INFLATIONARY PRESSURE DETERMINANTS IN MEXICO

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Resumen: El problema de precios inestables sigue siendo un tema difícil que enfrentan las autoridades monetarias en muchas economías en vías de desarrollo. La inflación crea incertidumbre, tasas de inversión disminuidas, e incrementa los costos de producción, disminuyendo así la tasa de crecimiento. Dado lo anterior, existe la necesidad de algún mecanismo para comprender la dinámica inflacionaria de cualquier país de interés. Este trabajo desarrolla un modelo estándar de inflación monetaria e incluye factores de producción importados y el costo de trabajo, teóricamente posibles. También se discuten las implicaciones para instrumentar una versión empírica de este modelo.

Abstract: An ongoing and difficult policy issue confronting monetary authorities in many developing economies is how to mantain stable prices. Unstable prices create uncertainty, lower investment, and raise costs of doing business, thus lowering rates of growth. As a result, when a country, it is necessary to understand its particular inflationary dynamics. This paper develops a standard monetary inflation model and augments it to include imported inputs and labor costs in a theoretically plausible manner. Implications for implementing an empirical version of the model are also discussed.

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1. Introduction

Virtually every Latin American economy must deal with the effects of inflation. In general, establishing a stable price environment is regarded as a key step to improving economic welfare, since it allows any given economy to operate more efficiently. This argument applies equally to advanced economies such as the United States (Motley, 1993) and to developing nations (Zind, 1993). This argument bears particular relevance in Mexico due to the inflationary aftershock which followed the "tequila effect" devaluation of the peso in an important goal of the current government is attaining price stability. The accurate understanding of the price dynamics of the Mexican economy, is critical to the sucessful implementation of such policy.

This paper presents a literature review followed by a theoretical framework for analyzing the sources of inflationary pressures in developing countries. A standard monetary model is adapted to incorporate two important factor costs of production, labor and imported inputs, in a mathematically consistent manner. Several empirical versions of the resulting model are estimated in order to examine the historical behavior of Mexican consumer-price movements. Literature review is first (in next section). Suggestions for future research are summarized in the conclusion.

2. Literature Review

The seminal research on inflationary dynamics in developing countries was conducted on Chilean data by Harberger (1963). Interestingly, this paper pointed out that analyzing nominal data in level form could result in spurious correlations in equations estimated for highly inflationary economies. To circumvent this problem, percentage rates of change are utilized in a linear regression framework based on the quantity theory of money. What became known as the "Harberger" framework incorporates real income, current and lagged values of the money supply, and the opportunity cost of holding cash balances. The success of this initial effort conducted on Chilean data led to the application of this framework to other developing countries (for example, see Vogel, 1974). The results of these studies have generally confirmed the usefulness of the Harberger model.

Following numerous applied econometric studies utilizing this approach, it became apparent that exclusive reliance on domestic variables often provides unsatisfactory results. Bomberger and Makinen (1979) provide a thorough examination of the Harberger model using quarterly data for Korea, Taiwan, and Vietnam. Rather than extend the model in a new direction, they conducted extensive testing to establish whether the model provides a suitable characterization of inflation. Encouragingly, the parameter estimates do not appear to be sensitive to the time period selected. However, the elasticities with respect to money and real income are not always unitary as hypothesized. Also, the coefficient signs for the cost of holding money variables are sometimes negative.

Hanson (1985) extends the Harberger framework in a systematic fashion to incorporate an important missing component: import costs. An implicit cost function is utilized to derive an aggregate supply curve which includes the local prices of imported inputs. When the underlying production function is homogeneous of degree one, inflation becomes a weighted sum of money supply changes and import prices. This is important because it implies that the elasticity of inflation with respect to money supply growth is less than one. Empirical results in the Hanson article strongly support the inclusion of import prices in models of inflation.

Subsequent research has provided additional evidence in favor of the augmented Harberger-Hanson approach wherein the effect of import prices on inflation is considered. Koch, Rosensweig, and Witt (1988) and Fullerton, Hirth, and Smith (1991) both report positive link between the trade-weighted exchange value of the dollar and consumer prices in the United States. These empirical studies indicate that exchange-rate changes affect domestic prices in the United States. As will be discussed below, the direction of this casual relationship has important implications for both model form and estimation techniques.

Developing country studies have also confirmed the usefulness of an augmented modeling treatment of inflationary dynamics. Sheehey (1976) reports some of the early econometric work along these lines. Sheehey (1980) reaches the additional conclusion, on the basis of empirical tests, that accurate assessment of austerity policy efforts will likely require explanatory variables representing cost push factors. More recently, Brajer (1992) provides evidence that such models may offer better specifications than those which rely solely on domestic economic factors. Similarly, Fullerton (1993a,b) successfully imbeds a variant of this approach in large-scale macroeconometric forecasting models for Colombia and Ecuador.

There have also been a small number of dynamic models estimated on the basis of monthly data for developing economies. Fullerton (1993c) examines Colombian anti-inflationary efforts utilizing monthly data with an autoregressive-moving average, ARMA, transfer function. Separately, Fullerton (1995) develops an econometric model, based in large part on the augmented Harberger-Hanson framework, to examine price stabilization efforts in Ecuador. The estimated models for both economies are found to generate realistic simulation scenarios for policy analysis. Results reported in both articles also support the hypothesis that the rate of inflation is inelastic with respect to money supply growth.

3. Theoretical Model

Harberger's (1963) model is based on the traditional quantity theory of money equation:

$$MV=PQ, \tag{1}$$

where M represents some measure of the money stock, V is the velocity of circulation, P is the price level, and Q is real output. The realism of the model is enhanced by allowing velocity to vary instead of arbitrarily forcing it to be constant. Velocity is assumed to be a predictable function of other macroeconomic variables that reflect the cost of holding cash balances.

To utilize percentage changes, the variables can be transformed by natural logarithms and taking the first difference. Introduction of a time subscript, and rearrangement of the terms, yields the basic Harberger equation:

$$DP_t = DM_t - DQ_t + D(I_{t-1}) \tag{2}$$

where D represents a difference or backshift lag operator and I can represent either the rate of inflation, or an interest rate. Harberger substitutes inflation for velocity, using the lagged change in the inflation rate to proxy for the implicit cost of holding money. This approach is useful when modeling inflation in countries where banking regulations have occasionally caused savings and loan rates to become fixed in nominal terms and temporarily negative in real terms. Unadjusted interest rates from these periods would obviously not provide an accurate estimate for the cost of holding cash. In economies where financial markets have been allowed to operate more flexibly, and where appropriate data are available, an interest-rate series may also be used to define the last explanatory variable in equation 2. Because Mexico has allowed fairly substantial interest rate flexibility since 1982, we use an interest rate as the last right-hand side variable in our estimates.

Equation 2 implies that inflation will vary positively with the money supply and inversely with respect to real output. A statistically significant intercept term will enter the estimated equation if there is a trend in the velocity of circulation. If only contemporaneous lags of M and Q enter in the equation, the parameters for both variables are hypothesized to be unitary. This can be tested empirically with the following specification:

$$DP_t = a_0 + a_1 DM_t - a_2 DQ_t + a_3 D(I_{t-1}) + u_3, \qquad (3)$$

where a_1 and a_3 are hypothesized to be positive, and the absolute values of a_1 and a_2 should both be statistically indistinguishable from one. The last argument in the expression represents the disturbance term.

Hanson (1985) proposes an implicit cost function to incorporate the price of inputs into the derived an aggregate production function which is homogeneous of degree one. The output supply functions derived from this framework will be homogeneous of degree zero in input and output prices. Equation 4 expresses this relationship using logarithmic first differences:

$$DQ_t = b_0 + b_1 DP_t - b_2 DPI_t + u_4, \qquad (4)$$

where PI represents imported input prices. When the relative prices of imported inputs increase, output is assumed to decline. The standard homogeneity assumptions for production and derived supply relations imply that $b_1 - b_2 = 0$.

The vector of input prices utilized in the derivation of equation 4 can be extended to include factor prices beyond those represented by imported materials, equipment, and services. Perhaps the most obvious candidate to further improve the relevance of the framework is labor costs (Fullerton, 1997). Doing so yields the following theoretical expression:

$$DQ_t = b_0 + b_1 DP_t - b_2 DPI_t - b_3 DW_t + u_5, \tag{5}$$

where W represents wage and labor costs. In this case, the standard microeconomic assumptions for production and derived supply functions imply that $b_1 - b_2 - b_3 = 0$.

Equation 5 can be substituted into equation 3 to eliminate the output term from the expression to be estimated. This step is exceedingly useful for avoiding interpolation bias in empirical studies of monthly inflation for countries where national income and product accounts are published on a quarterly and/or annual basis (for a discussion of interpolation bias, see Bomberger and Makinen, 1979). The resulting equation can be written as follows:

$$\begin{aligned}(1 + a_2 b_1) DP_t = a_0 - a_2 b_0 + a_1 DM_t + a_2 b_2 DPI_t \\ + a_2 b_3 DW_t + a_3 D(I_{t-1}) + u_6\end{aligned} \tag{6}$$

Equation 6 can be further simplified prior to estimation. Dividing through by the left-hand side constant term and rearranging terms so that the price series remains as the dependent variable generates the following relation:

$$DP_t = c_0 + c_1 DM_t + c_2 DPI_t + c_3 DW_t + c_4 D(I_{t-1}) + u_7, \tag{7}$$

which also has testable properties. Note that the monetary variable, c_1, is hypothesized to be significantly less than one. With the possible exception of the intercept, all of the regression parameters in Equation 7 are expected to be positive. In earlier studies for other countries such as Ecuador, Nigeria, and the United States (Fullerton, 1995; Fullerton and Ikhide, 1998; Fullerton, Hirth, and Smith, 1991), it has been necessary to substitute the import price deflator with an exchange-rate series due to data constraints. That substitution may not be necessary in the case of Mexico since the central bank has developed an import-price deflator with historical observations that date back more than two decades.

As indicated in the literature review, this general approach has provided a useful framework for analyzing annual inflation rates. But because the implied lag structure is fairly short, it may require additional modification prior to estimation, since dynamic modeling in economics does not offer clear guidelines with respect to lag-length specification. As a result, if the inflationary impact of a change in the money supply is felt over the course of more than one calendar year, the implied lag structure for a model estimated with monthly data could potentially exceed that which is shown above. equation 8 takes into account this empirical issue which has confounded researchers for many years (see Laidler, 1993):

$$DP_t = c_0 + Sum\,(c_{1i})DM_{t-i} + Sum\,(c_{2j}DPI_{t-j}) + Sum(c_{3k})DW_{t-k} + Sum(c_{4m})D(I_{t-1-m}) + u_8\,, \quad (8)$$

where $i, j, k, m = 0, 1, 2,\ldots$ respectively.

4. Implications for Estimation

The above model provides an attractive starting point for examining inflationary trends in an economy. It is not, however, without potential problems for analyzing price movements. The principal concern with this theoretical construct arises from the fact that equation 8 treats all of the regressors as exogenous or pre-determined. In doing so, it does not allow for the possibility of statistical feedback or endogeneity between the left-hand and right-hand side variables.

If a central bank yields to political pressures and engages in accommodative monetary policy in the face of inflation shocks, this assumption would be violated. Research conducted using both monthly and quarterly data for Colombia indicates that the causality paths are unidirectional as implied by equation 8 (see Fullerton, 1993c, and Leiderman, 1984). This assumption may not always be satisfied, however, as it was found to be necessary to model domestic prices, monetary aggregates, and import prices simultaneously in the Colombian macroeconometric model which Fullerton (1993a) estimated using annual data. It would not be surprising if the feedback relations encountered in paper also emerge occasionally in monthly data samples for other countries, especially in cases where monetary authorities are forced to yield to political pressures. This likelihood is even greater in economies where wages and prices are linked via formal indexing rules and other types of cost-of-living escalator clauses in labor agreements (Dornbusch and Fischer, 1993).

A second possible concern arises from the use of first-differenced, log-transformed time series data in the equation to be estimated. If the resulting series are stationary, the equation can be estimated without risk of obtaining spurious correlations in the results. As shown in many studies of hyperinflationary economies, however, higher-order differencing may be required to induce stationarity during periods in which prices increase rapidly (see Engsted, 1993). Because Mexico has never experienced any hyperinflationary episodes, regular first differencing should adequately remove nonstationary trends in any variable selected for analysis. It is still important, however, to formally test the latter assumption when empirical versions of equation 8 are estimated.

In order to examine whether the working series included in equation 8 are stationary, a variety of unit root tests may be utilized. For some developing economies where data limitations are severe, applying unit root tests to relatively short time spans may be risky. The latter consideration is due to the fact that these tests typically have low power unless long-run data sets are employed (Hakkio and Rush, 1991). Time series data for consumer prices and exchange rates generally date back to 1957 and do not pose any problems. For other variables such as money supply aggregates, wages, and interest rates, there may be little that can be done to avoid this potential problem. In such cases, chi-square tests calculated for autocorrelation functions (Greene, 1993) may provide corroborative evidence to support the results obtained from the unit root tests.

As explained above, our model is explicitly built around a set of unidirectional causality relations from movements in the regressors to consumer prices. To examine whether the absence of simultaneity in the model is plausible, Granger causality tests may be calculated for the stationary components of the series of interest. If the resulting F-tests fail to reject the feedback hypothesis, then the reduced form model appearing in equation 8 is inadequate. Potential alternative approaches include structural model systems of equations (Beltrán del Río, 1991, and Fullerton and Araki, 1996) and vector autoregression equation systems (Arellano and González, 1993).

The model developed above accounts for more potential sources of inflation than do previous versions of the Harberger-Hanson theoretical framework. Its scope still may not be wide enough to explain all systematic variations in aggregate price levels for particular economies. If this is the case, residuals will be serially correlated. If it is not possible to identify and extend the model to resolve the nonrandom component of the residuals, then the autocorrelation should be corrected in order to minimize the possibility of spurious estimation results (Hamilton, 1994). Pagan's (1974) nonlinear, ARMAX, procedure offers an attractive option because of its capacity to handle autoregressive, moving average, and mixed error generating processes.

The lag structure in equation 8 is arbitrary by design. In estimation, however, specific lag lengths must be selected. Ultimately, this question is an empirical one. Experimentation with the lag structure generally cannot be avoided in any modeling process involving dynamic specifications. Several decision rules are available. Examples include likelihood ratio tests, Akaike, and Schwarz criteria. Previous Latin American research cited above, however, indicates that the use of annual data is not likely to require long lag lengths.

As a result of the exploratory characteristics of the model developed herein, a variety of simulation exercises will be necessary to evaluate empirical versions of equation 8. The goal of the simulation tests is to provide insights as to wether or not it would be valid to use the results to analize government policies, and whether extrapolations are likely to be valued. The use of out-of-sample data not employed in parameter estimation provides the only means by which the simulation experiments can satisfy the Klein (1984) and Christ (1993) criteria for forecast and model evaluation. Although model development and hypothesis testing are the primary goals of the research at hand, a sample set of monetary policy simulation exercises are also reported below.

5. Empirical Results

Equation estimation is conducted for two sample periods, 1970-1997 and 1975-1997. The initial period starting point is determined by data availability at the Banco de Mexico internet web site (www.banxico.org.mx). At present, that web site serves as a tremendous tool to researchers located outside Mexico City. Data coverage at the web site is expanding rapidly and offers a timely means for acquiring macroeconomic and balance of payments data. The second sample period starting point is selected to correspond with the period during which nominal exchange rates have changed with a higher degree of frequency than was observed between 1954 and 1976. The split sample approach is useful because it provides a means for examining the possibility of parameter heterogeneity due to policy innovations observed in recent decades in this economy (Fullerton and Sprinkle, 1997).

As noted above, Mexico has never experienced hyperinflation (price changes of 50 percent per month or higher). Given this, it not surprising that first moment stationarity is obtained after first-order differencing is performed on logarithmic transformations of the original series. As underscored by the unit root test results shown in table 1, this allows a straightforward application of the theoretical framework developed above. Granger causality F-tests reported in table 2 confirm the absence of feedback effects across both sides of the equation, implying that parameter estimation will not be required to handle simultaneity. These results are obtained for two- and three-year lags of the dependent and independent variables appearing in equation 8. That the results are in contrast to those reported by Leiderman (1984) for Mexico may reflect the substantial turnabouts witnessed in Mexican monetary policy since 1988.

Parameter estimation results for equation 8 are reported in appendix A. Fairly strong evidence in favor of the theoretical model is provided by the high degree of coefficient stability across sample periods. Also remarkable is the absence of serial correlation problems, underscored by the relative

Table 1

Augmented Dickey-Fuller Unit Root Stationarity Tests

Variable	*ADF Test Statistic*	*1% MacKinnon Critical Value*
DP	-5.833	-2.632
DM	-5.149	-2.632
DPI	-4.503	-2.665
DW	-5.392	-2.632
DI	-5.747	-2.656

Table 2
Pairwise Granger Causality Tests

Variable Direction	*F-Statistic*	*Probability*
DM => DP	3.874	0.032
DP => DM	2.301	0.118
DPI => DP	1.146	0.338
DP => DPI	0.690	0.513
DW => DP	3.316	0.071
DP => DW	22.827	0.001
DI => DP	12.974	0.001
DP => DI	0.519	0.512

stability of coefficients between the corrected and non-corrected estimates of the equations. Of primary importance is the fact that the results consistently point to the same variables as the sources of inflationary pressures in Mexico.

In appendix A, equation A1 is estimated over the entire sample period, 1971-1997. Although the *F*-statistic is highly significant, three of the regression coefficients are statistically insignificant as a consequence of multicollinearity. Of even greater concern is the fact that the estimated parameter for the stationary component of the import price deflator is negative instead of positive as hypothesized. The other parameters have the expected signs and are in line with results and inferences reported elsewhere (Caire and Calderón, 1996; Jarque and Téllez, 1993; Pérez-López, 1996). Contemporaneous lags for money, import prices, and wages, plus an additional lag on the interest rate are sufficient to explain changes in the dependent variable. The latter is confirmed by the Durbin-Watson statistic reported in the appendix. The six-lag correlogram chi-square analysis reported in appendix A does not reveal evidence of higher order serial correlation or indicate that higher order lags of the regressors are required to adequately account for inflationary trends in Mexico. The Akaike and Schwarz criteria estimates also appear in the appendix.

Given the fact that Mexican monetary policy from 1954 through 1975 established a fixed nominal exchange rate with respect to the dollar, it is natural to question whether the empirical estimates reported for the full sample period are valid. To address the issue of potential parameter heterogeneity, the sample is shortened to cover the twenty three years from 1975 through 1997. This is the only period in Mexican economic history during which nominal exchange rates have been managed with a high degree of flexibility by the central bank. Similar to equation A1, the import price deflator coefficient in equation A2 carries a negative algebraic sign that runs counter to the underlying theoretical model. Multicollinearity remains present in the right-hand-side variable matrix. While the magnitudes of calculated parameter estimates for the original variables included in the model remain virtually identical to those of equation A1, Chow tests for parameter heterogeneity are not conducted due to the conterintuitive sign associated with the import price deflator coefficient. There is no plausible reason for import price inflation to lead to domestic price deflation in an open economy such as that of Mexico.

Because of the unexpected outcomes with respect to the signs attached to the import price deflator, additional models are estimated using a specification that uses the peso/dollar nominal exchange rate as a proxy for international price pressures. Equation B1 is estimated for the 1970-1997 time period. All of the parameter estimates are below unity as hypothesized by the underlying theoretical model. Further, all of the coefficients are positive in line with a priori expectations. In general, equation B1 also exhibits good statistical traits. Regression coefficients for the monetary, exchange rate, and wage variables all have t-statistics associated with them that exceed the 5-percent significance threshold. The interest rate variable parameter, however, is not significant. As in equation A1, serial correlation is not encountered in the residuals. The log likelihood coefficient for B1 easily exceeds that of A1, implying that the exchange-rate is a better proxy for international price pressures. The 6-lag chi-square correlogram reported in appendix B does not uncover any specification problems due to omitted regressor lags.

Equation B2 is estimated for the 1975-1997 time frame to allow for potential parameter instability resulting from the aforementioned shift in exchange-rate regimes. Once again, the parameters all carry the hypothesized algebraic signs and magnitudes. As with the full sample estimate, the model coefficient associated with the implicit cost of holding idle cash balances does not-meet the 5-percent significance criterion. The log likelihood coefficient exceeds that associated with the alternative import-deflator version of the equation. Random residual distribution is confirmed by the Durbin-Watson and correlogram data for B2. The Chow F-test for coefficient heterogeneity is 1.726 and statistically insignificant at the 5-percent level. Given this result, the complete sample (including data for 1970-1975) is used in the simulation experiment conducted below.

An important question to consider is whether these in-sample estimation results can be replicated under out-of-sample simulation conditions. To at least partially examine this issue, equation B1 is reestimated for the 1970-1992 sample period. The resulting equation is then simulated for the 5-year 1993-1997 period using actual historical data to construct an ex-post forecast simulation. As shown in appendix B, equation B3 exhibits generally good econometric traits and does not fail to explain any systematic movements in the consumer price index.

Predicted annual average inflation rates using equation B3 are compared with actual average price index increases in table 3. In three of the years appearing in the tabulated results, the model over-shoots the observed inflation rate, while in the remaining two under-shooting occurs. During the devaluation and recession years of 1995 and 1996, the model simulations err by approximately 20 percentage points from the average rates posted. The 24-month average rate is almost identical to the historical value observed during that period of temporary turbulence and adjustment in the macroeconomy.

Table 3
Consumer Price Index Ex-Post Forecast Results

Year	*Predicted CPI Percentage Change*	*Actual CPI Percentage Change*
1993	8.3	9.8
1994	10.9	7.0
1995	14.9	36.0
1996	52.5	33.4
1997	24.5	20.6

The estimation and simulation results appearing in the appendices and tables 1 through 3 confirm the overall usefulness of the underlying theoretical model. Parameter estimates for the money, exchange-rate, and cost-of-holding-cash-balance proxy variables are significant and robust with respect to sample period changes. Ex-post forecast results envelope the historical sample observations without any evidence of a simulation. Because the exchange-rate equations out-perform the import-price deflator equations, and because the interest rate parameters do not reach 5-percent significance threshold, further empirical testing is necessary. Given the wide ranging cyclical and policy regime conditions observed during the sample estimation periods, the overall usefulness of this general modeling approach is fairly well underscored and future applications appear likely to meet with success.

6. Conclusion

An inflationary model is developed above that includes both monetary and factor cost effects in a theoretically plausible manner. Specification and estimation of the model and its parameters are relatively easy to accomplish. Because the model does not pose stringent data requirements, it is likely to be applicable to most developing economies where inflation remains a problem. Given its dynamic specification, the model may be useful in cases where monetary officials continue to grapple with short-term price stabilization goals and high frequency data are utilized.

Empirical results indicate that the factor that contributed most significantly to consumer price pressures in Mexico was labor costs followed by nominal currency depreciation, and finally liquidity growth. Evidence regarding the role of interest rate movements is mixed, but carries the expected algebraic effect in all of the estimation results. The overall specification of the model is relatively robust. Without exception, the diagnostic tests indicate that the model successfully explains all systematic movement in the dependent variable. Coefficients for the statistically significant variables are stable across sample periods and estimation procedures. Thus, this basic modeling approach appears to offer promise as a viable platform for both policy analysis as well as business forecasting exercises.

Over the sample period in question, endogeneity between inflation, money, wages, the peso/dollar exchange rate, and interest rates does not appear to pose any constraints on choice of estimator or model structure. Even though it is not required for parameter estimation consistency, it might be of interest to imbed the framework developed above into a large scale system of equations. Doing so could potentially enrich subsequent analysis of both policy and business outlook simulation. The results shown in table 3 suggest that the model developed herein performs fairly reliably in this context. Ultimately, empirical research utilizing this general modeling approach may help to unravel some of the questions that frequently arise with respect to price trends in Mexico and other developing economies.

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Appendix A
Empirical Results using Banco de Mexico's Import Price Deflator Series

Equation A1

Variable	*Coefficient*	*Std.Error*	*t-Statistic*	*Prob.*
C	0.043743	0.049014	0.892463	0.3818
DM	0.268696	0.147254	1.824704	0.0817
DPI	-0.388987	0.383739	-1.013674	0.3218
DW	0.712499	0.130934	5.441657	0.0000
DI (-1)	0.002956	0.001648	1.793974	0.0866

R-squared	0.840742	Mean dependent var	0.290261
Adjusted *R*-squared	0.811786	S. *D*. dependent var	0.222242
S. E. of regression	0.096417	Akaike info criterion	-1.674699
Sum squared resid	0.204516	Schwarz criterion	-1.434729
Log likelihood	27.608430	*F*-statistic	29.035200
Durbin-Watson stat	2.023158	*Q*(6) Chi-square	1.587300

Equation A2

Variable	*Coefficient*	*Std.Error*	*t-Statistic*	*Prob.*
C	0.068592	0.056395	1.216287	0.2396
DM	0.207670	0.156427	1.327585	0.2009
DPI	-0.442516	0.407381	-1.086246	0.2917
DW	0.735099	0.140956	5.215100	0.0001
DI (-1)	0.002932	0.001702	1.722458	0.1021

R-squared	0.844337	Mean dependent var	0.322180
Adjusted *R*-squared	0.809745	S. D. dependent var	0.224440
S. E. of regression	0.097897	Akaike info criterion	-1.620142
Sum squared resid	0.172509	Schwarz criterion	-1.373296
Log likelihood	23.631640	*F*-statistic	24.408540
Durbin-Watson stat	1.960837	*Q*(6) Chi-square	1.465400

Appendix B

Empirical Results using the Peso/Dollar Exchange Rate as a Proxy for Import Prices

Equation B1

Variable	*Coefficient*	*Std.Error*	*t-Statistic*	*Prob.*
C	0.010792	0.022666	0.476148	0.6385
DM	0.231896	0.082429	2.813275	0.0099
DPI	0.330650	0.049677	6.656035	0.0000
DW	0.498447	0.082083	6.072487	0.0000
DI (-1)	0.001243	0.001015	1.224879	0.2330

R-squared	0.943246	Mean dependent var	0.281709
Adjusted *R*-squared	0.933376	S. D. dependent var	0.222733
S. E. of regression	0.057491	Akaike info criterion	-2.713944
Sum squared resid	0.076020	Schwarz criterion	-2.476050
Log likelihood	42.995220	*F*-statistic	95.565120
Durbin-Watson stat	2.001642	*Q*(6) Chi-square	4.435701

Equation B2

Variable	*Coefficient*	*Std.Error*	*t-Statistic*	*Prob.*
C	0.020134	0.027484	0.732581	0.4732
DM	0.198040	0.088171	2.246092	0.0375
DPI	0.316275	0.052068	6.074334	0.0000
DW	0.531728	0.088689	5.995394	0.0000
DI (-1)	0.001235	0.001042	1.184288	0.2517

R-squared	0.945615	Mean dependent var	0.322180
Adjusted *R*-squared	0.933529	S. D. dependent var	0.224440
S. E. of regression	0.057865	Akaike info criterion	-2.671746
Sum squared resid	0.060271	Schwarz criterion	-2.424900
Log likelihood	35.72508	*F*-statistic	78.24312
Durbin-Watson stat	1.748572	*Q*(6) Chi-square	2.382399

Equation B3

Variable	*Coefficient*	*Std.Error*	*t-Statistic*	*Prob.*
C	-0.014119	0.031048	-0.454736	0.6547
DM	0.325232	0.108323	3.002444	0.0076
DPI	0.263370	0.067282	3.914416	0.0010
DW	0.527308	0.090500	5.826602	0.0000
DI(-1)	0.001403	0.001275	1.099728	0.2859

R-squared	0.948864	Mean dependent var	0.301940
Adjusted *R*-squared	0.937500	S. D. dependent var	0.237306
S. E. of regression	0.059326	Akaike info criterion	-2.621866
Sum squared resid	0.063353	Schwarz criterion	-2.375019
Log likelihood	35.151460	*F*-statistic	83.500120
Durbin-Watson stat	2.044918	*Q*(6) Chi-Square	1.649402