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Is Namibia's Inflation Import-driven? An Econometric Investigation (1990-2007)

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Abstract: The principal objective of this study was to investigate and test the hypothesis that Namibia's inflation is mainly driven by imports using annual macroeconomic data. The study relied heavily on the Ordinary Least Squares (OLS) estimation technique. The study confirmed the results of previous studies (which used different methodologies from the current study) that inflation in Namibia is heavily import driven. The other variables that were found significant in explaining inflation in Namibia are rate of growth of GDP, broad money supply (M2), real interest rates and the real exchange rate. The main conclusion that we came to is that Namibia needs to put more emphasis in developing its manufacturing base which would ensure increased domestically produced output and less imported inflation from South Africa and the rest of the world.

Key words: Namibia, Inflation, Imported inflation, Macroeconomic data, OLS,

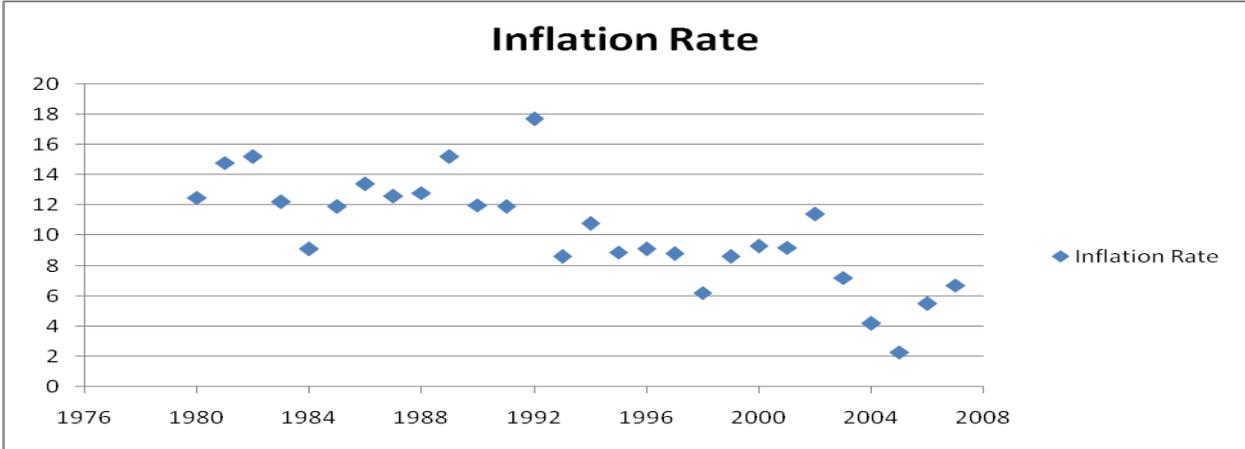
Introduction and Research Background

Economists have long recognized the potential dangers often associated with the phenomenon of inflation, especially if uncontrolled over a protracted period of time. The Monetarists, Keynesians, and the Structuralists in one way or another do ascribe to the notion that inflation could have a destabilizing effect on the national economy. In the case of Namibia's inflation, imported inflation is highly implicated as a contributing factor to its current inflationary situation. This is so since about 80% of the country's imports are obtained from South Africa. The result is that any rise in the general price level in South Africa is automatically transmitted to the economy of Namibia. South Africa is the industrial giant of the SADC region accounting for about 85% of the manufactured goods originating from this region and also accounting for about 68% of the GDP of the SADC region. It is very doubtful, if this situation is likely to change in the near future considering the current heavy dependence of the region for manufactured goods

from South Africa. Studies explaining the dynamics of inflation in the context of Namibia are rather scant, few and mainly qualitative in nature.

It's also important to note that Namibia has not experienced very high levels of inflation since 1980. For the period 1980 to 1989 average inflation was 12.97% with the highest level being 15.2% in 1982 and the lowest being 9.1% in 1984. For the period 1990 to 2007 average inflation was 8.8% with the highest level being 17.7 in 1992 (drought year) and the lowest level being 2.3% in 2005. In the same vein average inflation for the period 1980 to 2007 was 10.29 % with the highest level being 17.7% in 1992 and the lowest level being 2.3% in 2005. From 1980 to 2007 the inflation trend has been downward in Namibia as shown in the diagram below.

Diagram 1



Source: National Bureau of Statistics

The objectives of this study can therefore be viewed from the following perspectives:

Firstly, to establish, if Namibia's inflation is mainly driven by imported items. Secondly, to isolate other factors contributing to the current inflationary situation in Namibia. Thirdly, to establish, which of the factors are more critical in accounting for Namibia's inflation. The sample period that was studied runs from 1990 to 2007.

The rest of the paper is arranged in the following fashion. In section II, some theoretical thoughts concerning the inflation concept are presented. Section III discusses empirical works relating to inflation, while section IV focuses on data, procedures, methods as well as the various models utilised in the study. Discussions of research results constitute section V, while the final section is devoted to the concluding comments and policy alternatives.

A Theoretical Analysis of the Concept of Inflation

Despite the controversies in the literature regarding the definition of the term inflation, economists generally speaking, define inflation as a persistent increase in the level of the consumer prices. Alternatively, inflation is also defined as a persistent decline in the purchasing power of money, caused by an increase in available currency and credit beyond the proportion of available goods and services. Other theoretical explanations given by economists relating to inflation are presented below:

Demand-Pull inflation: This type of inflation originates from the buyers side of the market. It occurs when the aggregate demand in an economy increases above aggregate supply. Inflation occurs as real GDP rises and unemployment falls and is described as "too much money chasing too few goods". That however would not be expected to persist over time as supply would increase as a result of the increase in demand; and unless the economy was at full employment level, inflation would decrease.

The following factors were quoted as main causes of demand pull inflation:

- Rapid growth of household consumption
- Increases in government spending

Cost-push inflation: These factors operate through the supply side of the economy by increasing the unit cost of production. That occurred when firms do experience an increase in costs and then pass these costs

on to the consumers in the form of higher prices. Cost-push inflation had been cited to occur due to various reasons such as:

- Rising imported raw material costs, and
- Rising labor costs

Monetarists' Views: The Monetarists maintain that inflation is always engineered by monetary factors. The monetarists further argued that increased money supply will lead to increases in spending through transactional mechanisms, and that would invariably create a situation where aggregate demand for goods and services exceeds aggregate supply.

The Monetarists also identified budget deficit as an important factor contributing to inflation. If government spending exceeds government revenue, printing more money or borrowing becomes necessary. Both result in increases of money supplied and hence a lot of money in circulation which will inevitably lead to inflation.

Keynesians' Views: The Keynesians argued that keeping a tight monetary policy to control money supply does not necessarily control spending. They further argued that spending is not only dependent on the amount of money in circulation but also on how rapidly it is used. The velocity of money in circulation in the economy could differ depending on the number and volume of economic transactions occurring within the national economy within a specified period of time. Keynesians view inflation as caused by interest rates movement but not by money supply as the monetarists believed.

Structuralists Views: The Structuralists emphasized the importance of demand pressures, structural factors and cost pressures (e.g. import prices) as the fundamental causes of inflation. The structuralists argued that monetary expansion was not in itself the cause of inflation, but rather an indication of the existence of upward pressures exerted on prices by structural and cost factors. This implied that, aggregate demand for goods and services in an economy might increase, not necessarily because of an increase in the rate of money supply, but also because of structural changes in the economy.

Some Selected Empirical Works on Inflation

Goamab (1998) in his study of inflation in Namibia employed a combination of the following econometric techniques, namely, co-integration, error correction modelling and structural stability testing. The co-integration was used to provide potential information about the long-term equilibrium relationship of the model, while the error correction modelling was used to evaluate the short-term adjustments in the model and the structural stability testing was used to determine the behaviour of inflation function in Namibia. The study revealed that there was a dominant influence of foreign prices, especially, imported inflation from South Africa on Namibia's inflation. The study used data covering the period 1974 to 1996. The study observed generally that Namibia's inflation is highly affected both on the short and long runs by external factors.

Odada (2000) isolated the potential causes of inflation in Namibia. The study relied upon regression technique using data covering the period 1972-1998. The study identified among others money supply, real GDP, aggregate demand and South Africa consumer and producer price indices as significant sources of inflation in Namibia. The study strongly implicated the heavy reliance on imports from South Africa as a critical variable contributing to Namibia's inflation.

Ogbokor (2003) analysed the impact of inflation on Namibia's economic growth. Using annual data covering the period 1991 to 2001, he observed that inflation could be counter productive, especially if not controlled. He also attributed a great deal of Namibia's inflation to external factors.

Atta (1995) using OLS and cointegration and error correction techniques revealed that there was indeed a very strong influence of South African prices on prices in Botswana in the long run. The study further revealed that 92% of changes in the price of imports from South Africa are also transmitted to the economy of Botswana.

Model, Methodology and Data

Inflation is a complex process and it is very difficult to construct an empirical model for a country. However it is possible to find the key variables impacting the inflation process in a country like Namibia. On the basis of the monetarists' argument that inflation is always and everywhere a monetary phenomenon, the first determinant of inflation we consider in this study is the rate of money supply (M2) growth. Since there are some lags in the impact of monetary policy on the real variables we also include first lag of money supply (M2) growth. To see how the availability of goods and services in the economy eases domestic pressure on the domestic price growth we include real GDP growth in the equation expecting a negative sign. We also know from the cost-push theories of inflation that the cost of capital may also be a significant contributory factor to inflation. The real lending rates were used as a proxy for the cost of capital in our analysis and we expect it to be positively related to inflation. The USD to Namibian dollar exchange rate is the other variable that we include in the model of inflation for Namibia. A weaker Namibian dollar leads to higher domestic prices of goods and services and hence the need to include the real exchange rate in our analysis. Our analysis also includes the real budget deficit growth as an explanatory variable for inflation. Budget deficits may spur the Government to borrow from the domestic market and end up crowding out the private sector (which normally borrows to finance investments in the productive sector). If this goes on for some time, it will impact negatively on national output and hence cause inflation. The other key variable, which has to be included, is the rate of growth of the imports price index. Real budget deficits growth and the rate of growth of the imports price index could be categorized as structural variables of inflation as they depend on the structure of the economy. Lastly, the other variable that will be included in the analysis is the previous level of inflation. The argument here is that the previous levels of inflation affect the current level of inflation, in other words, the higher the previous level of inflation the greater the impact it has on the current level of inflation and vice versa^[10].

So the general model for inflation in Namibia is given by:

$$\pi_t = f(g_t^M, g_{t-1}^M, g_t^Y, i_t, rex_t, rbd_t, \pi_{t-1})$$

[1]

The linear specification of [1] is as follows:

$$\pi_t = \alpha_0 + \alpha_1 g_t^M + \alpha_2 g_{t-1}^M + \alpha_3 g_t^Y + \alpha_4 i_t + \alpha_5 rex_t + \alpha_6 rbd_t + \alpha_7 \pi_{t-1} + \varepsilon_t \quad [2]$$

The log linear specification of model [2] is as follows:

$$\ln \pi_t = \ln \alpha_0 + \alpha_1 \ln g_t^M + \alpha_2 \ln g_{t-1}^M + \alpha_3 \ln g_t^Y + \alpha_4 \ln i_t + \alpha_5 \ln rex_t + \alpha_6 \ln rbd_t + \alpha_7 \ln \pi_{t-1} + \varepsilon_t$$

[3]

where, g_t^M , g_{t-1}^M , g_t^Y , i_t , rex_t , rbd_t , π_{t-1} represent rate of money supply (M2) growth, first lag of money supply (M2) growth, real GDP growth, real lending rates as a proxy for interest rates, real exchange rate, percentage growth of debt, import price index growth and previous level of inflation. Model [3] is the model that we are going to estimate because in almost all cases it performs better than the linear specification. We first estimate equation [3] using Ordinary Least Squares estimation technique and apply all the diagnostic tests to the equation. When the equation passes these tests we then include the rate of growth of the imports price index (g_t^{mpi}) (we used the South African CPI as a proxy). We test if imports price index rate has any significant impact on inflation in Namibia in the presence of explanatory variables found significant in the estimated equation [3].

Discussion of Regression Results

We started by regressing equation [3] using Ordinary Least Squares (OLS) and all the variables except real interest rates were found insignificant. We then dropped the insignificant variables one at a time starting with the most insignificant ones and then observed the performance of the remaining variables in

the OLS estimation. Through this iterative process we found that money supply, real interest rates, real exchange rates, and real GDP growth are the arguments of inflation in Namibia. Previous levels of inflation, previous levels of money supply, and budget deficits growth were found to be insignificant arguments of inflation in Namibia. The results of the study are summarized below:

Table 1: Model of inflation without the imports price index variable

Variable	Coefficients	t-statistic	p-value
$\ln\alpha_0$	3.6124	2.6832	0.00033
$\ln g_t^Y$	-0.9218	-1.8642	0.00793
$\ln i_t$	-1.5527	-3.2498	0.00696
$\ln rex_t$	0.5791	2.1960	0.04849
$\ln \pi_{t-1}$	0.1855	0.9061	0.38269
$\ln g_t^M$	0.4182	0.6939	0.09100

$\overline{R^2}$ = 75%

Observations = 18

F statistic = 7.2428 (0.002543)

DW statistic = 1.84

Table 2: Model of inflation for variables that were significant in Table 1 plus import price index variable

Variable	Coefficients	t-statistic	p-value
$\ln\alpha_0$	7.58526	3.45	0.004
$\ln g_t^Y$	-0.0942493	-1.35	0.089
$\ln i_t$	-2.02921	-3.21	0.007
$\ln rex_t$	0.533181	2.26	0.053

lng_t^M	0.4234	0.6844	0.078
mpi_t	0.54163	0.3555	0.042

$\overline{R^2}$ = 78%

Observations = 18

F statistic = 12.9415 (0.00013)

DW statistic = 1.89

The results in Table 1 do not include the rate of growth of budget deficits, the lagged rate of growth of money supply, and lagged inflation rate as explanatory variables as suggested by equation [3] because these three variables performed badly in the preliminary estimations that we did and we therefore dropped them from the final equation estimated. The results summarized in Table 2 include the variables that were found significant in Table 1 and the rate of growth of the import price index variable. The import price index is the variable, which helps to answer the important question about whether Namibia's inflation is import driven, or not. The results show that import price index is an argument for inflation in Namibia and this implies that Namibia's inflation is import driven. The results obtained reveal that there is a dominant influence of foreign prices and imported inflation from South Africa on Namibian prices and inflation, which conforms to the apriori expectations. Real income growth however showed a negative relationship with inflation, which is in line with theoretical expectations. The results we got are also in line with the results obtained by other researchers. The F-statistics for the two models above show that the results of the two models specified were robust; and also that the models' DW-statistics show that they are autocorrelation free.

Conclusion and Policy Alternatives

Maintaining low inflation without hurting economic growth is the main macroeconomic policy objective in Namibia and any other developing country. We have attempted in this study to model inflation in Namibia by focusing on the contribution of imports to the inflationary process. The results

that we got reveal that the imports price index as proxied by the South African CPI is a significant determinant of inflation in Namibia. This suggests that Namibia is an extremely open and import dependant economy, which makes the country vulnerable to foreign price developments especially in South Africa. For Namibia to reduce its dependence on imports and for the policy makers to have greater success in meeting the objective of maintaining price stability, there is need to put more emphasis in developing the manufacturing base for Namibia as this would help reduce dependency on imports, and hence protect the country against the changes in prices of the imports. The manufacturing base can only increase under a conducive investment environment and a sound investment policy.

The other variables that were established as arguments of inflation are rate of growth of real GDP, money supply growth, real interest rates and the real exchange rate. These are the variables that the policy makers need to watch very closely if they want to keep inflation at bay in Namibia. The results of this study vindicate the results of a similar study carried out by using co-integration and error correction modelling in 1998.

It is also important to note that for a given level of overall output production in the economy there is a desired level of money stock which is consistent with low and stable inflation conditions, the additional money created becomes inconsistent with economic activity and, therefore, becomes inflationary. It is therefore important for the policy makers to determine this level of money supply that is consistent with the current level of output production if the Namibian economy is to suppress the emergence of inflationary pressures.

The N\$/US\$ exchange rate which was found to be significant, also, has important policy implications. Devaluation of the exchange could be used as a tool to enhance competitiveness, and domestic monetary measures could be used to contain the short-run inflationary pressures that could result. In addition, the Lucas critique would argue that a policy of continuous devaluation would lead

agents to adjust their behaviour to take account of the repeated devaluation, limiting the effectiveness of the policy. The opposite policy of exchange rate appreciation to achieve inflation lower than in the USA could only be achieved at the cost of reduced short-run competitiveness for domestic producers. This would make the task of export diversification even more difficult.

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