Stabilization Policies and Agricultural Impacts in Developing Countries: The Case of Bolivia

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Abstract

This research examines the success of stabilization policies to control hyperinflation in Bolivia. Money demand functions for the hyperinflation and stabilization periods were econometrically estimated and statistically tested. We conclude that the demand for money in Bolivia changed after stabilization policies were implemented, indicating that the new government's objectives were met. Stabilization policies resulted in real economic growth for Bolivia's economy, including its agricultural sector, where agricultural export shares increased tenfold as stabilization policies corrected overvalued exchange rates.

Key Words: Bolivia, developing countries, hyperinflation, money demand, stabilization policies

Introduction

Hyperinflation, where monthly inflation rates exceed 50 percent (Cagan, 1956), became a major economic problem in the 1980's in many less developed countries (LDCs) and continues to plague LDCs today (*New Africa*, April, 1994). Agriculture, a key sector for LDCs, often accounts for 40-50 percent of gross domestic product and employs a significant portion of the work force (Hadwiger, 1992). However, LDCs have historically taxed the agricultural sector while developed countries (DCs) have protected it (Webb, Lopez, and Penn, 1990; Valdes, 1993; McCalla and Josling, 1985; Hadwiger, 1992; and Krueger, Schiff, and Valdes, 1991).[1]

Along with taxation policies, developing countries have historically instituted distortionary macroeconomic policies, often with good intentions, such as raising revenues to pay off international debt, but with unintentional destabilizing consequences (World Bank). Such distortionary macroeconomic policies favored the industrial sector at the expense of the agricultural sector via direct and indirect protection. These destabilizing policies resulted in (1) hyperinflation; (2) overvalued exchange rates, which suppressed agricultural exports making them relatively more expensive to potential importers; (3) distorted prices, providing subsidies to the urban sector while taxing the rural, agricultural sector; and (4) reduced investment in agriculture. Since agricultural products are a

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significant portion of exports for developing countries, overvaluation discriminates against the agricultural sector (Schuh, 1974; McCalla, 1982; Chambers and Just, 1982).

This article estimates and compares the money demand functions during the hyperinflation and the stabilization periods in Bolivia. It also analyzes the importance of factors underlying the changes in the demand for money in the two periods. Finally, the implications of stabilization policies on agriculture, with particular focus on agricultural exports, are discussed.[2]

The Case of Bolivia

During the 1980s, Bolivia suffered two major economic events: (1) hyperinflation, where the average annual inflation rate peaked at 8,169 percent in 1985 (Pastor, 1991) and (2) government stabilization policies, instituted to restore confidence in Bolivia's currency and stimulate economic growth by controlling hyperinflation. Table 1 illustrates average annual inflation rates in selected developing countries as well as corresponding macroeconomic policies used to control inflation. Specifically, Bolivia faced an economic crisis culminating in hyperinflation from the later part of 1984 through mid-1985 (Melvin, 1988; Pastor, 1991)[3]. A large fiscal deficit, negative growth rates, high unemployment rates, as well as exchange rate and balance of payment problems characterized this crisis. These problems were generated in the mid-1970s when the prevailing administration over borrowed from foreign countries, increased Bolivia's fiscal deficit, and discouraged domestic investment coupled with a high degree of government intervention as exemplified by (1) fixed prices for many products, (2) fixed exchange rates, (3) fixed interest rates, and (4) fixed wage increases in the private sector. Also, regulations prohibited laying off workers and restrictions precluded holding foreign currency and conducting financial transactions in foreign currency. These problems exacerbated in 1984, when export prices decreased significantly, droughts and floods were common, and the economy faced a negative growth rate troughing at -6.5 percent (Pastor, 1991). The domestic currency suffered continuous devaluations at a rate of 50 percent per month in 1985. Also, a great shortage of basic goods existed. Bolivians lost

confidence in their domestic currency leading to an increased demand for U.S. dollars, resulting in a dramatic increase in the exchange rate (Melvin, 1988). After August 1985, Bolivia's economy became less regulated. New stabilization policies included the following:

1.   *Interest rates:*   Regulations were completely removed.

2.   *Exchange rates:*   Regulations were completely removed and a floating exchange rate system was implemented.

3.   *Prices:* All regulations on private sector prices were removed. For goods and services produced by public enterprises, prices were no longer regulated.

4.   *Wages and employment:* Only a minimum wage was administered and employers were allowed to lay off workers.

5.   *Fiscal deficit:* The objective of reducing the government deficit was attained by laying off government workers and reducing public expenditures.

6.   *Foreign Currency:* Individuals were free to make financial transactions in foreign currency and could now hold foreign currency.

7.   *Subsidies:* All subsidies were removed.

As a result of these new policies, the Bolivian economy changed dramatically during and after the hyperinflation period. Figure 1 shows *monthly inflation rates* both before and after stabilization policies were implemented. Although these new rules restored the economic equilibrium in a few months, the subsequent recession lasted for more than two years (Pastor, 1991).

Bolivians now faced with a different economic framework should adjust their nominal money holdings such that their real purchasing power remains unchanged (Barron, et al., 1989). However, rapid changes in the inflation rate introduce uncertainty, such that the quality of a given *stock* of real money balances is reduced,

Table 1. Annual Inflation Rates in Selected Countries and Macroeconomic Policies Employed to Correct Inflation

| COUNTRY | -- INFLATION -- | | -- MACROECONOMIC POLICIES -- |
	1981-85	1985-90	
BRAZIL	160%	954%	Cruzado plan - Monetary reform, brief wage and price freeze followed by administered prices, increase in interest rates, fiscal rebates introduced to stimulate exports and savings, suspended interest payments on foreign debt, devalued currency
MEXICO	66	73	Fiscal and monetary policy, structural reforms aimed at liberalization, joined GATT in 1979, wage and price freeze followed by wage and price controls, reduced size of public sector, deregulation of prices, removal of price subsidies, secured more foreign credits
BOLIVIA	2,200	27	Tight monetary policy, increased tax revenues, reduced employment in public corporations, devalued currency by 93%, eliminated debt servicing, introduced value added tax (VAT), obtained external financing for investments, obtained structural adjustment loan from IMF, aimed at annual average price increase of less than 10%
ARGENTINA	370	1,382	Austral plan - Price freeze followed by administered prices, increased interest rates, economic integration and cooperative agreement with Brazil in 1986, special export programs, obtained loan from IMF to pay external debt and reformed public sector by restructuring, staffing and adjusting price levels
CHILE	21	20	Export promotion, efficient import substitution, greater domestic savings, improved international payments position, reduced size of public sector and transferred enterprises to private sector, increased ceiling for foreign investment, reduced import tariffs
NICARAGUA	93	10,176	Devaluation of official exchange rate (settlement of 50% of exports and cash grants at the official rate with the other 50% settled at the exchange agency rate), bank reserve requirements increased to channel resources to key productive activities, interest rates on lending and borrowing increased, taxes increased and wages adjusted
PERU	108	2,467	Reduced production costs, reduced interest rates and tax burden of businesses and individuals, revived domestic output and demand with expansive monetary and fiscal policies, maintained overvalued exchange rate in order to make imported inputs less expensive, and exchange controls reinforced to ensure availability of foreign exchange for economic recovery
URUGUAY	50	84	Reduced public sector deficit with measures designed to control the rise in spending, periodic adjustments of rates and prices for public services, limited the money supply growth, wage adjustments with workers and employers every four months, monitored movements of international reserves and changes in exchange rate, negotiated new terms for servicing external public debt

Sources: Data on inflation - CEPAL, *Transformacion Productiva con Equidad* and CEPAL, *Preliminary Overview . . . 1990,* 1991. Data for 1961-1980 are from IDB, *Economic and Social Progress in Latin America* 1990 Report. Information on macro economic policies - IDB, *Macroeconomic Policies - Economic and Social Progress in Latin America,* 1987 Report.

where the quality of money is defined as the *flow* of monetary services (Klein, 1977). If the quality of money rises, the same monetary services can be obtained using less real money balances; the reverse would be true if the quality of money declined. Thus, we can identify two opposing effects of hyperinflation on the real demand for local currency: (1) Hyperinflation reduces the quality of money, which leads to an increased demand for real local currency, i.e., the *income effect.* (2) As is true for hyperinflation, inflation induces substitution from local currency to other financial assets with higher real rates of return, such that the *substitution effect* reduces the demand for local currency. Consequently, the final impact of hyperinflation is uncertain (Klein, 1977; Asilis, et al., 1993).

Figure 1. Bolivian Monthly Inflation Rates
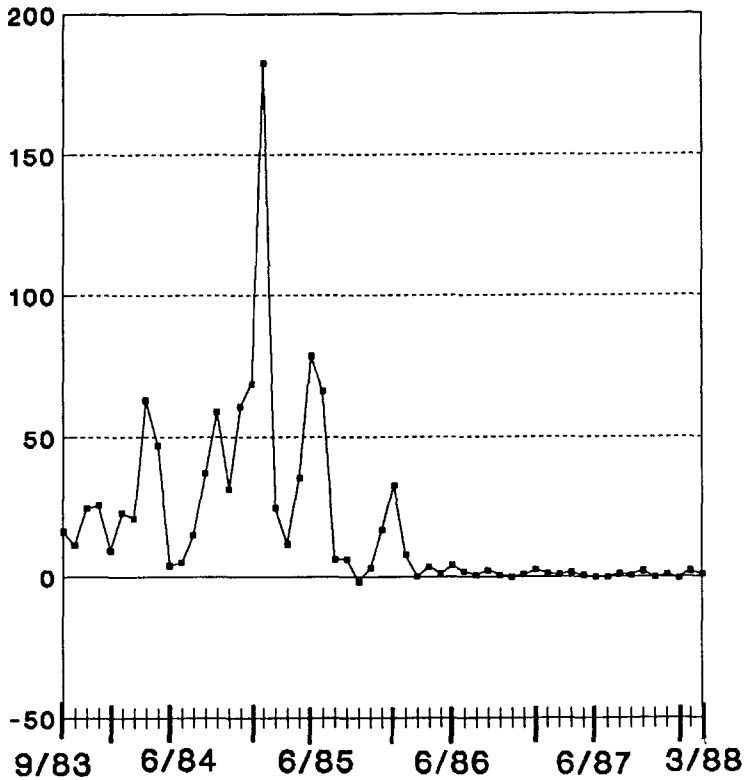
Source: UDAPE. *Dossier of Statistical Information.* UDAPE, La Paz-Bolivia, 1992.

Conceptual Framework

The basis of our conceptual model stemmed from the "classic" money demand function, which specifies a direct relationship exists between real money demand and real *income*, and an inverse relationship between real money demand and *interest rates*. Incorporating results from the following researchers, the classic model was augmented to include additional explanatory variables, such as *lagged money demand*, to account for dynamic adjustment (Cuthbertson and Taylor, 1990); *inflation*, to capture the effect of price increases (Cesarano, 1991; Branson, 1989); the *wage rate*, as a proxy for the value of time (Dawd, 1990; Becker, 1976); and *exchange rates*, as a hedge against inflation. Based on economic theory and building upon research results presented above, six regressors were chosen to estimate the real, short-run money demand function for Bolivia as specified below in the parent Cobb-Douglas function:

$$\left(\frac{M^D}{P}\right) = \beta_o \left(\frac{M^D_{(-1)}}{P_{(-1)}}\right)^{\beta_1} IR^{\beta_2} \ ER^{\beta_3} \ P_{(-1)}^{\beta_4} \left(\frac{Y}{P}\right)^{\beta_5} \left(\frac{W}{P}\right)^{\beta_6} e^\varepsilon \tag{1}$$

where

M^D = nominal money demand
P = a price index
IR = the real interest rate
ER = exchange rate expressed in units of Bolivian currency per U.S. dollar
Y/P = real national income
W/P = real national wage rates
β_i = parameters for i = 0, ..., 6
ε = disturbance term
The subscript (-1) is a one period lag

As described in the "classic" money demand function in equation (1), we expect a positive relationship between real *income* and real money demand and a negative relationship between real *interest rates* and real money demand. However, it is important to point out that the use of

banks in Bolivia is not widespread. As such, the demand for money may not be as responsive to interest rate changes (Kelfala, 1992). The *lagged money demand*, ($M^D_{(-1)}$ / $P_{(-1)}$), is included as an explanatory variable to capture dynamic adjustments. A positive relationship is expected. As stated earlier, the effect of *inflation* on the real demand for money is uncertain due to the opposing substitution and income effects. The average *wage rate* is hypothesized to be positively correlated with the demand for money. According to economic theory, an increase in wages leads to an increase in money demand for both transaction and speculative purposes (Barron, et al., 1989).

The *exchange rate* appears to be an important determinant of money demand. In Bolivia, the exchange rate constituted and still constitutes the most reliable means of hedging against inflation. Through a market determined exchange rate, Bolivians maintain or may improve their purchasing power by holding wealth in foreign currency. Consequently, the exchange rate captures the speculative demand for money with the U.S. dollar being the most important alternative financial asset. On this basis, the exchange rate should be negatively related to the demand for local currency.

Empirical Procedures[4]

Estimation used monthly data from September 1983 through March 1988. Real values were obtained by dividing the nominal values by the consumer price index.[5] Real interest rates were obtained by subtracting inflation rates from nominal interest rates. The annual interest rate on bank deposits is a representative interest rate, since Bolivia's financial markets have not been developed and individuals do not have diversified portfolios. Choice of time deposit interest rates is supported by Melvin (1988), in his study on the dollarization of Latin America.

Data were obtained from a Dossier of the Unit of Economic Policies Analysis (UDAPE), which includes statistical information from the Instituto Nacional de Estadistica, (National Institute

of Statistics), Banco Central de Bolivia (Federal Reserve Bank of Bolivia), Tesoro General de la Nacion (National Treasury of Bolivia), and Ministerio de Planificacion (Ministry of Planning). Monthly data was obtained for money demand, interest rates, wage rates and exchange rates. Monthly income and expected inflation data had to be proxied. For income, we used monthly government expenditures, since the government is a major employer and therefore an important source of income. The use of government expenditures to estimate the demand for money is supported by Deravi, et al., who used government expenditures to proxy wealth. For expected inflation, a lagged price variable was used, where inflation in the current period is expected to be at least be as high as in the previous period.

Empirical analysis estimates the demand for money in two different time periods, the hyperinflation period, September 1983-August 1985, and the stabilization period, September 1985-March 1988. Empirical results are used to test whether Bolivia's money demand after stabilization differed from the previous hyperinflation period using the Chow test (Kmenta, 1986). Furthermore, the composition of significant parameters is compared for the two time periods. A log-linear functional transformation for both periods was used to estimate equation (1) based on the specifications cited in the above literature review. The transformed model is as specified below (note subscripts indicating observations have been omitted for clarity):

Period 1 (Hyperinflation)

$$\ln(\frac{M^D}{P}) = \ln\beta_0 + \beta_1 \ln(\frac{M^D_{(-1)}}{P_{(-1)}})$$
$$+ \beta_2 lnIR + \beta_3 \ln ER$$
$$+ \beta_4 \ln P_{(-1)} + \beta_5 \ln(\frac{Y}{P})$$
$$+ \beta_6 \ln(\frac{W}{P}) + \varepsilon$$

(2)

Period II (Stabilization)

$$\ln(\frac{M^D}{P}) = \ln\gamma_o + \gamma_1\ln(\frac{M^D_{(-1)}}{P_{(-1)}})$$

$$+ \gamma_2\ln IR + \gamma_3\ln ER$$

$$+ \gamma_4\ln P_{(-1)} + \gamma_5\ln(\frac{Y}{P})$$

$$+ \gamma_6\ln(\frac{W}{P}) + \phi \tag{3}$$

where previous definitions hold and

γ_i = parameters for i = 0, ..., 6
ϕ = disturbance term

Empirical Results and Discussion

    Empirical results for equations (2) and (3) are shown in table 2. Models were estimated using ordinary least squares analysis (*OLS*) on "*SAS*" software. The empirical model was tested for multicollinearity and autocorrelation. Due to the presence of multicollinearity, the lagged price index regressor was dropped, but its presence remains, since it is embedded within the real lagged money demand regressor. Listed below each parameter estimate is its corresponding *t*-value, which appears in parentheses. Also listed are the adjusted coefficients of determination (Adj. R^2), the *F* values, the Durbin's "*h*" test statistics (DW_h), and the maximum variance inflation factors (Max *VIF*) to measure multicollinearity (Kmenta, pp. 438, 1986).

Chow Test

    One of the objectives of this research is to determine whether the demand for money changed during the stabilization period relative to the hyperinflation period. The Chow test was used to verify this hypothesis (Kmenta, 1986). Results for the pooled regression model used in the Chow test are presented in table 2. The maintained hypothesis of the Chow test is that parameter estimates for the hyperinflation period (equation 2) are equal to parameter estimates for the stabilization period (equation 3). The alternative hypothesis is that these estimates differ.

$$H_o: \quad \beta_o = \gamma_o, \; \beta_1 = \gamma_1, \; \beta_2 = \gamma_2, \; \beta_3 = \gamma_3,$$

$$\beta_4 = \gamma_4, \; \beta_5 = \gamma_5, \; \beta_6 = \gamma_6$$

$H_a:$ *they are different*

$$if \quad \frac{(SSE_u - SSE_1 - SSE_2)/k}{(SSE_1 + SSE_2)/n + m - 2k}$$

$$> F_{k,n+m-2k} \quad then \; reject \; H_o \tag{4}$$

where:

β_i are the parameter estimates for the first period, i = 0,...,6

γ_i are the parameter estimates for the second period, i = 0,...,6

SSE(u) = the sum of squared error for pooled data

SSE(1) = the sum of squared error for period 1

SSE(2) = the sum of squared error for period 2

n = number of observations for period 1

m = number of observations for period 2

k = number of regressors

The calculated *F* value from the Chow test (which equalled 6.3) indicates a statistically significant difference between equations (2) and (3) at the one percent level of significance. These results imply a difference in money demand between the two periods indicating that Bolivian's had greater faith in their domestic currency and that stabilization policies were successful.

    Thus, we conclude that the demand for money in Bolivia changed after stabilization policies were implemented, indicating that the new government's objectives for economic growth and controlling hyperinflation were met in the short run. In Bolivia, the successful stabilization of the economy has had significant positive implications. For example, prior to 1987, real economic growth

Table 2. Empirical Results for the Money Demand Equations in Bolivia

Variable	Hyperinflation Period	Stabilization Period	Pooled Model
$\left(\dfrac{M^{D}{}_{(-1)}}{P_{(-1)}} \right)$	0.48 (2.5)[a]	0.39 (3.4)	0.5 (4.2)
ln IR	0.14 (1.7)	-0.08 (-2.5)	-0.06 (-1.7)
ln ER	-0.1 (-3.5)	-0.08 (-0.8)	-0.03 (-2.2)
ln $(\dfrac{Y}{P})$	0.11 (2.8)	0.19 (3.4)	0.1 (3.2)
ln $(\dfrac{W}{P})$	0.07 (0.4)	0.4 (2.8)	0.1 (1.2)
Adj. R^2	71%	93%	71%
F value	11.8	78.8	26.7
DW_{h}	0.97	1.0	0.51
Max VIF	3.2	5.4	2.8

[a] The t-values of the parameters are given in parentheses below the coefficients.

was negative. Since then, economic growth has been positive and stable (figure 2). For agriculture, new policies have significantly stabilized the variability of its economic growth, which also has been positive since 1987 excluding drought-related declines in 1989 and 1990. In addition, the agricultural export share relative to total exports rose from 3.7 percent in 1984 to a peak of 31.2 percent in 1990 as stabilization policies corrected for overvalued exchange rates (figure 3).
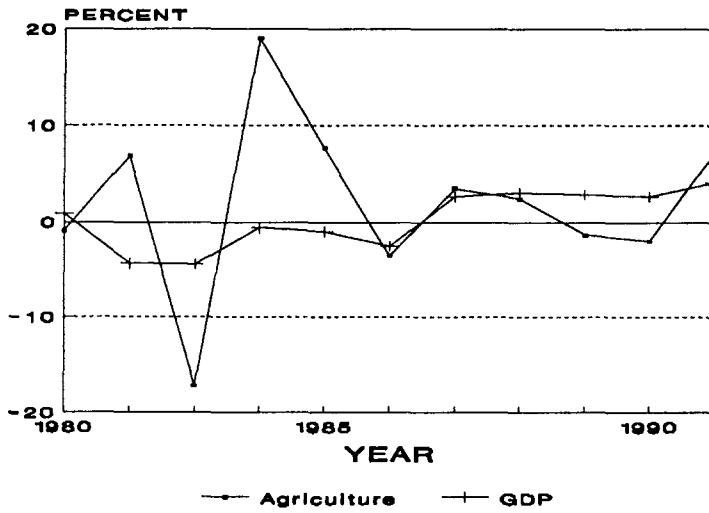
Overall Statistical Significance

The overall relationship among variables for each of the above time periods was significant as indicated by the respective correlation coefficients and F tests. The statistical significance of our empirical results were dramatically improved over Asilis, where our lowest *adjusted* R^2 was 71 percent, while Asilis reported an R^2 of 35 percent. From the empirical results, the models explained 71 percent and 93 percent of the variation in real money demand for the hyperinflation and

stabilization periods, respectively. The model explains more variation and has more significant parameters during the stabilization period compared to both the hyperinflation period and the pooled data.

Lagged Money Demand

As expected, the relationship between money demand and lagged money demand was positive for both periods. The parameters (β_1 and γ_1), correspond to elasticities, since the Cobb-Douglas function was used. Thus, the elasticity of money demand with respect to the lagged money demand during hyperinflation was higher (0.48) than that for the stabilization period (0.39); the same applies for the standard error. These numbers indicate that during hyperinflation, Bolivians adjusted their real money holdings much faster. Uncertainty about the future, as reflected by a higher standard error during the hyperinflation period may have contributed to this behavior.

Figure 2. Bolivian Economic Growth Rates (Average Annual Rates)

Figure 3. Bolivian Agricultural Export Share (Agricultural Exports/Total Exports)
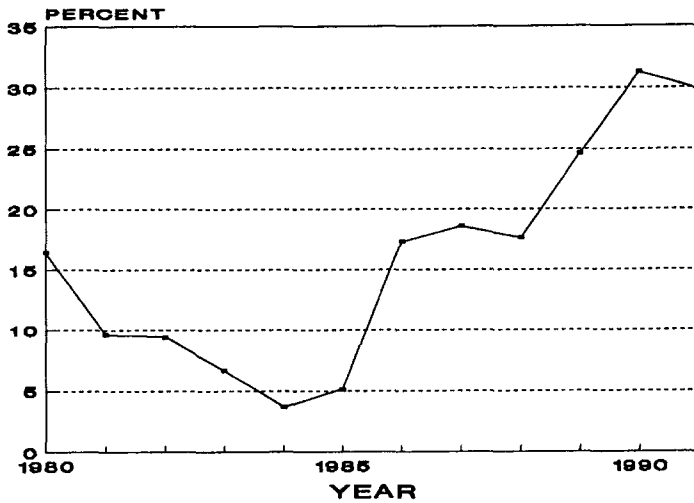
Interest Rates

A negative interest rate parameter, (β_2), was estimated for the stabilization period as expected (-0.08), but it was positive for the hyperinflation period, $(\gamma_2 = 0.14)$. Both elasticities were nevertheless small. These results reflect the underdeveloped Bolivian financial markets. Since there is no stock market in the country, time deposits and foreign currency holdings are among the few ways Bolivians can speculate. A smaller standard error during the stabilization period implies again that the uncertainty faced during the hyperinflation period diminished after September

1985. A stable and growing economy attracts foreign investment. Foreign investment leads to the development of technology and infrastructure, which in turn leads to an increase in productivity and efficiency for the overall economy, including agriculture.

Income

Government expenditures was used as a proxy for national income, since the government is a major employer and therefore an important source of income. Nevertheless, the relationship between the demand for money and government expenditures was found to be direct, as expected. The elasticities of money demand with respect to government expenditures (β_4 = 0.11 and γ_4 = 0.19), were significant but rather low.

Wages

Parameters for real wages in both periods, β_5 = 0.07 and γ_5 = 0.4, were positive. Money demand was more responsive to wages after stabilization, as expected. During hyperinflation, a rise in wages lead to a less than proportional increase in the demand for local currency, since wages could be saved in alternative assets. The standard error for wages in the hyperinflation period is proportionally greater than the standard error for the stabilization period, reflecting more uncertainty in the former period. Since the agricultural sector employs a significant portion of LDC workers, growth in agriculture leads to an increase in employment. In Bolivia, as in many developing countries, agriculture accounts for over 20 percent of gross domestic product and employed nearly half of the work force in 1991 (U.S. Department of State, 1991).

Exchange Rates

The exchange rate parameters for both periods, (β_3) and (γ_3), were negative, as expected. Although both parameters were small (0.1 and 0.08), the exchange rate was highly significant during hyperinflation but not significant during stabilization. Exchange rates were more relevant in determining money demand during hyperinflation disequilibria than during the stabilization period. During hyperinflation, Bolivians did not want to hold their domestic currency for long periods of

time. As such, an excess demand for goods and foreign currency developed. Government policy introduced exchange control, consequently, a non-official parallel market for foreign currency developed, particularly for the U.S. dollar. During 1984-1985, the U.S. dollar replaced the domestic currency in many of its functions, including as a means for payment. The gap between the official and non-official exchange rates increased rapidly, while the value of the Bolivian currency decreased.

Summary and Conclusions

This research estimated money demand functions for two different time periods, the hyperinflation period and the stabilization period. Empirical results for each time period were compared to determine (1) whether Bolivia's demand for money differed during the two time periods, (2) whether the composition of significant variables influencing money demand changed, and (3) the implications of stabilization policies on agriculture. The Chow test indicated a definite structural change between the two periods. Furthermore, the composition of significant parameters changed. During hyperinflation, lagged money demand, exchange rates and government expenditures were statistically significant. After stabilization, significant parameters included the above parameters, as well as real wages. Elasticities with respect to lagged money demand, interest rates and exchange rates were higher during the hyperinflation period, indicating that the real demand for money was more responsive to changes in these parameters. Uncertainty during hyperinflation was reflected by larger standard errors for lagged money demand, interest rates and wage rates. In general, this model provides more predictive power during the stabilization period.

For agriculture, we have seen that (1) agriculture is a significant portion of the economy in many developing countries and employs a significant portion of the workforce; (2) LDCs have historically taxed their agricultural sector both directly and indirectly--with indirect taxation often exceeding direct taxation; (3) well meaning macroeconomic policies instituted by LDCs have suppressed agricultural exports through over valued exchange rates; and (4) stabilization policies that removed economic distortions and regulations in Bolivia have increased the demand for domestic

currency and resulted in economic growth for the overall economy as well as the agricultural sector, where agricultural exports are no longer penalized with over valued exchange rates.

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Endnotes

1. In developing countries, the high taxation of agriculture stems from both direct and indirect price intervention and is associated with lower growth rates for the economy as a whole, as well as the agricultural sector (Valdes, 1993; and the World Bank series entitled *The Political Economy of Agricultural Pricing Policy*). The World Bank assessed the effects of both direct and indirect intervention on agricultural prices over 25 years (1960-84) in 18 developing countries throughout the world, for 26 different commodities. Key findings over all regions (Latin America, Asia, Africa, and the Mediterranean) included (1) developing countries have historically taxed their agricultural sector explicitly as well as implicitly and subsidized competing agricultural imports; (2) the rate of indirect taxation due to industrial protection policy and overvalued exchange rates was large in all regions (usually exceeding 20 percent). Also, indirect taxation was greater than direct taxation on agriculture; and (3) total taxation exceeded 25 percent in all regions. (World Bank, 1991). These factors hinder the development of agriculture in LDCs.

2. Our study contributes to the literature by consolidating significant explanatory variables from related hyperinflation research (Asilis, et al., 1993; Kelfala, 1992; Pastor, 1991; Melvin, 1988); variables which policymakers may consider in formulating policies, such as income, interest rates, wage rates, exchange rates, and lagged money demand. In regards to previous research focusing on Bolivia's hyperinflation, Asilis, et al. used only two variables to explain the demand for money in Bolivia--lagged inflation and the variance of inflation. Godoy and De Franco analyzed the impact of high inflation on Bolivia's agriculture with ambiguous results. Their methodology differed from Asilis, et al. in that Godoy and De Franco used descriptive statistics instead of econometric analysis to analyze results, and their time frame may have been too short for results to be realized in the agricultural sector, as later shown in figure 3.

3. Inflation may escalate despite government controlled prices because of transactions occurring in a parallel market using other currencies or barter. The government may frequently be forced to revise controlled prices upwards in order to incorporate inflation.

4. Several monetary aggregates are used to measure liquidity preference. M_1 includes currency outside banks plus demand deposits. M_2 includes M_1 plus less liquid assets such as time deposits. Generally, when focusing on the money demand function, M_1 or M_2 are used. Authors who rely on the transaction money function approach use M_1 because they define money solely as a medium of exchange (Argandoña, 1985). However, under existing financial innovations, the use of M_2 has become more common (Bagliano and Favero, 1992; Caramezza, et al. 1990; Arize 1987). In developing economies, such as Bolivia, M_1 is the more likely candidate due to underdeveloped financial institutions.

5.   According to many theoretical studies, real rather than nominal money balances are important to consumers because they reflect purchasing power.   However, recent articles have focused on nominal balances, yielding significant results (Gupta and Moazzami, 1990; and Serletis, 1987).   The use of nominal balances to estimate money demand is relevant for stable economies.   For economies with chronic inflation or hyperinflation, the real balance approach is more appropriate since it takes into account the purchasing power of the domestic currency.   The cash balance approach of the quantity theory of money supports this method (Gupta and Moazzami, 1988; and Arize, 1987).