Journal of Economics and Sustainable Development www.iiste.org
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.3, No.4, 2012

# Price and Income Elasticities of Disaggregated Import Demand: Bounds Test Results for the Dominican Republic

Santiago Grullón
Senior Director of Research and Analysis, NYC & Company
Adjunct Professor, Mercy College
E-mail: santiago.grullon@gmail.com

**Abstract**
This paper presents an empirical examination of the import demand for services, merchandise, petroleum, and other products in the Dominican Republic during the period of 1980-2005. Using the 'bounds' testing approach to co-integration of Pesaran *et al*. (2001), four import demand functions are estimated and all show the existence of a long-run equilibrium relationship between imports, relative prices and domestic income. These imports have long-run price demand elasticities below unity, indicating that relative prices have no effect on their demand. On the other hand, all the long-run domestic income demand elasticities are significantly above unity, demonstrating that imports are strongly affected by domestic economic activity. These results are shown to have important implications for sustainable economic growth in the Dominican Republic, particularly in the light of its recent membership in the Central American Free Trade Agreement (DR-CAFTA).

**Key words:** price/income import demand elasticities, error correction model, 'bounds' test

## 1. Introduction

This paper presents an empirical examination of the demand for imports of services, merchandise, petroleum, and other products in the Dominican Republic during the period of 1980-2005. The Dominican Republic presents an interesting case for quantifying the responsiveness of imports to variations in relative prices and in domestic economic activity. In the early 1980's in response to a deceleration of growth and balance of payments difficulties attributed to trade distortions caused by an inward-oriented model, the Dominican government began to put into practice various measures designed to reduced the demand for imports of substitutable non-capital goods (World Bank 1985). Initially, this involved the transfer of various categories of previously-subsidized imports under a fixed-parity exchange rate system between the peso and U.S. dollar to a flexible-market-determined exchange rate system (Serulle and Boin, 1984: 299). However, the key component of this regime switch originated with the signing in 1983 of an International Monetary Fund (IMF) three-year extended fund facility (EFF) agreement which called for the implementation of various measures including the substitution of the fixed-parity exchange rate system by a flexible-exchange rate regime, a further increase in the number and type of previously-subsidized imports transferred from the fixed-exchange rate system to the flexible-exchange rate system, and the devaluation of the Dominican by replacing the fixed one-for-one exchange rate between the Dominican peso and the US dollar with a three-for-one exchange rate. Because the market-determined exchange rate was more expensive than the government-established rate, the transfer of various categories of imports from the fixed to the flexible-exchange rate system was designed to reduce the demand for foreign-produced goods. Similarly, the devaluation of the Dominican peso was intended to make all foreign-made goods more expensive to Dominican residents, thereby reducing their importation and increasing domestic production of these. These changes in relative prices were the mechanism through which movements in the exchange rate were expected to reduce the demand for foreign-produced substitutable non-capital goods.

Beginning in 1990 and concluding in 2001, the Dominican government began to undertake a series of import tariff reforms as part of a process designed to deepen the level of trade openness of the economy (Ceara Hatton and Isa-Contreras, 2003:24). The tariff reforms initiated in the former year were based on two presidential degrees which were subsequently unified under a new law in 1993. The new system of import tariffs consisted of a structure of ad-valorem tariffs with a maximum rate of 35% and a minimum rate of 3%. In 2001, the Dominican Congress approved a new tariff reform which increased the maximum tariff rate from 35% to 40%. However, despite this higher maximum rate, the average tariff rate declined from an average of nearly 18% in 1995 to approximately 9% in 2002.

Table 1 shows the rates of growth for the Dominican economy and for the four categories of imports over the period 1980 to 2005. Over the course of this 25-year period, the economy expanded at an average annual rate of 4.1 percent and the four types of imports posted average growth rates ranging from a low of 5.0 percent for imports of services to a high of 6.4 percent for other imports. However, if we divide this phase into two sub-periods: 1980 to 1991 and 1992 to 2005 – with the first sub-period consisting of the years prior to the import tariffs reforms and the second covering the post-import-liberation regime – an interesting pattern appears. Over the course of the first sub-period, the economy grew at an average rate of only 2.3 percent, with most categories of imports expanding at rates only slightly higher than 1 percent. During the subsequent sub-period, the economy expanded at more than 5 percent per annum. However, these imports grew at rates significantly higher than during the previous sub-period. The only exception was petroleum products, which grew at basically the same average rate as that achieved during the first sub-period.

**Table 1: Economic Performance and Imports Growth (%), 1980-2005**

| **Period** **(1)** | ***GDP*** **(2)** | $M_S$ **(3)** | $M_M$ **(4)** | $M_P$ **(5)** | $M_O$ **(6)** |
|---|---|---|---|---|---|
| 1981 | 4.3 | -13.6 | -14.9 | -1.3 | -16.2 |
| 1982 | 1.7 | -25.7 | -15.7 | -4.0 | -17.1 |
| 1983 | 4.6 | 7.5 | 2.8 | 14.0 | 1.3 |
| 1984 | 1.3 | -1.3 | -7.0 | 8.6 | -9.4 |
| 1985 | -2.1 | -9.7 | 8.8 | -11.0 | 12.5 |
| 1986 | 3.5 | 5.9 | 23.9 | -26.5 | 31.2 |
| 1987 | 10.1 | 27.2 | 15.8 | 81.8 | 10.4 |
| 1988 | 2.2 | 5.7 | 0.8 | 1.0 | 0.8 |
| 1989 | 4.4 | 13.2 | 16.5 | 3.8 | 18.2 |
| 1990 | -5.5 | -6.2 | -16.6 | 4.3 | -19.0 |
| 1991 | 0.9 | 9.0 | 0.7 | -4.7 | 1.5 |
| 1992 | 8.0 | 15.9 | 28.9 | 17.0 | 30.6 |
| 1993 | 3.0 | 48.4 | 34.6 | 1.8 | 38.8 |
| 1994 | 4.3 | 10.0 | 5.4 | 23.0 | 3.7 |
| 1995 | 4.7 | 0.9 | 0.2 | 5.2 | -0.3 |
| 1996 | 7.2 | 14.8 | 8.3 | 4.8 | 8.7 |
| 1997 | 8.2 | 5.4 | 20.5 | 14.1 | 21.2 |
| 1998 | 7.4 | 15.4 | 26.8 | 9.4 | 28.7 |
| 1999 | 8.1 | -3.6 | 4.1 | 2.8 | 4.2 |
| 2000 | 8.1 | 8.2 | 11.0 | 8.2 | 11.2 |
| 2001 | 3.6 | -6.0 | -3.4 | -1.0 | -3.6 |
| 2002 | 4.4 | 2.6 | 5.2 | 2.9 | 5.4 |
| 2003 | -1.9 | -8.4 | -24.9 | -6.3 | -26.5 |
| 2004 | 2.0 | -4.5 | -4.1 | -10.3 | -3.4 |
| 2005 | 9.3 | 13.8 | 26.1 | 11.0 | 27.7 |
| 1980-2005 | 4.1 | 5.0 | 6.2 | 5.9 | 6.4 |
| 1980-1990 | 2.3 | 1.1 | 1.4 | 6.0 | 1.3 |
| 1991-2005 | 5.5 | 8.1 | 9.9 | 5.9 | 10.4 |

The aim of this paper is to derive long-run relative-price and income elasticities of demand for services, merchandise, petroleum, and other imports and to use the results to ascertain the potential implications for sustainable economic growth in the Dominican Republic from its recent membership in a regional economic integration agreement between the United States, Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua (DR-CAFTA). Toward this end we use the 'bounds' testing approach to co-integration of Pesaran *et al.* (2001) and a method developed by Bårdsen (1989) to derive long-run price and income demand elasticities for these import demand functions. The rest of this paper is

organized as follows: the model specification, methodological framework, and data sources are presented in Section 2; the empirical results are summarized discussed in Section 3; and the last section summarizes the findings and discusses their economic implications.

**2. Model Specification, Econometric Methodology, and Data Sources**

In standard form, the import demand for a commodity *i* can be expressed by the following logarithmic function:

$$\log M_i = a_0 + a_1 \log(P_i/P_j) + a_2 \log Y + u \quad (1)$$

where: $M_i$ is the quantity of commodity *i* imported per unit of time, $P_i$ is the price of commodity *i*, $P_j$ is the price of competing commodity *j*, and $Y$ is a measure of the purchasing power of consumers and $u$ is the error term and is assumed to be randomly and normally distributed. It is expected that $a_1$ will be negative and $a_2$ positive. These two parameters are the relative-price and income elasticities of demand, respectively. The methodological framework for conducting the empirical analysis uses the recently developed 'bounds' testing approach to the analysis of level relationships of Pesaran *et al*. (2001). These researchers have developed a method for the analysis of time series that takes into consideration whether the variables under consideration are stationary or non-stationary. Failure to take into account the time series properties of the underlying variables can lead to spurious results and invalid inferences. One way to avoid the problems of 'spurious results' is to estimate a dynamic function which includes lagged dependent and independent variables, i.e., an error correction model (ECM).

Pesaran *et al*. (2001) have extended and formalized an unrestricted error correction model (UECM) approach to test for the existence of co-integration between the dependent variable and its determinants. The theoretical logic behind the concept of co-integration is that although the dependent variable and its determinant(s) may be individually non-stationary, over the long-run they will nonetheless tend to move together, so that a linear combination of them will be stationary (Engle and Granger 1987). Moreover, "[d]ata generated by such a model are sure to be co-integrated" (Granger 2004:422). This follows directly from Granger's Representation Theorem which states that if the dependent variable and the independent variable(s) are co-integrated, then an ECM representation generates co-integrated series (Engle and Granger ibidem). According to Harris (1995:25), "the practical implications of Granger's theorem for dynamic modelling is that it provides the ECM with immunity from the spurious regression problem, provided that the terms in levels co-integrate." Thus, in line with Pesaran *et al*. (2001), an import demand function for the Dominican Republic can be expressed within an Unrestricted Error Correction Model (UECM) as follows:

$$\Delta \log M = \alpha_0 + \alpha_1 \log(RPM)_{t-i} + \alpha_2 \log Y_{t-i} + \alpha_3 \log M_{t-i}$$

$$+ \sum_{i=0}^{l_3} \alpha_4 \Delta \log(RPM)_{t-i} + \sum_{i=0}^{l_3} \alpha_5 \Delta \log Y_{t-i} + \sum_{i=1}^{l_3} \alpha_6 \Delta \log M_{t-i} + u_t \quad (2)$$

where $\Delta$ is the first difference operator, $M$ is imports at constant 1970 Dominican pesos, *RPM* is the relative price of imports ($eP_f/P_d$), defined as the ratio of the product of the nominal exchange rate between the D.R. peso and the U.S. dollar ($e$) and the price of imports ($P_f$) to the domestic price level expressed by the implicit price deflator of the Dominican gross domestic product ($P_d$). The variable $Y$ is a measure of domestic purchasing power - the gross domestic product of the Dominican Republic, and $u$ is the error term. Equation (2) was modified by including exogenously a dummy variable (Dummy) to capture the effects of the changes in the system of import tariffs implemented in 1993 on imports and to see whether there was a permanent shift in the growth of these imports.

In performing the UECM estimation, the maximum number of lags of the terms in levels is set equal to one, and on the first-differenced variables the process starts off from a maximum of three lags, then the

optimum number is chosen based on the Akaike's Information Criterion (AIC), the Ramsey RESET test, and the adjusted $R^2$. Thus, the formulation with the lowest AIC, the Ramsey RESET test results for the best-fit specification, and the highest adjusted $R^2$ is selected. Moreover, each estimated equation is evaluated on the basis of the following battery of diagnostic tests up to third order: the Breusch-Godfrey's LM test for serial correlation, the ARCH test for the existence of first and second order heteroskedasticity in the disturbance term, and the Ramsey RESET specification test for equation specification error.

In Equation (2) and following Bårdsen (1989), the long-run elasticity derived for the relative-price variable ($\psi$) is $-(\alpha_1/\alpha_3)$ and for the measure of domestic economic activity ($\pi$) is $-(\alpha_2/\alpha_3)$. After estimating Equation (2) the Wald *F*-test is used to assess the significance of the lagged level explanatory variables by imposing the following restrictions:

$H_o$ : $\alpha_1 = \alpha_2 = \alpha_3 = 0$ (no co-integration exists)
$H_A$ : $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq 0$ (co-integration exists)

Pesaran *et al*. (2001) provide two sets of critical value bounds covering the two polar cases of the included lagged level explanatory variables (see Table A1 in the Appendix). If the computed Wald *F*-statistic falls below the lower bound, for example, then this would lead us to conclude that there is no co-integration between the terms in levels. If, on the other hand, the computed *F*-statistic exceeds the upper bound of the critical value, then the alternative hypothesis of co-integration between the terms in levels will be accepted.

The empirical analysis uses annual statistics. Following Serrano *et al*. (1999) the data used in the econometric analysis were converted into index numbers with 1980 = 100. Data on the Dominican Republic's gross domestic product (*Y*) and the four categories of imports were downloaded from the Dominican Central Bank's web site. They are available in current and in constant 1970 pesos and have been used to calculate the implicit GDP deflator, and the import price index. Data on the exchange rate between the Dominican peso and the United States dollar are from the International Monetary Fund's *International Financial Statistics Yearbook.*

**3. Empirical Results**

Table 2 summarizes the results of using the UECM-based bounds test approach and the method developed by Bårdsen (1989) to estimate long-run price and income elasticities of demand for services, merchandise, petroleum, and other imports. The estimated long-run price elasticity of import demand for all four categories of imports are below unity, indicating that these imports are not responsive to relative price variations. On the other hand, all the estimated long-run domestic income elasticities of demand are above unity, ranging from a low of 1.21 for services to a high of 1.48 for other imports. Thus showing that imports are strongly affected by domestic economic activity

**Table 2: Income Elasticities ($\pi$) and Price Elasticities of Imports ($\psi$): Summary Results**

| Category | Price ($\Psi$) | Income ($\pi$) |
|---|---|---|
| Services | 0.16 | 1.21 |
| Merchandise | 0.09 | 1.37 |
| Petroleum | 0.06 | 1.27 |
| Other Products | 0.05 | 1.48 |

**4. Summary and Conclusions**

This paper presented an empirical examination of the Dominican Republic's import demand functions for services, merchandise, petroleum, and other products. Using the 'bounds' testing approach to co-integration of Pesaran *et al*. (2001), the results indicate that there exist a long-run equilibrium relationship between these four categories of imports, relative prices and domestic income. All the

estimated long-run price elasticities of import demand are below unity and indicate that relative prices do not exert an impact on imports, meaning that devaluation cannot be used to affect imports. Conversely, the estimated long-run domestic income demand elasticities for all four classes of imports are above unity. These results have important implications for the potential adverse effects of trade liberalization on the Dominican Republic's merchandise and service account, especially in the light of its recent membership in a regional economic integration agreement between the United States, Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. The Dominican Republic-Central American Free Trade Agreement (DR-CAFTA) calls for the immediate elimination of tariffs on more than 80 percent of United States exports of consumer, agricultural and industrial products to the participating countries, with the rest to be phased out over the next 10 years. By opening up prematurely the Dominican market to imports from United States and other CAFTA members, DR-CAFTA can, because of the high income elasticity of demand for imports, render local producers of some of these goods unable to compete with cheaper and better imports. Thus, this agreement has the potential to deal a substantial blow to the Dominican manufacturing sector by displacing small local import-competing chains of production that lack the capacity to survive entry into their markets by resource-rich large multinational corporations capable of competing both on better quality and lower prices. If producers for the local market do not have the ability and the available capital to bear the costs of switching resources to produce non-import-threatened goods, the only switching that can take place would be for them to seek 'refuge' in the fiscal and foreign exchange oases that are the export-oriented Industrial Free Zones. However, this would also require they have the ability to compete internationally with other DR-CAFTA members.

**References**

Bairam, E. I. (1993), Income elasticities of exports and imports: a re-examination of the empirical evidence, *Applied Economics*, **25**, 71-74.

Banco de Reservas de la Republica Dominicana (1968), *Industrial Incentive and Protection Law of 1968*, [In Spanish] (Santo Domingo: D.R.).

Bårdsen, G. (1989), Estimation of long run coefficients in error correction models, *Oxford Bulletin of Economics and Statistics*, **51**, 346-351.

Ceara Hatton, and P. Isa-Contreras "Desarrollo Económico, Política Comercial y Reformas Estructurales en la República Dominicana," Nov. 14, 2003.

Chang, T., Y. H. Ho, and C. J. Huang (2005), A re-examination of South Korea's aggregate import demand function: the bounds test analysis, *Journal of Economic Development*, **30**, 119-128.

Chen, Shyh-Wei (2008), Long-run aggregate import demand function in Taiwan: an ARDL bounds testing approach, *Applied Economics Letters*, **15**, 731-735.

Dutt, D. and N. Ahmed (2004), An aggregate import demand function for India: co-integration analysis, *Applied Economics Letters*, **11**, 607-613.

Engle, R. F. and C. W. J. Granger (1987), Co-integration and error correction: representation, estimation, and testing, *Econometrica*, **55**, 251-276.

Granger, C. W. J. (2004), Time series analysis, co-integration, and applications, *American Economic Review*, **94**, 421-425.

Harris, R. I. D. (1995), *Using Co-integration Analysis in Econometric Modelling* (London: Prentice Hall/Harvester Wheatsheaf).

Hye, Q. M. A. (2008), Aggregate import demand function for Pakistan: analysis in the form of old and relatively new co-integration techniques, *International Journal of Economic Perspective*, **2**, 236-245.

Jeon, Y. (2009), Balance-of-payment constrained growth: the case of China, 1979-2002, *International Review of Applied Economics*, **23**, 135-146.

Narayan, P.R. and R. Smyth (2005), The determinants of aggregate import demand in Brunei Darussalam: an empirical assessment using a co-integration and error correction approach, *The Singapore Economic Review*, **50**, 197-210.

Pattichis, C. A. (1999), Price and income elasticities of disaggregated import demand: results from UECM's and an application, *Applied Economics*, **31**, 1061-1071.

Pesaran, H. H., Shin, Y., and Smith, R. J. (2001), Bound testing approaches to the analysis of level relationships, *Journal of Applied Econometrics*, **16**, 289-326.

Serrano, J. M., M. Sabate, and D. Gadea (1999), Economic growth and the long-run balance of payments constraint in Spain, *Journal of International Trade and Economic Development*, **8**, 389-417.

Serulle, J. and J. Boin (1984), *Fondo Monetario Internacional – Capital Financiero Crisis Mundial* (Santo Domingo: Ediciones Gramil).

Tang, T. C. and M. Nair (2002), A co-integration analysis of Malaysian import demand function: reassessment from the bounds test, *Applied Economics Letters*, **9**, 293-296.

World Bank (1985), *Dominican Republic: Economic Prospects and Policies to Renew Growth* (Washington, D. C.).

## APPENDIX

**Table A1: Critical Value Bounds for the Wald *F*-Statistic**

| Level of Significance | Lower Bound Value *I*(0) | Upper Bound Value *I*(1) |
|---|---|---|
| 1% | 5.15 | 6.36 |
| 5% | 3.79 | 4.85 |
| 10% | 3.17 | 4.14 |

Source: Pesaran *et al*. (2001), Table C1.iii:Case III: Unrestricted intercept and no trend.

**Table A2: Estimated UECM for Services Imports, 1980-2005**
**Dependent Variable: Services Imports**
**Included observations: 23 after adjusting endpoints**

| Regressor | Coefficient | *t*-Statistic | Probability |
|---|---|---|---|
| Constant | -1.28 | -2.75 | 0.01 |
| Log$Y_S$ (-1) | 0.81 | 3.90 | 0.00 |
| Log*RPM* (-1) | 0.11 | 4.30 | 0.00 |
| Log$M_S$ (-1) | -0.67 | -5.99 | 0.00 |
| Dlog*Y* | 1.23 | 2.81 | 0.01 |
| Dlog*RPM*(-1) | -0.15 | -2.83 | 0.01 |
| Dlog$M_S$ (-1) | -0.01 | -0.09 | 0.93 |
| DUMMY | -0.24 | -4.62 | 0.00 |
| **Elasticity** | | | |
| Price (Ψ) | 0.16 | | |
| Income (π) | 1.21 | | |
| **Model Criteria** | | | |
| $R^2$ | 0.85 | | |
| Adjusted $R^2$ | 0.79 | | |
| DW | 2.06 | | |
| SER | 0.07 | | |
| *F*-statistic | 13.38 | | |
| Wald *F*-Test | 20.54 | | 0.00 |
| **Diagnostic Tests** | [1] | [2] | [3] |
| Breusch-Godfrey LM | 0.26 (0.62) | 2.30 (0.14) | 2.43 (0.11) |
| ARCH | 0.57 (0.46) | 0.28 (0.76) | 0.80 (0.51) |
| Ramsey RESET | 0.00 (0.96) | 3.43 (0.06) | 2.14 (0.14) |

**Table A3: Estimated UECM for Merchandise Imports, 1980-2005**
**Dependent Variable: Merchandise Imports**
**Included observations: 24 after adjusting endpoints**

| Regressor | Coefficient | *t*-Statistic | Probability |
|---|---|---|---|
| Constant | -1.81 | -4.12 | 0.00 |
| Log*Y* (-1) | 1.11 | 5.74 | 0.00 |
| Log*RPM* (-1) | 0.07 | 3.98 | 0.00 |
| Log$M_M$ (-1) | -0.81 | -7.60 | 0.00 |
| Dlog*Y* | 2.27 | 7.23 | 0.00 |
| Dlog*RPM*(-1) | 0.06 | 1.43 | 0.17 |
| Dlog$M_M$ (-1) | 0.26 | 2.97 | 0.01 |
| DUMMY | -0.25 | -6.44 | 0.00 |
| **Elasticity** | | | |
| Price ($\Psi$) | 0.09 | | |
| Income ($\pi$) | 1.37 | | |
| **Model Criteria** | | | |
| $R^2$ | 0.93 | | |
| Adjusted $R^2$ | 0.89 | | |
| DW | 2.29 | | |
| SER | 0.05 | | |
| *F*-statistic | 28.32 | | |
| Wald *F*-Test | 27.87 | | 0.00 |
| **Diagnostic Tests** | [1] | [2] | [3] |
| Breusch-Godfrey LM | 2.33 (0.15) | 1.60 (0.24) | 4.30 (0.03) |
| ARCH | 3.35 (1.00) | 0.28 (0.76) | 0.15 (0.93) |
| Ramsey RESET | 0.02 (0.89) | 0.09 (0.91) | 3.51 (0.65) |

**Table A4: Estimated UECM for Petroleum Imports, 1980-2005**
**Dependent Variable: Petroleum Imports**
**Included observations: 24 after adjusting endpoints**

| Regressor | Coefficient | *t*-Statistic | Probability |
|---|---|---|---|
| Constant | -0.99 | -2.13 | 0.05 |
| Log*Y* (-1) | 0.81 | 4.00 | 0.00 |
| Log*RPM* (-1) | 0.04 | 1.73 | 0.10 |
| Log$M_P$ (-1) | -0.64 | -5.52 | 0.00 |
| Dlog*Y* | 0.74 | 1.43 | 0.17 |
| Dlog*RPM* (-1) | -0.38 | -9.43 | 0.00 |
| Dlog$M_P$ (-1) | 0.09 | 0.93 | 0.37 |
| DUMMY | 0.08 | 1.78 | 0.09 |
| **Elasticity** | | | |
| Price ($\Psi$) | 0.06 | | |
| Income ($\pi$) | 1.27 | | |
| **Model Criteria** | | | |
| $R^2$ | 0.91 | | |
| Adjusted $R^2$ | 0.87 | | |
| DW | 2.07 | | |
| SER | 0.06 | | |
| *F*-statistic | 23.43 | | |
| Wald *F*-Test | 11.74 | | 0.00 |
| **Diagnostic Tests** | [1] | [2] | [3] |
| Breusch-Godfrey LM | 0.17 (0.69) | 0.22 (0.80) | 0.14 (0.93) |
| ARCH | 0.56 (0.46) | 0.59 (0.57) | 0.47 (0.71) |
| Ramsey RESET | 0.39 (0.54) | 3.52 (0.04) | 2.73 (0.09) |

**Table A5: Estimated UECM for Other Imports, 1980-2005**
**Dependent Variable: Other Imports**
**Included observations: 23 after adjusting endpoints**

| Regressor | Coefficient | *t*-Statistic | Probability |
|---|---|---|---|
| Constant | -2.59 | -5.24 | 0.00 |
| Log*Y* (-1) | 1.44 | 7.04 | 0.00 |
| Log*RPM* (-1) | 0.05 | 2.52 | 0.03 |
| Log$M_O$ (-1) | -0.97 | -8.87 | 0.00 |
| Dlog*Y* | 2.34 | 8.16 | 0.00 |
| Dlog*RPM* (-1) | 0.08 | 1.91 | 0.08 |
| Dlog$M_O$ (-1) | 0.32 | 3.49 | 0.00 |
| DUMMY | -0.30 | -7.95 | 0.00 |
| **Elasticity** | | | |
| Price ($\Psi$) | 0.05 | | |
| Income ($\pi$) | 1.48 | | |
| **Model Criteria** | | | |
| $R^2$ | 0.95 | | |
| Adjusted $R^2$ | 0.92 | | |
| DW | 2.02 | | |
| SER | 0.05 | | |
| *F*-statistic | 32.20 | | |
| Wald *F*-Test | 38.53 | | 0.00 |
| **Diagnostic Tests** | [1] | [2] | [3] |
| Breusch-Godfrey LM | 0.02 (0.88) | 0.01 (0.99) | 0.59 (0.64) |
| ARCH | 0.78 (0.41) | 0.76 (0.48) | 1.82 (0.18) |
| Ramsey RESET | 0.05 (0.83) | 1.06 (0.38) | 0.56 (0.65) |