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Submitted Paper for AAEA Annual Conference, Long Beach, CA, July 28-31, 2002

The Andean Price Band System: Effects on Prices, Protection and Producer Welfare©

Nelson Villoria, Corporación Andina de Fomento and Harvard University

and

David R. Lee, Cornell University

Abstract: The Andean Community's Price Band System (APBS), introduced in 1995, had the announced goal of reducing domestic price instability by buffering fluctuations in international prices through use of a variable import tariff. This paper evaluates the effects of the Andean Price Band System on domestic producer price variability, levels of nominal protection and changes in producer welfare. Application is made to four important food products – maize, rice, sugar and milk – in Colombia, Ecuador and Venezuela, from the period 1990 to 1998. The effects of the APBS on producer price variability are analyzed through 1) comparing coefficients of variation of detrended, monthly deseasonalized real prices before and after the harmonization of the APBS in 1995, and 2) variance decomposition of real domestic prices. For Colombia and Ecuador, the APBS is shown to have successfully reduced real price instability below levels of instability which existed prior to its introduction. Real exchange rate instability also decreased sharply in these two countries following introduction of the APBS. In Venezuela, real price instability is shown to have increased following introduction of the APBS, while real exchange rate instability was unchanged. The APBS' effects on producer price protection are examined through estimation of average nominal protection coefficients for the twelve country-commodity combinations identified above before and after the introduction of the APBS. Results show that in all three countries and four virtually all products, the APBS contributed to increased producer protection. Finally, this paper uses a variant of the Newbery-Stiglitz approach to calculate efficiency benefits due to risk reduction among producers and the transfer benefits created by redistributing income among producers, consumers and government. The results show that the risk reduction benefits created by the APBS are small. Similarly, the income transfer effects, though larger, are also low, and both contribute to generally low levels of estimated producer welfare effects. Overall, the paper concludes that the APBS has been of limited usefulness as a policy instrument designed to reduce producer price variability in an economically efficient manner.

Key Words: Andean Community, price band system, agricultural prices, price stabilization

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Corresponding author: Prof. David R. Lee, DRL5@cornell.edu

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Introduction

As part of wide-ranging macroeconomic, trade and sectoral reforms, many Latin American nations, including members of the Andean Community (AC)[1], substantially reduced levels of tariffs and non-tariff barriers, including those in agriculture, during the 1990's. These market-oriented reforms exposed formerly highly protected national agricultural sectors to the volatility of international markets and prices. Predictably, producer groups throughout the Andean region registered wide concern concerning the introduction of new sources of domestic price instability in agriculture and urged the introduction of policies to address this instability. These policies included the adoption of variable levy systems in four of the AC nations (excluding Bolivia), and in three countries, Colombia, Ecuador and Venezuela, price band systems were introduced employing price floors and ceilings to buffer international price shocks. These systems had varying product coverage, tariff rules and methods of operation, and resulted, by mid-decade, in trade distortions and depressed growth in intra-regional trade (Garcia, 1997).

In response to these deficiencies among national systems, the Andean Community adopted, in 1995, a comprehensive price band system known as the "*Sistema Andino de Franjas de Precios*" (Andean Price Band System, APBS), which, along with policy surveillance and agricultural health systems, form the core of the Andean Community's harmonized agricultural policies. The APBS consists of the application of variable levies in addition to a basic *ad valorem* tariff established through the Andean Community's

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[1] Bolivia, Colombia, Ecuador, Perú, and Venezuela.

common external tariff policy. Price bands are established based on 60-month moving averages of past real border prices, with the price floor based on a formula that incorporates 1) deflated (by the U.S. CPI) monthly c.i.f. prices, 2) shipping and insurance costs to convert f.o.b. prices to c.i.f. prices, and 3) application of the basic *ad valorem* import duty. As long as the c.i.f. price is within the band created by floor and ceiling prices, only the basic *ad valorem* tariff is applied. When the spot c.i.f. price is below the corresponding floor price, a variable levy (surcharge) is applied on top of the basic tariff, sufficient to raise the import cost to the floor price, which thus becomes the minimum import price. When the spot border price exceeds the ceiling price, the variable levy is not applied and discounts to the basic tariff are made up the full amount of the difference. The ceiling price is calculated as one standard deviation above the floor price. The APBS encompasses 13 different bands, including 144 individual tariff items. As an example, Figure 1 shows the operation of the price band system for yellow corn between 1995 and 1998. The cross-hatched area shows the magnitude of the total *ad valorem* tariff applied as spot c.i.f. prices changed under the given floor and ceiling prices.

The underlying rationale of price band systems like the APBS is that they are needed to buffer the effects of international price fluctuations on domestic markets. These fluctuations include sources of price instability generated by the price-distorting effects of industrialized countries' agricultural policies which are transmitted through international markets to developing country producers. Critics argue, on the other hand, that price variability results from many sources, not just world market price instability, but including trade policies, government intervention of various types, market structure and performance phenomena, and, perhaps most importantly, exchange rate instability

(Hazell, et al, 1990). The APBS has also been argued to be protectionist in operation, if not in intent (Josling, 1997). Not surprisingly, the APBS has also been unpopular with exporting countries (such as the United States) and with multilateral organizations such as the WTO.

This paper addresses three questions regarding the APBS: 1) Has the APBS reduced the variability in prices received by farmers, and if so, what is the contribution of instability in world market prices to domestic instability relative to the contributions of other factors? 2) Has the APBS increased or decreased the levels of domestic prices in relation to world prices? and 3) What are the transfer benefits received by farmers as well as the benefits resulting from reduction in price risk?

Analytical Methods and Data

The methods used to examine each of these questions are briefly summarized in this section (details are given in Villoria, 2000). Data constraints limit the analysis in this paper to four products, all important to regional food security -- rice, yellow corn (Ecuador) and white corn (Colombia, Venezuela), sugar and milk); three countries (Colombia, Ecuador, and Venezuela); and monthly prices available for the period from 1990 through 1998. Data required for the analysis (international prices, exchange rates, production, etc.) were obtained from standard national and international sources as well as the Andean Community Agricultural Secretariat.

<u>Effects on Price Instability</u>

In order to assess the effects of the price band policy on price instability in the sample countries and products, two periods are defined: the first “pre-APBS period” from January, 1990, to April, 1995, and the second “APBS period” from May, 1995, through

December, 1998, the last month of comprehensive data available for this study. Comparisons of price instability in different periods are commonly based on estimation of the coefficients of variation of detrended domestic prices in different time periods (Hazell et al. (1990), Knudsen and Nash (1990), Mendoza (1998)). This approach is used in this study. Detrended real domestic market prices (P^*_{Dtk}) for each commodity in each country were obtained by deflating nominal monthly prices by domestic CPI's, and then detrending to yield a residual stochastic variable, ε_{tk}, via equation (1):

$$P^*_{Dtk} = \beta_{0k} + \beta_{1k}T + \sum_{m=1}^{11} \gamma_{ik} D_m + \varepsilon_{tk} \qquad (1)$$

where the D_m's are dummy variables accounting for monthly seasonality, T represents a time trend variable, and subscripts t and k denote monthly observations and the two policy periods, respectively. Once the detrended, deseasonalized real price residuals were obtained, coefficients of variation were estimated and then compared across the two policy periods, and their equality tested using the following form of the t-test (Greene, 1997):

$$t = \frac{\left(\overline{P}_{D1} - \overline{P}_{D2}\right) - m}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \qquad (2)$$

A similar process was followed using international prices for the same commodities and time periods in order to compare trends in domestic price instability with those in international markets (these results are only briefly cited here but are discussed in detail in Villoria, 2000).

Sources of Price Instability

In countries such as those studied here, domestic price variability may be a function not only of international price variability and domestic factors, but of chronic exchange rate variability. Following the approach of Quiroz and Valdés (1993), we decompose the variance of the logarithm of real domestic prices of each product in each country for both time periods (as well as the entire 1990-1998 period) into the variance of the logarithm of three major components: real world prices (P_W^*), real exchange rates (E*), and a term, φ, representing other factors, which as Quiroz and Valdés suggest, include import tariffs, other trade barriers, and the effects of domestic agricultural policies:

$$Var\left(\log P_D^*\right) = Var\left(\log P_W^*\right) + Var\left(\log E^*\right) + Var\left(\tilde{\phi}\right) + 2\left[Cov\left(\log P_W^*, \log E^*\right) + Cov\left(\log P_W^*, \tilde{\phi}\right) + Cov\left(\log E^*, \tilde{\phi}\right)\right] \quad (2)$$

The relative importance of each of the factors in explaining the variance of the logarithm of each domestic price series is obtained through a) estimating the variance decomposition equation (2), and then b) calculating the relative share of total variance of P_D^* which is explained by the variance of each component. In the case of latter results, reported below, covariance effects are omitted; however, in the detailed variance decomposition estimates, these effects are included (see Villoria, 2000). These estimates enable us to obtain a general picture of the relative importance of each component of price variability, notably the real exchange rate.

Nominal Price Protection

In order to assess the extent to which the APBS works as a trade protection mechanism, nominal protection coefficients are estimated for each commodity in each country. The NPC is equal to the ratio of the domestic price (P_D) of a commodity to its border price (P_W) using the official exchange rate (E):

$$NPC = \frac{P_D}{E \times P_W} \tag{3}$$

An estimated NPC > 1.0 implies that producers are protected; an NPC < 1.0 implies that they are being taxed.

Welfare Effects

The methodology proposed by Newbery and Stiglitz (1981) and widely applied to the analysis of price buffer schemes, is used here to evaluate the effects of the APBS on producers welfare. Their approach, summarized in equation (4),

$$\frac{B}{\overline{Y}_0} = \frac{\left(\overline{Y}_1 - \overline{Y}_0\right)}{\overline{Y}_0} - \frac{1}{2} R\overline{Y}_0 * \left[\sigma^2_{Y_1}\left(\frac{\overline{Y}_1}{\overline{Y}_2}\right)^2 - \sigma^2_{Y_0}\right] \tag{4}$$

suggests that the total welfare effects (B) induced by a price stabilization scheme can be divided into the transfer effects (first RHS term) and the benefits due to income risk reduction (second RHS term). The transfer effects measure the distributional impact of the price stabilization scheme; producers may gain or lose at the expense of consumers and/or the government. The second term expresses the risk benefits, that is, the gains derived from the reduction in the levels of risk attributable to the program. These benefits represent the gains (or losses) resulting from the increased (decreased) efficiency which which the economy operates as a result of the stabilization program.

The Newbury and Stiglitz approach is applied in comparing the welfare changes from the pre-APBS period to the APBS period. However, in order to get more accurate estimates of the effects of the APBS, two additional scenarios were formulated. The first, the “Pure Andean Price Band System”, simulates the price bands for maize, rice and sugar for the entire period 1990-1998, including the first five years in which national programs were in effect. The welfare effects of the APBS are then estimated by comparing the simulated prices under bands with the prices that would have prevailed under free trade (e.g., adjusted border prices). This provides an idea of what the effects of the APBS would have been had it been the only policy applied during the 1990's. The final "historical policy" scenario encompasses prices which actually prevailed in domestic markets under various policy regimes in the period 1990-1998. Transfer and risk benefits are expressed as estimated producers' income in the absence of any price stabilization program. These estimates require the use of price elasticities of supply (obtained from Sullivan, et al., 1989) and coefficients of risk aversion, which are assumed to be unity (following the practice of many authors (Newbery and Stiglitz, 1981; Larson, 1993; Islam and Thomas, 1996; Hinchy and Fisher, 1998).

Empirical Results

This section describes the empirical results stemming from each of the four components of the analysis described above. Table 1 shows the summary results of the analysis of price variability before and after the institution of the price band policy. In Colombia and Ecuador, results for the selected products generally show either a reduction or a steady level of price variability around mean levels before and after the introduction of the APBS. In Colombia, the importable products (milk and rice) exhibit greater price stability after the application of the APBS than before. In Ecuador, the situation is similar. Sugar and milk show lower coefficients of variation in the APBS period. In the case of maize in Ecuador, the estimated CV is slightly higher, however, due to a corresponding sharp increase in the variability of world market prices. In general, it can be argued that the APBS has reached its objective of stabilizing domestic prices in these two countries. The results for Venezuela, however, demonstrate the opposite conclusions. For all the importables (maize, milk and sugar), the estimated CV of prices in the APBS period is greater than in the pre-APBS period.

For exportables, the pattern of changes in price instability across periods is more similar. For rice, the estimated CV was unchanged (for Venezuela) or decreased (Ecuador). For sugar in Colombia, the same situation prevailed. Changes in CV's appear to be directly due to reductions in the variance of prices across periods. Overall, except for exportables (rice) in Venezuela, it appears that the introduction of the APBS largely achieved its stated intention of substituting former domestic price policies with price stabilization goals and buffering world market price instability by reducing levels of price variability to producers.

The second part of the analysis shows the contribution to overall price variability of three components: world market prices, exchange rates, and domestic factors and policies, including trade policies. Variance decomposition results (not shown here – see Villoria, 2000) and Figures 2 and 3 – which present the relative contribution of each component to the variance of the logarithm of domestic prices in pre-APBS and APBS periods, respectively – demonstrate several important conclusions. First, generally the most important contributor to domestic price variability in both periods and for almost all countries and crops is "other factors." This is understandable since this factor incorporates a broad range of factors contributing to the gap between international and domestic price variability. These include transportation costs, marketing margins, subsidies and taxes, trade barriers and other policies.

Second, the variance decomposition results (not shown) indicate that for the entire 1990-1998 period, exchange rate fluctuations have had a generally greater weight in determining domestic price variability than have world price fluctuations (exceptions are sugar prices in all three countries and maize prices in Ecuador). Once we compare the periods before and after the introduction of the APBS, the picture changes substantially. As shown in Figures 2 and 3, real exchange rate instability decreased sharply in Colombia and Ecuador after 1995, leaving world market prices with a dominant effect on domestic price instability (compared to exchange rate variability). In Venezuela, however, the persistent instability of the real exchange rate induced domestic price instability that was unable to be buffered by trade policies. Overall, the APBS has been least effective in stabilizing prices in Venezuela, where its effects have been offset by the real exchange rate which generated a high level of instability throughout the late 1990's.

A third interesting result from the variance decomposition results (Villoria, 2000) is the positive covariance between real exchange rates and international prices. This positive co-variability indicates that declining international prices have coincided with an appreciation in real exchange rates (and vice versa). Thus, in addition to a loss in competitiveness induced by appreciated real exchange rates, domestic goods have had to compete with cheaper imports. Conversely, these same results would imply that higher world prices have, at least on occasion, been reinforced by a depreciated real exchange rate.

Turning to the estimates of trade protection, Table 2 shows the coefficients of nominal protection for each product in each country before and after the introduction of the APBS. The estimated t-values test the equality of means. In all cases, the degree of protection in the APBS period is higher than that in the pre-APBS period. The only cases in which these results are not statistically significant are those of maize and milk in Ecuador. It seems clear that the APBS has indeed acted as a mechanism of domestic price protection. This does not mean that application of the policy actually increased price levels, indeed, price levels for virtually all products and countries declined during the study period. The increase in estimated NPC's simply indicates that domestic prices have increased with respect to their international counterparts. Application of the APBS has allowed domestic prices to decline at a slower pace than border prices. This is a direct result of the use of variable tariffs under the price band system. The protective effects of the APBS confirm the views of Quiroz and Valdés (1993) who argue that this arises from the lagged effects of instituting floor and ceiling prices based on moving averages of past prices, in this case, based on a very "long memory" of 60 months.

The last set of results (Tables 3-5) show the effects of changes in total welfare benefits induced by the APBS, divided into transfer or distributional effects and those benefits due to income risk reduction and associated efficiency benefits. As mentioned above, three scenarios were considered. In the first, we compare the period prior to the introduction of the APBS with the period after its introduction. As shown in Table 3, the weighted benefits from risk reduction (weighted by each country's proportionate share of total production) are very small, ranging between –1.65 and 1.62 percent, being positive for rice and sugar and negative for maize and milk. The application of the APBS has not contributed significantly to welfare effects stemming from greater stability of real incomes of maize and milk producers relative to the earlier period. For rice and sugar producers, on the other hand, the APBS has induced greater stability in real incomes and associated welfare gains, though these gains are relatively small. Transfer benefits, by contrast, are much larger in magnitude, although with only two exceptions (maize and sugar in Ecuador), they are negative. Typically, this indicates that changes in real incomes to producers are matched by changes in expenditures by consumers and/or government revenues. In this case, however, what is underlying the negative transfer benefits are the substantial declines in real commodity prices over the 1990-1998 period. It is unrealistic to think that consumer expenditures and government receipts have changed by as much as the declines in prices received by farmers. Overall, the negative transfer benefits dominate the small gains from risk reduction, leading to overall negative benefits from price stabilization for the three nations as a whole. Again, however, it is apparent that the long-term decline in prices combined with the system of variable tariffs together mask the income transfer effects of the APBS. Moreover, this scenario compares the pre-APBS period which was characterized by a variety of disparate domestic policies in the three countries with the common APBS period from 1995 on. This may not provide the basis for an accurate evaluation of the APBS' effects on producers.

To try to surmount these limitations, the second scenario (Table 4) estimates real producer incomes under simulated price bands for the entire 1990-1998 period, and compares these levels with those that would have prevailed under free trade. This assumes that the APBS is the only agricultural price policy applied during the 1990's; though this was not the case, this scenario estimates the results of a hypothetical scenario that avoids the mixing of domestic policy and APBS effects that characterizes the prior scenario. In this case, the hypothetical risk benefits are estimated to be positive, though again very small in magnitude. This is consistent with the findings of Newbery and

Stiglitz (1981). Similarly, the weighted transfer benefits for maize and rice are generally small; those for sugar are somewhat larger. The low transfer benefits are explained by the fact that lower variability of world market prices especially for maize and rice require less necessity to apply tariffs and subsidies under the "pure APBS" regime. Overall, the transfers from consumers and government to producers are positive (except for rice) but small, the largest averaging 12.5% for sugar producers.

The third policy scenario estimates risk and transfer benefits based on the comparison of historical real incomes resulting from the policies actually applied with estimated real "free trade" incomes. This provides a benchmark against which the welfare effects of the APBS (the previous scenario) can be evaluated had it been the only policy applied. The results for this scenario (Table 5) show that the risk benefits generated by historical policies are both positive and negative for individual crops and countries, but overall, as in the previous scenarios, are again rather small. This is not unexpected, given the fact that historical policy interventions in these countries were only in part designed to address price instability; other policies such as import prohibitions, import licensing and other measures had more direct domestic protection objectives. In the case of the estimated income transfer benefits, however, these are (with only one exception) positive and substantial in magnitude, averaging 22-26% for rice and maize sectors, with some crops in some countries showing much larger transfer benefits. Summing the two components, it is clear that historical Andean Community policies have, in most cases, created significant benefits to producers of maize, rice and (except in Colombia) sugar.

Conclusions

The series of analytical steps reviewed above lead to an assessment of the Andean Price Band System which is mixed in terms of the policy's success in achieving its objectives. It is clear that under the APBS, domestic producer prices in Colombia and Ecuador have achieved a more moderate level of price variability. Is this entirely due to the price band policy itself? No. As we have seen, a major reason for this was the significant effect of lower exchange rate volatility in contributing to dampening price variability in these two countries. This was not the case in Venezuela, where exchange rate volatility contributed significantly to price instability even under the APBS policy. In terms of protection, the results of this analysis are more definitive: the APBS has led to significantly increased nominal protection levels across most all countries and crops. This appears to confirm the concerns of many authors that the APBS induced increased protection of domestic agricultural sectors, regardless of its effects on price stabilization. In terms of producer welfare effects stemming from greater price stability, we find that the benefits from risk reduction are nearly universally small. The transfer benefits, however, are considerably larger, although they range in magnitude and absolute value depending on the crop, country and analytical assumptions, as reflected in the various scenarios estimated. The net producer benefits which result are accordingly highly variable, and in some cases – e.g., maize and rice in the "historical policy" scenario – are positive and significant. Much depends on the secular trends in international commodity prices, which generally trended downward in the 1990's.

The Andean Price Band System has had varying though demonstrable effects in controlling producer price instability, increasing protection, and in generating welfare benefits to producers. However, it has only been able to mitigate and delay the impacts of extreme fluctuations in international commodity prices. Even with its "long memory", the APBS, as currently structured, cannot reverse the impacts of long-run declines in real international commodity prices.

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Table 1. Summary Statistics of Prices of Selected Products in Colombia, Ecuador and Venezuela: 1990-1998

Product	Country	Summary Statistics	Entire Pd.[1] (1)	Pre-APBS (2)	APBS Pd. (3)	CV_{apbs}-$CV_{pre-apbs}$ (4)	t-values[3] (5)	F-Values[3] (6)
Maize	Ecuador	Average	81,087.06	84,344.38	76,349.13			
		Standard Deviation	11,803.15	10,816.72	10,219.97			
		Coefficient of Variation	14.56%	12.82%	13.39%	0.56%	2.643***	1.351ns
	Venezuela	Average	6,377.77	6,545.95	6,133.16			
		Standard Deviation	984.46	679.05	1,187.52			
		Coefficient of Variation	15.44%	10.37%	19.36%	8.99%	1.713*	3.091***
Rice	Colombia	Average	71,178.31	72,417.70	69,375.55			
		Standard Deviation	5,798.31	5,135.41	3,012.15			
		Coefficient of Variation	8.5%	7.09%	4.34%	-2.75%	2.640***	2.239**
	Ecuador	Average	105,400.22	105,154.27	105,757.97			
		Standard Deviation	12,429.57	10,140.80	7,954.49			
		Coefficient of Variation	11.79%	9.64%	7.52	-2.12%	0.202ns	2.540**
	Venezuela	Average	6,640.53	6,728.56	6,512.49			
		Standard Deviation	1,079.44	876.23	889.31			
		Coefficient of Variation	16.26%	13.02%	13.66%	0.63%	0.918ns	1.001ns

Table 1. (continued)

Product	Country	Summary Statistics	Entire Pd.[1] (1)	Pre-APBS (2)	APBS (3)	CV_{apbs}- $CV_{pre-apbs}$ (4)	t-values[3] (5)	F-Values[3] (6)
Maize	Colombia	Average	119,402.16	122,582.32	114,183.22			
		Standard Deviation	6,459.52	4,46l8.55	5,267.07			
		Coefficient of Variation	5.41%	3.65%	4.61%	0.97%	7.179***	1.684ns
	Ecuador	Average	219,764.08	214,750.64	227,056.37			
		Standard Deviation	17,648.99	18,563.22	10,210.28			
		Coefficient of Variation	8.03%	8.64%	4.50%	-4.15%	3.589*	1.777*
Rice	Venezuela	Average	14,255.78	15,610.20	12,285.72			
		Standard Deviation	1,426.10	1,224.37	1,412.13			
		Coefficient of Variation	10.00%	7.84%	11.49%	3.65%	10.790***	1.260ns
	Colombia	Average	84,621.92	88,966.43	76,677.68			
		Standard Deviation	5,895.24	4,944.30	1,985.29			
		Coefficient of Variation	6.97%	5.56%	2.59%	-2.97%	10.556***	50.811**
	Ecuador	Average	117,558.91	121,352.18	112,041,41			
		Standard Deviation	9,819.12	7,804.62	6,258.53			
		Coefficient of Variation	8.35%	6.43%	5.59%	-0.85%	4.703***	1.582ns
	Venezuela	Average	7,713.93	8,181.77	7,033.44			
		Standard Deviation	708.50	463.26	553.91			
		Coefficient of Variation	9.18%	5.66%	7.88%	2.21	5.575***	5.393***

[1] Periods: Entire (January 1990-December 1998), pre-APBS (January 1990 – April 1995) and APBS (May 1995 – December 1998) periods. [2]Averages are calculated based on real prices and are in LCU/MT. The standard deviations are calculated based on the residuals of a time trend-seasonal linear regression. The coefficient of variation is the ratio of the standard deviation of residuals and average prices. [3]The t and F values correspond to the tests of mean and variance equality, respectively. Further explanation in the text. ***significant at the 1% level; **significant at the 5% level; *significant at the 10% level; ns, not significant.

Table 2. Nominal Protection Coefficients (NPCs) for Selected Products in Colombia, Ecuador and Venezuela: Pre-Andean Price Band System and Andean Price Band System Periods

Country	**Product**	**Period**	**N**	**Average NPC**	**t-test**
Columbia	Rice	Pre-APBS	64	0.99	7.025***
		APBS	44	1.24	
	Sugar	Pre-APBS	64	1.09	6.131***
		APBS	39	1.41	
	Milk	Pre-APBS	64	1.35	4.483***
		APBS	35	1.66	
Ecuador	Maize	Pre-APBS	64	1.52	1.000ns
		APBS	44	1.60	
	Rice	Pre-APBS	64	1.07	3.602***
		APBS	44	1.20	
	Sugar	Pre-APBS	64	0.98	6.964***
		APBS	44	1.28	
	Milk	Pre-APBS	64	1.13	0.626ns
		APBS	44	1.16	
Venezuela	Maize	Pre-APBS	64	1.08	4.817***
		APBS	44	1.30	
	Rice	Pre-APBS	64	1.25	6.307***
		APBS	44	1.55	
	Sugar	Pre-APBS	64	1.16	3.312***
		APBS	44	1.34	
	Milk	Pre-APBS	64	1.43	3.009***
		APBS	44	1.61	

***Difference between means across periods is statistically significant at the 1% level;

** 5% level; *10% level, or ns = not significant.

Table 3. Welfare Effects of the Andean Price Band System: Changes from the Pre-APBS Period to the APBS Period for Selected Products in Colombia, Ecuador and Venezuela

Product	**Country**	**Share of AC Production (%) (1)**	**Risk Benefits (2)**	**Transfer Benefits (3)**	**Net Producer Benefits (4)**
Maize	Colombia	40%	4.84%	-31.39%	-26.54%
	Ecuador	21%	-0.44%	5.74%	5.30%
	Venezuela	39%	-7.89%	-0.45%	-8.33%
	Weighted Average		**-1.24%**	**-11.59%**	**-12.83%**
Rice	Colombia	50%	0.79%	7.55%	-6.76%
	Ecuador	31%	0.90%	-5.63%	-4.73%
	Venezuela	19%	0.87%	-4.30%	-3.44%
	Weighted Average		**0.84%**	**-6.34%**	**-5.50%**
Sugar	Colombia	70%	2.36%	-53.49%	-51.13%
	Ecuador	12%	0.32%	5.29%	5.60%
	Venezuela	18%	-0.30%	-24.42%	-24.72%
	Weighted Average		**1.62%**	**-41.10%**	**39.47%**
Milk	Colombia	60%	-3.24%	8.82%	5.58%
	Ecuador	22%	-0.27%	-8.23%	-8.51%
	Venezuela	18%	1.86%	-36.65%	-34.79%
	Weighted Average		**-1.65%**	**-3.26%**	**-4.91%**

Table 4. Welfare Effects of the Andean Price Band Systems: "Pure Andean Price Band System" Scenario for Selected Products in Colombia, Ecuador and Venezuela

Product	**Country**	**Share of AC Production (%) (1)**	**Risk Benefits (2)**	**Transfer Benefits (3)**	**Net Producer Benefits (4)**
Maize	Colombia	40%	-0.11%	0.93%	0.83%
	Ecuador	21%	0.56%	11.90%	12.47%
	Venezuela	39%	1.49%	-0.64%	0.85%
	Weighted Average		**0.66%**	**2.58%**	**3.23%**
Rice	Colombia	50%	0.00%	0.08%	0.08%
	Ecuador	31%	0.08%	3.33%	3.41%
	Venezuela	19%	1.20%	-7.38%	-6.18%
	Weighted Average		**0.25%**	**-0.30%**	**-0.05%**
Sugar	Colombia	70%	2.05%	11.76%	13.82%
	Ecuador	12%	1.63%	3.66%	5.29%
	Venezuela	18%	2.33%	10.03%	12.36%
	Weighted Average		**2.05%**	**10.48%**	**12.53%**

Table 5. Welfare Effects of the Andean Price Band Systems: "Historical Policy" Scenario for Selected Products in Colombia, Ecuador and Venezuela

Product	**Country**	**Share of AC Production (%) (1)**	**Risk Benefits (2)**	**Transfer Benefits (3)**	**Net Producer Benefits (4)**
Maize	Colombia	40%	-2.09%	4.92%	2.83%
	Ecuador	21%	3.23%	42.67%	45.90%
	Venezuela	39%	-1.07%	29.67%	28.60%
	Weighted Average		**0.59%**	**22.41%**	**21.82%**
Rice	Colombia	50%	4.13%	11.06%	15.19%
	Ecuador	31%	1.65%	23.68%	25.33%
	Venezuela	19%	-4.28%	68.63%	64.34%
	Weighted Average		**1.77%**	**25.85%**	**27.62%**
Sugar	Colombia	70%	3.80%	-49.88%	-46.08%
	Ecuador	12%	3.13%	7.46%	10.59%
	Venezuela	18%	3.82%	21.94%	25.77%
	Weighted Average		**3.72%**	**-29.76%**	**-26.04%**

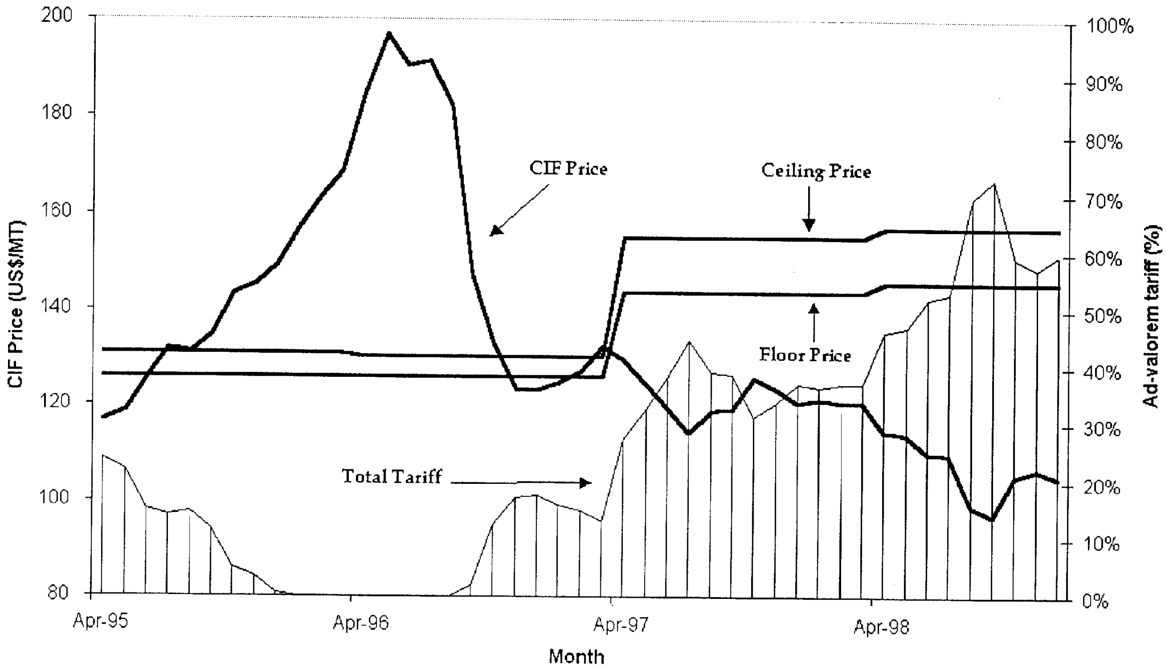

Figure 1. Andean Price Band System for Yellow Corn: 1995-1998

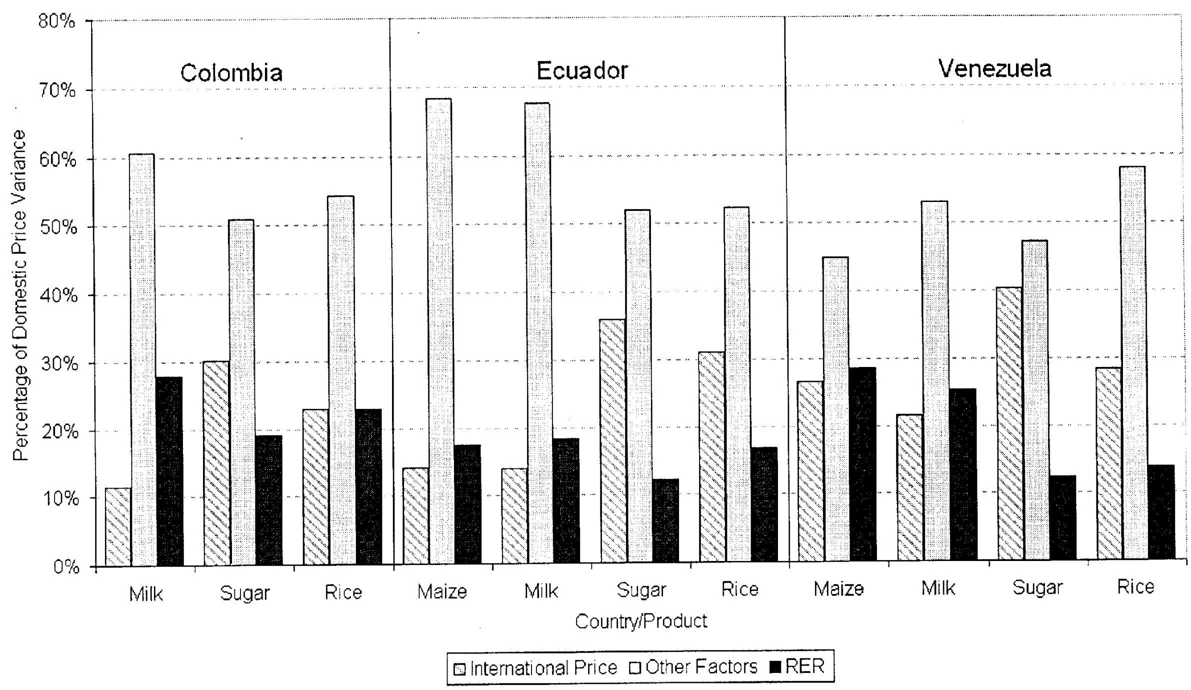

Figure 2. Relative Weight of World Market Prices, Real Exchange Rates, and Other Factors on Domestic Price Instability for Selected Products in Colombia, Ecuador and Venezuela: Pre-APBS Period.

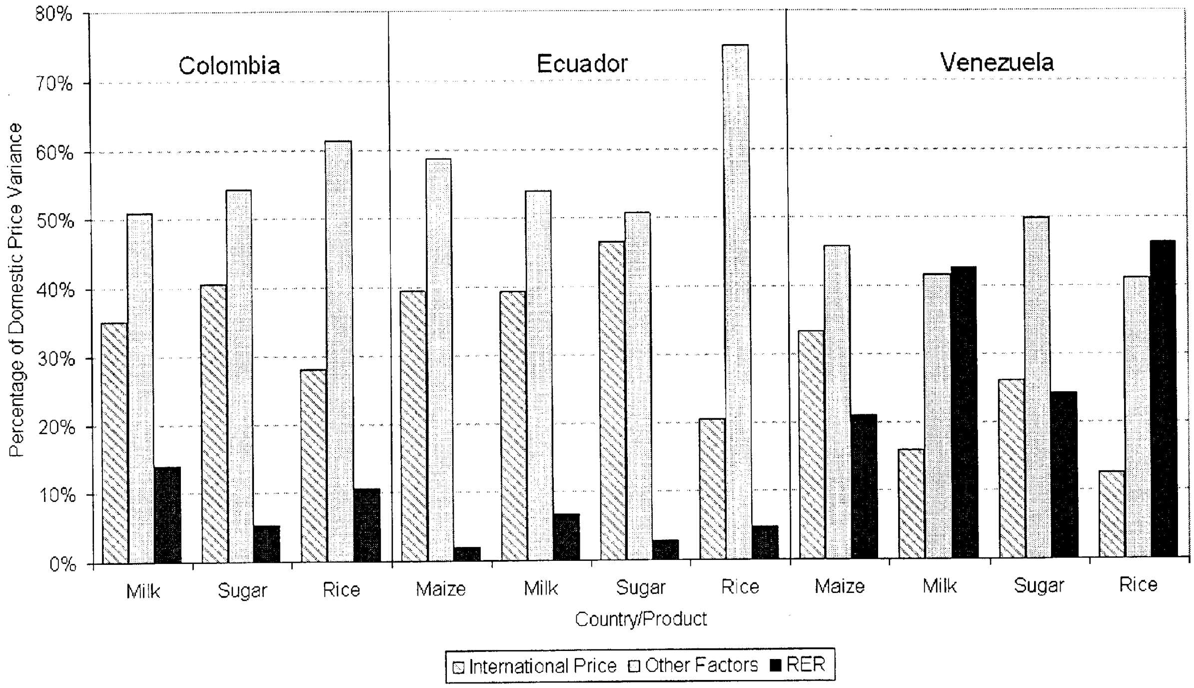

Figure 3. Relative Weight of World Market Prices, Real Exchange Rates, and Other Factors on Domestic Price Instability for Selected Products in Colombia, Ecuador and Venezuela: APBS Period.