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MACROECONOMIC POLICY UNDER
UNSCHEDULED REGIME TRANSFERS**

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**THE PARTISAN THEORY AND MACROECONOMIC POLICY UNDER
UNSCHEDULED REGIME TRANSFERS,
A Case Study of an LDC**

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Abstract

In this paper we investigate the possible occurrence of patterns in macroeconomic policy targeting and instruments used in some less developed countries where unscheduled regime transfers may occur. The patterns are held to correspond to those stipulated by Hibbs in his Partisan Theory for advanced democracies after due allowance is made for the nature of government and modes of regime transfer. The investigation is undertaken with special reference to the Sudan, a country which has witnessed dramatic political changes that assumed the forms of eight alternating regimes in the shape of civilian democracies and military dictatorships since its independence in 1956. In particular, we trace the evidence on quasi-political business cycles in output growth and inflation; and on quasi-budget cycles in deficits and instruments. Patterns on the form of use of policy instruments through reliance on monetary policy surprises are also investigated. Empirical results obtained generally point to the possible presence of eco-political patterns similar in principle to those operable in the case of developed countries but with some distinct differences in nature and rhythm.

ملخص

يطرح هذا البحث التطبيقي إمكانية توافر أنماط متوافقة في انتهاج السياسات الاقتصادية الكلية واستعمال الأدوات مع أشكال النظم السياسية السائدة في الدول النامية حيث تتغير النظم بصورة مفاجئة. ويشير البحث إلى تطابق تلك الأنماط مع الأنماط التي وضعها "هيبز" للدول المتقدمة في نظرية "التحيز" مع مراعاة طبيعة الحكم وأشكال تغير النظم السياسية. ويجري استكشاف هذه الإمكانية بالرجوع إلى حالة السودان وهو دولة مرت بعدد من التحولات الضخمة التي اتخذت أشكال ثمان نظم سياسية متعاقبة تأرجحت بين الديمقراطية المدنية والدكتاتوريات العسكرية منذ استقلاله عام ١٩٥٦. وبصفة خاصة يتتبع البحث إمكانية حدوث دورات أعمال شبه سياسية في معدلات النمو الاقتصادي والتضخم؛ وحدث شبه دورات ميزانية في العجز والأدوات. وتقصى البحث أنماط شكل استخدام أدوات السياسة اعتماداً على عنصر المفاجأة في السياسة النقدية. وتعضد النتائج التطبيقية التي تم التوصل إليها الدعوى القائلة باحتمال وجود أنماط سياسية-اقتصادية في الدول النامية شبيهة من ناحية المبدأ بتلك التي تعمل في الدول المتقدمة مع وجود بعض الاختلافات المميزة في الطبيعة والنمط.

1. INTRODUCTION:

Spurred by the pioneering work of Nordhaus(1975) on the Political Business Cycle(PBC), which hypothesized that governments manipulate economic policies before elections in order to maximize reelection probabilities, a plethora of empirical models purporting to detect and explain rhythmic behavior in target assignments and instruments use were developed and subjected to various testing procedures. Some of these studies included MacRae(1977), Frey and Schneider(1978), McCallum(1978), Tufte(1978), Golden and Poterba(1980), Abrams *et. al.*(1980), Beck(1982,1984), Chapell and Keech(1986), Richards(1986), Soh(1986) and the various papers in Willet(1988) and Cukierman *et. al.*(1992), *inter alia*, who tested - and provided sometimes conflicting evidence on - the probable existence of the Nordhaus PBC.

On a related vein, Hibbs(1977) developed a Partisan Theory(PT) in which rightist governments 'strategically manipulate' the economy with greater aversion to inflation as compared to leftist governments which usually focus on rapid growth within an 'opportunistic' hypothetical framework. According to Hibbs PT the main macroeconomic time series may show different patterns of behaviour according to which political party is in power. Hibbs' PT was also subjected to empirical testing - again with some conflicting evidence - by Beck(1984), Havrilesky(1987,1988) and Chapell and Keech(1986), *inter alia*. More recently, Alesina and Sachs(1988) presented a model based on the PT of political parties incorporating rational expectations. The model was subsequently tested on post-Second World War United States data. Alt(1985) and Alesina(1989) empirical findings suggested the presence of widespread partisan effects on policy instruments and economic outcomes in OECD economies.

The different approaches usually assumed that agents were myopically naive and retrospective, tending to heavily discount the past. Their expectations were adaptive; and under such circumstances governments could - and generally did - exploit the existence of Phillips curve type tradeoffs. But due to the onset of inflation, agents become informed and their expectations evolve into forward-looking rational forms, hence nihilating the exploitable tradeoffs. This was ascertained initially by McCallum(1978), who noted that the admittance of rational expectations within a general non-inflationary context leads to the insignificance of used political dummies. Incorporating these new elements and using informational asymmetries between governments and private agents, Rogoff and Sibert(1988) proved the presence of a political budget cycle(PbdC). Their theory predicts increases in expenditures and/or reductions in taxes in election years and consequently larger budget deficits thereafter. Rogoff(1990) further predicts reductions in government investment in election periods. On the empirical side, Alesina(1988), *inter alia*, investigated the occurrences of these PbdC. Haynes and Stone(1988) traced the occurrences of cycles in monetary policy for the United States while Keil(1988) and Emberton(1993) addressed the same questions with respect to the United Kingdom.

A common thread linking the various political rhythmic models and their partisan counterparts, is that their construction was effected within the context of a developed country(DC) where

power may change hands between different parties within constitutional and democratic frameworks. As Edwards(1994) notes:

"... Most of the literature is limited to a two-party case and has focused on the experiences of the developed nations ..." ¹.

That setup may not suit well the analytical apparatus of a less developed country(LDC) where power may be transferred through - sometimes violent - non-constitutional and nondemocratic means. A cycle of military - civilian regimes is generally detectable in many LDCs. Revolutions and popular uprisings may be the means of wresting power from the hands of the military dictator rather than going to the polls. And the military dictator in turn usually argues that he was *forced* to act unconstitutionally to save the country from collapse at the hands of the ruling monopolistic power elites. In Latin America; Argentina and Brazil were until recently entrapped in that vicious cycle. In Asia; Thailand and Pakistan, are examples while in Africa; Sudan and Nigeria provide yet more examples of countries which have fallen prey to that same cycle.

In this paper, we attempt to collect empirical evidence on the possible existence of eco-political patterns of Hibbs' style in a LDC - the Sudan, where unscheduled transfer of power seems to be the rule. The country experienced eight abrupt regime changes pendulating between civilian and military forms in its short modern history since independence in 1956. The country thus provides a rich environment with enough regime transfers to enable us to trace the evolution of the various eco-political rhythms within an LDC setup and to circumvent 'the very common problem in the literature of scarcity of degrees of freedom' ².

The paper addresses at first the question of whether partisan behavior exists in an LDC where unscheduled predatory ³ military regimes, inheriting a recession, tend to select a 'low unemployment - high inflation' target on their Phillips curve type tradeoff; whereas civilian regimes, inheriting high inflation, would tend to select the reverse. That in turn would lead us to the possibility of a second rhythmic budget pattern of a quasi-PbdC nature ⁴ where the military, in pursuance of their avowed goals, will follow an expansionary fiscal policy which will aggravate the budget situation and create a greater tendency to rely on inflationary finance through seigniorage as compared to what civilian democratic regimes do. Related to these issues we also try to gather evidence on any significant differences in the form of use of instruments through engagements in 'policy surprises' between the two types of regimes.

To gauge these problems, we utilize intervention Autoregressive Integrated Moving Average(ARIMA) models in output growth and inflation; in the budget deficit, seigniorage and

¹ Indeed, Edwards(1994) himself applied his analysis to Chile - a less developed country; but his empirics stopped short of the military takeover in 1973. Hence his sample covered periods when transfer of power within constitutional democratic means was the norm.

² See Alesina *et.al.*(1992) for example.

³ For a topolgy of types of governments, see Krueger(1993) for example.

⁴ Eco-political cycles were developed essentially for the case of developed democracies with elections. To differentiate the patterns holding in LDCs where political power could alternate between democracies and dictatoships, we use the adjunct quasi.

the inflation tax; and in money surprises for the Sudan over the period 1956:1-1992:4. As noted above, over this period of time the two regimes of power alternated eight times in government-though, many times with differing administrations within each regime⁵.

The paper is organized as follows. Section 2 describes the setup and discusses the role of political instability in shaping policy targets and hence on determining the nature of the differentiated partisan behavior. It also discusses the role of abrupt political power turnover in shaping instrument assignments and hence on determining the nature of the quasi PbdC. This is undertaken through investigations on the degree of resort to seigniorage and the propensity of different regimes to rely on the inflation tax - despite its observed high inefficiency. A related discussion on the degree of reliance on policy surprises for each type of regime is also investigated in this section. Section 3 describes the empirical setup by presenting a historical note on the country and discussing the variables and data. The section then conducts tests for the presence of quasi partisan effects on output and inflation, on budget cycles and patterns of policy surprises for the Sudan. A final section 4 then concludes the study.

2. THE SETUP:

Some of the conventional theories of political rhythmic behavior could be modified to suit the requirements of a LDC alternating between civilian democratic and military dictatorship governments. A Nordhaus(1975) type PBCs cannot be postulated here since power in our construct doesnot change hands in accordance with a democratic electoral setup - rather it is violently transferred through *coup d'etats* and revolutions. But, on the other hand, correspondences could be drawn with Hibbs'(1977) PT; where LDC civilian governments tend to perform in a manner similar to Hibbs' 'rightists' and LDC dictatorships, revolutionaries or populists tend to perform in a manner similar to his 'leftists'. In his original formulation, Hibbs specified that elected left-wing governments tend to pursue expansionary demand policies resulting in due process in temporary increases in growth and reductions in unemployment. These policies inevitably result in the acceleration of inflation which may persist - due to credibility problems - even after the initial real expansion has waned. Conversely when right-wing governments are appointed, they are willing to incur the costs of an immediate recession or downturn, in order to reduce inflation. After the initial downturn, the economy returns to its natural level of activity and inflation remains low. In addition to having these partisan goals, politicians are opportunistic. They prefer being in office rather than out.

To adapt this construct to the case of our LDC, then the military dictator generally pursues 'ideological goals' that may fall within the opportunistic hypothesis framework. One often quoted pretext by the dictator for his assumption of power is the 'miserable state of the economy'. Lacking the legal basis for his move, the dictator normally tries to proceed swiftly on the economic front to attain what is sometimes termed 'the legitimacy of achievements'. Being

⁵ Regimes are either Military or Civilian. Administrations are different governments within the same regime.

assisted by an informational advantage⁶, the dictator will choose less unemployment at the outstart. Initially, inflation would generally be suppressed through massive incomes policy controls⁷. The exchange rate is normally pegged and black markets are curtailed⁸, *i.e.* the dictator would attempt to shift the conventional Phillips-curve tradeoff in order to strike both targets of high-unemployment and low-inflation. But the process tends to become unsustainable at some stage and faced with the policy dilemma of high growth and inflation, the dictator would opt for high growth, tending to view inflation as less of a hazard. The dictator will tend to rely more on monetary instruments use to meet his growing budget demands, normally via seigniorage, with no compunction of causing inflation. Money growth would go up in the period immediately following the assumption of power by a military dictator searching for swift achievements on the growth front. Inflation thus would tend to accelerate after the initial phases of the military administration.

In contrast, a democracy would assume that agents are rational to policy choices and/or that informations between governments and people are symmetric⁹. Myopia is ruled out and rationality in expectations admitted by allowance of symmetrical information between agents and government. Civilian administrators, observing rationality, will view inflation as the greater threat and hence exhibit relative monetary discipline refraining from excessive monetary instruments use. This severely constrains the set of policy options available to the civilian democratic regime. The civilian administrator would indulge in 'strategic behavior' electing to choose less of - the often inherited - inflation at the expense of possible higher unemployment and attendant slack of growth - the recession. The democratic government is thus more liable to stick to the exploitable conventional Phillips-curve trade-offs than the military regime did. There is no attempt at the impossible of trying to achieve simultaneously sustained output growth and inflation control.

The use of other forms of finance, aside from seigniorage, mirrors the political climate in the country. Taxation has its well-known economic and administrative problems in LDCs. Reliance on it may be shunned by LDCs' democracies, since they are mostly coalition administrations which are generally politically vulnerable and weak and often have to face hostile legislatures which may contain hostile private groups bent on deliberately undermining the economy in order to maximize the probability of a change. This means of finance is, however, exploited more ruthlessly by military governments. Reliance on foreign assistance is generally administration - not regime - specific depending on various political and economic stances. A particular military regime - *i.e.* a military administration - may succeed in tapping massive foreign assistances from

⁶ One of the first moves a dictator makes is to control the media and hence obstruct and manage the flow of information to the people.

⁷ However, inflationary pressures would tend to build up and explode at the point of relaxations of controls.

⁸ Military regimes go to considerable lengths to enforce these incomes policies. For example, in Sudan following the 1989 *coup de tat*, people found in possession of hard currencies were actually executed. Similar incidents occurred quite recently in Iraq.

⁹ In a democracy the media is free from political control. This serves to enhance the informational flow to the public

traditional aid sources whereas another particular civilian administration may fail to do so in any appreciable degree, and vice versa.

Related to the above is the question addressed recently by Cukierman *et. al.*(1992) and Edwards(1994), of whether a country of violent and unscheduled transfers of power via revolutions and *coup d'état* would exhibit a greater tendency to rely on inflationary financing as compared to democratically elected countries¹⁰. Political instability in this setup is related to inefficient tax forms like the inflation and trade taxes. To trace those quasi PbdC effects we will test empirically for the degree to which the consecutive regimes tended to rely on seigniorage, and hence the sensitivity - or indeed, the insensitivity - of each type of regime to the burden thus placed upon its citizens in the form of the resultant inefficient inflation tax.

Yet still on another related vein is the observation that military regimes - despite their announced ideological precommitments - generally may not regard the moral hazard as compared to civilian regimes. This will generally result in more volatile economic behavior being pursued, less consistency being ascribed to plans, more frequent policy reversals and less credibility being attached to policies. A military dictator may resort more often to policy surprises as opposed to a civilian administrator. As a result inflation may be further fueled through its added expectations. Thus another concern of the paper, is to empirically gauge the hypothesis that an LDC government's incentive to maintain its reputation, and hence be kept in office, discourages it from making policy 'surprises'. For, the cost of recurrent surprises is that agents are liable to endogenize them within their expectational generating mechanisms by realizing that reappointing a government that persisted in using surprises as a policy vehicle would end up in a higher expected inflation in the future and lower social welfare for the various participants. This factor may not be operative in the case of military dictatorships. Military dictators are not swayed by public opinion but serve to manipulate it. They are not concerned about the problem of retention in office but rule to enforce it. The military would tend to follow an egalitarian development path for the purposes of what they believe is benefiting a wider cross-section of the people¹¹. Hence they are more prone to rule and survive by constantly surprising the people. The reputational constraint seems not to be particularly binding for a military government but remains critical for a civilian democratic regime which would tend to shun policy surprises as compared to military regimes. In other words, policy surprises tend to remain exogenous under military regimes whereas they become endogenous for the civilian ones.

¹⁰ On yet another related vein, countries with unstable political systems usually lack reputation, thus tending to seek assistance and 'seals of approval' from external sources and institutions, *par exemple* the IMF, as a substitute for reputation. This contrasts with the case of politically stable countries with constitutional government transfers - a conjecture which was empirically tested and validated by Santaella and Edwards(1993) using probit analysis on devaluation episodes under Bretton Woods arrangements as functions of constructed political instability indices.

¹¹ Cases in point in the Sudan are the two ideologically motivated military regimes; The Nimiery and the Bashier regimes. Both followed neo-mercantilist approaches at their outstarts with autarchic, inward-looking and ultranationalistic policies which consider national autonomy and economic self-sufficiency as avowed goals.

But while the analysis admits some of the main theories in this area, it rules out others. For example, the conventional form of the PBC is inapplicable in our case since it presumes the knowledge of 'points of breaks' or regime shifts. In sustained DC democracies this is feasible and corresponds to the timing of elections. In a LDC which has fallen prey to the civilian - military cycle, the break point is unknown. The exact timing of a popular uprising or a *coup de tat* - though sometimes anticipated - is generally unknown with certainty and is an act of surprise in its own right with far reaching economic consequences.

An important implication of the above - noted by Edwards(1994) - is that political polarization plays a key role in explaining macroeconomic policy outcomes and fluctuations.

3. THE COUNTRY, VARIABLES, DATA AND RESULTS:

This section explores the evidence for the presence of eco-political patterns in business and the budget between military and civilian regimes which alternated in Sudan. Since strategic behavior - or opportunism - is likely to reveal itself in the choice of the actual policy instruments used rather than in the policy goals variables, we also gauge the evidence on rhythm in the budget deficit(fiscal) on one hand and in the seigniorage(monetary) and inflation tax variables on the other; where the latter two are differentiable in the case of high inflation. An addendum to these considerations is to investigate the extent of reliance on surprises by the two types of regime.

In what follows we start by presenting a brief history of the country over the sample period and then proceed to detect the empirical evidence in support of the rhythmic business, budgets and surprises.

3.1. The History:

Sudan gained its independence in January 1956. Since then, the country had been entrapped within a vicious cycle of eight alternating civilian and military regimes. The first democracy was overthrown by high ranking army officers led by, the then, army chief General Abboud in November 1958. A form of centre-rightist 'benevolent social-guardian'¹² dictatorship ruled upto October 1964 when it was overthrown by a massive countrywide popular uprising¹³. An interim civilian administration then followed and set the stage for the resumption of democracy by June 1965. A succession of centrist coalition civilian administrations then alternated in government upto May 1969 when a group of mid-ranking ideologically motivated leftist army officers led by, the then, Colonel Nimieri seized power. That regime quickly shed its ideological precommitments and rapidly degenerated onto a crude form of dictatorship revolving around its central figure, the bythen, General Nimieri. As Brown(1992) notes:

¹² See Kreuger(1993), for example.

¹³ The elderly junta were rather stunned by the extent and intensity of public resentment against their rule such that they relinquished power in a hasty way.

"... The Nimieri military regime involved series of coalitions across the entire spectrum of political parties over its sixteen years of existence."¹⁴.

In April 1985 that dictatorship was toppled under the combined weight of a popular *Intifada* and some form of a military acquiescence. A Transitional Military Council(TMC) ruled for one year paving the way for democratic elections which were conducted by March 1986. Again, a succession of center-right civilian parties' coalitions followed until a group of mid-ranking ideologically motivated - this time Islamic - army officers led by, the then, Colonel Bashier seized power on the last day of June 1989¹⁵. The military regimes of Nimieri and Bashier both succeeded in building what could be described as a 'Leviathan'¹⁶ bureaucratic-authoritarian predatory' state according to the political economy taxonomy of models of governments.

3.2. Variables and Data:

As far as the variables used are concerned, output growth and inflation are used to search empirically for the existence of a PBC. Output growth was computed using real Gross Domestic Product(GDP) figures while inflation was computed as the rate of change in the Consumer Price Index(CPI) figures measured by the first difference of the logarithm of the index. On the other hand the budget deficit(bd), seigniorage and the inflation tax were used to search empirically for the existence of a PbdC. The bd variable was computed using net claims of the banking sector on the central government. This is known to be a suitable empirical measure of the budget deficit in the case of an LDC since it takes into account the dependence on borrowing from the central and commercial banks as a main form of finance¹⁷. The variable actually used, bdy, was then taken as the ratio of bd to nominal GDP to obtain a budget deficit to income ratio. Seigniorage-reflecting the role of money finance- was measured as $\nabla \ln M \times m$ where $\nabla \ln M$ is the rate of growth of nominal money, ∇ being the first difference operator, $\ln M$ is the logarithm of nominal money with nominal money, M , being defined at the narrow concept; and m is real money balances. The inflation tax which refers to capital losses suffered by money holders as a direct result of inflation was measured as $\nabla p \times m$ where ∇p is the inflation rate with p being the

¹⁴ That regime was an example of ideological chaos starting from extreme left orientations and ending at the extreme right ones before it was eventually overthrown.

¹⁵ For more on the political economy of the country, see Niblock(1987) and Brown(1992) for example.

¹⁶ The 'Leviathan' is a Frankenstein monster. A Leviathan state is one in which entities such as the army and civil service, ostensibly created to 'serve the people' will instead arrogate to themselves the task of defining the goals of the state, which they make to coincide with their own.

¹⁷ The government budget deficit constraint faced by a LDC could assume the following form:

$$\begin{aligned} bd &= P(g - t) \\ &= \nabla M + \nabla L - \nabla F \end{aligned}$$

where g , t , M , L , F and P are respectively real government expenditures, real tax revenues, nominal money stock, nominal commercial banks claims on government, nominal foreign reserves and the price level. The constraint suggest that the bd could be financed by money creation, sale of government debt or running down foreign reserves. The ability to finance by debt expansion is limited because markets in government debt are generally not developed. Foreign exchange is scarce and hence the only component under the control of the government in a LDC is M . The measure of the bd used thus includes ∇M and ∇L from the government budget constraint.

logarithm of the CPI. Because of the presence of high inflation we treat seigniorage and the inflation tax as different; the two will be the same only if agents maintain a constant value of real money balances - a thing which does not happen during episodes of high inflation. Seigniorage and the inflation tax variables were then taken as ratios of GDP and denoted respectively as, $seiy$, and, $iftxy$. The related surprise variable, $msurp$, was constructed as the residual from an ARIMA model in the logarithm of nominal money, $\ln M$; where the orders of the ARIMA were determined by use of the appropriate identification procedures.

Quarterly data for the various variables were obtained from the *International Monetary Fund (IMF)*, *International Financial Statistics (IFS)* tapes. The sample period extends from 1956:1 upto 1992:4. GDP was used as a measure of output and income after addressing and resolving two impasse's. The first was that data on *real* GDP are not available prior to 1970. We used the CPI as a deflator for the whole time period. The correlation between the CPI and the GDP deflator since 1970 was of a high magnitude 0.988, hence pointing to the suitability of the CPI deflator to act as a proxy in the absence of the true deflator. The second problem was that the figures so obtained on real GDP were annual. Lagrangian interpolation methods were employed to convert these data points onto quarterly frequencies. Other structural variables used by researchers, e.g. Edwards(1994), were not available to us in the desired form and hence were not used. Subsequently, instead of using the structural approach or the transfer function technique, we followed the alternative time series intervention ARIMA methodology in our investigations.

3.3. The Empirical Models:

We work with a generalized intervention ARIMA model which assumes the form:

$$\nabla^d \nabla_s^D x_t = \frac{\theta(L)\Theta(L^s)}{\phi(L)\Phi(L^s)} \varepsilon_t + \sum_{j=1}^J \sum_{h=1}^H \frac{\omega_{jh}(L)}{\delta_{jh}(L)} L^{b_{jh}} \nabla^d \nabla_s^D I_{jht}$$

where x is the variable to be modeled, ∇ is the above defined ordinary differencing operator now of order specified by its d superscript, ∇_s is the seasonal differencing operator of length specified by its s subscript and order specified by its D superscript. The first term on the right hand side is the noise process in the ARIMA for which L is the lag operator, $\theta(L)$ and $\phi(L)$ are MA and AR polynomial lags respectively, $\Theta(L^s)$ and $\Phi(L^s)$ are seasonal AR and seasonal MA polynomial lags respectively. The second term on the right hand side specifies the nature of the intervention process; where we have J intervention regimes, I_j , with attached intervention and decay polynomials, $\omega_j(L)$ and $\delta_j(L)$, respectively and b_j measuring the delay in effect - or dead time - for intervention j . Each intervention regime I_j may encompass h administrations $h = 1, 2, \dots, H$.

To represent shapes of interventions, we entertained some parsimonious forms by appeal to the hypothesis that the military administration - with no answerability or accountability to an insubordinate legislature or an independent judiciary - would be more 'decisive' in its actions. Its

intervention would assume the shape of an abrupt start, or in macroeconomic jargon, an immediate 'cold-turkey', step response of magnitude ω_{jh} , and the effect of the intervention would be of permanent duration. On the other hand, the civilian government intervention would be of the more 'gradual start' first-order dynamic response form $\omega_{jh}(1 - \delta_{jh}L)^{-1}$ which has an intervention effect of permanent duration; with an eventual, or long run response, of magnitude $\omega_{jh}(1 - \delta_{jh})^{-1}$. In this form, δ measures the rate of decay. If $\delta > 0$, the effect is increasing and if $\delta < 0$, the effect is decreasing. If $\delta = 0$, the effect is instantaneous whereas if $\delta = 1$, the pulse input is a steep positive linear trend change with a permanent effect.

The intervention response polynomials were estimated firstly by Ordinary Least Squares(OLS) and the usual ARIMA identification procedures were then applied to the residuals from these regressions. Following appropriate identification, estimation was undertaken simultaneously for the full model incorporating the noise and intervention components. The method of estimation for the full model was Maximum Likelihood(ML) via Nonlinear Least Squares(NLS). Conventional diagnostic checks were applied for the various chosen models to guarantee their adequacy.

3.3.1. The Quasi Political Business Cycles:

In this section, we use the intervention ARIMA model to investigate the occurrence of PBCs on GDP growth and inflation rates. The interventions assume the forms of added political dummy variables in each case. The basic variables used are y and p which stand for the logarithms of output and prices respectively. Their rates of growth are ∇y and ∇p , *i.e.* the output growth rate and the inflation rate respectively. The interventions I_j stand for the Military(DMR), Transitional(DTR) and Civilian(DCV) regimes which are the political step dummies to be specified shortly. The general form of the model is:

$$\begin{aligned} \nabla^d \nabla_s^D x_t = & \frac{\theta(L)\Theta(L^s)}{\phi(L)\Phi(L^s)} \varepsilon_t + \sum_{i=1}^3 \frac{\omega_{M_i}(L)}{\delta_{M_i}(L)} L^{b_{M_i}} \nabla^d \nabla_s^D \text{DMR}_{M_i,t} + \sum_{k=1}^2 \frac{\omega_{T_k}(L)}{\delta_{T_k}(L)} L^{b_{T_k}} \nabla^d \nabla_s^D \text{DTR}_{T_k,t} \\ & + \sum_{l=1}^3 \frac{\omega_{C_l}(L)}{\delta_{C_l}(L)} L^{b_{C_l}} \nabla^d \nabla_s^D \text{DCV}_{C_l,t} \end{aligned}$$

where the military regimes consisted of three administrations, the transitional regimes of two administrations and the civilian regimes had three administrations.

To allow for differences within particular regimes, we tried 'administration-specific' regressions based on intervention ARIMA models¹⁸. We defined the variables $\text{DMR}_{i,t}$, $i = 1, 2, 3$ to stand for

¹⁸ Interventions usually have direct impacts on the *level* of the data. But in our case we are more interested in the impact of interventions on the *changes* e.g. output growth and inflation. This coupled with the fact that sometimes the levels were stationary as noted by the applied ADF tests, motivated us to model the variables in this subsection in their rates of growth form.

the three military regimes; $DTR_k, k = 1, 2$ to stand for the two transitional 'caretaker' administrations and $DCV_l, l = 1, 2, 3$ to stand for the three civilian administrations. The step dummy variables corresponding to these regimes were:

$$\begin{aligned} DMR_1 &= 1, & 1958:4 - 1964:3 \\ &= 0 & \text{otherwise} \\ DMR_2 &= 1, & 1969:3 - 1985:1 \\ &= 0 & \text{otherwise} \\ DMR_3 &= 1, & 1989:3 - \\ &= 0 & \text{prior} \end{aligned}$$

for the three military regimes, and:

$$\begin{aligned} DTR_1 &= 1, & 1964:4 - 1965:2 \\ &= 0 & \text{otherwise} \\ DTR_2 &= 1, & 1985:2 - 1986:2 \\ &= 0 & \text{otherwise} \end{aligned}$$

for the two transitional administrations. Further, dummies on the three civilian administrations during the sample period were:

$$\begin{aligned} DCV_1 &= 1, & 1956:1 - 1958:3 \\ &= 0 & \text{otherwise} \\ DCV_2 &= 1, & 1965:3 - 1969:2 \\ &= 0 & \text{otherwise} \\ DCV_3 &= 1, & 1986:3 - 1989:2 \\ &= 0, & \text{otherwise} \end{aligned}$$

Results obtained via time series regressions for the equations are listed below. First, output was $I(1)$ but its rate of growth, ∇y was $I(0)$ as judged by an Augmented Dickey-Fuller(ADF(4)) test in fourth period lags which resulted in a value of -95.990.

An intervention ARIMA(2,0,2) regressions was then identified and results obtained for the output growth equation were:

$$\begin{aligned}
\nabla y = & \underset{(10.341)}{0.690} \nabla y_{-1} - \underset{(2.846)}{0.197} \nabla y_{-4} + \underset{(8.165)}{\hat{\varepsilon}} + \underset{(19.863)}{0.431} \hat{\varepsilon}_{-1} - \underset{(19.863)}{0.968} \hat{\varepsilon}_{-4} \\
& + \underset{(2.461)}{3.262} DMR_1 - \underset{(1.174)}{3.509} DMR_2 + \underset{(4.268)}{21.898} DMR_3 \\
& + \underset{(1.215)}{3.828} DTR_1 - \underset{(0.010)}{0.022} DTR_2 \\
& - \underset{(2.593)}{2.072} (1 + \underset{(0.000)}{0.304} L)^{-1} DCV_1 + \underset{(2.941)}{0.492} (1 - \underset{(84.900)}{0.988} L)^{-1} DCV_2 \\
& - \underset{(1.990)}{1.048} (1 - \underset{(34.805)}{1.057} L)^{-1} DCV_3
\end{aligned}$$

$$R^2 = 0.833 \quad \hat{\sigma} = 6.033 \quad d = 1.882 \quad Q_{(35)} = 33.081 \quad (0.366)$$

where the bracketed terms underneath parameter estimates are t-values, R^2 is the coefficient of determination, being the uncentred one when the regression does not have an intercept term and the centred one when the regression does have a constant term, $\hat{\sigma}$ is the standard error of the estimated equation, d is the Durbin-Watson statistic and $Q_{(.)}$ is the Ljung-Box *portmanteau* statistic with bracketed degrees of freedom on the left hand side and P-values on the right hand side.

The fit for this equation was good. Output growth was significantly positive for two of the three military regimes whereas it was negative for two of the three civilian regimes. Growth was positive for the first military regime which spanned a period of six years. That regime was economically disciplined and initiated many development projects in all sectors of the economy. Towards the end of its period, there were signs of faltering, and indeed a growing economic crisis was one of the contributors to its eventual demise. As for the second military regime which spanned a period of sixteen years, growth was insignificantly negative. In view of the lengthy time period of its span, a better test of the effect of that particular regime would be to decompose its period into two subpartitions and to compare patterns of growth at the start and those towards the end. Growth was significantly positive for the third military regime which could be explained by the fact that the sample covered up to 1992, the period for which the drive for higher output was still underway. Output growth is expected to taper-off with the passage of time and indeed some post sample anecdotal evidence suggests that was precisely what was happening.

As far as the civilian regimes are concerned, growth was significantly instantaneously slack during the tenure of the first civilian regime which could be attributed to the break in performance caused by the transition to independence. The second civilian regime affected output positively. Its delay parameter was 0.988 which was not significantly different from one at level 1%. Hence the effect of that civilian regime on growth was increasing linearly through time. The behavior of the last civilian regime is also noteworthy. Results were in direct contrast to those of the second civilian regime with negative impacts on growth. As a civilian authority fighting the inherited inflation was a priority and hence it opted for deflation. Its period of office corresponded with the successive occurrences of many adverse supply shocks which worsened

the negative growth patterns inherited from the second military and transitional administrations. Those shocks assumed the shape of large scale droughts and resultant famines, intensification of the civil war in the southern part of the country and large scale floods in 1988. Hence growth was negative at 5% level for this regime. But this was a short run effect. The behavior of the regime showed some signs of different patterns of behavior over the long run as judged by the positive decay parameter estimate of magnitude 1.057 which was greater, though not significantly different, from 1. This indicates that the initial adverse step was more likely followed by a linear 'ramp' in growth.

As for as the inflation equation, we note at the outstart that the modeled variable is the first difference of the inflation rate which could be looked upon as a 'rate of growth' of inflation $\nabla^2 p$. We elected to use the rate of growth of inflation instead of its level because inflation was generally rising throughout the sample period. Hence, differences in the attitudes of the various regimes towards it would be more pronouncedly reflected with respect to its rate of growth than its level. During military regimes we expect inflation to accelerate whereas during civilian regimes we expect it to decelerate. In addition to that, inflation, as measured by ∇p , was nonstationary. The variable and its first difference were $I(1)$ and $I(0)$, respectively, as evidenced by the ADF unit root tests applied to them which yielded respective statistics of magnitude 2.002 and -124.483. The effect of a political intervention was thus held to be of step form with permanent duration.

As for the differential administration-specific inflation equation, we obtained the following intervention ARIMA(2,1,1):

$$\begin{aligned}\nabla^2 p = & -0.699 \nabla^2 p_{-4} - 0.476 \nabla^2 p_{-8} + \hat{\varepsilon} - 0.147 \hat{\varepsilon}_{-4} \\ & - 0.022 DMR_1 + 0.517 DMR_2 + 2.251 DMR_3 \\ & - 0.353 DTR_1 - 3.340 DTR_2 \\ & + 0.827 DCV_1 + 0.077 DCV_2 + 2.770 DCV_3\end{aligned}$$

(4.419) (4.113) (0.822)
(0.043) (1.867) (2.998)
(0.152) (2.072)
(0.294) (0.121) (3.392)

$$R^2 = 0.485 \quad \hat{\sigma} = 5.364 \quad d = 1.849 \quad Q_{(33)} = 50.349$$

(0.011)

Inflation accelerated during the last two of the three military episodes and especially so for the last one which generally followed a 'print-to-spend' policy to finance its expenditures. The regime was forced to follow this policy since other sources of finance dried up. Conventional sources of internal finance reached a limit with some indications of the onset of a reverse Vito-Tanzi taxational effect in the form of a Laffer curve for taxation. External sources of finance dried up because of certain political factors related to the escalation of the civil war in the south, allegations of terrorism and human rights abuses and to the policy stance of the military regime regarding the Iraqi invasion of Kuwait in August 1990 and its aftermath. During the period of

rule of the third military regime, there was a virtual abandonment of any commitment to monetary policy. In other words, the policy stance of the regime was effectively supplanted by the 'print-to spend' policy¹⁹. Inflation's growth was also significantly positive for the third civilian regime. That could be attributable to the same sudden structural supply side shifts, noted in the discussion on the output growth equation above, which occurred during the short lifespan of that regime. Inflation also tended to recede during transitions which could be attributable in turn to expectational mechanisms in operation following the fall of each military regime with agents anticipating a tough new stance against inflation from the forthcoming civilian administration plus a noticeable trend on part of the transitional regimes to harness at least the most immediate economic problem inherited from the fallen regime which is usually inflation.

3.3.2. The Quasi Political Budget Cycles:

This section investigates the budget and its methods of finance under the alternative regimes of government. The models used are again the intervention ARIMAs which parallel those for the PBC with appropriate differences in the dependent variables now.

The budget deficit ratio variable, bdy - which was I(2) - was investigated initially for the possible presence of rhythm in its behavior.

To allow differential regime impacts on the budget ratio, we identified and estimated the following intervention ARIMA(3,0,2):

$$\begin{aligned} \nabla^2 bdy = & \underset{(0.750)}{-0.072} \nabla^2 bdy_{-4} - \underset{(5.555)}{1.071} \nabla^2 bdy_{-6} \\ & + \hat{\varepsilon} - \underset{(49.461)}{1.156} \hat{\varepsilon}_{-3} \\ & + \underset{(3.857)}{27.100} \nabla^2 DMR_1 + \underset{(4.256)}{27.990} \nabla^2 DMR_2 + \underset{(3.872)}{22.982} \nabla^2 DMR_3 \\ & + \underset{(2.858)}{27.005} \nabla^2 DTR_1 + \underset{(3.738)}{16.919} \nabla^2 DTR_2 \\ & + \underset{(4.072)}{27.364} \nabla^2 DCV_1 + \underset{(4.161)}{26.894} \nabla^2 DCV_2 + \underset{(1.199)}{4.387} (1 - \underset{(28.864)}{1.159} L)^{-1} \nabla^2 DCV_3 \end{aligned}$$

$$R^2 = 0.980 \quad \hat{\sigma} = 12.332 \quad d = 2.768 \quad Q_{(34)} = 43.295 \quad (0.070)$$

There are similar significant impact expansionary budgets in all three military regimes and two of the three civilian ones, the first two. This could be explained by what Roubini and Sachs(1989) noted, that the presence of many political parties in a ruling coalition with a short expected tenure may be associated with a low ability to reduce the budget deficit and curb

¹⁹ On this see Murinde and Ngah(1993) for example.

inflation. A greater degree of political instability leads to higher budget deficits²⁰. This indeed was the case in Sudan; for most of the civilian administrations were in fact coalition administrations. Indeed, even the transitional regimes significantly pursued expansionary budget policies. This could be attributable to the growing demands made on the budget by the escalation of the civil war in the southern part of the country during the periods of tenure of those regimes in addition to the inertial factors at work on the budgetary process - a 'budget drag' - and to the general disinterest of the transitional administrations to undertake any drastic policy changes for fear of 'rocking the boat' further. Overall then, an PbdC may be discernible but inertial factors in the budget process may serve to blur the distinction between administrations.

Next, the seigniorage-GDP ratio, *seiy*, was investigated and found to be stationary according to an ADF(4)=-5.757. The differential *seiy* variable led to an intervention ARIMA(2,0,1) of the form:

$$\begin{aligned} \text{seiy} = & \underset{(13.107)}{0.889 \text{seiy}_{-1}} + \underset{(1.404)}{0.091 \text{seiy}_{-4}} + \hat{\varepsilon} - \underset{(8.370)}{0.624 \hat{\varepsilon}_{-4}} \\ & + \underset{(1.803)}{11.270 \text{DMR}_1} + \underset{(1.602)}{9.476 \text{DMR}_2} + \underset{(2.377)}{11.804 \text{DMR}_3} \\ & + \underset{(1.665)}{10.335 \text{DTR}_1} + \underset{(1.814)}{10.071 \text{DTR}_2} \\ & + \underset{(2.022)}{12.676 \text{DCV}_1} + \underset{(1.568)}{9.601 \text{DCV}_2} + \underset{(1.896)}{9.989 \text{DCV}_3} \end{aligned}$$

$$R^2 = 0.949 \quad \hat{\sigma} = 1.458 \quad d = 2.354 \quad Q_{(34)} = 36.423_{(0.231)}$$

The fit was good now and results were largely supportive for the prior expectations. Seigniorage was used as a form of finance by the different types of administrations but significantly so by the last military regime and the first civilian one after independence. In a LDC like Sudan this is the easiest form and few governments can resist its temptations. Reliance on seigniorage as a means of finance may be more administration rather than regime specific. Substantial reliance on printing money started to become noticeable since 1977²¹ *i.e.* during the second phase of the second military regime.

As for the differential inflation tax equation, results were:

²⁰ This was verified empirically by Roubini and Sachs(1989) and Alesina et. al.(1992). For formal models of the effects of political instability and conflict on budget deficits see Alesina and Tabellini(1990) and Tabellini and Alesina(1990).

²¹ See Brown(1992) pp. 111.

$$\begin{aligned}
iftxy = & 4.055 + 0.695 iftxy_{-1} + \hat{\varepsilon} + 0.294 \hat{\varepsilon}_{-1} \\
& \quad (2.245) \quad (8.078) \quad (2.799) \\
& - 2.946 DMR_1 + 2.988 DMR_2 + 6.855 DMR_3 \\
& \quad (1.545) \quad (1.691) \quad (2.981) \\
& - 2.111 DTR_1 + 4.853 DTR_2 \\
& \quad (1.306) \quad (2.229) \\
& - 2.593 DCV_1 - 0.511(1 - 0.968 L)^{-1} DCV_2 + 7.987(1 + 0.148 L)^{-1} DCV_3 \\
& \quad (1.058) \quad (2.395) \quad (30.789) \quad (3.752) \quad (1.061)
\end{aligned}$$

$$R^2 = 0.896 \quad \hat{\sigma} = 1.650 \quad d = 1.978 \quad Q_{(35)} = 51.847_{(0.020)}$$

Of the three military regimes two relied positively on the inflation tax. The second military regime coefficient was significant at 9%. The third at 0.3% level. Indeed, even the second TMC which was essentially military in nature exploited this form of taxation. Of the three democratically elected regimes only the last one resorted positively to this tax structure- the first and second having negative coefficients with those of the second civilian regime declining almost linearly through time. The third civilian regime was exceptional on this count with a positive coefficient which showed signs of decline through its estimated negative decay coefficient. This pattern was largely similar to that on the bdy variable and the same causes listed there for the behavior of the third civilian regime are applicable here.

Across regimes, a pattern is noticeable between the first military regime and the first and second civilian ones on the one hand; and between the second and third military regimes and the last civilian one on the other. The first group of regimes were largely nonideologically motivated whereas the second group could be classified as ideologically motivated and served to 'remain in office'. A military government is normally not sufficiently motivated in the sense that it is not worried by reelections. This was the case for the first military regime where the 'benevolent' junta assumed power citing growing political - not economic - instability. The civilian administration following that uprising generally behaved in a way similar to the military regime preceding it on the economic front. No one anticipated a recurrence of military rule after the uprising and hence the civilians were not much motivated to change the 'rules of the game'. As Brown(1992)²² notes:

"...Neither the civilian parliamentary regimes nor the military regime of Abboud sought to bring about any radical transformation of the economy they inherited, for ... most political authority lay with those social groups who had profited most from the socio-economic structure that had evolved before independence."

On the other hand, the two military and latest civilian regimes that followed were more or less, ideologically motivated, hence exhibiting partisan behavior, and enabling us to discriminate between different economic actions across political regimes. This may validate the conjecture

²² See Brown(1992) pp. 102.

that when governments are office-oriented, politicians in power behave similarly, irrespective of the nature of the system.

3.3.3. Monetary Surprises:

Money surprises were computed as residuals from an appropriately selected ARIMA fitted on the logarithm of nominal money $\ln M$. The variable was $I(1)$ since an ADF(4) statistic yielded a value of 2.108 for levels form, while that statistic was -31.965 for the first difference form. The chosen ARIMA(2,1,2) was:

$$\nabla \ln M = 0.274 + 0.436 \nabla \ln M_{-1} + 0.562 \nabla \ln M_{-4} + \hat{\varepsilon} - 0.556 \hat{\varepsilon}_{-1} - 0.358 \hat{\varepsilon}_{-4}$$

(0.036) (2.510) (3.222) (2.745) (1.852)

$$R^2 = 0.137 \quad \hat{\sigma} = 0.083 \quad d = 1.737 \quad Q_{(35)} = 22.981$$

(0.850)

Money surprises were then computed as the residuals from this money growth rates model. Results obtained after appropriate allowance for differential regime responses were:

$$\begin{aligned} \text{msurp} = & -0.092 \text{msurp}_{-1} \\ & + 0.013 \text{DMR}_1 + 0.014 \text{DMR}_2 + 0.059 \text{DMR}_3 \\ & + 0.007 \text{DTR}_1 + 0.035 \text{DTR}_2 \\ & + 0.033 \text{DCV}_1 + 0.001 \text{DCV}_2 + 0.022 \text{DCV}_3 \end{aligned}$$

(1.405) (1.214) (2.048) (3.912) (0.197) (1.388) (0.861) (0.036) (1.401)

$$R^2 = 0.165 \quad \hat{\sigma} = 0.057 \quad d = 2.089 \quad Q_{(34)} = 21.438$$

(0.939)

Results were robust across different specifications on money surprise ARIMAs and policy regime intervention ARIMAs. Of the three military regimes, two had significant positive coefficients. None of the three civilian regimes, or indeed the transitional regimes, adopted a similar policy of monetary surprises. The military made more recourse to money surprises as related to transitional and civilian administrators who followed more restrained policy paths. The results generally point to the reliance of military regimes on monetary policy surprises during the conduction of their expansionary policies as contrasted to civilian ones.

CONCLUSIONS:

The various theories on eco-political cycles were developed within a DC framework. The inquiry as to the possible existence and nature of these cycles in an LDC and as to the degree that results obtained would coincide with or depart from those generated for a DC framework, seems both of interest and relevance.

In this paper we considered the presence of possible 'partisan' modes of behavior in an LDC with frequent unscheduled political regime transfers. The partisan behavior is similar in concept to that of conventional Hibbs' type where emphasis is placed on systematic differences in macroeconomic policy targeting and instrument manipulation between an 'unemployment averse' left and the 'inflation averse' right. In our LDC the distinction is now between the 'growth prone' dictator and the 'inflation averse' civilian democrat.

The empirical analysis was undertaken with special reference to the Sudan - a country which has hit substantial political and economic turbulence in the past four decades. Results obtained presented some evidence on the presence of regime-specific cycles in policy variables outcomes and instruments use. The hypotheses that military regimes tend to pursue growth at the cost of inflation, that they have no compunction in resorting to the inefficient inflation tax to finance their expansionary budgets and that they tend to pursue policy surprises as contrasted to their civilian counterparts, were empirically corroborated. Clear cut evidence was obtained on the existence of PBC and in the pursuance of money surprises. The evidence however was less clear and remained lukewarm on some aspects of the PbdC. This is consistent with the notion that it is easy to manipulate policy instruments while it is more difficult to control policy outcomes.

The analysis could be conceivably formalized and generalized to other LDCs where power may change hands within a similar unscheduled abrupt transfer framework different from the electoral change perceived in conventional PBC theories. In view of the paucity of consensus on the existence of the various political cycles in DCs, our results generally support the view that a country which has an unstable political system would have a high level of inflation tax. An implication - noted by Edwards(1994) - is that creating and reforming the political institutions of the country with a view of strengthening democracy through representation and overall involvement and reducing political instability should be high in the agenda of policy reform.

To effect more generality, different types of behavior within regimes and between administrations could also be admitted. Military regimes tend to exhibit higher inflation *at first* whereas civilian regimes suffer from drag at the *outstart*. But both regimes come to 'catastrophic' endings via revolutions or *coup d'etats*, respectively. This may present an operational difficulty in the proper investigation of the hypothesis that regimes will behave differently during their first and second phases of tenure since mid tenure and hence first and second are not *a priori* properly defined for each regime in this context of an unknown and sudden change.

Other interesting hypotheses which were not pursued in this paper, but which are certainly worthy of being further investigated is to gauge the extent to which *private groups* or *agents* may deliberately destabilize the economy in order to maximize the probability of a structural change - a catastrophe²³ and the extent to which the findings may be consistent with the theories of the 'dynamic inconsistency of monetary policy'²⁴.

²³ See Nordhaus(1975) for example where *governments* destabilized to maximize the probability of retention of power through reelctions.

²⁴ See Alesina, *et. Al*(1992) for example.

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