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SUSTAINABLE AGRICULTURAL DEVELOPMENT: THE ROLE OF INTERNATIONAL COOPERATION

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Evaluating Policy Choices in Developing Countries: The Policy Analysis Matrix

INTRODUCTION

Developing country governments often alter substantially the incentives facing producers and consumers. Commodity markets are subject to taxes, subsidies and control of international trade through licensing or government monopolization. Prices in domestic factor markets for land, labour and capital, as well as the foreign exchange rate also receive ample attention from policy makers. A host of reasons account for these interventions including policy maker support to rent-seeking interests, promotion of non-efficiency objectives of society, provision of government revenues, control of inflation and compensation for budget deficits, compensation for the presence of market failures and stabilization of domestic markets in the face of international instability.

Whatever the rationale for government policies, many economists view the number of interventions as excessive and give this perceived glut much of the blame for stifling economic growth. But convincing policy makers of the merits of reform requires a detailed disentangling of the economic effects of policies. How do policies affect incentives among alternative commodities and technologies? How does the incidence of policy vary among regions? How would changes in various policies alter the incentive structure? The answers to such questions lie at the heart of most successful reform programmes.

The Policy Analysis Matrix (PAM) provides a framework for analysis of such questions (Monke and Pearson, 1989). A PAM portrays the pattern of incentives at the micro-economic level (producers, processors and marketing agents) and estimates of the impacts of policies on this pattern. This information is used to explore several topics of interest to policy makers: the pattern of comparative advantage and the potential for the economy to exploit this advantage; the formulation of public investment policy to support particular commodities, regions, and farm types; and the allocation of public research and development expenditures within the agricultural sector. A PAM does not provide information on all the important questions about policies which affect the agricultural sector (for example, risk and stabilization issues often require

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more information than that needed for the PAM), but PAM issues are often at the heart of policy debates about the most desirable course of agricultural growth and development. Further, the PAM approach is useful as a way to organize existing knowledge about agriculture. PAM results thus serve as an information baseline for monitoring and evaluation of the effects of policy and for identifying policy-relevant research needs.

The following two sections of the paper describe the analytical structure of the PAM and explain the meaning of the elements in the matrix. The construction of a PAM begins with the estimation of costs and returns at market prices, hence this calculation of private profitability shows the actual competitiveness of the agricultural activity. Subsequent analysis focuses on disentangling the effects of policies on observed (private) costs and returns. In the end, the analyst emerges with estimates of the efficiency or potential competitiveness of the activity (the costs and returns that would prevail if there were no government policies) and estimates of the magnitude of policy transfers to and from producers. Transfers are estimated for each input and output relevant to the activity, and their aggregate effect on profits are derived. Such results are communicated easily to policy makers and provide them with indicators of the quantitative importance of individual policies as well as a clear sense of the aggregate effect of policies on representative agricultural activities.

The next section of the paper considers application of PAM methods to two types of systems. The first system perspective is provided by the commodity chain–representative combinations of production, marketing and processing activities that are necessary to link farmers to consumers. Particular advantages of this perspective arise in identifying constraints at all stages of the marketing chain rather than just at the farm level and in assessing the impacts on farmers of changes in post-farm activities. The second system perspective is that of the farming system. Many agricultural observers argue that a full understanding of farmer behaviour requires an aggregated perspective on all production activities of the farm. This paper shows how 'whole farm' PAMs are constructed and used. The final section reviews the principal types of policy analysis that are aided by organizing information in the PAM framework.

THE POLICY ANALYSIS MATRIX

One of the principal motivations for the development of PAM was the need for easy communication between economic analysts and policy makers. Many decision makers often have only a limited exposure to the principles of economics and little time to digest the results of economic analyses. To be effective, therefore, presentations of the economic effects of policy ought to use perspectives understood by a larger group than just economists. At the same time, all methods need to satisfy the requirements of sound economic research, specifically an analytical framework which is theoretically rigorous and which tolerates variations in the quantity and quality of information available.

The cornerstone of PAM is the concept of economic profit. Profit is defined as the difference between revenues and costs – the value of outputs minus the

costs of all inputs. When calculated at observed market prices, the result is termed 'private profit'. The definition of private profit is embodied in the first row of the PAM: A-B-C=D (Figure 1a). The letter A is used to represent the value of revenues at market prices. The costs of inputs are divided into two categories. The cost of tradable inputs – letter B in Figure 1a – is the value of inputs available in world markets. In practice, many of these inputs are produced domestically. However, these commodities are treated as tradable inputs because they are also available in international markets and represent potential imports or exports. The second category of input costs is primary domestic factor costs, denoted by the letter C in PAM. Primary domestic factors are land, labour and capital. They are treated separately from tradable inputs because they are usually available only in domestic markets. Some intermediate inputs, such as electricity or transportation services, may be similar to primary domestic factors in that they also are available only in domestic markets. In a PAM,

	Revenues	Input costs		Profits
		Tradable commodities	Primary domestic factors	
Market values	A	B	C	D
Efficiency values	E	F	G	H
Effects of divergences	I	J	K	L

(a) The structure of the matrix

	Revenues	Input costs		Profits
		Tradable commodities	Primary domestic factors	
Market values	$P^d Q^d$	$\sum_i p_i^d q_i^d$	$\sum_j w_j^d l_j^d$	D
Efficiency values	$P^w Q^s$	$\sum_i p_i^w q_i^s$	$\sum_j w_j^s l_j^s$	H
Effects of divergences	I	J	K	L

(b) A disaggregated view of the matrix

FIGURE 1 *The policy analysis matrix*

these intermediate input costs are disaggregated into tradable and primary domestic factor components, avoiding the need for a third category of inputs.

The second row of the matrix is intended to show what private costs and returns would be without domestic policies. This part of the analysis requires assessment of all policies that affect producer incentives. The list of potential policy interventions is large since policy makers have so many ways to express their dissatisfaction with efficient market outcomes. Desires to alter outcomes in commodity markets are usually pursued through commodity price policies – taxes, subsidies and quantitative controls that apply to domestic production or trade of the commodity. A second category relates to macro policies which affect incentives throughout the economy rather than just in a single commodity market. Macro policies include factor market policies that directly influence the prices for labour, capital and land; exchange rate policies that directly affect the domestic prices of internationally traded commodities relative to non-traded commodities; and macro-economic policies which influence the distribution of purchasing power between government and the private sector.

The results of policy assessments are summarized in the second and third rows of the matrix. Social profit (H in Figure 1(a)) is measured in a manner analogous to the calculation of private profitability – the value of outputs minus the costs of tradable inputs and primary domestic factors, all measured at efficiency prices (H=E-F-G). Because efficiency values exclude the influence of domestic government policies, social profit can be interpreted as showing the potential competitiveness, or comparative advantage, of the activity.

Calculation of the individual revenue and cost elements – E, F and G – is an exercise in efficiency pricing and borrows heavily from the logical foundations of international trade theory and social cost–benefit analysis. For example, the Little-Mirrlees method of project evaluation argues that efficiency prices for tradable outputs (E) and tradable commodity inputs (F) are represented by world prices, because these prices would prevail in the economy if there were efficient markets and no domestic government policies. A similar conclusion about the relevance of world prices as efficiency prices comes from international trade theory – setting domestic prices equal to world prices allows the economy to exhaust potential gains from trade and realize maximum national income. Trade theory also provides the theoretical basis for efficiency pricing of primary domestic factors (G). Efficiency prices of domestic factors are defined as the prices that would prevail if the factors were employed so as to maximize national income. Because maximum national income involves the production of commodities at world prices, factor prices are implicitly linked to world market prices even though primary factors are not traded internationally.

As an additional category, market failures must be considered if efficiency prices are to be consistent with the maximization of total income. Like policies, market failures alter costs and revenues and prevent the economy from realizing potential income gains. Market failures fall into three categories. Perhaps the best known type is imperfect competition, in which a small number of sellers or buyers is able to influence aggregate supply or demand and therefore exert some influence on market price. The second category of market failures includes externalities, such as pollution, and public goods, such as transport and communications infrastructure. Of particular relevance to the PAM calcu-

lations are the externalities involving producers. These arise when producers are unable to charge consumers for the full value of the things which they supply, or when producers do not pay all the costs associated with their activities.

Institutional market failures, constituting a third category, are less clearly defined than the first two categories. They include situations in which markets are inadequately developed or do not exist because of a lack of adequate rules and regulations to ensure fair behaviour in the market and to prevent cheating. For example, formal capital markets are often under-developed in rural areas, at least partly because banks lack sufficient authority to pursue repayment of defaults. Diagnosing institutional market failure is complicated because public investments may be necessary for the development of markets. In the formal credit market, for example, transport and communications infrastructure also influence the decision to establish bank branches. To break such constraints and integrate the local capital market into the national network requires an investment decision by the public sector (provision of public goods) rather than regulatory reform. The presence of institutional market failures is thus more difficult to confirm than are the other types.

The difference between private (market) values and social (efficiency) values is defined as the net effect of divergences; these values make up the third row of PAM. Divergences can be evaluated for each of the categories of revenues and costs (I, J and K). From this information, the analyst or policy maker can identify the most important distorting policies and begin to see how one distortion complements or contradicts other distortions affecting the agricultural activity. When the values of divergences are dominated by policy distortions, the final row of the matrix is sometimes represented as the effects of policies rather than the effects of divergences (policy distortions and market failures). This simplified representation is not strictly correct when market failures are significant; the analyst should disaggregate the third row of the PAM into sub-rows showing the effects of distorting policies, market failures and efficient policies that offset market failures.

EMPIRICAL ESTIMATION

Budgets of costs and returns are the principal sources of information needed to construct the first row of the PAM. Figure 1b contains a disaggregated view of the calculation and makes clear the linkage to budget data. The private market value of revenues (A) is calculated as the observed price of output, P^d, times the quantity of output produced, Q^d (Figure 1(b)). The value of entry B is calculated as the market price for each input times the quantity used of that input, summed across all inputs ($\sum p_i^{d*} q_i^d$ in Figure 1(b)). Primary factor costs (C) are calculated in an analogous manner as the market price for each primary factor times the quantity used ($\sum w_j^{d*} l_j^d$). Because the market prices used to value outputs and inputs may be very different from world market prices or opportunity costs, these potential differences are recognized in Figure 1b by attaching a superscript (^{d}) to the private market values.

Budgets for costs and returns could be constructed for every farm or firm in the market, yielding a comprehensive set of profitability estimates. Since the preparation of such estimates would stretch the availability of resources for research, and would overwhelm analysts and policy makers, it is common for empirical estimation to concentrate on a small set of budgets for representative groups of farms or firms. These budgets may be quite specific with respect to region, agro-ecological zone and technology, but they should be representative of broad groups in the market rather than exact portraits of actual farms or firms.

Budget data may be collected from surveys initiated by the researchers. More likely, secondary data will provide at least part of the information needed. If secondary information is of sufficient quality, fieldwork efforts focus on verification, updating and collection of details about input–output relationships. Even with such a seemingly straightforward exercise, however, problems arise with respect to proper calculation procedures. Common complications are the treatments of non-marketed outputs and inputs, such as farm family labour. Non-marketed items are evaluated at their market-equivalent values, implying that their value to the household or firm is the same as their value in the market. Family labour, for example, is valued at the market wage for hired labour, adjusted for sex, age and skill level. In many situations, family labour may not be able to find hired employment as an alternative to working on their home farm, and the analyst may feel that the appropriate opportunity cost is less than the market wage. Such perspectives are readily incorporated within the market-equivalent approach to pricing. When private profitability calculations turn out to be negative, the result can be interpreted as showing acceptance of rates of return (to family labour, for example) which are less than the market value.

The budget for private costs and returns can be modified to generate the second row of PAM entries, the social (efficiency) values. Some of the transformations needed to convert private values to social values are straightforward. The efficiency prices for outputs and tradable commodity inputs are world prices, indicated in Figure 1(b) as P_i^w for outputs and p_i^w for tradable commodity inputs. World prices are used as the efficiency standards, even though these prices may be distorted by policies and market failures in foreign countries. Foreign policies are usually beyond the influence of domestic politicians, and (distorted) world prices thus represent the prices that would prevail in the economy in the absence of domestic policy. Such situations may seem unfair to the domestic agricultural sector (indeed, they may provide a non-efficiency rationale for domestic policy distortions), but world prices continue to represent the opportunity cost of the commodity to the domestic economy.

More problematic are the calculations of efficiency prices for primary domestic factors, denoted as w_j^s in Figure 1(b). One approach to estimation is to make use of the linkage between world commodity prices and factor prices with the help of a general equilibrium model. Unfortunately, such models are generally unavailable or lack the necessary detail to price the primary factors used in agricultural activities. The next best approach is to exploit the double-constraint structure of PAM. When direct derivation of efficiency values is too difficult, the analyst can estimate the values indirectly by identifying the

particular policies and market failures that influence factor prices. Adjustments of private market prices to their efficiency values are based on assessments of the quantitative significance of policy distortions (particularly factor price policies) and factor market failures. Sensitivity analyses are also useful procedures to evalute the impact of changes in social factor price estimates.

The most difficult information to obtain for social evaluation is the quantity data – Q^s, q_i^s, and l_j^s. A full assessment of the impacts of policy on profitability requires accounting for the effects of price divergences on output level and input use. Three categories of effects can cause social quantity measures to be different from private quantity measures (Q^d, q_i^d and l_j^d): changes in relative input prices can alter the combination of inputs used to produce a given level of output; changes in input prices can alter the amounts of inputs used and thus the level of output; and changes in output prices can encourage changes in input use that in turn change the level of output.

Measurements of these effects usually require a long time-series of detailed data that are rarely available, even for developed economies. The empirical approach to such problems is to rely on assumptions of fixed input–output coefficients (as done in social cost–benefit analysis) and thus to preclude any price response by the producer. A less restrictive approach is that used in linear programming analysis. In this approach, a set of alternative technologies (each with fixed input-output coefficients) is used to portray production alternatives. The technique with the largest social profit becomes the budget relevant for the second row of the PAM.

PAMS AS SYSTEMS

A policy analysis matrix can be estimated for any production activity which can be represented by a budget of costs and returns. These could include farm production, industrial processing or production, and marketing or other service sector activities. However, the analyst may also wish to present PAM results at a more aggregated level. One of these aggregation exercises involves representation of a commodity chain as a set of farm production, marketing and processing activities which is the essential link between producers and consumers. Consumption depends simultaneously on all of these activities, and knowledge of the complete pattern of incentives is needed to assess actual or potential competitiveness.

In a PAM, the aggregation of farming, marketing and processing activities is referred to as a commodity system (Figure 2). PAMs for individual activities (farm, farm-to-processor, processing and processor-to-market) are added together to generate measures of aggregate competitiveness and policy transfers. The measures of private profitability for the system require careful interpretation. Private profit for the commodity system is the aggregate of profits that accrue to different activities, whereas competitiveness at private market prices depends on positive profitability for each of the activities. Social profitability and total transfers have interpretations like those made at the activity level. The social profit of the system proves a particularly useful measure because some domestically produced outputs can be compared to world market coun-

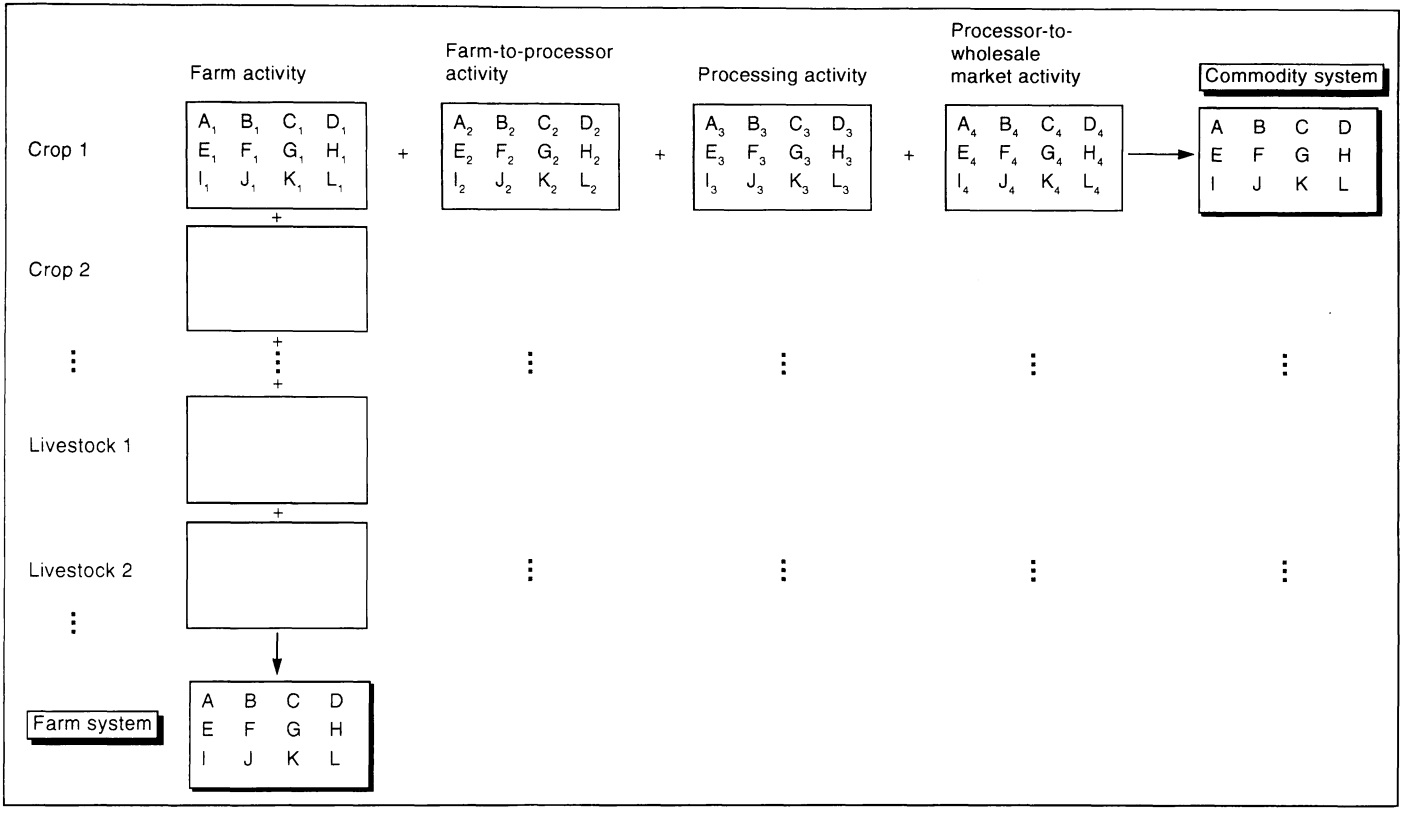

FIGURE 2 *PAMs for commodity and farm systems*

terparts only after they have been processed and delivered to a wholesale market. Milk, for example, is not traded internationally in raw form and becomes tradable only when processed.

Empirical estimation of the system values is more complicated than direct addition of the results at the activity level. Each output and input relevant to the production process can be counted only once. Double-counting can be a particular source of confusion for outputs, because the output from one activity is an input to the next activity in the commodity chain. Adding values across different activities requires a common numeraire, such as hectares or units of the final product. Conversion ratios are applied to the relevant activity budgets to convert values to this common numeraire. A third complication arises because four activities may be an inappropriate number to portray the system. For some commodities, processing is trivial and can be ignored. For others, two marketing activities (farm-to-processor and processor-to-market) may understate the number of transactions required to handle, transport and store the commodity. Generally, however, the four-activity framework has proved to be a workable starting-point for empirical analysis, and it is straightforward to expand or contract the number of activities recognized in the system.

The second aggregated perspective for PAM analysis is the farm system (Figure 2). Farmers do not think only in terms of individual commodities, but consider the farm as a composite of commodities, animals and technologies, with numerous complementarities and constraints binding together the different activities. Figure 2 shows that the PAM for the whole farm can be constructed as a composite of the farm activities in the relevant commodity systems. For the purposes of budget calculations, the whole farm can be described in terms of revenues and costs. Revenues come from the sale or home consumption of crops and livestock products. The farm's costs include inputs used in the production of crops and livestock and transportation expenditures used to service the farm's crop and livestock activities.

Some care needs to be taken in the farm system aggregation. Crop and livestock activities must be weighted to reflect their relative importance in the total area and total livestock population of the representative farm; costs and uses for inputs serving multiple production activities, such as machinery, must add up to totals that are consistent with aggregate availability; and all intra-farm transportation activities must be represented somewhere in the individual activity budgets; and a numeraire (usually land area) must be chosen to allow addition across a disparate group of commodities. Provided that all inputs and outputs are attributed to one of the commodity or livestock commodity systems, the 'whole farm' PAM will give an accurate accounting of revenues, costs and profits.

The results of whole farm analyses provide insights into aggregate farm income and the net effect of policies and market failures on income. Such calculations are particularly useful in comparisons across different farm systems. Whole farm results also provide a convenient framework in which to discuss farm-level issues, such as the total demand for farm labour and capital equipment. However, they are less useful in highlighting the relative importance of particular policies. The effect of policy distortions on total revenues,

for example, is a composite of effects of commodity policies for all the outputs of the farm. Without commodity system PAMs, the analyst is unable to explain (or even calculate) the values of any of the elements in the whole farm PAM. Consequently, commodity system PAMs are necessary complements to whole farm PAMs.

PAM AND POLICY EVALUATION

Because both the rows and the columns of the matrix are based on accounting identities, the entries in the matrix satisfy a double-constraint consistency check that characterizes all successful accounting methods. The aggregate impact of divergences on the incentives facing the producer (L) can be represented in two ways: as the difference of the elements in the third row (I-J-K) or as the difference between private and social profits (D-H). These results are useful to determine the source of competitiveness: namely whether the activity is profitable because of the support of policy ($H<0$, $L>0$) or because of natural comparative advantage ($H>0$).

By considering the pattern of incentives with and without policy, the methodology can play a useful role in identifying new and efficient policy interventions. First, the results can be used to identify public interventions that assist economic growth. From a micro-economic perspective, growth opportunities are represented by excess profits. Often these profits are the consequence of changes in technologies, prices of outputs, exchange rates and domestic factor prices. When excess profits are positive, the industry has an incentive to expand production. Increased production allows for decreases in imports or increases in exports (if the good is a tradable) or a reduction in prices (if the good is a non-tradable). Perhaps most important, increased production entails increased demand for domestic factor inputs and allows increases in factor prices. Ultimately, excess profits are eliminated and the industry is ready for another round of growth.

Social profits are indicators of opportunities for economic growth. If positive, policy makers can assess the possibilities for expansion of the activity. A decision by producers to expand output requires that private profits are positive (producers have no particular interest in social profits) and may require the elimination of distorting policies in order to improve incentives. Public investments, such as improvements and expansion of road networks, may be needed if the profitable activity is to be introduced to other regions. In this circumstance, social profits can be compared with public investment costs to determine the efficiency of expanding the activity. Finally, policy makers may need to supplement PAM results to evaluate the merits of expansion. If the country has a large share of world exports, for example, the benefits of increased production will be at least partly transferred to foreign consumers through reduced export prices. If the country is a large importer, the gains from increased production will be augmented by the consequent effect on import prices.

Another use of the results in the analysis of growth is to simulate hypothetical technical changes. The appearance of negative social profitability in an

existing activity need not imply that the activity should be abandoned since production of the commodity may serve well some non-efficiency objective of the economy. Policy makers can then explore the possibility of 'inducing' social profitability through the invention and dissemination of a new technology. The new technology can be described in terms of quantities of inputs and outputs, and social prices can be applied to evaluate social profitability. The impact of the technical change on social profitability is compared with the expected costs of research and development to identify efficient opportunities for public expenditures.

Other opportunities to identify efficient policy interventions arise when market failures are present. PAM results provide measures of the cost of market failure. Hence by calculating PAMs for all affected activities and aggregating, the total cost of the market failure to the economy can be estimated. This value is compared with the costs of implementing a policy to offset the market failure to distinguish between worthwhile countervailing policies and those that are uninteresting because their introduction in the economy has transactions costs that are too high. Decomposition of the final row of the matrix is essential in this context to recognize the effects of policy distortions, the effects of market failures and the effects of efficient government policies.

In addition to identification of efficient policy interventions, another potential use of the technique involves the evaluation of distorting policy. In this application, a major difference arises between it and most social cost–benefit approaches. Many methods of social cost–benefit analysis attempt to adjust efficiency values to reflect the concerns of society about income distribution and other non-efficiency objectives, such as food security. In reality, these adjustments are impossible to calculate. The flaws in attempts to value non-efficiency objectives are the presumptions that society's preferences for all aspects of the economy can be identified, compared with one another and ranked; and that some individual (or set of individuals) can be selected by the economic analyst and deemed the proper spokesman for society. Even if such difficulties were resolvable, the importance of non-efficiency objectives is neither fixed through time nor determined in advance. Instead, their importance at any point in time is the outcome of debates among policy makers.

The argument against the modification of efficiency values in social price calculations does not imply that analysts should (or can) ignore non-efficiency issues in the evaluation of economic policy. Consideration of non-efficiency objectives instead is deferred to a later stage of policy analysis, after quantitative estimates of the effects of policy on efficiency have been made. Efficiency is not the only objective of economic policy, and non-efficiency objectives provide possible explanations why divergences may be desirable. Measures of transfers (I, J, K and L) and the sacrifices of potential income (H, or profitability measured at social prices) allow PAM results to serve as inputs into policy debates about the desirability of trade-offs between efficiency and non-efficiency objectives. With the PAM approach, the analyst is not forced to make definitive statements about 'proper' and 'improper' policy.

CONCLUSIONS

The strength of the PAM approach is its simple framework, which is capable of showing non-economists critical facets of many important issues in economic policy. At the same time, the method is sufficiently general in structure to accept analytical sophistication. Both aspects are essential for successful policy analysis. Results have to be understood easily by non-economists (particularly policy makers) to have an impact on policy debates. Many economic analyses are unused for want of an understanding audience. Policy analysis frameworks should be sufficiently flexible in information requirements for analyses to be performed in data scarce environments. For example, the results of general equilibrium models can be useful for the determination of the social efficiency prices of primary domestic factors, and econometric estimates of input–output relationships and output responses can help in the estimation of the input and output quantities relevant to calculation of social efficiency revenues and costs. However, such estimates are not essential to the construction of PAMs, and researchers have other options for acquiring the necessary estimates.

Initial efforts to develop PAMs will require assumptions or guesses about appropriate values for some parameters. The results can then be enhanced by the sequential improvement in the quantity and quality of information. The important point is that, once an initial PAM baseline is prepared, the analyst can see the relative importance of various information gaps and begin to organize subsequent research efforts in an efficient manner. Such procedures allow policy makers and analysts alike to improve and deepen their understanding of the relationships between policies, agricultural competitiveness (private profitability) and efficiency (social profitability).

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DISCUSSION OPENING – ALEXANDER SARRIS*

A major contribution to policy debates in developing countries in recent years has been empirical estimation of direct and indirect costs of micro-economic or macro-economic policies on various sectors in the economy, and on agriculture in particular. A series of techniques has been applied, largely in the context of the general push towards market and institutional reforms necessitated by liberalization and structural adjustment programmes. As Monke and Pearson suggest, one problem with such analyses is communication of the results to policy makers in a way amenable to easy policy evaluation and

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debate. Their contribution lies in proposing an organizational framework for presentation of results to make them more accessible.

The Policy Analysis Matrix (PAM) suggested as a means of easier communication between analyst and policy maker is based on analysis of profitability of specific activities within a production system. In other words, the key information communicated to the policy maker is the private profitability of the particular production or marketing activities under the current, presumably distorted, policy regime, and in an undistorted policy environment. The idea is that the policy maker can assess the cost of the policy or other distortions on private incentives and hence can be helped in forming a judgement about appropriate policies. Information is communicated by arranging the revenues, tradable input costs, non-tradable input costs, and profits, under the current policy regime, in a row; then placing the same information in a subsequent row but with valuation at efficiency prices. The difference between rows is the key information that will presumably help the policy maker obtain a better perspective on the impact of policies.

The belief underlying the suggestion seems to be that the most important information which might motivate policy reform or debate concerns divergence between undistorted and distorted prices for an activity, and the resulting impact on private profits. I suggest that such information, valuable as it might be, is only part of the story. Policies are instituted for a variety of objectives, and policy makers are often quite willing to sacrifice private profitability to promote some other objective. Unless the impact of a particular set of policies on this variety of objectives is also analysed, the information conveyed is only partial. For instance, a policy of export taxation applied to a particular agricultural product might be motivated by fiscal needs, in full recognition of the fact that the incentive to private producers is reduced. In such a case exhibiting the PAM for the commodity does not help the policy debate. What might help in such a case would be joint presentation of the disincentives to private production, along with the cost of enforcement of the policy as well as the fiscal benefit, and the contribution of various distortions to these.

The second criticism of the PAM is that it seems to rely on the comparison between distorted and completely undistorted prices in evaluation of costs. Most policy makers, and particularly those concerned with specific sectoral policies, have a limited set of instruments at their disposal. Hence the most interesting information for them would be the implications of the particular reforms within their discretionary power, leaving all others unchanged. For instance, a minister of agriculture will be much less concerned about exchange rate policy than about agricultural price policy. This implies that the row in the PAM exhibiting private profits and costs at efficiency prices must be disaggregated to indicate the implications of difference distortions. It could very well be the case that, while a particular price policy *ceteris paribus* has a beneficial effect on private producers, a fiscal, monetary, trade or other non-agricultural policy might reverse the impact. In such a case it is clear that the opposing effects of different policies on the activity should be exhibited, since that might indicate both the relative importance of policies and the necessary reforms.

The third criticism of the PAM concerns the information required for calculation of the different entries in the matrix. The authors suggest that a PAM can be estimated for any activity that can be represented by a budget of costs and returns. It is the recalculation of the costs and returns at different prices, namely efficiency ones, that provides the information necessary to complete the PAM. However, while it is relatively straightforward to compare domestic and international prices at current exchange rates, estimating prices for primary factors of production, as well as foreign exchange, under different policy regimes, is far from trivial. The authors suggest discretion, judgement, and trial and error in order to derive some of these prices. However, this procedure, valuable as it might be under some circumstances, seems quite inappropriate for presenting information of policy relevance. It is quite common, for instance, for difference policies to have opposing effects on the shadow prices of various factors and foreign exchange due to the multi-market general equilibrium nature of the interactions. In fact, seemingly simple issues, such as the response of marketed surplus of staple food to prices, become quite complicated once income effects, to mention only the simplest ones, are included. It can be correctly argued, of course, that what one needs in such a case is a multi-market or general equilibrium model to assess the influence of policies. The authors acknowledge this need, but they dismiss it as too complicated for speedy analysis. However, I suggest that policy reform is not a trivial business, and sound analysis of impacts, no matter how complicated, is a necessary prerequisite to effective recommendations on anything but small policy changes. In fact, foes of policy reforms can all too often latch onto criticisms of simple approaches as a weapon for thwarting meaningful reform efforts.

Given that serious and major policy reforms necessitate debate based on sound empirical analysis, a major part of which is precisely to assess the impact on macro variables such as costs of primary factors and foreign exchange, the information of such exercises will usually be much more than that conveyed by a PAM. I do not think that the major problem of most analysts has been to convey information from sophisticated exercises to policy makers in a parsimonious way. While it is correct to assume, as the authors do, that policy makers are not particularly interested in the methodologies, but rather the results, I believe that the problem with most empirical policy analyses seems to have been their lack of methodologically sound empirical valuation. One might argue that such analyses are time-consuming and might not be available for the critical debates. However, the information on which a PAM is based does not seem any less time-consuming to obtain and analyse. In fact, the micro surveys needed are the most time-consuming exercises in policy analysis.

It must, nevertheless, be emphasized that these criticisms are not meant to suggest that the PAM proposed by Monke and Pearson is a superfluous tool. In fact, its strength lies in exhibiting the 'vertical' pattern of profitabilities of different activities in a relatively simple picture. In particular, I find the idea of separating the pattern of private profitabilities along a vertical market chain rather attractive. This is in keeping with the strength of the approach which is its partial equilibrium nature. However, my belief is that any summation of PAMs across commodities is not as useful, since it is much more likely that it

will run up against assumptions that are untenable under general equilibrium. On balance, one should assess the utility of this particular tool in the context of its strengths relative to others and not as a panacea for all types of policy analysis needs.