated that the business cycle has largely become a "policy cycle" [MacRae (1977)].

Analyses of policy cycles focus on fluctuations in two economic variables — the rate of unemployment and real disposable personal income per capita. The rate of unemployment is used because it is a measure of economic welfare and might be managed in a way to sway outcomes of the electoral process. Also, the rate of unemployment is a key variable in analyzing short-run trade-offs between inflation and unemployment — the so called Phillips Curve relationship. It will be seen later that some hypotheses about political behavior are derived from the inverse inflation-unemployment relationship.

Real disposable personal income per capita is used because it measures bundles of goods and services and is thus a direct measure of economic welfare; more goods provide greater satisfaction and fewer goods provide less satisfaction. This real measure of welfare offers an alternative to the nominal variable approach to electoral cycles implied by the Phillips Curve relationship.

Several hypotheses are suggested in the literature for each of the economic variables. For the unemployment rate, one hypothesis is that the rate should fall prior to a presidential or a congressional election period and rise following an election [Nordhaus (1975), Tufte (1978)]. Related to this hypothesis is the belief that there is a difference in the level of economic activity in an election year when an incumbent is seeking re-election; a popular hypothesis is that the incumbent is in a position to better the economy to improve the chances for re-election [Kenski (1977), Monroe (1983), Tufte (1978)]. The party in power is also hypothesized to have an impact on the unemployment rate — Democratic regimes are believed to give a higher priority to reducing unemployment than Republican regimes [Hibbs (1977)]. Finally, it is suggested that the act of war may significantly reduce the rate of civilian unemployment [Hibbs (1977)].

For real disposable income per capita, hypotheses have been specified to reflect the impact on income and on acceleration of income of the timing of elections [Stigler (1973), Tufte (1978)], the occurrence of war [Hibbs (1977)], the power of the incumbent at re-election time [Kenski (1977), Monroe (1983), Tufte (1978)], and the differences due to the party in power [Monroe (1983), Silk (1984)].

Some countries that have been studied previously have been the United States, the United Kingdom, Sweden, Germany, and other O.E.C.D. countries [Hibbs (1977), Hibbs (1987)]. In this paper, two countries — the United States and the United Kingdom — have been selected for analysis since they offer both similarities and interesting contrasts to each other. Both the U.S. and the U.K. employ the democratic process to choose their leaders, but the timing of these elections are different. The timing of U.S. elections is fixed, whereas elections in the U.K. can be called within a five-year period at a time selected by the current Prime Minister. This difference in the election

process may result in a different impact of that process on the economy, or the impact of the economy on the election process.

The purpose of this paper is to subject hypotheses about the economic-political nexus in each country to rigorous statistical testing. The approach used here is to model the time path of each of the two economic variables for each country by an autoregressive-integrated-moving average (ARIMA) model [Beck (1982), Box and Tiao (1975), Vandaele (1983)]. If any hypothesized intervention as specified by the political acts is true, this represents an important omitted variable which is not likely to be captured by the ARIMA terms in the model. This omitted factor may be described by an intervention function; if the factor has a major impact, this would result in the additional terms being statistically significant.

ARIMA models will be developed for the two economic variables for each country, resulting in four base models. Once the base models are created, the political interventions will be specified and incorporated into the base models. If an intervention proves to have a significant coefficient, then the political act behind the intervention is said to have a significant relationship with that economic variable. The next section of this paper develops and tests models of the U.S. electoral cycle, and the third section does the same for the U.K. The final section of the paper contains a summary and conclusions.

The United States Political Cycle

In order to test for the existence of political business cycles in the U.S., quarterly seasonally unadjusted data were gathered for the rate of civilian unemployment and for real disposable personal income per capita. Unemployment rate data from the first quarter of 1949 to the fourth quarter of 1980 were drawn from *Business Statistics: Biennial Supplement of the Survey of Current Business*, published by the U.S. Department of Commerce. Real disposable personal income data, from the first quarter of 1958 to the fourth quarter of 1980, were calculated from data supplied in *Business Week's Measure of Personal Income*, available from Business Week magazine. Post-1980 data were not collected because of the structural change in economic policies and the upward trend in government deficits relative to Gross National Product during the Reagan Administration. Other variables used in the intervention models are described in Exhibit 1. It should be noted that most data published by the Federal Government are in seasonally adjusted form. However, such adjustments are likely to mask the intervention effects we are seeking so the unadjusted data are preferable. For the record, we did perform some analyses on the adjusted data; the results were largely compatible with those reported here although the impact of the interventions appeared weaker because of the adjustment effects.

| EXHIBIT 1 |
| Definition of Variables, U.S. Model |

VARIABLE	DEFINITION
U	Rate of Unemployment
Y	Real Disposable Income Per Capita
INCUMB	A Pulse Variable which indicates the quarter in which an incumbent president is running for re-election.
DEMREP	Designates the party in power (1 for Democratic, 0 for Republican).
PELE	Designates the quarter in which a presidential election occurs.
CELE	Designates the quarter in which a congressional election is held.
WAR	A war period is one; a non-war period is zero.
S	Seasonal Dummies

The Unemployment Rate Model

The hypotheses to be tested about political impacts on the unemployment rate are derived from the studies cited above and specified prior to any empirical testing; they are listed in Exhibit 2.

| EXHIBIT 2 |
| Hypotheses About U.S. Political Influences on Unemployment (U) |

H_1	WAR has a negative coefficient and leads U.
H_2	INCUMB has a negative coefficient and lags U.
H_3	INCUMB has a positive coefficient and leads U.
H_4	DEMREP has a negative coefficient and leads U.
H_5	PELE has a negative coefficient and lags U.
H_6	PELE has a positive coefficient and leads U.
H_7	CELE has a negative coefficient and lags U.
H_8	CELE has a positive coefficient and leads U.

The first stage of analysis is to find the best ARIMA model with no interventions and to use that initial result as a base model from which to analyze interventions for potentially significant relationships. The cross correlation functions (CCF) were used to identify the initial lead and lag structures for the intervention variables; the initial ARMA model and the lead-lag patterns are given in Exhibit 3.

EXHIBIT 3
Initial Model, U.S. Unemployment Rate (U)

VARIABLE	DIFFERENCING	INITIAL MODEL
U	∇	(3, I, 0) (1, 0, 0)
WAR	∇	Lags 0, 1, 2
INCUMB		Lags -3 through +3
DEMREP		Lags 0, 1, 2, 3, 4
PELE		Lags -3 through +3
CELE		Lags -2 through +1
SEASONAL		S_1, S_2, S_4

Using a step-down option provided by the AUTOBOX program [AUTOBOX Plus (1984)], the final form of the unemployment model is estimated as:

$$(1)\ \nabla U_t = 0.365\ \nabla U_{t-1} \quad - 0.272\nabla U_{t-3} \quad + 0.292\nabla U_{t-4}$$
$$\quad\quad\quad (3.93) \quad\quad\quad (-2.85) \quad\quad\quad (2.82)$$

$$- 0.571\nabla WAR_{t-1} - 0.596\ INCUMB_{t-1} + 0.622\ INCUMB_{t-2}$$
$$(-2.14) \quad\quad\quad (-2.16) \quad\quad\quad (2.45)$$

$$+ 0.434\ DEMREP_t - 0.727\ DEMREP_{t-1}$$
$$(1.77) \quad\quad\quad (-2.96)$$

$$- 0.581\ PELE_{t+3} \quad - \quad 0.510S_4 \quad + 1.473S_1 - 0.466S_2$$
$$(-2.99) \quad\quad\quad (-0.38) \quad (9.73) \quad (-3.37)$$

For equation (1), the R^2 is 0.888, and the mean square error is 0.264. It should also be noted in equation (1) that the ARIMA model does not adequately account for seasonal variation, and the three quarterly seasonal dummies, S_4, S_1, and S_2, must be employed. The t-ratios of the coefficients, provided in parentheses, indicate statistical significance for S_1 and S_2; but all three were retained as is customary in econometric studies.

Hypothesis H_1 is supported since the coefficient on WAR is negative and significant. Unemployment rates fall significantly within one quarter as the nation enters a period of war. This conclusion differs from that of Hibbs (1977) who finds a negative but insignificant coefficient on a war dummy variable. No support is found for H_2, but some mixed evidence is found for H_3. In the equation, the coefficients indicate that INCUMB does lead changes in unemployment. However, unemployment decelerates until one quarter after an incumbent is elected, and only after two quarters do unemployment rates accelerate and have a net effect of increasing unemployment. Thus, some support is found for H_3, but the expected effect of larger unemployment rates occurs only after two quarters.

Some evidence is also found to support H_4. While the DEMREP coefficient is significant and positive at the time a Democratic administration is elected, the coefficient turns negative one quarter after the election; recall that the new administration does not take office until the next quarter. Further analyses suggest that the initial increase may be explained by the impact of the Kennedy recession, so that the results do suggest that Democratic administrations are more aggressive in reducing unemployment than Republic administrations. These results are consistent with those found by Hibbs (1977).

Hypothesis H_5 is also supported; the sign of the coefficient of PELE is significant and negative. Unemployment rates decelerate up to three quarters prior to a presidential election. However, there is no evidence to support hypotheses H_6, H_7, or H_8. While descriptive studies have suggested that congressional elections have an impact on unemployment rates, the results from equation (1) suggest that H_7 and H_8 may not exercise independent effects that are separate from normal seasonal influences in the data. For example, the coefficient on S_1 is large and positive so that unemployment rates increase in the first quarter of every year and not just in the two year congressional electoral cycle.

The Real Income Model

As in the U.S. unemployment rate model, the hypotheses to be tested are derived from the existing literature and specified prior to any empirical tests. The hypotheses to be tested about real disposable personal income per capita are listed in Exhibit 4. For purposes of testing, the data series on real disposable personal income per capita (Y) was converted to logarithmic form. The initial ARIMA model and lag structures on the intervention variables are provided in Exhibit 5. Once again using the AUTOBOX step-down procedure the final form of the real income model. is estimated as:

$$(2)\ \nabla lnY_t = 0.027 \quad + \quad 0.364\ \nabla\ lnY_{t-4} - 0.020\ \nabla\ WAR_t$$
$$\quad\quad\quad\quad (3.37) \quad\quad\quad (-2.05)$$

$$-0.001S_4 \quad\quad 0.046S_1 \quad - \quad 0.541S_2.$$
$$(-0.12) \quad\quad (-6.35) \quad\quad (-7.62)$$

For equation (2), the R^2 is 0.999, and the mean square error is 0.215 x 10^{-3} for logarithms and 250.7 for the original data. Of all the hypotheses considered, only H_1 has any empirical support. It appears that at the onset of a period of war, there is a simultaneous decrease in real disposable income per capita and thus an immediate decline in the standard of living as goods and services are diverted from civilian use.

EXHIBIT 4
Hypotheses About U.S. Political Influences
on Real Disposable Personal Income Per Capita (Y)

H_1	WAR has a negative coefficient and leads Y.
H_2	INCUMB has a positive coefficient and lags Y.
H_3	INCUMB has a negative coefficient and leads Y.
H_4	PELE has a positive coefficient and lags Y.
H_5	PELE has a negative coefficient and leads Y.
H_6	CELE has a positive coefficient and lags Y.
H_7	CELE has a negative coefficient and leads Y.

EXHIBIT 5
Initial Model, U.S. Real Income (Y)

VARIABLE	DIFFERENCING	INITIAL MODEL
Y	∇	$(1, 1, 0) (1, 0, 0)_4$ + Constant
WAR	∇	Lags 0, I, 2
INCUMB		Lags -3 through +3
DEMREP		Lags -3 through +1
PELE		Lags -3 through -3
CELE		Lags -2 through +1
SEASONAL		S_1, S_2, S_4

Again, noting from S_1 and S_2 that real income tends to be higher in the third and fourth quarters of a year suggests that confusion between seasonal and real effects in the descriptive studies cited is the likely source of hypotheses H_2 - H_7 in Exhibit 4. It appears that politicians either do not focus on policies designed to affect real incomes or that those policies are ineffective.

The United Kingdom Political Cycle

In analyzing the effects of political action on both the rate of unemployment and real disposable personal income in the United Kingdom, the hypotheses set forth are different in several instances from the United States. The condition of the economy (as measured by both variables) is believed to be one of the factors driving the timing of the U.K. elections [Alt (1979), Hibbs (1977), Hibbs (1987)]. The Prime Minister is party leader and would be reappointed as Prime Minister if his or her party won a Parliamentary majority; therefore, the issue of incumben-

cy and the timing of elections are directly tied together. At present, Britain is considered primarily a two party system, as is the United States, but this has not always been the case. However, it is approximately true for the time period under study (1955-1986). During this period the U.K. was not involved in any long term wars, so that the effect of war on the economy could not be examined.

The two parties in the U.K., the Labour party and the Conservative party, are hypothesized to treat the economy differently, as in the U.S. [Alt (1979), Hibbs (1977), Hibbs (1987)]. The Labour party tends to favor lower unemployment whereas the Conservative party puts greater emphasis on economic growth. However, the Thatcher government seems to have different priorities than earlier Conservative regimes, so it is worth examining the party effect separately pre- and post-1979.

The procedure to test the U.K. models is comparable to that of the U.S. models. Quarterly seasonally unadjusted data for unemployment rates in the United Kingdom, from the first quarter of 1955 to the fourth quarter of 1986, were down from the *Monthly Bulletin of Statistics* published by the United Nations. Quarterly seasonally unadjusted data for personal disposable income, also from the first quarter of 1955 to the fourth quarter of 1986, were taken from the *Monthly Digest of Statistics,* published in the United Kingdom. The data were divided by quarterly population estimates derived from data also obtained from the *Monthly Digest of Statistics,* which provides a measure of personal disposable income per capita. All U.K. variables, includ-

EXHIBIT 6
Definition of Variables, U.K. Model

VARIABLE	DEFINITION
U	Rate of Unemployment
Y	Real Disposable Income Per Capita
THATCH	Designates quarters in which the Thatcher government is in power.
PARTY	Designates the party in power (1 for Conservative, 0 for Labour).
ELECT	A Pulse Variable which indicates the occurrence of an election.
W	A Dummy Variable for the Winter of 1963 (1 for

ing intervention variables, are defined in Exhibit 6.

The Unemployment Rate Model

The hypotheses to be tested about political impacts on the rate of unemployment in the U.K. are provided in Exhibit 7. The ARIMA base model and the initial lead

and lag structures of the intervention variables are provided in Exhibit 8. The final form of the estimated model using the step-down procedure is,

$$(3)\ (1\text{-}0.3968)\nabla\nabla_4 U_t = (1\text{-}0.523B^4)\Sigma_t + \underline{0.0645\nabla\nabla_4}\ THATCH_{t\text{-}4}$$
$$(6.42)\qquad\qquad (1\text{-}0.872B)$$
$$(2.14)\ /\ (5.70)$$

$$-\ 0.0227\nabla_4\ ELECT_{t+2} + 0.0389\nabla_4\ ELECT_{t\text{-}3}$$
$$(-2.06)\qquad\qquad\qquad (3.52)$$

$$+\ 0.111\nabla\nabla_4 W_t\ .$$

For equation (3), the R^2 is 0.987, and the mean square error is 0.00144. The dummy variable W_t is included in the model and is statistically significant. W_t is included to account for the effects on unemployment of the infamously cold winter of 1963 when unemployment rose sharply because of the weather. Other seasonal dummies were investigated as well, but, unlike the U.S. models, were

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EXHIBIT 7
Hypotheses About U.K. Political Influences
on Unempolyment (U)

H_1	THATCH has a positive coefficient and leads U.
H_2	PARTY has a positive coefficient and leads U.
H_3	ELECT has a negative coefficient and lags U.
H_4	ELECT has a positive coefficient and leads U.

EXHIBIT 8
Initial Model, U.K. UnemploymentRate(U)

VARIABLE	DIFFERENCING	INITIAL MODEL
U	$\nabla_1\,\nabla_4$	$(0, 1, 1)\,(0, 1, 1)_4$
THATCH	$\nabla_1\,\nabla_4$	$\dfrac{\omega B^4}{1\text{-}\delta B}$
PARTY	∇_4	Lags 0 through +4
ELECT	∇_4	Lags -2 through +4

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found to be insignificant.

The results from equation (3) provide support for hypothesis H_1; the period of office of the Thatcher government is associated with significant increases in unemployment rates. However, no support is provided for H_2. It appears that an election of a non-Thatcher Conservative government had no impact on unemployment rates. This conclusion appears to be at odds with that of Hibbs

(1977), who did find a significant Conservative versus Labour effect. Restricting our series to 1955-78 and omitting the THATCH intervention produced the same lag structure and very similar coefficients so we are unable to resolve this difference.

The most interesting conclusion from equation (3) is that, in the U.K., elections do seemed timed to reflect the state of the labor market. The negative coefficient on ELECT suggests that significant changes in unemployment occur two quarters prior to an election being called, and the positive coefficient on ELECT indicates that unemployment rates accelerate three quarters after the election. The stronger support of H3 and H4 for the U.K. compared to hypotheses about PELE for the U.S. models probably reflect the stronger role of the executive versus legislative branches of government in the U.K., and the ability of the executive to choose the timing of the election.

The Real Income Model

The hypotheses that were specified about real disposable income per capita prior to testing are listed in Exhibit 9. As in the U.S. real income model, the data series on real income (Y) was converted to logarithms for testing the model. The initial ARIMA model and lag structures on the intervention variables are provided in Exhibit 10. Quarterly seasonal dummies were also investigated, but they were unable to contribute anything to the model. The final form of the estimated equation given by the step-down procedure is:

$$(4)\ \nabla\nabla_4\ln Y_t = (1\text{-}0.323B)\,(1\text{-}0.216B^4)\varepsilon_t$$
$$(3.51)\qquad (2.22)$$

$$+\ (0.0279B\ -\ 0.0351B^3\ -\ 0.0199B^6)THATCH_t$$
$$(2.83)\qquad (-3.21)\qquad (-2.43)$$

$$+\ (-0.0107B^2 + 0.0200B^5)PARTY_t$$
$$(-2.55)\qquad (+4.82)$$

$$+\ (0.014B^2\ +\ 0.0182B^5\ -\ 0.0135B^6)ELECT_t\ .$$
$$(2.56)\qquad (3.65)\qquad (2.60)$$

For equation (4), the R^2 is 0.9997, and the mean square

EXHIBIT 9
Hypotheses About U.K. Political Influences on
Real Disposable Personal Income Per Capita (Y)

H_1	THATCH has a negative coefficient and leads Y.
H_2	PARTY has an effect on Y.
H_3	ELECT has a positive coefficient and lags Y.
H_4	ELECT has a negative coefficent and leads Y.

EXHIBIT 10		
Initial Model, U.K. Real Income (Y)		
VARIABLE	DIFFERENCING	INITIAL MODEL
Y	$\nabla 1 \nabla 4$	(0, 1, 2) (0, 1, 1,)4
THATCH	$\nabla 4$	Lags 1 through +7
PARTY	$\nabla 4$	Lags 0 through +5
ELECT	$\nabla 4$	Lags -2 through +5

error is 0.320×10^{-3} in logarithms and 700 in original units.

Equation (4) provides some support for hypotheses H_1. The coefficient on THATCH at lag one is positive and indicates that income accelerates one quarter after the Thatcher government was first elected, but income then decelerates three and six quarters after the election. This deceleration occurs at about the same time that unemployment rates were found to increase significantly in the U.K. unemployment model and reflects the changes in economic polity at that time. H_3 also has support from the model, and equation (4) shows that, while real income decelerates two quarters after a Conservative government is elected, there is more than a compensating increase five quarters after the election.

There is no empirical support for H_3, and it is unclear how the empirical results relate to H_4. Instead of having a negative coefficient, real income accelerates up to five quarters after an election, and declines do not occur until the sixth quarter. It appears that, as in the case of the U.S., politicians either do not focus strongly on policies designed to affect real income or that those policies are ineffective.

Summary and Conclusions

In this paper, the Box-Tiao technique of intervention analysis was employed to determine the existence of political business cycles in the United States and the United Kingdom. The two economic variables analyzed were the unemployment rate and real personal disposable income per capita, and hypotheses were formulated and tested about political interventions such as party in power, timing of elections, the incumbent running for re-election, and the existence of a state of war. Most of the hypotheses had been specified in previous studies of a descriptive nature, and this paper offers the opportunity to draw statistical conclusions about those hypotheses in relation to both the timing and the magnitude of the effects.

The models analyzed in this paper provide strong support for the existence of a political or policy cycle in the rate of unemployment for both the U.S. and the U.K. In the U.S., changes in unemployment are related to a state of war, an incumbent running for re-election, the party in

power, and the occurrence of a presidential election. In the U.K., the unemployment rate was affected by the election of the Thatcher government, and elections appear to be timed according to the state of the economy as measured by the severity of unemployment.

The models presented in this paper indicate little support for a policy cycle in real income. In the U.S. model, only a state of war had a significant impact on real income. In the U.K., the Thatcher government had a strong post election effect.

Although the party in power and the timing of elections were related to changes in real income, the results could not be interpreted without some ambiguities. The general conclusion about real income cycles is that either politicians do not implement policies to manipulate that variable or, if they do, such policies are not totally effective.⁑

⁂ References ⁂

1. Alt, J.E., *The politics of economic decline: economic management and political behavior in Britain since 1964.* Cambridge University Press, New York, 1979.

2. *AutoBox Plus, User's Guide Version 2.0,* Automatic Forecasting Systems, Inc., Hatboro, PA, 1984.

3. Beck, N., "Does there exist a political business cycle: a Box-Tiao analysis," *Public Choice,* Vol. 38, pp. 205-209, 1982.

4. Box, G.E.P. and Tiao, G.C., "Intervention analysis with applications to economic and environmental problems," *Journal of the American Statistical Association,* Vol. 70, pp. 70-79, 1975.

5. Hibbs, D.A., Jr., "Political parties and macroeconomic policy," *The American Political Science Review,* Vol. 71, pp.1467-1487, 1977.

6. Hibbs, D.A., Jr., *The political economy of industrial democracies.* Harvard University Press, Cambridge, MA, 1987.

7. Kenski, H.C., "The impact of economic conditions on presidential popularity," *Journal of Politics,* Vol. 39, pp.764-773, 1977.

8. MacRae, C.D.,"A political model of the business cycle,"*Journal of Political Economy,* Vol. 85, pp. 239-263, 1977.

9. Monroe, K.R., "Political manipulation of the economy: a closer look at the political business cycle," *Presidential Studies Quarterly,* Vol. 13, pp. 37-49, 1983.

10. Nelson, C.R., *Applied time series analysis for managerial forecasting.* Holden-Day Book Co., San Francisco, 1973.

11. Nordhaus, W.D., "The political business cycle," *Review of Economic Studies,* Vol. 42, pp. 169-190, 1975.

12. Silk, L., *Economics and the real world.* Simon and Shuster, New York, 1984.

13. Stigler, G.J., "General economic conditions and national elections," *The American Economic Review,* Vol. 63, pp. 160-171, 1973.

14. Tufte, E.R., *Political control of the economy.* Princeton University Press, Princeton, NJ, 1978.

15. Vandaele, W., *Applied time series and Box-Jenkins models.* Academic Press, Inc., New York, 1983.

16. Young, P., Marcus, A.A., Koot, R.S., & Mevorach, B., "Improved business planning through an awareness of political cycles, practitioners' and researchers' perspectives." *Journal of Forecasting,* Vol. 9, pp. 37-52,1990.