Inflation,Inflation Variability, and Output Performance. Venezuela 1951-2002

Olivo, Victor

Andres Bello Catholic University, Metropolitan University

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Inflation, Inflation Variability, and Output Performance. Venezuela 1951-2002

Victor T. Olivo (PhD).
Andres Bello Catholic University/Metropolitan University- Caracas Venezuela

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This paper explores the relationship between the level of inflation, inflation variability and output performance in the Venezuelan economy for the period 1951-2002. The paper examines the mechanism of transmission through which higher inflation translates into lower non-oil real GDP growth. We find empirical evidence that supports Friedman's (1977) contention, that higher inflation produces more inflation volatility/uncertainty that leads to relative price variability that in turn, is harmful for the proper functioning of the market as the best system for the allocation of resources.

1.-Introduction

Most economists accept that inflation even when it is very high will have negligible real effects if it is steady, and hence easily anticipated. In contrast, unanticipated inflation can be damaging through distributional effects and its impact on real variables (Jensen, 1989). Although this is a theme that has lost relevance this century when inflation seems to have been controlled in most countries, it is still relevant in Venezuela where inflation continues to be an unresolved problem. The other issue that frequently appears in the discussions related to the cost of inflation is at what level inflation starts to generate significant problems. Most economists agree that rates close or above 100 percent are more likely to generate distributional and real effects, but are less certain about the impact of inflation rates moderate to high (between 10-50 percent).

Despite the fact that the Venezuelan economy has been experiencing problems controlling inflation at least since 1974, the issues mentioned above have received little formal attention. Most analysts have centered their discussions about the cost of inflation on its distributional effects. For example, a favorite of Venezuelan economists is that official data indicates that food inflation tends to be higher that general inflation, thus inflation is a regressive tax because it has a greater impact on the poor that spend a larger proportion of their income in food items. Although less frequent, some economists point to the effect of inflation on savings when nominal interest rates are regulated, something that has been very common in Venezuela.

This paper attempts to examine from an empirical perspective the effect of inflation on output performance measured as the rate of growth of real non-oil GDP, and a feasible mechanism of transmission that could connect these variables.

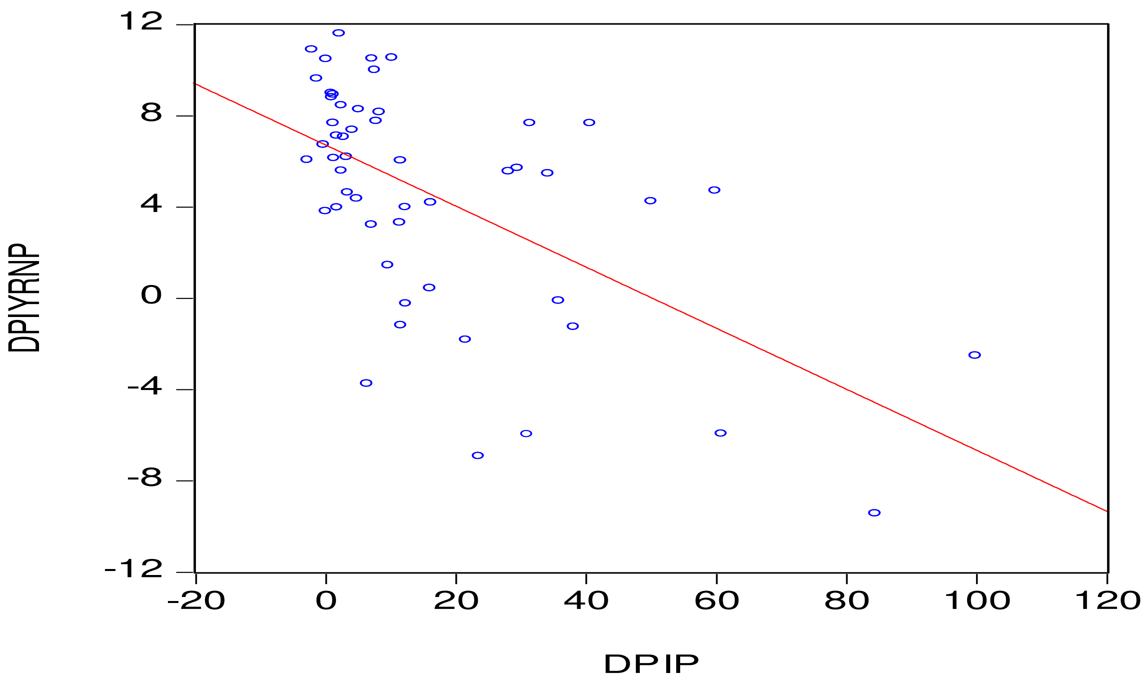
We use annual data for the period 1951-2002. Our exclusion of the recent data 2003-2012 is due to the unreliability of the official data for this period. Although price and exchange controls have been a fixture of the Venezuelan economy for a long time, the system of controls/subsidies put in place since 2003 to the present is the longest running, most widespread and rigid in the history of the country. It has been combined with a huge and sustained expansion of the money supply that has stimulated black markets. In this context, a large proportion of the CPI does not longer reflect adequately the evolution of prices set by market forces.

The paper is organized as follows: after this introduction section 2 explores the empirical relationship between inflation and the rate of growth of real non-oil GDP; section 3 presents Friedman's Nobel Lecture (1977) exposition of a mechanism that connects the level of inflation with its variability, relative price volatility, and output performance; sections 4 to 7 evaluates empirically the different components of Friedman's (1977) analysis; section 8 presents concluding remarks.

2.-Inflation and output performance in Venezuela

For the Venezuelan economy for the period under analysis (1950-2002) there is strong evidence of a negative relationship between inflation (the rate of change of the Consumer Price Index) and non-oil real GDP growth. Graph 1 shows a contemporaneous correlation coefficient of -0.59

Graph 1. Non-oil GDP Growth and Inflation 1951-2002



A more rigorous analysis based on a partial adjustment model for the rate of growth of non-oil GDP (DPIYRNP) yields the results shown in Table 1.[1]

The model includes contemporaneous inflation (DPIPC) and inflation lagged one and two periods. The sum of the coefficients associated to inflation is -0.0692, and is statistically significant with a p-value of 0.0083. The model implies that in the long-run, a one percentage point increase in inflation is associated with 0.1449 percentage point reduction in non-oil real GDP growth.

[1] Using the Augmented Dickey-Fuller test, DPIYRNP is a stationary variable at a 1% level of significance. Using the Dickey-Fuller GLS test, DPIPC is stationary variable at a 5% level of significance.

Table 1
Dependent Variable: DPIYRNP
Method: Least Squares
Date: 03/19/14 Time: 16:47
Sample (adjusted): 1953 2002
Included observations: 50 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.160565	1.098215	2.877910	0.0061
DPIPC	-0.192612	0.047892	-4.021789	0.0002
DPIPC(-1)	0.216199	0.047712	4.531316	0.0000
DPIPC(-2)	-0.092745	0.026554	-3.492716	0.0011
DPIYRNP(-1)	0.522565	0.129865	4.023898	0.0002

R-squared	0.569034	Mean dependent var	4.324000
Adjusted R-squared	0.530726	S.D. dependent var	5.013903
S.E. of regression	3.434703	Akaike info criterion	5.400378
Sum squared resid	530.8733	Schwarz criterion	5.591580
Log likelihood	-130.0094	Hannan-Quinn criter.	5.473188
F-statistic	14.85415	Durbin-Watson stat	1.891184
Prob(F-statistic)	0.000000	Wald F-statistic	19.38460
Prob(Wald F-statistic)	0.000000		

In Olivo (2009), we show that controlling for other variables that may affect non-oil GDP growth such as the growth rate of real oil prices and the growth rate of nominal primary government expenditures, does not alter noticeably the negative relation between inflation and non-oil GDP growth.

3.-Explaining the negative relationship between inflation and GDP growth. The Friedman hypothesis

Milton Friedman in his Nobel Lecture (1977) develops a story that can explain why high inflation may lead to lower or negative growth.

A high rate of inflation if steady may have some real effects by altering desired cash balances, but its impact on economic efficiency may be negligible. But when an economy is in periods of transitions, moving from one steady state to another, inflation would be more variable at high rates than at low rates.[2] Such transitional periods may well extend over decades. Friedman's explanation for this positive relationship between the level of inflation and its variability is as follows:

[2] Okun (1971) was one of the first attempts to discuss thoroughly the positive relationship between the level of inflation and its variability (Olivo, 1998).

"Governments have not produced high inflation as a deliberate announced policy but as a consequence of other policies—in particular, policies of full employment and welfare-state policies rising government spending. They all proclaim adherence to the goal of stable prices. They do so in response to their constituents, who welcome many of the side effects of inflation but are still wedded to the concept of stable money. A burst of inflation produces strong pressure to counter it. Policy goes from one direction to the other, encouraging wide variation in the actual and anticipated rate of inflation" [3]

This increased volatility of inflation in turn, reduces the efficiency of market prices as a system for coordinating economic activity:

"A fundamental function of a price system, as Hayek (1945) emphasized so brilliantly, is to transmit compactly, efficiently, and at low cost the information that economic agents need in order to decide what to produce and how to produce it, or how to employ owned resources. The relevant information is about relative prices—of one product relative to another, of the services of one factor of production relative to another, of products relative to factor services, of prices now relative to prices in the future. But the information in practice is transmitted in the form of absolute prices—prices in dollars or pounds or kronor. If the level is on average stable or changing at a steady rate, it is relatively easy to extract the signal about relative prices from the observed absolute prices. The more volatile the rate of general inflation, the harder it becomes to extract the signal about relative prices from the absolute prices: the broadcast about relative prices is, as it were, being jammed by the noise coming from the inflation broadcast (Lucas 1973, 1975; Harberger 1976). At the extreme, the system of absolute prices becomes nearly useless, and economic agents resort either to an alternative currency or to barter, with disastrous effects on productivity."

Friedman (1977) also pointed out that these effects of increased volatility of inflation would occur even if prices were legally free to adjust, but that the political and social forces unleashed by high and variable inflation will push governments to try to repress it through explicit price and wage controls. Adding these controls to high and volatile inflation will further reduce the capacity of the price system to guide economic activity.

Hence in Friedman's view, high and variable inflation that generally combines with direct price controls, may reduce drastically the capacity of markets to assign efficiently resources, which in turns deteriorates economic performance.

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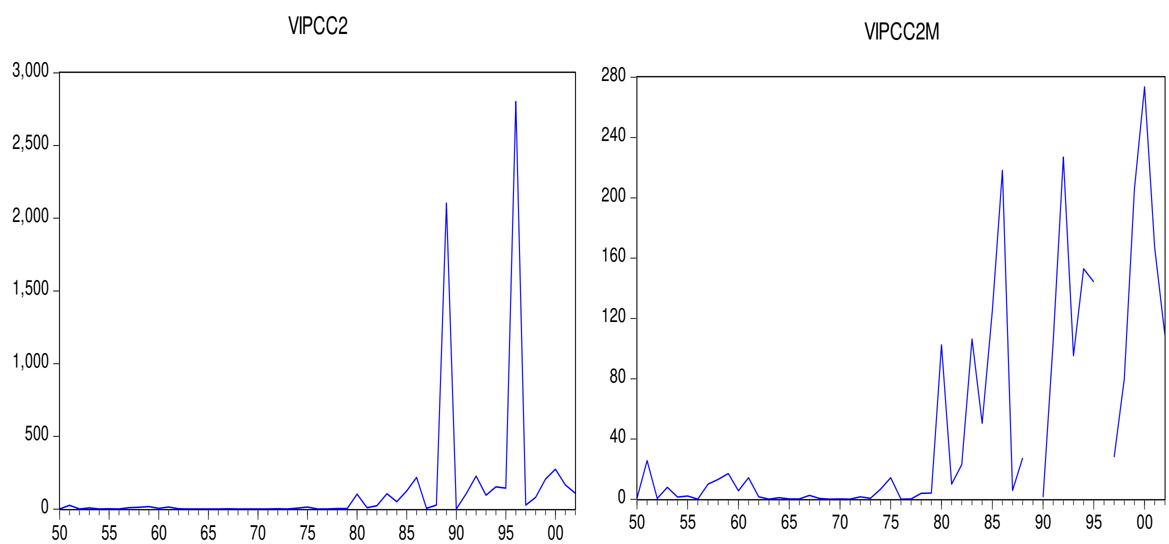
[3] Ball (1992) tries to formalize this part of Friedman's story. During a period of low inflation, it is a good bet that the monetary authorities will attempt to prolong this situation. In contrast, in a period of high inflation, it is not obvious what the monetary authorities will do. They would like to disinflate, but fear the recession this may generate. Though it is likely that disinflation will occur, the timing is uncertain (Olivo, 1998).

4.-Inflation and inflation variability

We use the Hodrick- Prescott (HP) filter to decompose the inflation series for the 1951-2002 period in its trend and cyclical components. We interpret the squared deviations of the observed inflation series relative to its HP trend (VIPCC2) as a measured of volatility. Graph 2 shows the original volatility series, and a modified series (VIPCC2M) that excludes outliers for 1989 and 1996. In 1989 there was a price liberalization after a long period of extensive price controls. In 1996 there was a large monetary expansion related first to the devaluation of the official exchange rate, and then its depreciation under a floating regime. The adjustment of the nominal exchange rate in this period allowed to the oil industry and the government to obtain more bolivars per dollar from the central bank.

Graph 2. Inflation Variability



To evaluate Friedman's contention regarding the positive relationship between the level of inflation and inflation variability, we run a regression of the inflation volatility measure VIPCC2 against the trend of inflation (VIPCHP) plus dummy variables (D89, D96) – Table 2. As expected from Friedman's analysis, higher trend inflation implies more volatility. The coefficient of VIPCHP is positive and statistically significant (p-value is close to zero).

Table 2

Dependent Variable: VIPCC2
Method: Least Squares
Date: 12/25/13 Time: 21:09
Sample: 1950 2002
Included observations: 53
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.395838	4.731837	0.717657	0.4764
VIPCHP	2.963822	0.561108	5.282090	0.0000
D89	1985.141	21.40826	92.72781	0.0000
D96	2662.815	25.48687	104.4779	0.0000

R-squared	0.987869	Mean dependent var	137.6922
Adjusted R-squared	0.987127	S.D. dependent var	473.1956
S.E. of regression	53.68925	Akaike info criterion	10.87677
Sum squared resid	141244.3	Schwarz criterion	11.02548
Log likelihood	-284.2345	Hannan-Quinn criter.	10.93396
F-statistic	1330.112	Durbin-Watson stat	1.485525
Prob(F-statistic)	0.000000		

Therefore we find that in the case of Venezuela for the period under analysis, higher trend inflation is associated with greater inflation volatility.

5.-Inflation, inflation variability and the issue of causality

Friedman's analysis clearly states that the direction of causality runs from high inflation to high inflation variability. However, if we apply Granger-causality tests to the relationship between the level of inflation and inflation variability, we get ambiguous results.

With one lag, the Granger-causality test indicates that causality runs only from trend inflation to inflation variability as suggested by Friedman (Table 3). The null hypothesis that VIPCC2 does not Granger-cause VIPCHP cannot be rejected (p-value 0.67). The null hypothesis that VIPCHP does not Granger-cause VIPCC2 can be rejected (p-value close to zero). But if we run the Granger-causality test with four lags as recommended by the lag length criteria, causality runs both ways (Table 4). The null hypothesis that VIPCC2 does not Granger-cause VIPCHP can be rejected (p-value close to zero). The null hypothesis that VIPCHP does not Granger-cause VIPCC2 can be rejected (p-value close to zero).

Table 3

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 04/03/14 Time: 12:30
Sample: 1950 2002
Included observations: 52

Dependent variable: VIPCHP

Excluded	Chi-sq	Df	Prob.
VIPCC2	0.186044	1	0.6662
All	0.186044	1	0.6662

Dependent variable: VIPCC2

Excluded	Chi-sq	Df	Prob.
VIPCHP	69.03176	1	0.0000
All	69.03176	1	0.0000

Table 4

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 04/03/14 Time: 12:28
Sample: 1950 2002
Included observations: 49

Dependent variable: VIPCHP

Excluded	Chi-sq	Df	Prob.
VIPCC2	225.2828	4	0.0000
All	225.2828	4	0.0000

Dependent variable: VIPCC2

Excluded	Chi-sq	Df	Prob.
VIPCHP	45.09929	4	0.0000
All	45.09929	4	0.0000

Friedman's hypothesis cannot explain the reverse causation from inflation volatility to the level of inflation.

To confront this issue, we resort to Friedman again. In discussions with Tobin during the seventies, Friedman argued that to support de direction of causality from money to prices, one can rely on the methodological proposition that in a relationship between two variables the one that can be controlled is the causal variable (Olivo, 2011). Thus we replace the Hodrick-Prescott smoothed rate of growth of M1 (VM1HP) for trend inflation (VIPCHP) as the main variable explaining inflation volatility (VIPCC2).

In Table 5, we show the results of the regression of inflation volatility (VIPCC2) against the smoothed rate of growth of M1 (VM1HP) plus dummies. As expected the coefficient of VM1HP is positive and statistically significant (p-value close to zero)

Table 5

Dependent Variable: VIPCC2
Method: Least Squares
Date: 03/23/14 Time: 20:01
Sample (adjusted): 1951 2002
Included observations: 52 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-21.07130	10.70978	-1.967482	0.0549
VM1HP	3.489846	0.644478	5.414998	0.0000
D89	2015.665	16.13733	124.9069	0.0000
D96	2656.757	25.93714	102.4306	0.0000

R-squared	0.986157	Mean dependent var	140.3288
Adjusted R-squared	0.985292	S.D. dependent var	477.4190
S.E. of regression	57.90044	Akaike info criterion	11.02913
Sum squared resid	160918.2	Schwarz criterion	11.17923
Log likelihood	-282.7574	Hannan-Quinn criter.	11.08667
F-statistic	1139.805	Durbin-Watson stat	1.246812
Prob(F-statistic)	0.000000		

Hence we conclude that in the case of Venezuela for the period 1951-2002, a higher trend money growth has a positive effect on inflation volatility.

6.-Inflation, inflation variability, and inflation uncertainty

The literature after Friedman (1977) has emphasized the difference between inflation variability and inflation uncertainty (see for example Grier and Perry, 1998). An economic variable may be very volatile, but that does not imply that it cannot be modeled and predicted.

The strategy to analyze whether our measure of inflation volatility (VIPCC2) is related to uncertainty consist of estimating a good model for inflation, and then use the squared recursive forecast errors of that model as a measure of uncertainty (Taylor, 1981). Table 6 shows a partial adjustment model for the inflation rate that includes lagged, contemporaneous and forward values of the variable monetary gap (M1PGAP), define as the difference between the annual rate of growth of M1 and the annual rate of growth of non-oil GDP.[4]

Table 6

Dependent Variable: DPIP
Method: Least Squares
Date: 07/30/12 Time: 10:03
Sample (adjusted): 1954 2002
Included observations: 49 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.056376	1.406046	0.040095	0.9682
M1PGAP(2)	0.096081	0.062825	1.529345	0.1337
M1PGAP(1)	0.126809	0.033411	3.795436	0.0005
M1PGAP	0.280671	0.055252	5.079845	0.0000
M1PGAP(-2)	0.197363	0.064142	3.076948	0.0037
M1PGAP(-3)	-0.179060	0.050427	-3.550854	0.0010
DPIP(-1)	0.472657	0.082067	5.759373	0.0000

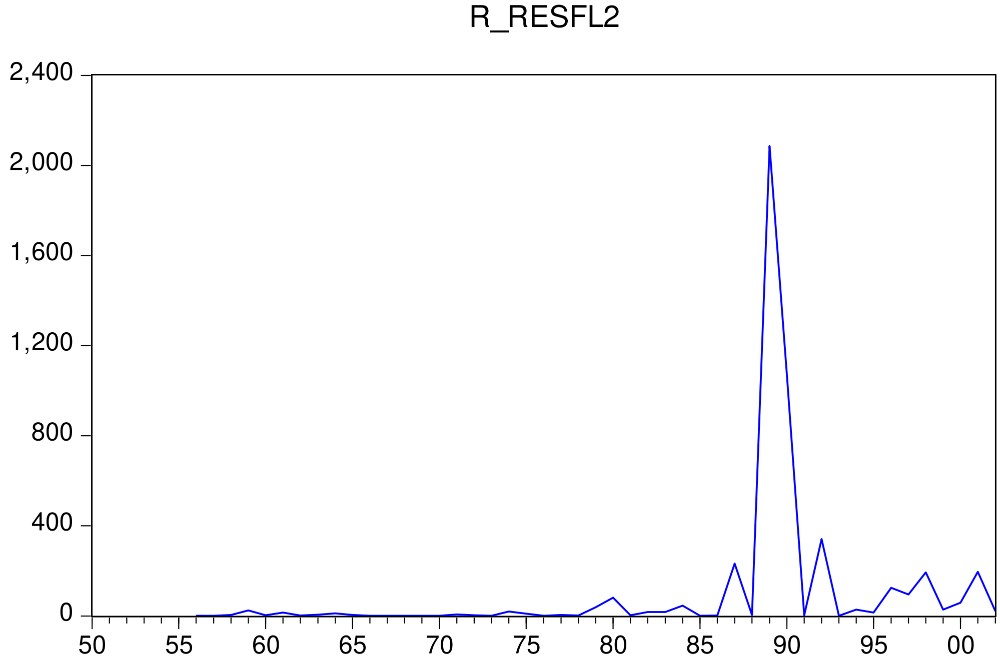
R-squared	0.801819	Mean dependent var	17.35928
Adjusted R-squared	0.773507	S.D. dependent var	22.43217
S.E. of regression	10.67576	Akaike info criterion	7.705392
Sum squared resid	4786.815	Schwarz criterion	7.975652
Log likelihood	-181.7821	Hannan-Quinn criter.	7.807928
F-statistic	28.32117	Durbin-Watson stat	2.074935
Prob(F-statistic)	0.000000		

The squared recursive forecast errors from the inflation model are shown in Graph 3.

Here it is important to note that when the ARCH test is applied to the inflation model, the null hypothesis of homocedasticity cannot be rejected at standard levels of significance. That explains why we do not use ARCH/GARCH models as suggested by Jansen (1989) and Grier and Perry (1998) to obtain the conditional variance of inflation as measured of inflation uncertainty.

4 The most appropriate econometric method to estimate this model would be the Generalized Method of Moments (GMM), but in an economy constantly subjected to controls in key macroeconomic variables, it is not easy to find good instruments. As estimated, the model assumes economic agents with perfect foresight, which is somewhat extreme, but arguably better than using a purely backward looking model.

Graph 3. Squared Recursive Forecast Errors Inflation Model



The measure of inflation uncertainty (R_RESFL2) presents a statistically significant correlation coefficient of 0.53 with the inflation volatility measure (VIPCC2).

A regression of R_RESFL2 against the HP- smoothed rate of inflation yields a positive coefficient that is statistically significant (p-value 0.0092) – Table 7.

Table 7

Dependent Variable: R_RESFL2
Method: Least Squares
Date: 04/11/14 Time: 10:08
Sample (adjusted): 1974 2002
Included observations: 29 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.272472	14.66313	0.291375	0.7732
VIPCHP	2.065721	0.732256	2.821038	0.0092
D89	2001.759	17.54474	114.0945	0.0000
D90	979.4045	19.69040	49.74020	0.0000

R-squared	0.966013	Mean dependent var	163.3223
Adjusted R-squared	0.961935	S.D. dependent var	423.0203
S.E. of regression	82.53233	Akaike info criterion	11.79170
Sum squared resid	170289.6	Schwarz criterion	11.98029
Log likelihood	-166.9796	Hannan-Quinn criter.	11.85076
F-statistic	236.8614	Durbin-Watson stat	2.725347
Prob(F-statistic)	0.000000		

A regression of R_RESFL2 against the HP-smoothed rate of growth of M1 yields a positive coefficient that is statistically significant (p-value 0.0292) – Table 8.

Table 8

Dependent Variable: R_RESFL2
Method: Least Squares
Date: 04/11/14 Time: 10:03
Sample (adjusted): 1974 2002
Included observations: 29 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.390017	25.41745	-0.251403	0.8036
VM1HP	2.286174	0.988395	2.313018	0.0292
D89	2021.186	12.56617	160.8434	0.0000
D90	996.7033	15.11702	65.93255	0.0000

R-squared	0.964921	Mean dependent var	163.3223
Adjusted R-squared	0.960711	S.D. dependent var	423.0203
S.E. of regression	83.84874	Akaike info criterion	11.82335
Sum squared resid	175765.3	Schwarz criterion	12.01194
Log likelihood	-167.4385	Hannan-Quinn criter.	11.88241
F-statistic	229.2228	Durbin-Watson stat	2.612177
Prob(F-statistic)	0.000000		

Thus we conclude that in the case of Venezuela for the period 1951-2002, there is a close relation between inflation variability and inflation uncertainty, and that trend inflation and money growth have a positive impact on both variables.

7.-Inflation and relative price variability

In Friedman's (1977) analysis, the transmission of high inflation variability/uncertainty to relative price variability is a crucial element to explain the potential negative impact of inflation on output performance.

Fernandez and Gerling (2011) as other studies in the past (Taylor, 1981) use Parks' (1978) measure of relative price variability as a weighted variance of individual CPI inflation subcategories around the general CPI inflation.

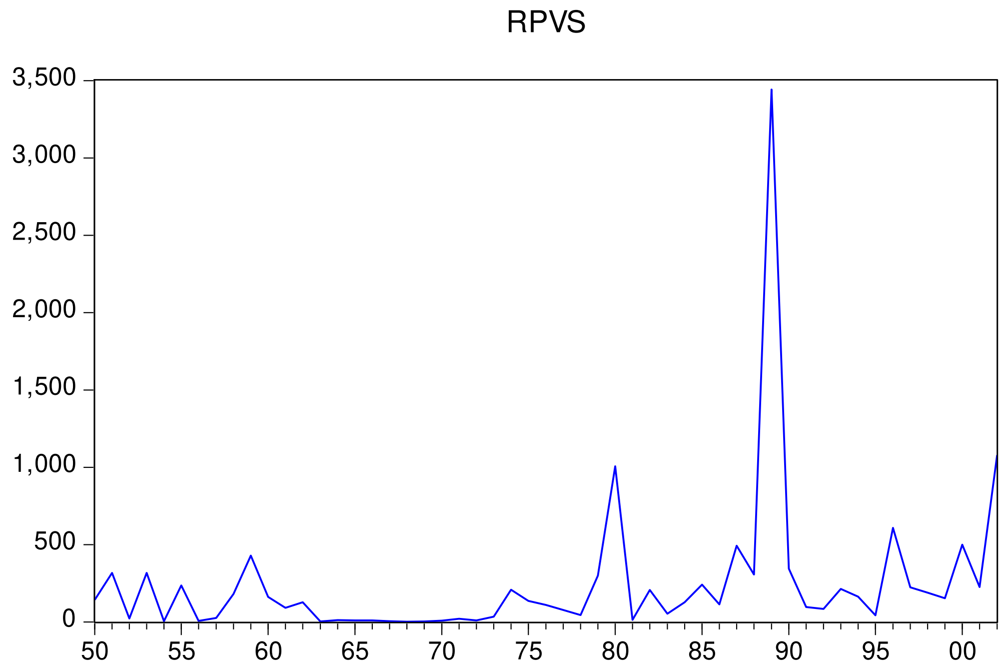
$$RPV_t = \sum_{i=1}^{n} w_i (\pi_{it} - \pi_t)^2$$

Where w_i is the expenditure weight of subcategory $i = 1, 2, ..., n$; π_{it} the rate of inflation for subcategory i; and π_t the general rate of inflation.

Our actual measure of relative price variability for Venezuela (RPVS) assumes equal weights, because we do not have information of the CPI weights prior to 2000. Additionally, it is important to note that, the CPI in Venezuela comprised four main subcategories from 1950 to 1999, and then was expanded to twelve categories from 2000 on.[5]

Our non-weighted measure of relative price variability (RPVS) is shown in Graph 4.

Graph 4. Relative Price Variability



The RPVS exhibits a coefficient of correlation of 0.63 with inflation variability (VIPCC2), and 0.83 with inflation uncertainty (R_RESFL2).

A regression of RPVS against trend inflation and several dummies, shows that the coefficient of VIPCHP has a positive and statistically significant coefficient (p- value 0.0277) – Table 9.

[5] The four subcategories from 1950 to 1999 were: 1) Food, beverages, and tobacco; 2) Apparel products; 3) Home expenditures; 4) Sundry expenditures. The twelve categories from 2000 on are: 1) Food and nonalcoholic beverages; 2) Alcoholic beverages and tobacco; 3) Apparel products; 4) Home rental; 5) Home services except telecommunications; 6) Home equipment; 7) Health; 8) transportation; 9) Telecommunications; 10) Entertainment and culture; 11) Education services; 12) Restaurants and hotels.

Table 9

Dependent Variable: RPVS
Method: Least Squares
Date: 04/09/14 Time: 15:36
Sample: 1950 2002
Included observations: 53
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	84.71274	24.68901	3.431192	0.0013
VIPCHP	2.293299	1.006819	2.277768	0.0277
D59	342.0647	23.89743	14.31387	0.0000
D80	894.7890	17.82820	50.18953	0.0000
D87	337.2838	20.57560	16.39241	0.0000
D89	3268.342	26.29832	124.2795	0.0000
D96	418.1196	32.46100	12.88068	0.0000
D00	346.6978	20.10806	17.24173	0.0000
D02	945.7517	16.65879	56.77193	0.0000

R-squared	0.967324	Mean dependent var	244.4119
Adjusted R-squared	0.961382	S.D. dependent var	500.4743
S.E. of regression	98.35000	Akaike info criterion	12.16846
Sum squared resid	425599.8	Schwarz criterion	12.50304
Log likelihood	-313.4643	Hannan-Quinn criter.	12.29713
F-statistic	162.8170	Durbin-Watson stat	2.153168
Prob(F-statistic)	0.000000		

A regression of RPVS against trend money growth and several dummies, shows that the coefficient of VM1HP has a positive and statistically significant coefficient (p- value 0.0387) – Table 10.

The results in this section suggest that in the case of Venezuela for the period under analysis, higher trend money growth/trend inflation is related to higher inflation volatility/uncertainty that in turn, generates larger relative price volatility.

It is important to note, however, that even though trend inflation and trend money growth have a significant influence on relative price variability, the necessity to include several dummy variables in the regression indicates that real factors also may play a substantial role in the behavior of relative prices.

Another point to highlight is that some empirical research finds that the relation between the level of inflation an relative price variability is non-linear (Taylor 1981; Fernandez and Gerling 2011) . In the case of Venezuela, however, the simple linear model seems to do a fine job.

Table 10

Dependent Variable: RPVS
Method: Least Squares
Date: 04/06/14 Time: 13:19
Sample (adjusted): 1951 2002
Included observations: 52 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	68.68593	32.67361	2.102184	0.0414
VM1HP	2.443734	1.145583	2.133179	0.0387
D59	344.8416	26.73458	12.89871	0.0000
D80	898.8011	19.91958	45.12149	0.0000
D87	364.1984	17.41413	20.91396	0.0000
D89	3297.030	19.14688	172.1967	0.0000
D96	422.8080	32.28463	13.09626	0.0000
D00	351.5870	19.85865	17.70448	0.0000
D02	954.7197	17.52654	54.47282	0.0000

R-squared	0.965668	Mean dependent var	246.3619
Adjusted R-squared	0.959280	S.D. dependent var	505.1537
S.E. of regression	101.9356	Akaike info criterion	12.24267
Sum squared resid	446807.0	Schwarz criterion	12.58038
Log likelihood	-309.3094	Hannan-Quinn criter.	12.37214
F-statistic	151.1832	Durbin-Watson stat	2.051166
Prob(F-statistic)	0.000000		

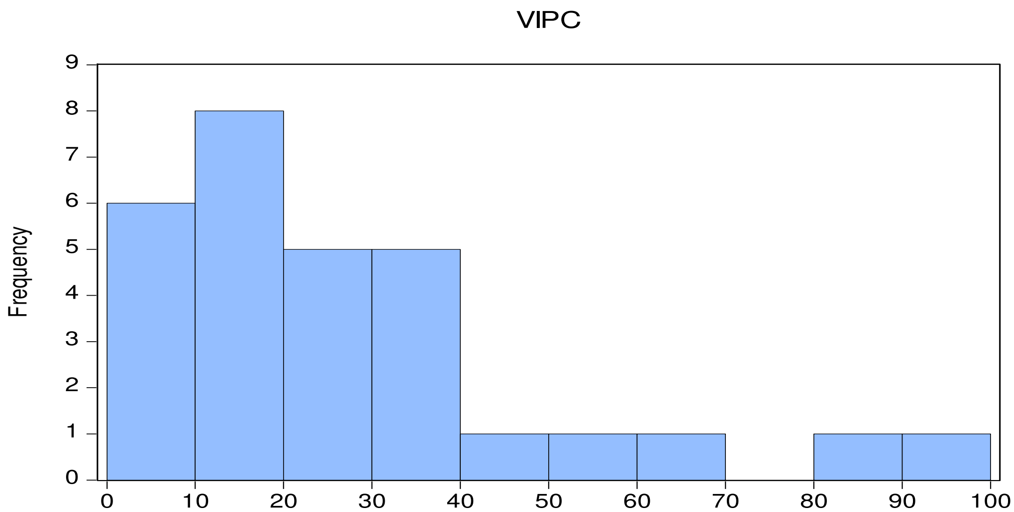
8.-Concluding remarks

In this paper we present evidence that for the Venezuelan economy for the period 1951-2002, inflation has a negative impact on output performance measured by the rate of growth of non-oil real GDP. Our estimates suggest that the negative influence of inflation on non-oil output is far from trivial. The model in section 1 (Table 1), shows that a one percentage point increase in inflation is associated with 0.1449 percentage point reduction in non-oil real GDP growth in the long-run. This is an important result, because most of the discussion about the effects of inflation in the Venezuelan economy has revolved around its distributional consequences.

The paper also explores the mechanism of transmission through which higher inflation translates into lower non-oil real GDP growth. We find empirical evidence that supports Friedman's (1977) contention, that higher inflation produces more inflation volatility/uncertainty that leads to relative price variability that in turn, is harmful for the proper functioning of the market as the best system for the allocation of resources. Thus it is mainly through its debilitating action on market functioning, that inflation exerts its negative effect of output performance.

Another interesting result from the paper, is that an economy does not need to reach inflation levels close to or above 100 percent to experience the weakening effects of inflation variability on market functioning and output performance. As Graph 5 illustrates, since 1974 when inflation exhibits clear signs of acceleration, there are relatively few observations above 50 percent. Most of the observations are located in the 20-40 percent range.

Graph 5. Rate of Inflation 1974-2002. Distribution of Frequency



Therefore, it is crucial for Venezuela's policy makers to tackle seriously and consistently its long standing inflationary problem, in order to achieve a higher and more stable long-run rate of growth of non-oil output. The reliance on widespread and persistent price controls, while maintaining a high level of money growth is a strategy condemn to failure. Policies and institutions that allow the central bank to implement monetary discipline are essential to lower inflation on a permanent basis

References

-Fernandez, C., and K., Gerling, 2011. Inflation Uncertainty and Relative Price Variability in WAEMU Countries. IMF Working Paper WP/11/59.

-Friedman, M., 1977. Nobel Lecture: Inflation and Unemployment. Published in Milton Friedman on Economics. Selected papers. The University of Chicago Press 2007.

-Grier, K., and M.J., Perry, 1998. On inflation and inflation uncertainty in the G7 countries. Journal of International Money and Finance 17 (1998).

-Jansen, D., 1989. Does Inflation Uncertainty Affect Output Growth? Further Evidence. Federal Reserve Bank of St. Louis Review July/August.

-Olivo, V., 1998. The Relationship between Inflation and Inflation Uncertainty, Output Variability, and Relative Price Variability: A Survey. Univesity of Connecticut unpublished manuscript.

_______,2009. Precios del Petróleo, gasto público y crecimiento del producto no petrolero en Venezuela: mitos y realidades. Nueva Economía año XVII, Nº29.

_______,2011. Tópicos Avanzados de Teoría y Política Monetaria. Editorial Arte Profesional.

-Taylor, J., 1981. On the Relation Between the Variability of Inflation and the Average inflation Rate. Carnegie-Rochester Conference Series on Public Policy 15.