Structural Characteristics of the Economy of Mozambique: A SAM-based Analysis

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Abstract

Key features of the Mozambican economy are synthesized in this paper based on a new 1995 social accounting matrix. Particular attention is paid to the critical role of home consumption and large marketing margins. The fundamental importance of agricultural development emerges clearly from the analysis in which the multiplier for value added by capital is re-examined. Agriculture has large sectoral multipliers and is generally more effective in the use of scarce capital than industry and services. Commodities with attractive features for the promotion of agriculture in the short to medium term include maize, rice, as well as small-scale livestock and forestry.

1. Introduction

This paper distills insights about the economic features of the Mozambican economy, based on the 1995 social accounting matrix (SAM), named Mozam.1 The paper also outlines implications of these characteristics for choice of development strategy and policy. No up-to-date SAM for Mozambique has so far been available. Hence, this study should help in providing a more coherent understanding of the complexities of the economy—including the linkages between the various sectors—with a special focus on the role and importance of agricultural sectors. The SAM also indicates the critical importance of high marketing costs, the sizeable share of agricultural production consumed on-farm, and the capital constraints, which inhibit marketed agricultural production, in particular.

The methodological approach relies partly on a descriptive analysis grounded in Mozam and its aggregate version, known as Macsam. In addition, a series of multipliers are derived from Mozam, and a structural decomposition of these is undertaken following the structural path procedure introduced by Defourny and Thorbecke (1984). It follows that policy implications are based on the income and expenditure shares and the production technology in place in 1995 as reflected in Mozam. Finally, a novel interpretation of the multiplier for value added by capital (referred to as the capital multiplier) is developed as part of the analysis to reach appropriate conclusions about development strategy and the allocation of scarce capital.

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2. Mozam: Basic Features and Assumptions

War and economic collapse have not been kind to data-gathering and analysis systems in Mozambique. Nevertheless, the National Institute of Statistics (NIS) has, starting in 1991, produced coherent sets of national accounts in accordance with the United Nations System of National Accounts. The NIS figures differ substantially from the current official national accounts published by the National Directorate of Planning (NDP). These differences reflect that the NDP data are based on dubious estimation procedures and poor cross-checking, as suggested by Johnson (1995). More specifically, the NDP national accounts rely heavily on data from technical ministries and public enterprises. They do not, for example, capture the importance of home consumption of own production in the subsistence sector and a variety of activities in the services sector. In addition, the NDP data are not representative of economic activity in the formal private sector following the economic reforms undertaken since 1987 in the context of the Economic Rehabilitation Program. In contrast, the NIS data are based on a variety of surveys, and they have been adjusted for items unnoticed in the NDP approach. Finally, the new NIS accounts provide gross domestic product (GDP) from the expenditure as well as the income side.

Mozam incorporates a complete and coherent dataset, based on NIS information, which is amenable to in-depth economic analysis. Furthermore, Mozam contains a reasonable amount of detail on the production side, covering 40 activities as set out in Arndt et al. (1998). With 13 agriculture and two agricultural processing activities, the agriculture, forestry and fisheries sector is particularly well represented. There are also 40 commodities, three factors of production (agricultural and nonagricultural labor, and capital), and two household types (urban and rural). In addition, government expenditure is divided into two separate accounts, recurrent government and government investment. The division of government expenditure highlights the role of aid inflows for the financing of investment for reconstruction purposes, and it also facilitates the examination of recurrent expenditures relative to tax revenue. A non-governmental organization (NGO) account captures transactions related to NGOs, while a capital account reflects the private-sector savings–investment balance.

Mozam includes a number of innovative features. In household demand, a distinction is made between home consumption of own production and private consumption of marketed commodities. Home consumption avoids trade and transport margins, which can in Mozambique represent 50% or more of the marketed price. Thus, Mozam captures prevailing incentives for households to avoid markets and function more as autonomous production/consumption units. Marketing margins are in focus in relation to decisions regarding production for export and domestic consumption. However, transactions costs are also important for imported commodities. Domestic, export, and import marketing margins are therefore explicitly broken out for each activity in Mozam.

Finally, in order to obtain the balanced Macsam, as well as the disaggregated Mozam, the minimum cross-entropy estimation procedure proposed by Golan et al. (1994) was used. This method takes all the consistency requirements of the SAM into account, and the aggregate macroeconomic totals of Mozam were in all cases within 1% of the previously balanced Macsam. Since entries were disaggregated on the basis of different, not fully compatible data sources, adjustments were necessary to individual cells of Mozam. Differences from the original data (the estimation “prior”) were generally small (i.e., less than 1%) and seldom more than 20% (in such cases from a small base).

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3. Macroeconomic Characteristics

A coherent 1995 macroeconomic profile of the Mozambican economy can be derived from Macsam, and it emerges that Mozambique is a very poor country. Using an exchange rate of 8,890Mt/US$ and an estimated population of 16 million, per capita income amounted to only 121 US$ in 1995 market prices. Macsam also documents that home consumption accounts for almost 19% of total GDP, and private consumption of marketed commodities makes up 62%. Since home consumption avoids marketing margins, this item actually accounts for a much higher proportion of “real” household demand than reflected in Macsam.

Turning to the external balance, imports add up to some 49% of GDP, while exports are 19%. This sizable foreign trade deficit is financed by an inflow of foreign capital, mainly in the form of aid. External capital inflows to the government and NGO budgets in Macsam can be directly attributed to foreign donors. Moreover, a major share of net capital inflows to the capital account, derived on a residual basis, is in fact related to foreign aid, as commercial borrowing from abroad is very limited. Mozambique is therefore one of the most aid-dependent countries in the world, and the sustainability of these aid flows is a matter of serious concern.

Private and government investment account for respectively 19% and 17% of GDP. The productivity of investment has given rise to concern as growth of GDP in per capita terms has remained around 4–6% per annum in recent years. A balanced assessment must, nevertheless, take into account that some donor-funded investment may in practice be of a recurrent nature. In any case, given the need to reconstruct Mozambique after a long and vicious war, it is essential to maintain investment at a high level in the years to come. When it comes to the financing of investment, the dependence on external sources is daunting. Total domestic savings from enterprises, households, and recurrent government add up to 11% of GDP, equivalent to a mere 31% of total investment. Hence, more than two-thirds of total investment is financed through external sources. Maintaining a high and efficient level of investment and lowering aid dependency is a challenging task, given the imperative of increasing the absolute level of consumption of the Mozambican population.

In relative terms, private consumption including home-consumed production and marketed consumption make up some 81% of GDP. Government and NGO consumption amount to almost 13% of GDP. While consumption should rise in absolute terms owing to widespread poverty, consumption will in the longer term have to fall to a much lower relative level, unless donors are willing to maintain the extraordinarily high aid level.

Aid inflows registered in the government budget make up more than 40% of total revenue. Aid is therefore the largest single revenue item. Other important sources of revenue are consumption taxes and import tariffs, accounting respectively for 27% and 15% of the total, while income taxes yield 6% only. The composition of revenue clearly reflects both the dramatic aid dependence of the Mozambican government and the low level of development. Trade taxes have so far been one of the few administratively feasible ways of mobilizing revenue from domestic sources. Since their significance has been decreasing in line with the reform efforts, there is now a pressing need for reforming the income tax system. Yet, it will take time before such changes can have any major impact.6

Government recurrent consumption amounts to less than 10% of GDP.7 This is low given the critically important role, that the state will have to play in furthering development in Mozambique. Hence, in line with the implementation of public sector
reforms to improve government effectiveness, and good governance, this share should increase. Finally, total government revenue and expenditure (including investment) imply a financing requirement of 3% of GDP. This is not by itself a critical figure. It is, nevertheless, high in light of the low domestic household and enterprise savings, amounting to less than 9% of GDP, which put the vulnerable, aid-dependent nature of the Mozambican government into perspective.

4. Sectoral Characteristics and Economic Linkages

The disaggregated nature of Mozam makes it possible to extend the descriptive macroeconomic analysis based on Macsam to a sectoral level. In what follows focus is, first, on production activities and the split between home-consumed and marketed production, and second, on the supply and demand for commodities, including marketing margins. Subsequently, more in-depth analytical insights as regards the agricultural sector are pursued and a set of SAM-multipliers are derived and decomposed. A full version of Mozam is available in Arndt et al. (1998). Only highlights are provided here.

Mozam

The activities columns of Mozam indicate that value added at factor cost amounts to 56% of total production costs in Mozambique. The share of value added is particularly high in agriculture, where intermediate inputs account for less than 16% of total sectoral costs. The limited intermediate input use in agriculture reflects the rudimentary nature of technology used in this labor-intensive sector. In fact, almost 90% of value added in agriculture represents labor wages. A more detailed analysis of agricultural sector costs of production shows that—except for raw cotton, other export crops, and fishery—the low share of value added by capital is, indeed, a general sectoral characteristic. In contrast, the share of value added by labor is 45% in industry and 32% in commerce. Hence, the intensity of capital is—under the rate of return assumption already referred to—relatively high in the production of commerce activities.

In the activity rows of Mozam, production is transformed into home-consumed and marketed production. The latter group corresponds to 88% of the value of total domestic production. Yet, in agriculture, marketed production accounts for only 45% of domestic production, valued at producer prices (i.e., excluding marketing margins and consumption taxes). This is a startling feature of the underdeveloped Mozambican economy, since no less than 80% of the Mozambican population depend on agriculture for their livelihood. It also follows that home consumption is mainly a rural phenomenon.

Total commodity supply in the columns of Mozam does not include the supply of goods for home consumption in the activity rows. Consequently, the agriculture share of total marketed supply is very low, as shown in Table 1. Industry plays a significant role in formal sector sales, and it is also the sector in which imports make up an overwhelming share of supply. Thus, industry is the sector in which government has at present relatively easy access to revenue in the form of consumption taxes and import tariffs.

Table 1 confirms that commercial margins are particularly important in agriculture. In fact, they account for 29% of the total value of the supply of marketed agricultural products. In industry, the corresponding share is 19%, whereas the service sector has by definition no marketing costs. The high share of commercial margins in marketed agriculture explains why home consumption of agricultural products is so widespread.
It is moreover illustrative that heavily home-consumed subsectors, such as cassava and other basic crops, are burdened with average domestic marketing costs of 80% of the market prices. In contrast, maize faces more modest margins of around 25%.

The demand side of the Mozambican economy, in the commodity rows of Mozam (Table 2), is dominated by private consumption, but the two investment accounts also make up a considerable share of final demand. Moreover, Table 2 documents that the export share of the industrial sector is small. This sector therefore runs a large trade deficit. In contrast, both the marketed agriculture and service sectors run trade surpluses with export shares of around 20%. Within agriculture, more than two-thirds of exports come from fishery.

The disaggregation of factor and household accounts in Mozam indicates that 80% of capital income is paid to urban households, whereas 60% of wage income goes to rural households. Given that the large majority of Mozambicans are rural, this depicts an unequal distribution of income between rural and urban areas. Poverty, though certainly acute for some urban people, is mainly a rural phenomenon. While urban dwellers save 12.5% of their income, the equivalent savings rate is only 3.8% in rural areas.

Finally, Mozam implies that while agriculture is crucial for the subsistence and employment of the vast majority of the Mozambican population, agricultural GDP amounts to only 28% of total GDP, including marketed production at market prices as well as home consumption at producer prices. On the other hand, services, industry, and commerce account for 27%, 25%, and 20% of GDP, respectively.

Table 1. Composition of Sectoral Supply (100 billion Mt)

|                     | Agriculture | Industry | Services | All sectors |
|---------------------|-------------|----------|----------|-------------|
| Domestic production | 25.1        | 79.2     | 90.1     | 194.4       |
| + Marketing margins | 12.5        | 37.0     | 0.0      | 49.4        |
| + Consumption taxes | 0.9         | 7.6      | 2.2      | 10.8        |
| + Import tariffs    | 0.2         | 5.6      | 0.0      | 5.9         |
| + Imports           | 5.0         | 64.7     | 14.2     | 83.9        |
| = Sectoral supply   | 43.8        | 194.1    | 106.6    | 344.5       |
| Share of total supply | 12.7%      | 56.3%    | 30.9%    | 100.0%      |

Table 2. Composition of Sectoral Demand (100 billion Mt)

|                     | Agriculture | Industry | Services | All sectors |
|---------------------|-------------|----------|----------|-------------|
| Intermediate consumption | 15.0      | 57.7     | 48.4     | 121.1       |
| + Private consumption   | 20.1        | 70.9     | 15.8     | 106.8       |
| + Government consumption | 0.0        | 0.0      | 16.8     | 16.8        |
| + NGO consumption      | 0.0         | 0.0      | 5.5      | 5.5         |
| + Private investment    | 0.1         | 30.8     | 2.3      | 33.1        |
| + Government investment | 0.0        | 27.6     | 0.8      | 28.4        |
| + Exports              | 8.6         | 7.1      | 17.0     | 32.7        |
| = Sectoral demand      | 43.8        | 194.1    | 106.6    | 344.5       |
| Share of total demand  | 12.7%       | 56.3%    | 30.9%    | 100.0%      |
Multiplier and Structural Path Analyses

SAM-based multiplier models belong to the class of fixed-price general equilibrium models, used to assess the economic effects of exogenous changes in income and demand. The common distinguishing features of these models include three basic sets of assumptions. First, prices are fixed. Accordingly, conclusions about quantities are drawn on the basis of values. Second, functional relationships are taken as linear in the SAM-columns. This implies, *inter alia*, that Leontief production functions are relied on in the activity columns, and there is no substitution between imports and domestic production in the commodity columns. Third, multiplier models are demand-driven. Accordingly, there are no supply-side constraints on economic activity.

In the Mozam-multiplier application, activities, commodities, factors, enterprises, and households are specified as endogenous accounts, whereas government recurrent, indirect taxes, government investment, NGO, capital, and rest of the world are kept exogenous. Thus, only two kinds of shocks are possible, working through respectively the commodities and the household accounts. Reference will, in the analysis, be made to individual as well as total and sectoral multipliers. The total multiplier for domestic activity output following from a shock to a commodity is defined as the sum of the multipliers (down the column of the multiplier matrix) for all of the affected activity accounts. For example, a one-unit increase in the demand for the maize commodity generates an increase in total domestic production of 2.10 units as shown in Table 4. Other total multipliers can be defined with respect to total supply, value added, enterprise income, and household income. Accordingly, the total multiplier in the case of, for example, household income following from a shock to the cassava commodity account is defined as the sum of the individual household income multipliers with respect to cassava. The sectoral commodity multiplier is, in turn, defined as the weighted average of the total multipliers belonging to a given set of commodity accounts where the weights reflect 1995 shares in total sectoral supply.

In the analysis, particular attention will also be paid to the capital multipliers. Capital is—from an overall point of view—the critically scarce factor of production in Mozambique. Nevertheless, some limited capital is available for economic expansion. As such, capital should from an analytical point of view be considered freely available, when marginal expansion in specific sectors of production is under consideration. This is exactly the assumption underlying standard SAM-multiplier analysis, in which capital is treated as a fully unconstrained, endogenous factor. It is evident, however, that the relative scarcity of capital at the macro-level has a fundamental impact on how the multiplier results should be interpreted. Normally, large multipliers in target sectors are welcome. They signal that there are big effects on the economy. However, capital multipliers measure as well the additional number of capital units needed to sustain the multiplier process. Thus, under conditions of generalized capital scarcity, maximizing the overall production and income effects presumes that capital use is minimized. Assuming that the rates of return to capital are the same across sectors, it follows that it is the ratio between the target and the capital multiplier, rather than the target multipliers *per se*, which is the proper measure to focus on.

Such an approach, which is adopted in what follows, is similar in spirit—but methodologically different from—to the constrained multiplier analysis proposed by Parikh and Thorbecke (1996). Their starting point is that well-defined, but limited, excess capacities exist in certain production sectors. On this basis, they derive in addition to the unconstrained multipliers so-called mixed multipliers, which come into effect as capacity constraints are reached. The final multipliers put forward by Parikh and...
Thorbecke are defined as the sum of the unconstrained and mixed multipliers. However, this route is not the appropriate one here. First, detailed data are not available on the amount of excess capital in Mozambique. Second, a major objective of this paper is to identify the sectors in which expansion should originate, with a view to allocating available capital most effectively. In such a case, the multiplier methodology must allow capital to adjust endogenously in the multiplier analysis. 17

Finally, path multiplier decompositions, as described in Defourny and Thorbecke (1984), are relied on to investigate the importance of capital-intensive marketing services in the transformation of domestic production into home-consumed and marketed goods. Structural path analysis is designed to provide a more detailed picture of the effects of shocks to exogenous accounts. The SAM-multipliers measure the cumulative effects from a shock, while the path analysis decomposes the multiplier into direct and indirect components. The effect on domestic marketing margins following a shock to the demand for a given commodity can therefore be divided into effects related to, respectively, the marketing of the final domestic product and the marketing of intermediate inputs. Thus, the structural path decomposition is in this context useful in coming to grips with the nature and strength of linkages that work through the commerce sector, which is in focus in our discussion of incentives to consume on-farm rather than supplying to the market.18

Concerning linkages from commodity demand, it is clear from Table 3 that the agriculture and services sectors have large linkages to domestic production, total supply, value added, and household income. However, industry has in general rather small linkages. It also appears that the sectoral commodity multiplier of services with respect to domestic production, amounting to 2.56, is lower than that of agriculture (2.75). Since the linkage from services to the capital-intensive domestic commerce activity is relatively small (0.19), it might seem that an increase in services could expand production without significant strain on scarce capital. Yet, this is an incomplete assessment as only capital used in marketing services is considered. Account must also be taken of the capital used in actual “physical” service production, reflected in a capital multiplier of 0.60. On this basis, it can be concluded that an increase in overall domestic production is most effectively arrived at in terms of capital used, by expanding the

Table 3. Sectoral Commodity Multipliers

|                      | Agriculture | Industry | Services |
|----------------------|-------------|----------|----------|
| Non-commerce         | 2.03        | 1.34     | 2.17     |
| + Domestic commerce  | 0.45        | 0.21     | 0.19     |
| + Export commerce    | 0.03        | 0.03     | 0.02     |
| + Import commerce    | 0.23        | 0.24     | 0.18     |
| = Total activities   | 2.75        | 1.81     | 2.56     |
| Total commodities    | 3.14        | 2.47     | 3.08     |
| Agricultural labor   | 0.79        | 0.25     | 0.34     |
| + Nonagricultural    | 0.33        | 0.29     | 0.51     |
| + Capital            | 0.59        | 0.47     | 0.60     |
| = Total factors      | 1.72        | 1.01     | 1.44     |
| Total enterprises    | 0.58        | 0.46     | 0.59     |
| Urban households     | 0.76        | 0.56     | 0.79     |
| + Rural households   | 0.91        | 0.42     | 0.60     |
| = Total households   | 1.67        | 0.97     | 1.39     |
agriculture sector. This is reflected in the fact that the ratio between the output and capital multipliers (i.e., 2.75/0.59 = 4.66) is largest in domestic agricultural production.19

Agriculture has the largest sectoral multipliers when it comes to factor and household income. A one-unit expansion in the demand for the “average” agricultural good will create additional factor returns of 1.72 units. Furthermore, since the ratio between value added and the individual capital multiplier is largest for agriculture, this sector stimulates valued added through a more effective use of capital than is the case for the other two sectors. Similarly, a unit expansion of agriculture will increase household income by 1.67 units. This is more in absolute terms than what would result from stimulating the services and industry sectors, and it is also more, relative to the size of the capital multiplier. Finally, the income increases, following from a shock to the agriculture sector, are directed relatively more towards rural areas.

Turning to the multipliers, following shocks to the demand for specific agricultural commodities, they span a broad spectrum of combinations of linkages as shown in Table 4.20 The commodities can, however, be grouped into categories with markedly different characteristics as regards their potential for furthering domestic production, value added, and household income, including a more equal distribution of income. These characteristics are, in turn, largely determined by the size of the total multipliers in Table 4. The amount of capital necessary to fuel the multiplier process does, however, also play a role in ranking the commodities, especially in the case of maize.

*Rice* is the crop with the highest linkages. It faces reasonably low domestic marketing costs, reflected in a multiplier of 0.30, and also capital costs associated with the multiplier process are relatively low.21 In addition, the total value-added to capital-multiplier ratio (2.51/0.50 = 5.02) is very high. The same goes for the ratios between the domestic activity and household multipliers vis-à-vis the capital multiplier. Thus, Mozam implies that expanding rice production appears attractive. Yet, current rice production cannot, in reality, expand much owing to existing land and water constraints, which would eventually kick in.

*Maize* is the second largest individual crop in Mozam when account is taken of both marketed and home-consumed production, and Table 4 shows that the production of marketed maize has relatively small overall linkages. Yet, the multiplier process following an expansion of this crop also faces relatively low domestic marketing and capital constraints. The path multiplier analysis shows that 52% of the marketing costs pertain to the marketing of the final domestic product, and that 48% can be ascribed to the multiplier process associated with the marketing of intermediate inputs. It follows that the total structural path influence associated with the marketing of the final domestic product is 0.15 (= 0.29 × 0.52). This is relatively low compared with other commodities such as cassava and other basic food crops where the share of home-consumed production is also high. Thus, the potential to transform home-consumed maize into marketed maize appears promising relative to other agricultural products.

Table 4 also documents that maize is characterized by high ratios between the different total multipliers and the capital multiplier, implying that an expansion of this crop is an attractive policy option in formulating an agricultural development strategy. This is so, in particular, since there is significant natural potential for expanding this crop. Furthermore, the high linkage to agricultural labor income, when measured in relation to nonagricultural labor (0.77/0.25 = 3.08) and in relation to capital (0.77/0.42 = 1.83) means that it is the rural population which benefits most from expanding maize production.

*Livestock* and *forestry* are characterized by high linkages to noncommerce domestic production, while the domestic marketing and capital multipliers are of intermedi-
### Table 4. Agricultural Commodity Multipliers

|                        | Maize | Rice | Wheat | Other grain | Cassava | Beans | Other basic crops | Raw cashew | Raw cotton | Other export crops | Other crops | Livestock | Forestry | Fishery |
|------------------------|-------|------|-------|-------------|---------|-------|-------------------|------------|------------|---------------------|------------|-----------|----------|---------|
| Noncommerce activities| 1.54  | 2.99 | 0.00  | 2.30        | 1.92    | 1.59  | 1.99              | 2.48       | 2.47       | 2.01                | 1.09       | 2.50      | 2.71     | 2.33    |
| + Domestic commerce    | 0.29  | 0.30 | 0.00  | 0.73        | 0.95    | 0.39  | 0.70              | 0.54       | 0.22       | 0.29                | 0.43       | 0.47      | 0.37     | 0.29    |
| + Export commerce      | 0.02  | 0.03 | 0.00  | 0.03        | 0.02    | 0.02  | 0.03              | 0.05       | 0.04       | 0.23                | 0.02       | 0.03      | 0.05     | 0.02    |
| + Import commerce      | 0.25  | 0.25 | 0.00  | 0.22        | 0.20    | 0.31  | 0.27              | 0.22       | 0.30       | 0.29                | 0.16       | 0.23      | 0.22     | 0.21    |
| = Total activities     | 2.10  | 3.58 | 0.00  | 3.28        | 3.09    | 2.31  | 2.99              | 3.29       | 3.03       | 2.81                | 1.70       | 3.22      | 3.35     | 2.86    |
| Total commodities      | 2.58  | 3.62 | 1.00  | 3.49        | 3.41    | 2.77  | 3.29              | 3.48       | 3.41       | 3.22                | 2.32       | 3.45      | 3.54     | 3.35    |
| Agricultural labor     | 0.77  | 1.69 | 0.00  | 1.06        | 0.69    | 0.70  | 0.85              | 1.20       | 0.89       | 0.72                | 0.43       | 1.19      | 1.28     | 0.58    |
| + Non-agricultural labor| 0.25  | 0.32 | 0.00  | 0.42        | 0.47    | 0.30  | 0.41              | 0.38       | 0.30       | 0.34                | 0.25       | 0.34      | 0.35     | 0.31    |
| + Capital              | 0.42  | 0.50 | 0.00  | 0.70        | 0.82    | 0.51  | 0.71              | 0.64       | 0.56       | 0.64                | 0.43       | 0.57      | 0.58     | 0.61    |
| = Total factors        | 1.44  | 2.51 | 0.00  | 2.18        | 1.98    | 1.52  | 1.97              | 2.22       | 1.74       | 1.71                | 1.10       | 2.11      | 2.22     | 1.50    |
| Total enterprises      | 0.41  | 0.49 | 0.00  | 0.69        | 0.81    | 0.51  | 0.70              | 0.63       | 0.55       | 0.63                | 0.42       | 0.56      | 0.58     | 0.60    |
| Urban households        | 0.58  | 0.84 | 0.00  | 0.94        | 1.00    | 0.67  | 0.91              | 0.90       | 0.74       | 0.79                | 0.53       | 0.82      | 0.85     | 0.73    |
| + Rural households      | 0.82  | 1.62 | 0.00  | 1.18        | 0.92    | 0.80  | 1.01              | 1.27       | 0.96       | 0.86                | 0.54       | 1.24      | 1.31     | 0.73    |
| = Total households      | 1.41  | 2.47 | 0.00  | 2.12        | 1.91    | 1.48  | 1.91              | 2.17       | 1.70       | 1.66                | 1.07       | 2.06      | 2.17     | 1.45    |
ate size. The path multiplier analysis reveals that the influence associated with the marketing of the final domestic products is around 0.13, which is rather low. Increasing the share of marketed production of these goods, including in particular activities such as small ruminants and firewood collection, is therefore a promising option. Furthermore, livestock and forestry have very high multiplier ratios relative to the capital multipliers, and high linkages to agricultural labor means that an expansion of these marketed commodities will benefit rural relative to urban households. Thus, livestock and forestry are sectors of considerable interest in future agricultural development in Mozambique, in particular since they are associated with considerable potential for expansion. This last observation reflects both the natural resource endowment of Mozambique and the elimination of livestock herds during the war-period.

Raw cashew has high linkages to noncommerce domestic production, but this sector is also associated with domestic marketing and capital multipliers slightly above average. Consequently, the reliance on capital in the multiplier process is somewhat higher than in the case of livestock and forestry. The result is that domestic production, value added, and household income per unit of capital used in the multiplier process is slightly lower than that of livestock and forestry, but still relatively high and—in this respect—comparable to maize. Yet, the path analysis shows that the influence associated with the marketing of the final domestic product is 0.34, which is high. Thus, the potential for shifting the balance between home-consumed and marketed raw cashew is not very promising, in contrast to maize.

Home consumption as a share of domestic production ranges between 38% and 80% for the five agricultural products singled out above. However, despite these shares of home-consumed production, the associated marketing constraints are not—with the possible exception of raw cashew—particularly large. It follows that the share of home-consumed production could—and should—decline. This is not true for cassava and other basic crops (largely vegetables), which face very high domestic marketing constraints. Furthermore, the excessive marketing costs are the main reason for the high capital multipliers, since these crops are certainly among the least capital-intensive in production. The path analysis shows that the influences associated with the marketing of final domestic production of cassava and other basic crops are respectively 0.89 and 0.60. Consequently, these commodities have very limited potential for market development. Low ratios of total to capital multipliers are also characteristic. Nevertheless, insurance, or safety-first, considerations, which are not captured in the SAM-multiplier analysis, are particularly important for cassava production. Better drought and disease-resistant production technology for this crop may well carry substantial socioeconomic benefits, because they increase reliability of production.

Fishery has high linkages to noncommerce domestic production and is associated with a low domestic marketing multiplier. However, both the dependence on intermediate inputs and the high share of capital in total value added imply that the capital multiplier ends up quite high. This lowers the ratio between the total multipliers and the capital multiplier considerably. In sum, the Mozam multiplier analysis indicates that an expansion of the fishery sector does not appear particularly attractive in a situation where capital is scarce and natural resources are constrained. This result is further underlined by the fact that a low ratio between rural and urban household multipliers for fishery implies that an overall expansion of this sector does not carry with it attractive equity and poverty alleviation effects.

Finally, raw cotton has some attractive characteristics such as a low capital multiplier owing to its role as a direct input into the textile industry, and as such it has relatively

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high total multipliers per unit of capital used. Thus, raw cotton comes out as a borderline case between fishery, on the one hand, and livestock and forestry, on the other. Yet, the multiplier process associated with an expansion of the textile sector, which drives the demand for raw cotton, is not attractive based on 1995 Mozam.

The second category of exogenous shocks that can initiate a Mozam multiplier process (i.e., shocks to household income) can be implemented either by increasing social security transfers from government or transfers from abroad. Such shocks have, as shown in Table 5, uniformly higher multipliers when they work through rural rather than urban households. People in rural areas demand more agricultural products, and there are fewer leakages in the expenditure–income feedback mechanism owing both to the lower rural savings rate and the more limited imports of agricultural goods. In addition, while the capital multiplier under this kind of experiment is slightly higher for rural than urban households, additional production, value added, and overall household income per unit of capital used are in all cases higher when rural rather than urban income expands.

5. Conclusions

The macroeconomic situation of Mozambique leaves much to be desired. Poverty is widespread, and the room for income redistribution is nonexistent. Thus, growth must form the core of any future development strategy to increase consumption in absolute terms. Yet, investment is being maintained at a reasonable level only because of the aid influx. It follows that mobilizing savings and changing the consumption–investment balance, as well as making the best of capital investments actually undertaken, are critical macroeconomic challenges in promoting longer-term growth in Mozambique. Moreover, there is an evident need to increase government revenue. To overcome these problems, it is indispensable that the economic reform program shifts focus from macroeconomic stabilization, which has been achieved during the 1990s, to addressing the fundamental need for structural change and development.

Table 5. Household Multipliers

|                         | Urban households | Rural households |
|-------------------------|------------------|------------------|
| Noncommerce activities  | 1.44             | 2.03             |
| + Domestic commerce     | 0.26             | 0.32             |
| + Export commerce       | 0.03             | 0.03             |
| + Import commerce       | 0.21             | 0.25             |
| = Total activities       | 1.94             | 2.63             |
| Total commodities       | 2.36             | 2.55             |
| Agricultural labor      | 0.38             | 0.86             |
| + Non-agricultural labor| 0.30             | 0.33             |
| + Capital               | 0.45             | 0.51             |
| = Total factors         | 1.13             | 1.70             |
| Total enterprises       | 0.44             | 0.50             |
| Urban households        | 1.57             | 0.71             |
| + Rural households      | 0.52             | 1.95             |
| = Total households      | 2.09             | 2.66             |
The sectoral GDP figures presented, especially the low share of agriculture, are unusual given the low level of development of the Mozambican economy. They are, however, a reflection of geography, poor infrastructure, and the role of Mozambique as a provider of services to neighboring countries. In any case, agricultural development is the only way of providing a livelihood for the vast majority of the population. It is also a particularly effective way of increasing the extremely low rural savings and income, and such progress is indispensable if government is to diversify revenue sources away from the present excessive dependence on import related consumption taxes and import tariffs.

The critical importance of agriculture also emerges clearly from the multiplier and structural path analysis. Agriculture has much larger sectoral linkages than industry, and agriculture is more effective than both industry and services in generating additional value added under the present conditions of scarce capital. In addition, the sectoral commodity multipliers confirm that agricultural expansion is the most appropriate way of reducing the inequality in the rural/urban income distribution. Poverty-reducing growth strategies must focus on the agricultural sector. This observation is further reinforced by the fact that exogenous income transfers have—in the case of Mozambique—higher multiplier effects when they are channeled through rural people.

While agriculture has high average multipliers, the specific agricultural commodity multipliers and path analyses demonstrate that there are large intrasectoral differences. For example, agricultural development in Mozambique cannot—from a strictly economic perspective—rely in any significant way on expanding or shifting the balance between home-consumed and marketed production of cassava and other basic crops. Similarly, fishery and raw cotton do not appear very promising, while livestock and forestry come out reasonably well, in particular if focus is on smallholder production. In addition, maize and rice must as demonstrated here form part of the very core of any short- to medium-term Mozambican development strategy.

Finally, it is clear from the analysis presented in this paper that high agricultural marketing margins (including transport, storage, and capital costs) make home consumption of own production rational from the perspective of many peasants and ties up a lot of scarce capital in commerce. Successful agricultural development requires that marketing costs be brought down. Yet, it is unlikely that home consumption could—or for that matter should—be reduced significantly in the short run. Food security at the family level is a fundamental concern, and uncertainties associated with rural life and agricultural production are bound to be significant for quite some time to come, even with better infrastructure. Nevertheless, the medium- to long-run goal must be to transform Mozambican agriculture into a more market-oriented sector in order to deal effectively with the daunting macroeconomic challenges faced by the Mozambican government.

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Notes
1. Mozam was developed within the MERISSA project, an acronym for Macroeconomic Reforms and Regional Integration in Sub-Saharan Africa. The MERISSA project is implemented by the International Food Policy Research Institute in cooperation with the Universities of Copenhagen and Kiel and collaborators in various countries in Southern and Eastern Africa.
2. They include surveys of demographic features as well as expenditure and production patterns, which have been used to estimate the dimensions of consumption of own production. Moreover, the careful accounting of marketing margins reflected in this paper were based on price differentials between producer and consumer prices.
3. These activities include maize, rice, other grains, cassava, beans, other basic crops, raw cashew, raw cotton, other export crops, other crops, livestock, forestry and fishery alongside grain milling and other food processing. These activities correspond on a one-by-one basis with the commodity specification in Mozam, except that there is an additional commodity, wheat, for which there is no domestic activity. Wheat is not exported.
4. Land is relatively abundant in Mozambique, and data on returns to land are nonexistent. There is some work indicating that these returns are not zero as often assumed (Ministry of Agriculture, 1992), but the cost share of land is surely small and is therefore lumped into the returns to capital in Mozam.
5. A large national household survey carried out in 1996–97 will facilitate further disaggregation and allow more in-depth analyses of distributional issues.
6. On-going reforms include the introduction of value-added taxes, and plans are also being drawn up to revise the income tax system.
7. If account were taken of the recurrent items in government investment expenditures, this share would be somewhat higher.
8. Assuming that the rate of return to capital is the same across all sectors of the economy, the implication is that capital stocks (and the implied capital intensities in production) are relatively small in the majority of the agricultural subsectors.
9. Recall that Leontief production functions are characterized by constant returns to scale as well as no substitution in factors or intermediate inputs. Moreover, consumption shares of the households in the relevant columns of the SAM are constant.
10. SAM-multiplier analysis is a static analysis that cannot capture the full dynamic returns to investments.
11. A more traditional input–output multiplier analysis would have to be relied on if it were considered critical to have home consumption as an exogenous demand component. This will not be pursued here.
12. Linkages to enterprise income matches linkages to capital closely. The reason is that the Mozam framework allocates all of the capital income to the enterprise account, which in turn distributes most of this income to the household accounts. It is only because of small enterprise
taxes and retained earnings that the multipliers are not perfectly identical. Consequently, the
interpretation of the linkages to the enterprise account is the same as the interpretation of the
linkages to capital. Reference will therefore not be made to enterprise income multipliers in
what follows.
13. The total multipliers for agricultural commodities with respect to domestic production are
for example averaged to arrive at what is termed the sectoral commodity multiplier for agri-
culture with respect to domestic production. This sectoral multiplier reflects, in other words, the
increase in domestic production that would ensue following an increase in the demand for the
“average” agricultural commodity.
14. In what follows “capital multiplier” is used as short-hand for “value added by capital mul-
tiplier.” Note that since the prices of capital (the rates of return) are assumed constant, the
capital multipliers actually measure the additional physical capital needed to sustain the multi-
plier process.
15. It must be kept in mind, of course, that there are cases where a foreign investor is willing
to make capital available for specific purposes. In such situations, the present analysis needs
modification.
16. The implicit assumption of a uniform rate of return to capital across sectors is relied on in
the sectoral ranking in this paper. Ranking according to changes in the returns to capital
(i.e., the capital multiplier), as done in what follows, is only consistent with the desired ranking
according to changes in the stock of capital (i.e., capital used in the multiplier process) when the
rate of return to capital is uniform.
17. Subramanian and Sadoulet (1990) suggest the use of yet another analytical framework
in which supply constraints are binding right from the outset, with Lewis and Thorbecke
(1992) being an illustrative application. Since the focus of the present paper is on the alloca-
tion of scarce capital among the various production sectors, capital is not seen as binding
for individual sectors. This is why the constrained multiplier approach was not adopted
here.
18. A complete structural path analysis has been carried out as part of the research reported in
this paper. Tables with the full set of total influences (in the notation of Defourny and Thor-
becke) can be obtained from the authors. Only selected results are given here, since focus is on
decomposition related to marketing.
19. Assuming a rate of return to capital of 10%, the additional domestic production per unit of
capital used in the multiplier process can be calculated as 2.75/(0.59/0.10) = 0.47. Assuming—as
previously mentioned—a uniform rate of return to capital across sectors, it follows that ranking
based on the capital multiplier is the same as ranking based on capital used in the multiplier
process.
20. For reasons of space, comments are not included on other grains (mainly sorghum), beans,
other export crops (citrus fruits, copra and sugar crops) and other crops (various minor crops,
sunflower and mafurra). These commodities represent crops which have either low multipliers
(beans and other crops) or high capital multipliers (other grains and other export crops). The
importance hereof is clear from the main text. As regards the two agricultural processing com-
modities, flour milling and other food processing, they have multipliers similar to those of industry.
Similarly, textiles which are often considered of interest as it uses raw cotton as an input,
does not perform better than the other industrial commodities.
21. Terms such as marketing costs or use of capital include both the direct costs related to the
expansion of a particular commodity, which is shocked, and the derived use of marketing ser-
dices and capital in the multiplier process.
22. The shares of home consumption in total production valued at producer prices are rice
(80%), maize (63%), livestock (50%), forestry (48%), and raw cashew (38%). In comparison,
home-consumed cassava and other basic crops make up 92% and 62% of total production,
respectively.
23. The activity fishery is treated here as an aggregate and no account is taken of the fact
that there are subsectors such as small scale fisheries which have substantially different charac-
teristics in terms of imported intermediates. Furthermore, if exclusive focus were put on the
generation of exports, it is relevant to recall that both raw cotton and fishery are important. Yet, expanding them will in the Mozambican situation of scarce capital take place at a substantial cost to other sectors. Moreover, it is highlighted that exports are exogenous in the SAM-framework applied here. They are therefore set at a level provided by the analyst rather than being an endogenous response as in a fully specified computable general equilibrium model.