THE NEW POLITICAL MACROECONOMICS

Alial-Nowaihi and Dean Garratt
Department of Economics, University of Leicester

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Abstract

The paper surveys the 'old' and 'new' political macroeconomics. In the former we consider how governments can be seen to manipulate the economy as to satisfy opportunistic or ideological motives, thereby creating opportunistic or partisan political business cycles. We examine how the macroeconomic revolution of the 1970s cast doubts on the ability of governments to freely and repeatedly create such cycles. Consequently, the new political macroeconomics have focused more on the effect of politically induced incentives on the inherent amount of inflation in the economic system. In exploring the concept of inflation bias we attempt to use ideas from the old political macroeconomics to show how the two strands of literature may complement one another. The paper finishes by focusing on the debate within the new political macroeconomics about the possible trade-off between reduced inflation bias and extra output volatility following the establishment of an independent central bank.

Keywords: Political business cycles; time inconsistency; inflation bias; central bankers

JEL Classifications: C22, E61, E62, H10

1. Introduction

This paper reviews elements of the 'old' and 'new' political macroeconomics. At the core of the 'old' political macroeconomics is idea that governments can shape the economy to satisfy their own wants. Governments are self-seeking institutions, like any other. The nature of such economic expediency is dependent upon the modelling of government's objective function. In the William Nordhaus (1975) model a vote-maximising government creates a boom-bust cycle coinciding with the electoral cycle. In the partisan model of Douglas Hibbs (1977) the ideological persuasion of the government is all important. Governments are characterised as placing different relative weights on inflation and unemployment which accordingly affect actual rates of unemployment and inflation. Finally, Bruno Frey and Friedrich Schneider (1978) incorporate both these opportunistic and ideological elements, allowing their to be behavioural switches in policy.

In contrast, the new political macroeconomics, which grew out of the new classical macroeconomic revolution of the 1970s, rejects the notion that government can freely manipulate the economy. By applying political incentives to a new classical macroeconomic model, the new political macroeconomics has focused primarily on inflation. In particular, arguments in favour of rules-based policies and the depoliticising of economic policy have been advocated so as to reduce the inherent amount of inflation in the economic system. Finn Kydland and Edward Prescott (1977) describe how discretion in

economic policy-making leads to an unnecessary amount of inflation without any gains from lower unemployment or higher output. Robert Barro and David Gordon (1983) consider how government's concern over the loss in credibility following economic manipulations could reduce inflation bias. We will analyse how elements of the objective functions from the 'old' political macroeconomics could also be shown to affect inflation bias. This is true of the Alberto Alesina (1987) model which shows that Hibbsian type policy-makers affect the degree of inflation bias. Alesina's influential model also bridges the gap between the 'old' and the 'new' by analysing how a political business cycle can merge from a new classical macroeconomic model.

The debate about the relative merits of an independent central bank has been a major issue for new political macroeconomists. While the Kydland and Prescott (1977) framework suggests that an independent central bank reduces or eliminates inflation bias, Kenneth Rogoff (1985) argues that this may come at the price of greater output variability. We contrast Rogoff's model with its adaptation by Alberto Alesina and Roberta Gatti who again incorporate Hibbsian type policy-makers. They argue that there is no clear association between an independent central bank and greater output variability, offering the possibility that the establishment of an independent central bank leads to 'gain without pain'.

In section 2 we present an overview of the old political macroeconomics, before in section 3 outlining the three fundamentals of new classical

macroeconomics. Section 4 analyses the new political macroeconomics, while section 5 concludes.

2. The Old Political Macroeconomics

At the core of what we will refer to as the 'old political macroeconomics' is the possibility that governments may deliberately shape the economy for their own political ends. The resurgence in interest emanated from an article by William Nordhaus (1975) who, as we shall see, described how a vote-maximising government would attempt to court popularity by presiding over an expanding economy prior to the election. What makes this an 'old' as opposed to a 'new' political macroeconomic model is the assumption that governments can repeatedly manipulate the economy. In the Nordhaus model it is assumed both that quantities move more quickly than prices and that voters ignore or discount higher future inflation. This is in contrast with the assumptions of market clearing, rational expectations and a natural rate aggregate supply function which are central to the new classical macroeconomic revolution of the 1970s.

The Nordhaus model is an opportunistic, vote-maximising model. However, the old political macroeconomics also encompasses partisan theory. Hibbs (1977) argues that political parties aim to satisfy not a median voter but their own core constituent or representative voter. We shall discuss how this relates to different weights being placed on the relative economic importance of

inflation and unemployment. Finally, in this section we consider the Frey-Schneider model (1977) which incorporates elements of both the Nordhaus and Hibbs approaches. Economic policy can be described as opportunistic or ideological depending on the government's perceived electoral security.

2.1 The Nordhaus Model

The 'pure' political business cycle model is associated with the work of Nordhaus (1975). The term 'pure' is a consequence of Nordhaus's assumption that political parties are interested not in satisfying ideological goals but in maximising votes at an election. The election period is taken to be of fixed length so that there are periodic elections. The economy is described by the Phillips curve relationship between inflation and unemployment, such that there exists a greater trade-off in the long-run than in the short-run.

Voters are assumed to have a poor understanding of the economic system and use rates of inflation and unemployment to judge the government's performance. Voters' memories extend only over the course of the current election period and furthermore they place increasingly less weight on past events. The aggregate vote function is the summation of individual voting functions. The final assumption of the Nordhaus model is that the score hypothesis holds so that popularity is directly related to economic outcomes. Specifically, this model associates rising unemployment and inflation with falling popularity.

Given these assumptions government is able to exploit the short-run Phillips curve in order to maximise votes at election time. If there was no short-run trade-off the government would pursue the socially optimal inflation rate consistent with the tangency between the long-run Phillips curve and the aggregate voting function. With the short-run Phillips curve government vote-maximising behaviour implies a political business cycle. Prior to an election government attempts to increase aggregate votes by moving along one particular short-run Phillips curve, trading-off inflation for lower unemployment. Provided inflation is not too high governments can attain higher levels of popularity and so improve their chances of being re-elected.

The politically expedient policy outcomes cannot be sustained since they do not lie along the long-run Phillips curve or inflation-unemployment trade-off. Therefore, after an election the government has an incentive to contract the economy in order to reduce inflation. The lower inflation when government initiates a pre-election expansion, the higher the attainable level of popularity and the greater the chance of election success. If inflation is high enough when the pre-election expansion is initiated, government can actually reduce individuals' welfare and its own popularity. In short, the government will induce falling unemployment and rising output growth prior to the election and rising unemployment and falling output growth after the election.

2.2 Partisan theory

The pure political business cycle approach omitted an ideological dimension from the utility function of politicians. Political parties are a coalition of interests. Assuming that the only motivation is to retain power ignores issues relating to the pursuance of partisan interests. Partisan theory categorises political parties as being of the Left or Right. It portrays the party of the Left as being concerned with the interests of the worker and the party of the Right as defending the interests of the entrepreneur. In order to defend these interests partisan theory assumes that a party of the Left will prioritise unemployment over inflation and undertake monetary and fiscal policies to promote growth and welfare. The party of the Right will prioritise inflation over unemployment. Monetary and fiscal policy will be tighter than under a party of the Left.

The definition of partisan theory stresses that political parties will have different economic priorities. An economic validation of the concept of partisanship considers how individuals are affected differently over the course of the business cycle. If it is possible to identify groups such that they are affected differently over the course of the business cycle, then it would appear valid to have political parties that offered different economic priorities. The political parties would then be able to use policy in order to serve the economic interests of their core constituents.

Partisan theory can be categorised according to whether or not governments persistently pursues partisan policies. Strong partisan theory takes the pursuit of partisan economic policies as the sole objective of political

behaviour with these policies having persistent effects on the economy. The ability to manipulate the economy for partisan objectives results in strong partisan theory also being referred to as the party control hypothesis.

Strong partisan theory is closely associated with Douglas Hibbs (1977). Tests for the effect of strong partisan theory thus involve analysing whether the Left versus Right dimension has led to discernible partisan effects on economic instruments and outcomes, net of trends, cycles and random fluctuations.

2.3 The Frey and Schneider model

The Frey and Schneider (1978) approach is the classic exposition of weak partisan theory since partisan economic policies are not always pursued. It highlights a trade-off between opportunism and ideology and, therefore, contrasts with the polarised perspectives of the pure political business cycle and strong partisan models. The mechanism that underpins the model is government's popularity lead over the main opposition party. This allows policy behaviour to switch from being opportunistically motivated to ideologically motivated. Government is assumed to feel electorally safe when its actual popularity lead is in excess of what is perceived to be necessary to be re-elected. This is referred to as the critical popularity lead and is dependent on the time to the next election. The nearer the forthcoming election, the higher the desired critical popularity lead.

If government's actual popularity lead is in excess of the critical popularity lead then government holds a popularity surplus. If government's popularity lead falls short of the critical lead then government holds a popularity deficit. A popularity surplus motivates government to act ideologically while a popularity deficit motivates them to act opportunistically.

Opportunistic behaviour during a popularity deficit conforms to the pre-election behaviour described by Nordhaus. The score hypothesis is again assumed so that to increase popularity government manipulates the levers of government policy to affect economic variables, such as unemployment and inflation. Ideological behaviour is defined by the desired proportion of government expenditures in GDP. A left-wing government will aim for a higher relative size of government expenditure than a right-wing government. This satisfies the partisan characteristics of a left-wing party in promoting welfare and economic growth.

3. New Classical Macroeconomics

The new classical revolution of the 1970s was based on three fundamentals. The first was that of continuous market clearing. This infers that the economy is in a continuous state of equilibrium. This is in contrast to Keynesian models which allow for the failure of markets to clear. Indeed, a central task for New Keynesians has been to explain why it is rational for possible gains from trade not exploited to exist for any period of time.

The second fundamental was the rational expectations hypothesis, whereby economic agents take into account what they believe to be the correct economic model and make use of all available information. Agents can make errors in their forecasts since available information may be incomplete. However, these errors are not related to the information set the individual had at the time of the expectation. If individuals made systematic errors they could learn from their mistakes and change the way expectations are formed.

The third fundamental was the aggregate supply hypothesis, perhaps better known as the Lucas surprise supply function. Lucas (1973) argues that individual suppliers of goods and services, including labour, will alter their supply decision only if they believe that the real price of their product has changed. Their problem is then attempting to discern, given their information set, whether or not their real product price has changed. This is known as a signal extraction problem. While they know their product price they must make expectations about the overall price level of the economy.

The three fundamentals of new classical economics led to the policy invariance result (see Sargent and Wallace, 1975) in which anticipated demand management policies have no affect on output or unemployment levels. Rational agents would take government policies into account thereby fully anticipating the effects on the general price level and leaving output and unemployment unchanged at their natural levels. Only unanticipated policy will influence employment and output levels.

On the basis of the policy invariance result new classical economists began to develop models that showed clear drawbacks from governments attempting to reduce unemployment (increase output) below (above) its natural level. An important starting point in this development and of the new political macroeconomics was the work of Kydland and Prescott (1977) who showed how a government, while disliking inflation, would be tempted to generate unexpected or surprise inflation in order to reduce unemployment below its natural level. However, the publics' recognition of this incentive leads them to revise their inflationary expectations upwards to a point where the government would no longer be willing to generate surprise inflation. The result is excessive inflation.

4. The New Political Macroeconomics

4.1 Time inconsistency

Kydland and Prescott (1977) were the forerunners of an economic analysis which has brought together elements of the political business cycle literature with more mainstream macroeconomics.

Kydland and Prescott's paper provides a strong argument against discretionary economic policies. Their argument is formulated using a New Classical model where the policy-maker is engaged in a strategic game with sophisticated forward-looking private sector agents. This was one attack on the

theory of economic policy of Tinbergen (1952). Tinbergen argued that the policy-maker could specify the targets or goals of economic policy, such as low inflation and unemployment, and given this social welfare function, a set of instruments would be chosen to achieve these targets. These instruments would be set at values determined by some model of the economy. Essentially, this approach is an exercise in optimal control theory.

Kydland and Prescott argue that optimal control theory is inappropriate in social systems where intelligent agents will attempt to anticipate policy actions. Consequently, the discretionary policy which is best, given the current situation, does not result in the social objective function being maximised.

Mankiw (1990) gives an excellent non-economic example of the importance of expectations in determining the optimality of a policy. He considers the question of negotiating with terrorists over the release of hostages. The announced policy of most governments is that they will never negotiate over hostages. If there is nothing to be gained from kidnapping, rational terrorists will not take hostages. However, terrorists are rational enough to know that once hostages are taken, the announced policy may have little credibility and the temptation to make some concessions to obtain the hostages' release may become overwhelming. The only way to deter rational terrorists is to somehow take away the discretion of policy-makers and commit them to a rule of never negotiating.

This same problem, argue Kydland and Prescott, arises in the conduct of monetary policy. Assume the economy can be modelled by a Lucas Surprise Supply function

$$U_t = U_t^* - a\,(\Pi_t - \Pi_t^e) \qquad (1)$$

where U_t is unemployment in period t, U_t^* is the natural level, α the Phillips curve slope parameter and Π_t and Π_t^e are the actual and expected rates of inflation in period t. This is constraint facing the policy-maker.

Kydland and Prescott assume that the government or policy-maker has an objective function which rationalises the policy choice and is of the form

$$S = s(\Pi_t, U_t) \qquad (2)$$

where the first partial derivatives of S with respect to each of Π_t and U_t are negative. A consistent policy will seek to maximise (2) subject to (1). The contours of this social objective function are shown in figure 1 and indicated by the indifference curves S_1, S_2, S_3 and S_4.

All points on the vertical axis are potential equilibria since unemployment is at the natural level and agents are correctly forecasting inflation, so that $\Pi_t^e = \Pi_t$. The indifference curves indicate that the optimal position is at O where $\Pi_t = 0$ and $U_t = U_t^*$.

While the monetary authorities can determine the rate of inflation, the relevant Phillips curve will depend on the inflationary expectations of economic agents. Suppose the economy is initially at point D on indifference curve S_4. The policy-maker wishes to achieve the highest possible indifference curve knowing that if agents adjust their inflationary expectations accurately, the economy will reach an equilibrium along the y-axis. If the policy-maker announces that they will deflate the economy in order to deliver the optimal zero rate of inflation in the next period, how should economic agents respond?

Economic agents realise that if the government keeps to its promised policy in the next time period, it will have an incentive in the time period after that to renege on its anti-inflation policy, and expand the economy along the Phillips curve with inflationary expectations of Π_o^e to reach point A. Ex post, the zero inflation policy announcement is not optimal and is time inconsistent. The announcement is not seen as credible by economic agents because they are aware of the government's incentive to abandon the zero-inflation policy. They will not believe it, and hence they will not reduce their inflationary expectations to zero.

Economic agents will observe that at point C, where the short-run Phillips curve with the associated expectations Π_c^e is at a tangent to a government indifference curve on the vertical axis, government has no incentive to deviate from the natural rate. The only credible anti-inflation policy which the authorities may implement is one which partially reduces inflation, to point C.

The distance from the optimal inflation rate (O) to the discretionary inflation rate (C) is excessive inflation and is known as inflation bias.

In this monetary game discussed by Kydland and Prescott, the government is the dominant player and acts as leader. When the government decides on its optimal policy it will take into account the likely reaction of the followers who are the private agents. This is an example of a non-co-operative Stackelberg game. In a Stackelberg game, unless there is a pre-commitment from the leader with respect to the announced policy, the optimal policy (O) will be dynamically inconsistent because the government can improve its own pay-off by cheating. Since private agents know this, the time consistent equilibrium (C) is a Nash equilibrium.

The non-co-operative Nash equilibrium indicated by point C illustrated how discretionary policy may produce a sub-optimal outcome exhibiting an inflationary bias. Since rational agents can anticipate the strategy of monetary authorities who possess discretionary powers, they will anticipate π_c^e. Hence, policy-makers must also supply inflation equal to π_c^e in order to prevent a fall in real output and a rise in unemployment.

Herb Taylor (1985) consider the various outcomes that can arise in this sort of game between monetary authorities and wage negotiators. Suppose firms and workers in the economy agree on contracts specifying low wage increases. Given the policy-maker is willing to pursue a high inflation policy to reduce unemployment, with low wage increases already locked in, the policy-

maker would have its chance. If labour market participants signed contracts specifying high wage increases for the year, again the monetary authority would be willing to run a high inflation monetary policy in order to keep unemployment from rising above its natural level as would happen with a low inflation policy.

In short, firms and workers of the economy enter into wage negotiations with the realisation that pursuing a high money growth, high inflation policy is the only time consistent plan for the policy-maker to follow. They thus sign contracts for high wage increases at the beginning of the year. During the year, the policy-maker pursues the high money growth policy that they expected, so inflation comes in high. Unemployment settles at its natural level. As a result of the time inconsistency of the optimal low inflation policy, the policy-maker winds up creating an excessive rate of inflation even though its gains nothing on the unemployment front.

The possibility that policy-maker's inflation announcements can be time inconsistent led Barro and Gordon (1983) to analyse the properties of time consistent rates of inflation. They referred to these as enforceable inflation rates which removed any temptation for the policy-maker to attempt surprise inflation.

Again assume the economy is modelled by Lucas Surprise Supply function so that we can write output (Y) as

$$Y_t = Y^* + a(\Pi_t - \Pi_t^e) \qquad (3)$$

Let us normalise the natural level of expected output at zero and set a equal to 1 so that we can re-write (3) as

$$Y_t = \Pi_t - \Pi_t^e \qquad (4)$$

It is assumed that the policy-maker has a target level of output, k, above the natural level, thus, k>0. To achieve this requires the inducement of surprise inflation. This is evident when we write the policy-maker's loss function as

$$Z_t = \frac{1}{2}\Pi_t^2 + \frac{b}{2}(k - Y_t) \qquad (5)$$

Substituting for Y_t this is equivalent to

$$Z_t = \frac{1}{2}\Pi_t^2 + \frac{b}{2}(k - \Pi_t - \Pi_t^e) \qquad (6)$$

The first term is seen as representing the so-called menu or shoe-leather costs associated with changing prices. The optimal rate of inflation is zero in this case since any deviation of inflation from zero imposes a cost.[1] The parameter, b, is the benefit parameter of generating surprise inflation and takes a positive value.

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1. We could modify the government's loss function so that it is of the form

$$Z_t = \frac{1}{2}(\Pi_t - \Pi^*)^2 + b(k - \Pi_t - \Pi_t^e)$$

The optimal rate of inflation would then be Π^* rather than zero.

It is assumed that the public forms expectations rationally before the policy-maker or government chooses the value of Π, the policy instrument. Minimising the expected value of the policy-makers loss function gives us the discretionary inflation choice[2]

$$\Pi_{dis_t} = \frac{b}{2} \tag{7}$$

Agents with rational expectations solve this optimisation problem so

$$\Pi^e = \frac{b}{2} \tag{8}$$

The output level of the economy is thus

$$Y = 0 \tag{9}$$

The loss to the policy-maker from the discretionary inflation choice is[3]

$$Z_{dis_t} = \frac{1}{2}[(\frac{b}{2})^2 + bk] \tag{10}$$

Therefore, the loss will be greater the higher is the policy-maker's benefit parameter and also the larger the target level of output relative to the natural level.

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2. With an optimal rate of inflation of Π^*, the discretionary choice would be

$$\Pi_{dis_t} = \frac{b}{2} + \Pi^*$$

Therefore, the discretionary choice reflects both the optimal inflation rate and the benefit parameter.

3. Where the natural level of output, Y^*, is non-zero, the loss the policy-maker would incur is

$$z_{dis_t} = \frac{1}{2}[(\frac{b}{2})^2 + b(k - Y^*)]$$

Equations (7) and (9) confirm the Kydland and Prescott finding of a positive inflation bias resulting from a lack of any pre-commitment without any affect on the level of output.

4.2 Enforceable Inflation Rates

Barro and Gordon proceeded to analyse the properties of the lowest enforceable inflation rate. To understand these properties Barro and Gordon introduce the concepts of temptation and enforcement. The former is a measure of the gains a policy-maker can derive from reneging on a policy announcement and is consistent with the Kydland and Prescott analysis. The concept of enforcement is a measure of future reputational costs imposed by private sector agents associated with reneging in the current period. To understand both these concepts let us understand why a zero inflation rule is not enforceable, although we know that this is the ideal rule.

Assume the government announces a zero inflation policy and that the public expects zero inflation. The government would face the expected cost function:

$$E[Z_t] = \frac{1}{2}\Pi_t^2 - \frac{b}{2}(k - \Pi_t) \qquad (11)$$

If it then proceeded to minimise (11), this would yield the discretionary inflation choice, $\frac{b}{2}$. This causes output to rise above its natural level

$$Y_t = \frac{b}{2} \tag{12}$$

The cost of this 'cheating' inflation policy is

$$Z_{cheat_t} = -\frac{1}{2}[(\frac{b}{2})^2 - bk] \tag{13}$$

If the policy-maker had continued with the policy announcement of zero inflation the costs of inflation would have been[4]

$$Z_{rule_t} = \frac{1}{2}bk \tag{14}$$

Therefore, there exists a positive temptation to renege on a zero inflation rule.

Temptation can be expressed generally as:

$$temp_t = Z_{rule_t} - Z_{cheat_t} \tag{15}$$

The temptation to renege on the zero inflation rule is therefore

$$temp_t = \frac{1}{2}(\frac{b}{2})^2 \tag{16}$$

At this point Barro and Gordon note that we have ignored any future costs associated with today's inflation choice. By introducing reputation into the

4. With a non-zero optimal rate, the cost of reneging on the zero inflation policy announcement would be

$$Z_{cheat_t} = -\frac{1}{2}[(\frac{b}{2})^2 + b\Pi^* - bk]$$

while the cost of continuing with this announcement would be

$$Z_{rule_t} = \frac{1}{2}[bk + (\Pi^*)^2]$$

equation we can limit the degree of inflation bias as measured from the ideal rule or optimal inflation rate. To do this it is assumed that if the policy-maker cheats in period t, in period t+1 the public will expect the discretionary inflation choice. Therefore, the enforcement cost is essentially higher future inflationary expectations.

Current enforcement costs are the discounted value of the difference between the costs of having to follow the discretionary choice next period and the costs of continuing with the rule. Written more formally this is

$$enf_t = q(Z_{dis_{t+1}} - Z_{rule_{t+1}}) \tag{17}$$

where q is the discount factor.

In the case of the zero inflation rule, the expected enforcement costs would be

$$enf_t = q\frac{1}{2}(\frac{b}{2})^2 \tag{18}$$

Therefore, provided that there is some discounting of the future, enforcement costs will not ensure that the zero inflation rule is credible. Only if there is no discounting of the future will zero inflation be enforceable.[5]

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5. With a positive optimal inflation rate temptation and enforcement with the zero inflation announcement are

$$temp_t = \frac{1}{2}[(\frac{b}{2})^2 + b\Pi^* + (\Pi^*)^2]$$

$$enf_t = q\frac{1}{2}[(\frac{b}{2})^2 - (\Pi^*)^2]$$

To find the best enforceable rule (the lowest enforceable inflation rate) one needs to equate temptation with enforcement and solve for Π. Denoting the best inflation rule as Π_{best}, we first calculate temptation, where this is the difference in cost when Π_{best} is expected and delivered and when Π_{best} is expected but the discretionary choice is pursued. Temptation can be found to be

$$temp_t = \frac{1}{2}\left(\frac{b}{2} - \Pi_{best}\right)^2 \tag{19}$$

The enforcement costs associated with reneging in this period and facing the discretionary inflation choice next period, rather than continually pursuing the rule are

$$enf_t = q\frac{1}{2}\left(\left(\frac{b}{2}\right)^2 - \Pi_{best}\right)^2 \tag{20}$$

Two solutions are found in equating temptation and enforcement

$$\Pi_{best} = \begin{cases} \dfrac{b}{2} \\ \dfrac{b}{2}\left(\dfrac{1-q}{1+q}\right) \end{cases} \tag{21}$$

Provided $0<q<1$, then the best enforceable rule is found to be

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Therefore, temptation is greater than when the optimal inflation rate is positive. This is because more surprise inflation is generated and because the policy-maker's optimal inflation rate is positive. Enforcement costs are smaller, again because the policy-maker's optimal inflation is positive.

$$\frac{b}{2}\left(\frac{1-q}{1+q}\right) \qquad (22)$$

This is a weighted average of the ideal rule (the optimal inflation rate) and of discretion. A higher discount factor (a lower q) leads to a higher best enforceable inflation rule. Less discounting of the future reduces the value of the best enforceable inflation rule since enforcement costs have greater importance.

The best enforceable inflation rule is simply the lowest deliverable and credible inflation announcement. However, we can draw further on the old political macroeconomic literature to consider the effect of politics on the inherent amount of inflation in the economic system. If one accepts the premise that a government is prone to attempt pre-election expansions as in the Nordhaus model then there are two complementary effects influencing the best enforceable rule. Firstly, we may expect the benefit parameter, b, to be affected by the position in the electoral cycle. In the Nordhaus model we have pre-election boom followed by post-election slump. Translating this to the Barro-Gordon framework infers that the government's benefit parameter would increase over the course of the electoral cycle.

The second complementary effect arises from the impact of the time to an election on the discount rate applied to future inflation costs. This too is a central concern in the Nordhaus model since an expansion from an initially low inflation rate, rather than a high rate, has a positive impact on votes. In the

context of the Barro-Gordon model, the question is whether the gains from surprise inflation today outweigh the future cost of higher inflationary expectations. However, this concern decreases the closer the government is to an election. In this way the benefit parameter and the discount rate applied to future enforcement costs both work to increase the lowest enforceable inflation rate or lowest time consistent rate.

The old political macroeconomics identifies an important exception to the proceeding analysis in the case where governments remain popular and expected to win the election. The concept of electoral security was central to the Frey and Schneider (1978) political business cycle model. They recognised the need to model simultaneously the timing of elections and a government's re-election probability. Therefore, when we measure electoral security, it is perhaps necessary to use a weighted popularity index. The weight would be dependent on the time elapsed in an election period.

The political business cycle literature infers that electoral security may affect both the necessity to generate surprise inflation and the costs of so doing. Unlike the early Nordhaus political business cycle model, political manipulation in the Barro-Gordon framework has future reputational costs. The beginning of a new election cycle does not necessarily mark a fresh start for a government. Economic reputations carry over and do not recognise the artificial boundary imposed by an election as suggested by Nordhaus. One election period is not separate from another.

The Barro-Gordon framework suggests that if the setting to the policy instrument Π is delegated to a more inflation-averse agent then the inflation bias can be reduced. If one imagines a suitably constituted central bank who derives no utility from generating surprise inflation, then effectively their loss function can be written as

$$Z_t = \frac{1}{2}\Pi_t^2 \qquad (23)$$

With a zero benefit parameter the discretionary inflation rate becomes the optimal inflation rate, which in this case is zero.

The same considerations that apply to the benefit parameter could also apply to the optimal rate of inflation. Policy-makers could be seen as more or less inflation averse depending upon the opportunistic factors identified above. A more opportunistically inclined policy-maker could be seen as inferring a higher optimal inflation rate, thus further increasing the discretionary inflation choice over and above that implied by a larger benefit parameter. Since inflation bias is measured between the discretionary and optimal inflation rates the magnitude of inflation bias is independent of the optimal inflation rate. Therefore, should we allow both the benefit parameter and the optimal inflation rate to vary over an election period in accordance with political opportunism, only the benefit parameter will affect inflation bias. However, both variables go to determine the actual rate of inflation.

4.3 The Partisan Model

Alesina (1987) saw that the importance of politics could be incorporated more explicitly into the Barro-Gordon framework. Rather than considering the importance of opportunism he concentrated on the ideological aspect of policy-making. He argued that both the benefit parameter and ideal inflation rate could reflect the Left-Right dimension often observed in politics. He modelled the party of the Left as having a higher optimal rate of inflation than its right-wing counterpart. He justified this on the grounds that the left-wing party is more willing to finance government expenditures through money creation and is less inflation-averse than the right-wing party.

In the case of the benefit parameter, the value for the left-wing party is denoted as, b_L, which is greater than that of the right-wing party, b_R. In order to simplify the analysis we will continue to assume that the optimal inflation rate, regardless of party-type, is zero. This does not affect the conclusions since all that is required is for the discretionary inflation rates of the parties to be different. This can arise with different benefit parameter values alone. To the extent that the optimal rates of inflation for the two parties are different this will simply magnify the results.

The economy is again modelled according to the New Classical supply function in equation (4). The main difference is that there are now two policy-maker types so that equation (5) is replaced by two loss functions. Equation 5' refers to a left-wing policy-maker (L) and equation 5" to a right-wing policy-maker (R)

$$Z_{L_t} = \frac{1}{2}\Pi_t^2 + \frac{b_L}{2}(k - Y_t) \qquad (5')$$

$$Z_{R_t} = \frac{1}{2}\Pi_t^2 + \frac{b_R}{2}(k - Y_t) \qquad (5")$$

where $b_L > b_R$.

Substituting for Y_t in equation (4), we obtain

$$Z_{L_t} = \frac{1}{2}\Pi_t^2 + \frac{b_L}{2}(k - \Pi_t - \Pi_t^e) \qquad (6')$$

$$Z_{R_t} = \frac{1}{2}\Pi_t^2 + \frac{b_R}{2}(k - \Pi_t - \Pi_t^e) \qquad (6'')$$

With two policy-maker types there exist two discretionary inflation choices. Minimising the expected value of the each policy-maker's loss function gives the discretionary choice for L and R respectively

$$\Pi_{L_t} = \frac{b_L}{2} \qquad (24)$$

$$\Pi_{R_t} = \frac{b_R}{2} \qquad (25)$$

Since $b_L > b_R$, the discretionary inflation choice will always be higher for the left-wing party than for the right-wing party.6 The difference simply reflects the benefit parameters. Alesina (1987) refers to this difference as a measure of political polarisation. We can represent this polarisation, q , as

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6. If the optimal rates for L and R had been Π_L^* and Π_R^* respectively, where $\Pi_L^* > \Pi_R^*$, the discretionary choices would be

$$\Pi_{L_t} = \frac{b_L}{2} + \Pi_L^*$$

$$\Pi_{R_t} = \frac{b_R}{2} + \Pi_R^*$$

$$q = \frac{1}{2}(b_L - b_R) \qquad (26)$$

This polarisation is greater if there is any difference in the policy-makers' optimal inflation rates.7

Election result uncertainty is fundamental to the model. After the election the inflation rate will depend upon the political party (policy-maker) elected. The public are assumed to know the inflation preferences of the two political parties. They also have information from opinion polls about the probability of each party winning the election. For simplicity it is assumed that the probability of election success is exogenous. Party L wins with probability P and Party R with probability (1-P). Election result uncertainty is a crucial concern for those contracts negotiated prior to the election that then run into the new election period.

Election result uncertainty allows the inflation rate chosen after the election by the successful party to differ from expected inflation. We can write expected inflation for the post-election period as

$$\Pi^e_{post} = P\Pi^e_L + (1-P)\Pi^e_R \qquad (27)$$

Since the public solve for each policy-maker's objective function, we can substitute in from equations (24) and (25)

$$\Pi^e_{post} = P(\frac{b_L}{2}) + (1-P)(\frac{b_R}{2}) \qquad (28)$$

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7. $q = \frac{1}{2}(b_L - b_R) + (\Pi^*_L - \Pi^*_R)$

If the left-wing party is elected then post-election output is

$$Y_{L_{post}} = \Pi_L - \Pi^e_{post}$$
$$Y_{L_{post}} = \frac{1}{2}(1-P)(b_L - b_R) \qquad (29)$$

while if the right-wing party is elected, post-election output is

$$Y_{R_{post}} = \Pi_R - \Pi^e_{post}$$
$$Y_{R_{post}} = -\frac{1}{2}P(b_L - b_R) \qquad (30)$$

This infers that after an election, assuming some election result uncertainty, there will be an expansion or contraction in output depending on which political party is elected. If the left-wing party is elected, inflation will be higher than expected since some weight is placed on right-wing success. The result will be an expansion in output. The less likely the result, the smaller is P and the greater is the post-election expansion in output. If the right-wing party is elected, inflation will be lower than expected and the result will be a contraction in output. Again the more unlikely the result, the larger is P and the larger is the post-election contraction in output.

It can also be seen that the larger the difference between the benefit parameters the greater the expansion or contraction. Greater political polarisation stems from an increasing difference between the discretionary inflation choices. Greater political

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If $\Pi^*_L = \Pi^*_R$, this would collapse to equation (26).

polarisation increases the importance of election result uncertainty on the output in the economy.8

Once all wage contracts are negotiated on the basis of the actual party or policy-maker in power, output or unemployment will return to their natural levels. However, the time consistent rates of inflation for the two parties will always differ so long as the benefit parameters differ. Therefore, while inflation would continue to be higher under the left-wing party for the remainder of the election period, output and unemployment would be at the natural levels, regardless of party.

In order to make the computation of the variance of inflation and output easier we will follow Alesina and Gatti (1995) and make a few simple assumptions which do not affect the general conclusions of the model. We shall assume that an election period coincides with the length of a wage contract and with the term in office. Thus, expectations are formed, elections take place and the party of government chooses inflation. This pattern is repeated in every period. In this case, the post-election term is one period only. Therefore, output continually reflects the importance of election result uncertainty and is at its natural level only when this uncertainty is removed or the degree of political polarisation is zero. The variance of inflation and output would be scaled down proportionately if additional post-election periods were included since in

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8. With optimal inflation rates, Π_L^* and Π_R^*, post-election output for L and R respectively is

$$Y_{L_{post}} = (1 - P)[\frac{1}{2}(b_L - b_R) + (\Pi^*_L - \Pi^*_R)]$$

$$Y_{R_{post}} = -P[\frac{1}{2}(b_L - b_R) + (\Pi^*_L - \Pi^*_R)]$$

these additional periods output would be at its natural level and expected inflation would be equal to actual inflation.

Given our assumptions, expected output would be

$$Y_t^e = P(Y_{L_t}) + (1-P)(Y_{R_t}) \tag{31}$$

Substituting from (28) and (29) we find

$$Y_t^e = 0 \tag{32}$$

We can find the variance of output

$$Var(Y) = P(1-P)[\frac{1}{2}(b_L - b_R)]^2 \tag{33}$$

The variance of output thus reflects the degree of political polarisation.9 If the political parties were identical then the result collapses to that in the Barro-Gordon model, such that the variance of output is zero. If this was the case then election result uncertainty would be irrelevant and output would be at its natural level. Where the parties are different, the degree of difference and the uncertainty of the result are important. If the election result was a foregone conclusion then it would not matter that the political parties were different since fully informed, rational agents would be able to solve the optimisation problem and expected inflation would equal actual inflation.

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9. With optimal inflation rates, Π_L^* and Π_R^*,

$$Var(Y) = P(1-P)[\frac{1}{2}(b_L - b_R) + (\Pi_L^* - \Pi_R^*)]^2$$

Given equation (27) we can show that the variance of inflation is equal to

$$Var(\Pi) = P(1-P)[\frac{1}{2}(b_L - b_R)]^2 \qquad (34)$$

and thus is equal to the variance of output. Again political polarisation and the uncertainty of the election result can be seen to affect the variance of inflation.10

Alesina's model thus demonstrates how ideology can affect inflation policy. Furthermore, it allows one to model a partisan political business cycle within a new classical framework.

4.4 The Rogoff Model

One major drawback of the framework used by both Barro and Gordon (1983) and Alesina (1987) is that it does not allow for shocks to hit the economy. With one policy-maker type the variance of output and inflation in both models would be zero. By including a random shock term, Rogoff (1985) is able to show that while handing monetary policy to an independent central bank reduces inflation bias this could be at the expense of increased output volatility. Rogoff demonstrates how a policy-maker could choose an independent agent with a lower benefit parameter and yet increase their own welfare. While this would result in a lower average inflation rate and lower inflation variance, the economy's output variance would be greater despite the average level of output remaining at its natural level.

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10. With optimal inflation rates, Π_L^* and Π_R^*,

$$Var(\Pi) = P(1-P)[\frac{1}{2}(b_L - b_R) + (\Pi_L^* - \Pi_R^*)]^2$$

To show Rogoff's main results we present the simplification offered in Alesina and Gatti (1995). The economy is modelled as in equation (4) except that an independently and identically distributed shock term, e_t, is introduced. This has a zero mean and variance, s_e^2. Therefore, we can model the economy as:

$$Y_t = \Pi_t - \Pi_t^e + e_t \tag{35}$$

The policy-maker's loss function is modified from (5) to allow for the shock term to be significant and can thus be written as:

$$Z_t = \frac{1}{2}\Pi_t^2 + \frac{b}{2}(k - Y_t)^2 \tag{36}$$

Substituting in from equation (35) this becomes:

$$Z_t = \frac{1}{2}\Pi_t^2 + \frac{b}{2}(\Pi_t - \Pi_t^e + e_t - k)^2 \tag{37}$$

Again economic agents are assumed to form expectations first, this is followed by the shock, before the policy-maker chooses the policy instrument, Π. The discretionary inflation choice of the policy-maker involves taking the first order condition of (37) and solving for Π_t^e. The inflation choice is:[11]

$$\Pi_t = bk - \frac{b}{1+b}e_t = b(k - \frac{1}{1+b})e_t \tag{38}$$

while the expected inflation rate is

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11. With the natural level of output, Y^* and optimal inflation rate Π^*, the discretionary inflation rate would be

$$\Pi_t^e = bk \tag{39}$$

The policy choice again involves an inflation bias, bk, since the optimal or ideal rule would be zero inflation. It also involves a stabilisation term $(\frac{b}{1+b}e_t)$. The inflation choice will be greater the larger the benefit parameter as was found by Barro and Gordon. Therefore, one could use the old political macroeconomics in the same way as was applied to the Barro and Gordon framework. However, we can now makes inferences relating to the variance of inflation and output as well as the levels of inflation and inflation bias.

The variance of inflation can be written as

$$Var(\Pi) = Var(bk) + Var(\frac{b}{1+b}e_t) \tag{40}$$

Given the values of b and k are fixed and $E(e_t) = 0$

$$Var(\Pi) = (\frac{b}{1+b})^2 s_e^2 \tag{41}$$

Writing this as

$$Var(\Pi) = (\frac{1}{1+(1/b)})^2 s_e^2 \tag{42}$$

we can see readily that a higher benefit parameter not only leads to higher inflation but more variable inflation.

$\Pi_t = b(k - Y^*) + \Pi^* - \frac{b}{1+b}e_t$

By substituting for Π_t and Π_t^e into (35), we find that output[12] and expected output are

$$Y_t = \left(\frac{1}{1+b}\right)e_t \tag{43}$$

$$Y_t^e = 0 \tag{44}$$

Therefore, average output is its natural level. The benefit parameter does not affect average output. Since, the variance of output is

$$Var(Y) = \frac{1}{(1+b)^2}s_e^2 \tag{45}$$

a higher benefit parameter actually reduces the variance of output.

A summary of these results from the Rogoff model is shown in Table 1.

Table 1: Summary of Rogoff's Results

12. With the natural level of output, Y^* and optimal inflation rate Π^*, output would be

$$Y_t = Y^* + \left(\frac{1}{1+b}\right)e_t$$

Variable	Value
Π_t	$bk - \frac{b}{1+b}e_t$
Π_t^e	bk
Y_t	$\frac{1}{1+b}e_t$
Y_t^e	0
$Var(\Pi)$	$(\frac{b}{1+b})^2 s_e^2$
$Var(Y)$	$\frac{1}{(1+b)^2} s_e^2$

A key question posed by Rogoff was whether a policy-maker can gain by handing-over inflation policy to an independent central bank with a different benefit parameter in the loss function. It is assumed that the agent would be chosen first and then the timing of events would be as before. Our concern is the value of the benefit parameter that would minimise the expected loss of the policy-maker. We shall denote this particular benefit parameter as $\hat{b}$. Given that the independent central bank would face the same optimisation problem as previously solved for the policy-maker, the above solutions for output and inflation will feed into the policy-maker's loss function,

but with $\hat{b}$ rather than b. The policy-maker will then minimise their loss function. We can write the optimal choice for the policy-maker as

$$\min E(L(b,\hat{b}) = E[\frac{1}{2}(\hat{b}k - \frac{\hat{b}}{1+\hat{b}}e_t)^2 + \frac{b}{2}(\frac{1}{1+\hat{b}}e_t - k)^2] \tag{46}$$

The solution to this gives

$$\hat{b} + \frac{\hat{b}(1+\hat{b})^3}{s_e^2} = b \tag{47}$$

Since both b and $\hat{b}$ are assumed to be positive, the policy-maker can actually gain welfare from delegating inflation policy to an independent central bank with a lower benefit parameter. Consequently, the bank would be more inflation-averse than the policy-maker.

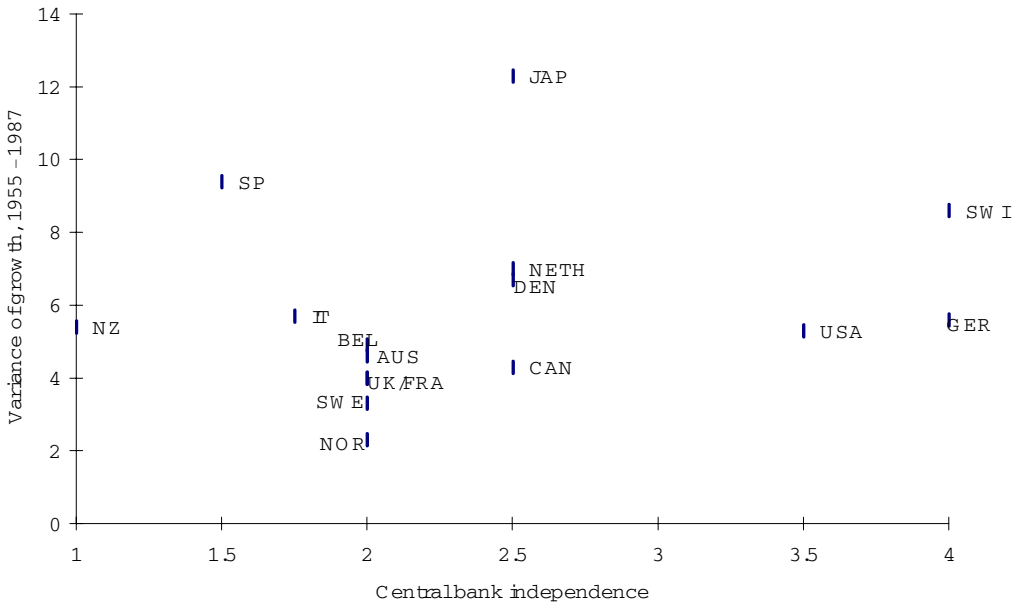
An important implication of Rogoff's result is that since $\hat{b} < b$, both expected inflation and inflation variance will be lower under delegation. However, while average output will remain at its natural level the variance of output will be higher. These can be seen by inspection of Table 1.

4.5 Gain without pain?

Alesina and Gatti (1995) challenge Rogoff's theoretical finding that an independent central bank necessarily means an increase in output variability in reducing inflation and inflation variability. They point to empirical work by Alesina and Summers (1993) which, for a selection of OECD countries, finds no relationship

between the dependence of the central bank and output variability. This can be seen from the diagram below which is constructed from the data used by Alesina and Summers.

CENTRAL BANK INDEPENDENCE AND VARIANCE OF REAL GNP GROWTH



The theoretical underpinning as to why central bank independence does not increase output variability centres on the sources of this variability. The Rogoff model concentrates only on economically induced variability from exogenous shocks, which monetary policy could then attempt to stabilise for. However, Alesina and Gatti (1995) also perceive there to be a politically induced variability. In fact, this is a very particular source of variability based on Alesina's earlier model (see Alesina (1987)). The variability is thus the uncertainty about the future course of monetary policy

arising from political competition between two partisan policy-makers. Election result uncertainty then induces a partisan business cycle.

Alesina and Gatti modify Alesina's model by adding an independently and identically distributed shock term, e_t, to the model the economy. Therefore, the economy is modelled as in equation (35). There are again two policy-maker's or political parties. The respective loss functions for the left-wing (L) and right-wing (R) parties are

$$Z_{L_t} = \frac{1}{2}\Pi_t^2 + \frac{b_L}{2}(Y_t - k)^2 \tag{48}$$

$$Z_{R_t} = \frac{1}{2}\Pi_t^2 + \frac{b_R}{2}(Y_t - k)^2 \tag{49}$$

where $b_L > b_R > 0$.

Inflationary expectations are formed before the election and wages set. After the election, the shock e occurs and the policy-maker chooses the inflation rate. It is assumed, as in the earlier Alesina model, that Party L wins with probability P and Party R with probability (1-P). The probability of election success is exogenously given. Therefore, expected inflation can be written as

$$\Pi_t^e = P\Pi_{L_t}^e + (1-P)\Pi_{R_t}^e \tag{50}$$

To simplify matters it will be assumed that the election period is equivalent to the length of wage contracts.

Taking the first-order condition with respect to Π for party L and R respectively gives

$$\Pi_{L_t} = \frac{b_L}{1+b_L}(\Pi_t^e + k - e_t) \tag{51}$$

$$\Pi_{R_t} = \frac{b_R}{1+b_R}(\Pi_t^e + k - e_t) \tag{52}$$

Taking expectations of (51) and (52) and substituting into equation (50), we find

$$\Pi_t^e = \frac{P(b_L - b_R) + b_R(1+b_L)}{(1+b_L) - P(b_L - b_R)}k \tag{53}$$

Substituting equation (53) into equations (51) and (52) gives us the respective inflation policies of Party L and Party R

$$\Pi_{L_t} = \frac{b_L(1+b_R)}{(1+b_L) - P(b_L - b_R)}k - (\frac{b_L}{1+b_L})e_t \tag{54}$$

$$\Pi_{R_t} = \frac{b_R(1+b_L)}{(1+b_L) - P(b_L - b_R)}k - (\frac{b_R}{1+b_R})e_t \tag{55}$$

It therefore, follows that if Party L is elected output will be

$$Y_{Lt} = \frac{(1-P)(b_L - b_R)}{(1+b_L) - P(b_L - b_R)}k + (\frac{1}{1+b_L})e_t \tag{56}$$

and if Party R is elected output will be

$$Y_{Rt} = -\frac{P(b_L - b_R)}{(1+b_L) - P(b_L - b_R)}k + (\frac{1}{1+b_L})e_t \tag{57}$$

Therefore, the expected value of output is

$$Y_t^e = PY_{L_t}^e + (1-P)Y_{R_t}^e = 0 \qquad (58)$$

The substantive theoretical development follows from the equations for the variance of inflation and output. These will be seen to comprise an economically and politically induced component. The variance of output is found to be

$$VAR(Y) = E(Y)^2 = \frac{P(1-P)(b_L - b_R)^2}{[(1+b_L) - P(b_L - b_R)]^2} k^2 + [\frac{P}{(1+b_L)^2} + \frac{1-P}{(1+b_R)^2}]s_e^2 \qquad (59)$$

The first term reflects politically induced variance because of election result uncertainty. If, $P = 1$ or $P = 0$ election result uncertainty is removed. If $b_L = b_R$ so that the two policy-makers collapse to a single type then election result uncertainty is again removed. In both cases the only variance arises from the exogenous shock term, e_t. This latter term increases in significance the less both parties wish to stabilise.

The variance of inflation is found to be

$$VAR(\Pi) = P(\Pi_L - \Pi_t^e)^2 + (1-P)(\Pi_R - \Pi_t^e)^2$$

$$VAR(\Pi) = \frac{P(1-P)(b_L - b_R)^2}{[(1+b_L) - P(b_L - b_R)]^2} k^2 + [P(\frac{b_L}{1+b_L})^2 + (1-P)(\frac{b_R}{1+b_R})^2]s_e^2 \qquad (60)$$

Again the first term reflects politically induced variance, while the second term reflects the exogenous shock.

Alesina and Gatti conclude that an independent inflation-averse central banker does not necessarily lead to greater output variability. This is because the variance of both output and inflation comprise a political and economic element. Therefore, in the current context consider the outcome of both policy-makers appointing an independent central banker with some benefit parameter, $\hat{b}$. Assume that $\hat{b}$ is chosen before expectations are formed and that elections then follow. After the election e is realised and finally the central banker chooses the rate of inflation.

The outcomes from appointing an independent central banker are then equivalent to those from the Rogoff model. The difference is then in the comparison with the scenario of a politicised central banker. Our benchmark is now those outcomes from the Alesina and Gatti partisan model. The outcomes from a dependent and independent central banker are summarised in Table 2 below.

Table 2: Economic Outcomes and Central Bankers

	Dependent	Independent
Π_t^e	$\frac{P(b_L - b_R) + b_R(1+b_L)}{(1+b_L) - P(b_L - b_R)}k$	$\hat{b}k$
Y_t^e	0	0
VAR(Y)	$\frac{P(1-P)(b_L - b_R)^2}{[(1+b_L) - P(b_L - b_R)]^2}k^2 + [\frac{P}{(1+b_L)^2} + \frac{1-P}{(1+b_R)^2}]s_e^2$	$\frac{1}{(1+\hat{b})^2}s_e^2$
VAR(Π)	$\frac{P(1-P)(b_L - b_R)^2}{[(1+b_L) - P(b_L - b_R)]^2}k^2 + [P(\frac{b_L}{1+b_L})^2 + (1-P)(\frac{b_R}{1+b_R})^2]s_e^2$	$(\frac{\hat{b}}{1+\hat{b}})^2 s_e^2$

Table 2 shows that an 'appropriate' choice of $\hat{b}$ can deliver both a lower expected inflation and a lover variance of inflation. However, the significant result highlighted by Alesina and Gatti in Table 2 is that an independent central bank does not necessarily infer greater output variability as concluded by Rogoff (1985). Alesina and Gatti argue that "the variance of output can easily be larger than the variance of output with an independent central bank" (1995, p. 199).13 If the two parties were identical, then the difference between the dependent and independent central banker scenarios would depend upon the degree, if any, to which $\hat{b} < b_L = b_R$. With identical parties, the politics disappears and we are left simply with the notion that the independent central banker is more inflation-averse. Nevertheless, as the difference between the benefit parameters of the two policy-makers increases, the importance of the political variance also increases. For a sufficiently large difference between the benefit parameters, the political term dominates. In this case, the variance of output with an independent central bank would be 'significantly lower'.

5. Conclusions

The paper surveys the new political macroeconomics which has developed out of the new classical macroeconomic revolution of the 1970s. It has made important contributions to the debate about the delegation of monetary policy and the degree of political and economic independence of central banks. However, we began by introducing the old political macroeconomics and the area of political business cycles. The 'old' school suggest that governments are able to create opportunistic or partisan

13. Italic emphasis is that of the authors.

business cycles and perhaps even both. By introducing the political business cycle school we show how it is possible to better transfer some of the characterisations of governments' objective functions over to the new political macroeconomics.

The new political macroeconomic model of Kydland and Prescott (1977) is opportunistic in nature. However, unlike the Nordhaus model (1975) from the 'old' school, no business cycle emerges. Instead, opportunism in the Kydland and Prescott model results in excessive inflation or inflation bias. Therefore, although the government inherits the median voter's preferences, when the economic constraint is imposed this voter, like others, acts in such a way that the government is unable to trade-off inflation for more output. The result is higher inflation for no extra output.

The Barro and Gordon (1983) model considers whether the importance of reputation to governments reduces the inherent amount of excessive inflation. Its formulation allows one to draw on ideas from the political business cycle literature. Indeed, Alesina (1987) has used Hibbsian objective functions from which it is easy to show that the degree of inflation bias is party-dependent. This results from the characterisation of left-of-centre governments as placing relative more weight on output than inflation than right-of-centre governments.

One can take the idea of the inflation cost of extra output and argue that that the tolerance to this cost is dependent upon a government's electoral security. Governments may be more tolerant to the inflation cost when they are unpopular or close to an election. In this way one can use the concept of opportunism more explicitly when analysing the effect on inflation bias. An electorally secure government may be less tolerant of the inflation cost and less willing to discount future costs

resulting from the lost credibility of generating surprise inflation today. Therefore, by drawing on the way that opportunism is portrayed in the old political macroeconomics one can further explore the determinants of inflation bias.

The paper concludes by surveying the new political macroeconomics for an answer as to whether the establishing of an independent central bank offers all gain and no pain. Rogoff (1985) suggests that there exists a credibility-output variability trade-off. By delegating monetary policy to a more inflation-averse body one has to accept higher output variability for any reduction in inflation bias. Motivated by empirical evidence that offers little support for the credibility-output variability trade-off, Alesina and Gatti show that an independent central bank may or may not increase a country's output variability. The answer appears to depend upon the degree of politically induced variability relative to economic induced variance. If the former is more important then an independent central bank will reduce output variability.

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