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## **The KIPPRA-Treasury Macro Model: A New Instrument for Policy Analysis and Forecasting**

### **Abstract**

*This brief provides a bird's-eye view of the KIPPRA-Treasury Macro Model (KTMM) and its importance in policy analysis. KTMM is built mostly along the now fairly standard lines of the aggregate demand aggregate supply framework. The model is demand driven in the short run, with multiplier effects through consumption and investment and the external sector. An important assumption of this model is that any demand is actually met, that is, we assume that the price system ensures that there is always some excess capacity in the economy. This assumption is justified by the liberalized nature of the Kenyan economy. The model is designed in such a way that it tends to return to equilibrium with 'normal' capacity use and unemployment rates in the medium and long run. The main feedback mechanisms in the real economy work through the wage-price spiral, the interest rate and the real exchange rate.*

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## **Why the KIPPRA -Treasury Macro Model?**

Policy-making and budgeting in Africa in general and Kenya in particular are increasingly being informed by medium- to long-term strategies such as the Poverty Reduction Strategy Paper. This is closely linked to a new budgeting approach called the Medium-Term Expenditure Framework. Both realizing a strategy such as that on poverty reduction and using the expenditure framework require an overall macroeconomic framework that ensures consistency in defining the aggregate resource envelope and how it is going to be spent, as well as forecasting major macro aggregates three to four years ahead. The KIPPRA -Treasury Macro Model (KTMM) is an invaluable instrument in achieving that. Since both preparing the budget and forecasting key macro variables are made in a consistent framework, the components of the budget cannot be changed in a discretionary manner (that is, without taking the overall consistency framework into account).

Another important justification for using the macro model is that through simulation, it can help policy-makers analyse policy. This is crucial because it will help policy-makers assess the implications of proposed policy or packages of policies before they are implemented. Policy analysis conducted with the aid of such models avoids a partial analysis, and hence partial understanding, of issues of national significance. It has the advantage of taking into account all possible intertwining links in the economy that the human mind might not easily take cognizance of.

Macro models are also instrumental in carrying out macroeconomic research. Macro economists at KIPPRA or related research institutions in Kenya can use the model to investigate a wide range of issues such as external shocks and domestic responses or implications of alternative policies. In the process, they may gain a better understanding of the Kenyan economy. This in turn improves the model and hence policy formulation.

### **Forecasting and policy analysis using KTMM**

Despite much criticism of the forecasting record, forecasts continue to be in demand. Those in business and elsewhere who require a macroeconomic background for their planning are regular customers for



macroeconomic forecasters. At the same time, forecasts can be used to monitor the economy with reference to the government's current economic strategy and to suggest modifications in either substance or tactics. This demand can come from the government itself, or from outside bodies or pressure groups that have an interest in influencing policy. As we noted earlier, the demand for forecasting in Kenya emanates from the nature of the adopted poverty reduction strategy and the accompanying budgeting framework. KTMM will be an important tool in this forecasting.

## **Forecasting**

The forecasting quality of the KIPPRA -Treasury Macro Model has not yet been systematically checked, because the model has been in operation for only one year. In updating the model, however, it was implicitly checked. So far its forecasting capacity is quite good. Although a model such as the KIPPRA -Treasury model is still very young and many improvements can still be made, forecasting quality is a problematic general feature of macro models throughout the world and will, therefore, most likely also be a permanent feature of the KIPPRA -Treasury model.

### **Innovative model use in forecasting: expert opinion**

Notwithstanding the weakness of macro models in forecasting, in practice, things are not as bad as they first appear. The KTMM is not meant to be used by itself, but jointly with expert opinion for additional information. This information may be based on events that have just been realized and will affect the immediate future such as a new retrenchment programme or multi-year development aid programmes, or drought on the horizon.

Also, expert opinion from different parts of the government may be incorporated into the macro model's forecast. Examples here are specialists on government expenditure and revenue and specialists on different sectors of the economy. In turn, these specialists benefit from this exchange as well, since they get a better picture of the overall economy. In practice, adding such outside information significantly reduces the forecast uncertainty, especially for the short run. For example, a drought scenario would be improved by using information from the Meteorological Department. This means that the chair of the modeling technical group must be authorized to co-opt experts as necessitated by the specific scenarios



the total amount of coffee milled in Kenya owing to its historical close relationship with cooperative societies. KPCU can be credited for the services it provides farmers directly, such as extension and financing. However, its record of recovering loaned funds is poor, and this has affected its delivery of services to farmers. KPCU needs to improve the efficiency of its coffee milling and its ability to recover loans to be able to compete effectively in coffee milling.

Coffee milling by the private sector is a new phenomenon. The major challenger to KPCU in coffee milling for smallholder farmers is Thika Coffee Mills, but its capacity is little used because it has yet to penetrate the market adequately. The other private millers mainly serve the coffee estates. Part of the problems that new millers have is the restriction that CBK places on milling charges, which cannot exceed 4% of the export price. The services they can provide to farmers are also subject to restrictions. All millers should be allowed to operate without hindrance to enhance competition and efficiency in coffee milling and in providing services to farmers.

## **Coffee Board of Kenya**

Despite the policy reforms in coffee processing and milling, CBK remains the regulatory agency in the coffee industry and also controls coffee marketing. The board provides farmers with extension services, conducts research and promotes coffee in the export markets. It charges about 8% of the export price on marketed coffee to cover its expenses. CBK control over coffee marketing and regulatory functions in the industry has been a bone of contention between CBK and other stakeholders, particularly coffee millers. A major problem is that CBK performs dual functions in the coffee industry provision of services to farmers and regulation. Thus its interests are in conflict.

With liberalization of the economy, the board should be wholly a farmer organization to supervise the delivery of services by various institutions, private or public, to member farmers and be a lobby group to protect the farmers' interests. It can also lead in providing farmers with such services as extension and research. However, its functions should be clearly defined to avoid the conflicts it runs into with the organizations it oversees coffee factories, cooperative societies, millers and marketing agents. The regulatory function of enforcing the rules of licensing, registering and controlling the industry should be left to a different government body to ensure equal opportunity for all engaged in the industry.



## Impact on the farm

Coffee production in the country has generally declined. Production went down from about 120,000 tonnes in 1990 to about 51,300 tonnes in 1998. The main reason for low production is that coffee farms are neglected (bushy, unpruned and diseased coffee trees and poor weeding) as a result of a number of production and marketing constraints that farmers encounter. Their most common production constraints are poor access to inputs, high incidence of coffee berry disease, lack of credit and low payment for the coffee.

For many years, farmers depended on cooperative societies to provide them with services; however, the services that societies are offering farmers through factories are becoming less and less visible in recent years. The most important services that farmers need are processing coffee and providing credit (cash and input). As societies no longer provide the primary function of supplying inputs, farmers do not see the need for them. Society costs of delivering services to farmers are also generally high, reducing the amount of payment to the farmer. Societies need to become more efficient in delivering services by improving the managerial skills of their officials. Farmers should also be allowed to form smaller societies as they may require for processing their coffee.

The price farmers have received over the years has fluctuated. In general, the price for processed cherries is higher than for *mbuni* (dried, hulled beans), because wet processed coffee is of high quality and fetches better prices in the world market. Because of the problems they encounter in societies and factories, however, many farmers are forced to sell their coffee as *mbuni*, and more farmers will have to follow suit. Societies must be able to process coffee at low cost if the quality of Kenyan coffee is to be maintained in the world market.

Negative practices such as corruption and false under-recording of farmers' coffee weights at the factory, and high operating costs in the factory and for the society, are major reasons that coffee payments to farmers are low. Theft of parchment coffee from the factory and society stores has also become a problem in recent years. This practice is attributed to liberalization of the local coffee market with no clear regulatory mechanisms, which made it possible for unchecked outlets to sell parchment and *mbuni*. The monitoring and regulatory system for the coffee industry needs to be improved to reduce such practices, which hinder farmers from benefitting fully from liberalization of the industry.



more research over time and use the results to improve the model. Third, using the same model framework will permit some degree of consistency in areas such as budgeting and planning. Fourth, sustaining and using the model over a long time will permit policy-makers to evaluate the areas where it is of most value and therefore make the best use of it.

It is clear that the model will be only as good as the resources, which are used in designing, operating and maintaining it. Above all, the key to the success of a macro model is to determine the measures that are necessary to sustain and institutionalize it, thereby ensuring that the model remains operational and is continually updated. To sum up, institutionalization and sustainability of KTMM require, *inter alia*, accuracy and timeliness of the data; trained staff who are assigned to maintain and operate the model; expert opinion, which will ensure the accuracy of the relationships specified within the model and help to design scenarios and interpret the results of the policy simulations; and the users who are expected to benefit from the analytical and forecasting activities.

We should not underestimate the numbers of suitably trained and motivated staff who will be required to maintain and operate a macro model. The involved agencies must recruit and retain personnel who are conversant with the detailed design of the model and are able to update both the data and the actual model through re-estimations. It is likely that staff currently assigned to this model will be promoted to new assignments over the next few years; thus an adequate pipeline of new staff must always be undergoing training. The involved agencies should ensure that any transfers are replaced immediately and that new staff members receive appropriate on-the-job training. Training economists in key agencies in understanding and using the model should be continuous. To ensure sustainability of the model, such training should be planned at least once a year.

Although copies of the model should be widely available to public officials, research institutions, universities and development partners, their research and policy analysis should not be officially authorized. These models are extremely complex to use and there is a danger that inexperienced users will draw incorrect conclusions. Updated versions of the model should be disseminated twice a year, probably after the main model runs, and KIPPRA could provide formal training in operation to interested users.

Because the model will have several potential users, it is vital to ensure that its integrity is maintained. This implies that stakeholder institutions should share electronically the master copy of the model on which changes to the data sheet can be made. However, the model should also have one 'gatekeeper' the KIPPRA -Treasury team leader, who will be responsible for authorizing all



changes to the model equations and the theory. The gatekeeper will ensure that all authorized changes and their justifications are recorded in a logbook.

Sustaining the model will require that the government and government institutions make a significant financial commitment to the key modelling agency. The macro modelling institution will have already devoted a considerable amount of time to this activity. Likewise, the government must invest in capacity building for macro modelling. Although senior officials will not be members of the modelling team, they will be expected to act as champions of the model within their respective agencies and to ensure that the agencies directly involved in collecting data and operating the model are allocated adequate resources.

It is inevitable that some KTMM aspects will need to be strengthened. In addition, the behavioural and semi-behavioural equations will need to be revised in the light of new information or new theoretical and practical challenges. Much research is needed to improve the estimates. The intention should be to encourage in-house personnel and qualified professionals from the universities and other research institutions to use the model when undertaking a programme of research on areas that are seen to be weak in the model, such as the labour market. This approach will help create a critical mass of people who understand modelling. In addition, it will provide universities and research institutes with a challenging research agenda. KIPPRA has already prepared a 'road map' on how to organize such studies.



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