

3-1-1986

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Recommended Citation

Akinnifesi, E. O. (1986). Independence of monetary management and exchange rate regimes: evidence from Nigeria, 1961 – 1982: comments. CBN Economic and Financial Review, (EFR), 24(1), 62-64.

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INDEPENDENCE OF MONETARY MANAGEMENT AND EXCHANGE RATE REGIMES: EVIDENCE FROM NIGERIA, 1961 – 1982

Comments

The following comments are based on Mr. Asogu's paper titled as above and which appeared in the December 1985 edition of the *Economic and Financial Review*.

The objective of the study is "to use the monetary approach to the balance of payments (MABOP) and exchange rate theory of an open economy to determine the existence and significance of the links and relationships among macro-economic variables which are regularly applied in monetary management of both the domestic and external sectors". The author hoped that through this procedure he could "provide a basis for rethinking about the adequacy or otherwise of current stance in monetary policy for the achievement of desired targets with minimal distortions on all the sectors". Although one objective thus appears to have been listed by the author, the various tests carried out in the body of the paper actually indicate that the author had several objectives which he intended to achieve. In particular, several equations were developed for the explanation of interest rates, exchange rates, reserves, and money demand in Nigeria. The author failed to show the interrelations among the equations which would convince the reader that only the objective stated in his introduction was being pursued.

The first criticism concerns the hypothesis of margins or means and variances of national inflation rates under which the author hoped to distinguish between fixed and floating exchange rates in Nigeria using what he called, the means and variances tests. In so far as the author himself had split the period of investigation into two subperiods i.e. 1961-1972, when the exchange rate was fixed, and 1973-1982, when the exchange rate was one of managed floating, what was the purpose of conducting tests to establish that the second exchange rate regime was floating? If the issue of floating exchange rate was crucial to his study he should simply have assumed it away knowing that it already existed. However, even when the test was finally conducted later in the study, the author still left the reader unconvinced about his test procedure and conclusion.

The test for Fisher-open relationship is based on the familiar equation which expresses a relationship between nominal and real rate of interest. The derivation as contained in equations 8.1 to 8.4 is supposed to incorporate the purchasing power parity (PPP) theory about which nothing was stated in the section as to how the PPP theory entered the equations. Secondly, the author failed to explain the meaning of the partial derivatives in equation 8 and the purpose of the equation. Also, what is the rationale for equations 8.1 to 8.4 more so when it is recognised that interest rates in Nigeria are determined administratively?

The author used the exchange market pressure hypothesis to explain the behaviour of exchange rates in Nigeria. As is well known, the naira exchange rate is also determined by the monetary authorities using the "basket-of-currencies" (BOC) approach. The author failed to show the link between the BOC approach and his equations 9.1 and 9.2. Indeed, granted that the Naira exchange rate can be modelled via the exchange-market-pressure (EMP) approach, the method and its implications can be better highlighted as follows:

According to its proponents i.e. Girton & Roper (1977), the

monetary model of the EMP is a model for explaining exchange rate movements and official intervention. The dependent composite variable ($r+e$) of the model which the authors call "(foreign) exchange market pressure" provides a measure of the volume of intervention necessary to achieve any desired target of exchange rate. The variable ($r+e$) thus contains two components – changes in official reserves and changes in exchange rates. A measure of monetary independence is the extent to which changes in the domestic source of reserve money (or monetary base) bring about changes in the demand for domestic base and thereby the total quantity outstanding. That is the degree to which the Central Bank in an open economy can pursue an independent monetary policy.

The crucial issue in determining the degree that a fixed exchange rate target undermines monetary autonomy say, in Nigeria, is whether the Nigerian authorities can allow their interest rates and prices to diverge from the interest rates and prices of their trading partners (e.g. USA) by the use of monetary policy.

Girton and Roper investigated this problem of monetary independence for the 2 – country case of Canada & America (USA) on the basis of the following equation:

$$r_c + e_c = -\emptyset_c d_c + \emptyset_c h_c + b_c y_c - B_c y_u + v_c$$

where, r_c = the rate of change of Canadian international reserves valued in domestic currency divided by the domestic monetary base. (r_c is thus a real measure of the balance of payments);

e_c = rate of appreciation of Canadian currency in terms of U.S. dollars;

d_c = percent change in Canadian base money created by domestic credit expansion;

h_u = percent change in the supply of base money issued by the US Federal Reserve;

y_c, y_u = percent changes in real incomes of Canada & U.S. respectively;

\emptyset, B = constant parameters;

v = error term.

When the original Girton – Roper equation above is compared with equations 9.1 and 9.2 in Mr. Asogu's paper a wide disparity can be noticed in the sense that the latter equations indicate regressions of naira exchange rate against variables such as domestic prices, foreign price, external reserves, money (undefined) and income. Even if the results were statistically robust, the issue of exchange rate determination rather than monetary independence would have been indicated.

A similar specification error occurs in the interpretations and use of "offset coefficient". In Asogu's work, the aim of using offset coefficient was to establish a link between external reserves and other monetary variables, i.e., interest rate (domestic and foreign), exchange rate, domestic prices, money (undefined), and domestic credit. In the original Obstfeld study, the notion of offset coefficient is taken to imply the fraction of any extension in domestic credit which is reversed by Central Bank foreign reserve losses in the same quarter and the fact that this provides a useful indicator of the scope for monetary policy which is oriented towards the domestic economy. Furthermore, the offset coefficient is interpreted in empirical studies as a measure of capital-account sensitivity to

domestic credit expansion, with a coefficient of unity indicating a complete offset.

There are two main approaches to the empirical estimation of the offset coefficient, i.e. structural and reduced-form approaches. The latter is briefly discussed. A reduced-form approach is a linear equation relating quarterly capital account surplus (CAP) to the change in domestic credit over the quarter (ΔDC), the change in the foreign bond rate (ΔR_f), the change in nominal income (ΔY), the current account balance (CURR), plus other exogenous variables of the capital account (X_i). Notationally therefore, we have,

$CAP_t = a_0 + a_1 \Delta DC_t + a_2 \Delta R_{ft} + a_3 \Delta Y_t + a_4 CURR_t + X_i B + u_t \dots$
where, a_1 measures the offset coefficient.

Once more, the gap between Asogu's and Obstfeld's specifications can be seen by comparing the above equation with equations 10.1-10.3 in Asogu's paper. One wonders why a proper 'adaptation' was not done by Asogu if indeed an adaptation was necessary in the face of available data for the variables of interest.

Finally, equations 11.1 to 11.4 in Mr. Asogu's paper were designed to reflect the 'currency substitution' model. He regressed money stock against his usual variables i.e. interest rate, reserves, price level, income, and domestic credit. It is, however, not clear whether the relationship is measuring money demand, money supply, or any other variable. An examination of the currency substitution model in the literature, however, reveals the following:

The term "currency substitution" is normally used in two senses: it may refer to substitution between domestic and foreign currencies within a single small economy and so the model assumes the absence of capital flows so that importations of currency takes place through current account surpluses. In the second approach, 'currency substitution is assumed to occur in a world of integrated capital markets'.

Using the second approach, the demand functions for two currencies (domestic and foreign) are specified and then solved simultaneously to yield an expression for the exchange rate as follows:

$$S = \frac{m}{m^*} K \exp - \epsilon (i - i^*)$$

where, S =exchange rate, expressed in units of domestic currency per unit of foreign currency; M =money supply, i =nominal interest rate, $K (=K^*/K_0)$ is functional notation for demand for money, and an asterisk denotes the foreign country.

The currency substitution model can, therefore, be seen as a model for determining exchange rates based on the relative

supplies of two currencies, and relative holding cost as measured by the interest rate differential. It can be shown that if the two currencies are close substitutes, a small increase in the nominal rate of interest would cause a sizeable shift in demand out of the domestic currency [Bilson, 1979 p.212].

The next critical area for examination in Asogu's paper is the results. Under the margin of means, it is not clear how the author obtained his 47 and 39 degrees of freedom. Also, what is the test criterion for declaring the mean difference of inflation rate highly significant? Under the results for interest rates, the test has to be more rigorous to warrant the bold conclusion that 'excessive regulation of interest rate structures without taking cognizance of real variables . . . render interest rate an unrealistic and ineffective monetary instrument.'

One finds it difficult to understand the conclusion regarding the Fisher Open relationship and exchange market pressure concept that 'changes in money supply . . . cannot be isolated in a realistic administration of exchange rates'

The 34 regression results obtained in the study are not only too many for what should otherwise be regarded as a simple study for policy guidance, but the series of misspecified functions as already pointed out above, seem to cast doubt on the reported coefficients and goodness-of-fit statistics.

In his conclusions and recommendations, the author attributed 'the prevalence of inelastic responses in most of the structural regression equations' to 'the degree of over-control of the economy' rather than the misspecification errors in his model structure. Several other conclusions were arrived at whose bases were not demonstrated in the empirical section of the study. Take for instance, the conclusion that, 'the analyses have shown that openness is more crucial in monetary management than exchange rate regime'; or the conclusion that, 'the results on offset coefficient and currency substitution and sterilization throw some light on capital mobility'. As for the recommendations, it is not clear, for instance, how monetary stability can be guaranteed by 'the creation of government equity interests in economic national utilities into bonds', etc., or the manner in which privatization of government businesses could be linked with the objective of Mr. Asogu's study. On the whole, however, one should say that since so much doubt surrounds the regression results, one would need to withhold judgement on the conclusions and recommendations in the paper, for now.

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A Reply

The broad objective of the study which has been clearly stated in the abstract and the introduction, has been put into econometrically or statistically testable forms, using the concepts and hypotheses presented in the paper. The concepts and consequent hypotheses and tests constitute alternative perspectives of evaluating the broad objective, namely, the linkages and relationships among the macroeconomic variables associated with the targets and indicators of monetary management of an open economy, such as Nigeria. Dr. Akinnifesi's suspicion that there is more than one objective has tended to influence his view of the material presented in the paper.

The various concepts presented were adapted from existing literature (especially where such procedures have been used to carry out similar studies) but with appropriate modifications. We are not compelled to do a one-to-one adaptation or grafting of the concepts (as originally proposed) and super-impose them on Nigerian data, but to ensure that whatever modification we effect on the procedures makes theoretical sense while enabling us to carry out plausible empirical tests. We adopted the multiple-procedures approach not because the single test procedure cannot be used to test the fundamental objective, but because it affords us opportunity of reconfirming results and conclusions from a particular procedure of a study that is considered exploratory at this stage. The specifications and test procedures may not necessarily be error-free, but several alternative procedures and tests are more likely to reconfirm correct results and conclusions than any single sensitive procedure would do.

Nevertheless, it would have been more helpful if Dr. Akinnifesi could pick one or two of the concepts, analyse, extend and/or reformulate them the way he considers most appropriate and run the tests using the same data. If he comes out with results and conclusions that contradict the ones presented here, we would be in a better position to reconsider our own results, and ascertain areas of further verification and explanation.

So far the comments have tended to divert attention away from important policy issues that need further examination and careful consideration. An example of diversionary comment borders on his view of our use of administratively determined interest rates and foreign exchange rates. The link that binds most monetary variables including rates is the price level and the consequential inflation variable. Any analysis that does not identify and separate nominal and real variables in the discussion is capable of misdirecting the reader. Thus, where nominal interest and exchange rates are administratively determined, as in the case of Nigeria, while the price level and hence inflation rates are not under such control, the existence of the Fisher Open relationship which also incorporates the purchasing power parity theory, implies that the real counterparts (real interest rates and exchange rates, and income) will be subjected to instability with greater consequences for the economy than the authorities perceive from the nominal variables.

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