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RICE PRICE STABILIZATION: CONTRASTING EXPERIENCES IN THE PHILIPPINES AND INDONESIA

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ACRONYMS

| | |
|--------------|---|
| BULOG | Bureau of Logistics |
| CGE | computable general equilibrium model |
| CV | Coefficient of Variation |
| NARIC | National Rice and Corn Corporation |
| NFA | National Food Authority |
| NGA | National Grains Authority |
| PSA | price stabilization agency |
| RCA | Rice and Corn Authority |

EXECUTIVE SUMMARY

The standard advice of economists is that price stabilization programs constitute an inefficient use of resources. On the other hand, all Asian rice economies stabilize their domestic rice prices. This paper attempts to partially bridge the gap between theory and practice by considering theoretical issues that are typically ignored in the analysis of price stabilization programs. The new assessment of costs and benefits that results argues that a well implemented price stabilization program may improve the efficiency of resource allocation in the economy and thus spur investment and growth. Case studies of price stabilization programs in the Philippines and Indonesia are presented in order to relate the theory to actual practice.

Chapter 2 is a brief introduction to some of the institutional features of the world rice market. The world rice market is a "thin" market, and this results in prices that are more unstable than those in other grain markets. The thinness of the market also leads to a lack of futures markets for countries to use in hedging operations. These considerations make domestic rice price stabilization programs more necessary than price stabilization programs for other grains.

Chapter 3 then discusses the range of benefits of food price stabilization programs in terms of human capital, dynamic investment functions dependent on expectations, and macro stabilization. This is a departure from most of the earlier literature on price stabilization in that up to this point most of the theoretical discussion has been largely couched within an overly restrictive static microeconomic framework.

Chapter 4 briefly discusses what types of food price fluctuations are the most harmful, and the respective roles of the government and the private sector in ironing out these fluctuations. It is argued that the role of the government is most important in stabilizing interannual price fluctuations, while the role of the private sector is most important in dealing with seasonal price movements.

In light of the role of government elaborated on in Chapter 4, Chapter 5 proceeds to a discussion of the direct and indirect costs of food price stabilization, and shows that these costs may be much less than is commonly supposed. The role of fiscal and monetary policy in both closed and open economy settings is discussed and it is argued that the destabilizing influence of rice price stabilization programs on the government budget and credit markets can be made negligible if the program is financed properly. It is also argued that direct costs in practice are often due not to price stabilization per se but rather to unnecessary elements of the program that are more properly analyzed as subsidization. Finally, if the costs of operating a buffer stock are viewed in opportunity cost terms, it is seen that government storage in a world of segmented credit markets may be much less costly than is typically thought to be the case.

Given the above theoretical discussion of the costs and benefits of food price stabilization in the context of specific market failures, Chapter 6 discusses the actual rice price stabilization

programs of the Philippines and Indonesia to shed some light on the issue of "government failures" versus market failures, an issue which can only be addressed by reference to specific experience in the real world.

Chapter 7 concludes with a brief discussion of how properly implemented food price stabilization may be an important component of stabilization and structural adjustment programs in lower income economies.

1. INTRODUCTION

No East or Southeast Asian country, not even Hong Kong or Singapore, allows border prices for rice to be passed through fully to the domestic economy. Present-day Asia is not unique in trying to stabilize the price of its staple food, however. Great Britain, for example, stabilized wheat prices using a variable levy in the 19th century, and France also stabilized domestic wheat prices at this time. In fact, it is not likely that any nation at any time has ever allowed world markets to dictate domestic food price policy completely. This observation is even more remarkable when one stops to consider that in many cases there is no obvious, small, tightly knit constituency that should have food price stabilization as a goal. Some people would argue that it is in the interests of society as a whole, but the theory of collective action and the provision of public goods tells us that it is precisely these kinds of goods that are undersupplied due to free rider problems. Thus, revealed preference theory applied to society as a whole coupled with an understanding of the problems of adequate provision of public goods tell us that there must be a high demand indeed for food price stabilization programs. Yet the standard advice of economists is typically that price stabilization programs probably cost more than they are worth.

This paper will discuss some of the benefits and costs that can flow from food price stabilization programs, and this discussion will have direct implications for how food price stabilization programs need to be implemented if these theoretical benefits are to be maximized in actual practice. The experience of the Philippines will then be contrasted with that of Indonesia with respect to how each country has actually implemented their own program. First, however, we will begin with a brief discussion of the world rice market to provide some context to the problem at hand.

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2. THE WORLD RICE MARKET

The world rice market is one of the most volatile commodity markets there is. Although not as unstable as sugar or oil, it is decidedly more unstable than other grain markets. A rough indication of this can be gleaned from Table 1, which shows the coefficient of variation (CV) of world prices for various commodities. It can be seen there that the CV for rice is more or less twice that for corn and sorghum, and roughly 35% higher than that of wheat. These results are fairly robust to the time period chosen for calculation of the CV.

The world rice market is so unstable primarily because it is a "thin" market, which means that a small proportion of world production is traded. In the case of rice, only 2.6% of world production is traded on international markets (average from 1982-1987), while in the case of wheat and corn it is 21% and 13% respectively (average from 1982-87 for wheat, 1985-87 for corn). In conjunction with the operation of domestic price stabilization programs, this essentially means that small fluctuations in aggregate world production can get translated into large fluctuations in the aggregate quantity traded on world markets, which will then result in correspondingly large price movements.

TABLE 1: Coefficient of Variation (CV) of World Prices for Various Commodities

| | 1950 - 1984 CV | 1963 - 1984 CV |
|-------------|-------------------|-------------------|
| Rice | .40 | .33 |
| Sorghum | .21 | .17 |
| Corn | .22 | .19 |
| Wheat | .29 | .24 |
| Sugar | .67 | .71 |
| Coconut Oil | .37 | .30 |
| Oil | .55 | .77 |
| Bananas | .09 | .41 |
| Urea | --- | .41 |

One reason why the world rice market is thin is because Asian governments heavily regulate their imports and exports, which decreases quantities traded internationally. Thus, if all Asian countries were to simultaneously open up to free trade, world rice prices would become less unstable and everyone would be better off. Domestic buffer stocks for price stabilization could be smaller and international trade could be used as the balance wheel, which

would probably be cheaper than the current state of affairs. Unfortunately, however, it is in no one's interest to make the first move. If the Philippines were to open up to free trade in rice, there would be some very small positive impact on the quantity traded in international markets, which would tend to stabilize world prices to some extent. No matter how small the effect, the rest of Asia would be happy to see the Philippines make the move. However, given the weight countries seem to place on the importance of price stabilization programs, there would still be no incentive for other countries to also open up their markets, since this would expose them to world prices that would still be very unstable. In fact, this consideration would prevent the Philippines from making the move in the first place. Short of some international agreement, then, the world rice market is likely to remain unstable for some time to come.

One consequence of the thin world market is the lack of futures markets for rice. Because the world market is so thin, private traders are not willing to engage in longer term contracts to buy and sell rice, as they do with wheat and corn. This lack of futures markets further distinguishes rice from wheat and corn, and makes it yet more difficult to stabilize domestic prices without resorting to buffer stocks. For example, Mexico is able to stabilize domestic corn prices to a certain extent by using U.S. futures markets. This option is not open to the Philippines, however.

To conclude, world rice prices are very unstable, and this instability implies relatively large potential gains to price stabilization. In addition, it says something about how governments must stabilize prices if they desire to do so, i.e. reliance must be placed at least partially on buffer stocks because of the small and unstable world market. We will now consider some of the benefits that may be realized from rice price stabilization programs, as well as the costs of such programs.

3. POTENTIAL BENEFITS OF FOOD PRICE STABILIZATION

The earliest discussions of price stabilization (see Waugh 1944, Oi 1961, and Samuelson 1972) focused on identifying whether producers or consumers of the commodity whose price was being stabilized gained from such programs and what parameters influenced the distribution of benefits (e.g. the slope and shape of the demand and supply curves). From then on, the debate concerning price stabilization has been largely carried on within a static microeconomic framework (the most comprehensive and sophisticated treatment being Newbery and Stiglitz 1981). We will argue here, by elaborating on ideas first presented in Timmer (1989), that *both* consumers and producers can benefit from such programs, as well as agents in sectors of the economy other than that of the commodity whose price is being stabilized. The potential benefits will be grouped into microeconomic, macroeconomic, and political economy, although we will not have a lot to say here about the last of those three. The microeconomic benefits will be further subdivided into consumption side and production side. It is of course more difficult to quantify benefits of the kind that we will discuss here, but progress is being made in this regard.

It is important to realize that these are benefits that are potentially realizable in theory, and that it is entirely possible that they will not be achieved in practice (or that they will be achieved at an excessively high price). As a result, it is crucial to have a grasp of the theory behind the potential benefits because this will provide the basis for understanding how to implement a price stabilization program that will allow the potential benefits to be translated into actual benefits.

Before beginning a discussion of the potential benefits to rice price stabilization, we need to explicitly clarify two particular conceptual issues. The first is the difference between price stabilization and price subsidization. Pure price stabilization will here be defined as having domestic prices follow the long run trend of world prices while exhibiting smaller fluctuations around that trend than the actual fluctuations observed in world markets (mathematically, this means that domestic and world prices will have the same mean, but domestic prices will exhibit a smaller variance). Pure price subsidization, on the other hand, is defined as systematically altering the mean of domestic prices so that it differs from the mean of world prices over time (without any smoothing about the trend). There is nothing to prevent a government from implementing a price stabilization program for a commodity at the same time that it operates a price subsidization program, and this is often the case in actual practice. It is important to recognize the conceptual difference between the two, however.

The main consequence of the conceptual difference is that price subsidization programs can be vastly more expensive than price stabilization programs. Price subsidization implies that there is a persistent wedge between domestic and world prices, which further means that the government will have to finance this wedge year after year. Price stabilization, however, means

that sometimes domestic prices are above world prices and sometimes below, with the result that the financial position of the government is not put under as much stress.¹

In this paper, only pure price stabilization programs will be discussed. This is primarily what the National Food Authority (NFA) attempts to do, as there is no explicit attempt by the government to alter the long run price of rice in the Philippines. Probably the only significant deviation at present of domestic prices from world prices is due to the overvaluation of the exchange rate. The precise incentive effects of this are somewhat problematic anyway, since a devaluation might only move the domestic price from the level of the import parity price to a level a little below the export parity price. In other words, it would take a large devaluation to make the Philippines a rice exporter. Thus, discussion here will concentrate on rice price stabilization.

The other conceptual issue that needs to be clear from the start is that we will be discussing "market based" price stabilization, i.e. consumers and producers are free to buy and sell as much of the commodity as they want at the new, more stable, market prices. This is to be contrasted with price stabilization by administrative decree, which can at best only hope to be effective in the short run. In the long run, such strategies will simply lead to black markets, and we will not discuss such issues in this paper.

3.1 Food Price Stabilization as Protection for Poor Consumers

Let us begin with the consumption side of the "micro" benefits. These are the benefits that accrue to consumers from not having to readjust their budgets when rice prices change. For richer consumers, these benefits are likely to be very small, and are largely psychological. For poor consumers, however, the benefits are much larger, and they could have serious nutritional implications. Benefits will be larger for poorer consumers because they react to price changes much more sensitively than do rich consumers (Timmer 1981) and because they have more difficulty smoothing real income over time. The first of these statements is true both because the poor spend a larger share of their budget on rice (which affects the income term in the Slutsky equation) and because they also react more sensitively to price changes even after compensating for these income effects (i.e. their compensated price elasticity of demand is higher in absolute value). As an example of the magnitudes involved, a recent study by Bouis (1990) estimated the own price elasticity of demand for rice in the lowest income quartile in rural areas in the Philippines to be -0.87, while for the highest income quartile in rural areas it was only -0.45. If one were to compare the lowest and highest deciles instead of quartiles, the

¹ This does not necessarily mean, however, that government price stabilization programs should be expected to break even on the financial books. The main reason is that private traders buy and sell rice based, not on current prices, but on expectations of future prices. In other words, if prices of paddy are low, traders will not necessarily buy if they anticipate prices going still lower in the near future. The government can not act in this fashion while running a price stabilization program, however. If prices are low and expected to go lower in the near future, this is precisely the time when they must buy in order to prevent that from happening. In contrast to private traders, then, the government must act on current prices, not on expectations of the future. This is why they may not be able to turn a profit in a competitive environment.

discrepancy would be even more pronounced. The second statement is true because poor consumers without much in the way of collateral may not have access to credit markets, which would allow them to smooth consumption across years. Thus, a low price of rice in one year may not compensate for a high price the year before if disease and malnutrition (or in an extreme case death of a child) are the result of the high price in the first year. In sum, by ironing out price fluctuations, rice price stabilization can stabilize food consumption of the poorer segments of society. This in turn will contribute to human capital formation by improving the nutritional status of the poorest segment of the population.

3.2 Food Price Stabilization as a Cost-Effective Substitute for Targeted Credit Programs

To understand the production side of the "micro" picture, one must move beyond the static framework that is typically employed in analyzing the effects of more stable prices on producers and view the farmer as an investor in an uncertain environment. Farmers more than other producers are exposed to high levels of risk (due largely to fluctuations in the weather), and this risk can act to depress productive investment. If ample credit were available to carry farmers through periods of low income, the investment might be forthcoming anyway, but for a variety of reasons farmers are often unable to obtain the credit necessary to induce them to engage in such longer term productive investment.

The typical response of most governments is to remedy this lack of credit by intervening directly to supply more. This can take the form of subsidized credit, loan targeting, or a variety of other measures. The problems with such strategies are well recognized by now, however. They include reduced savings mobilization due to negative real interest rates, increased rent seeking behavior due to the fact that not everyone is able to avail of the subsidized interest rates, and decreased efficiency of financial intermediation due to the numerous bureaucratic requirements of loan targeting. Add in the fact that repayment rates for government lending programs are often low because the government is not efficient at gathering the type of specialized information necessary to run an efficient lending program, and all too often the result is the destruction of an efficient financial system.

If the specialized agricultural credit programs are simply abandoned, however (as they probably should be), this still leaves farmers (and society) in the same dilemma as before, namely how to encourage productive investment at the farm level. Price stabilization offers a way out by attacking the problem from another angle. Instead of increasing the supply of credit to agricultural producers, price stabilization reduces their demand for it.² It also does so in a

² To be exact, farmers will be more concerned with income stabilization than price stabilization. As long as price fluctuations are due to transitory supply shocks (e.g. induced by the weather) and the price elasticity of demand is greater than -0.5 (less than 0.5 in absolute value), price stabilization will also result in income stabilization. The latter condition is surely satisfied for rice in the Philippines (a study by the World Bank recently estimated the price elasticity of demand for rice to be -0.1), while the first condition will also be satisfied in practice since shocks to the demand curve for staple foods in developing countries (due, for example, to changes in real income) are typically much smaller than supply side shocks. As an aside, it should be noted that price stabilization schemes for corn and coconut may actually destabilize farmers incomes, since demand elasticities for these commodities may be close to -0.5.

way that does not encourage rent seeking, reduce savings mobilization or increase the real costs of financial intermediation. Thus, rice price stabilization can help to increase productive investment in the rice sector and ultimately increase production of the staple food.³

3.3 Food Price Stabilization as a tool for Macroeconomic Stabilization

The economics profession and policymakers are now beginning to realize the significance of the macroeconomic policy environment (e.g. exchange rates, budget deficits and inflation) for the health of the agricultural sector. Here we will discuss one aspect of the reverse line of causation—the effect of events in the agricultural sector on the macroeconomy.

The potential benefits to price stabilization programs that were discussed in the previous two sections above are relatively straightforward in that the benefits accrue directly to consumers and producers of the commodity whose price is being stabilized. We will now discuss the "indirect" benefits that may accrue as a result of stabilizing staple food prices. The fact that they are indirect does not make them any less important. In fact, because they affect all sectors of the economy and not just rice, their quantitative significance is likely to be much larger. Measurement of these effects will be very difficult, but some preliminary work is already underway.

Shocks to the rice market affect the macroeconomy because of what we will term "spillovers." Spillovers into markets other than the rice market arise as the result of changing aggregate expenditures on rice whenever the price of rice changes. Some diagrams may help to clarify the exposition at this point. Let us look at Figure 1a, which shows the supply and demand situation in the rice market under "normal" conditions. For the moment, let us assume a closed economy, although this assumption will be relaxed shortly. We will now see what happens in the event of a random, weather induced shock to the supply curve. If the weather shock is a positive one, i.e. the supply curve shifts down and to the right, expenditures on rice will decrease provided the price elasticity of demand is less than 0.5 in absolute value. These reduced expenditures on rice will result in increased demand pressure in all other markets in the economy (e.g. shoes, vegetables, beer) due to the additional income that has been freed up for purchases of other goods and services (see Figure 1b). This increased demand pressure will affect prices and quantities in all other markets in the economy.⁴

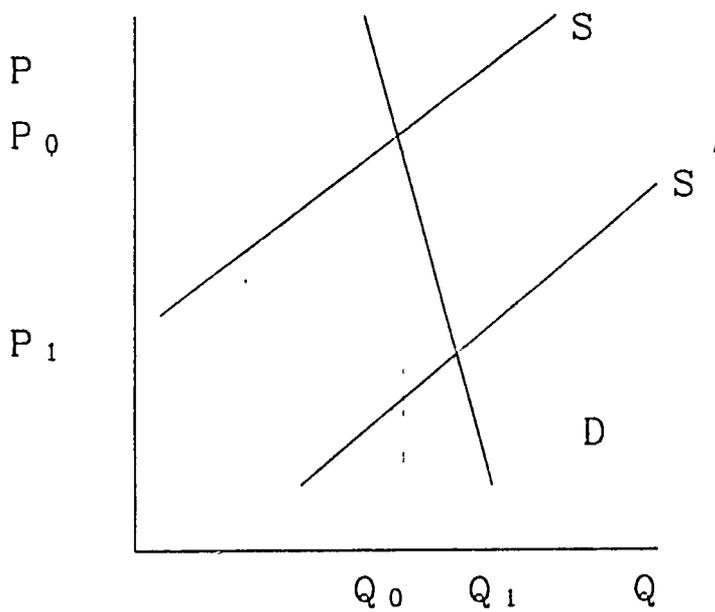
These effects will have quantitatively important macro consequences only under certain conditions. One is that the price elasticity of demand for the commodity is low (in absolute terms), and another is that the budget share of the commodity is high. If the price elasticity of demand is low (imagine the demand curve in Figure 1a to be very steep), this implies that large

³ Such price stabilization may also cause farmers to shift resources out of other crops into rice. For a discussion of these effects in the Asian context, see Timmer (1988).

⁴ There will also be cross-price effects that will mitigate some of the fall in expenditures on rice (since the relative price of rice has fallen), but these effects will be minor relative to the income effects.

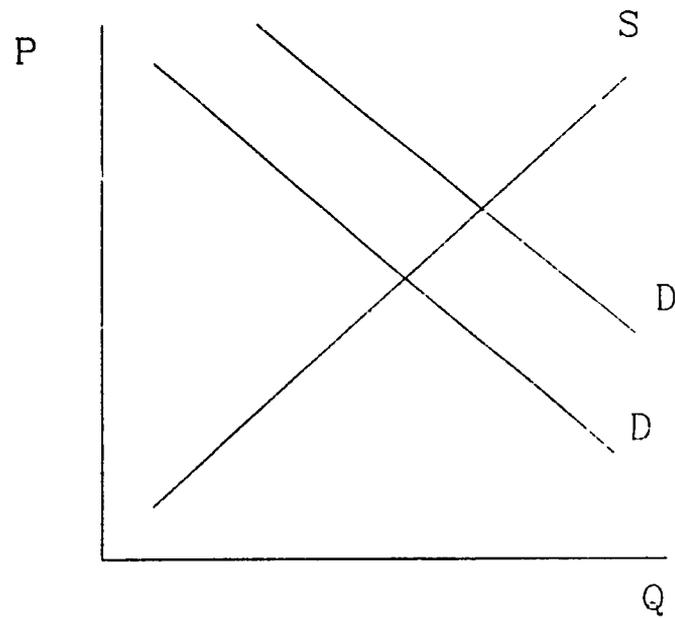
FIGURE 1

Effects of Positive, Weather Induced Supply Shocks: Aggregate Expenditures on Rice and Demand for Other Goods



Rice Market

Figure 1a. A positive, weather induced supply shock to the rice market reduces aggregate expenditures on rice.



"Other Goods"

Figure 1b. The reduced aggregate expenditures on rice result in increased demand pressure on other markets (spillovers)

fluctuations in price P lead to large changes in expenditures $P*Q$, which means large spillovers into other markets. Large budget shares for the commodity in question imply that a given percentage change in expenditures on that commodity are large in absolute terms relative to the total size of the economy.

Both of these conditions must be satisfied for there to be important macro consequences of unstable food prices. For example, in highly industrialized countries where the budget share for any particular commodity is small, the macro effects will be much smaller and the rationale for price stabilization accordingly reduced.⁵ Similarly, for commodities where the price elasticity of demand is not so small (for example corn in the Philippines, since most of the demand is for feed, or coconut), price variations in one direction are largely compensated for by quantity variations in the other direction, with the net effect on expenditures on that commodity being close to zero. Although such variations may affect individual farmers, they will not significantly affect farmers as a group, and the macro consequences will also be small.

These considerations would not pose any problems if there existed a large, stable world market for rice. If this were the case, any shortfall in domestic production could be countered by imports, and excess domestic production could be exported. The stable world market would serve as a buffer for the domestic market, and localized weather shocks would not have macro ramifications. As discussed earlier, however, the world rice market is not large and stable, but small and unstable. Thus, the above closed economy analysis is easily extended to that of an open economy. Now, price shocks on the world market play the same role of domestic weather shocks, with the resulting price fluctuations leading to large swings in domestic expenditures on rice, which in turn lead to large swings in domestic expenditures on other commodities and services.

Just how important are these spillovers in quantitative terms? Preliminary analysis suggests that the effects could be quite large. Simulations were run with a computable general equilibrium (CGE) model of the Philippine economy constructed by Habito (1988), and the effects on prices in other sectors of the economy as the result of fluctuating rice prices were noted. The next step is to ascertain the effects of these fluctuating prices in individual sectors on investment in those sectors. In another context, work by Pindyck (1988) has shown that increasing price uncertainty can seriously affect investment if that investment is irreversible, which is true of most real world investment projects of any size. This is the case even though he assumes that producers are risk neutral. Thus, price fluctuations in the rice market will likely have important effects on investment in other sectors. Building a degree of risk aversion into the analysis would make the effects even more dramatic.

Another channel through which events in rice markets may affect other sectors of the economy is what will be termed "price confusion." The theoretical underpinnings for this argument can be traced back to work in the early 70's by Lucas (1972, 1973) and Barro (1976),

⁵ That being said, one should recall the rather large effects on GNP in the United States due to the drought in 1987.

who were concerned with the effects of variable rates of inflation on economic growth. Lucas began with the idea that a change in price in a specific product market could be due to one of two reasons. It could be due to changes in the underlying technology and preferences determining fundamental supply and demand in that market (in which case it would be a "real," or "permanent," change), or it could be due to the way in which changes in the money supply worked their way through the economy market by market (sector by sector). In the latter case, the effect would disappear in the long run since money is neutral over that time horizon, but there would remain localized market specific effects in the short run (which we will term "transitory" effects). The problem arises because there is no easy way to tell the difference between the two effects in any given market, although the ideal responses of an entrepreneur in the two cases would be complete opposites. If the observed price change were due to changes in technology and preferences (which can not always be observed directly), then the appropriate response would be to alter output and investment. On the other hand, if the price change were due to temporary localized effects of money supply growth (which can not be observed either since the lags with which changes in the money supply translate into changes in prices in various markets are, to use the phrase of Milton Friedman, "long and variable"), then the appropriate response would be to do nothing (or borrow or lend in capital markets). The term "price confusion" thus arises because it is no longer necessarily obvious what prices really signify. Such an issue could become a major problem for a market economy, where prices function as the allocator of scarce resources, if the rate of inflation were highly variable. On the other hand, if the rate of inflation is steady, changes in the normal growth rate of prices in any given market will almost certainly signify changes in technology and preferences, and prices will once again be able to play their role as allocators of scarce resources. This is part of the rationale behind the argument for monetary rules in the current "rules versus discretion" debate in macroeconomics.

After that long digression, let us return to the issue of rice price stability. Because of the spillover effects on all other markets in the economy that changes in rice expenditures have, a parallel sort of price confusion will arise if rice prices in a rice economy (as opposed to the inflation rate) are very unstable. In this case, the price confusion will arise because it will not be obvious whether a price change in any individual market is due to changes in technology and preferences or due to spillovers from changes in expenditures in the rice sector. This effect will be more important the larger is the budget share of rice in consumers' expenditures.

Empirical studies on the effects of variable inflation, while crude due to the inherent complexity of the issue, have tended to support the price confusion arguments. Lucas' 1973 study found a significant negative correlation between economic growth and the variability of the inflation rate. More recently, Kormendi and Meguire (1985) found that variability of the inflation rate explained more of the variance in economic growth across countries than any other of a wide range of plausible explanatory variables.

The above arguments relating to irreversible investment (nonconvexities in the production function), risk aversion and imperfect capital markets, and price confusion (imperfect information) show that not only rice producers are affected by unstable rice prices, but the

producers of all commodities and services. This is because random shifts in the supply curve for rice affect demand curves in the markets for all other goods and services in the economy (Figures 1a and 1b). Thus, the "micro" production benefits discussed above in section B of Chapter 3 become macro benefits when aggregated across all sectors of the economy. These are not the only "macro" effects that result from random shifts in the supply curve of rice, however. To conclude the discussion of the macro ramifications of rice price instability, we will examine an additional effect that is likely to be of some importance in one market in particular, the credit market.

A recent paper by Deaton (1989) has elaborated on the importance of precautionary savings in developing countries. Precautionary saving is saving that is used to buffer consumption from short run fluctuations in income. Such saving fluctuates in value with a relatively high frequency because it is drawn down and built up in response to low and high income states of the world. This is in contrast to life cycle saving, which is saving done for retirement purposes. Since the purpose of this type of saving is to augment consumption when the individual ceases to work because of old age, it does not fluctuate in value very much, and can thus be termed "low frequency" saving. Deaton argues that in a world of uncertainty and imperfect capital markets, which are important features of low income countries, "high frequency" saving is more important than the "low frequency" saving that typically receives most of the attention in the economics literature, and his model of savings behavior seems to fit many stylized facts of savings behavior in low income countries better than the standard life-cycle model.⁶

Compared to low frequency saving that is not expected to be utilized until the saver is retired, high frequency saving to buffer short run fluctuations in consumption must be invested in a highly liquid form if it is to be effective in performing its function. Thus, in a highly uncertain environment (e.g. one where the price of the staple food is very unstable), long term investment by the vast majority of savers is discouraged. By reducing the uncertainty in the economic environment facing rural dwellers (both farmers and non-farmers), food price stabilization can allow a proportion of the population to become entrepreneurs by lowering the income threshold above which net accumulation begins to take place. This will happen since families will now have to worry less about planning for contingencies of very low income due to either very low food prices (which will hurt net producers of the staple food) or very high food prices (which will hurt net consumers of the staple food), and instead will be able to focus on generating savings for their own small businesses. Food price stabilization will therefore

⁶ It is almost certainly the case that precautionary saving is more important in low income countries, where lack of access to capital markets is the norm, than in industrialized nations. A recent paper by Caballero (1991), however, argues that saving due to precautionary motives may account for as much as 60% of the net wealth in the United States. Thus, high frequency saving may be much more important in all types of economies than a reading of the literature would suggest.

shift out the aggregate supply curve of savings *that can be used for longer term investment*,⁷ which will contribute to the growth of a dynamic group of small-scale entrepreneurs.

Quantification of these macro benefits is difficult, but not impossible. Work in this area is currently underway to see exactly how large the numbers are. The preliminary work that has already been done by others has not yet been applied to food price stabilization, but the results in other applications point to potentially large effects indeed.

3.4 Issues of Political Economy

When discussing justifications for food price stabilization, many observers are likely to respond that it is just a political necessity for the government to stay in power. That may be true, but it also begs the question. Why will governments fall if food prices fluctuate erratically? If we assume that organizations to overthrow the government will arise and become a serious threat when the benefits to replacing the government exceed the costs of organizing the movement, unstable food prices may serve as a catalyst to the formation of such movements by lowering the costs of organizing. If food prices are very high relative to some societal norm, then consumers will have more to gain by contributing their energies or sympathies to such a movement than they would if food prices were closer to normal. A similar case can be made for farmers, who will have more to gain if prices are very low. By stabilizing food prices, the government insures that neither one of these extremes will be reached, and thus stabilizes its own existence.

In turn, a stable government is likely to have a positive impact on investment from both foreign and domestic sources. A stable government is less likely to change policies in seemingly random ways, and an important consideration for anyone making a long term investment is knowing that the "rules of the game" do not change in the middle of the game. Thus, by stabilizing food prices, the government is less likely to be forced to alter economic policies continuously in an attempt to placate first one group and then another. This latter strategy may achieve its objective of preserving the government, but it is unlikely to promote the long term growth of the economy. Food price stabilization can thus contribute to the continuity and credibility of a whole range of economic policies, which are important for long term investment and growth in the economy.

⁷ Many authors have argued that a reduction in uncertainty will decrease savings because there is less need to save in a certain environment. This may be true, but the argument implicitly assumes that all saving is identical. Saving serves many different purposes, however, and the effects of different kinds of saving on economic growth will not be the same. Thus, aggregate saving may go down with the implementation of a food price stabilization program, but this is not inconsistent with increased saving for long term investment by rural entrepreneurs. It is the latter which is crucial for economic growth and development.

4. WHAT KINDS OF PRICE FLUCTUATIONS SHOULD BE STABILIZED, AND WHO SHOULD STABILIZE THEM?

Not all price fluctuations have identical effects, and it follows that the government should not be as concerned with some price movements as with others. It is important to contrast seasonal and interannual price movements in this regard, and we will argue that it is the latter that merits the most attention from the government, while the former are generally best left to the efforts of the private sector.

We will define a seasonal price movement as the price rise (in real terms) that occurs from the harvest to the pre-harvest season. This movement is not random, and it arises because it costs money to store grain from one period to the next. This is in contrast to interannual price movements, which are due largely to the weather and/or price movements in world markets, neither of which are predictable with any degree of accuracy.

This difference in predictability has implications for the benefits discussed above in Chapter 3. Most of the benefits from food price stabilization programs arise because of the reduction in uncertainty that accompanies a well implemented program. Since seasonal price rises are not uncertain in the first place, eliminating them will not give rise to any of the benefits discussed above. In fact, since seasonal price rises are predictable, elimination of such should more properly be discussed as a type of price subsidization, not price stabilization.

Stabilization of interannual price movements, on the other hand, will result in the benefits elaborated on above due to the accompanying reduction in uncertainty. These benefits are non-excludable, however, in the sense that provision of the benefits to one person provides them simultaneously to thousands of other people. In such a situation, it is impossible for a private entrepreneur to charge all of the people who benefit from the service, and thus the private sector will not supply the socially optimal amount of the good. It is in precisely such cases that there is a theoretical case for the provision of such goods by the public sector. Thus, taking into account the benefits discussed in Chapter 3, the social demand for interannual price stabilization will exceed the effective private demand, and only the government will be able to supply the socially optimal amount.

In conclusion, seasonal price movements are not unstable in the first place (by definition), and elimination of these movements does not provide any of the benefits discussed above. Thus, there is no case for government intervention in this area. In fact, elimination of seasonal price movements is not price stabilization at all, but rather subsidization of consumers at a particular time of year. On the other hand, stabilization of what is typically referred to as interannual price movements results in the provision of public goods, and there accordingly is scope for government intervention in this area.

Now that we have established more clearly what price movements should merit the most concern, and the fact that the burden is on the government (as opposed to the private sector) to

intervene to stabilize these price movements, we can proceed to a discussion of the costs of food price stabilization programs.

5: COSTS OF PRICE STABILIZATION PROGRAMS

In assessing the desirability of any project or program, one must weigh both the costs and the benefits before making a decision as to whether or not to implement it. Granted the above benefits to price stabilization programs, what are the costs to the government of achieving the stabilization? The most obvious costs are the direct ones, i.e. the physical and interest costs of storage and the costs of running the bureaucracy necessary to implement the price stabilization program. There is also the potential for indirect costs, however. These indirect costs will arise if the financing of the price stabilization program induces instability in other sectors of the economy (e.g. the government budget or the availability of credit to the private sector) in order to achieve stability in the rice sector. If this is the case, rice price stabilization programs may simply shuffle instability from one sector of the economy to another, and the net benefits will then be small (or negative). We will begin with a discussion of the indirect costs, and we will argue that, if the program is implemented properly, the indirect costs will be zero. On the other hand, if the program is not implemented correctly, the indirect costs may be substantial.

5.1 Financing a Price Stabilization Program in a Closed Economy

Implementation of a food price stabilization program requires the government to provide funds to the price stabilization agency in charge of procuring and distributing the staple food, since changing the supply on the market is the only way to affect the market price, and changing the supply on the market requires the government to buy and sell the staple food. In general, there are two ways of financing any government program - fiscal policy and/or monetary policy. Each type of policy will have different consequences for the rest of the economy however. We will assume for now that the economy is closed to international trade, in which case the country is by definition self-sufficient. The case where the country is not self-sufficient is very important, and will be treated in the following section. It is a simple extension of the closed economy case however.

Before beginning the analysis it is important to realize that a food price stabilization program, in attempting to impart stability to domestic prices, will have unstable financing needs. This simple point is what forces us to discuss the mechanics of the financing in the first place, because it may be the case that while the government is able to stabilize domestic food prices, the unstable financing requirements of the food price stabilization program may destabilize other parts of the economy. If this is the case, it may not make sense to devote scarce resources to a program which simply shuffles instability from one part of the economy to another.

Let us begin with fiscal policy, which is a bit simpler to analyze than monetary policy. If government budget appropriations are used to finance the operations of the program, the unstable financing requirements of the price stabilization agency will obviously destabilize the government budget. Is this good or bad? This is at best a difficult question to answer, but it is not at all obvious that the price stabilization program has yielded any benefits in this case. Instead of unstable food prices destabilizing private sector spending and causing spillovers

throughout the economy, unstable food prices will now destabilize public sector spending, which on a priori grounds would seem to have just as much potential as private sector spending for causing spillovers throughout the economy. Thus, to the extent that a food price stabilization program is financed with *variable* budget appropriations, there would not appear to be any benefits to such a program. In any event, such a financing mechanism is not an efficient one in the sense that the volume of food that needs to be procured and distributed in order to defend the floor and ceiling prices can not be predicted with any accuracy a year in advance. Efficient implementation of a food price stabilization program requires more flexibility in financing than can be provided by budget appropriations alone, and this point will be discussed in more detail shortly.

The above problems could be finessed by having the budget appropriations be viewed as a contingency fund that is drawn down in years when the financing requirements of the program are unusually large and built up when the financing requirements are unusually small. If it were done this way, other government spending could remain stable, and no spillovers would arise. Perhaps the major difficulty with such an approach would be operational in nature, in that the government may be tempted to spend a temporary surplus in the contingency fund for purposes other than food price stabilization. If this temptation could be resisted, however, such a contingency fund would be an efficient way in which to finance a food price stabilization program. In addition to preventing fluctuations in government spending due to weather shocks, it would also provide the price stabilization agency (PSA) with the short term flexibility needed to successfully implement a food price stabilization program (assuming the agency did not have to petition the legislature every time it wanted to spend some money in the contingency fund).

The use of monetary policy to finance a food price stabilization program is very similar in its effects to the use of a contingency fund as described above. The main difference is that it does not involve the legislature, but rather the Central Bank. Here, a flexible credit line is granted to the PSA that can be tapped whenever it is necessary to procure an abnormally large volume of crop. It is important that this credit line come directly from the Central Bank, and not from private sector banks. If the PSA is forced to go into the private sector credit market, it will seriously destabilize that market, and the government will again be in the position of funding a program that is trading instability in one sector of the economy for instability in another sector.⁸

What will happen to the economy if the Central Bank injects fresh credit into the system whenever the PSA needs it? Earlier we showed that spillovers into individual markets in the rest of the economy will be reduced by virtue of the fact that the price of the staple food has been

⁸ It is also possible that if the PSA were forced to go into the private sector credit market that they could be rationed out and unable to obtain the necessary financing (assuming that the credit market is not perfectly competitive due to adverse selection and moral hazard problems). This could indeed be something to be concerned about, but it is probably not likely that an arm of the government would be the one to be rationed out, so we will not further concern ourselves with that issue.

stabilized. Thus, relative price shifts due to factors other than shifts in technology and preferences will be reduced. What will happen to the macro-economy however? More specifically, what will happen to the inflation rate?

On first thought, one may think that highly variable rates of credit creation by the Central Bank to meet the financing needs of the PSA might create highly variable rates of inflation. To a certain extent this is true, although variable harvests of the staple food also create the need for variable rates of money creation if the government desires to stabilize the general price level. This can be seen most easily by using the quantity theory of money, which says that $MV=PQ$, where:

M is the amount of money in circulation,
V is the velocity of money, which is assumed constant, or at least predictable,
P is the general price level, and
Q is the aggregate quantity of real goods and services produced in the economy.

This implies that if there is an abnormally good harvest (Q increases), there will be downward pressure on prices P if M and V are constant. Since V is assumed constant, the only way for the government to stabilize the aggregate price level P is to increase the supply of money M. Thus, as Q varies, M must also vary if P is to remain constant. If the size of the harvest is equal to $(1+h)$ times the normal harvest, one can show (this derivation, along with the others that follow, are contained in Appendix 1) that the growth in the money supply that would be required for price stability at the macro level is:

$$\Delta M = \frac{1}{V}(hP^R Q^R)$$

where P^R is the stabilized price of rice and Q^R is the size of the normal harvest. In other words, a fraction $1/V$ of the excess harvest should be procured for macro stability (or, in the event of a shortfall, a fraction $1/V$ of the shortfall should be released from stocks).

This is relatively straightforward, but it is not the case that procuring a fraction $1/V$ of the excess harvest is necessarily consistent with stabilization of the rice price. One can show (see Appendix 1) that stabilization of the rice price requires that one procure a fraction $(1-\alpha\eta)$ of the excess harvest, where α is the budget share of rice and η is the income elasticity of demand for rice.⁹ This will be equal to $1/V$ if and only if the velocity of money happens to be

⁹ Procurement of all of the excess harvest will not perfectly stabilize the rice price because the extra income generated by the government's printing of money to purchase the excess crop creates additional demand for rice due to income effects. This puts upward pressure on the rice price in the face of a good harvest, which counteracts to some small extent the downward pressure on prices due to the excess harvest. Thus, in order to perfectly stabilize the price, the government should not purchase 100% of the excess harvest.

$1/(1-\alpha\eta)$. One can also show that if the velocity of money is less (greater) than $2/(1-\alpha\eta)$, then procuring a fraction $(1-\alpha\eta)$ of the excess harvest in order to stabilize the rice price will result in a more (less) stable macro-price level than the laissez-faire alternative of not printing any money at all in the event of a good harvest.

Some typical values for the parameters α , η , and V in developing countries are 0.1, 0.1, and 30. Using these numbers, one can see that rice price stabilization argues for procuring roughly 99% of the excess harvest, while aggregate price stability argues for procuring about 3% of the excess harvest. Clearly, these numbers could not be much farther apart. It appears, then, that rice price stabilization and macro-price stabilization are inconsistent.

This inconsistency is more apparent than real, however. We have been implicitly assuming in the above analysis that the only function of the Central Bank is to alter the money supply in response to the needs of the PSA. If we take into account the fact that the Central Bank is constantly engaged in manipulating the supply of money in the economy for a variety of reasons (e.g. changes in Q due to changes in productivity), then all that has to happen is that the Central Bank (CB) consider the extra money it has already pumped into the economy in the event of a good harvest when planning its operations that impact on the money supply. If the CB was planning on injecting D dollars into the economy during the harvest season before anyone became aware that there was going to be a good harvest, they now need to inject $D - (h(1-\alpha\eta) - 1/V) * P^R Q^R$ dollars instead.

For example, let us assume that the CB was going to inject \$100 into the economy in the fourth quarter for a variety of reasons. Now, when the fourth quarter actually comes around, it turns out that the harvest is larger than expected and the PSA needs \$10 to procure the excess crop. In order to accommodate the needs of the PSA, the CB should extend \$10 of credit to them and then inject \$90 of additional credit into the system. While doing this, the CB does not need to calculate the value of the expression given at the end of the previous paragraph. It simply needs to realize that the \$10 it gave to the PSA must be considered when trying to meet its overall target of injecting \$100 into the economy in the fourth quarter. In fact, it is not likely that the Central Bank will need special instructions to do this. If they are the ones in charge of issuing the credit line to the PSA, it is almost inconceivable that they would not take this into account when conducting other operations that affect the money supply in the economy.

Thus, we come to the conclusion that, in a closed economy, proper financing of a food price stabilization program will result in no indirect costs to the rest of the economy. In addition, rice price stabilization is consistent with "macro-price" stabilization.

5.2 Financing a Price Stabilization Program in an Open Economy

The above analysis assumed that the country was self-sufficient in the staple food, and the result derived was that the instability generated throughout the economy due to abnormal domestic weather could be dissipated by appropriate monetary policy or the operation of a contingency fund in the government budget. If the economy is not self-sufficient in the staple

food, however, then the economy can now be disturbed not only by domestic weather disturbances, but also by changes in the world price of the staple food. Domestic weather disturbances can still be neutralized in the same way as discussed above, but changes in the world price will have to be met with different responses. For the purposes of discussion, we will assume that the country under consideration is typically (or always) a net importer of the staple food, and that domestic weather is "normal," i.e. the change in world price that confronts the country is taken to be exogenous. None of these assumptions are crucial. The case of a net exporter is entirely symmetrical, and none of the following arguments are altered even if the change in the world price is endogenous (i.e., if a poor domestic harvest causes a country to go into the world market for imports, which in turn forces up the world price).

If the country is a net importer of the staple food, and there is a temporary rise in the world price above its long run trend level, then the following issue must be confronted: should imports continue at their normal level, in which case increased foreign exchange will be required but domestic prices will remain stable, or should the quantity of imports be reduced so that the import bill remains constant but domestic prices become unstable? This question basically boils down to the optimal way in which to trade off foreign exchange instability and domestic food price instability. In order to address this question, we will consider two different foreign exchange regimes: one with a fixed exchange rate where foreign exchange is rationed, and one where the foreign exchange rate floats freely.

In the former case, an increase in world prices will increase the foreign exchange reserves required to purchase the normal level of imports, and if foreign exchange is rationed, the increased foreign exchange required for imports of the staple food will decrease the amount of foreign exchange available for other imports. This reduced supply of goods will cause inward shifts of the supply curve in other markets in the economy (as firms are forced to use alternative, less desirable, inputs), which will shift prices and quantities in those markets and cause spillovers elsewhere in the economy through income and relative price effects. Notice that with instability in foreign exchange, shifts in supply curves in various markets are the source of the spillovers into the rest of the economy, while in the case of unstable food prices, shifts in demand curves in various markets are the source of the spillovers. While the abstract transmission mechanism may be different in the two cases, however, there will still be spillovers in both cases, and it is not clear that the spillovers generated by one mechanism will be preferred to those generated by the other. Thus, we appear to again be shuffling instability from one sector of the economy to another, and it is not clear that there will be any payoffs from such a strategy.

Let us now consider the case where the exchange rate freely floats. In this case, an increased demand for foreign exchange (in order to finance the added costs of food imports due to the rise in the world price) will exert upward pressure on the exchange rate, causing a depreciation. Now, firms will not be rationed out of the foreign exchange market and be forced to use less desirable substitutes, but their costs of production in domestic currency terms will be forced up nonetheless, and their supply curves will shift inward just as in the above case. From here on in, the analysis is identical to that in the above paragraph, and it would appear

that we are again merely shuffling instability from one place to another. In fact, some would probably argue that we are shuffling the instability so that it is more harmful to the economy. Much of the literature on foreign exchange instability argues that this type of instability is particularly damaging because it curtails imports of essential capital and intermediate goods, thus disrupting production in key sectors of the economy.

The above discussion overlooks a key point, however. Just as domestic food price instability can be damped by storing food, instability of foreign exchange reserves can be damped by storing foreign exchange. In the case of foreign exchange, however, storage is essentially costless, since reserve funds of temporarily surplus foreign exchange can easily be invested on international financial markets in highly liquid instruments. Thus, the government can simply set up a contingency fund similar to the one discussed above as a possible component of fiscal policy. In years of high import prices, the foreign exchange contingency fund would be drawn down, while in years of low prices the fund would be built up. Just as with the contingency fund used to stabilize government spending, however, the major problem with such an approach is that it may be difficult to avoid the temptation of spending temporary surpluses of foreign exchange. Nevertheless, if such a foreign exchange contingency fund were to be set up, the side effects of stabilizing domestic food prices in an open economy (i.e. destabilizing foreign exchange availability) would be eliminated.

We have thus shown that the indirect costs of a food price stabilization program are zero if the program is financed properly. In a closed economy, it is possible to stabilize domestic prices and soak up the instability generated by weather disturbances with either monetary policy or fiscal policy that makes use of a contingency fund. In an open economy, it is possible to set up a similar foreign exchange contingency fund that soaks up the disturbances on the world market. We now proceed to a discussion of the direct costs of price stabilization programs, i.e. the physical and interest costs of storing the grain and the funds necessary for the operation of the PSA as an organization.

5.3 Direct Costs of Price Stabilization Programs

The direct costs of running a PSA are often substantial in actual practice, and such costs can be a large portion of the government budget in many countries. The worst examples of such, however, are most commonly due to the fact that the price stabilization agency is functioning primarily as a price subsidization agency, i.e. they are engaged in a systematic attempt to alter the long run level of market prices. As noted above, we are not discussing such programs in this paper. In passing, let us just say that the benefits of such programs are much more dubious than the benefits that arise from stabilizing food prices, and the costs required to run such programs are much greater than a program whose sole goal is to stabilize food prices.

As an example of this, let us examine the pricing policy that the National Food Authority (NFA), is forced to implement. The NFA currently procures palay at ₱6 per kilo, and releases rice at ₱8.50 per kilo. Since one kilo of palay does not yield one kilo of rice due to milling, procurement of palay at ₱6 per kilo should imply a price of ₱9.23 per kilo of rice even without

any marketing costs whatsoever (using a milling ratio of 0.65). Thus, the NFA is actually attempting to enforce negative margins on the rice market. Clearly this is not possible unless the government is the sole trader in rice. Since they are not in fact the sole trader, the mandated margins can never be effective. This in turn means that by insisting on selling rice at such low prices, there is a subsidy going to the buyers of NFA rice, who in this case are private traders.¹⁰

How large is this subsidy compared to the total NFA budget? Appendix 2 sets out some illustrative calculations, and the results are rather staggering. Based on 1990 pricing policies, annual subsidies to rice buyers (i.e. private traders) are equal to 1.23 billion pesos, which is roughly the size of the entire NFA operating budget. Thus, essentially all of the annual funding the government must give to NFA does not even go to stabilize prices, but rather to enrich private traders.

Let us now return to the theoretical argument, however. Even after eliminating costs due to activities other than price stabilization, there still remain the costs of storing the grain. We will argue that while the financial costs of this are certainly positive, the opportunity cost of such public storage may be negative. The argument hinges on the displacement of private storage by public storage. Such displacement is typically assumed to be a net loss to the economy because of the presumed greater efficiency that results when the private sector undertakes an activity. We most certainly do not want to dispute the general validity of this observation, which in recent experience has been amply borne out all over the world, but the fact remains that it is sometimes useful to examine the relative efficiencies of the private and public sector on a case by case basis.

For the argument to hold, we also need to assume a world of segmented credit markets where the government has access to credit (not necessarily its own) at interest rates below those available to many individuals in the private sector. This is likely to be an accurate reflection of reality since the size of the government's assets will allow it to bear risks more easily. Since interest costs are a large percentage of the cost of storage, the ability of the government to obtain cheap loans will significantly lower its costs of storage. The mere fact that the government is able to secure loans on better terms than a private entrepreneur is not likely to convince anyone, however, that it is efficient for public storage to replace private storage, since many would argue that the lack of profit incentives on the part of the government will engender other inefficiencies that will more than offset the gains from cheaper interest costs. Thus, we also need to develop some theory about what types of investments are relatively efficiently undertaken by the public sector.

¹⁰ Private traders are obliged to sell the rice they buy from NFA at a price 50 centavos above the NFA release price, which, if effective, would transfer the subsidy to the actual consumers of the rice. In practice, however, private traders have every incentive to re-bag the NFA rice, which tends to be high quality, and sell it as non-NFA rice. They would then sell low quality rice that they have obtained elsewhere as NFA rice. Reports alleging this practice are common, and they are almost certainly true, since traders have every incentive to behave in this way and the government has no way of monitoring their behavior on a minute by minute basis.

Storage to reduce the instability of rice prices is at least partially a public good, since, as elaborated on above, many of the benefits of rice price stabilization are spread across the entire population and it is not possible to exclude a group from reaping these benefits even if they do not pay for the services rendered. Thus, the private sector will not supply the socially optimal amount of storage. Storage of rice is not a pure public good, however, since some of the benefits from storing rice are excludable in that they can be denied to individuals who are not willing to pay for them. In other words, if you do not want to pay us for moving rice from the peak harvest in November to the lean season in July, then we do not have to sell you the rice in July.

Having established the rationale for some public storage, we now must realize that this public storage will displace some private storage, since the public storage will reduce price instability and the convenience yield to private stocks. This will lower the returns to private storage at the margin, and if we assume that private storage was taking place (before government intervention) until its marginal benefit equalled its marginal cost, then lowering the marginal benefit to private storage by introducing public storage will cause private storage to contract. Thus, public storage will not be able to simply *supplement* private storage, but will also be forced to partially *substitute* for it. Given the validity of the benefits discussed above in Chapter 3, which are clearly non-excludable and are thus public goods, it is obvious that the *supplemental* public storage that occurs is an efficiency gain to the economy.¹¹ What we will now argue is that the public storage that merely *substitutes* for private storage is not necessarily an efficiency loss, but that it may also constitute an efficiency gain. At this point, we now need to further develop the theory that can guide us as to what activities are most efficiently undertaken by the public sector, and explain why storage specifically may be such an activity.

One reason was that given above, namely, that in a world of segmented credit markets the government may be able to obtain credit at significantly lower interest rates than the private sector. Since interest rates are a major component of the cost of storage, this in itself gives the government an important comparative advantage. We now have to argue that the lack of profit incentives on the part of the government will not fritter away this advantage. In order to do this, we will need to distinguish between services that are "micro-information" intensive and those that are not. "Micro-information" is information that is highly specialized and has a value only in certain unique situations. This information takes so much effort to obtain that it will be done only if there is a definite profit incentive to do so, and thus government bureaucracies are unlikely to be adept at gathering such information. Most marketing services are "micro-information" intensive, since knowledge of each individual customer's requirements and preferences are clearly not very transferable to other customers. In other words, a marketing organization that treats its clients as a perfectly homogeneous group is not likely to stay in business very long. Provision of credit is another such "micro-information" intensive activity, since a detailed knowledge of each client who takes out a loan is essential if the bank is not to be saddled with bad loans and forced into bankruptcy. Not surprisingly, most governments are

¹¹ Provided of course that the physical costs of storage are less than the value of the sum total of all those benefits.

very poor at providing credit because of its "micro-information" intensity. As a final example, transportation of agricultural outputs and inputs also belongs to this category. The produce of farmers needs to be picked up in a timely fashion or else it will rot in the fields and be valueless. Since not every farmer needs his produce picked up at exactly the same time, this activity is "micro-information" intensive, and governments are not likely to perform it very well (and in fact, in most cases they don't).

Storage of grains, however, is not a "micro-information" intensive activity. Transport of the grain to and from the warehouse most certainly is, but the storage itself is not. Efficient storage is the result of employing a fairly well defined technology in a minimum number of locations, and we are arguing that this is precisely the type of activity that governments are least likely to bungle. Thus, the government's comparative advantage in storage due to its cheaper financing costs is least likely to be frittered away in an activity such as grain storage that is not "micro-information" intensive. Whether or not that advantage is in fact frittered away in actual practice is clearly a function of how efficient the particular government under consideration is. Unfortunately, this is a subject about which economists understand little.

To sum up the entire argument about the costs of running a rice price stabilization program, we claim that the indirect costs are zero if the program is properly financed, and that the direct costs under certain circumstances may be less than the physical costs of storage. In other words, we reach the fairly startling conclusion that the opportunity cost (not the financial cost) of running a price stabilization program may be negative even if the benefits discussed in Chapter 3 above are not taken into consideration whatsoever.

6. FOOD PRICE STABILIZATION IN ACTUAL PRACTICE: THE PHILIPPINES AND INDONESIA

The contrasting experiences with rice price stabilization in the Philippines and Indonesia provide an interesting empirical contrast that highlights the importance of certain implementation mechanisms if the potential benefits of food price stabilization are to be realized in actual practice. Comparison of these two experiences may be particularly instructive because the two implementing organizations (the National Food Authority, or NFA, in the Philippines, and the Bureau of Logistics, or BULOG, in Indonesia) were founded with similar mandates and similar organizational structures. In addition, at present, the two countries have similar levels of per capita income and are more or less self-sufficient in rice in a normal year.

The NFA is a direct offshoot of the National Grains Authority (NGA), which began operations in 1972 under the martial law regime of Marcos, although there have been a host of predecessor organizations tasked with a similar mandate, e.g. the Rice and Corn Administration (RCA) and the National Rice and Corn Corporation (NARIC). Similarly, BULOG as currently constituted first began operations in 1969, although again there were a host of predecessor organizations dating back to at least 1939. The present discussion, however, will focus on the experience of the last twenty years or so.¹²

6.1 Price or Volume Targets?

The above discussions of the potential costs and benefits of food price stabilization programs simply took it for granted that food prices were being stabilized. In actual practice, however, food (rice in the case of the Philippines and Indonesia) price stabilization is not necessarily easy to accomplish. As any private trader surely knows, markets can change drastically in short periods of time, and thus, if market prices of rice are to be effectively stabilized, the organization charged with stabilizing prices must be flexible enough to respond to new developments quickly and efficiently. Just as importantly, the government must be aware of the price stabilization agency (PSA)'s need for flexibility, and set its goals accordingly.

This consideration points up a major difference between the Philippine and Indonesian programs, namely, the setting of price or volume targets. BULOG is a price stabilization organization, and it is expected to defend the stated prices regardless of what quantitative actions it takes to do so. NFA is ostensibly also a price stabilization organization, but the government simultaneously gives it procurement volume targets, e.g. NFA is expected to procure x% of the crop. This carries with it the implication that NFA will have failed in its job if it does not procure at least that much of the crop.

¹² For a more detailed discussion of the history of price stabilization programs in the Philippines, see Dawe (1989). For a discussion of the Indonesian historical experience, see Timmer (1990).

Given that we are dealing only with random supply shocks or price movements on world markets, price and quantity are related in a unique one to one correspondence, and this correspondence is known as the demand curve. Thus, it is not possible to specify both price and quantity procured independently - choosing one will automatically set the value of the other, although it is not known ex-ante what the ex-post value of the other variable will be, since the supply curve is subject to random shocks. As an example, first consider a normal year where the price of palay is, let us say, ₱6 per kilo. Now an extraordinarily good harvest comes in that threatens to drive the price down. If it is desired to stabilize the price at ₱6 per kilo, then most of the excess crop must be pulled off the market (see section A of Chapter 5 and Appendix 1). This will be a relatively large percentage of the total crop compared to the situation that would prevail if the crop had been a normal one, in which case no net procurement would have to take place in order to stabilize prices. Now consider what would have happened if a poor crop had been realized instead. Again assuming it is desired to stabilize the price at ₱6 per kilo, then obviously rice will have to be released into the market, and procurement will not even be an issue. Thus, it is clear that the percentage of the crop that needs to be procured in order to stabilize prices will depend on whether the realized crop is good, bad or normal. Since it is impossible to predict the size of the crop in advance (the uncertainty surrounding this is the whole reason why it is important to stabilize prices in the first place), it is also impossible to predict what percentage of the crop should be procured if the goal is to stabilize prices. As a result, the setting of volume targets will prevent the PSA from performing its function, which is to stabilize prices.

6.2 Flexibility in Financing

The issue of price versus volume targets is intimately related to the flexibility of financing. In order to effectively adhere to price targets, the PSA must have timely access to funds in order to procure excess grain if it becomes necessary, and this will simply not be known a year in advance.¹³ The government of Indonesia has considered BULOG important enough to give it this flexibility provided it does in fact stabilize prices. If paddy prices are going down due to excess supplies on the market, BULOG can draw on a credit line in order to procure enough paddy in order to pull the price back up. This is in line with the recommendations in Chapter 5 on the proper financing of a price stabilization program, namely the use of monetary policy (extension of a credit line) in order to minimize spillovers elsewhere in the economy. In addition, we are here stressing the importance of the *timeliness* of the monetary policy in order to react quickly to changing market conditions.

The NFA, on the other hand, has not had this luxury. Instead, it must go through a battle in the legislature every year in order to secure its funding and sources of credit. Without flexibility in financing, NFA will not be able to effectively stabilize prices.

¹³ Actually, flexibility in financing is also needed in order to effectively adhere to quantity targets, since supply shocks will cause prices to change, which in turn will cause financing requirements to change. Since there are no benefits to be gained from adhering to such targets, however, there is no need to discuss this issue. In fact, strict adherence to quantity targets would most likely destabilize prices and make the economy worse off.

Clearly, there is a potential for BULOG to abuse its easy access to financing. A remedy for this is to insist that they repay the loans they receive. This is right in line with the requirements of a rice price stabilization program anyway, since when harvests are bad, BULOG needs to release rice into the system to prevent prices from rising. Release of the rice from government stocks will generate revenues for BULOG, and this money should be used to repay the loans they received when the harvest was good. Again, the need for flexibility must be stressed. It is not possible to know in advance exactly how much credit BULOG will need in any given year, or exactly when they will be able to repay their loans. Thus, it will not do for the legislature to decide these issues a year ahead of time. At the same time, there must be some constraints placed on BULOG. Loans taken out must be repaid, or else there is tremendous potential for abuse and a collapse of the whole system.

What is the real lesson of these two sections? One is that it is not so much the level of funding that is important for running an effective price stabilization program, but the flexibility with which that funding can be accessed. It is difficult, if not impossible, to stabilize prices if there is not access to flexible financing. Another way to state this is that it is not so important that a certain percentage of the crop is procured, but rather that grain can be procured when it has to be. In fact, even this may not be necessary once the PSA has established a reputation for aggressively defending floor and ceiling prices. Just the threat that the PSA will step in if necessary can be enough to defend prices without buying or selling any rice whatsoever.

A common complaint in the Philippines is that NFA can not really hope to stabilize prices unless they can procure at least 25% of the crop. This completely misses the point, however. BULOG procures only about 5-7% of the crop and is able to carry out its mandate effectively. The NFA could do the same if traders believed that it had the support of the government. Since it is common knowledge that the NFA does not have that support, however, private traders simply sit on the sidelines and wait until the NFA inevitably exhausts its limited funds. When that point is reached (which is rather quickly), the traders re-enter the market and buy and sell at prices that bear no relation whatsoever to those NFA is asked to defend. The key issues then are flexibility and reputation, not the creation of a mammoth bureaucracy that consumes huge quantities of scarce government resources.

6.3 Stabilization of Prices and Expectations

Given the setting of volume targets and the lack of flexibility in financing, it is not surprising that NFA has not been as effective in stabilizing prices as BULOG. This is revealed by a comparison of the coefficients of variation (CV) of real rice prices in the two countries. Over the period 1974-1987, the CV in Indonesia was 0.07, while in the Philippines it was more than double that at 0.17 (although both were lower than that for world prices, which was 0.42).

This simple measure, although instructive, is not indicative of the true extent to which price stabilization programs in the two countries differ. To appreciate why, consider once again the potential benefits to price stabilization discussed in Chapter 3. Except for the microeconomic consumption side, all benefits accrue largely as increased physical investment (the

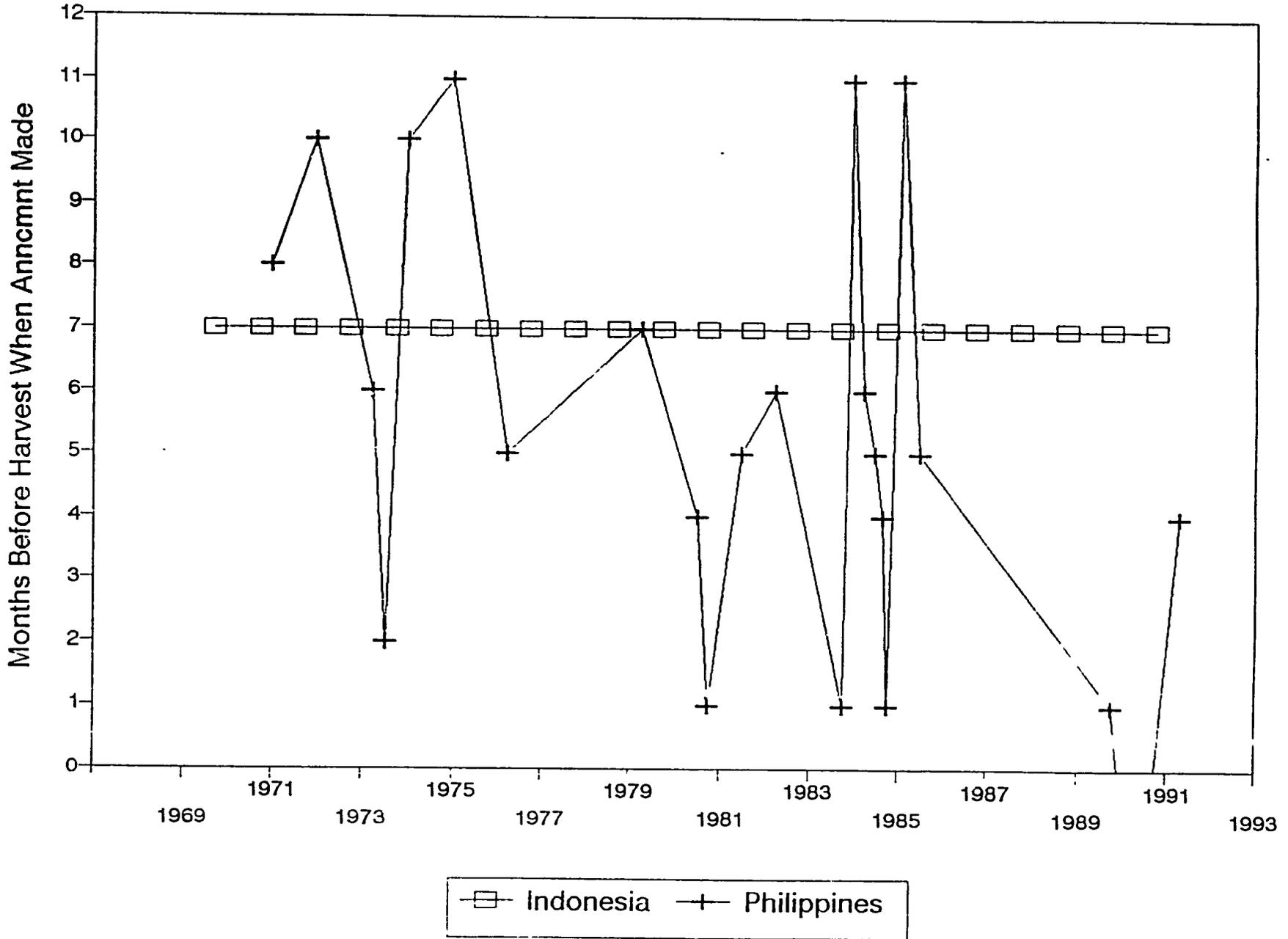
microeconomic consumption benefits may be viewed as investment in human capital). A key component of any investor's plans is his/her expectations of the future. Rice farmers will invest more in upgrading their farms if they expect future prices to be stable, and this holds as well for investors in other sectors who desire a stable macroeconomic environment and a stable political economy. Perceptions of the future depend heavily on how the government implements its program in actual practice, not just on academic measurements of the coefficient of variation over a 15 year time period in the past.

While expectations of the future may be difficult to quantify, Figure 2 gives a particularly graphic representation of how expectations on the part of private investors in the Philippines and Indonesia are likely to differ. The graph shows how floor prices for paddy are set in the two countries. The x-axis is time, while the y-axis shows how many months in advance of the main harvest floor prices are announced. In Indonesia, floor prices are announced every year in October for the main harvest the following May. This is done at the same time every year, and far enough ahead of the harvest to influence the planting decisions of farmers. The straight line, in a matter of speaking, represents the stable expectations of Indonesian investors. In contrast, floor prices in the Philippines are announced at basically random intervals, as can be seen by the huge variation in both the horizontal distance between successive points (representing the length of time between successive announcements) and the position on the vertical axis of each point (representing the number of months before harvest when any given announcement is made). This graph is basically white noise, and this probably more or less reflects what is in the mind of private investors in the Philippines. In such a situation, any price stabilization that is achieved ex-post was probably not expected ex-ante, which means that it would have had no positive impact on the investment climate. In conclusion, then, not only has Indonesia been able to stabilize prices more effectively, but each increment of price stabilization achieved has also had a larger effect on investment due to the organized fashion in which the stabilization was achieved.

6.4 Direct Costs and the Width of the Price Band

We have already discussed above the different means of financing price stabilization programs in the Philippines and Indonesia, with the implication that there have been fewer side-effects in the form of spillovers from the operation of BULOG. In addition, BULOG has also operated at lower levels of direct costs. One factor in this is the size of the respective staffs in the two organizations. The staff at BULOG is about the same size as that of NFA, despite the fact that Indonesia is roughly three times the size of the Philippines in terms of population and produces about four times as much rice.

Another key factor is the width of the price band in the two countries. As mentioned above in section C of Chapter 5, NFA procurement and release prices actually imply a negative marketing margin, which insures that the government will have to subsidize every single grain of rice handled by the NFA. This might make some sense if there was a whole-hearted attempt to target this rice to the poor, but this is not systematically the case. Thus, scarce government



Timing of Support Price Announcements

FIGURE 2

resources are used to subsidize private traders who are privileged enough to get access to the cheap rice, since they simply re-bag the high quality rice and resell it at a much higher price. Meanwhile, they pass off low quality rice obtained elsewhere at a very low price as NFA rice, which by law must be sold at a subsidized price. In Indonesia, however, the price band that BULOG is asked to defend is much wider and allows for full recovery of marketing costs. This tremendously reduces the size of the direct subsidies that must be given by the government to BULOG on an annual basis, and confines government spending to areas where there is a solid case for intervention.

To sum up the discussion of Chapter 6, Indonesia has operated its rice price stabilization program at lower levels of both direct and indirect costs. In addition, it has achieved higher levels of benefits due to the greater quantitative extent of the stabilization itself and also due to the orderly, transparent manner in which prices have been stabilized.

7. CONCLUSION: FOOD PRICE STABILIZATION PROGRAMS IN THE CONTEXT OF STRUCTURAL ADJUSTMENT

Structural adjustment is a harsh reality that many countries must face today. Such programs are a prominent ingredient in many World Bank lending strategies, and are almost certainly a necessary, if not sufficient, condition for getting many low income economies back on the track of sustained growth. We have argued here that food price stabilization, if properly implemented, can play an important role in increasing investment throughout the economy, which is an integral part of any transition from adjustment and stabilization to sustained growth. Beyond that, however, food price stabilization may dovetail well with structural adjustment programs in other ways. The discussion here will parallel closely the discussion of benefits in Chapter 3.

An important (and legitimate) concern of many is the impact structural adjustment will have on the poor, especially in the short run. Food price stabilization can provide a cushion for the poor in this regard, since it can guarantee that food prices will get neither too high (for poor consumers, either urban based or the rural landless) nor too low (for poor rice farmers). It thus provides a safety net of sorts in countries where it is impossible to set up social security or welfare programs as they exist in the industrialized countries.

Financial liberalization may also cause short run problems in that the flow of credit to the agricultural sector may be temporarily curtailed with the dismantling of certain specialized lending programs. Food price stabilization provides a cost effective way to mitigate this damage to agricultural producers by reducing the need of farmers for credit.

If structural adjustment programs are to be effective, reallocation of resources must take place across various sectors of the economy. For this to happen, relative prices must shift so as to signal private investors where to put their money. Effective implementation of a food price stabilization program can insure that relative price shifts are "real" in the sense that they are reflective of underlying technology and preferences instead of due to spillovers from weather disturbances or events in the unstable world rice market. Thus, the private sector will know that the relative price shifts that are being observed as the economy adjusts are "permanent," and not of temporary and uncertain duration. Such knowledge will smooth the flow of resources across sectors in a period when relative prices may be adjusting rapidly.

Finally, food price stabilization can help to insure the survival of the government, and with it the new reforms that have recently been implemented. If there is some possibility that the government implementing the reforms will fall, this will reduce the credibility of the reforms. Such credibility is an essential ingredient if the private sector is to react favorably to the new incentives, and without it the reforms will likely fail. Thus, by reducing the probability of a change in government, food price stabilization can help to lend credibility to structural adjustment programs.

In conclusion, food price stabilization offers a wide array of potential benefits at potentially very little cost. A major reason for this is that, although it must be implemented by the government, it is inherently a market based system. It offers few incentives for rent seeking, and can have wide ranging effects in the economy with a minimum of bureaucratic interference. As such, it deserves a long look as an important component of structural adjustment packages.

APPENDIX A

To calculate how the money supply should change in response to a non-normal harvest, start with the quantity theory of money

$$M_0 V_0 = P_0 Q_0 \quad (1)$$

where variables are as defined in the main text and the zeroes indicate the initial, or normal, situation. Next, express $P_0 Q_0$ as the sum of expenditures on rice (R) and non-rice (NR) goods:

$$P_0 Q_0 = P_0^R Q_0^R + P_0^{NR} Q_0^{NR} \quad (2)$$

In period 1, we will assume that the harvest is non-normal such that:

$$Q_1^R = Q_0^R (1+h) \quad (3)$$

where h can be positive or negative. Substituting (3) and (2) into (1), where (2) and (1) are now modified to carry the subscript 1 instead of 0 yields:

$$M_1 V_1 = P_1^R Q_0^R (1+h) + P_1^{NR} Q_1^{NR} \quad (4)$$

Since rice prices are being stabilized, $P_1^R = P_0^R$. In addition, we will assume (as an approximation) that non-rice output does not change, which means $Q_1^{NR} = Q_0^{NR}$. We will also assume velocity is constant so that $V_1 = V_0 = V$. Finally, we want to impose the condition of price stability for non-rice goods ("macro" price stability), so we will set $P_1^{NR} = P_0^{NR}$.

Now subtract (1) from (4) to obtain:

$$M_1 V_1 - M_0 V_0 = h P_0^R Q_0^R \quad (5)$$

A little manipulation yields:

$$\Delta M = M_1 - M_0 = \frac{1}{V} P_0^R Q_0^R \quad (6)$$

In words, this says that a fraction $1/V$ of the excess harvest should be procured for macro price stability.

Now we will derive the formula that shows what fraction of the excess harvest must be procured in order to stabilize rice prices. When the price stabilization agency (PSA)

procures the excess harvest, it injects money into the economy. This increment in income ΔI is:

$$\Delta I = hP^R Q^R \quad (7)$$

The definition of the income elasticity of rice is:

$$\eta_R = \frac{\% \Delta Q_R}{\% \Delta I} = \frac{\frac{\Delta Q_R}{Q_R}}{\frac{\Delta I}{I}} \quad (8)$$

Substituting $I = PQ$ and (7) into (8) yields:

$$\frac{\eta_R h P^R Q^R}{PQ} = \frac{\Delta Q_R}{Q_R} \quad (9)$$

Solving for ΔQ_R ,

$$\Delta Q_R = \eta_R h \alpha_R Q^R \quad (10)$$

where α_R is the budget share of rice. This is the additional rice that will be demanded due to the additional income in the economy (which resulted from the good harvest). Therefore, the PSA should procure

$$Q_{PROC}^R = hQ_0^R - h\alpha_R \eta_R Q_0^R \quad (11)$$

in order to stabilize prices. This simplifies to:

$$Q_{PROC}^R = hQ_0^R (1 - \alpha_R \eta_R) \quad (12)$$

In words, this says the PSA should procure a fraction $(1 - \alpha_R \eta_R)$ of the excess harvest for rice price stability. In actual practice, the PSA need not know the value of either α_R or η_R , since procurement should simply proceed until observed market prices are at the desired level.

APPENDIX B

We will here describe the calculations used to assess the size of subsidies granted to private traders in 1990 relative to the sum of fixed and variable operating costs of NFA in the same year. For this exercise, we will ignore the corn operations of NFA, which are a small fraction of their rice operations. All of the data used in this appendix comes directly from NFA.

The fixed overhead costs of NFA in 1990 were roughly 747.5 million pesos. We will attribute all of this to their rice operations. Strictly speaking some of this should be allocated to corn, but we will not attempt to do this. This will make the size of the subsidies granted to private rice traders smaller relative to the sum of NFA's fixed and variable rice costs by making the latter number larger. This bias will thus make our estimate of the relative size of the subsidies to private traders a lower bound on the true number.

To get an estimate of the sum of NFA's fixed and variable rice costs in 1990, we need to add variable operating costs for rice to the fixed costs noted above. In 1990, it cost NFA ₱695.60 to market a metric ton of palay procured on the domestic market and ₱432.20 to market a metric ton of imported rice. Total palay procurement in 1990 was 572,174 metric tons, while a total of 621,757 metric tons (mt) of rice was imported. Summing these two numbers (after taking account of the milling ratio of 0.65) gives us 993,670 mt of rice that was added to NFA stocks in 1990. On the other hand, since NFA released only 662,459 mt of rice that year, there was a substantial net buildup of stocks. In the long run, NFA stocks will not continue to be built up indefinitely, so we will only consider the operating costs necessary to procure 662,459 mt of rice equivalent in carrying out our calculation. This is because our purpose is not to assess exactly what happened in 1990, but rather to estimate what the typical effect of the pricing policies in place in 1990 would be on the government budget.

Since it costs more for NFA to obtain a kilo of rice equivalent by procuring palay on the domestic market than by importing, the variable costs we calculate will depend on what mixture of palay and imported rice we use to come up with the 662,459 mt of rice that was distributed in 1990. If we use all of the 621,757 mt of imported rice and only use palay to bring the figure up to 662,459 mt, we will have a lower bound estimate of variable costs. On the other hand, if we use all of the domestically procured palay, and then add imported rice to bring us up to 662,459 mt, we will have an upper bound estimate. Doing these calculations results in an upper bound estimate of 1.27 billion pesos and a lower bound estimate of 1.06 billion pesos (these numbers include fixed costs of 747.5 million pesos). These numbers represent the sum of NFA fixed and variable costs.

We now need to calculate the subsidy given to private traders. In 1990, the release price for rice was ₱6.50 per kilo from January to April, and ₱7.00 from May to December. Given that 78,649 mt of rice was released in the first four months of the year, and 583,810

mt was released in the last eight months, the weighted average NFA release price for the year was ₱6.94 per kilo of rice. In 1990, the average wholesale price of rice was ₱8.80 per kilo for rice of roughly comparable quality. This means that the government subsidized private traders by ₱1.86 per kilo of rice. Multiplying this by the total volume of rice released yields a subsidy of 1.23 billion pesos. This is close to the upper bound estimate of NFA costs, which means that NFA could have been self-financing if it had priced rice at market rates. Instead, it sold to private traders at prices well below market, which means that the funds the government provides for the operation of NFA are best viewed not as funds for the support of NFA, but rather as direct grants to private rice wholesalers. Thus, if the government abandoned its policy of subsidizing private traders, the rice price stabilization program would cost the government practically nothing.

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