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### Abstract

The central bank of a country is a very important institution. Usually, it is in charge of monetary policy and supervision of the banking industry and, consequently, publishes money and banking statistics. However, in some developing countries, like Nicaragua, its central bank, Banco Central de Nicaragua, also publishes the official national income accounting data, which includes the Gross Domestic Product (GDP) and all its main components: private consumption, private investment, government expenditures, and net exports.

The Central Bank of Nicaragua (Banco Central de Nicaragua) also publishes real GDP figures, which determine the rate of growth of an economy. This paper analyzes the economic report found on the homepage of the central bank of Nicaragua for the period between 1960 and 2000 and evaluates its consistency across different sub-

periods using an alternative method of calculating the real GDP. Those sub-periods are: 1960-1963, 1964-1973, 1974-1977, 1981-1987, 1989-1990, 1991-1994, and 1995-1999.

The analysis shows that all sub-periods but one contains consistent statistics. Specifically, the 1981-1987 official report shows that the Nicaraguan economy shrank at an average annual rate of -0.52 percent, while the author's estimation shows that it actually shrank at a rate of approximately -21.33 percent. As expected, the two rates are statistically different. There is no significant difference between the reported and calculated rates for all the other sub-periods.

## Introduction

Basic aggregate demand and aggregate supply analysis demonstrates that, in the short-run, inflation and output are positively related. However, when the money supply is increased at very high rates, the effect on output is reduced and a period of hyperinflation may occur. As Milton Friedman once said: "inflation is always and everywhere a monetary phenomenon" (Friedman, 1982). Some of the better known hyperinflation episodes occurred in Germany and Hungary during the 1920s and 1940s respectively. More recently, during the 1980s, Bolivia also experienced hyperinflation. Such an episode was analyzed by Sachs, who focused on the necessary monetary and fiscal policies to control prices (Sachs, 1987). Almost simultaneously, Nicaragua experienced hyperinflation under the administration of a new government called the Sandinistas, who took power in July of 1979 after a one-year civil war. This paper analyzes the post-revolution 1981-1987 period and compares it to other periods in Nicaraguan in order to test the consistency of the statistics reported by the central bank.

## Method

Real GDP is simply defined as the value of all goods and services produced by an economy after discounting the effect of inflation. Thus, a simple way to measure the growth rate of real GDP growth is to subtract the rate of growth of prices from the rate of growth of nominal GDP. For example, if inflation grows at 3 percent while the nominal GDP (GDP at market value) grows at 7 percent, the real GDP grows at 4 percent (7 percent - 3 percent). In countries like the United States, the inflation rate is estimated using the GDP deflator, which is an estimator of inflation based on the value of goods and services produced. On the other hand, the CPI is another price index that measures inflation based on items consumed by the typical family, and its rate of growth could also be used to estimate the rate of growth of real variables.

The method described above has been questioned by some authors, who argue that the CPI only measures prices of the consumption component of GDP (Altig, 2008). However, other authors have used the CPI as a deflator instead (Asdruballi, Sorensen, and Yosha, 1996) (Kalemli-Ozcan, Sorensen, and Yosha, 2003). Whatever bias is

introduced by the use of such an index, it would be consistently reflected in this study since the calculations are made for different periods. As will be demonstrated below, the results obtained do not support evidence of an upward or downward bias.

To make any economic evaluation of the Nicaraguan economy using statistical data presents some challenges. Due to significant changes in monetary policies, since 1960, the Nicaraguan Consumer Price Index has used five different base years. As a strategy to control inflation, in 1988, the Sandinista government announced the creation of a “new” currency which exchanged with the “old” currency at a ratio of 1 to 1,000. And in 1990, a new currency called “cordoba oro” was introduced at a one-to-one exchange rate with the dollar. For a more detailed analysis of the different policies implemented before, during, and after the Sandinista regime, refer to a special report prepared by The Swedish International Development Agency (Bruno, Corbo, Fischer, & Laban, 1993).

## Results

Due to the restrictions mentioned above, the first period analyzed was the one between 1964 and 1973. According to the Banco Central de Nicaragua (BCN), real GDP grew at an annual average rate of 9.73 percent.<sup>1</sup> The “predicted” rate of growth using the CPI and the nominal GDP is 9.14 percent for the same period. The difference between the two rates is 0.59 percent (real GDP growth rate reported minus the predicted rate of growth). The period between 1974 and 1977 experienced, according to the Central Bank, a real GDP rate of 4.4 percent. The predicted rate of growth for the same period is 6.14 percent, indicating a difference of -1.74 percent. For the period 1981-1987, the main focus of this paper, the BCN and calculated rates are -0.52 percent and -23.75 percent respectively, for a significant difference of -23.23 percent. Between 1989 and 1990, the real GDP grew at a rate of -0.19 percent while the calculated rate was 0.38 percent for a difference of -0.57 percent. Another “post-revolution” period analyzed was the one between 1991 and 1994. Both the reported BCN rate of growth of real GDP and the estimated rate were 1.09 percent, indicating a perfect prediction of the rate using the method explained before. That is repeated during the period 1995-1999 as both rates were 5.32 percent. Table 1 below summarizes the findings.

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<sup>1</sup> All average rates calculated are geometric means.

**TABLE 1: Real GDP growth reported by the BCN and Calculated**

<b>Period</b>	<b>BCN rate</b>	<b>Calculated Rate</b>	<b>Rate Difference</b>	<b>Difference-in- Means Test (p-values)</b>
1964-1973	9.73%	9.14%	0.59%	0.804
1974-1977	4.4%	6.14%	-1.74%	0.702
<b>1981-1987</b>	<b>-0.52%</b>	<b>-23.75%</b>	<b>-23.23%</b>	<b>0.0000145</b>
1989-1990	-0.19%	0.38%	-0.57%	Na
1991-1994	1.09%	1.09%	0%	0.99
1995-1999	5.32%	5.32%	0%	0.99

As may be observed, even though there are differences between the reported rates and the predicted rates, these are not significant, especially if they are compared to those observed during the 1980s, the years when the Sandinistas ruled the country. As is indicated by the p-values, none of the periods observed has significantly different means, not only at the traditional 5 percent level of significance, but at extreme values of at least 70 percent. However, during the Sandinista period, the p-value indicates that both means are significantly different at a 99 percent confidence level. What could have caused such a great disparity? It is not possible to argue that the CPI is not a reliable variable since, as demonstrated by the results, it can predict the rate of growth of real GDP during every other period, nor can it be argued that it introduces an upward or downward bias, as the results demonstrate no consistent difference in either direction. That leaves only two other explanations: either errors entering data or the Sandinista government altered the data to present a conservative picture of an economy growing at about 0 percent rather than a catastrophic negative growth comparable only with “Great Depression” rates.

## **GDP COMPONENTS**

The BCN does not publish the GDP expenditures as private consumption, private investment, government spending, and net exports. Instead, it publishes private and public consumption, private and public investment, and net exports. To make matters more suspicious, the 1980s period is the only period that does not have any data

available for private and public investment. That means that it is impossible to know the amount of government spending (public consumption plus public investment) and private investment (not published). However, some efforts that are explained below were made to uncover the absent data.

First, real private consumption is the most important macroeconomic component of real GDP and, therefore, it should reflect the economic contraction of the 1980s. Table 2 below shows the rates of growth of such a variable according to the official government version, the “calculated” versions using the CPI to deflate it, and finally, the rates obtained if real consumption were calculated with the implied GDP price index.

**TABLE 2: CONSUMPTION GROWTH RATES**

Year	BCN reported growth rate	Growth rate using IPC	Growth rate using the GDP Implied Index.
1981-1987	-7.11%	-26.5%	-5.8%

According to the BCN, during the period between 1981 and 1987, real private consumption grew at an average annual rate of -7.11 percent. If the implied GDP Price Index were used, the rate would have been -5.8 percent, a relatively close number. However, if the CPI were used, the rate would have been a much lower -26.5 percent. An interesting observation is that the BCN officially published growth rates for real GDP and real consumption as -0.6 percent and -7.11 percent respectively. Those are very inconsistent rates since an economy that contracts only by 0.6 percent cannot have simultaneously a much larger contraction of 7.11 percent in real consumption, which historically accounts for about 70 percent of total expenditures.

Another important component of GDP that is not published on the “Gastos” (expenditures) page is government spending. Not surprisingly, that only occurs during the Sandinista government (the 1980s). However, there is another publication named “gastos del gobierno central” (central government expenditures) in which all government expenditures are shown including the 1981-1987 period. Although these expenditures are not identical to those reported on the GDP accounts for periods other than the 80s, they can be a very good proxy for total government expenditures since in a small country like Nicaragua local governments have very limited budgets, and most of them are supported by grants provided by the central government. Besides, for this study, what matters are the rates of growth, not the actual values.

Central government spending is further divided into “normal purchases” and “investment spending.” Tables 3 and 4 below show the different rates of growth of the two components of government spending using the two different price indexes. There is no official version of the BCN for the real values of this variable.

**Table 3: Real Government Spending Average Rates of growth calculated using IPC  
(1981-1987 period)**

Non-capital expenditures	Capital Expenditures	Total
- 14.97%	-27.2%	-17.3%

**Table 4: Real Government Spending Average Rates of growth calculated using GDP Implied Price Index  
(1981-1987 period)**

Non-capital expenditures	Capital Expenditures	Total
8.3%	-7.3%	5.42%

It is clear from Tables 3 and 4 above that during 1981-1987, real government spending in capital goods declined. However, two different calculations are obtained for total expenditures: a decrease by 17.3 percent using the IPC as deflator, and an increase by 5.42 percent using the GDP price index as a deflator. The latter figure will be used below to adopt a more “conservative” approach analyzing the components of GDP.

The last piece of the puzzle is private investment. The official publication of the BCN shows no data for private or public investment for the 1981-1987 period. However, the BCN publishes “real total investment” (private plus public), and according to those numbers, it grew at an average annual rate of 4.22 percent. This reveals interesting results. On one hand, as it is shown in Tables 3 and 4, real public capital expenditures grew at negative rates, -27.2 percent or -7.3 percent respectively. However, the government reported that total investment grew at 4.22 percent. Using the most conservative approach of a -7.3 percent rate for public investment, private investment should have increased by 11.9 percent. The latter rate was calculated based on the historical weights found in the same data set (1960-1977) whereby public investment is about 40 percent of total investment while private investment the remaining 60 percent.

Finally, the BCN also publishes exports and imports. For the period between 1981 and 1987, the average annual rate of growth of Net Exports is -2.02 percent, making this a positive contribution to the economy (a negative number becoming less negative). However, such “improvement” should not be regarded as a stimulus to the economy since it is just the result of exports declining at a higher rate (6.24 percent) than imports (4.69 percent). Table 5 below summarizes the growth rates of real GDP and each one of its components.

**Table 5: Rates of Growth of Real GDP Components**

**1981-1987 period.**

GDP	Consumption	Gov. Spending	Pvt. Investment	Net Exports
- 0.52%	-7.11%	5.42%	11.9% (est.)	-2.02%

Except for the rate of growth of private investment, every rate of growth shown is published by the Central Bank of Nicaragua. Using the most conservative estimated rates, private investment should have increased by approximately 11.9 percent. Such rate does not seem too logical given the characteristics of the 1980s. According to the assessment of the same period reported by the Swedish International Development Agency (Corbo, Fischer and Laban, 1993), the standard of living “went back to 1940s levels; a fall of more than 70 percent in real wages..., negative savings reached levels of -9.1 percent of GDP” (p.5). Adding those two facts, falling wages and falling savings, how could have private investment increased at such positive rate? Obviously, that is a piece of the puzzle that does not fit.

## **Conclusion**

The official publications of the Central Bank of Nicaragua are found consistent and reliable except those that correspond to the 1980-1987 period. First, the published real GDP annual average growth rate is not even close to the calculated rate using the CPI as the price deflator. The latter is much larger and negative, indicating an economy experiencing a very deep recession, which is consistent with the findings of other reliable sources like the Swedish Agency mentioned above. The abysmal difference of the rates is not shown in any other period. In fact, for some periods, the two rates are identical.

Analyzing the average rates of growth of the GDP components demonstrates that the BCN official figures for that period are either plagued with errors or lies that attempt to hide the economic catastrophe experienced by the Nicaraguan economy during the Sandinista period. While the real GDP is shown contracting by only 0.52 percent, real private consumption declines by a much higher negative rate of 7.1 percent, which indicates a clear inconsistency. On the other hand, using the BCN's own reports on government spending and trade deficit, it is implied that private investment increased at an average annual rate of 11.9 percent, which is another inconsistency. Are these errors or data manipulation? I think the answer might be found with the current government of Nicaragua.

The Sandinistas are again in power and are ruling the country with the same president of the 1980s, Daniel Ortega. He personally receives revenues from the sales of Venezuelan oil to his own government and neighboring countries. He created a company called "Alba de Nicaragua, S.A, or ALBANISA" to administer such revenues, but he has not provided any reports or financial statements of such activities despite public demands made by opposition leaders and non-governmental organizations (Riley, 2010). I personally think that such flagrant conflict of interest is a clear indication that the Sandinista bookkeeping flaws are not produced by unintentional errors.

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