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Tariff-based Commodity Price Stabilization Schemes in Venezuela

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Of the stabilization schemes proposed to ease the liberalization of quota driven, price-managed domestic markets for several "essential" commodities, the wide price band — based on a moving average of nominal border prices — is the least offensive. It provides benefits when price movements are extreme but preserves average international price signals.

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This paper — a product of the International Trade Division, International Economics Department — is part of PRE's research on commodity price risk management by developing countries. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Sarah Lipscomb, room S7-062, extension 33718 (46 pages, with tables).

Venezuela's agricultural sector is heavily regulated and protected. As part of structural adjustment, the government is considering major reform of its agricultural trade policies. The strategy is to introduce competition into the economy by removing government price controls and liberalizing trade.

The government is concerned about the microeconomic effects of the resulting commodity price instability on individual producers and consumers. Farm prices have been fixed in Venezuela for more than 40 years, so Venezuelan farmers have little experience managing risk; and the government fears high food prices will lead to malnutrition among the poor and a repeat of the food riots experienced in Caracas in 1989.

In 1990, the government of Venezuela proposed a price stabilization scheme to ease the liberalization of quota-driven, price-managed domestic markets for several "essential" commodities — including maize, sorghum, rice, wheat, sugar, palm oil, and soybeans and soybean products. Coleman and Larson analyzed historical data to demonstrate the effects of several alternative stabilization schemes on domestic prices and government revenues. They also calculated average welfare benefits, including transfer and risk benefits — based on assumptions about risk aversion among producers.

The effects of the various stabilization schemes on government revenues and producer welfare depend on both the crop and the method of stabilization chosen.

Generally, Coleman and Larson conclude that a wide price band — based on a moving average of nominal border prices — is the least offensive of the stabilization proposals, providing benefits when price movements are extreme but preserving average international price signals.

As a practical matter, budget constraints may limit the government's ability to defend the domestic price range dictated by this scheme.

Four properties are desirable in any stabilization scheme, contend Coleman and Larson:

- The scheme should allow changes in the world price to be reflected in the domestic market.
- The mean stabilized price to producers should not be above or below the long-run average international price.
- The scheme should not put too much of a financial burden on the government.
- The scheme should be transparent and predictable.

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1. Introduction

The Venezuelan agricultural sector is highly regulated with government control over many farm output and input prices, as well as the retail prices of many food items. Domestic prices are set for many agricultural commodities at levels which bear little relation to international prices and are protected at the border by a strict set of quantitative trade controls including prohibitions and licensing requirements. These restrictions affect more than 70% of domestic agricultural production (World Bank, 1990a).

Currently, major reforms to Venezuelan agricultural trade policies are being considered as part of an economy-wide structural adjustment program aimed at redressing macro-economic and debt imbalances. The overall strategy is to introduce competitive forces into the economy by removing government price controls and liberalizing trade. The agricultural trade reforms are likely to eliminate the quantitative trade restrictions and to replace them with tariffs. Further, the Government of Venezuela (GOV) is committed to a tariff policy which allows price changes and trends in international commodity markets to be reflected in the Venezuelan markets.

By linking domestic prices to international prices Venezuelan producers and consumers are exposed to prices which fluctuate widely. This represents a dramatic change from the existing price regime where agricultural prices are stable and known at the time production decisions are made. Thus, only source of risk in producer revenues at present is from the uncertainty of crop yields.

While there is a strong commitment by the GOV to allow domestic prices to be closely linked with international prices, there is also concern that moving immediately from a fixed price regime without price risk to one where prices fluctuate with international prices may be too abrupt a policy change for the agricultural sector to absorb immediately. The GOV feels that it is both economically undesirable and politically infeasible to bring about such a change without some form of interim price policy to ease the transition. Fearing both the microeconomic and macroeconomic consequences associated with extreme price fluctuations, the GOV wishes to insulate domestic market from extremely high and low international prices by introducing a commodity price stabilization scheme.

The GOV is especially concerned about the microeconomic impacts of commodity price instability on the welfare and economic decisions of individual producers and consumers. For example, the Government fears that the productive capacity for many important crops may atrophy if the volatility of prices causes farmers to reduce investment in farm inputs which provide services over long periods. Investments in irrigation and soil fertility, for example, are especially important for the growth of agricultural production and the Government is concerned that these will be delayed or even postponed if prices cannot be stabilized within a certain range. This concern is based on the belief among Government officials that Venezuelan producers are highly risk averse, and that investment incentives for individual farmers are already very poor.

High risk aversion and poor investment incentives are the result of the institutional structure in Venezuela which developed from past and current agricultural policies. For example, farm prices

have been fixed in Venezuela for more than 40 years. As a result Venezuelan farmers have little experience in managing risk on-farm and have no access to off-farm risk management instruments. The assurance of price levels removed the need to manage the price risk through financial measures or through crop diversification, or by modifying use of agricultural inputs. By eliminating price uncertainty, third-party risk management markets and instruments, such as futures and options contracts and crop insurance, failed to develop in Venezuela; moreover use has not been made of international futures and option markets.

Further the GOV believes that the effects of price instability on investment by farmers will be exacerbated because of the reforms currently taking place in rural markets. These reforms are having a major impact on the availability of rural credit. For example, with the relaxation of the upper ceilings on interest rates, interest on agricultural loans increased substantially (although rates on commercial agricultural loans are set 7% below those for general lending). Current nominal rates on agricultural loans are about 35%, compared with only 13% in late 1988. Also agricultural credit has become tighter with Government relaxing the requirement that commercial banks keep a certain proportion of their portfolios as agricultural loans. This proportion was lowered from 22.5% to 17.5% under the policy changes. Thus with the decline in the availability of rural credit, farmers will be less willing to invest in the face of commodity price risk. At the same time investors are expected to be more reluctant to lend to the agricultural sector given that the perceived default probability is increased in the face of commodity price risk.

Another important factor which limits farmers' desires and ability to invest in long-run inputs relates to the system of land tenure in Venezuela. Most farmers do not hold title to the land they operate and tenure is not guaranteed to individual farmers for long periods. This reduces the incentive to invest substantially in fixed inputs. Further, such tenure arrangements reduce the availability of credit since the farmers' land-holdings cannot be used as collateral to secure loans.

While the GOV is hoping to bolster agricultural investment and production through reforming the rural credit market and land tenure system, it sees price stability as an important component of this process. Further, if Venezuelan farmers are highly risk averse, the welfare benefits of reducing price and income variability are expected to be substantial (Newbery and Stiglitz, 1981).

The Government also fears the possibility of extremely high prices for consumers. For a large proportion of the population, food constitutes a major component of the household budget and higher food prices can reduce purchases considerably. There is much anecdotal evidence that the sharp increase in food prices in 1989 led to malnutrition among the poorer sections of the population which previously were nourished adequately. The political consequences of sharp increases in food prices were made very clear to the Government in February 1989 when the list of products subject to maximum retail prices was reduced sharply and the prices of other regulated commodities dramatically increased. This led to food riots in the capital, Caracas, which lasted for a six-week period.

While the GOV is especially concerned about the microeconomic effects of commodity price risk, the macroeconomic consequences are also troublesome. This is based on the fact that higher food

prices lead to higher wage demands which fuel inflation. Given that price and nominal wage movements are typically asymmetric, with a downward stickiness in their movement, price fluctuations tend to have an upward, ratcheting effect on nominal wages and prices, creating unemployment (Knudsen and Nash, 1990a).

To avoid the problems associated with commodity price fluctuations, the Government wishes to introduce stabilization by imposing import tariffs which can be varied to determine the extent to which price fluctuations in the international market are transmitted to the domestic economy. The GOV is searching for a tariff structure which neither increases nor decreases the long-run average producer price, yet protects producers against extreme price movements[1]. At the same time it wants the tariff structure to be made transparent and to afford protection equitably across manufacturing and agro-industry so as not to distort inter-sectoral production shares. Further, the GOV wishes to ensure that levels of protection are given uniformly not only across product categories but also within agriculture and the agro-industry processing chain.

The purpose of this study was to analyze various kinds of price-stabilization measures which could be used by the Venezuelan Government in making its new tariff policy for a number of essential agricultural commodities. This involves: (i) describing various tariff-based price stabilization schemes (section 2), (ii) using historic price data to determine the levels of protection afforded by each scheme and their effects on price stability and Government revenues (section 3 and Appendix), (iii) analyzing the welfare effects of each scheme (section 4), (iv) determining the impact of each scheme if implemented immediately (section 5), and (v) on the basis of (i) - (iv), recommending the most appropriate form of tariff structure (section 6). A summary of the paper is made in section 7.

2. Tariff-Based Commodity Price Stabilization Schemes

At one extreme a variable-tariff can be adopted that adjusts to fluctuations in international prices so that domestic producers and consumers face no price risk. At the opposite extreme a fixed-tariff provides no insulation against external shocks from the international market because changes in world prices are reflected one-for-one in the domestic market. As mentioned above, the GOV wishes to introduce a tariff structure somewhere between these extremes -- that is, a structure which allows changes in the international market to be reflected in the domestic market, yet provides some protection against sharply fluctuating price movements. Below a variety of tariff structures are discussed.

Fixed-tariffs involve taxing imports at a fixed rate so that domestic prices are set at a fixed amount above the world price. The tariff revenue is simply the fixed-tariff times the quantity of imports. That is,

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[1]The problem with a tariff scheme which seeks to maintain price around its long-run average is the pressure, both from budgetary demands and producers, to avoid domestic price reductions. One would anticipate that the stabilized price would move above the long-run average.

$$P^d = er.P^i + T$$

and $$GR \quad T.Q^m$$

where: P^d = domestic price,
er = exchange rate,
P^i = international price,
T = fixed tariff,
GR = government revenue, and
Q^m = quantity imported.

The advantages of fixed-tariffs are that they are relatively easy to administer and legal in terms of form under GATT regulations. However, as shown in the equation, they provide no level of protection against fluctuating international prices. Also, fixed-tariffs are not able to insulate the domestic agricultural sector from unstable domestic prices associated with sharp movements in the exchange rate (er).

Variable-tariffs can be used to insulate the domestic market completely from all commodity price risk. Variable-tariffs can be used as instruments of tariff-based stabilization schemes such as: (i) a reference price scheme, (ii) a minimum price scheme, and (iii) alternative forms of a price-band scheme.

A reference price scheme involves a flexible-tariff structure so that a given price is guaranteed in each period to producers and consumers. That is,

$$P^d = er.P^r$$

$$T = P^d - er.P^i \quad \text{or} \quad T = er.(P^r - P^i)$$

$$GR = T.Q^m$$

where: P^r = moving average of P^i, and
Q^m = quantity imported.

The reference price may be linked to the world price in some way[2]. If the border price ($er.P^i$) is below the reference price (P^r), the tariff is positive to ensure that the reference price prevails in the domestic market. However, when the border price exceeds the reference price a subsidy is required. Given that a moving average of past prices is less variable than the underlying price series itself, this tariff structure lowers the variability of prices facing producers and consumers.

Under this scheme the risk is transferred to the government in the form of unstable tariff

[2] For example, in the case of Venezuela a reference price equal to a five-year moving average of past world prices was used.

revenues. Over the long-run, the reference price scheme does not increase the average domestic price, since the mean of the reference price series is equal to the mean of the underlying world price series. Thus, eventually the tariff revenues and subsidy payments will match. The choice of reference price definition is important in terms of the impact on government revenues. For example, if a long moving average of prices is chosen as the reference price and real prices have been falling over a number of year, then the world price will tend to be below the reference price for long periods, requiring persistent government tariffs.

A number of problems are associated with the reference price scheme. For example, as with the fixed-tariff scheme, it cannot hedge the risks associated with sharply fluctuating exchange rates (er). If the reference price is denominated in US dollars (i.e., $P^d = er.P^r$, where er is in terms of Bs/US$) then a devaluation of the domestic currency in real terms vis-a-vis the dollar will cause the reference price in terms of domestic currency to increase, while domestic prices fall when the domestic currency strengthens. Exchange rates can be highly unstable as the experience of Venezuela in the late 1980s shows. One solution to this problem is to denominate the reference price in terms of domestic currency. This could be done, for example, by using a 5-year moving average of domestic prices as the reference price. However, it can be argued that even though exchange rate changes affect the domestic price when the reference price is denominated in foreign dollars, all traded goods prices are affected in the same way. Therefore, exchange rate changes leave the relative prices of traded goods unchanged, but affect the relative price of traded to non-traded goods in order to maintain balance of payments equilibrium. Another problem with the reference price scheme is that, if announced annually, it removes incentives for private storage. However, it can also lead to hoarding of the commodities immediately prior to announcement of the new price schedule if it is speculated that new prices will be set at levels above the previous ones.

A <u>minimum price scheme</u> is similar to a reference price scheme in that it ensures prices do not fall below a certain level (or minimum price). When the international price falls below this level the government levies a tax on imports in order to raise the price to the minimum price. That is,

$$P^d = er.(\max(P^r , P^i))$$

$$T = P^d - er.P^i$$

$$GR = T.Q^m.$$

In contrast to the reference price, when the international price exceeds the reference price, no subsidy payments are made (i.e., from the equations above T can never be negative), so that the international price prevails domestically. In this way the minimum price scheme offers producers downside price protection and increases the average price to producers at the expense of consumers. Therefore, the minimum price scheme can be considered a vehicle of producer price support as well as price stabilization.

This scheme has some drawbacks. For example, if the minimum price is set at the moving average

of past prices and prices have been falling over long periods, the international price tends to be below the minimum price, causing it to be inflationary. The minimum price will become the domestic price for long periods. Further, as in the case of the reference price scheme, the minimum price scheme does not protect domestic producers from fluctuating exchange rates.

A price band scheme sets upper and lower limits on the level of domestic prices, while the international price prevails when it lies within the band. The scheme can be represented as follows,

$$P^d = er.(\min(P^i_{ub}, \max(P^i_{lb}, P^i)))$$

$$T = P^d - er.P^i$$

$$GR = T.Q^m$$

where: P^i_{ub} = upper band price level, and
P^i_{lb} = lower band price level.

When the international price (P^i) falls below the lower band (P^i_{lb}) a tariff is levied in order to raise the price of imports to the lower band level, while if the international price (P^i) exceeds the upper band (P_{ub}), subsidy payments are made in order to lower the price of imports to the upper band price level.

The upper and lower levels of the price band can be linked to international prices. Different methods are feasible. For example, a reference price could be established and bands set at a given percentage or number of standard deviations above and below the reference price level. Alternatively, a given number (or percentage) of the highest and lowest prices could be removed from a series of past prices (e.g., monthly prices over the previous five-year period) and the range of the prices remaining could be used as the upper and lower levels of the price band. Such a scheme is currently used to determine the price bands of a scheme to stabilize commodity prices in Chile.

The advantage of the price band system is that in the years when the international price is within the band, this price is also the domestic price, while in any given year producers and consumers are protected against extremely high or low prices. This scheme does not discourage private storage as much as other schemes because there is more price variability left (however, the fact that it reduces some price variability acts to discourage private storage). The disadvantage of this scheme is that if prices remain persistently high or low, the upper or lower pri e bands prevail for long periods.

3. Analysis of Various Tariff-Based Price Stabilization Schemes Based on Historical Data

Analysis was undertaken on three tariff regimes. These were: (i) a reference price scheme, with

reference prices set at a five-year moving average of past prices, (ii) a guaranteed minimum price scheme with the minimum prices also set at a five-year moving average of past prices, and (iii) three variations of a price band scheme. The bands of the first price band scheme (scheme A) were determined by removing a certain percentage of the top and bottom observations of a series made up of the previous five years of monthly prices and using the minimum and maximum of the remaining prices as the lower and upper bands, respectively. The bands of the second scheme (scheme B) were set at a reference price (also a five-year moving average of past prices), plus and minus a certain percentage. The bands of the third scheme were set at plus and minus a certain number of standard deviations around a reference price (scheme C), again a five-year moving average of past prices.

Given that the period of analysis extended over 25 years, each of the regimes was analyzed using both nominal and real prices. The method of denominating prices changed the nature of the results considerably, with important implications for policy design. For example, if the price bands and reference prices (e.g., a five-year moving average of past prices) are denominated in nominal prices, and if prices rise in nominal terms, then in most periods the current price will be above the reference price and frequently will exceed the upper band level. This will result in lower government tariff rates needed to maintain the upper band level, and lower government revenues. In periods of abnormally high prices, subsidies are necessary to maintain the upper band price level. Alternatively, if prices are denominated in real terms, real prices fall during periods of stagnant nominal commodity prices. In these periods, the current real price will tend to be below the reference price or even below the lower band level. In this case the lower band price is maintained by increasing the tariff rate. Denominating the reference price and price bands in real prices calls into question the choice of deflator. The most appropriate would appear to be the U.S producer price index. This index is set at the relevant stage of production (i.e., for primary producers), is readily available and published regularly.

The various schemes were also analyzed with and without the inclusion of government subsidies on imports. Subsidies are needed to maintain the upper band when world prices exceed the upper band by more than the basic tariff amount. It is unlikely that GOV would subsidize commodity imports, although if subsidies are not made, then the price band scheme becomes, in effect, a minimum price scheme.

International monthly commodity price data for the period January 1960 to February 1990 were collected for nine agricultural commodities produced and consumed in Venezuela. Five year's of data were used to generate initial moving averages. The data were used to generate a series of "stabilized" prices which would have prevailed domestically under each stabilization scheme for the period 1965 to 1990. The mean ($\overline{X}$), standard deviation (STD) and coefficient of variation (CV) for each of the commodities are reported in Tables A1.a-A1.h in the Appendix. Also reported are these diagnostics for the "unstabilized" historic world prices. Comparison of the means of stabilized prices with the mean world price provides an indication of the level of price support under each scheme. The differences in the standard deviations and coefficients of variation between world prices and stabilized prices provide a measure of the degree of risk reduction. Mean government revenues per ton are also presented in the Tables. These include a basic tariff

of 20% of the world price.

It is important to remember that the prices are denominated in terms of US dollars and not in local currency. In other words, the analysis has been done in the absence of exchange rate risk and without consideration of shipping, port and other handling charges. These may be quite unstable and could change the results considerably. However, while these components are important, they have a more global impact on trade in general, not specifically commodity trade. Therefore the costs and benefits of exchange rate or shipping cost stability should be analyzed separately for the economy as a whole.

A detailed discussion of the results of this analysis is given in the Appendix. Based on the results reported there, it is useful to conclude this section by briefly comparing the different schemes. In terms of risk reduction in terms of current dollars, the risk reduction impact of the schemes as measured by standard deviations and coefficients of variation was surprisingly small. In most cases the coefficient of variation is reduced very little below the CV of world prices. This result was consistent across all commodities analyzed, with the exception of sugar (and rice to a lesser extent) for which prices were the most unstable. This result could lead to the conclusion that using tariffs to stabilize domestic prices (which are linked to the world prices) would be ineffective in managing commodity price risk. However, while this may be true in terms of monthly prices averaged over a 25 year period, the benefits of commodity price stabilization in periods of extremely high or low prices may be large[3]. This result calls into question the appropriateness of the CV as a measure of riskiness. Perhaps a different measure of instability should be applied which weights more heavily the outlying observations (than does, for example, the standard deviation). The analysis based on real prices showed a much greater difference in the CVs between domestic prices under the tariff regimes and the world price.

The reference price scheme reduces the price risk more than the other schemes, and there seems to be very little to choose between the three price band configurations -- except in the case of sugar. When nominal prices were used for the price band schemes, the mean price fell, indicating that deviations in prices on the up-side tended to exceed deviations on the down-side. Price bands set at certain percentage levels below and above the reference price afforded more price risk reduction.

In terms of the criteria of mean prices and government revenues, and again with the exception of sugar, there was little difference between the price band schemes. Government revenues were largest for the minimum price scheme since no subsidy payments were made in periods of high prices. The minimum price scheme increased the average price across all commodities, since the down-side of price fluctuations were supported while no subsidy payments were made on the up-side. Therefore the minimum price scheme was an instrument of price support as well as risk management. Since no subsidy payments were made when internal prices were above the guaranteed minimum price level, government revenues for the minimum price scheme were

[3]Empirical evidence, for example, Binswanger (1978), indicated that risk aversion increases in the face of larger potential loses. Thus, extreme prices are likely to place extraordinary pressures on producers, consumers and government officials.

approximately double those for the others. In this respect, price band schemes where no subsidy payments were paid should be considered price-support mechanisms as well. Whereas the minimum price scheme and price band schemes without subsidies were both an instrument of risk management and price support, the other schemes did not systematically support prices and were only mechanisms for reducing price variability.

4. Welfare Analysis of Commodity Price Stabilization Schemes

An analysis of the welfare benefits for each of the tariff-based price stabilization schemes described above was undertaken. The purpose of this exercise was to provide estimates of the dollar value of the benefits derived from the risk reduction associated with each of the schemes. The framework employed was developed by Newbery and Stiglitz (1981) and has been applied in recent studies (Akiyama and Varangis, 1990; Jolly, Beck and Bodman, 1990; Hinchy and Fisher, 1989).

Newbery and Stiglitz begin by assuming that a country can be modeled as if it were an individual with a Von-Neumann Morgenstern utility function of income given by U(Y). The Arrow-Pratt approximation of the coefficient of relative risk aversion is given by,

$$R = - Y\, U''(Y)/U'(Y).$$

The effect of price stabilization on income is to transform the distribution of income (Y) from the random variable Y_0 to Y_1. The money value benefits of stabilization are given such that,

$$EU(Y_0) = EU(Y_1 - B)$$

This formula can be manipulated by using a Taylor series expansion to give the welfare equation,

$$B/Y = \Delta Y/Y_0 - 0.5 * R(Y_0)*(\sigma^2_{Y1} * (\overline{Y}_1/\overline{Y}_0)^2 - \sigma^2_{Y0})$$

where: B = money values of stabilized benefits,

Y_i = income: i = 0 unstabilized income,
i = 1 stabilized income,

$\overline{Y}_i$ = mean of Y_i ; i = 0,1,

σ^2_{Yi} = square of the coefficient of variation of Y_i,

$\Delta Y = \overline{Y}_1 - \overline{Y}_0$.

The interpretation of B/Y_0 is the dollar value of benefits to producers of stabilized income,

expressed as a proportion of average income before stabilization. The first term in the welfare equation (i.e., $\Delta Y/Y_o$) is an expression for the transfer benefit because it shows the percentage change in mean producer income before and after the introduction of the stabilization scheme and represents a transfer to producers from consumers, government or both, depending on how the stabilization scheme is designed. It is possible for the transfer benefits to be negative, indicating that transfers are made to consumers and/or government by producers. The second term in the equation (i.e., $0.5 * R(Y_o)*(\sigma^2_{Y1} * (\bar{Y}_1/\bar{Y}_o)^2 \cdot \sigma^2_{Yo})$) is the risk benefit to producers which is positive when the price stabilization scheme lowers the coefficient of variation of income.

The producer welfare benefits of stabilizing prices of maize, sorghum, rice and sugar are presented in Table 1. The analysis was based on annual data for the 1980-89 period. Estimates of producer income for these years under the stabilized and unstabilized price scenarios were derived for each of the four commodities as follows. First, the percentage changes in prices between years were combined with an estimate of the elasticity of supply to obtain percentage changes in production. This was done for each of the ten years. This procedure was repeated for the stabilized and unstabilized price series, giving stabilized and unstabilized production series. Then the stabilized price and production and unstabilized price and production were multiplied to give stabilized and unstabilized income series. The means and coefficients of variation of the income series were used in the welfare equation. This procedure was repeated for each of the four tariff-based price stabilization schemes under consideration. Given that estimates of the elasticity of supply are not available, the welfare benefits are reported for assumed elasticities of 0.1 and 0.3. The coefficient of relative risk aversion was assumed to be equal to one.

From Table 1 we see that the total benefits were quite small for maize and sorghum, and fairly large in the cases of rice and sugar. Most of the benefits were transfer benefits, reflecting an increase in the mean income values over the period taken. The risk benefits were small with the exception of sugar. This reflected the small changes in the coefficients of variation between the stabilized and unstabilized income series in most cases. Overall the benefits are larger when the elasticity was assumed to be 0.3 than when it was 0.1.

For maize the total benefits were all less than 10% of the average unstabilized income level. The risk benefits were below 3% and did not differ significantly across the alternative schemes. The transfer benefits for the price bands were negative when the elasticity was assumed to be 0.1, indicating that the mean of stabilized income was less than the mean of unstabilized income. Similar results were obtained for sorghum. In all schemes the risk benefits were less than 2% of the average unstabilized income. Large differences were found for the transfer benefits associated with the three price band schemes. This was because during the 1980s sorghum prices were at the upper bands of these schemes, and the upper band for scheme B is significantly higher than for schemes A and C.

The transfer benefits of stabilizing the income from rice production were positive for the reference price and minimum price schemes and negative for the price bands. This reflected a fall in average income due to prices being held at the upper band level. The risk benefits were small with a maximum of 3.4%.

Table 1.

Welfare Benefits of Various Commodity Price Stabilization Scheme for Maize, Sorghum, Rice and Sugar, 1980 - 1989 in Venezuela

Commodity	Reference Price		Minimum Price		Price Band 1/		Price Band 2/		Price Band C 3/	
	Stabilization Schemes									
	Percent of Total Revenue									
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Maize										
Transfer Benefit	4.6	7.4	6.2	7.3	-2.5	-0.9	-1.9	-1.1	0.9	1.1
Risk Benefit	1.5	1.9	1.3	1.8	0.9	2.2	0.9	2.2	1.6	2.8
Total Benefit	6.1	9.3	5.5	9.1	-1.6	1.3	-1.0	1.1	2.5	3.9
Sorghum										
Transfer Benefit	6.0	9.6	9.7	10.9	-0.3	1.6	6.7	8.1	3.3	4.6
Risk Benefit	1.2	1.5	1.1	1.4	0.9	1.2	1.2	1.6	0.8	1.0
Total Benefit	7.2	11.1	10.8	12.3	0.6	2.8	7.9	9.7	4.1	5.6
Rice										
Transfer Benefit	11.7	18.6	16.7	18.7	-3.6	-2.2	-2.1	-0.3	-1.7	-0.5
Risk Benefit	2.0	2.6	0.6	0.8	2.3	3.2	2.5	3.4	1.9	2.6
Total Benefit	13.7	21.2	17.3	19.5	-1.3	1.0	0.4	3.1	0.2	2.1
Sugar										
Transfer Benefit	21.8	26.1	38.2	40.9	-8.8	-10.4	35.3	37.8	20.1	33.4
Risk Benefit	1.4	1.4	3.3	4.5	6.0	8.0	2.9	4.0	7.7	9.1
Total Benefit	23.2	27.5	41.5	45.4	-2.8	-2.4	38.2	41.0	27.8	42.5

(a) Supply Elasticity = 0.1
(b) Supply Elasticity = 0.3

1/ 24 observations removed, with subsidies
2/ +/-20% of Reference Price, with subsidies
3/ +/-1 Standard Deviation from the Reference Price, with subsidies

The largest risk benefits were realized for sugar. This reflected the large fall in the coefficient of variation in all schemes considered. In the case of price band scheme C the risk benefit reached 9%, the highest reported in Table A1. Wide differences were found between the price band schemes in terms of transfer benefits. The reason for this was the same as in the case of sorghum. That is, the price was constrained by the upper band which was much higher for price band scheme B than for the other schemes.

This analysis showed that the risk benefits of price stabilization were quite small when based on the Newbery and Stiglitz framework. This finding is consistent with the other applications of the framework cited above. However, the analysis ignores important factors such as the distribution of income of individual producers and differences in their risk attitudes. Also, the results are sensitive to the choice of the instability measure, as well as to the assumptions made about the value of the coefficient of relative risk aversion.

Another important omission from the analysis and discussion so far is the efficiency losses associated with each of the schemes. When tariffs and subsidies are used to set domestic prices different from international prices, efficiency losses are incurred which should be tradedoff against the welfare benefits associated with risk reduction. However, a considerably more complicated model would be required to measure the welfare losses associated with such stabilization schemes.

5. Immediate Impact of Implementing the Various Price Stabilization Schemes

The consequences of introducing the various price stabilization schemes[4] in March 1990 were addressed. The approach taken was to compare, for each of the nine commodities, the expected world price with the price level supported internally under each scheme. Based on this comparison, the actual internal price expected to prevail was determined, together with the likely government revenues and expenditures. The results are reported in Table 2. For each commodity the world price for 1990 was given as the most recent World Bank forecast (World Bank, 1990b). A 20% tariff was then added to the world price.

The internal price was the one that exists under each scheme. In the case of the reference price scheme, the reference price prevails regardless of the world price. For the minimum price scheme, the internal price was the minimum price if the world price was below it. Alternatively, if the world price was above the minimum price, the internal price was the world price.

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[4] The analysis was for four price stabilization schemes. Each resulted in different support prices. These schemes are: (i) a reference price scheme, with reference prices set at a five-year moving average of past prices, (ii) a guaranteed minimum price scheme, with the minimum prices also set at a five-year moving average of past prices, (iii) a price band scheme, with bands determined by removing the top and bottom 20% observations of a series made up of the previous five years of monthly prices and using the minimum and maximum of the remaining prices as the lower and upper bands, respectively, and (iv) a price band scheme, with the upper and lower bands established as plus and minus 20% of a reference price (also a five-year moving average of past prices).

Table 2. Price Support Levels for March 1990 Under Alternative Price Stabilization Schemes.

Commodity	Reference Price	Minimum Price	Price Band A 1/		Price Band B 2/		Price Band C 3/		World Price 4/
			Min	Max	Min	Max	Min	Max	
Maize									
Support Price 5/	118.3	118.3	94.5	140.8	94.6	141.9	96.0	140.5	100
Internal Price 6/	118.3	120.0	120.0		120.0		120.0		
Govt Rev (+)/Exp (-) 7/	18.3	20.0	20.0		20.0		20.0		
% Tariff 8/	18.3	20.0	20.0		20.0		20.0		
Wheat									
Support Price	163.1	163.1	134.5	196.6	130.4	195.8	134.6	191.6	184
Internal Price	163.1	220.8	196.6		195.8		191.6		
Govt Rev (+)/Exp (-)	-20.9	36.8	12.6		11.8		7.6		
% Tariff	-11.4	20.0	6.8		6.4		4.1		
Soybeans									
Support Price	294.5	294.5	252.0	349.2	235.6	353.4	241.3	347.6	270
Internal Price	294.5	324.0	324.0		324.0		324.0		
Govt Rev (+)/Exp (-)	24.5	54.0	54.0		54.0		54.0		
% Tariff	9.1	20.0	20.0		20.0		20.0		
Sugar									
Support Price	215.6	215.6	142.6	296.3	172.4	258.4	124.9	306.1	391
Internal Price	215.6	469.2	296.3		258.4		306.1		
Govt Rev (+)/Exp (-)	-175.4	78.2	-94.7		-132.6		-84.9		
% Tariff	-44.9	20.0	-24.2		-33.9		-21.7		
Rice									
Support Price	308.8	308.8	252.0	366.0	247.4	370.6	247.8	369.7	285
Internal Price	308.8	342.0	342.0		342.0		342.0		
Govt Rev (+)/Exp (-)	23.8	20.0	57.0		57.0		57.0		
% Tariff	8.4	20.0	20.9		20.0		20.0		

All prices include a 20% tariff.

1/ 24 months of price observations removed. 2/ +/- 20% price band. 3/ +/- 1 standard deviation. 4/ Excludes 20% tariff. 5/ Price maintained under stabilization program. 6/ Domestic price prevailing under the stabilization program. 7/ Internal price minus mean world price. 8/ Government revenues or expenses as percent of mean world price.

Table 2. continued. Price Support Levels for March 1990 Under Alternative Price Stabilization Schemes.

Commodity	Reference Price	Minimum Price	Price Band A 1/		Price Band B 2/		Price Band C 3/		World Price 4/
			Min	Max	Min	Max	Min	Max	
Sorghum									
Support Price 5/	110.8	110.8	88.6	130.4	79.1	132.9	70.3	141.1	93
Internal Price 6/	110.8	111.6	111.6		111.6		111.6		
Govt Rev (+)/Exp (-) 7/	17.8	18.6	18.6		18.6		18.6		
% Tariff 8/	19.1	20.0	20.0		20.0		20.0		
Soybean Meal									
Support Price	255.5	255.5	213.6	306.0	204.4	306.6	200.8	310.2	240
Internal Price	255.5	288.0	288.0		288.0		288.0		
Govt Rev (+)/Exp (-)	15.2	48.0	48.0		48.0		48.0		
% Tariff	6.3	20.0	20.0		20.0		20.0		
Soybean Oil									
Support Price	511.2	511.2	403.2	562.8	408.9	613.4	387.6	634.7	430
Internal Price	511.2	516.0	516.0		516.0		516.0		
Govt Rev (+)/Exp (-)	81.2	86.0	86.0		86.0		86.0		
% Tariff	18.9	20.0	20.0		20.0		20.0		
Palm Oil									
Support Price	447.0	447.0	358.8	513.6	357.6	536.5	323.8	570.3	354
Internal Price	447.0	447.0	424.8		424.8		424.8		
Govt Rev (+)/Exp (-)	93.0	93.0	70.8		70.8		70.8		
% Tariff	26.3	26.3	20.0		20.0		20.0		

All prices include a 20% tariff.

1/ 24 months of price observations removed.
2/ +/- 20% price band.
3/ +/- 1 standard deviation.
4/ Excludes 20% tariff.
5/ Price maintained under stabilization program.
6/ Domestic price prevailing under the stabilization program.
7/ Internal price minus mean world price.
8/ Government revenues or expenses as percent of mean world price.

In the case of the price bands, if the world price was within the band, then the internal price was the world price. If the world price was outside the band, then the internal price was set at either the lower or upper band level. Government revenues and expenditures were given by the internal price (including the 20% tariff), less the world price (excluding the 20% tariff). Also reported in Table 2 are the tariff rates.

The results for maize showed that the world price was above the reference price of $118.30/ton, which was supported by a tariff of $18.30/ton, equivalent to a 18.3% tariff on the world price. The world price plus tariff was $120/ton, which exceeded the minimum price level and fell within the upper and lower bands of the price band schemes. In these cases the internal price was the world price and a tariff of $20/ton was levied, representing 20% of the world price.

The world price of wheat plus the 20% tariff was forecast to be $220.80/ton. This was almost $60/ton higher than the reference price and required the Government to lower the price by $21/ton. The world price also exceeded the upper level of the price band schemes. To achieve these price levels the government would cut the tariff rate to between 4.1% and 6.8%.

The forecast for soybean prices for 1990 with a 20% tariff was $324/ton. This was close to the reference price of $294.50/ton. To maintain this reference price the tariff rate must be lowered to about 9% or $24.50/ton. The world price fell within the bands of the price band schemes and above the minimum price level. As a result, a tariff of 20% on these schemes would apply.

The price of sugar on the world market was expected to soar in 1990 to $391/ton. With a 20% tariff this amounted to $469.20/ton. This exceeded the reference price substantially, estimated at $215.60/ton. To maintain the reference price at this level, a large subsidy was needed, amounting to $175.40/ton or 44.9% of the world price. With the price band schemes, the world price exceeded the upper level in all cases. Interestingly, the band levels were quite different, with the price band schemes A and C considerably wider than scheme B. Subsidies were required in these cases to lower the border price to the upper band level. These subsidies amounted to 24.2%, 33.9% and 21.7% of the world price for schemes A, B and C, respectively.

The price of rice in 1990 was expected to be $285/ton. This was above the minimum price and within the bands of the price band schemes. In these cases a 20% tariff applied. The tariff rate was lowered to 8.4% to establish the reference price of $308.80/ton.

The forecast of the world price of sorghum for 1990 was $111.60/ton, including a 20% tariff. This price was above the minimum price and between the upper and lower limits of the price band schemes. For these schemes a 20% tariff was applicable, equivalent to $18.60/ton. To reach the reference price of $110.80/ton, the tariff rate was lowered to 19.1%.

The border price of soybean meal with a 20% tariff was forecast to be $288/ton. This exceeded the minimum price and was within the bands of the price band schemes. In these cases, a 20% tariff was imposed amounting to $48/ton. The reference price was supported by a tariff of $15.20/ton, equivalent to 6.3% of the world price. Similar results were found for soybean oil with

the world price greater than the minimum price and within the price bands. In these cases a 20% tariff applied. The world price was very close to the reference price which was supported by an 18.9% tariff.

In the case of palm oil, the price forecast including the 20% tariff, was $424.80/ton. This was below the reference and minimum prices estimated at $447/ton. In order to achieve a price of $447/ton, a 26.3% tariff was required. Interestingly, only in this case was a tariff rate of more than 20% required. For the price band schemes, the border price fell within the band, so that imports were subject to a 20% tariff only.

6. Recommendations

In making our recommendations for the choice of tariff-based stabilization program, the approach taken was first to put forward a number of desirable properties or characteristics of a stabilization scheme, and then to assess how well each of the schemes analyzed met these characteristics. Four desirable properties of a scheme were used in making the assessment.

The first was that tariff-based price stabilization schemes should allow changes in the world price to be reflected in the domestic market. This property is based on economic efficiency arguments which state that when internal prices differ from border prices, welfare and efficiency losses are incurred. Second, since the goal of the policy is to stabilize the domestic price, the tariff structure should not increase or decrease the price over the long-term. Otherwise there will be a transfer between producers and consumers. Third, the stabilization scheme should not create a significant fiscal burden by requiring substantial Government expenditures. In the long-run, this should not be the case if border prices are normally distributed and if the stabilization scheme in any period is centered on the current long-run price. However, the experience of other stabilization schemes shows that defending a price above the long-run average will eventually lead to a financial deficit. In addition, commodity price series may exhibit distributional characteristics leading to large single-year or multiple-year expenditures which may strain fiscal budgets. Fourth, schemes should be transparent in their mechanics. Transparent rules allow economic agents to act more efficiently, remove advantages to "insiders", and are easier to administer.

Comparing each of the schemes with the first criteria (i.e., that changes in world prices be reflected in the domestic market) the schemes which placed fewest constraints on domestic prices met this criteria best[5]. Therefore, the price band schemes without subsidies and with wide bands around the reference price are preferred. This is because they allow a greater range of international prices to prevail directly in the domestic market, so that changes in the international price are more likely to be reflected domestically. Of the schemes analyzed the +/- 30% band without

[5]Such a scheme may not be the best based on efficiency criteria, however. For the same reduction in price variability achieved without subsidies, efficiency losses are lower if the scheme operates with subsidies. Operating on two margins to reduce risk extracts the smallest marginal efficiency losses.

subsidies met this criteria the best[6]. In contrast, the reference price scheme did not allow changes in international prices to be reflected in the domestic market, other than to move the reference price marginally in the direction of the price change.

The second criteria was that the mean stabilized producer price should not be above or below the long-run international price. As shown in Table A1, whenever the schemes are centered around a reference price based on a five-year moving average of past prices (denominated in current terms), the mean prices of the stabilized series tend to be below the mean of the unstabilized international price. Thus a transfer from producers to consumers occurs. However, the results showed that this transfer was small (i.e., less than 5% of the world price in most cases). The transfer is lower for a reference price based on fewer years of past prices and if subsidies payments are not made.

An alternative approach is to denominate the reference price and price bands in terms of real prices. As shown in Table A1, the mean price of schemes denominated in constant dollars was not consistently above or below the mean of the world price. Even with prices denominated in constant terms, the minimum price scheme (which only supported the domestic price when international prices were low) systematically increased the mean domestic price. Also, the price band scheme A may not preserve the mean price even using constant prices, because the upper and lower bands are not set symmetrically around the reference price.

The third criterion is that the scheme should not create an excessive financial burden on the government. For importing countries such as Venezuela, a tariff-based stabilization scheme can become a burden when international prices are high, so that the reference price or upper band can be maintained only with a reduction in the basic tariff and, on occasions, subsidy payments (i.e., when prices are very high and the basic tariff has fallen to zero). For an exporting country, the government must pay subsidies to exporters to maintain the reference price or lower band when international prices are very low.

For the scenarios analyzed in section 3 and in the Appendix, clearly if subsidies are not made then there will be no budgetary difficulties for the government. For an importing country, when prices are very high the basic tariff on imports will fall to zero, but will never go negative. In this regard all schemes without subsidy payments are equally desirable. However, in terms of the stability of government revenues from import tariffs, the price band schemes with the widest bands are more desirable because under these schemes the basic tariff applies more often. In contrast, the reference price scheme requires that the tariff rate change every period.

In times of very high international prices the government may decide to subsidize imports to maintain the reference price or upper band. This could become a heavy fiscal burden on the government, especially if high international price persist for long periods. Subsidies are more likely

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[6]The exception to this is for sugar for which bands set at +/-1.5 standard deviations from the reference price provide the greatest flexibility.

under certain conditions[7]. These include (i) if the basic tariff is set at a relatively low level, (ii) if the stabilization scheme is very constraining (e.g., the bands of a price band scheme are narrow), (iii) if the schemes are denominated in current prices, and (iv) if the world price is above the reference price based on past prices[8]. Based on these conditions, of the stabilization schemes employing subsidies the price band scheme with the most relaxed band can be considered more desirable, as well as the schemes denominated in constant prices. Therefore, the most desirable scheme analyzed is the price band scheme with bands set at 30% around the reference price. This scheme provides even greater flexibility than the scheme with band widths +/- 1.5 standard deviations from the reference price.

The fourth criterion is that the schemes should be transparent, thus making the scheme predictable to all economic agents, less open to opportunism and exploitation, and more easy to administer. All of the schemes discussed above are transparent, with the exception, perhaps, of the price band scheme A where the rules of the scheme can be changed slightly to give large changes in the band widths[9]. However, it can be argued that if a government wishes to manipulate or change the stabilization policy it will do so whatever the mechanism employed.

The stabilization schemes denominated in real terms are generally more difficult to interpret and tend to be much less transparent. Also, such schemes require that a suitable index be chosen. These concerns can be accommodated if a common and well-known deflator is used, such as the U.S. producer price index which is published widely.

From the single standard of economic efficiency it is clear that a policy of no intervention is preferred, with risks hedged using standard market mechanisms such as futures, options, swaps and multi-period contracts. However, based on the multiple criteria cited earlier, and in conjunction with the further criterion that it must be workable and acceptable to the government operating the scheme, the most appropriate, "second best" scheme for Venezuela appears to be the price band scheme. It would provide producers and consumers protection against extremely high and low prices. The price bands should be set at a given percent above and below a reference price set (i.e., price band scheme B) as the 5-year moving average of monthly prices. To ease the transition in Venezuela's agricultural sector from a system of fixed market prices to one where prices are allowed to fluctuate freely, the bands could be widened over time. For example, bands could be set at +/- 10% for an initial period (say 6 months) and then widened to +/- 20% after one year. Later the bands could be widened even further to, say, +/- 30% by which time the bands would rarely constrain domestic prices (Table A2). Such a scheme is very transparent and should be operated in terms of nominal prices.

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[7] Targeting the effects of import subsidies in a country with otherwise liberal trade policies may prove untenable as well, since subsidized imports may be re-opened or smuggled

[8] These features are borne out by the results for sugar in Table A1.c. Using current prices, and with a tight price band, even with a basic tariff of 20% a subsidy payment averaging $9.20/ton would be required to maintain the scheme.

[9] When this scheme was used in Chile the rules over the number of observations removed from the scheme were adjusted continuously, with the result that the price band widths change unpredictably.

In order to maintain a average effect on average, the scheme would require subsidies when prices are at the upper band and additional taxes when they reach the lower band. This may not be practical. If trade across borders is profitable then targeting only domestic consumers is impossible. In addition, such subsidies encourage circular trade. Given the limited resources of government, such a program would soon fail. As a result, the band may have to operate without subsidies despite the subsequent distortions.

7. Conclusions

The research presented in this paper was prompted by the agricultural trade reforms being discussed by the Venezuelan Government. The general nature of the reforms is to remove the quantitative restrictions on agricultural trade and to replace them with tariffs. While the GOV is committed to constructing the tariff regime in such a way that international commodity price movements and trends would be reflected in Venezuelan agricultural and food prices, it fears the repercussions of extremely high and low commodity prices, as well as severe inter- and intra-year price fluctuations. The purpose of this paper was to analyze a number of tariff-based commodity price stabilization schemes in terms of (i) general structure, (ii) advantages and disadvantages, (iii) effect on the average level and stability of domestic prices, (iv) impact on government revenues and expenditures, (v) impact on producer welfare, and (vi) impact on domestic prices if introduced before the end of 1990. Based on these analyses recommendations are made on the most appropriate scheme to employ.

Analysis was undertaken on three tariff regimes. These were: (i) a reference price scheme, (ii) a guaranteed minimum price scheme, and (iii) three types of price band scheme. Each of the regimes was analyzed using both nominal and real prices. It is concluded that denominating prices in nominal or real prices has different implications for policy design. The various schemes were also analyzed with and without the government paying import subsidies, since it is likely that few Governments could effectively subsidize commodity imports due to budget limitations and smuggling operations. The analysis was based on monthly international commodity price data from January 1960 to February 1990 for nine agricultural commodities produced and/or consumed in Venezuela. Each scheme was simulated using these data to derive a series of "stabilized" prices (i.e., those which would prevail domestically under each stabilization scheme) and were compared with the "unstabilized" world price. All the analyses included a basic tariff of 20% of the world price.

In terms of risk reduction, when measured in current dollars and as measured by the standard deviations and coefficients of variation, the impact of employing any of these schemes was surprisingly small. In most cases the coefficients of variation dropped very little below the CVs of world prices. This result was consistent across all commodities analyzed, with the exception of sugar (and rice to a lesser extent) whose price was the most unstable of all. This result could have led to the conclusion that using tariffs to stabilize domestic prices (which are linked to the world prices) would be ineffective in managing commodity price risk. However, while this may be true

in terms of monthly prices averaged over a 25 year period, the benefits of commodity price stabilization in periods of extremely high or low prices may be large. The analysis based on real prices showed a much greater difference in the CVs between domestic prices under the tariff regimes and the world price.

The reference price overall reduced the price risk more than the other schemes, and there seemed to be very little to choose between the three price band configurations, except in the case of sugar--the most volatile commodity market sampled. When nominal prices were used with the price band schemes, the mean price fell, indicating that deviations in prices on the up-side tended to exceed deviations on the down-side. Comparing the three systems, the bands when set at certain percentage levels below and above the reference price afforded more price risk reduction, as measured by the standard deviations and coefficients of variation of the stabilized price. Based on the criteria of mean prices and Government revenues, and with the exception of sugar, there was little differences between the results of the price band schemes.

Government revenues were largest for the minimum price scheme since no subsidy payments were made in periods of high prices. Across all commodities the minimum price scheme increased the average price, since only downward of price fluctuations were supported, while no subsidy payments were made when prices moved up. In this respect the minimum price policy can be regarded as an instrument of price support as well as of risk management. Since no subsidy payments were made when internal prices were above the guaranteed minimum price level, Government revenues for the minimum price scheme were approximately double those for the others.

In addition to these analyses, the welfare effects of the schemes were presented using a framework developed by Newbery and Stiglitz. Overall the results showed that the welfare benefits were small. This result followed mainly from the fact that the measure of risk reduction used in the approach (i.e., the change in the coefficients of variation between stabilized and unstabilized income) was found to be small.

The immediate impact of introducing the schemes was assessed by comparing a commodity price forecasts for 1990 with the domestic price prevailing under each scheme. It was shown that for all commodities, with the exception of palm oil, the world price was above the minimum price, while international prices (with the exception of wheat) lay within the bands of the price band schemes.

In making our recommendations for the choice of tariff-based stabilization program, a number of characteristics of a stabilization scheme were suggested and used to assess the desirability of the schemes. Four desirable properties of stabilization schemes were used in making the assessment. These were that (i) the scheme should allow changes in the world price to be reflected in the domestic market, (ii) the mean stabilized price to producers should not be above or below the long-run international price, (iii) the scheme should not create an excessive financial burden on the Government, and (iv) the scheme should be transparent and predictable.

Based on these criteria the most appropriate scheme for Venezuela appeared to be the price banc scheme. Bands should be set at a certain percentage above and below a reference price which should be set at the five-year moving average of monthly prices. To ease the transition to a free market, the band widths could be set, initially, quite narrowly (e.g., +/- 10%) and then should be widened successively over a number of pre-specified periods (e.g., widening the band to +/- 20% after 6 months and to +/- 30% after one year). Such a scheme should be operated in nominal prices and would be very transparent. Based on discussions with officials in Venezuela such a scheme would be workable and could be implemented before the end of 1991.

Appendix- Analysis of Various Tariff-Based Price Stabilization Schemes Based on Historical Data

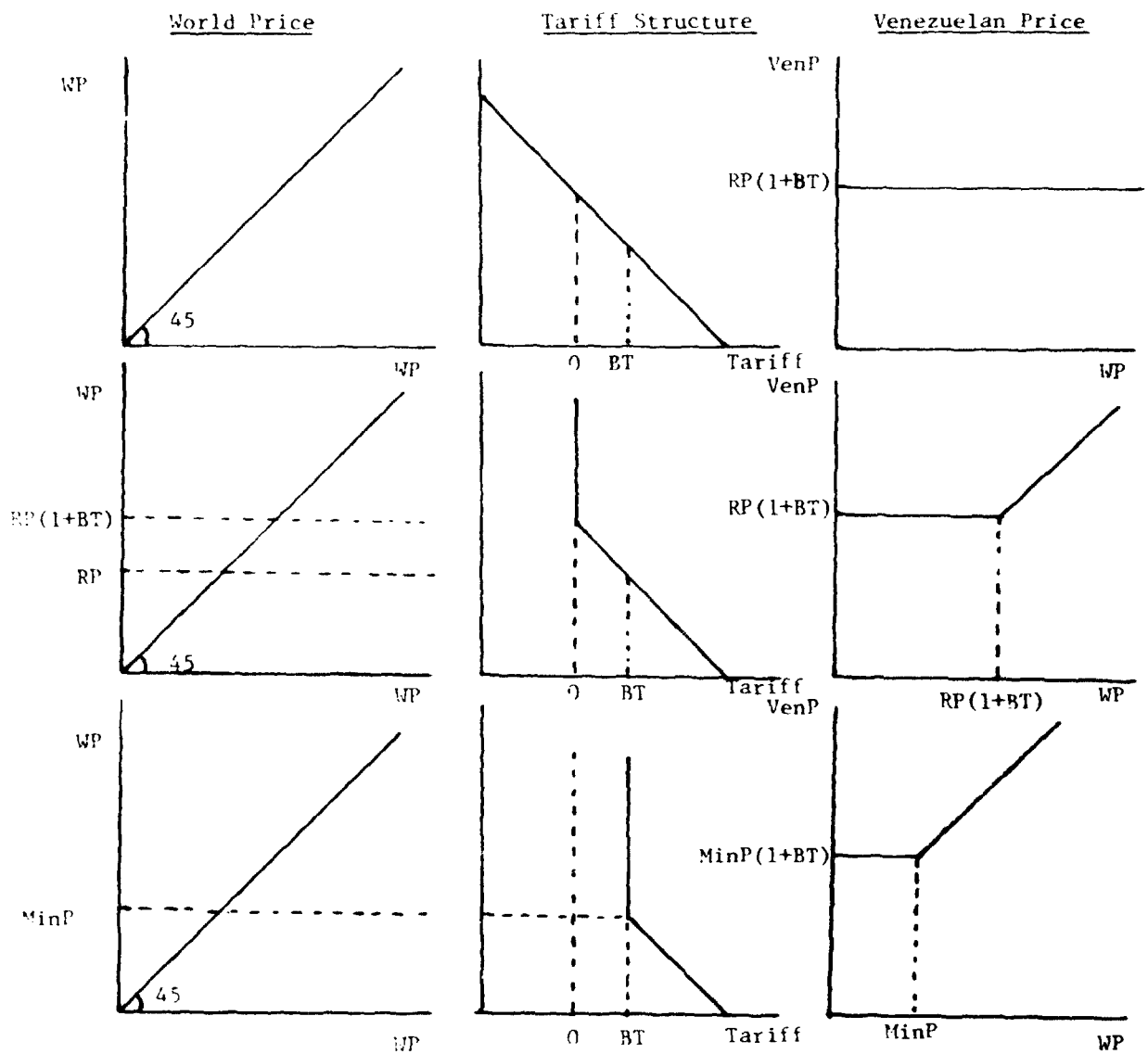
A1. Reference Price and Minimum Price Schemes

The reference price and minimum price schemes are illustrated in Figure A1. Panel i of Figure A1 shows the reference price scheme with government subsidy payments. The internal or domestic price is set at the reference price (RP) plus the basic tariff (BT). The internal price (VenP) in each period is unaffected by the current world price (WP) through adjustable tariffs and subsidies. Panel ii shows the reference price scheme without Government subsidies. The internal price is set at the reference price plus the basic tariff level. If the world price exceeds this level, then the internal price is equal to the world price level and the tariff falls to zero. Panel iii illustrates the minimum price scheme. If the world price is below the minimum price level (MinP) the tariff rate is increased above the basic tariff rate. Otherwise the basic tariff applies to the world price. In the analysis the reference price and the minimum price in each period were set at a five-year moving average of past prices, while the basic tariff was set at 20%. The results for nine commodities in terms of nominal prices are reported in Table A1.a.

The stabilization policies did not reduce price variability for maize substantially. The largest drop in the CV was for the reference price scheme without subsidies which was only 4% lower than for the world price. The CV for the minimum price scheme was lower than that for the reference price with subsidies scheme. This is an anomalous result since, by definition, the minimum price series cannot be more stable than the reference price series. While the standard deviation was lower for the reference price scheme, the mean was lower also, and together these changes resulted in a CV larger than for the minimum price scheme. This result calls into question the appropriateness of the CV as a measure of risk. The reference price scheme slightly lowered the mean price, while the minimum price scheme increased it by about 6%. As expected, the tariff revenues were highest for the minimum price scheme; in fact close to twice the revenues of the reference price scheme with subsidies.

The results for wheat showed that the reference price scheme without subsidies had the lowest CV at 0.34 (12% below the CV for the world price), although the lowest STD was reported for the reference price with subsidy scheme. As with maize, the tariff revenues for the minimum price scheme were close to double the revenues from the reference price scheme with subsidies. In the case of soybeans, the reference price schemes had the smallest CVs although not substantially below that of the world price. The most significant effect on the price stability as measured by

Figure A1. Reference Price Scheme and Minimum Price Scheme.



Panel i

Reference Price Scheme

With-Subsidy Case

Panel ii

Reference Price Scheme

Without-Subsidy Case

Panel iii

Minimum Price Scheme

Table A1.a. Comparison of Alternative Stabilization Policies in Venezuela. Reference Price Scheme and Minimum Price Scheme.

Comodity	Reference Price with subsidies	Reference Price without subsidies	Minimum Price	World Price
Maize				
STD	34.1	34.0	37.8	36.0
X	106.5	110.8	119.4	112.4
CV	0.320	0.307	0.317	0.320
Govt Rev/Exp	12.9	17.1	25.7	
Wheat				
STD	46.8	48.0	55.1	54.4
X	133.7	141.3	152.2	143.2
CV	0.355	0.340	0.362	0.381
Govt Rev/Exp	14.3	21.9	32.8	
Soybeans				
STD	84.7	85.2	95.1	93.9
X	242.1	252.8	273.3	260.8
CV	0.346	0.337	0.348	
Govt Rev/Exp	24.8	35.5	56.0	
Sugar				
STD	128.7	180.3	209.4	218.3
X	234.0	287.2	312.6	245.3
CV	0.550	0.628	0.670	0.885
Govt Rev/Exp	29.6	82.9	108.2	
Rice				
STD	98.8	109.5	126.4	130.3
X	308.8	333.9	362.[illegible]	325.7
CV	0.318	0.328	0.349	0.402
Govt Rev/Exp	37.4	62.5	90.8	
Sorghum				
STD	22.1	19.3	20.7	25.1
X	117.7	122.3	132.2	123.9
CV	0.188	0.157	0.156	0.203
Govt Rev/Exp	14.4	19.0	29.0	
Soybean Meal				
STD	69.8	78.4	88.8	89.0
X	199.3	209.7	227.8	217.1
CV	0.354	0.374	0.390	0.407
Govt Rev/Exp	18.5	28.8	46.9	
Soybean Oil				
STD	177.6	188.2	213.1	222.3
X	507.4	537.6	577.4	529.2
CV	0.350	0.350	0.369	0.416
Govt Rev/Exp	66.4	96.6	136.3	
Palm Oil				
STD	170.2	177.9	203.5	210.7
X	472.8	488.3	538.3	490.0
CV	0.359	0.357	0.378	0.430
Govt Rev/Exp	64.4	89.9	129.9	

All prices measured in current $/MT and include a 20% tariff.
Based on monthly data January 1965-February 1990.

the CVs was for sugar. The lowest CV was for the reference price with subsidies scheme at 0.55 which was substantially below the CV for the world price at 0.885. The minimum price scheme had a CV of 0.67 and, on average, earned $108.2/ton in tariff revenue. This was more than three times the tariff revenue from the reference price scheme with subsidies. There was a substantial difference between the government revenues for the two reference price schemes. This was because large government subsidies were required to keep prices at the reference price or at upper band levels when sugar prices rose dramatically in the 1974-75 and 1980-81 periods. The price stabilization schemes also reduced the price variability of rice considerably. The lowest CV was reported for the reference price scheme with subsidies at 0.318, which was 26% below the CV of the world price. Government revenues differed between schemes ranging from $37.4/ton for the reference price scheme with subsidies to $90.8/ton for the minimum price scheme. The results for sorghum were counter-intuitive since the CV for the minimum price scheme was below that of the reference price scheme with subsidies. Again this demonstrated the hazards of measuring instability with the CV, since, as mentioned in the discussion of the maize results, the minimum price could not be more stable than the reference price. The results were fairly consistent across soybean products and palm oil. The reference price scheme gave the most risk reduction in terms of the CVs which fell 13%, 16% and 17% below the world price for soybean meal, soybean oil and palm oil, respectively.

The results of the analysis using constant prices are reported in Table A1.b. Overall the results were consistent with what was expected in terms of each scheme's effect on mean price and price variability reduction. For example, across all commodities the CVs and standard deviations were highest for the world price, lower for the minimum price scheme, still lower for the reference price scheme without subsidies and lowest for the reference price scheme with subsidies. Comparing the world price with the reference price scheme with subsidies, the CVs fell significantly -- between 30% to 40% for maize, soybeans and sorghum and between 40% to 50% for sugar, wheat, rice, soybean oil, soybean meal and palm oil. The mean real prices were the highest for the minimum price scheme, significantly above the world price for some commodities (e.g., sugar 35%, rice 16%, and palm oil 14%). As expected, the mean price under the reference price scheme without subsidies was higher than the world price. This was also true for the reference price with subsidies scheme.

A2. Price Band Schemes

A2.1 Price Band Scheme A

The price band schemes analyzed are illustrated in Figure A2. The bands for scheme A were determined in each period by removing a specified number of the highest and lowest observations of a series of the past 5 years of monthly prices, and using the range of the remaining observations as the lower and upper bands of the scheme. A number of variations of this scheme were analyzed. In Table A1.c the results are reported for prices denominated in current dollars, with 18 and 24 price observations removed and for the cases with and without subsidies.

Table A1.b. Comparison of Alternative Stabilization Policies in Venezuela. Reference Price Scheme and Minimum Price Scheme.

Commodity	Reference Price with subsidies	Reference Price without subsidies	Minimum Price	World Price
Maize				
STD	34.3	37.4	44.7	51.1
X	189.7	192.8	200.2	180.4
CV	0.181	0.194	0.223	0.283
Govt Rev/Exp	39.2	42.3	49.7	
Wheat				
STD	43.3	54.2	65.8	70.6
X	233.9	242.0	251.6	224.8
CV	0.185	0.224	0.262	0.314
Govt Rev/Exp	46.5	54.6	63.6	
Soybeans				
STD	81.9	99.9	119.7	129.3
X	426.7	438.4	457.0	414.5
CV	0.192	0.228	0.262	0.312
Govt Rev/Exp				
Sugar				
STD	200.5	283.2	326.7	343.9
X	405.0	476.8	515.3	381.3
CV	0.495	0.594	0.634	0.902
Govt Rev/Exp	87.2	159.0	197.6	
Rice				
STD	143.0	180.5	212.4	235.5
X	562.8	591.7	626.6	539.0
CV	0.254	0.305	0.339	0.437
Govt Rev/Exp	113.6	142.6	177.4	
Sorghum				
STD	40.0	42.6	49.5	54.4
X	178.2	180.6	187.1	166.1
CV	0.224	0.236	0.265	0.328
Govt Rev/Exp	39.8	42.2	48.6	
Soybean Meal				
STD	72.7	111.6	133.2	138.3
X	351.0	364.8	380.5	343.3
CV	0.207	0.306	0.350	0.403
Govt Rev/Exp	65.0	78.7	94.4	
Soybean Oil				
STD	200.1	247.0	294.0	336.7
X	897.5	931.9	979.9	852.3
CV	0.223	0.265	.300	0.395
Govt Rev/Exp	187.2	221.6	269.6	
Palm Oil				
STD	156.1	187.6	230.0	287.8
X	830.4	856.5	895.1	784.3
CV	0.188	0.219	0.257	0.367
Govt Rev/Exp	176.9	202.9	241.5	

All prices measured in constant $/MT and include a 20% tariff.
Based on monthly data January 1965-February 1990.

Figure A2. Price Band Schemes.

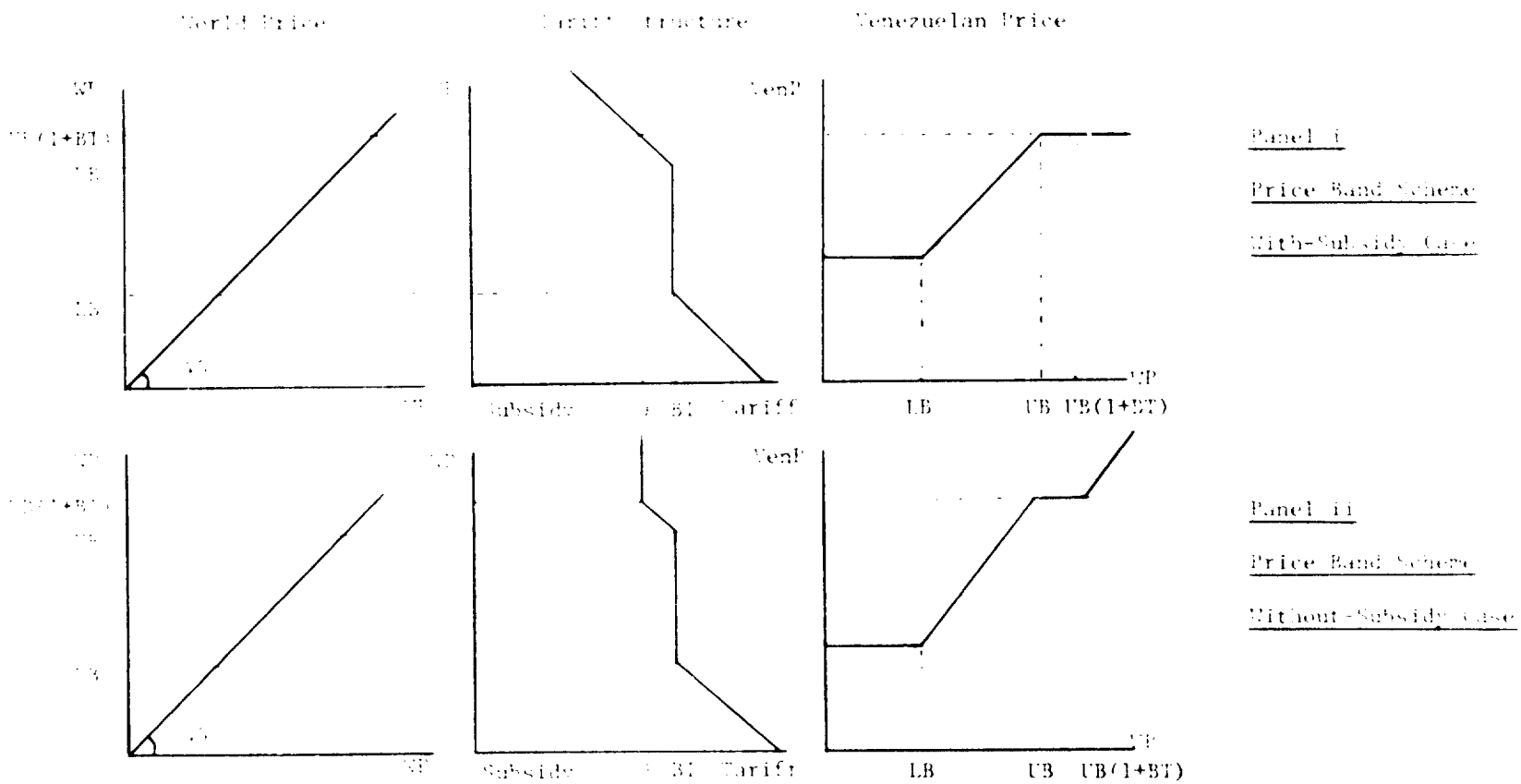


Table A1.c. Comparison of Alternative Stabilization Policies in Venezuela. Price Band Scheme A.

Commodity	24 months removed with subsidies	24 months removed without subsidies	18 months removed with subsidies	18 months removed without subsidies	World Price
Maize					
STD	34.9	34.7	35.3	35.2	36.0
X	109.4	111.2	109.9	111.0	112.4
CV	0.319	0.312	0.321	0.317	0.320
Govt Rev/Exp	15.70	17.5	16.0	17.3	
Wheat					
STD	50.6	50.2	51.2	51.3	54.4
X	137.0	141.0	138.5	141.6	143.2
CV	0.369	0.356	0.370	0.362	0.381
Govt Rev/Exp	17.88	21.7	19.2	22.2	
Soybeans					
STD	86.4	86.7	88.0	88.3	93.9
X	248.3	254.2	251.3	255.8	260.8
CV	0.348	.341	0.350	0.345	0.359
Govt Rev/Exp	31.0	36.9	34.0	38.5	
Sugar					
STD	109.9	179.3	123.1	180.9	179.3
X	195.3	231.0	202.5	230.8	245.3
CV	0.563	0.776	0.608	0.784	0.885
Govt Rev/Exp	-9.2	26.6	-1.9	26.3	
Rice					
STD	100.3	109.4	104.7	112.1	130.3
X	302.2	315.2	306.0	315.9	325.7
CV	0.332	0.347	0.342	0.355	0.402
Govt Rev/Exp	30.8	43.8	34.6	44.5	
Sorghum					
STD	21.8	20.7	22.1	21.3	25.1
X	120.3	122.3	120.9	122.2	123.9
CV	0.181	0.169	0.183	0.174	0.203
Govt Rev/Exp	17.1	19.1	17.7	18.9	
Soybean Meal					
STD	72.1	77.8	73.6	79.0	89.0
X	203.6	210.9	205.7	211.7	217.1
CV	0.354	0.369	0.358	0.373	0.407
Govt Rev/Exp	12.3	16.5	13.5	16.6	
Soybean Oil					
STD	185.2	195.9	190.5	199.0	222.3
X	506.4	523.8	510.8	523.8	529.2
CV	0.366	0.374	0.373	0.380	0.416
Govt Rev/Exp	65.3	82.8	69.8	82.8	
Palm Oil					
STD	181.6	186.9	185.1	189.9	210.7
X	474.1	489.2	477.1	488.2	490.0
CV	0.383	0.382	0.388	0.389	0.430
Govt Rev/Exp	65.8	80.9	68.7	79.9	

All prices measured in current $/MT and include a 20% tariff.
Based on monthly data January 1965-February 1990.
Ban set by throwing out 18 and 24 months of extreme prices from a series of previous 60 monthly price.

The results for maize showed that the stabilization effect as measured by the CV and standard deviation was very small. The mean price also changed very little with each scheme although, as expected, the mean price was higher for the without-subsidy cases than the with-subsidy cases for the following reason. When the world price was greater than the upper band by more than the basic tariff rate, the world price was allowed to become the internal price (i.e., imports enter at zero tariff). Given that the means were different, the standard deviations cannot be compared directly. Moreover, the CVs tend to give misleading representations of risk exposure. As a result, in both settings of the scheme (i.e., with 18 and 24 observations removed), the CV fell in the without-subsidy cases, although the internal prices for the without-subsidy cases were more variable. The impact of widening the band by removing 18 observations instead of 24 was very small, with the CV increasing from 0.319 to 0.321 (less than 1%) in the with-subsidy case and from 0.312 to 0.317 (less than 2%) in the without-subsidy case. The stabilization schemes did not differ widely in terms of government revenue, and range between $15.70/ton (24 months removed with-subsidies) to $17.50/ton (24 months removed without-subsidies). In the case of wheat the risk reduction provided by the schemes was slightly larger than in the case of maize, but still was quite small. The reduction in the CV between the world price series and the internal prices under the schemes analyzed ranged from 3%-6% below. The mean prices increased between 2%-3% for the with- and without-subsidy cases. As a result of the higher means, there was the anomalous result that the without-subsidy scenarios gave CVs lower than the with-subsidy scenarios, although the risk exposure to fluctuating prices was greater in the without-subsidy scenarios. Average government revenues per ton ranged from $17.88/ton (24 months removed with-subsidy case) to $22.20/ton (18 months removed without-subsidy case).

The results for soybeans were similar to wheat and maize. The mean prices for each scheme were slightly below the mean of the world price. The reduction in the CVs for the schemes compared to the world price ranged from about 2.5% below (18 months removed without subsidies) to 5% below (24 months removed without subsidies). The impact of widening the band by removing 18 observations instead of 24 was negligible in terms of the CV, which increased from 0.348 to 0.350 in the with-subsidy case and from 0.341 to 0.345 in the without-subsidy case.

The effects of the stabilization schemes for sugar were the most dramatic of all the commodities analyzed. This reflected the high degree of volatility in the sugar market during the period of study. For the with-subsidy cases, the mean domestic price fell by about 20%, while the CV fell to 0.563 (compared to a world price CV of 0.885) when 24 months were removed, while the mean fell about 17.5% and the CV fell to 0.608 when 18 months were removed. Therefore, stability of internal prices would be increased by 36% and 31%, respectively. For the without-subsidy cases, the mean price fell about 5% below the world price, while the fluctuations of internal prices under the schemes were about 12% and 11% below world price levels when 24 and 18 price observations were removed, respectively. The effect on government revenues was quite varied across the various schemes analyzed. In the without-subsidy cases government revenues were between $26/ton and $27/ton.

However, when the Government paid subsidies, average government revenues were negative, despite a basic tariff of 20%. Average subsidy payments of $9.20/ton and $1.90/ton were required,

respectively, in the cases where 24 and 18 months of prices were removed. This finding showed that in the case of sugar the band setting was an important issue, whereas for other commodities, the size of the band in terms of risk reduction and government revenues appeared to be of little consequence.

The impact of introducing these price stabilization schemes on the rice market was larger than other commodities with the exception of sugar. Again this reflected the volatility of rice prices over the period of study. The mean domestic price was lower than the world price for all the schemes analyzed, and dropped as much as 7% in the case with 24 months removed with subsidies. In contrast to the other grains analyzed, the CV was substantially lower for the with-subsidy cases, falling 17.4% and 14.9% below the CV of the world price when 24 and 18 months were removed from the price series, respectively. Widening the band increased the CV from 0.332 to 0.342 in the with-subsidy case and from 0.347 to 0.355 in the without-subsidy case. Reflecting the reduction in the CVs, the government revenues were considerably larger in the without-subsidy cases (22% greater with 18 months removed and 30% greater with 24 months removed). The world price of sorghum was fairly stable with a CV of only 0.203. The variability of domestic prices was reduced moderately by the stabilization schemes analyzed, reducing the CV to 0.169, when 24 months were removed and subsidies excluded.

In the case of soybean meal the mean price fell with each of the schemes analyzed, to as much as 7% below in the case of 24 months removed with subsidies. The CV for the world price was 13% above the scheme with 24 months removed with subsidies, and 12% above the scheme with 18 months removed with subsidies. The CVs for schemes without subsidy payments were larger than their with-subsidy counterparts, although the difference was about 4% in both cases. When government subsidies were included, average revenues were $12.30/ton and $13.50/ton when 24 and 18 prices were removed, respectively and about $16.50/ton for both schemes without subsidy payments.

For soybean oil the mean price fell under each of the schemes compared to the world price, by a maximum of 4% lower in the scenario with 24 prices removed with subsidies. In the cases where government subsidies were included, the CV fell to 0.366 when 24 months were removed and to 0.373 when 18 months were removed, compared to a CV for the world price of 0.416. The corresponding CVs in the without-subsidy cases were 0.374 and 0.380, respectively. As with other commodities, the impact of widening the band by reducing the number of observations removed was very small.

Finally, when applied to palm oil the various schemes did not give large differences between the CVs. The CV for the world price was 0.43 and for the stabilization schemes ranged from 0.382 (24 months removed, without subsidies) to 0.389 (18 months removed, without subsidies). Larger differences were found in terms of the government revenues under each of the schemes analyzed. For example, in the case where 24 monthly prices were removed, the average government revenues increased from $65.80/ton to $80.90/ton between the with- and without-subsidy scenarios. With 18 monthly prices removed the difference was less, increasing from $68.70/ton to $79.90/ton for the with- and without-subsidy cases.

In Table A1.d the results for the various commodities and stabilization schemes for Price Band Scheme A are repeated for prices denominated in constant dollars. With constant prices there was no systematic downward bias in the mean prices. In this respect a more accurate picture of the level of risk reduction under each of the schemes was obtained from the standard deviation and CV.

In the case of maize the real mean price was slightly higher for the stabilization schemes than for the world price, although the difference was very slight. However, in contrast to the results using current prices, the reduction in the CV for the various schemes was relatively large. The CV of the world price was 0.283, while for the case of 24 monthly price observations removed and with-subsidies, it was 0.214, a decline of almost 25%. Also, with 24 monthly prices removed, the CV increased from 0.214 to 0.220 for the with- and without-subsidy scenarios, and increased from 0.227 to 0.233 for the with- and without-subsidy scenarios, in the case where 18 monthly observation were removed. Also, as the bands were widened by removing 18 observations instead of 24, the CV of the internal price increased, from 0.214 to 0.227 in the with-subsidy case, and from 0.22 to 0.233 in the without-subsidy case. Therefore, when constant prices were used the relative reduction in price variability associated with each of the schemes was captured by differences in the CVs. The impact on government revenues was small, ranging from $31.80/ton (18 observations removed, with subsidies) to $33.70/ton (24 observations removed, without subsidies).

In the case of wheat, the mean world price of $224.80/ton was between the mean price for the stabilization schemes with- and without subsidies. This reflected the fact that by deflating the price data there was no systematic bias of the stabilized prices. In contrast to the analysis based on current prices, the CVs of the stabilized prices were substantially lower than the CV of the world price. The largest decline in CV was for the scenario with 24 observations removed and subsidies included where the CV of 0.194 was 38% below the world price CV of 0.314. Including subsidies increased the CV significantly, from 0.194 to 0.237 when 24 observations were removed, and from 0.213 to 0.251 when 18 observations were removed. The impact of excluding subsidy payments was to increase government revenues by about $5/ton for both scenarios analyzed.

When applied to constant soybean prices the stabilization schemes caused the CVs to fall significantly. For example, the CV for the tightest band (24 observations removed, with-subsidies) fell by about one-third compared to the CV of the world price, while for the least constraining scheme (18 observation removed, without subsidies) the CV fell almost 17% below the world price level. The impact on government revenue was almost identical in both cases. For the with-subsidy case, Government revenue amounted to about $60/ton, and to $69/ton without subsidy payments.

Table A1.d. Comparison of Alternative Stabilization Policies in Venezuela. Price Band Scheme A.

Commodity	24 months removed with subsidies	24 months removed without subsidies	18 months removed with subsidies	18 months removed without subsidies	World Price
Maize					
STD	39.2	40.5	41.4	42.7	51.1
X	183.1	184.2	182.3	183.2	180.7
CV	0.214	0.220	0.227	0.233	0.283
Govt Rev/Exp	32.6	33.7	31.8	32.6	
Wheat					
STD	43.0	53.7	47.1	56.5	70.6
X	221.7	226.7	221.1	225.3	224.8
CV	0.194	0.237	0.213	0.251	0.314
Govt Rev/Exp	34.3	39.3	33.7	37.8	
Soybeans					
STD	85.2	103.8	91.0	107.7	129.3
X	405.6	415.2	406.1	414.3	414.5
CV	0.210	0.25	0.224	0.260	0.312
Govt Rev/Exp	60.1	69.8	60.6	68.9	
Sugar					
STD	177.0	282.1	198.0	284.5	343.9
X	327.7	371.2	334.5	368.5	381.3
CV	0.540	0.760	0.592	0.772	0.902
Govt Rev/Exp	9.9	53.4	16.7	50.7	
Rice					
STD	151.6	188.8	164.2	194.1	235.5
X	517.2	536.3	519.7	534.7	539.0
CV	0.293	0.352	0.316	0.363	0.437
Govt Rev/Exp	68.0	87.1	70.6	85.5	
Sorghum					
STD	42.2	43.7	44.5	45.4	54.4
X	168.5	169.5	167.5	168.1	166.1
CV	0.250	0.258	0.266	0.270	0.327
Govt Rev/Exp	30.0	31.0	29.0	29.7	
Soybean Meal					
STD	62.3	108.5	68.7	111.0	138.3
X	329.4	342.4	330.1	341.6	343.3
CV	0.189	0.317	0.208	0.325	0.403
Govt Rev/Exp	43.3	56.3	44.0	55.5	
Soybean Oil					
STD	226.9	264.8	246.1	272.2	336.7
X	840.2	859.6	840.1	853.4	852.3
CV	0.270	0.308	0.293	0.319	0.395
Govt Rev/Exp	129.9	149.3	129.8	143.1	
Palm Oil					
STD	196.6	222.0	212.6	229.7	287.8
X	780.2	795.6	778.7	789.2	784.3
CV	0.252	0.279	0.273	0.291	0.367
Govt Rev/Exp	126.6	142.1	125.1	135.6	

All prices measured in constant $/MT and include a 20% tariff.
Based on monthly data January 1965-February 1990.
Ban set by throwing out 18 and 24 months of extreme prices from a series of previous 60 monthly price.

Based on current prices, the impact of the stabilization scheme on sugar prices was the greatest of all the commodities analyzed. Even with deflated prices, the mean internal prices under the stabilization schemes were substantially different from the world price, especially for the scenarios where subsidies were made. For example, the mean price fell 14% under the most constraining of the schemes (24 observations removed, with subsidies) compared to the mean of the world price. The CVs for all of the schemes analyzed were below the CV of the world price by a considerable amount, ranging from 14% to 40% below. The differences in the CV between the with- and without-subsidy cases were also considerable, increasing from 0.54 to 0.76 when 24 observations were removed, and increasing from 0.592 to 0.772 when 18 observations were removed. Government revenues were also found to be small for the with-subsidy scenarios, reflecting the high price levels existing for long periods for sugar. In contrast to the analysis based on current prices, the government revenues were positive for all scenarios analyzed.

The same pattern of results found for sugar were obtained for rice. The mean prices were lower for all schemes analyzed, especially in the with-subsidy cases. The CV dropped 33% and 28% in the cases with 24 and 18 observations removed, respectively. The inclusion of subsidies increased the CV by almost 12% and 17% for the two band widths analyzed. The difference in government revenue for the with- and without-subsidy cases was substantial for both settings of the bands.

For the remaining commodities analyzed (soybean meal, soybean oil and palm oil), a similar pattern of results was obtained. The mean prices for each of the schemes were not systematically above or below the mean of the world prices. The CVs were considerably less than the CV of the world price, especially in the tightest setting of the band (24 observations removed, with subsidies). In the case of soybean meal the CV under this scheme was more than half the CV of the world price.

A2.2 Price Band Scheme B

In price band scheme B the bands were set at a given percentage above and below a reference price. The reference price was set at a 5-year moving average of past prices and band widths of 20% and 30% around this price were analyzed. Schemes with and without subsidy payments were analyzed with both current and constant prices. In Table A1.e the results for current prices are reported.

The results for maize were similar to those reported for price band scheme A. That is, the measurement of risk reduction given by the CV provided anomalous results, with the CV of the unstabilized world price lower than the CVs for all the stabilization schemes. This was because the mean stabilized prices were approximately 15% below the mean of the world price, giving a lower CV for a similar standard deviation for the schemes analyzed. For both band widths, the without-subsidy scenarios resulted in a CV lower than the with-subsidy cases, also due to a higher mean price in both cases.

Table A1.e. Comparison of Alternative Stabilization Policies in Venezuela. Price Band Scheme B.

Commodity	+/- 20 percent with subsidies	+/- 20 percent without subsidies	+/- 30 percent with subsidies	+/- 30 percent without subsidies	World Price
Maize					
STD	34.9	35.1	35.9	36.1	36.0
X	108.7	110.7	109.4	110.7	129.8
CV	0.321	0.317	0.328	0.326	0.320
Govt Rev/Exp	15.1	16.9	15.7	17.0	
Wheat					
STD	49.0	49.9	50.7	51.8	54.4
X	135.0	139.0	136.7	139.9	143.2
CV	0.363	0.359	0.371	0.370	0.381
Govt Rev/Exp	15.7	19.6	17.4	20.6	
Soybeans					
STD	85.6	86.7	87.5	88.6	93.9
X	248.2	253.6	251.4	255.4	260.8
CV	0.345	0.342	0.348	0.347	0.359
Govt Rev/Exp	30.9	36.3	34.1	38.1	
Sugar					
STD	111.6	175.2	110.0	175.0	218.3
X	220.6	261.9	214.8	250.7	245.3
CV	0.506	0.669	0.512	0.698	0.885
Govt Rev/Exp	16.3	57.5	10.4	46.2	
Rice					
STD	95.5	107.3	102.2	113.0	130.3
X	303.3	316.5	304.3	314.8	325.7
CV	0.315	0.339	0.336	0.359	0.402
Govt Rev/Exp	31.9	45.1	32.9	43.5	
Sorghum					
STD	21.7	21.1	23.2	23.0	25.1
X	120.0	121.6	120.8	121.8	128.9
CV	0.181	0.173	0.192	0.189	0.203
Govt Rev/Exp	16.8	18.4	17.6	18.5	
Soybean Meal					
STD	72.6	78.5	75.2	80.7	89.0
X	206.2	211.7	208.3	212.8	217.1
CV	0.352	0.371	0.361	0.379	0.407
Govt Rev/Exp	25.3	30.8	27.4	31.9	
Soybean Oil					
STD	182.4	195.2	187.6	199.3	222.3
X	503.8	521.8	504.4	519.1	529.2
CV	0.362	0.374	0.372	0.384	0.416
Govt Rev/Exp	62.8	80.8	63.4	78.1	
Palm Oil					
STD	174.4	185.4	185.0	190.6	210.7
X	475.2	489.1	474.3	484.9	490.0
CV	0.367	0.379	0.390	0.393	0.430
Govt Rev/Exp	66.8	80.7	66.0	76.6	

All prices measured in current $/MT and include a 20% tariff.
Based on monthly data January 1965-February 1990.
Ban set at 20% and 30% above and below the 60-month moving average.

As the band widths were increased from 20% to 30%, the CV fell slightly between 2% and 3%. Government revenues amounted to $15.10/ton and $15.70/ton for the 20% and 30% band widths when no subsidy payments were made. Without subsidy payments, government revenues increased about 8% to about $17/ton. The nature of the results for wheat were similar to those for maize. The mean prices under all schemes fell -- by as much as 6% for the 20% band, with-subsidy case. The CVs of all schemes were below the CV of 0.381 recorded for the world price, and fell to 0.363 for the tightest scheme analyzed (+/- 20% band, with subsidies). Widening the price band from 20% to 30% increased the CV, but by only 2% to 3% as in the case of maize. The inclusion of subsidy payments increased government revenues significantly, by almost 25% for the 20% band and by 18% for the 30% band.

For soybeans, misleading results were found, with the CVs of the without-subsidy stabilization schemes lower than the with-subsidy scenarios. Again this resulted because the change to the mean price was greater than the change to the standard deviation. At most, the risk reduction in terms of the CV was less than 5% below the world price level. Government revenues were $30.90/ton with the price band set at 20% without subsidies and increased to $36.30/ton when subsidy payments were included. Consistent with all previous results, the most significant impact of the stabilization schemes was on sugar prices. The mean price dropped from $245.30/ton for the unstabilized price, to about $215/ton to $220/ton with subsidy payments. The impact of the bands was to reduce the CV by more than 40%, from 0.885 for the world price to 0.506 for the 20% band. In contrast to other commodities, the inclusion of subsidies made a substantial difference to the results. For example, with a 30% band, the CV increased from 0.512 to 0.698 with the removal of subsidy payments. This reflected the fact that the upper price band was a constraint on internal price for long periods during the study period. Reflecting this, government revenues were considerably lower for the with-subsidy scenarios, increasing from $16.30/ton to $57.50/ton in the 20% price band case, and from $10.40/ton to $46.20/ton for the 30% price band.

The results for rice showed a fairly large decline in the mean price, especially for the with-subsidy cases. A fall in the CV was reported for all schemes with the largest decline for the 20% band with-subsidy payments. This scheme gave a CV of 0.315, compared to the CV of the unstabilized world price of 0.402. Widening the band from 20% to 30% increased the CV by about 6% in both the with- and without-subsidy scenarios. Reflecting the fact that the upper band was a constraint of domestic prices for long periods, there was a substantial difference in government revenues reported between the with- and without-subsidy scenarios. For the 20% band, average government revenues increased from $31.90/ton to $45.10/ton, while for the 30% band, revenues increased from $32.90/ton to $43.50/ton.

The results for sorghum showed that the world price was relatively stable compared to other commodities with a CV of only 0.203. The largest decline in CV was reported for the scenario with the 20% band, with-out subsidies. The effect of the stabilization schemes on the price of soybean meal was to reduce the mean prices below the mean of the world price, although the greatest decline was only 5% in the case of bands set at 20% with subsidy payments. The CVs were all below the CV of the world price, and as expected, increased when the bands were widened from 20% to 30%, as well as when subsidy payments were excluded.

Similar results were obtained for soybean oil and palm oil as were obtained for soybean meal. That is, the schemes lowered the mean prices as well as the CVs. The greatest reduction in CV was reported for the scheme involving a 20% price band, with subsidy payments. The widening of the band from 20% to 30% increased the CV but generally the increase was small and by less than 5% in most cases. The exclusion of subsidy payments also increased the CV in all cases, but by less than 5% as well.

The results for commodity prices denominated in constant prices are reported in Table A1.f. As was the case for the price band scheme A, the effectiveness of the stabilization schemes was greatly increased in terms of risk reduction as measured by the CV when prices were denominated in constant dollars. For example, for maize, the CV for constant world prices was 0.283, while for the 20% band with-subsidy scenario a CV of 0.227 was reported. This was a reduction in CV of almost 20%, compared to a small increase in the corresponding CVs denominated in current prices. The inclusion of subsidies increased the CVs, but the increase was slight in both cases. Widening the band had a large impact on the size of the CV compared to current price results -- increasing from 0.227 to 0.253 for the with-subsidy case, and from 0.232 to 0.254 in the without-subsidy case.

The nature of the results for wheat and soybeans were similar to those of maize. When denominated in constant dollars, the effect of stabilization schemes was substantial in terms of lowering the CV below world price levels. In the case of the tightest stabilization policy (20% band, with subsidies) the CV declined from 0.314 to 0.211 in the case of wheat, and from 0.312 to 0.226 in the case of soybeans.

Consistent with the results reported for other stabilization schemes, the most significant risk reductions were found for sugar and rice. In the case of sugar, the mean world price was quite different from the mean prices of each of the schemes, with the mean world price above the mean price of both schemes w.. subsidies and below the mean price for both schemes without subsidies. The CV for the world price was 0.902. For the 20% band with-subsidy case, the CV more than halved to 0.447 and dropped to 0.458 for the 30% band with-subsidy scenario. The CVs for both band widths increased by a little more than 40% when subsidy payments were excluded. Similar results were obtained for rice, with the CV of the unstabilized world price of 0.437 falling to between 0.278 and 0.366 for the various schemes analyzed.

Applying each of the schemes to the price of sorghum lowered the CV in all cases. The largest decline in CV was for the 20% band with subsidy payments, which was found to be 0.276. The results for soybean meal, soybean oil and palm oil showed that the stabilization schemes reduced the variability of prices substantially below the unstabilized world price. The impact of widening the band from 20% to 30% caused the CV to increase significantly. Also the CV was increased substantially when subsidy payments were not included, especially in the case of soybean meal.

Table A1.f. Comparison of Alternative Stabilization Policies in Venezuela. Price Band Scheme B.

Commodity	+/- 20 percent with subsidies	+/- 20 percent without subsidies	+/- 30 percent with subsidies	+/- 30 percent without subsidies	World Price
Maize					
STD	40.9	41.9	45.4	45.6	51.1
X	180.1	180.7	179.3	179.4	180.7
CV	0.227	0.232	0.253	0.254	0.283
Govt Rev/Exp	29.6	30.1	28.7	28.9	
Wheat					
STD	46.3	56.6	49.6	58.4	70.6
X	219.5	223.7	218.7	221.9	224.8
CV	0.211	0.253	0.227	0.263	0.314
Govt Rev/Exp	32.0	36.3	31.2	34.5	
Soybeans					
STD	91.6	107.2	99.9	113.0	129.3
X	405.5	411.5	404.6	409.3	414.5
CV	0.226	0.261	0.247	0.276	0.312
Govt Rev/Exp	60.0	66.0	59.1	63.9	
Sugar					
STD	168.3	271.6	167.0	270.5	343.9
X	376.5	427.7	364.6	407.4	381.3
CV	0.447	0.635	0.458	0.664	0.902
Govt Rev/Exp	58.8	109.9	46.8	89.7	
Rice					
STD	148.4	183.6	165.3	194.8	235.5
X	533.7	550.2	519.7	532.3	539.0
CV	0.278	0.337	0.318	0.366	0.437
Govt Rev/Exp	84.5	101.1	70.6	83.2	
Sorghum					
STD	46.2	46.3	50.7	51.6	54.4
X	167.1	167.2	165.5	166.0	166.1
CV	0.276	0.277	0.306	0.311	0.327
Govt Rev/Exp	28.6	28.7	27.1	27.5	
Soybean Meal					
STD	72.7	111.9	78.4	114.6	138.3
X	333.4	342.8	330.6	338.7	343.3
CV	0.218	0.327	0.237	0.338	0.403
Govt Rev/Exp	47.3	56.7	44.5	52.6	
Soybean Oil					
STD	221.2	260.8	250.1	278.4	336.7
X	844	862.3	830.8	843.1	852.3
CV	0.262	0.302	0.301	0.330	0.239
Govt Rev/Exp	133.9	152.0	120.5	132.8	
Palm Oil					
STD	194.9	218.1	222.9	238.3	287.8
X	785.9	797.8	773.9	781.5	784.3
CV	0.248	0.273	0.288	0.305	0.367
Govt Rev/Exp	132.3	144.2	120.4	127.9	

All prices measured in constant $/MT and include a 20% tariff.
Based on monthly data January 1965-February 1990.
Ban set at 20% and 30% above and below the 60-month moving average.

A2.3. Price Band Scheme C

The third price band scheme analyzed was with bands set at a certain number of standard deviations (STD) above and below a reference price. Again the reference price was based on a five-year moving average of past monthly prices and these prices were used to calculate the standard deviation for each period. The results using current prices are reported in Table A1.g for band widths of 1 and 1.5 standard deviations around the reference price, and for cases with and without subsidies.

The overall results were very similar to those of the two price band schemes analyzed above. For example, the results for maize showed the smallest CV for the 1 STD without-subsidy case, which was 0.309, compared to the CV for the unstabilized world price of 0.32. However, there was very little difference between each of the schemes in terms of mean price, standard deviation and government revenues. For the price of wheat, all the schemes lowered the CV below the world price and by almost 8% for the 1 STD with-subsidy case. As in earlier results, the schemes gave different standard deviations and means, so that the CVs provided an unreliable measure of risk reduction, with the CVs of the schemes without subsidies below those of the with-subsidy cases. The same pattern occurred in the results for soybeans with means and standard deviations larger in the without-subsidy cases, and resulted in smaller CVs.

The stabilization schemes provided the greatest constraints on sugar prices compared to other commodities. The CV for the scheme 1 STD with subsidies lowered the CV by 30% below the CV for the unstabilized world price. Operating this scheme with a subsidy required average government expenditures of $5.80/ton (despite the basic tariff of 20%). The CV for the world price of rice was 0.402. The stabilization schemes lowered the CV as much as 20% to 0.321 in the 1 STD, with-subsidy case.

The impact of stabilizing the sorghum price with these schemes was small with little change in the standard deviations and means from the world price levels. The results for soybean meal, soybean oil and palm oil were consistent with the results of the two price band schemes previously analyzed. The results were also consistent with expectations in that the lowest CVs were reported for the most constraining schemes (1 STD with subsidies) and largest for the least constraining (1.5 STD without subsidies).

The results for commodity prices denominated in constant prices are reported in Table A1.h. As was the case for the stabilization schemes discussed earlier, the effectiveness of the stabilization schemes in terms of risk reduction were greater when prices were denominated in constant terms. The inclusion of subsidies increased the CVs, but the increase was slight in both cases. Widening the band had a significant impact on the size of the CV compared to current price results, increasing from 0.211 to 0.235 for the with-subsidy case and from 0.217 to 0.238 in the without-subsidy case.

Table A1.g. Comparison of Alternative Stabilization Policies in Venezuela. Price Band Scheme C 1/

	+/- 1 Std Dev with subsidies	+/- 1 Std Dev without subsidies	+/- 1.5 Std Dev with subsidies	+/- 1.5 Std Dev without subsidies	World Price
Maize					
STD	34.2	34.2	35.2	35.2	36.0
X	109.3	110.6	110.0	110.7	112.5
CV	0.313	0.309	0.320	0.318	0.320
Govt Rev/Exp	15.4	17.0	16.2	17.0	
Wheat					
STD	49.0	49.5	50.9	51.3	54.4
X	138.0	140.9	139.7	141.6	143.2
CV	0.355	0.351	0.364	0.362	0.381
Govt Rev/Exp	18.3	21.1	20.0	22.0	
Soybeans					
STD	85.2	86.5	88.0	88.6	93.9
X	250.6	254.4	253.5	256.1	260.8
CV	0.340	0.340	0.347	0.346	0.359
Govt Rev/Exp	33.1	36.9	36.0	38.6	
Sugar					
STD	123.7	180.7	140.0	184.0	218.3
X	199.2	228.2	207.7	227.5	245.3
CV	0.621	0.792	0.674	0.809	0.885
Govt Rev/Exp	-5.8	23.2	2.6	22.5	
Rice					
STD	98.0	107.9	106.2	113.2	130.3
X	305.4	315.6	306.9	313.5	325.7
CV	0.321	0.342	0.346	0.361	0.402
Govt Rev/Exp	33.7	43.9	35.2	41.9	
Sorghum					
STD	21.1	20.3	22.1	21.1	25.1
X	120.7	122.4	121.2	122.1	123.9
CV	0.175	0.166	0.182	0.173	0.203
Govt Rev/Exp	17.5	19.2	17.9	18.8	
Soybean Meal					
STD	73.1	78.9	75.5	80.5	89.0
X	207.8	212.8	210.2	214.2	217.1
CV	0.352	0.371	0.359	0.376	0.407
Govt Rev/Exp	26.7	31.7	29.0	33.1	
Soybean Oil					
STD	184.5	195.4	191.4	200.3	222.3
X	511.1	525.4	511.9	521.5	529.2
CV	0.361	0.372	0.374	0.384	0.416
Govt Rev/Exp	70.2	84.5	71.0	80.6	
Palm Oil					
STD	180.2	186.9	187.8	193.9	210.7
X	476.6	488.0	477.0	484.8	490.0
CV	0.378	0.383	0.393	0.400	0.430
Govt Rev/Exp	69.2	80.5	70.4	77.4	

All prices measured in current $/MT and include a 20% tariff.
Based on monthly data January 1965-February 1990.
1/ Ban set at 1 and 1.5 standard deviations above and below the 60-month moving average.

Table A1.h. Comparison of Alternative Stabilization Policies in Venezuela. Price Band Scheme C 1/

Commodity	+/- 1 Std Dev with subsidies	+/- 1 Std Dev without subsidies	+/- 1.5 std Dev with subsidies	+/- 1.5 Std Dev without subsidies	World Price
Maize					
STD	38.6	39.8	42.5	43.1	51.1
X	182.7	183.6	180.7	181.1	180.7
CV	0.211	0.217	0.235	0.238	0.283
Govt Rev/Exp	32.5	33.4	30.5	30.9	
Wheat					
STD	45.8	54.8	51.8	58.7	70.6
X	223.4	227.2	221.2	227.0	224.8
CV	0.205	0.241	0.234	0.262	0.314
Govt Rev/Exp	36.2	40.0	34.0	36.8	
Soybeans					
STD	91.9	106.5	99.9	113.1	129.3
X	410.2	416.2	406.5	411.4	414.5
CV	0.224	0.256	0.248	0.275	0.312
Govt Rev/Exp	65.6	71.6	61.9	66.8	
Sugar					
STD	192.7	283.0	220.9	289.5	343.9
X	323.4	359.6	330.2	354.8	381.3
CV	0.596	0.787	0.669	0.816	0.902
Govt Rev/Exp	58.8	42.3	12.9	37.5	
Rice					
STD	157.2	187.3	176.7	198.7	235.5
X	523.9	538.2	520.2	530.0	539.0
CV	0.300	0.348	0.340	0.375	0.437
Govt Rev/Exp	75.8	90.1	72.1	81.9	
Sorghum					
STD	42.2	43.4	45.3	45.7	54.4
X	169.5	170.2	166.5	166.7	166.2
CV	0.249	0.255	0.272	0.274	0.327
Govt Rev/Exp	31.0	31.8	28.0	28.2	
Soybean Meal					
STD	73.5	111.2	79.5	113.2	138.3
X	333.9	343.1	332.3	340.1	343.3
CV	0.220	0.324	0.239	0.333	0.403
Govt Rev/Exp	48.4	57.6	46.9	54.7	
Soybean Oil					
STD	227.3	260.8	259.2	278.8	336.7
X	845.1	860.7	836.9	845.6	852.3
CV	0.269	0.303	0.310	0.330	0.399
Govt Rev/Exp	137.0	152.6	128.8	137.5	
Palm Oil					
STD	203.8	223.2	228.6	239.6	287.8
X	783.7	794.2	775.9	781.5	784.3
CV	0.260	0.281	0.295	0.307	0.367
Govt Rev/Exp	132.8	143.3	125.0	130.7	

All prices measured in constant $/MT and include a 20% tariff.
Based on monthly data January 1965-February 1990.
1/ Ban set at 1 and 1.5 standard deviations above and below the 60-month moving average.

The nature of the results for wheat and soybeans were similar to those of maize. When denominated in constant dollars, the effect of the stabilization schemes was substantial in terms of lowering the CV from the world price levels. In the case of the tightest stabilization scheme (1 STD band, with subsidies) the CV fell from 0.314 to 0.205 in the case of wheat, and from 0.312 to 0.224 in the case of soybeans.

Consistent with the results reported for other stabilization schemes, the most significant risk reductions from the schemes were for sugar and rice. In the case of sugar, the mean world price was significantly above the mean price under each of the schemes. For the 1 STD band with-subsidy case, the CV fell to 0.596, and to 0.669 for the 1.5 STD band with-subsidy case. Similar results were obtained for rice, with a CV of the unstabilized world price of 0.437 falling to between 0.3 and 0.375 for the various scenes analyzed. The CVs for sorghum fell with the stabilization schemes to 0.249 for the 1 STD band with subsidies, compared to the CV of the world price of 0.327. The results for soybean meal, soybean oil and palm oil showed that the stabilization scheme reduced the variability of prices substantially below the unstabilized world price. The impact of widening the band from 1 STD to 1.5 STD caused the CV to increase significantly. Also consistent with earlier results was the substantial increase in the CV when subsidy payments were not included, especially in the case of soybean meal.

A2.4. Effectiveness of the Price Band Schemes

To gauge the effectiveness of the price band schemes the proportion of the total number of observations where domestic prices were constrained to be different from international prices are reported in Table A2. The proportion of observations at the lower and upper band levels are given, as well as the proportion of times subsidy payments were required to maintain the upper band. For example, when price band scheme A1[10] was applied to nominal maize prices, 48.7% of the domestic prices were inside the price band and therefore equal to the international prices. Domestic prices were constrained to be at the lower band 19.7% of the time, and domestic prices were constrained from being higher than the upper band level in 31.6% of the observations. The government was required to subsidize imports 10.3% of the time in order to maintain the upper

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[10] The schemes are the following:

A1 - 24 of the largest and smallest observations removed from a series of the past 5 years of monthly prices and the range of the remaining observations providing the upper and lower band levels.

A2 - 18 of the largest and smallest observations removed from a series of the past 5 years of monthly prices and the range of the remaining observations providing the upper and lower band levels.

B1 - Bands set at +/- 20% above and below a reference price. Reference price equal to the 5 year moving average of past monthly prices.

B2 - Bands set at +/- 30% above and below a reference price. Reference price equal to the 5 year moving average of past monthly prices.

C1 - Bands set at +/- 1 standard deviation above and below a reference price. Reference price equal to the 5 year moving average of past monthly prices.

C2 -Bands set at +/- 1.5 standard deviations above and below a reference price. Reference price equal to the 5 year moving average of past monthly prices.

band level.

Comparing the different schemes when applied to maize, wheat and soybean prices, the most constraining schemes were with bands set at 1 standard deviation around the reference price with the domestic price equal to the international price only 44.3%, 41.7% and 43.7% of the time, respectively. The scheme which put the least constraints on domestic prices was the scheme B2 (bands set +/- 30% around the reference price). For maize, wheat and soybeans, employing this scheme meant that domestic prices were equal to the international price over 80% of the time (i.e., only 1 in every 5 periods was the domestic price different from the world price). With prices denominated in nominal terms, the domestic price was constrained more often by the upper band, reflecting increasing nominal prices throughout the analysis period. In contrast, with price denominated in real terms, the lower band provided a constraint on domestic prices more often. This reflected declining real commodity prices over the study period. Widening the price band increased the proportion of observations within the price band; increasing the proportion by between 10% to 15% in the case of nominal prices and between 7% to 20% for real prices.

The volatility of sugar prices is clearly reflected in Table A2. For example, for price band scheme B1, measured in both nominal and real terms, only 13% to 14% of the domestic prices were equal to the international price, with about 38% to 40% of domestic prices constrained by the upper band and between 45% and 50% at the lower band. For all schemes analyzed in nominal terms, Government subsidy payments were required often, ranging from about 18% to 33% of the time. As with other commodities, the upper band level constrained prices more frequently and subsidies were paid more often when the schemes were denominated in nominal terms.

The price band scheme C1 constrained the domestic price of rice by more than other schemes analyzed, with domestic price equal to the international price a little over one-third of the time when prices were denominated in nominal dollars. Increasing the band widths had a large impact on domestic prices as revealed by comparing the results for schemes B1 and B2, and for C1 and C2. For example, increasing the band widths from +/- 20% to +/- 30% increased the percentage of the time the domestic price was equal to the international price from 38.3% to 70.3%, and widening the price band from 1 standard deviation to 1.5 standard deviations increased the percentage from 34.1% to 58.6%. In contrast to other commodities, there was not a large difference in the number of times the upper and lower bands placed constraints on domestic prices.

The results for other commodities reported in Table A2 followed a similar pattern. For sorghum, soybean meal, soybean oil and palm oil, the most constraining of the schemes was C1 when denominated in current dollars, with prices inside the band about 45% to 50% of the time. The least constraints on domestic prices were imposed by scheme B2 with domestic prices equal to international prices ranging from 73% of the time for sorghum to 85% of the time for soybean meal.

Table A.2. Percentage of Price Observations at the Upper and Lower Bands for Various Price Band Schemes 1/.

Commodity	Scheme	At Lower Band	Inside Band	At Upper Band 2/	Subsidies
				---------- (Percent) ----------	
Maize					
	A1-Current	19.7	48.7	31.6	10.3
	A1-Constant	38.0	47.7	14.3	3.3
	A2-Current	16.0	58.3	25.7	8.0
	A2-Constant	32.7	54.7	12.7	3.3
	B1-Current	8.3	71.3	20.3	9.0
	B1-Constant	20.3	71.7	8.0	4.3
	B2-Current	4.3	83.0	12.7	6.7
	B2-Constant	6.7	87.0	6.3	1.0
	C1-Current	21.9	44.3	33.8	9.3
	C1-Constant	42.7	41.1	16.2	4.3
	C2-Current	13.9	59.9	26.2	6.6
	C2-Constant	26.8	61.6	11.6	2.0
Wheat					
	A1-Current	21.3	55.3	23.3	8.7
	A1-Constant	41.3	45.7	13.0	6.3
	A2-Current	17.7	61.7	20.7	7.0
	A2-Constant	33.3	55.3	11.3	5.7
	B1-Current	8.7	64.7	26.7	10.3
	B1-Constant	19.0	70.0	11.0	5.7
	B2-Current	2.7	81.3	16.0	8.7
	B2-Constant	6.3	84.7	9.0	3.3
	C1-Current	27.5	41.7	30.8	9.3
	C1-Constant	45.4	40.0	14.6	5.3
	C2-Current	14.9	64.6	20.5	6.3
	C2-Constant	28.1	62.3	9.6	3.6
Soybeans					
	A1-Current	24.3	40.0	35.7	8.3
	A1-Constant	38.3	42.0	19.7	5.3
	A2-Current	19.7	49.3	31.0	5.0
	A2-Constant	34.7	49.7	15.7	3.7
	B1-Current	3.3	75.3	21.3	8.7
	B1-Constant	18.3	70.7	11.0	3.0
	B2-Current	0.0	88.3	11.7	7.0
	B2-Constant	2.3	90.3	7.3	2.7
	C1-Current	19.5	43.7	36.8	6.6
	C1-Constant	24.8	58.0	17.2	3.3
	C2-Current	8.6	65.6	25.8	3.3
	C2-Constant	22.5	67.2	10.3	2.9

1/ Based on monthly data January 1965-February 1990.
2/ Includes subsidy.

Table A.2. continued. Percentage of Price Observations at the Upper and Lower Bands for Various Price Band Schemes 1/.

Commodity	Scheme	At Lower Band	Inside Band	At Upper Band 2/	Subsidies
				---------- (Percent) ----------	
Sugar					
	A1-Current	26.7	34.0	39.3	28.3
	A1-Constant	35.0	28.0	37.0	23.3
	A2-Current	24.0	40.3	35.7	21.1
	A2-Constant	32.3	35.3	32.3	16.0
	B1-Current	45.7	13.7	40.7	33.0
	B1-Constant	49.3	13.0	37.7	29.0
	B2-Current	42.7	18.7	38.7	26.7
	B2-Constant	45.0	20.0	35.0	22.0
	C1-Current	16.9	45.0	38.1	29.1
	C1-Constant	25.8	38.1	36.1	24.2
	C2-Current	0.0	67.9	32.1	18.5
	C2-Constant	0.0	72.2	27.8	12.6
Rice					
	A1 Current	28.0	39.0	33.0	12.3
	A1-Constant	34.7	41.3	24.0	9.0
	A2-Current	26.0	44.3	29.7	9.7
	A2-Constant	31.3	47.3	21.3	7.0
	B1-Current	29.7	38.3	32.0	13.0
	B1-Constant	40.7	41.7	17.7	7.7
	B2-Current	8.3	70.3	21.3	8.0
	B2-Constant	26.7	62.3	11.0	5.7
	C1-Current	30.8	34.1	35.1	14.2
	C1-Constant	35.1	39.1	25.8	8.6
	C2-Current	10.6	58.6	30.8	8.6
	C2-Constant	18.2	62.6	19.2	6.3
Sorghum					
	A1-Current	20.7	47.1	32.2	13.9
	A1-Constant	44.2	43.3	12.5	5.3
	A2-Current	16.8	59.2	24.0	12.5
	A2-Constant	38.0	50.9	11.1	4.3
	B1-Current	12.5	61.5	26.0	9.1
	B1-Constant	29.8	61.5	8.7	1.9
	B2-Current	6.7	72.6	20.7	7.2
	B2-Constant	9.6	83.2	7.2	0.0
	C1-Current	22.1	46.2	31.7	12.5
	C1-Constant	47.6	40.4	12.0	5.3
	C2-Current	13.9	63.9	22.2	9.6
	C2-Constant	31.2	57.7	11.1	2.9

1/ Based on monthly data January 1965-February 1990.
2/ Includes subsidy.

Table A.2. continued. Percentage of Price Observations at the Upper and Lower Bands for Various Price Band Schemes 1/.

Commodity	Scheme	At Lower Band	Inside Band	At Upper Band 2/	Subsidies
		---------- (Percent) ----------			
Soybean Meal					
	A1-Current	13.3	48.0	36.7	8.0
	A1-Constant	26.0	57.0	17.0	6.0
	A2-Current	11.3	55.0	33.7	7.7
	A2-Constant	24.3	60.7	15.0	4.0
	B1-Current	5.3	72.7	22.0	7.3
	B1-Constant	22.7	67.7	9.7	3.7
	B2-Current	2.3	85.3	12.3	4.7
	B2-Constant	7.7	85.3	7.0	3.0
	C1-Current	13.9	49.0	37.1	7.6
	C1-Constant	24.8	58.0	17.2	4.8
	C2-Current	9.9	67.9	22.2	4.3
	C2-Constant	19.2	70.2	10.6	3.3
Soybean Oil					
	A1-Current	22.7	52.0	25.3	22.0
	A1-Constant	32.7	52.3	15.0	6.7
	A2-Current	20.7	57.7	21.7	7.7
	A2-Constant	27.7	60.0	12.3	6.3
	B1-Current	20.0	56.7	23.3	9.0
	B1-Constant	34.0	52.7	13.3	6.7
	B2-Current	8.0	77.0	15.0	7.0
	B2-Constant	20.7	71.0	8.3	5.7
	C1-Current	25.1	50.7	24.2	8.9
	C1-Constant	34.8	49.0	16.2	6.6
	C2-Current	17.9	64.9	17.2	7.0
	C2-Constant	23.8	64.9	11.3	5.3
Palm Oil					
	A1-Current	21.7	52.0	26.3	11.0
	A1-Constant	31.3	52.7	16.0	8.3
	A2-Current	18.0	58.3	23.7	10.3
	A2-Constant	26.0	60.3	13.7	7.0
	B1-Current	19.7	55.3	25.0	9.3
	B1-Constant	33.7	54.3	12.0	6.0
	B2-Current	11.7	75.7	12.7	7.3
	B2-Constant	18.0	74.0	8.0	4.7
	C1-Current	22.5	50.7	26.8	9.3
	C1-Constant	30.5	55.0	14.5	6.9
	C2-Current	16.2	60.6	17.2	7.6
	C2-Constant	21.8	67.2	11.0	3.3

1/ Based on monthly data January 1965-February 1990.
2/ Includes subsidy.

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