Stabilizing Rice Prices in the Philippines

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This paper proposes the stabilization of rice prices in the Philippines around a target price using rice imports. While commodity price stabilization schemes in the world are normally supported with publicly held buffer stocks that are locally procured, this scheme uses rice imports. Accordingly, the rice price stabilization program in the Philippines becomes potentially more cost-effective. We discuss the analytical structure of the price stabilization scheme and demonstrate the do-ability of the proposed rice price stabilization scheme in the subsequent sections.

Rice Price Instability in the Philippines

The government has pursued a self-sufficient policy in rice, allowing the National Food Authority (NFA) to import rice only as a last resort. Under this regime, rice prices tend to fluctuate more than if rice imports by private traders at fixed and reasonable customs duties were allowed. It will only be in 2005 that the government will implement its rice tariffication commitment to the WTO. But even then, Philippine lawmakers are likely to set a prohibitively high rice import tariff and allow minimum access volumes for rice to relieve the country of shortages. The

post-tariffication rice import regime, therefore, is likely to emulate the current one. Thus, rice price instability is expected to endure.

Rice prices are observed to follow a random path through time, responding to the changes in key fundamentals mostly affecting the supply of rice. Normally, these price fluctuations do not create economic and political problems for society. But to ensure that, the Philippine government maintains rice buffer stocks to keep price fluctuations within an acceptable range. Since the 1970s, the NFA has maintained warehouses in strategic places, bought rice during the main harvest, and released rice stocks during the lean third quarter of the year.

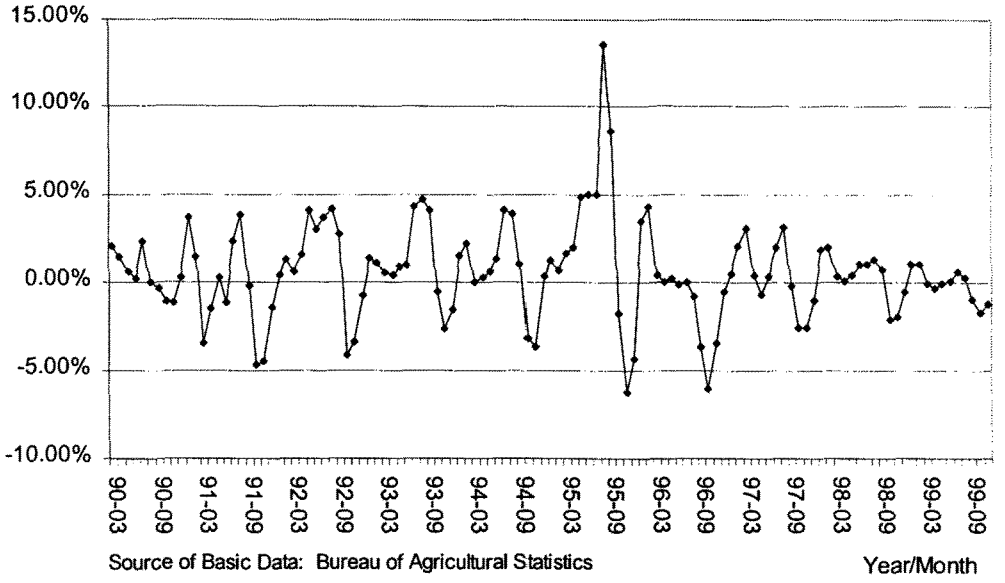
One needs to consider both the intra-year and inter-year variations of rice prices. The former refers to variations which are seasonal in nature while the latter set of variations captures the random occurrences of abnormal shocks to the rice economy including occurrences of drought, other natural calamities affecting rice production and policy shocks. Intra-year variations tend to be predictable unlike inter-year variations. (Islam and Thomas, 1993)

One measure of intra-year price instability is the percentage deviation of monthly wholesale prices from their 3-month moving average. Figure 1 illustrates this measure for rice prices in the Philippines. The peaks approaching five percent are roughly spaced a year apart to reflect the normal increases in rice prices during the lean third quarter of the year. It is also observed in the Figure that the declines of rice prices are likewise spaced to depict the harvest months of the year, during the last quarter of a given year. Over 90 % of these deviations fall within plus and minus 5% of the average (see Figure1 below).

It is interesting to note that observations in 1995 exceeding 5% depict the food insecurity the country experienced in that year. The accepted range for wholesale rice prices to deviate from their expected price in a given period may be between plus and minus 5%. It is equally interesting to point out that despite supply shortages due to drought in 1997 and 1998, rice prices tended to be closer to average because of adequate quantities of imported rice during these years.

The other type of price instability is inter-year variability of monthly wholesale prices from their levels a year ago. The extent of variability is shown in Figure 2 for the period from 1991 to 1999. The instability tends to display more randomness

FIGURE 1
Percent Deviations of Monthly Wholesale Rice Prices
from Their 3-Month Moving Average, 1990-1999

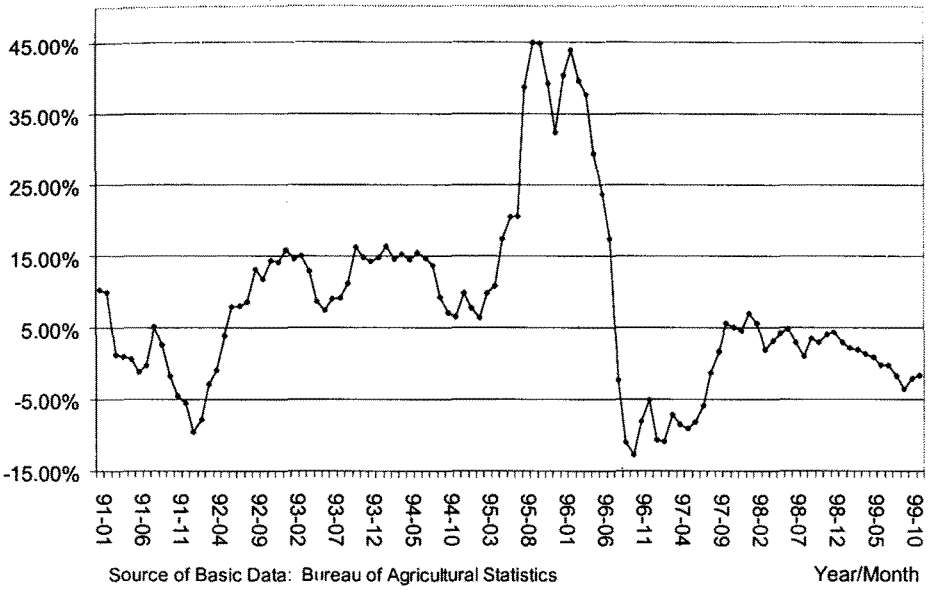


and is larger compared to the intra-year variability. The increase of annual prices between 1994 and 1995 was about 25 percent, reflecting an extreme occurrence of inter-year price instability. It is important to note that despite the El Nino weather phenomenon in 1997 and 1998, annual wholesale prices of rice either declined or increased moderately, reflecting the role of imported rice stocks in offsetting local supply shortages. On average, the change in yearly prices is less than 10%.

Price Band for Rice

A price band for rice is a range of wholesale prices of rice that the population is deemed to tolerate, i.e. these prices in the range do not require any substantive reallocation of resources of household budgets. There are then no major spillovers of rice price changes to the rest of the economy. Rice price fluctuations are socially tolerated if these do not lead to a sustained and widespread dissatisfaction regard-

FIGURE 2
Percent Deviations of Monthly Wholesale Rice Prices
from Their Levels A Year Ago: Philippines, 1991-1999



ing such price movements from a group or groups of stakeholders. The discontent is readily observable in the media. It is possible that a government official may have to resign from public service because of the social tensions arising from changes in rice prices.

Rice price fluctuations are socially tolerated if these do not lead to a sustained and widespread dissatisfaction regarding such price increases

Formally, the price band is a set of wholesale prices of rice, p^R, such that actual market prices of rice are in this set. That is, $p^T(1-\alpha) \leq p^R \leq p^T(1+\alpha)$. α is the largest tolerated proportionate deviation in absolute value terms of wholesale prices from the target price of rice, p^T. The target price is pegged to the world price of rice, p^W, in foreign currency terms. That is, $p^T = ep^W(1+\tau)$. This linkage is to take advantage of the relatively higher stability of world rice

prices. The exchange rate, e, may introduce instability, a matter that is dealt with in the form of a variable import levy, τ.

The levy reflects an appropriate level of protection for domestic rice producers. It takes into consideration the risk of market disruption of rice in the world, relative ease of access to rice substitutes and the size of the adjustment costs of rice farmers to other means of livelihood.

Empirical Estimate of the Rice Price Band

The price band requires three parameters: the trade protection to rice producers; the highest tolerated deviation of actual rice prices from the target price; and the growth of the target price of rice.

Trade Protection

The implicit tariff protection for rice, t, is used to estimate t. That is,

$$t = \frac{1}{n}\sum_{j=1}^{n}\frac{(p_j^R - ep_j^W)}{ep_j^W}.$$

In order to control for quality, time and location of transaction, the world price of rice, Bangkok F.O.B. 35 % broken, is used. To this price in local currency is added the cost of freight, insurance, handling costs at the port of Manila, transport and handling cost from port to first warehouse and storage cost. The in-situ warehouse cost is computed with these variables and compared with the average wholesale domestic price of rice.

As shown in Table 1, the average implicit tariff protection for rice producers is about fifty percent. As discussed above, this is our estimate for the equivalent trade protection of existing import restricting measures. Accordingly, the border price of rice is adjusted by the factor 1.5 to get the target price. That is, $p^T = ep^W(1.5)$.

TABLE 1: Estimated Implicit Tariff Protection on Rice Production: 1995-1999

Rice Price / Cost	Unit	1995	1996	1997	1998	1999[1]	Average
Average Peso Exchange Rates[2]	$/mt	25.71	26.22	29.47	40.89	38.95	
World Price[3]	$/mt	290.00	271.50	267.00	274.00	238.20	
Freight, Insurance (Bangkok to Mnl) [4]	$/mt	49.04	45.91	45.15	46.33	40.28	
Cost Insurance Freight	$/mt	339.04	317.41	312.15	320.33	278.48	
Cost Insurance Freight (in Pesos)	P/mt	8,716.70	8,322.52	9,199.06	13,098.45	10,846.80	
Plus : Manila Port Handling[5a]	P/mt	116.70	111.42	123.15	175.36	145.21	
Landed Cost	P/mt	8,833.40	8,433.94	9,322.22	13,273.81	10,992.01	
Plus : Transportation to First Warehouse	P/mt	129.80	129.80	129.80	207.68	233.00	
Storage Cost [5]	P/mt	264.00	264.00	400.00	163.70	152.23	
Handling Cost [5]	P/mt	48.40	48.40	44.00	44.00	40.00	
In Situ Warehouse Cost	P/mt	9,275.60	8,876.14	9,896.02	13,689.19	11,417.24	
In Situ Warehouse Cost	P/kg	9.28	8.88	9.90	13.69	11.42	
Average Metro Manila Wholesale Price[6]	P/kg	13.93	16.07	15.31	15.68	16.26	
Implicit Tariff	%	50	81	55	15	42	49

Sources:

[1] Cost data for 1999 is taken from the survey of private sectors

[2] Based on Reference Exchange Rate Bulletin, Treasury, BSP (1999 data is based on average exchange rate from Jan to Nov)

[3] Based on FAO Food Outlook, (April 1999 Issue) Market News (WTO) , Thai Rice 35% broken, WR, milled, indicative survey price, fob, Bangkok (1999 data is based on Jan to May average price)

[4] Based on 1999 percentage of Freight and Insurance to World Price = 0.1691016

[5 a] Based on 1999 percentage of Manila Port Handling Cost to Landed Cost = 0.0133875

[5] NFA

Width of the Band

The width of the price band depends on the estimated value of α. We computed the percent deviation of monthly domestic wholesale prices of rice from their respective three-month moving average. The probability distribution of such percentage deviations is computed. The range of percentage deviations containing the largest frequency of observations is chosen as the estimate.

Table 2 shows the frequency distribution of changes in monthly wholesale rice prices from 1990 to 1999. The percentage deviations of monthly prices from their 3-month moving average typically fall between minus 5% and plus 5%. Slightly over 95 % of the observations fall under these categories. The three observations for intra-year price variations belonging to the categories exceeding plus five percent occurred in 1995.

TABLE 2: Frequency Distribution of Changes In Monthly Wholesale Rice Prices, 1990-1999.

	Intra-Year: Deviations from 3-Month Moving Average		Inter-year: Deviations from Previous Year (1991-1999)	
	Number of Observations	Percentage to Total	Number of Observations	Percentage to Total
Up to -15%	0	0.00%	0	0.00%
Greater than -15% and up to -10%	0	0.00%	4	4.08%
Greater than -10% and up to -5%	2	1.71%	10	10.20%
Greater than -5% and up to 0%	41	35.04%	14	14.29%
Greater than 0% and up to 5%	71	60.68%	23	23.47%
Greater than 5% and up to 10%	2	1.71%	19	19.39%
Greater than 10% and up to 15%	1	0.85%	16	16.33%
Greater than 15% and up to 20%	0	0.00%	8	8.16%
Greater than 20% and up to 30%	0	0.00%	4	4.08%
Total	117	100.00%	98	100.00%

Source of Basic Data: Bureau of Agricultural Statistics

Changes in Target Prices

As for inter-year variations, the monthly wholesale prices are compared with their respective levels a year before in Table 2. About 67 % of observed annual changes in monthly prices fall within minus and plus 10%.

In this section, the concept of a band of rice prices we would define as "stable" is discussed. Formally, prices are deemed to be stable if the following conditions hold:

- Wholesale rice prices fluctuate within minus to plus five (5%) percent of the target price;
- Target rice price is the world price of rice in pesos adjusted for the equivalent tariff protection of existing import restricting measures; and
- The absolute value of the annual change in the target rice price is no more than ten percent (10%).

Illustrating the Price Band

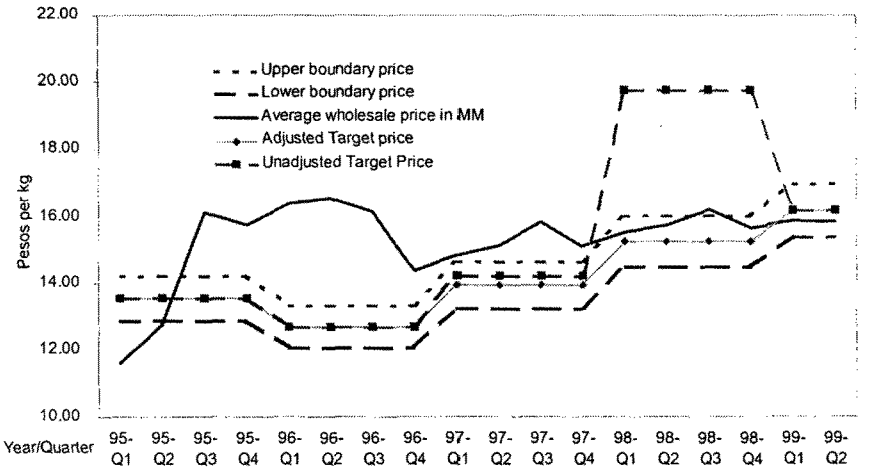
Figure 3 illustrates the estimated price band and compares this with observed quarterly wholesale rice prices in the Philippines from 1995 to 1998. The target wholesale prices of rice per quarter are the same in each year as the annual average rather than quarterly projected world price of rice is used in estimating the price band. That is, before the start of a given year, authorities are expected to obtain an annual world price of rice for the incoming year and to use this in estimating the target price. The boundaries of the price band are one plus and one minus five percent of the target price.

The target price goes up and down depending upon the world price of rice and the exchange rate. Figure 3 shows that the target price increased in 1997 and 1998 because of the devaluation of the Philippine peso. On the other hand, as world prices fell in 1996, the target price likewise declined.

Changes in target price may exceed expectations by the millions of households in the country. The increase in the target price between 1997 and 1998 was about 40 percent, pushing wholesale prices by five pesos for each kilogram of rice. Rice consumers did not go through this problem as observed wholesale prices remained below the target price for 1998 (see Figure 3).

FIGURE 3

Estimated Wholesale Rice Price Band After Tariff Adjustments and Observed Quarterly Wholesale Prices of Rice in Metro Manila: 1995-1999



Source of Data: BAS for observed prices and AGILE computations for estimated target prices

Implementing the unadjusted target price for 1998 (see Figure 3) would have been a major concern. If we take 1995 as a case in point, the change in average annual prices was only 27 percent. In that year, there was a public clamor protesting the manner by which rice policies were implemented. In Figure 3, the unadjusted target price jumped by nearly 40% between 1997 and 1998.

The issue at hand is inter-period variability. Even if fluctuations of rice prices were confined within the price band, changes in the level of the target price and thus, the price band of rice may pose a major problem. An appropriate width of the price band is one that addresses the intra-period variability, that is, we confine the range of deviations of actual prices from some norm which is the target price in this case to one that the population is prepared to tolerate.

To cope with the problem of inter-period variability, the statutory tariff protection can be adjusted to compensate for autonomous changes in world prices, the exchange rate or in the cost items that have to do with bringing the imported stock into the country, keeping inter-period variability within tolerable range. Trade protection of farmers is reduced when either world prices or the exchange rate goes up in order to keep the inter-period changes of target prices within the accepted range of no more than 10 percent in absolute value terms.

Table 3 illustrates the adjustments that may have to be made. The Table reproduces the unadjusted target prices as illustrated in Figure 3 above. The column following this shows the percentage changes. The target prices for 1997, 1998 and 1999 exceed the appropriate range of year-to-year changes in the target price. Appropriate adjustments to the tariff rate are thus made for these years and are shown in the subsequent columns of the Table.

Figure 3 shows both the adjusted and unadjusted target prices of rice. The adjustment allows the economy to avoid the 1998 price peak and to catch up with the 1999 prices. The rule of thumb of keeping changes in the target prices within the appropriate range of minus and plus ten percent allows the economy to avoid temporary price peaks or gradually to catch up with long term increases or decreases in prices. Between 1996 and 1999 for instance, one observes an upward trend in rice prices. The adjustment made provides a smoother transition to higher rice prices.

TABLE 3: Estimated Target Price After Adjusting for Tariff Protection: 1995-1999

	Landed Cost	Import Tariff Rate	In Situ Warehouse Cost Gross of Tariff	Annual Target Price	Percent Change	Adjusted Import Tariff Rate	In Situ Warehouse Cost Gross of Adjusted Tariff	Adjusted Annual Target Price	Percent Change
	P/mt	%	P/kg	P/kg		%	P/kg	P/kg	
95-Q1	7,298.11	50	11.39	13.53		50	11.39	13.53	
95-Q2	8,049.05	50	12.56	13.53		50	12.56	13.53	
95-Q3	9,599.35	50	14.98	13.53		50	14.98	13.53	
95-Q4	9,714.97	50	15.16	13.53		50	15.16	13.53	
96-Q1	9,364.63	50	14.56	12.68	-6.28%	50	14.56	12.68	-6.28%
96-Q2	7,981.82	50	12.41	12.68		50	12.41	12.68	
96-Q3	7,815.79	50	12.15	12.68		50	12.15	12.68	
96-Q4	7,443.82	50	11.58	12.68		50	11.58	12.68	
97-Q1	8,460.90	50	13.24	14.20	12.00%	47	12.99	13.92	9.85%
97-Q2	8,853.85	50	13.86	14.20		47	13.59	13.92	
97-Q3	9,324.76	50	14.59	14.20		47	14.31	13.92	
97-Q4	9,648.53	50	15.10	14.20		47	14.81	13.92	
98-Q1	12,361.35	50	18.94	19.75	39.11%	15	14.62	15.24	9.44%
98-Q2	12,322.49	50	18.88	19.75		15	14.57	15.24	
98-Q3	14,299.14	50	21.91	19.75		15	16.91	15.24	
98-Q4	12,567.12	50	19.26	19.75		15	14.86	15.24	
99-Q1	11,517.08	50	17.75	16.16	-18.16%	50	17.75	16.16	6.07%
99-Q2	9,458.37	50	14.58	16.16		50	14.58	16.16	

Source of landed cost: See Table 1.

Market Prices and the Price Band

Figure 3 shows that the observed wholesale market rice prices are not all in the price band as in 1995 when the Philippines suffered a rice shortage. Wholesale prices remained above the price band in 1996 as world prices of rice declined in that year and domestic prices appeared to be downward sticky. In the aftermath of the rice shortage in 1995, it appeared that the government was serious about avoiding a shortage with adequate imports. Accordingly, wholesale rice prices started their decline beginning in the second quarter of 1996 and bottomed in the last quarter of that year. Rice prices were in the band in 1998 and 1999.

The price band may be enforced with rice imports rather than buffer stocks. Stabilizing rice prices means ensuring that the equilibrium domestic rice prices are within the price band. If the supply curve shifts upward, potentially pushing the equilibrium domestic rice price above the price band, an appropriate volume of rice imports can be allowed to enter the country to keep prices within the band. The local supply and this volume of rice imports are just adequate enough to meet the demand for rice at some equilibrium domestic price within the band.

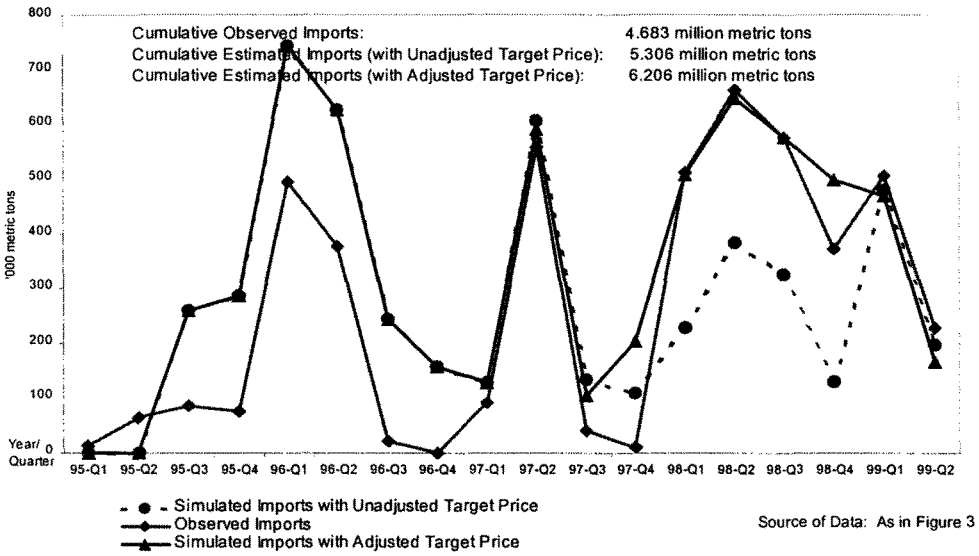
A model of the rice market was developed in order to simulate what would have been the rice imports if the target price were used as the prevailing wholesale rice prices. Figure 4 below shows both the observed and simulated rice imports. There are two of these simulated volumes. One refers to the required imports if market prices conformed to the unadjusted target prices (see Figure 3). The other version corresponds to the adjusted target price series.

One observes the seasonal nature of rice imports from the Figure. They tend to peak during the first half of a given year and to fall to about zero in the second half of the year. The year 1995 is an exception when authorities failed to allow rice imports until after the election in May of that year. It is interesting to note that in the last quarter of 1998 when imports traditionally fall to zero, the country imported about 370, 000 metric tons.

In 1998, the country imported over two million metric tons of rice. The drought may explain this unprecedented level of imported rice in any single year. In contrast, the country only required slightly over a million metric tons less to keep rice prices within the price band around the unadjusted target price. If we adjust the target price so that on a per year basis, the price in 1998 was no more than 110 percent of its level in 1997, the observed volume of imports was exactly required. The opposite result occurred instead in 1995 through 1997. The government imported less by close to a million and half metric tons than the volume required to keep the rice prices within the price band in those years.

While ensuring that imports are such as to make the equilibrium market price of rice as the target price, actual market prices are expected to fluctuate around the target price rather than be equal to it throughout the year. These fluctuations of market prices are due to the random timing of the availability of supplies of rice,

FIGURE 4
Observed and Estimated Imports of Rice Per Quarter If the Adjusted Target Price of Rice is Used as the Market Wholesale Price 1995-1999



Source of Data: As in Figure 3

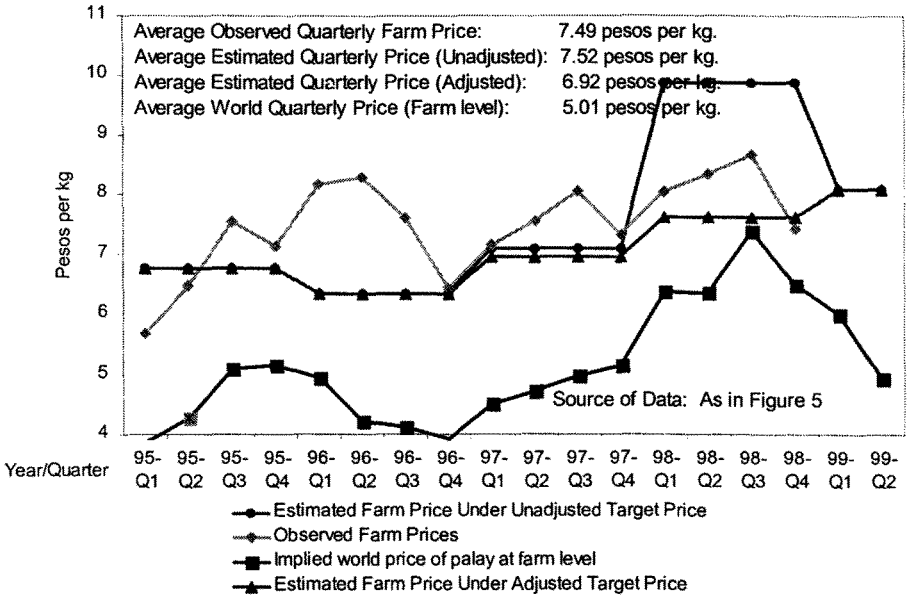
regardless of source, to the market. Holders of such inventories will take advantage of the market information that they have and release stocks into the market when they see fit. However, since the aggregate supply is adequate to meet expected demand at target price, the fluctuations of market prices are expected to be in the neighborhood of the target price or within the price band, i.e. market prices are stable.

Impact of the Price Band Mechanism

Impact on Farmers

Figure 5 illustrates the impact on farm prices if the price band is used. There is hardly any difference between the average observed and estimated farm prices for palay if the unadjusted target price for rice is applied. The average of the former is 7.49 pesos per kilogram, while it is 7.52 pesos for the latter. Estimated farm prices

FIGURE 5
Observed and Estimated Quarterly Farm Price of Palay If the Target Price of Rice is Applied: 1995-1999



if the unadjusted target price was applied are more variable. While estimated farm prices where the adjusted target prices were applied are less variable as compared to one without the adjustments, the average estimated prices are nearly sixty centavos less per kilogram.

The nominal protection rate (NPR), the percentage difference of prices received by farmers and the shadow world price of palay, i.e. the border price of rice converted to palay and adjusted to bring the commodity to the farmgate, is computed to measure the impact of the price band mechanism on rice farmers. The computed NPRs associated with each of the three farm price series are shown in Table 4. The average protection rate where the unadjusted target price is applied is nearly 48 percent. If the adjusted target price was used, the protection rate is only slightly over 40 percent. This result is expected since adjustments to the target price were such as to keep changes in the annual target price within plus and minus ten percent.

TABLE 4: Estimated Nominal Protection Rates on Palay Production: Base Case and Cases Involving Alternative Target Prices

		Base Case: Observed Farm Level Price of Palay		Scenario if Unadjusted Target Price of Rice Was		Scenario if the Adjusted Target Price of Rice Was	
	World Price of Palay at Farm Level[1]	Observed Price level	Nominal Protection Rate	Estimated Price level	Nominal Protection Rate	Estimated Price level	Nominal Protection Rate
	P/kg	P/kg		P/kg		P/kg	
1995	4.60	6.70	45.79%	6.76	47.13%	6.76	47.13%
1996	4.30	7.62	77.20%	6.34	47.39%	6.34	47.39%
1997	4.83	7.52	55.66%	7.10	46.95%	6.96	44.13%
1998	6.65	8.12	22.05%	9.88	48.43%	7.62	14.53%
1999	5.46	-		8.08	48.02%	8.08	48.02%
Average	5.17		22.05%	7.63	47.58%	7.15	40.24%
Std. Dev.	0.93	0.59	0.23	1.41	0.01	0.70	0.14

[1]Border Price (in-situ cost of rice) converted to palay price at the farm level by a multiple of 0.5.

Source: See Table 1 for estimates of border prices; and BAS for observed palay price at the farm level.

Although the nominal protection rate declines as target prices are adjusted so that their increases are no more than ten percent per year, farm profit per hectare tends to increase and farm prices appear to be more stable. The analysis is shown in Table 5. Since the bulk of production cost represents non-traded inputs, e.g. land and labor, production costs are not sensitive to changes in world prices of rice or to the exchange rate. While the prices of the traded inputs, e.g. fertilizer, pesticides, are expected to adjust more quickly to changes in exchange rates, such increases tend to be offset by the rise in the target prices and palay prices, albeit to more than ten percent. Table 5 shows that the share of such inputs ranges from about 14 percent for non-irrigated farms to about 17 percent for irrigated farms.

In Table 5, we simulated the impact of keeping increases in the target price to no more than ten percent on farm profits. In this analysis, the prices of traded inputs including fertilizer and chemicals are increased by forty percent. To recall from Table 3, the unadjusted target price would have increased by forty percent due to the currency devaluation and the increase in world price. Prices of palay at the farm level are then increased by ten percent, in keeping with the feature that the target price of rice will not increase by more than ten percent. The result of the simulation indicates that farm revenues increase by more than the increase in pro-

duction cost. Net earnings as percent of production costs rise for both irrigated and non-irrigated farms.

Farmers as Rice Consumers

While the decline in trade protection may reduce prices of palay compared to what it would have been if the target price at the farm level was unadjusted, this may be offset by the beneficial effect of lower rice prices. Rice farmers are both producers and consumers of rice. As producers, they are disadvantaged if government policy maintains changes in annual target prices within plus or minus ten percent. But as consumers, rice farmers benefit if increases in target prices are kept low. The net impact of these offsetting changes on farm income depends upon the

TABLE 5: Impact of Adjustment in Target Price on the Farm Profits in Palay Production in 1996 (Per Hectare basis)

	Irrigated Palay			Non-irrigated Palay		
	Base Case	Percent of Total Cost	Case With Adjusted Target Price	Base Case	Percent of Total Cost	Case With Adjusted Target Price
Labor inputs (pesos)	18,200	65.8%	18,200	15,400	75.9%	15,400
Other inputs (pesos)	9,450	34.2%	11,346	4,895	24.1%	5,999
Certified seeds	800	2.9%	800	800	3.9%	800
Fertilizer[1]	2,640	9.5%	3,696	1,920	9.5%	2,688
Chemicals[1]	2,100	7.6%	2,940	840	4.1%	1,176
Sacks	750	2.7%	750	525	2.6%	525
Irrigation fees	1,200	4.3%	1,200		0.0%	
PCIC Insurance	700	2.5%	700		0.0%	
Interest on loan	1,260	4.6%	1,260	810	4.0%	810
Total Cost (pesos)	27,650	100.0%	29,546	20,295	100.0%	21,399
Yield (metric tons)	5		5	4		4
Average farmgate price (p	7,620		8,382	7,620		8,382
Total Revenues (pesos)[2]	38,100		41,910	26,670		29,337
Net Revenues (pesos)	10,450		12,364	6,375		7,938
Return on investment	27%		30%	24%		27%

Source of Base Case Data: Bureau of Agricultural Statistics.

Notes:

1. The prices are adjusted by a multiple of 1.4 to simulate the impact on fertilizer and chemical cost if the target price w as not adjusted.
2. The price is adjusted by a multiple of 1.1 since palay prices go up by ten percent after adjusting for the target price.

proportion of the rice consumption that a typical rice farmer would have to source from the market. The more that the farmer depends on the market for his rice requirement, the more penalized he is by trade protection.

Extraordinary Situations

The discussion above focuses on the features of the price band mechanism under ordinary situations. However, there are two extraordinary situations that may emerge in the implementation of the price band mechanism. In a year with an unusually large rice harvest, the average annual price of locally grown rice is expected to fall by more than ten percent. If local production of rice increases higher than normal, the government would have to increase demand for rice to avoid a destabilizing drop in rice prices. The added demand could then be exported at a loss to the government, the loss being society's price for avoiding rice price instability induced by an extraordinary harvest in a non-typical year.

In coping with this extraordinary situation, the government simply computes the amount of exports required to defend the target price. Since the locally procured stocks destined for export are not internationally competitive, then the government may have to put up adequate budgetary resources to export the stocks at world prices. However, the intervention to cope with this extraordinary situation may be carried out by a private trading company engaged for this purpose. The point of this reform is that the government does not need to institutionalize a procurement capacity for dealing with problems such as this one that do not happen every year. An ad hoc problem may be addressed with an ad hoc intervention. This way, the government is able to keep the cost of stabilizing rice prices in the country. To implement this intervention, that part of government tasked to continue the regulatory mandate of the National Food Authority must have access to a contingency fund for this purpose.

An ad hoc problem may be addressed with an ad hoc intervention.

Related to this is the problem when a given locality or region of the country is hit by a natural disaster. The emergency may be a typhoon, flood, earthquake, vol-

canic eruption and similar occurrences. In each situation, the flow of private sector stocks into the region is slowed down, raising rice prices there. One advantage of the present policy regime is that the NFA can address location-specific price instability. The corporation has a network of warehouses and has the ability to inject rice supply in the shortest time possible when a natural disaster hits a region of the country. The current approach is of course unnecessarily more costly. As discussed in the preceding paragraph, the services of a corporation can be engaged by the government to inject supplies in the disaster-hit area. The point is that it is more costly to invest in a capability that requires recurrent maintenance expenditure to cope with a problem that occurs infrequently.

Another extraordinary situation is when world prices decline and/or the exchange rate appreciates by a magnitude as to decrease the target price by more than ten percent. The target price in this situation may be reduced to no more than ten percent. Since world prices are unusually low and/or the currency is strong, import tariffs may have to be increased to ensure that the reduced target price is within bounds.

Impact on Regional Markets

Regional rice prices are relatively integrated with one another. As shown in Table 6, more than half of the correlation coefficients are at least 0.7. The rice prices in Cagayan Valley, Central Luzon and Southern Tagalog have correlation coefficients of at least 0.7. Bicol is apparently linked to the Southern Tagalog rice market. Rice prices in both the Cordillera and Ilocos regions are correlated. Together, the two regions take market information from either Cagayan Valley, Central Luzon or Southern Tagalog.

With two exceptions, Mindanao prices are likewise fairly correlated with another. One exception is the case of Northern and Central Mindanao, with a correlation coefficient of 0.53. The other one is the pair of Central Mindanao and Caraga. It would seem from the Table that both Central Mindanao and Caraga take market information from Southern Mindanao, raising the importance of Davao as the source of rice market information. Mindanao appears to be one integrated market.

The Visayan regions can be grouped into two in terms of the degree to which their respective rice prices are correlated. The first group is Western Visayas and the other group comprises Central and Eastern Visayas. Western Visayas, being a major rice producing region, appears to use up all its local production for in-region consumption. Its prices are even less correlated than Manila's prices although marketable surpluses in the region can go to Metro Manila. Cebu has a major international port and any net rice deficit in Central Visayas may be supplied with imported rice. Although Central Visayan prices are weakly correlated with Metro Manila prices,

TABLE 6: Correlation Matrix of Monthly Retail Prices, By Region: 1995-1998

	CAR	ILOCOS	CAGAYAN VALLEY	CENTRAL LUZON	SOUTHERN TAGALOG	BICOL	WESTERN VISAYAS	CENTRAL VISAYAS	EASTERN VISAYAS
CAR	1.00	0.78	0.91	0.92	0.89	0.80	0.37	0.83	0.84
ILOCOS		1.00	0.91	0.84	0.78	0.48	0.59	0.72	0.70
CAGAYAN VALLEY			1.00	0.88	0.88	0.74	0.43	0.78	0.75
CENTRAL LUZON				1.00	0.84	0.59	0.46	0.79	0.82
SOUTHERN TAGALOG					1.00	0.77	0.29	0.71	0.80
BICOL						1.00	0.05	0.68	0.65
WESTERN VISAYAS							1.00	0.54	0.54
CENTRAL VISAYAS								1.00	0.83
EASTERN VISAYAS									1.00

	WESTERN MINDANAO	NORTHERN MINDANAO	SOUTHERN MINDANAO	CENTRAL MINDANAO	ARMM	CARAGA	METRO MANILA	PHILIPPINES
CAR	0.64	0.49	0.61	0.55	0.84	0.69	0.67	0.91
ILOCOS	0.58	0.43	0.60	0.50	0.66	0.63	0.79	0.84
CAGAYAN VALLEY	0.60	0.44	0.61	0.47	0.75	0.66	0.76	0.89
CENTRAL LUZON	0.70	0.57	0.61	0.62	0.82	0.66	0.70	0.91
SOUTHERN TAGALOG	0.62	0.41	0.57	0.56	0.85	0.73	0.81	0.89
BICOL	0.52	0.40	0.49	0.34	0.74	0.57	0.44	0.72
WESTERN VISAYAS	0.64	0.38	0.77	0.69	0.57	0.56	0.40	0.59
CENTRAL VISAYAS	0.74	0.56	0.72	0.65	0.75	0.74	0.58	0.88
EASTERN VISAYAS	0.78	0.53	0.77	0.79	0.83	0.77	0.66	0.91
WESTERN MINDANAO	1.00	0.74	0.89	0.82	0.81	0.76	0.51	0.84
NORTHERN MINDANAO		1.00	0.70	0.53	0.81	0.72	0.22	0.64
SOUTHERN MINDANAO			1.00	0.79	0.76	0.80	0.51	0.82
CENTRAL MINDANAO				1.00	0.73	0.61	0.52	0.76
ARMM					1.00	0.75	0.63	0.91
CARAGA						1.00	0.54	0.82
METRO MANILA							1.00	0.74
PHILIPPINES								1.00

Source of Basic Data: Bureau of Agriculture Statistics

Cebu can serve the function of Metro Manila, benchmarking levels of regional rice prices with those of imported rice.

From the foregoing analysis, it seems that regional rice prices in the country are relatively integrated with one another. If aggregate supply and demand match at near the target price, levels of regional prices may be in the neighborhood of the target price, except for marketing costs. The transmission mechanism of market information may start from major deficit areas with international seaports.

Concluding Remarks

The approach of adjusting the target price to keep annual changes in target prices within plus or minus ten percent may be inconsistent with the Philippine obligation under the WTO Agreement on Agriculture (AOA). Under Article 4.1 of the AOA, variable import levies are prohibited as these are regarded by the WTO to be a form of non-tariff import barrier. At present, this is not an issue since the Philippines maintains a non-tariff measure (NTM) for rice under the Special Treatment provision of the AOA.

World prices tend to be more stable since the likelihood of a world shortage of rice is low.

In 2005 however, the country's special treatment of rice will have to be lifted and the Philippine government will have to convert this barrier into a bound ordinary customs duty. If the government will convert the rice import NTM to its equivalent tariff protection rate, market rice prices in the Philippines will fluctuate, depending upon the exchange rate and world prices of rice. The price band mechanism becomes inconsistent if the bound tariff rate for rice imports is already low as to rule out any unilateral upward adjustment of it. This poses a problem if either the world prices of rice fall to a low level or the Philippine currency appreciates by more than ten percent and market prices fall outside of the price band. The mechanism is no longer defensible.

If not for exchange rate movements that recently proved to be substantive, tariffication of the rice import NTM at its tariff equivalent rate is expected to result

in price stability. World prices tend to be more stable since the likelihood of a world shortage of rice is low.

However, if the government imposes excessive tariffs, the NTM, then the country will expect more price instability and will virtually re-introduce the NTM in the form of the minimum access volume. Since the out-quota tariff rate is high, shortages in rice will not be met with out-quota imports because of the redundantly high tariff rates. Minimum access volumes or in-quota rice imports will have to be adjusted up during shortages for this purpose. While shortages are dealt with by the expansion of the MAV, domestic prices will go up or down with changes in the exchange rate. Legally, the variable import levy is no longer a tool for keeping rice prices within the band.

Since developing countries are allowed to bind at above applied tariff rates by the WTO, the Philippine government may appropriately set its binding commitment for the tariff rate on in-quota rice imports. The level is chosen to enable adjustment of applied (not bound) in-quota tariff rates to implement the price band mechanism and in a way consistent with the AOA. This is a possibility; the realization of it depends upon the outcome of the negotiation that the Philippines and its trading partners will undertake before 2005. But by its purpose, the in-quota tariff rate would have to be bound low so as to ensure full utilization of the quota. Thus, exchange rate stabilization measures, rather than the price band mechanism, will become the tools for stabilizing rice prices as well.

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