

Determinants of Hyperinflation: An Analysis of Argentina

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Abstract:

This paper examines the history of inflation rates in Argentina compared to other economic factors, including: GDP, national budget, money supply, exchange rate, and unemployment levels. Using data from the World Bank and Centre of International Economics this paper will give insight into some of the causes of high inflation levels that were evident in Argentina throughout the 1980s, peaking with hyperinflation in 1989 and 1990. Results from analyzing statistics pertaining to Argentina's economy from 1980 to present suggest that perpetual budget deficits led the government to print money more rapidly, causing a significant decrease in currency valuation and thus high inflation levels. The findings of this study suggest that by operating a balanced budget and controlling the money supply chronic high inflation and hyperinflation can be avoided.

JEL Classification: E31, E62

Keywords: Argentina, Inflation, M1, GDP, National Budget, Exchange Rate, Unemployment.

1.0 INTRODUCTION:

Inflation in an economy can have both positive and negative effects. Positive effects include economic growth and mitigation of economic recession, while the most prominent

negative effect is the devaluation of real money. Hyperinflation, however, can have detrimental effects on an economy and lead a country into serious economic turmoil. Hyperinflation is the extreme increase in prices as currency rapidly loses value. Argentina experienced periods of high inflation throughout the 1980's, along with a phase of hyperinflation in 1989 and 1990. The current inflation level over the past 15-20 years has been fairly stable, staying primarily between -1% and 10%.

High inflation levels can be the cause of a number of different problems in a given economy, including but not limited to, monetary policy and budget deficits that lead to rapid increases in the money supply. This paper examines the causes of the inflation within an economy and how hyperinflation can be prevented. Using data from the World Bank and Centre of International Economics websites, the causes of and effects of high inflation in Argentina are examined in this paper.

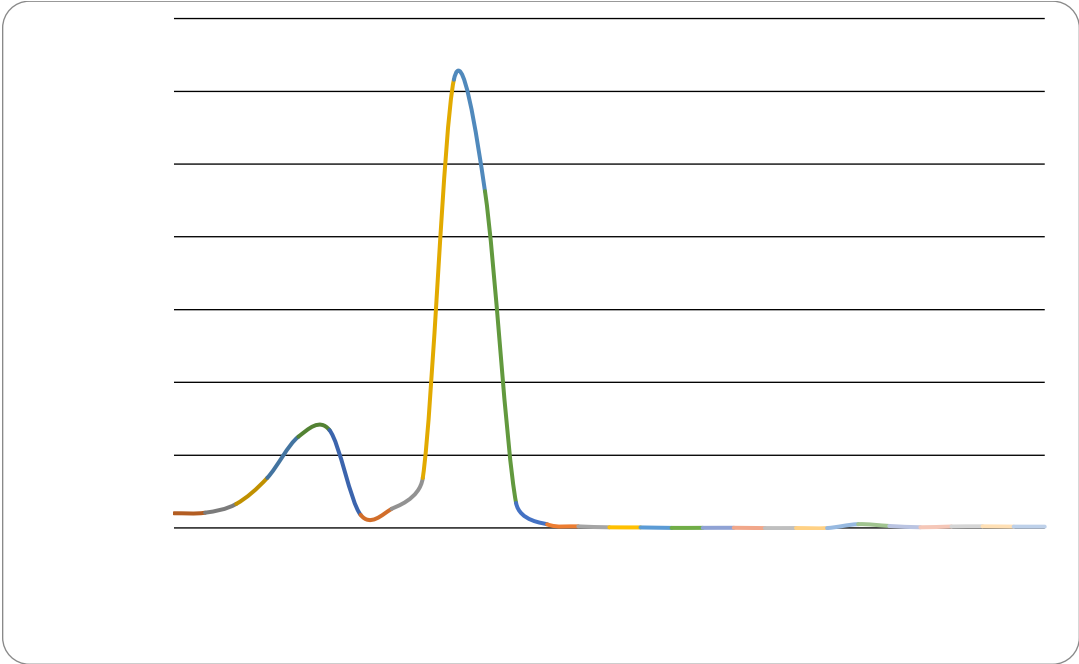
By looking at Argentina, in relation to other countries that have high inflation levels, it is widely believed price increases and the subsequent expansion in the money supply were to blame. According to macroeconomic principles, inflation begins with a budget deficit and the ensuing acceleration of printing money to accommodate for the increasing national debt. However, in a case of constant budget deficit, as evident in Argentina in the 1980s, it will eventually lead to a devaluation of currency. As this happens, exchange rates plummet and GDP has poor or even negative growth. This continues until monetary policies are adapted to prevent inflation from escalating to highly dangerous levels.

2.0 TREND:

From 1980 to 1991, Argentina experienced consistent budget deficits, and thus chronic high inflation levels. After eight currency crises since the early 1970s, inflation peaked in 1989, reaching over 3,000%. In 1989, GDP was 10% lower than in 1980 and per capita GDP had fallen by over 20%. Fixed investment fell by over 50% and could not cover yearly depreciation, particularly in the industrial sector. Social indicators declined significantly, real wages collapsed to about half of their 1974 peak, and income poverty rates increased from 27% in 1980 to 47% in 1989. It was obvious by 1989 and 1990 that Argentina had a serious problem with inflation as it

was deteriorating its economy. The figure below shows the fluctuation in inflation rates in Argentina from 1980-2008.

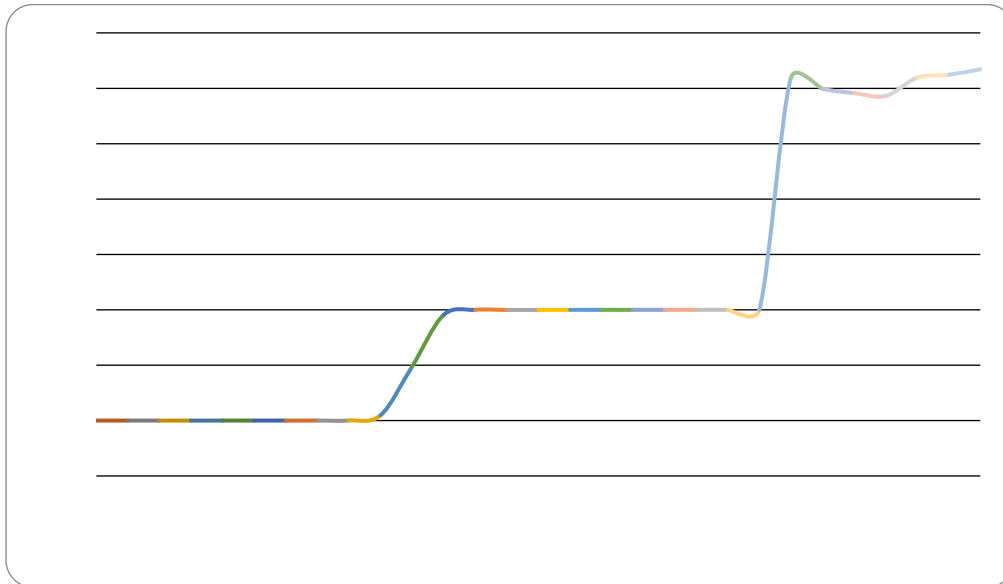
Figure 1: Inflation in Argentina from 1980-2007



Source: Author compilation using Centre for International Economics

Argentina finally controlled its inflation starting in 1991, when country pegged its currency to the U.S. Dollar. By doing this the government helped stabilize a very uncertain economy, and begin repairing its battered economy. In the figure below one can see how worthless the Argentine Peso was throughout the 1980's before being pegged to the U.S. dollar and eventually appreciating during the 2000's to its current rate. The currency peg remained in effect until 2002 and by that point inflation levels had subsided to normal levels, despite the continued budget deficits. When inflation levels are on the rise, it is often due to a perpetual budget deficit and is often coupled with devaluation of currency. It is for this reason that the budget surplus/deficit and exchange rates should have a significant correlation to inflation levels from year to year. The figure below shows exchange rates in Argentina from 1980-2007.

Figure 1: Exchange Rates in Argentina from 1980-2007



Source: Author compilation using World Bank data

Argentina has seen a dramatic transformation in its economy since 1980. During the 1980s and into the early 1990s, when Argentina was forced to endure more than a decade of high inflation and hyperinflation, the result was economic instability. Despite high wages by Latin American standards, the high inflation levels depressed the real value of those wages. Argentina was forced to acquire significant amount of foreign debt in order to maintain its standard of living. The government stepped in after this and pegged the currency to the U.S. dollar from 1991 until 2002 in order to help control inflation levels and begin a period of economic recovery. Government spending has also been reduced to promote a more balanced budget, further stabilizing the economy.

In order to achieve long-term economic growth, it is essential for the Argentinean government to continue to minimize the annual deficit and to further reduce its national debt. Argentinean workers are also some of the least productive workers of all the MERCOSUR countries, despite being some of the highest paid. Also, Argentina has received a significant amount of international support, including loans from the World Bank and International Monetary Fund, though further assistance is needed to ensure economic growth in the future. Additionally,

the establishment of free trade zones has helped attract considerable amount of foreign companies to Argentina, as well as foreign investment in the Argentinean economy. For these reasons stated above Argentina has been able to control and maintain stable levels in inflation.

3.0 LITERARY REVIEW:

It is the belief of the majority of economists that by having a balanced national budget, inflation levels can remain low and economic growth can be sustained. By operating in a perpetual deficit, the government must print more money to meet debt obligations and increasing interest rates. By printing increasing amounts of currency, it causes the value to decrease as inflation levels begin to rise. Economies that operate at a budget deficit for an extended period of time often end up printing more and more money to finance their increasing debt. It is this same situation that caused Argentina to deal with high inflation levels and eventually hyperinflation in 1989 and 1990. (Pultz 1984).

Dabus (1994) emphasized the importance of a balanced budget and its positive effect on an economy. He went on to proclaim that by operating in a budget surplus, or at the very least a small deficit, that an economy can better control money supply and currency rates. This in turn would lead to a more stable and efficient economy.

An economy with high inflation levels is extremely unattractive to investors; foreign investors will shy away from an unstable economy from a shaky economy. Many economists are wary of economies with high inflation, as they normally advise against investing in given economy. Seigniorage was also considered one of the primary reasons for high inflation levels in Argentina. Seigniorage is the difference between the value of money and the cost to produce it, if the seigniorage is positive, then the government will make an economic profit; a negative seigniorage will result in an economic loss. In the case of negative seigniorage there is a cost of holding cash or cash equivalents, which is known as "inflation tax." When inflation levels are high, the real value of money decreases, therefore by holding onto cash one would incur an "inflation tax." (Kiguel and Neumeyer, 1995).

Jacobs (1977) asserted that the government attempts to extract a constant level of real revenue from the economy through the inflation tax. If the actual amount of revenue differs from

that desired, the rate of money issued is varied in an attempt to equate the actual inflation revenue desired. When the desired level of government revenue exceeds the maximum equilibrium level, the hyperinflations were unstable, and the policy of inflationary finance led to ever-increasing rates of money issue.

However, according to Blejer (1979) as the rate of inflation becomes less stable, it becomes more difficult to forecast future inflation levels. In Blejer opinion, the uncertainty of future economic growth is more to blame for the high inflation levels. This is because it creates uncertainty of future price levels within an economy, which greatly affects the demand for money. The net effect of this is increased variability of the rate of inflation remains, therefore, open to empirical determination.

4.0 DATA AND EMPIRICAL METHODOLOGY:

4.1 Definition of Variables:

$$INFLA = \beta_0 + \beta_1MIG + \beta_2BUD + \beta_3EXCH + \beta_4GDP + \beta_5UNEMP + \varepsilon$$

INFLA represents the inflation level in Argentina and is used as the dependent, or endogenous, variable in this study. The independent variables chosen for this study were researched and decided upon based on their ability to proficiently explain changes in the dependent variable.

The first independent variable chosen for this study was *MIG* (money supply growth). This was done by using the M1 money supply in Argentina to calculate the growth rate from year to year over the given time (1980-2008). Next, *BUD* represents the national budget. National budget is widely believed to be the initial factor for high inflation levels, an economy operating at a budget deficit every year will likely experience high inflation levels than that of an economy with a budget surplus. *EXCH* depicts exchange rates, which is predicted to fall as inflation rises. This is because as inflation levels begin to increase, the value of domestic currency falls in comparison to other currencies. The fourth independent variable studied is *GDP*; during times of high inflation it is

predicted that GDP will have poor or even negative growth. *UNEMP*, the final independent variable used in this study is unemployment rate. It is my hypothesis that the level on unemployment will rise during times of high inflation. This is because as budget deficits occur and the value of real money is deflated it puts a pressure on businesses to cut costs and wages and salaries are often a significant cost to employers.

4.2 Data:

The data used in this empirical study was collected from various sources, but came primarily from the Centre for International Economy (CIE) website. Argentinean inflation levels, GDP, unemployment rates and nation budget data were all found on the CEI website. This data was also verified for accuracy using the World Bank data provided on its website. Exchange rates and M1 data that were used in this analysis were found on the UNdata website. A complete list of variables and definitions can be found in the appendix, along with the expected and actual results for each.

5.0 EMPIRICAL RESULTS:

The analysis of this study is based on 28 observations for each independent variable. The data was collected over a 28 year span from 1980-2008 on an annual basis (See Table 1). The results of this study support that the variables chosen for this study accurately explain the causes of high inflation levels.

Table 1: Regression Results

	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-2.267685	0.556195	-4.077142	0.0006

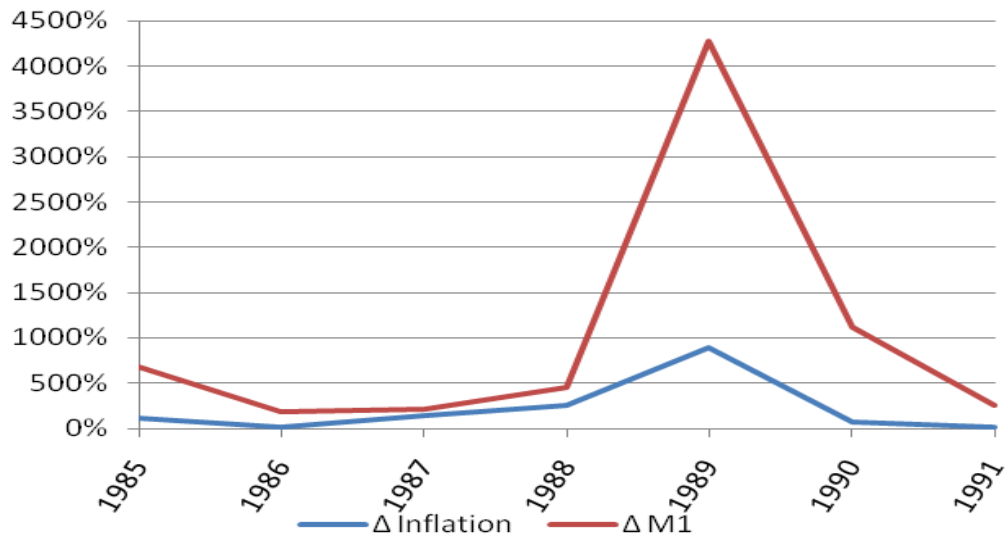
EXCH	-0.005887	0.070440	-0.083577	0.9343
BUD	-0.661793	0.300605	-2.201539	0.0403
MIG	0.886999	0.271439	3.267770	0.0040
UNEMP	-2.534518	0.670264	-3.781375	0.0013
C	8.689132	1.547473	5.615046	0.0000
R-squared	0.945951	Mean dependent var		1.391278
Adjusted R-squared	0.931727	S.D. dependent var		1.209765
S.E. of regression	0.316100	Akaike info criterion		0.740047
Sum squared resid	1.898466	Schwarz criterion		1.032578
Log likelihood	-3.250592	Hannan-Quinn criter.		0.821183
F-statistic	66.50632	Durbin-Watson stat		1.702223
Prob(F-statistic)	0.000000			

GDP represents the overall growth of an economy, so when inflation levels are high it is likely that GDP will be poor or negative. From this study we can conclude that for every percent that GDP rose over the given years, that inflation fell by 2.27%. This is easy to comprehend as it is not likely for a country to experience economic prosperity in times of high inflation

The second independent variable studied was exchange rates, it was expected to have a negative relationship with inflation rates, and the empirical study supports this opinion. The regression shows that for every percent that exchange rates improve inflation falls by .006%. This can be explained by the definition of inflation, which is the overall increase in price levels and therefore a lower real value of money. As one would expect when the real value of money devalues then it becomes worth less in comparison to other currencies.

National budget is expressed as a percent of GDP and is negatively correlated with inflation levels. A national budget decreases in the economy employs a less balanced budget to the point of operating at a budget deficit. For every percent that the national budget decreases (as a percent of GDP) inflation rises by .66%. By operating at a budget deficit, the government is forced to print more money to finance its debt and consequently high inflation rates follow. For this reason, as the budget decreases (spending overweighs money taken in) the inflation level rises.

Figure 2: Percent Change in Inflation vs. Percent Change in M1



Source: Author compilation using Centre for International Economic data

The growth in money supply from year to year has a positive correlation to inflation levels, as expected. Money supply used in this study was M1; and as seen in Figure 2 above, the change in inflation rates moves directly with the increase in money supply, albeit to different extents. When money supply is increased to finance a budget deficit, the real value of money decreases and inflation rises. This figure shows the direct affect that money supply has on inflation levels. For every percentage point that M1 rises, inflation rose by an average of .88% based on this regression

The final independent variable studied was also the only one that did not act as expected in relationship to inflation. It was expected that unemployment levels would rise in times of high inflation but that was not the case in this empirical study. The results of this study illustrate that as unemployment rates increase that inflation actually falls, contrary to my initial belief.

It is also important to look at the R-squared number in this regression. The R-squared number is vital to this study because it measures the extent to which the dependent variable is explained by the given independent variables. The R-squared number must fall between 0-1 and in this study it was 0.945951, meaning that the chosen independent variables explained about 94% of the movement in the dependent variable. The high R-squared value gives integrity to the model and the variables chosen to depict inflation.

6.0 CONCLUSION:

In conclusion, the variables that were chosen to depict the determinants of inflation were all relevant to the model. Although some variables affected inflation levels more or less than anticipated, all of the dependent variables were indeed significant to this study. As predicted, when budget deficits exist and money supply grows more rapidly, inflation levels also rise quickly. Also as anticipated, GDP and exchange rates were negatively related to inflation rates. This is because, as one would expect, during times of high inflation the real value of money decreases, and the domestic currency becomes devalued as inflation levels continue rise. As stated throughout this paper, one would expect GDP to have poor or even negative growth in times of high inflation, and the empirical results support that assertion. It is easy to understand why this would happen, when an economy has price levels rising and currency devaluing, it would not be expected to have a much, or even any, economy growth. The only variable to differ from expectations was unemployment rates, the belief came from innate thoughts that an economy with high inflation would be less stable and thus increases in job losses would be evident. However the contrary appears to be true, as these results support the Phillips Curve. The Phillips Curve says that when inflation rises, workers are fooled in accepting lower wages because they do not realize the fall in real wages. Firms, who do realize this drop in real wages, then hire more workers.

Overall, the variables used in this empirical study, accurately portray the macroeconomic factors that affect hyperinflation. It is important to understand the causes of hyperinflation so that other countries and economies can learn from previous mistakes and better plan for prevention of high inflation or hyperinflation.

Appendix A: Variables Defined

Variable	Description	Expected Sign	Actual Sign
INFLA	Inflation rate captures the rate at which the general level of prices for goods and services	Dependent Variable	

	is rising, and, subsequently, purchasing power is falling.		
MIG	Money Supply Growth- M1 was used to measures the money supply growth from one year to the next	+	+
BUD	National budget- evaluates the budget of a country and whether it is operating at a surplus or deficit (expressed as % of GDP)	-	-
EXCH	Exchange rate quantifies the valuation of domestic currency against other currencies	-	-
GDP	Gross Domestic Product reflects the value of all goods and services produced in a given year, expressed in base-year prices.	-	-
UNEMP	The civilian unemployment rate depicts the rate at which a percentage of the work force is unemployed.	+	-

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