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The Integrated Macroeconomic Model for Poverty Analysis

A Quantitative Macroeconomic Framework for the Analysis of Poverty Reduction Strategies

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Abstract

Agénor, Izquierdo, and Fofack present a dynamic, quantitative macroeconomic framework designed for analyzing the impact of adjustment policies and exogenous shocks on poverty and income distribution. They emphasize the role of labor market segmentation, urban informal activities, the impact of the composition of public expenditure on supply and demand, and credit market imperfections. Numerical simulations for a prototype low-income country highlight the importance of accounting for the various channels through which poverty alleviation programs and debt relief may ultimately affect the poor.

This paper—a product of the Poverty Reduction and Economic Management Division, World Bank Institute—is part of a larger effort in the institute to understand the impact of adjustment policies on the poor. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Maria Gosiengfiao, room J4-280, telephone 202-473-3363, fax 202-676-9810, email address mgosiengfiao@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at pagenor@worldbank.org or hfofack@worldbank.org. July 2003. (126 pages)

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Contents

1 Introduction

The current international debate on debt relief for highly-indebted, low-income countries has led policymakers, international development organizations and academic economists alike to reaffirm the goal of sustained poverty reduction as one of the key objectives of adjustment programs.[1] At the same time, renewed efforts have been made to amend existing macroeconomic policy tools and develop new ones in order to better understand the channels through which adjustment policies affect the poor and the possible trade-offs that poverty-reduction strategies may entail regarding the sequencing of policy reforms—particularly between short-term stabilization policies and structural measures. This paper presents an integrated quantitative macroeconomic framework developed recently at the World Bank for the specific purpose of analyzing the impact of policy and exogenous shocks on income distribution, employment and poverty in low-income, highly-indebted countries as well as middle-income developing economies.[2] This new framework (baptized IMMPA, for Integrated Macroeconomic Model for Poverty Analysis) dwells on the extensive analytical and applied research conducted in academic and policy circles over the past two decades on macroeconomic and structural adjustment issues in developing economies. It captures a variety of channels through which stabilization and structural adjustment policies affect growth, income inequality, and poverty in both the short and the long run.

Our analysis, as discussed in detail below, differs from existing approaches in several dimensions. It emphasizes, most notably, the role of labor market segmentation (induced either by government legislation or firms' wage-setting decisions), the role of informal employment in the transmission of policy and exogenous shocks to the poor, and (in the case of low-income, highly-indebted countries) the adverse effect of external debt on private incentives to invest. It accounts at the same time for the impact of different compo-

[1] On December 22, 1999, the International Monetary Fund (IMF) and the World Bank endorsed the elaboration of a Poverty Reduction Strategy Paper (PRSP) as the central mechanism for providing concessional lending to low-income countries. The declared objective of the PRSP is to provide a medium-term framework to reduce poverty and generate more rapid economic growth, with assistance from bilateral donors and multilateral financial institutions.

[2] We focus in this paper on a presentation of the prototype IMMPA model for low-income economies. As discussed in the concluding section, most of the building blocks of the model are also relevant for policy analysis in middle-income economies.

nents of government expenditure (on infrastructure, education, and health) on the production process and the accumulation of physical and human capital by the private sector. It also captures credit market imperfections and linkages between the financial system and the real side of the economy, by relating firms' borrowing needs (for both working capital and physical capital formation) to bank lending. Because of its integrated treatment of the real and financial sides, the model allows policy analysts to study not only the impact of structural reforms (such as changes in tariffs or the composition of public expenditure) on relative prices and output, but also the effect of short-term stabilization policies (such as a cut in domestic credit or a rise in policy interest rates) as well as other financial shocks (such as an outflow of private capital or a rise in world interest rates). Our detailed treatment of the labor market is particularly important to assess the poverty reduction effects of adjustment programs, because the poor often generate their main source of income from wages, and the latter depend on available employment opportunities. By distinguishing between rural and urban sectors (and accounting for migration dynamics driven by relative wages), the model allows us to study separately the evolution of poverty in urban and rural areas and its relation with output and employment fluctuations across sectors.

The remainder of the paper is organized as follows. Section II presents an overview of the main issues that our analysis focuses on and highlights areas in which our framework differs from some of the past and more recent research in the field. Section III describes in detail the structure of the prototype IMMPA model for low-income, highly-indebted countries, considering in turn production and employment, demand and external trade, prices, income and expenditure, the financial system, the public sector, the poverty and income distribution indicators that the model generates, and the link between consumption and income predictions and household expenditure surveys. Section IV discusses issues associated with the calibration and solution of the model and the extent to which our parameters and initial values can be deemed "representative" of a poor, highly-indebted economy. Section V presents the simulation results of various shocks (both exogenous and policy-induced) and discusses their real, financial, income distribution and poverty effects. We analyze, in turn, the short- and long-run impact of a temporary terms-of-trade shock, a permanent cut in domestic credit to the government, and a poverty-reduction program consisting of partial external debt forgiveness coupled with a reallocation of savings on debt service payments to three alternative forms of government expenditure: lump-sum

transfers to households, spending on infrastructure and outlays on education. This last experiment is of particular interest in light of the current international debate (alluded to earlier) on the need for debt relief for low-income countries—conditional on a productive use of associated savings. The last section summarizes our main results and suggests various extensions of our analysis.

2 Analytical Background

Development macroeconomists and policy analysts in general use a variety of policy tools (ranging from single equations to full-blown econometric models) to provide quantitative policy assessments. Within that range of tools, our framework is closer in spirit to dynamic, financial computable general equilibrium (FCGE) models. However, our approach differs from the existing literature in important ways. The point of departure of our analysis is the need to construct a framework that allows analysts to provide appropriate answers to a variety of policy issues that developing countries (including highly-indebted, low-income ones) are currently facing in designing pro-poor development strategies. For instance, how does resource reallocation induced by structural policy shocks affect income distribution and poverty rates? To maximize the impact of debt relief on the poor, should governments increase lump-sum transfers to the poor, or invest in health, education, or infrastructure capital? Are there trade-offs between stabilization and structural adjustment policies with respect to their impact on employment levels and poverty, and if so within what time frame? What are the implications of these potential trade-offs for the sequencing of policy reforms? Our fundamental premise is that these questions can be addressed in a meaningful manner only if the complexity of the labor market structure is properly represented, the linkages between the financial and the real sides that condition the transmission process of macroeconomic and structural policy shocks are well accounted for, and if the channels through which government expenditure affects the economy (and eventually the poor) are adequately captured.

The first important distinguishing feature of our model is its detailed specification of the labor market. Although it has long been recognized that the structure of the labor market can have a major impact on the transmission of macroeconomic shocks and adjustment policies to economic activity, employment, and relative prices (see Agénor (1996, 2000, 2001), Bodart and

Le Dem (1996), and the World Bank (1995)), the treatment of this market in *applied* policy models has focused on only a narrow set of its well-documented features—such as an economy-wide rigid minimum wage. Except for a few exceptions (see for instance Maechler and Roland-Host (1995, 1997)), insufficient attention has been paid to the macroeconomic implications of alternative sources of labor market segmentation, differences in wage formation across various labor categories, inter-sectoral wage rigidity (as opposed to aggregate wage rigidity), and feedback effects between relative prices and wage decisions by price-setting firms. All of these features may have important implications for understanding the impact of policy and exogenous shocks on poverty. Labor market segmentation, in particular, tends to restrict labor mobility and can be associated with persistent wage differentials; these, in turn, may prevent the reallocation of resources necessary to cope with external and policy-induced shocks. Because the poor in many countries generate a significant fraction of their income from labor services, modeling these features of the labor market is crucial for understanding the impact of pretty much any type of shocks on poverty in the short, medium, and long run.

Our analysis captures some of the important institutional characteristics of the urban labor market observed in low- and middle-income developing countries.[3] In these countries it is important to distinguish, in analyzing the functioning of the urban labor market, between formal employment (such as employment in large private enterprises and the public sector) and informal employment. In many cases (particularly in sub-Saharan Africa) public sector employment represents a very large share of formal sector employment. Formal employment in many countries (in both Latin America and sub-Saharan Africa) has increased only slowly in recent decades, whereas migration to urban areas has been extensive. Informal urban employment has thus increased dramatically in size.[4] In Kenya, for instance, the share of the informal sector in employment outside agriculture is currently about 60 percent, whereas in Cameroon in 1993 it was estimated that 57 percent of the employed labor force worked in the informal sector (Fortin, Marceau

[3]See Agénor (1996) for a detailed overview of the literature, and Bigsten and Horton (1998) for a survey of labor markets in sub-Saharan Africa. See also the World Bank (1995).

[4]The informal sector can be defined in various ways; one common definition is that it includes self-employed workers (except for professionals) unpaid family workers, workers employed in small firms (less than, say, 5 or 6 workers), and those working in the trade and services sector without a legally-binding contract.

and Savard (1997)). In Bangladesh, 90 percent of the labor force is in the informal (nontraded) sector, mainly in rural areas (Devarajan, Ghanem, and Thierfelder (1999)). In Ghana, between 1980 and 1990, employment in the formal sector declined significantly, despite a substantial increase (by almost 50 percent) of the non-agricultural labor force. Available estimates suggest that much of the expansion in the labor force was absorbed by the informal sector, whose size increased from 36 to 45 percent of the total (agricultural and non-agricultural) labor force. The urban poor are also disproportionately employed in the informal sector.

At the same time, wage formation and the composition of the labor force tend to differ substantially between the formal and the informal segments of the labor market. Whereas workers in the informal economy tend to have relatively low skill levels and face flexible wages, both low- and high-skilled workers are found in the formal sector. Particularly in the private formal urban economy, the use of relatively capital-intensive technologies implies that skilled labor and physical capital tend to be (net) complements, whereas they both tend to be substitutes for unskilled labor. As a result of both the relative scarcity of highly educated labor and its complementary with physical capital, wages for skilled workers tend to be high, relative to average wages in the economy.[5] In addition, the available evidence suggests that firms may pay higher wages to skilled workers for efficiency reasons—to reduce turnover costs (particularly if hiring, firing and training costs are high) to enhance productivity, attract better workers, and maintain loyalty and morale. A large number of studies focusing on sub-Saharan Africa (see e.g. Bigsten and Horton (1998)) and Latin America have indeed found that in the manufacturing industry in these countries there is often a significant effect of firm size on wages, as implied by various efficiency wage theories. The phenomenon persists even after controlling for (observable) labor quality differences and working conditions. This suggests that firms may pay more either to reduce costly labor turnover (larger firms are more capital intensive and require more educated labor) or enhance the level of effort (which is less easily observable and monitorable in larger firms).

Our framework captures all of these features in a stylized manner. We distinguish between the formal and the informal components of the urban labor market. We take wages to be fully flexible in the informal economy

[5] In some countries, however, there is excess supply of skilled labor and a high rate of open unemployment for that category of workers.

and assume that labor is heterogeneous in the formal sector, using a basic distinction between skilled and unskilled labor. We account for both private and public sector production and employment; and whereas wages of workers employed in the public sector and those working as unskilled labor in the private sector are taken to be fixed by government fiat, we assume that wages of skilled workers in the private sector are set on the basis of efficiency wage considerations. Although for tractability we use a specific efficiency wage formulation (based on the wage-productivity link), our formulation is observationally equivalent to various other specifications.

The second important feature of our framework is the treatment of the financial system. In the "archetype" poor economy that we consider in this paper, savers have access to only a limited range of financial assets (essentially money and bank deposits, held both at home and abroad) and commercial banks play a predominant role in the financial intermediation process.[6] Specifically, we assume that firms are unable to issue tradable claims on their assets or future output. We also dwell on some of the existing literature on FCGE models and the various channels that they have embedded: a portfolio structure that accounts for the impact of interest rates on asset allocation decisions and capital flows (see for instance Robinson (1991), Adam and Bevan (1998), Rosensweig and Taylor (1990), Thissen (1999, 2000), and Thissen and Lensink (2001)), real balance effects on expenditure (as in Easterly (1990)), and linkages between bank credit and the supply side through working capital needs—as in Taylor (1983), Bourguignon, de Melo, and Suwa (1991), Bourguignon, Branson, and de Melo (1992), Lewis (1992, 1994), and Fargeix and Sadoulet (1994). For instance, we explicitly incorporate the bank lending rate into the effective price of labor faced by firms that must finance their working capital requirements prior to the sale of output. This link turns out to be a crucial channel through which the real and financial sectors interact. But we depart from the specification adopted in many existing studies in two important ways. First, we provide a full *stock* treatment of portfolio decisions (as opposed to the *flow* approach used in several studies) within the context of a Tobin-type asset demand system. Second, we capture the role of balance sheet (or net worth) effects in the determination of bank lending rates, in addition to funding costs, by explicitly modeling the "finance premium" along the lines of recent research on credit market imperfections and

[6]The IMMPA application to Brazil described by Agénor, Fernandes, Haddad, and van der Mensbrugghe (2003) provides a richer description of the financial system.

the importance of collateral, as discussed by Agénor and Aizenman (1998, 1999*b*), Bernanke, Gertler, and Gilchrist (2000), Kiyotaki and Moore (1997), and Izquierdo (2000).

A third distinguishing feature of our approach is its emphasis on the negative effect of external debt on private investment. Such a relationship can result from various channels, including disincentive effects associated with a large external debt. Indeed, several studies, evolving from Krugman (1988) and Sachs (1989), have argued that an excessive amount of debt raises expectations of higher future (implicit or explicit) taxation and confiscation risk to satisfy debt service payments. This, in turn, creates disincentives to invest—most notably by lowering the expected after-tax rate of return on capital (Hernández-Catá (2000))—and may generate capital flight and lower net private capital inflows.[7] Studies by Elbadawi, Ndulu, and Ndungu (1997), Iyoha (2000), and Pattillo, Poirson, and Ricci (2002), provide some recent empirical evidence of a negative relationship between external debt and private capital formation for sub-Saharan Africa. Iyoha (2000) for instance, in a study covering the period 1970-94, found that the ratio of external debt to GDP had a significant and negative effect on gross domestic investment. Pattillo, Poirson, and Ricci (2002), in a study covering 93 developing countries over 1969-98, found that on average external debt begins to have a negative impact on growth when it reaches about 160-170 percent of exports or 35-40 percent of GDP. In the present model, we capture this adverse incentive effect by introducing a nonlinear effect of the ratio of debt service to taxes on private investment. As a result, the higher the initial level of debt, the stronger the negative marginal effect of a further increase in foreign borrowing on the propensity to invest. Put differently, the debt overhang in our setting provides a justification for debt reduction on efficiency grounds.

Finally, our approach differs from existing studies by accounting explicitly for the channels through which various types of public investment outlays affect the economy. Economists and policymakers have long known that different forms of public investment can have different effects on output and employment, but the different channels through which alternative forms of public spending operate have seldom been incorporated explicitly in applied macroeconomic models used for development policy analysis. In our framework, investment in infrastructure (or, rather, the stock of public

[7] As pointed out by Husain (1997), the taxation ability of the debtor government may be important in determining the magnitude of the debt overhang effect on private investment.

capital in infrastructure) affects directly the level of production in the private sector—and thus the marginal productivity of primary factors employed in that sector—whereas public investment in education has a direct impact on unskilled workers' decision to acquire skills (as in Jung and Thorbecke (2001)). This effect operates in addition, of course, to movements in relative wages across skill categories and the initial level of individual wealth, which acts as a constraining factor in the presence of restrictions in accessing the credit market. Our view is that this distinction is essential to understanding how the savings created by debt relief should be allocated by governments (or donor agencies) concerned with maximizing their poverty-reduction effects.

3 Structure of IMMPA

Given the type of policy issues that we wish to address, and the complexity of some of the channels highlighted above (regarding notably the structure of the labor market and the linkages between the real and financial sides of the economy), our strategy has been to specify our framework in a relatively parsimonious way by restricting its various building blocks to what we believe to be essential components. In this section we review these various building blocks and consider in turn the production side, employment, the demand side, external trade, sectoral and aggregate prices, income formation, the financial sector and asset allocation decisions, and the public sector. We specify behavioral functions for each of the six broad categories of agents included in IMMPA: households (disaggregated by levels of skills and location into various types of rural and urban households), firms, the government, the central bank, commercial banks, and the rest of the world. We also discuss the poverty and income distribution indicators that we use as a basis for analyzing the effects of our various simulation experiments on the poor, as well as the links between the model's predictions and household expenditure surveys. Throughout the discussion, we often use "generic" forms to specify functional relationships; explicit functional forms (as well as variable names and definitions) are provided in Appendices A and B and their exact specification in the computer simulation program are provided in Chen et al. (2001)). Finally, as indicated earlier, we focus in this paper on the prototype IMMPA model that we have designed with low-income countries in mind, leaving for a companion paper (see Agénor, Fernandes, Haddad, and van der Mensbrugghe (2003)) the modified version that we have built

with some specific characteristics of middle-income developing countries.

3.1 Production

In many low-income countries, the majority of the poor lives in rural areas; it is therefore essential for a framework whose aim is to help policymakers design poverty-reduction programs to be able to trace differences in economic performance in the rural and urban sectors. We therefore begin with a distinction on the production side between the rural and urban sectors. The rural economy is itself divided between a tradable sector, which consists solely of a homogeneous good sold abroad, and a nontraded goods sector, which produces a (composite) good sold only domestically (see Figure 1). The rationale that underlies this distinction can be found in the available evidence on the structure of the rural labor market, which suggests the existence of an often large wage differential between workers employed in the production of predominantly exported agricultural goods and workers producing mainly for the domestic market—many of whom are involved in subsistence agriculture (see for instance Bigsten and Horton (1998)). Because the poverty implications of such differentials can be large, our strategy is to model them separately.

Although income in the urban economy tends on average to be higher than in the rural sector, the incidence of poverty has increased significantly (and sometimes dramatically) in urban areas in many developing countries. Concomitantly, the informal economy has grown in size in these countries, in part as a result of the lack of employment opportunities in the formal sector and the pervasiveness of labor market segmentation. We account for these characteristics by including both formal and informal components when specifying urban production. Furthermore, we separate the formal urban economy into production of private goods (which are sold abroad and domestically) and a public good, as discussed below.

3.1.1 Rural Production

The rural sector produces two goods; one traded, one nontraded. Land available for each of these activities is assumed to be in fixed supply and there is no market to trade property claims on it. Gross output of nontraded goods, X_{AN}, and exported agricultural goods, X_{AT}, are given by the sum of

value added (V_{AN} and V_{AT}, respectively) and intermediate consumption:

$$X_{AN} = V_{AN} + X_{AN} \sum_i a_{iAN}, \qquad \text{for } i = AN, AT, I, P, G \tag{1}$$

$$X_{AT} = V_{AT} + X_{AT} \sum_i a_{iAT}, \qquad \text{for } i = AN, AT, I, P, G \tag{2}$$

where the a_{ij} are conventionally-defined input-output coefficients (sales from sector i to sector j) and AN, AT, I, P, G are used in what follows to refer, respectively, to the nontraded agricultural sector, the traded agricultural sector, the informal sector, the private urban sector, and the public sector.

Value added in each sector is assumed to be produced with a Cobb-Douglas (CD) function of land, LAN, and a composite factor, defined as a constant elasticity of substitution (CES) function that depends on the number of unskilled rural workers employed (U_{AN} in the nontraded-good sector and U_{AT} in the traded-good sector) and the economy-wide stock of public physical capital (K_G, which is defined below):

$$V_{AN} = CD[LAN_{AN}, CES(U_{AN}, K_G)], \tag{3}$$

$$V_{AT} = CD[LAN_{AT}, CES(U_{AT}, K_G)]. \tag{4}$$

As noted above, we assume that land is a fixed input in each sector; and for simplicity, we normalize the area of land allocated to production to unity in what follows. Given the CD specification, agricultural production exhibits decreasing returns to scale in the remaining (composite) input.

The introduction of K_G in the production functions (3) and (4) is based on the view that (cumulative) public investment in the economy improves the productivity of private firms and other production units in agriculture, because it facilitates not only trade and domestic commerce but also the production process itself. Thus, our concept of public capital includes not only roads and public transportation that may increase access to markets, but also power plants and similar public goods that may contribute to an increase in productivity.

As discussed below, the private, formal urban sector produces a single tradable good that may be either sold domestically or abroad. The structure of the rural economy by contrast is rather different: we assume that production of the rural traded good (X_{AT}) is exclusively allocated to exports (see below). In contrast, the nontraded agricultural good is exclusively

produced for the domestic market ($X_{AN} = D_{AN}$). The reason for choosing this approach is that in many poor countries, there is often a sharp contrast between the "external" component of the agricultural sector, where production is mostly targeted to exports, and the "domestic" component, where production is targeted mainly toward domestic consumers. The production process, access to bank credit, and wage formation mechanisms often differ significantly across these components, making the assumption of a smooth production possibility frontier (with a conventional concave shape) inappropriate. These modeling choices are obviously important for the interpretation of some of the simulation results discussed below.

3.1.2 Urban Informal Production

Gross production in the urban informal sector, X_I, is given as the sum of value added, V_I, and intermediate consumption, with value added given as a function of the number of unskilled workers employed in the informal economy, U_I, with decreasing returns to scale:

$$X_I = V_I + X_I \sum_i a_{iI}, \qquad \text{for } i = AN, AT, I, P, G \tag{5}$$

where

$$V_I = \alpha_{XI} U_I^{\beta_{XI}}, \qquad \alpha_{XI} > 0, \;\; 0 < \beta_{XI} < 1. \tag{6}$$

Moreover, given what the available evidence suggests regarding the degree of labor intensity of production in the informal sector, we take β_{XI} to be relatively high in our policy experiments.

3.1.3 Production of public goods and services

Gross production of public goods and services (or public good, for short), denoted X_G, is given by the sum of value added, V_G, and intermediate consumption. Production of value added requires both types of labor (skilled and unskilled) and is given by a two-level CES function. At the lower level unskilled workers, U_G, and skilled workers, S_G, combine to produce "effective" employment in the public sector; and at the second level, effective labor and public capital, K_G combine to produce net output:

$$X_G = V_G + X_G \sum_i a_{iG}, \qquad \text{for } i = AN, AT, I, P, G, \tag{7}$$

where

$$V_G = CES[CES(S_G, U_G), K_G]. \tag{8}$$

Employment levels of both categories of workers are treated as predetermined policy variables. This specification of the production process of the public sector good makes it possible to analyze the effects of changes in government employment. Public sector layoffs, for instance, will influence the rest of the economy both through quantity effects on the labor market as well as a reduction in public sector output.

Note also that, as indicated below, public sector wages for skilled workers are set equal to the efficiency wage paid to that category of workers in the private formal sector. Wages for unskilled workers in the public sector are, by contrast, set equal to the minimum wage; unskilled workers are therefore "off" their supply of labor. We will assume that "excess" employment (or disguised unemployment) of unskilled labor prevails in the public sector (so that output is never constrained), as documented in some studies of the labor market in developing countries.[8]

3.1.4 Urban Formal Private Production

As with the production of the public good, private formal production also employs skilled and unskilled labor. In addition, physical capital is also included as an input in the production process. An important step in specifying the production technology consists of defining the degree of substitutability among inputs. We assume—as suggested by some of the empirical evidence—that skilled labor and private physical capital have a higher degree of complementarity (lower degree of substitution) than physical capital and unskilled workers. In order to account explicitly for these differences in the degree of substitutability among inputs, we adopt a nested CES production structure. Specifically, gross production of the private formal-urban sector, X_P, is taken to be given by the sum of value added, V_P, and intermediate consumption:

$$X_P = V_P + X_P \sum_i a_{iP}, \qquad \text{for } i = AN, AT, I, P, G, \tag{9}$$

where

$$V_P = CES\{CES[CES(ef.S_P, K_P), U_P], K_G\}, \tag{10}$$

[8] See Agénor (1996), who discusses the role of political factors in the determination of public sector employment.

and ef, as discussed below, denotes the level of on-the-job effort provided by skilled workers. At the lowest level of equation (10), the effective supply of skilled labor, $ef.S_P$, and private capital, K_P, are used in the production of the composite input T_2 (assuming a low elasticity of substitution between them). At the second level, this composite input is used, together with unskilled labor, U_P, to produce the composite input T_1. With this specification it is possible to choose a higher elasticity of substitution between T_2, and unskilled workers, U_P. In other words, whereas skilled labor and private physical capital are essentially complements, either one of these inputs is a substitute to unskilled labor in the production process. The final layer of this nested CES has T_1 and K_G (the stock of government capital) as inputs in the production of private formal urban output.

Given our assumption that both the public and informal goods are not traded (that is, they are sold only on the domestic market), the private formal urban good is the only component of urban production that can be exported abroad. In line with conventional CGE models (see, for instance, Dervis, De Melo, and Robinson (1982), Devarajan et al. (1997), and Robinson et al. (1999)), we assume that firms choose to allocate their output to exports or to the domestic market according to a production possibility frontier, defined by a Constant Elasticity of Transformation (CET) function:

$$X_P = CET(E_P, D_P). \tag{11}$$

Equation (11) states that output, X_P, produced according to equation (9), is allocated either to exports, E_P, or the domestic market, D_P. The actual levels of each component are shown later to depend on the relative prices of exported and domestic goods, in standard fashion.

3.2 Wages, Employment, Migration, and Skills Acquisition

As mentioned earlier, there are two types of workers in this model: skilled and unskilled. In practice, of course, there is a continuum of skills, but one may want to think of our distinction as a broad one that suffices for analytical purposes. Unskilled workers may be employed either in the rural economy, U_R, or in the urban economy, U_U, whereas skilled workers are employed only

in the urban economy (see Figure 2).[9] We also assume that skilled workers are not employed in the informal economy either—perhaps as a result of signaling considerations, as discussed later. In practice, there may obviously be many cases in which (semi-) skilled workers take part in the informal labor force. However, their productivity should not differ much from that of unskilled workers, at least in part because monitoring is relatively easier than in the formal economy (this being in turn related to the smaller size of production units in the informal sector). As a result, modeling them differently would not substantially alter a broad range of simulation results.

3.2.1 Rural Wages and Employment

The available empirical evidence on wages in the rural economy of many low-income developing countries suggests that there is a significant discrepancy between wages paid in the export sector (cash crops and other agricultural products), and wages paid in the nontraded sector. Because of higher wages in the export sector, all workers in rural areas will opt to seek employment there first. In general, nominal wages in the export sector, W_{AT}, can be taken to be indexed either on the value added price or gross output price in that sector, or on the economy-wide consumer price, so that

$$W_{AT} = w_{AT}(PIND_{AT})^{ind_{AT}}, \tag{12}$$

where $PIND_{AT} = PV_{AT}$, PX_{AT}, or $PLEV$, and $0 \leq ind_{AT} \leq 1$, with PV_{AT} (PX_{AT}) being the price of value added (gross output) in the export sector, and $PLEV$ the consumer price index, which are defined later.

In the simulations reported below, we take the degree of indexation to be perfect with respect to the price of value added (as a result, say, of strong bargaining power of workers in that sector), so that $PIND_{AT} = PV_{AT}$, and $ind_{AT} = 1$. Thus, the product wage, w_{AT}, is taken to be fixed in real terms and firms are assumed to hire workers up to the optimal level given by their labor demand curve. The profit-maximizing demand function for labor in the export sector, U^d_{AT}, can be shown to be given by

$$U^d_{AT} = \left(V_{AT}^{1+\frac{\rho_{XAT}}{1-\eta_{XAT}}} \frac{1-\eta_{XAT}}{(1+IL_{-1})w_{AT}} \cdot \frac{\beta_{XAT}}{\alpha_{XAT}^{\rho_{XAT}}} \right)^{\frac{1}{1+\rho_{XAT}}}, \quad \text{where } w_{AT} = \frac{W_{AT}}{PV_{AT}}. \tag{13}$$

[9] This is of course a simplification, as there are some firms, located in the rural area, which may require skilled labor.

Equation (13) indicates that labor demand in the rural export sector is positively related to the level of net output, V_{AT}, and negatively related to the effective product wage, $(1 + IL_{-1})w_{AT}$. Labor demand does not depend directly on the price of the exported agricultural good, PX_{AT} (which is proportional to the value added price, as shown below in equation (47)), because the nominal wage rate paid to workers, W_{AT}, varies proportionally to PV_{AT} in order to keep the real wage rate fixed at w_{AT}. Again, the assumption of perfect real (product) wage rigidity is not necessarily appropriate for all countries; there are cases where partial indexation of nominal wages might be more appropriate. The assumption of full indexation can be easily relaxed in the IMMPA software for practical applications.

Note also that the product wage rate is multiplied by $(1 + IL_{-1})$, where IL_{-1} is the one-period lagged bank lending rate, to account for the fact that firms in this sector rely on working capital to pay wages in advance of the sale of output. As a result, firms consider the *effective* price of labor, which includes the cost of borrowing, when making labor hiring decisions.[10] We assume that the cost of credit specified in loan contracts negotiated for the current period is based on the interest rate prevailing in the previous period.

The supply of labor to the nontraded agricultural sector is determined residually, as the number of workers who are unable to find a job in the better-paying sector seek employment in the nontraded sector:

$$U^s_{AN} = U_R - U^d_{AT}. \tag{14}$$

The wage rate in the nontraded agricultural sector is flexible and determined so as to equate labor demand (derived from standard profit maximization conditions), U^d_{AN}, and labor supply, given by (14). The market-clearing equilibrium product wage, w_{AN}, is thus given by

$$w_{AN} = \frac{\beta_{XAN}(1-\eta_{XAN})}{\alpha^{\rho_{XAN}}_{XAN}} \left(\frac{V_{AN}^{1+\frac{\rho_{XAN}}{1-\eta_{XAN}}}}{(U^s_{AN})^{1+\rho_{XAN}}} \right), \quad \text{where } w_{AN} = \frac{W_{AN}}{PV_{AN}}. \tag{15}$$

The size of the labor force in the rural sector, U_R, is predetermined at any given point in time. Over time, U_R grows at the exogenous population

[10]There is a large literature emphasizing the role of interest rates in a credit-in-advance economy on the supply side; New Structuralist economists (see e.g. Taylor (1983)) have been particularly strong advocates of the necessity to take this effect into account when specifying macroeconomic models. See also Izquierdo (2000) for a more recent discussion.

growth rate, net of worker migration to urban areas, $MIGR$:

$$U_R = U_{R,-1}(1 + g_R) - MIGR. \tag{16}$$

In line with the traditional analysis of Harris and Todaro (1970), the incentives to migrate are taken to depend negatively on the ratio of the average expected *consumption* wage in rural areas to that prevailing in urban areas. We assume that costs associated with migration or other frictions may delay the migration process, introducing persistence in migration flows.

Unskilled workers in the urban economy may be employed either in the formal sector, in which case they are paid a minimum wage, W_M, or they can enter the informal economy and receive the market-determined wage in that sector, W_I. When rural workers make the decision to migrate to urban areas, they are uncertain as to which type of job they will be able to get, and therefore weigh wages in each sector by the probability of finding a job in that sector. They also take into account expected wages in the rural sector when making migration decisions. Suppose, for simplicity, that the rural labor market operates as a sequential "auction" market—all rural workers are laid-off at the end of each production period and re-hired randomly at the beginning of the next. In such conditions, the probability of employment in each sector subject to entry restrictions (that is, sectors where employment is demand determined) can be approximated by prevailing employment ratios. Finally, potential migrants also consider what their expected purchasing power in rural and urban areas will be, depending on whether they stay in the rural sector and consume the "typical" basket of goods of rural households, or migrate and consume the "typical" urban basket of goods.

Combining these hypotheses implies that the average expected urban consumption wage is a weighted average of the minimum wage in the formal sector and the going wage in the informal sector, deflated by an urban consumption price index, P_{UU} (defined below).[11] The weights are given by θ_U and $1 - \theta_U$, where θ_U is the probability of finding a job in the urban formal sector. The expected, unskilled urban real wage for the current period, Ew_U, is thus

$$Ew_U = \frac{\theta_U W_{M,-1} + (1 - \theta_U) W_{I,-1}}{P_{UU,-1}}, \tag{17}$$

[11] The weights of each type of good in the price index represent consumption patterns for urban unskilled workers in the base period (see the discussion below).

where θ_U is measured by the initial proportion of unskilled workers in the private formal sector, relative to the total number of unskilled urban workers net of government employment prevailing in the previous period (that is, $\theta_U = (U_{P,0}/(U_{U,0} - U_{G,0}))$.[12] A similar reasoning is used to calculate the expected rural consumption real wage, Ew_A:

$$Ew_A = \frac{\theta_R W_{AT,-1} + (1 - \theta_R) W_{AN,-1}}{P_{R,-1}},$$

where P_R is the consumption index for the rural sector (defined below) and θ_R is approximated by the initial proportion of the rural unskilled labor force employed in the export sector (that is, $\theta_R = U_{AT,0}/U_{R,0}$).[13] The migration function can therefore be specified as

$$MIGR = U_{R,-1}\lambda_m \left[\sigma_M \ln\left(\frac{Ew_U}{Ew_A}\right)\right] + (1 - \lambda_m)\frac{U_{R,-1}}{U_{R,-2}} MIGR_{-1}, \qquad (18)$$

where $0 < \lambda_m < 1$ measures the speed of adjustment and $\sigma_M > 0$ measures the elasticity of migration flows with respect to expected wages.

It should be noted that we have abstracted in the above discussion from the role of risk aversion in individual migration decisions, by focusing on "expected income" differentials rather than "expected utility" differentials. For a risk-averse worker, for instance, the probability of employment is a more important determinant of migration than the wage rate. More generally, we have not captured in our specification some of the other factors that may affect the decision to migrate, as emphasized in the recent analytical and empirical literature (see for instance Stark (1991) and Ghatak, Levine and Price (1996)). Wage uncertainty in agriculture or the urban sector (resulting, in the former case, from output variability, and in the latter, from imperfect information about labor market conditions), income inequality and relative deprivation in the rural sector, the joint nature of the decision process in households, and the lack of access to credit markets, may all affect migration

[12]Note that this expression for θ_U assumes that there is no "auctioning" of public sector jobs, that is, the government does not turn over its employees over every period as occurs in the private sector. This assumption captures the view that public jobs are not "randomly" offered but result rather from various non-economic considerations, such as political patronage. If there is turnover in the public sector, however, the probability of finding a job would be $(U_{P,0} + U_{G,0})/U_{U,0}$, instead of $(U_{P,0}/(U_{U,0} - U_{G,0})$.

[13]In principle, both θ_U and θ_R vary over time. In the simulations reported below, however, we treat them as constant.

decisions and lead potential migrants to alter their decision to move.[14] For instance, imperfect (and costly) information about urban labor market conditions may lead potential migrants to attach a greater weight to the available information regarding the rural sector and may lead them to postpone their decision to move—despite the existence of a large (expected) wage differential.[15] However, some of these factors may be country-specific and we have opted in building our prototype framework to focus on a more parsimonious specification that highlights the role of relative income opportunities.

3.2.2 Urban Unskilled Wages and Employment

The public sector is assumed to hire an exogenous level of unskilled workers, U_G. For simplicity, the wage rate paid by the government to unskilled workers is set at the same level as the wage rate paid to that category of labor in the private formal sector. Furthermore, we assume that there is a legally-binding minimum wage in place, which is indexed to either the consumer price index or an alternative price:

$$W_M = w_M (PIND_M)^{ind_M},$$

where $PIND_M = PLEV$ for instance, and $0 \leq ind_M \leq 1$. In the simulation exercises reported later, we assume that the minimum wage is fully indexed (so that $ind_M = 1$) on the price of the composite factor T_1.[16]

Labor demand in the formal private sector, U_P^d, is determined by firms' profit maximization. Given that formal private sector firms also borrow to finance their wage bill prior to the sale of output, the effective price of labor includes again the bank lending rate; thus

$$U_P^d = T_1 \left(\frac{1}{(1+IL_{-1})w_M} \frac{\beta_{XP1}}{\alpha_{XP1}^{\rho_{XP1}}} \right)^{\sigma_{XP1}}, \text{ where } w_M = \frac{W_M}{PT_1}. \qquad (19)$$

As was the case for the rural sector (and in order to avoid corner solutions), we assume that the wage rate paid to unskilled labor in the formal

[14] Stark (1991) also emphasized that individual migration can be the outcome of a family decision, often as a response to uninsurable risks.

[15] We also abstract from the negative externalities associated with rural to urban migration, such as congestion costs or pollution in shanty towns.

[16] An alternative would be to assume that the minimum wage is fixed in nominal terms ($ind_M = 0$). As is well known, simulation results of particular shocks may differ significantly under the two assumptions (see for instance Devarajan, Ghanem, and Thierfelder (1999)).

urban sector is systematically greater than the real wage rate paid in the informal sector. Consequently, unskilled urban workers will first seek employment in the private formal sector. The actual level of employment in that sector is determined according to equation (19). The remainder of the urban unskilled labor force, U_U, will thus seek employment in the informal economy, where there are no barriers to entry:

$$U_I^s = U_U - U_P^d - U_G. \tag{20}$$

From (6), the demand for labor in the informal sector is given by $U_I^d = \beta_{XI}(V_I/w_I)$, where w_I is the product wage defined as W_I/PV_I. Because the informal labor market clears continuously ($U_I^d = U_I^s$), the equilibrium product wage is given by

$$w_I = \beta_{XI}\frac{V_I}{U_I^s}, \quad \text{where } w_I = \frac{W_I}{PV_I}. \tag{21}$$

The urban unskilled labor supply, U_U, grows as a result of "natural" urban population growth and migration of unskilled labor from the rural economy, as discussed earlier. Moreover, a fraction of the urban unskilled population acquires skills (SKL) and leaves the unskilled labor force to increase the supply of skilled labor in the economy. We make the additional assumption that individuals are born unskilled, and therefore natural urban population growth (not resulting from migration or skills acquisition factors) is represented by urban unskilled population growth only, at the rate g_U. Thus, the size of the urban unskilled labor supply evolves according to

$$U_U = U_{U,-1}(1 + g_U) + MIGR - SKL. \tag{22}$$

We treat the growth rate of the urban unskilled population endogenously in our framework. We do so by dwelling on the several studies have documented the existence of a negative association between population growth rates and income levels; fertility rates tend to fall as the level of income increases (see for instance Barro and Becker (1989), and Becker, Murphy and Tamura (1990) for the growth implications of this relationship). Specifically, we assume that the growth rate of the urban unskilled population is related to a distributed lag of current and past values of the ratio of average income in the urban economy for skilled and unskilled workers. Assuming that these lags follow a declining geometric pattern and using the Koyck transformation,

we get

$$g_U = \lambda_g \alpha_{gu} \left[\frac{(S_P + S_G)W_S/S}{[U_I W_I + (U_P + U_G)W_M]/U_U} \right]^{-\gamma_{gu}} + (1 - \lambda_g) g_{U,-1}, \quad \alpha_{gu} > 0, \tag{23}$$

where $\gamma_{gu} > 0$ measures the elasticity of the growth rate of the urban unskilled population with respect to the wage ratio.

The acquisition of skills by unskilled workers is assumed to depend on three factors: *a*) relative expected consumption wages of skilled to unskilled urban workers (as a proxy for the future stream of earnings associated with higher levels of education); *b*) the government stock of education capital, K_E, which affects the ability to invest in skills; and *c*) the average level of wealth held by each unskilled worker, which plays an important role in the presence of liquidity constraints.

Consider first the effect of wages. In case they acquire skills, current unskilled workers expect to earn wage W_S if they are employed (with probability θ_S) and nothing if they are unemployed. The purchasing power of this wage is obtained by deflating it by the skilled consumption price index, $P_{US,-1}$ (defined below):

$$Ew_S = \theta_S \frac{W_{S,-1}}{P_{US,-1}},$$

where θ_S is, as before, approximated by the initial ratio of the number of skilled workers employed in the private sector, over the total number of skilled workers that are not employed in the public sector seeking a job in the private sector (that is, $\theta_S = S_{P,0}/(S_0 - S_{G,-0})$).

In contrast, if they remain unskilled, they expect to get the average unskilled wage, which is a weighted average of the minimum wage W_M and the informal wage rate. Assuming, again, that there is no job turnover in the public sector, the average expected real wage is given by (17), which is repeated here for convenience:

$$Ew_U = \frac{\theta_U W_{M,-1} + (1 - \theta_U) W_{I,-1}}{P_{UU,-1}},$$

with θ_U as defined above.

Consider now the effect of initial wealth. As can be inferred, for instance, from various studies in the endogenous growth literature (see for instance De Gregorio (1996)), the existence of constraints in obtaining credit to fund the

cost of acquiring skills may completely outweigh the impact of relative wages and the prevailing stock of government capital in infrastructure on workers' decisions. Indeed, in the framework that we consider here, only firms have access to bank credit (see the discussion below); no matter how high the wage differential is or is expected to be, workers simply cannot borrow to finance human capital accumulation.[17] To capture the existence of these credit constraints we assume that the decision to acquire skills is a function of the (lagged) ratio of the level of wealth of urban formal and informal unskilled households divided by the number of unskilled workers in the urban sector, $(WT_{UI} + WT_{UF})/U_U$ (with WT defined below). Admittedly, this is a rather simplistic way of modeling these frictions; an alternative (but less tractable) approach would be to assume that access to the credit market is subject to a threshold effect, with financial wealth playing a "signaling" role because of workers' ability to pledge a fraction of it as collateral.

Given these three effects, the flow increase in the supply of skilled labor can be written as:

$$\begin{aligned} SKL &= \lambda_S \left[\left(\frac{WT_{UI,-1} + WT_{UF,-1}}{U_{U,-1}} \right)^{\alpha_{edu}} \kappa_e \left(\frac{Ew_S}{Ew_U} \right)^{\sigma_W} (K_{E,-1})^{\sigma_E} \right] \\ &\quad + (1 - \lambda_S) SKL_{-1}, \end{aligned} \tag{24}$$

where $0 < \lambda_S < 1$, κ_e is a shift parameter, and $\alpha_{edu} > 0$. For simplicity, we treat as constant the cost of acquiring skills (as measured by the number of years of schooling multiplied by the average cost of education per year).

Public investment in education, I_E (which is treated as exogenous), determines the rate at which the stock of public capital in education grows over time:

$$K_E = K_{E,-1}(1 - \delta_E) + \frac{I_{E,-1}}{PQ_{P,-1}}, \tag{25}$$

where $0 < \delta_E < 1$ is a depreciation rate. We assume that only the private good is used to invest in education and therefore deflate nominal investment by the demand price PQ_P (defined below).

[17] This assumption is well supported by the evidence on the composition of bank credit in low-income countries, which suggests that only a small fraction of bank loans is allocated to households.

3.2.3 Urban Skilled Wages and Employment

As indicated earlier, we assume that wage-setting behavior for skilled labor is based on efficiency considerations. Specifically, we assume that in order to provide incentives for employees to work and avoid shirking, firms must set a sufficiently high (product) wage. Along the lines of the specific functional form derived by Agénor and Aizenman (1999*a*), we assume that the level of effort skilled workers provide depends negatively on the ratio of their real opportunity cost, Ω_W, to their *consumption* wage, that is, the nominal wage W_S deflated by the skilled consumption price index, P_{US}:

$$ef = 1 - ef_m \left[\frac{\Omega_W}{W_S/P_{US}}\right]^{\gamma_{ef}}, \quad \text{where } \gamma_{ef} > 0, \tag{26}$$

and where $0 < ef_m < 1$ denotes the "minimum" level of effort. The opportunity cost of effort is taken to be constant in what follows.

Firms determine the levels of skilled and unskilled employment, as well as the *product* wage for skilled labor, w_S, so as to maximize profits, taking as given the real minimum wage paid and the production technology (10). It can be established that the demand for skilled labor is given by

$$S_P^d = T_2 \kappa_S \left(\frac{1}{(1+IL_{-1})w_S} \cdot \frac{\beta_{XP2}}{\alpha_{XP2}^{\rho_{XP2}}}\right)^{\sigma_{XP2}}, \quad \text{where } w_S = \frac{W_S}{PT_2}, \tag{27}$$

whereas the optimal wage-setting equation is given by

$$w_S = \frac{\beta_{XP2}\gamma_{ef}(1-ef)}{\alpha_{XP2}^{\rho_{XP2}}} \left(\frac{T_2}{ef \cdot S_P}\right)^{1+\rho_{XP2}} \frac{P_{US}}{PT_2}. \tag{28}$$

Note that in this equation the ratio of the consumption price index for skilled workers, P_{US}, over the price of the composite input, PT_2, appears because firms set the *product* wage whereas effort depends on the *consumption* wage. This creates an important channel (seldom accounted for in empirical models) through which changes in relative prices affect wage formation.

Given that firms set wages and are on their labor demand curve, open skilled unemployment may emerge. The rate of skilled unemployment, $UNEMP_S$, is given by the ratio of skilled workers who are not employed either by the private or the public sector, divided by the total population of skilled work-

ers:[18]

$$UNEMP_S = \frac{S - S_G - S_P^d}{S}. \tag{29}$$

Note that here we assume that skilled workers who are unable to find a job in the formal economy do not enter the informal economy, in contrast to unskilled workers. In principle, any worker who is not hired in the formal economy could get a job in the informal economy at the going wage. However, there are several reasons why they may choose not to do so. An important consideration may be that skilled workers are concerned about possible adverse signaling effects associated with employment in the informal economy and may prefer instead to remain openly unemployed (Gottfries and McCormick (1995)). Indeed, the existence of "luxury" unemployment is a well-documented feature of the labor market in developing countries.

The skilled labor force evolves over time according to:

$$S = S_{-1} + SKL. \tag{30}$$

Because we assumed that workers are born unskilled, the skilled workforce does not grow at the natural growth rate of the urban population, but rather at the rate at which unskilled workers choose to acquire skills. Note also that, for simplicity, we assume no "de-skilling" (or obsolescence) effect, although this could be easily captured.

It is important, to conclude this discussion of wage formation mechanisms, to return to our assumption that skilled workers' wage is determined on the basis of an efficiency effect of compensation on productivity. In practice, it is notoriously difficult to discriminate among various forms of efficiency wage theories; these theories tend to be "observationally equivalent." At the same time, however, this makes our choice here of an explicit formulation based on the wage-productivity link less restrictive than it appears at first glance; in fact, a wage-setting equation fundamentally similar to (28) can also be derived by considering, say, turnover costs. A bargaining framework between firms and a centralized trade union could also lead to a similar wage-setting specification. The important point is to assume in each case that whereas firms are concerned with the *product* wage, workers (or the union that represents them) are concerned with the *consumption* wage. This

[18] As noted earlier, skilled employment in the public sector is set exogenously by the government.

creates a wedge (as derived above) through which relative prices affect wage-setting decisions.

Although our treatment above provides a tractable specification of the wage-productivity link, a more general specification of wage formation for skilled labor may also be warranted in some applications. Such a specification is also available in IMMPA and consists of replacing (28) by the "generic" formulation

$$W_S = w_S(PIND_S)^{ind_S}(UNEMP_S)^{-\phi_U}\Omega_W^{\phi_1}\left(\frac{P_{US}}{PT_2}\right)^{\phi_2}(1+IL_{-1})^{-\phi_3}, \quad (31)$$

where $PIND_S = PLEV$ or PT_2 (depending on whether the nominal wage is indexed to the overall level of prices or the composite "product" price), $0 \leq ind_S \leq 1$, and Ω_W, ϕ_U, ϕ_1, ϕ_2, $\phi_3 > 0$.

If this specification is used, w_S in equation (27) must be defined as $w_S = W_S/PT_2$, with W_S given in (31), and the production technology, equation (10), must be replaced by

$$V_P = CES\{CES[CES(S_P, K_P), U_P], K_G\}. \quad (32)$$

Specification (31) is quite flexible; for instance, full indexation on the consumer price index only requires setting $PIND_S = PLEV$, $ind_S = 1$, and $\phi_U = \phi_1 = \phi_2 = \phi_3 = 0$. To assume that the product wage depends only on the ratio P_{US}/PT_2 (as above) requires setting $PIND_S = PT_2$, $ind_S = 1$, $\phi_2 > 0$, and $\phi_U = \phi_1 = \phi_3 = 0$. Note also that in (31), as long as $\phi_U > 0$, the level of skilled unemployment will affect (negatively) the *level* of nominal wages, instead of the *rate of growth* of wages (as would be the case with a Phillips curve formulation). This level effect is consistent with various forms of efficiency wage theories in which unemployment acts as a "worker discipline device," such as the effort elicitation model of Shapiro and Stiglitz (1984); evidence supporting it has been provided for instance by Hoddinot (1996) for Côte d'Ivoire. Finally, note that the gross lending rate, $1 + IL_{-1}$, enters in this specification because, say, an increase in the cost of borrowing raises the effective price of labor, which firms try to offset, at least in part, by reducing the nominal wage. If $\phi_3 < 1$ ($\phi_3 > 1$) the net effect is an increase (reduction) in the effective cost of skilled labor, and the demand for skilled labor will fall (increase). The wage equation (31) is used by Agénor, Fernandes, Haddad, and van der Mensbrugghe (2003) in their IMMPA framework for Brazil.

Note that the inverse relationship between the level of skilled unemployment and the skilled workers' wage can also be introduced in either (26) or

(28), by assuming that the reservation wage, Ω_W , is inversely related to the unemployment rate:

$$\Omega_W = \overline{\Omega}_W (UNEMP_S)^{-\phi_U},$$

where $\phi_U \geq 0$. Put differently, unemployment acts as a "disciplining device" by reducing the perceived opportunity cost of working and/or in reducing wage demands. In the simulation experiments reported below, however, we focus on the case where $\phi_U = 0$.

3.3 Supply and Demand

As noted earlier, we assume that both the informal and public sector goods are nontraded. This therefore implies that, in each sector, total supply is equal to gross production, that is,

$$X_I = Q_I^s, \quad X_G = Q_G^s. \tag{33}$$

Agricultural and private formal urban goods, by contrast, compete with imported goods. The supply of the composite good for each of these sectors consists of a CES combination of imports and domestically-produced goods:

$$Q_{AN}^s = CES(M_{AN}, D_{AN}), \tag{34}$$

$$Q_P^s = CES(M_P, D_P), \tag{35}$$

where $D_{AN} = X_{AN}$.

Aggregate demand for each of these sectors consists of intermediate and final consumption, government spending, and investment demand:

$$Q_{AN}^d = C_{AN} + INT_{AN}, \tag{36}$$

$$Q_I^d = C_I + INT_I, \tag{37}$$

$$Q_G^d = C_G + Z_G + INT_G, \tag{38}$$

$$Q_P^d = C_P + G_P + Z_P + INT_P, \tag{39}$$

where INT_j (for $j = AN, I, G, P$) is defined as total demand (by all productions sectors) for intermediate consumption of good j:

$$INT_j = \sum_i a_{ji} X_i \qquad \text{for } i = AN, AT, I, P, G. \tag{40}$$

Government expenditure on good j, G_j, is expressed in real terms as:

$$G_j = gg_j \frac{G}{PQ_j} \qquad \text{for } j = P, AN, G, \tag{41}$$

where G represents total nominal government expenditure, PQ_h is the market price of goods purchased by the government, and $gg_{AN} + gg_G + gg_P = 1$. Note that the government is assumed not to spend on informal sector goods.

For the nontraded agricultural and informal sectors, aggregate demand (Q_{AN} and Q_I) consists of intermediate consumption and demand for final consumption (C_{AN} and C_I), whereas aggregate demand for the public good, Q_G, consists of intermediate consumption as well as demand for final consumption, C_G, and investment demand, Z_G. Aggregate demand of the private formal good, Q_P, is taken to consist of intermediate consumption as well as demand for final private consumption, C_P, final government consumption, G_P, and private investment, Z_P.

Final consumption for each production sector i, C_i, is the summation across all categories of households of nominal consumption of good i, deflated by the demand price of good i:

$$C_i = \sum_h C_{ih} = \frac{\sum_h cc_{ih} \cdot CON_h}{PQ_i}, \quad \text{where } 0 < cc_{ih} < 1, \ \sum_i cc_{ih} = 1, \tag{42}$$

where C_{ih} is consumption of good i by household h and PQ_i is the composite sales price of good i (defined below). Coefficients cc_{ih} indicate how total nominal consumption by household h, CON_h, is allocated to each type of good. Equations (42) can be derived by maximization of a Stone-Geary utility function (see for instance Deaton and Muellbauer (1980)). They represent a linear expenditure system in which, for simplicity, the subsistence level of consumption is set to zero.

Finally, aggregate investment made by firms, Z, consists of purchases of both public and private goods and services (Z_G and Z_P respectively):

$$Z_i = zz_i \frac{Z \cdot PK}{PQ_i}, \text{ where } zz_G + zz_P = 1.$$

Coefficients zz_i measure the allocation of total investment demand to public and private goods.

3.4 External Trade

As indicated earlier, firms in the private formal sector allocate their output to exports or the domestic market according to the production possibility frontier (PPF) specified in equation (11) and the relative price of exports (PE_P) vis-à-vis domestic goods (PD_P). Efficiency conditions require that firms equate this relative price to the opportunity cost in production. This yields:

$$E_P = D_P \left(\frac{PE_P}{PD_P} \cdot \frac{1-\beta_{TP}}{\beta_{TP}} \right)^{\sigma_{TP}}. \tag{43}$$

The agricultural traded good is fully exported, as also indicated earlier; given that this sector is the only one using only its own good as intermediate consumption, we have

$$E_{AT} = V_{AT} = (1 - a_{AT,AT}) X_{AT}. \tag{44}$$

A similar reasoning applies to the determination of the demand for imports. We assume that imports compete with domestic goods in the agricultural nontraded sector as well as in the private formal sector. Making use of Armington functions for the demand for imported vs. domestic goods and relative prices, import demand for both sectors (M_A and M_P) can be written as:

$$M_{AN} = D_{AN} \left(\frac{PD_{AN}}{PM_{AN}} \cdot \frac{\beta_{QA}}{1-\beta_{QA}} \right)^{\sigma_{QA}}, \tag{45}$$

$$M_P = D_P \left(\frac{PD_P}{PM_P} \cdot \frac{\beta_{QP}}{1-\beta_{QP}} \right)^{\sigma_{QP}}. \tag{46}$$

These equations indicate that the ratio of imports to domestic supply of both categories of domestic goods depends on the relative prices of these goods and the elasticity of substitution, σ_{QA} and σ_{QP}, between these goods.

3.5 Prices

As we have seen previously production requires both factor inputs and intermediate inputs; we therefore define the net or value added price of output as:

$$PV_i = V_i^{-1} \left\{ PX_i(1 - indtax_i) - \sum_j a_{ji} PQ_j \right\} X_i, \text{ where } i, j = AN, AT, I, P, G \tag{47}$$

where $indtax_i$ is the rate of indirect taxation of output in sector i (with $indtax_I = 0$ because there is no indirect taxation of informal sector output). This equation relates the value added price of output of sector i to the price of gross output, PX_i, net of indirect taxes, less the cost of intermediate inputs (purchased at composite prices).

We are considering a small economy and therefore assume that the world prices of imported and exported goods are exogenously given. The domestic currency price of these goods is obtained by adjusting the world price by the exchange rate, the import tariff rate, tm, or the export subsidy rate, te:

$$PE_i = wpe_i(1 + te_i)ER, \text{ for } i = AT, P, \tag{48}$$

$$PM_i = wpm_i(1 + tm_i)ER, \text{ for } i = AN, P. \tag{49}$$

Because the transformation function between exports and domestic sales of the urban private good is linear homogeneous, the sales price, PX_P, is derived from the expenditure identity:[19]

$$PX_P X_P = PD_P D_P + PE_P E_P,$$

that is,[20]

$$PX_P = \frac{PD_P D_P + PE_P E_P}{X_P}. \tag{50}$$

For the informal and public sectors (both of which produce goods that are not exported and do not compete with imports), the composite sales price is identical to the price of domestic sales, which in turn is equal to the price of gross output. In the agricultural sector, the sales price of the traded agricultural good, PX_{AT}, is simply the domestic-currency price of

[19] An alternative approach to price formation in the private formal sector is to assume that prices are set monopolistically, as markups over input costs (as for instance in Yeldan (1997), among others). With a fixed markup, equilibrium would then require the level of output to be demand determined, implying that the production function would be dropped from the system.

[20] In solving the model, we use equation (46) to solve for PD_P, and, because $Q_P^s = Q_P^d$, we use (39) to solve for the equilibrium value of Q_P. We then invert the composite good CES equation (35) to solve for M_P and invert the CET function (11) to solve for D_P. This procedure ensures that the composite price (and thus indirectly the price of domestic sales) adjusts to equilibrate supply and demand.

agricultural exports, PE_{AT}, whereas the sales price of the nontraded good, PX_{AN}, is equal to the domestic price of agricultural goods, PD_{AN}.

For the nontraded agricultural sector and private urban production, the substitution function between imports and domestic goods is also linearly homogeneous, and the market price is determined accordingly by the expenditure identity:

$$PQ_iQ_i = PD_iD_i + PM_iM_i, \text{ for } i = AN, P,$$

that is

$$PQ_i = \frac{PD_iD_i + PM_iM_i}{Q_i}, \text{ for } i = AN, P. \tag{51}$$

For those sectors that do not compete with imports (informal and public sector goods), the domestic price, PD_i, is simply equal to the market price, PX_i:

$$PD_i = PX_i, \text{ for } i = I, G. \tag{52}$$

The nested CES production function of private formal urban goods is also linearly homogeneous; prices of the composite inputs are therefore derived in similar fashion:

$$T_1PT_1 = T_2PT_2 + (1 + IL_{-1})W_MU_P, \tag{53}$$

$$T_2PT_2 = PROF_P + (1 + IL_{-1})W_SS_P, \tag{54}$$

where $PROF_P$, as defined below, denotes profits of private firms in the urban formal sector.

The price of capital is constructed as using the investment expenditure identity, which involves those goods for which there is investment demand, namely, the public good and private-formal urban good (see equations (38) and (39)):

$$PK = \frac{\sum_i PQ_iZ_i}{Z} = \frac{PQ_GZ_G + PQ_PZ_P}{Z}. \tag{55}$$

Markets for informal goods and government services clear continuously; equilibrium conditions are thus given by

$$Q_I^s = Q_I^d, \quad Q_G^s = Q_G^d.$$

In solving the model, we use equations (33) to determine the equilibrium quantities Q_I and Q_G, that is, equations (5) and (7). We also use the demand equations (37) and (38) to solve residually for C_I and C_G, that is:

$$X_I - G_I - INT_I = C_I, \tag{56}$$

$$X_G - G_G - Z_G - INT_G = C_G. \tag{57}$$

Equation (42) for $i = I, G$, is then solved for $PQ_I = PX_I$ and $PQ_G = PX_G$, respectively. This yields:

$$PX_i = \frac{\sum_h cc_{ih} CON_h}{C_i}, \quad i = I, G. \tag{58}$$

The aggregate price level, $PLEV$, or consumer price index (CPI), is a weighted average of individual goods market prices, PQ_i:

$$PLEV = CPI = \sum_i wt_i PQ_i, \tag{59}$$

where $0 < wt_i < 1$ denotes the relative weight of good i in the index, and $PQ_I = PD_I$ and $PQ_G = PD_G$. These weights are fixed according to the share of each of these goods in aggregate consumption in the base period. Inflation is defined as the percentage change in the price level:

$$PINF = \frac{PLEV - PLEV_{-1}}{PLEV_{-1}}. \tag{60}$$

Finally, the consumption price index for the rural sector is given by

$$P_R = \sum_i wr_i PQ_i, \tag{61}$$

whereas the consumption price indexes for urban unskilled and skilled workers are given by

$$P_{UU} = \sum_i wu_i PQ_i, \tag{62}$$

$$P_{US} = \sum_i ws_i PQ_i, \tag{63}$$

where the wr_i, wu_i and ws_i are relative weights with $\sum_i wr_i$, $\sum_i wu_i$ and $\sum_i ws_i$ summing to unity. The deflator of GDP at factor cost (used below), is given by

$$PGDP_{FC} = \Sigma_i v_i PV_i, \quad v_i \equiv PV_i X_i / \Sigma_j PV_j X_j, \tag{64}$$

where, again, $\Sigma_i v_i = 1$.

3.6 Profits and Income

Firms' profits are defined as revenue minus total labor costs. In the case of agricultural nontraded sector firms and urban informal sector firms, profits are simply given by

$$PROF_i = PV_i V_i - W_i U_i, \text{ for } i = AN, I. \tag{65}$$

Firms producing in the traded agricultural sector must include working capital costs as well in measuring their production costs, that is, interest payments on their wage bill; their profits are therefore given by

$$PROF_{AT} = PV_{AT} V_{AT} - (1 + IL_{-1}) W_{AT} U_{AT}. \tag{66}$$

Finally, profits of private-urban sector firms account for both working capital costs and salaries paid to both categories of workers:

$$PROF_P = PV_P V_P - (1 + IL_{-1}) U_P W_M - (1 + IL_{-1}) S_P W_S, \tag{67}$$

where, as noted earlier, the nominal wage paid to unskilled workers is the legally-imposed minimum wage, W_M.

Firms' income is simply equal to profits minus interest payments on loans for investment purposes. Firms' income and profits are defined separately, because not all sectors are assumed to borrow on the credit market to finance investment. Specifically, we assume that only firms in the formal urban economy accumulate capital.[21] Firms' income can thus be defined as:

$$YF_i = PROF_i, \text{ for } i = AN, AT, I, \tag{68}$$

$$YF_P = PROF_P - IL_{-1} DL_{P,-1} - IF \cdot FL_{P,-1} ER, \tag{69}$$

where IF is the interest rate paid on foreign loans, and DL_P and FL_P are the levels borrowed domestically and abroad by private urban firms for physical capital accumulation.

[21] Of course, this assumption can be relaxed in specific country applications.

Commercial banks' profits must also be taken into account. They are defined as the difference between revenues from loans to firms (be it for working capital or investment needs) and interest payments on both households' deposits, $\sum_h DD_h$, and foreign loans received from international creditors, FL_B:

$$\begin{aligned} YF_{PB} &= IL_{-1}[DL_{P,-1} + DL_{G,-1} + U_{AT}W_{AT} + W_M U_P + W_S S_P] \\ &\quad -ID\sum_h DD_{h,-1} - IF \cdot ER \cdot FL_{B,-1}, \end{aligned} \tag{70}$$

where ID is the interest rate on bank deposits, assumed to be set by the central bank.

Household income is based on salaried labor, distributed profits, transfers, and net interest receipts on holdings of financial assets. Households are defined according to both labor categories and their sector of location. There are two types of rural households: one comprising workers employed in the traded sector, and the other workers in the nontraded sector. In the urban sector there are two types of unskilled households, those working in the informal sector and those employed in the formal sector. The fifth type of households consists of skilled workers employed in the formal urban economy (in both the private and public sectors). Finally, there are "capitalist" households (including rentiers) whose income comes from firms' earnings in the formal private sector, the agricultural traded sector and commercial banks. We further assume that households in both the nontraded agricultural sector and in the informal urban economy own the firms in which they are employed—an assumption that captures the fact that firms in these sectors tend indeed to be small, family-owned enterprises.

Income of agricultural nontraded and urban informal groups is given by

$$YH_i = \gamma_i TRH + W_i U_i + ID \cdot DD_{i,-1} + IF \cdot FD_{i,-1} ER + YF_i, \text{ for } i = AN, I, \tag{71}$$

where γ_i is the portion of total government transfers (TRH) each group receives, $W_i U_i$ denote wage earnings, DD_i domestic bank deposits, FD_i foreign bank deposits (taken to be a fairly small share of assets in the simulations reported below), and YF_i firms' income in these sectors.

Income of the agricultural traded sector household, as well as that of the urban formal unskilled and skilled households, depends on government transfers, salaries and interests on deposits; firms provide no source of income,

because these groups do not own the production units in which they are employed:

$$YH_i = \gamma_i TRH + W_i U_i + ID \cdot DD_{i,-1} + IF \cdot FD_{i,-1} ER, \text{ for } i = AT, UF, \quad (72)$$

$$YH_S = \gamma_S TRH + W_S(S_P + S_G) + ID \cdot DD_{S,-1} + IF \cdot FD_{S,-1} ER, \quad (73)$$

where $U_{UF} = U_P + U_G$.

Firms' income in the traded agricultural and private urban sectors are assumed to go to capitalist households, along with commercial bank's income, and interest on deposits. Because there is no capital accumulation in the traded agricultural sector to be financed, the entire amount of firms' profits from that sector are transferred to capitalist households. By contrast, firms in the private urban sector retain a portion of their earnings, re, for investment financing purposes, and transfer the remainder to capitalist households. Capitalist households' income is thus:

$$\begin{aligned} YH_{KAP} &= ID \cdot DD_{KAP,-1} + IF \cdot FD_{KAP,-1} ER + YF_{AT} \\ &\quad + (1 - re) YF_P + YF_{PB} + \gamma_{KAP} TRH. \end{aligned} \quad (74)$$

3.7 Savings, consumption, and Investment

Each category of household h saves a fraction, $0 < savrate_h < 1$, of its disposable income:

$$SAV_h = savrate_h YH_h (1 - inctax_h), \quad (75)$$

where $0 < inctax_h < 1$ is the income tax rate applicable to household h.

The savings rate is a positive function of the real interest rate on deposits:

$$savrate_h = s_{0,h} \left(\frac{1 + ID}{1 + PINF} \right)^{\sigma_{S,h}}. \quad (76)$$

Note that in practical applications the propensity to save can be made a function of not only the real deposit rate, which implies that inflation and the savings rate are inversely related, but also of the inflation rate itself, as a result of a precautionary motive (with higher inflation acting as a signal of greater uncertainty about future real income). The evidence on the latter effect is significant (see Agénor (2000) and Loayza, Schmidt-Hebbel, and Servén (1999)) and may be highly relevant for some countries.

The portion of disposable income that is not saved is allocated to consumption:[22]

$$CON_h = (1 - inctax_h)YH_h - SAV_h.$$

Finally, the total flow of savings of each household is channeled into the accumulation of financial wealth, WT_h, which also accounts for valuation effects on the stock of foreign-currency deposits, FD_h, associated with changes in the nominal exchange rate, ER:

$$WT_h = WT_{h,-1} + SAV_h + \Delta ER \cdot FD_{h,-1}.$$

Capital accumulation occurs only in the private urban sector. The decision to invest is assumed to depend on several factors. First, there is a positive effect of the after-tax rate of return to capital relative to the cost of funds. Second, there is an accelerator effect, which aims to capture the impact of the desired capital stock on current investment. Third, there is a negative effect of the (lagged) inflation rate, which may be viewed as a measure of macroeconomic instability. Fourth, there is a positive effect of the public capital stock in infrastructure—cumulated investment in railroads, paved roads, water systems, telecommunications, and power—a relationship for which there is also robust evidence (see Agénor and Montiel (1999)). Finally, there is a negative effect of the economy's level of debt, which may result from several possible factors: *a*) the risk of confiscation associated with a debt overhang (as discussed earlier); *b*) the diversion of foreign exchange to service foreign debt and consequently insufficient amounts of foreign currency to import capital goods; and *c*) the possibility that a high external debt may force a reallocation of public expenditure away from productive uses (maintenance and infrastructure investment, most notably) and toward debt service. In the second case the inclusion of foreign debt acts as a "proxy" for foreign exchange availability, whereas in the third it is a proxy for the composition of public spending.[23]

[22]Note that we do not account for any real balances effect (or wealth effect) on consumption, as in Easterly (1990) and others. This effect can be, however, easily added if warranted by the empirical evidence—for instance by making the savings rate a function of wealth as well. It could prove important in assessing the effects of exchange-rate induced valuation changes on domestic expenditure.

[23]It should be noted that the disincentive effects of external debt may be related not only to private investment but also to international capital flows. As discussed by Khan and Haque (1985), high public external debt can lead to capital flight if domestic investment is

Specifically, we model the investment function by firms in the private urban sector as

$$\frac{Z}{K_{P,-1}} = \left(\frac{K_{INF}}{K_{INF,-1}}\right)^{\sigma_K} \left\{(1+\frac{\Delta RGDP_{FC}}{RGDP_{FC,-1}})^{\sigma_{ACC}} \right. \tag{77}$$
$$\frac{\phi_Z}{(1+PINF_{-1})^{\sigma_P}} \left(\frac{(1+IK)(1-inctax_{KAP})}{1+IL}\right)^{\sigma_{IK}}$$
$$\left. -\phi_D \left(\frac{IF_G \cdot ER \cdot FL_{G,-1}}{TXREV}\right) - \phi_{DD} \left(\frac{IF_G \cdot ER \cdot FL_{G,-1}}{TXREV}\right)^2 \right\}.$$

The analytical form adopted for the investment function incorporates some key features for the analysis of debt reduction strategies. Equation (77) indicates that the ratio of investment, Z, to the (lagged) stock of private capital, K_P, is positively related to the return to capital, IK, net of the income tax rate that capitalists are subject to. This term introduces an adverse effect of higher taxes on investment. The negative effect of the lending rate represents the cost of borrowing to finance capital accumulation. High inflation also has a negative effect on investment decisions; this variable captures the impact of increased uncertainty about relative prices under higher inflation, which makes investment decisions riskier. Several recent studies—see, for instance, Servén (1997, 1998) and Zeufack (1997)—have indeed shown that macroeconomic instability may have a significant detrimental effect on the decision to invest, particularly when capital outlays are irreversible. There is also substantial empirical evidence that public and private sector capital in infrastructure tend to be complements (see Agénor and Montiel (1999)). This is accounted for by the addition of the growth rate of the public capital stock in infrastructure (K_{INF}) in determining the growth rate of private capital.

Second, equation (77) integrates the "flexible" accelerator effect on private investment. The ability of the firm to respond to changes in its desired capital stock is reflected in the positive effect on investment of the growth in value added, which is measured by changes in real GDP evaluated at factor cost, $RGDP_{FC}$, defined as

subject to "expropriation risk." Conversely, debt reduction may not only stimulate private domestic capital formation but also net capital inflows; see for instance, Bhattacharya, Montiel and Sharma (1997) for sub-Saharan Africa. This may be an important source of positive externality associated with debt relief, which suggests that the benefits of this shock, as discussed below, may be under-estimated.

$$RGDP_{FC} = \Sigma_i PV_i X_i / PGDP_{FC}, \tag{78}$$

where $PGDP_{FC}$, the deflator of GDP at factor cost, is defined in (64).

There is considerable evidence supporting this effect, particularly for sub-Saharan Africa, as discussed for instance by Agénor (2000, Chapter 1). Finally, the last two terms in equation (77) indicate that investment is inversely related to the ratio of interest payments on public sector debt to tax revenues. This ratio may capture various factors (as noted above), including the existence of confiscation risk. For instance, when government revenues fall, investors may infer that there is a higher probability that private sector capital may be either taxed or confiscated to finance existing debt service.

This particular form of the investment function introduces a key role for fiscal policy. For instance, increasing income tax rates will increase tax collection and therefore result in a positive effect by reducing confiscation risk; but at the same time it will also reduce the net return to physical capital. A debt reduction program combined with suitable fiscal policies may both reduce interest payments and improve tax collection, thereby reducing confiscation risk and boosting private investment. The specific formulation that we have adopted here (which includes both linear and quadratic terms in the debt service-to-taxes ratio) implies that the marginal effect on private investment of a reduction in the debt ratio is magnified if the initial level of that ratio is high. We could also have assumed that the relationship between investment and external debt has a concave form, as suggested by the econometric results of Elbadawi, Ndulu, and Ndungu (1997); in that case, the coefficient ϕ_D should be negative, implying that external debt has at first a positive impact and a negative one only when the it becomes relatively large.

The rate of return on capital is defined as the ratio of profits to the stock of capital:

$$IK = \frac{PROF_P}{PK \cdot K_P}. \tag{79}$$

Capital accumulation depends on the flow level of investment, Z, and the depreciation rate of capital from the previous period, δ_P:

$$K_P = K_{P,-1}(1 - \delta_P) + Z_{-1}, \tag{80}$$

where $0 < \delta_P < 1$.

3.8 Financial Sector

The financial balance sheets of each group of agents are presented in summary form in Table 1. In what follows we consider in turn the determination of the portfolio structure of households, the demand for credit by firms, and the behavior of commercial banks.

3.8.1 Households

In contrast to various FCGE models that assume that existing stocks of assets cannot be traded, and only *additional* flows from savings can be allocated to existing assets, we assume here that agents can freely alter the desired composition of their stock of financial wealth—subject to the overall constraint that initial or beginning-of-period wealth is predetermined at any given moment in time. Each category of households allocates instantaneously its stock of wealth to either money (in the form of cash holdings that bear no interest), H_h, domestic bank deposits, DD_h, or foreign bank deposits, FD_h (see Figure 3):

$$WT_h = H_h + ER \cdot FD_h + DD_h. \tag{81}$$

Note that in our definition of private wealth we have excluded land and other types of real assets (such as livestock), which can be important for households located in the rural sector. Some of these assets are often held in "unproductive" form and no market *per se* exists to measure their relative price. Thus, in practice, accounting for real assets is likely to raise some insurmountable measurement problems, involving both values and quantities. Nevertheless, it should be kept in mind that in a setting in which such assets are accounted for, a reallocation of wealth away from (say) real to financial assets would have significant real effects, by affecting interest income on interest-bearing assets (such as bank deposits), disposable income, and thus expenditure.

Real money demand functions for each household category are taken to depend positively on real income (measured in terms of the overall price level, which is nothing but the inverse of the purchasing power of one unit of currency), and negatively on inflation (as a proxy for the opportunity cost of holding money instead of real assets) and the rates of return on domestic and foreign deposits (which measure the opportunity cost of holding money

instead of interest-bearing financial assets):

$$H_h^d = PLEV\left(\frac{YH_h}{PLEV}\right)^{\sigma_H}(1+ID)^{-\beta_{hD}}[(1+IF)(1+dev)]^{-\beta_{hF}}\cdot(1+PINF)^{-\beta_{hPINF}}, \quad (82)$$

where *dev* denotes the expected devaluation rate, that is, the expected rate of change in ER, which is taken as exogenous. This specification of the money demand function allows us not only to account for different elasticities between domestic and foreign deposits, but also for different elasticities across households.

An alternative, simpler specification is to assume that the demand for money balances is proportional to total consumption, as a result of a "cash-in-advance" constraint:

$$H_h^d = CONS_h.$$

Because of our assumptions of a fixed exchange rate and incomplete sterilization, the nominal money supply (which is derived below from the base money stock), H^s, is determined endogenously. In equilibrium, this stock is equal to the total sum of money demanded by households:[24]

$$H^s = \sum_h H_h^d. \quad (83)$$

The portion of wealth that is not held in the form of noninterest-bearing currency is allocated between domestic and foreign deposits. The relative proportions of holdings of each of these two categories of assets are taken to depend on their relative rates of return:

$$\frac{\gamma_{Bh}}{1-\gamma_{Bh}} = \phi_{Bh}\left(\frac{1+ID}{(1+IF)(1+dev)}\right)^{\sigma_{Bh}}, \quad (84)$$

where γ_{Bh} represents the proportion of domestic deposits held in total deposits:

$$\gamma_{Bh} = \frac{DD_h}{DD_h + ER\cdot FD_h}. \quad (85)$$

[24]When computing the solution of our model, this equation is dropped. Given Walras' law, if all other markets but the money market are in equilibrium, then the money market must be in equilibrium as well. Our computer program checks that this equation indeed holds continuously.

In solving the model, we use equation (84) to determine the optimal level of domestic bank deposits, whereas we use equation (81) to determine residually the level of foreign deposits.

3.8.2 Firms

Firms finance their investment plans (as defined above) through retained earnings and domestic (DL_P) and foreign (FL_P) loans:

$$PK \cdot Z = \Delta DL_P + ER \cdot \Delta FL_P + re \cdot YF_P.$$

Solving this equation for DL_P gives us the demand for bank loans:

$$DL_P^d = DL_{P,-1} - ER \cdot \Delta FL_P + PK \cdot Z - re \cdot YF_P. \tag{86}$$

The path of foreign loans is set exogenously. This implicitly accounts for ceilings that firms may face in their access to foreign markets.

3.8.3 Commercial Banks

Banks are at the heart of the financial system in our archetype economy, as is indeed the case in many low- and middle-income developing countries. Commercial banks in our framework are required to keep a portion $0 < rreq < 1$ of the deposits that they collect as reserve requirements:

$$RR = rreq \sum_h DD_h. \tag{87}$$

The balance sheet of commercial banks is

$$NW_{PB} = DL_P + DL_G + RR - \sum_h DD_h - ER \cdot FL_B, \tag{88}$$

where NW_{PB} denotes banks' net worth, DL_P loans to the private sector, DL_G loans to the government, and $ER \cdot FL_B$ foreign loans (measured in domestic currency terms).

Equation (86) represents the demand for loans. We assume that the actual stock of loans is demand determined, and that banks borrow on world capital markets the required "shortfall" given their domestic sources of funds. The

commercial banks' balance sheet is thus used to determine FL_B (see Figure 4):[25]

$$ER \cdot \Delta FL_B = \Delta DL_P + \Delta DL_G - (1 - rreq) \sum_h \Delta DD_h. \tag{89}$$

Given (89), and given that all their profits are distributed to households, the net worth of commercial banks evolves over time according to,

$$NW_{PB} = NW_{PB,-1} - \Delta ER \cdot FL_{B,-1}, \tag{90}$$

where the second term on the right-hand side represents again valuation effects associated with nominal exchange rate changes.

Banks set the loan interest rate as a premium over the average cost of funds—including the devaluation rate, which affects the cost of foreign borrowing—taking into account the (implicit) cost of holding reserve requirements:

$$IL = PR \frac{ID^{\alpha_b}[(1 + IF)(1 + dev) - 1]^{1-\alpha_b}}{1 - rreq}, \tag{91}$$

where $0 < \alpha_b < 1$ is measured by the initial share of domestic deposits in banks' total funds (that is, $\alpha_b = \sum_h DD_{h,0}/(\sum_h DD_{h,0} + FL_{B,0}ER_0)$), and PR denotes the finance premium, which is assumed to be set according to:

$$PR = \xi_{pr} \left[\lambda_{pr} \left(\frac{\delta_c(NW_P + DL_P)}{DL_P} \right)^{-\gamma_{pr}} \right] + (1 - \xi_{pr}) PR_{-1}, \tag{92}$$

where $0 < \xi_{pr} < 1$ is the speed of adjustment, $0 < \delta_c \leq 1$, and NW_P is the net worth of private urban firms in nominal terms, defined as

$$NW_P = PK \cdot K_P - DL_P - ER \cdot FL_P.$$

NW_P changes over time according to

$$\begin{aligned} NW_P &= NW_{P,-1} + PK \cdot \Delta K_P - \Delta DL_P - ER \cdot \Delta FL_P - \Delta ER \cdot FL_{P,-1} \\ &\quad + \Delta PK \cdot K_{P,-1}. \end{aligned} \tag{93}$$

The last two terms on the right-hand side of this expression represent capital losses associated with depreciations of the nominal exchange rate and capital gains associated with changes in the price of capital.

[25] Note that capital losses associated with nominal exchange rate changes, $\Delta ER \cdot FL_{B,-1}$, are accounted for in equation (70).

Our specification of pricing decisions by commercial banks allows us to capture balance sheet effects in the determination of loan rates. It is consistent with the current line of research emphasizing the role of collateral and the impact of borrowers' net worth on the "finance premium," as illustrated in the work of Bernanke, Gertler, and Gilchrist (2000), Kiyotaki and Moore (1997), and Izquierdo (2000). The higher the value of the private capital stock net of foreign borrowing (that is, "pledgeable" collateral, $PK \cdot K_P - ER \cdot FL_P$, or an "effective" fraction δ_c of that amount) relative to the amount of domestic loans, DL_P, the higher the proportion of total lending that banks can recoup in the event of default by seizing borrowers' assets. This reduces the finance premium and the cost of borrowing, stimulating the demand for credit. The dependence of the cost of funds on net worth is a critical aspect of the model; for instance, a nominal exchange rate devaluation (a rise in ER), reduces firms' net worth and may dampen private investment by increasing the cost of capital.

An alternative justification for the finance premium equation (92) can be found in the models of credit market imperfections recently developed by Agénor and Aizenman (1998, 1999*b*). These models, following Townsend (1979) and Helpman (1989), emphasize the importance of monitoring and enforcement costs of loan contracts that lenders face in a weak legal environment—as is so often the case in developing countries. In such an environment, these costs may be an *increasing* function of the amount lent (even against "good" collateral) because of congestion in courts and the difficulty of settling legal claims, which make it hard for lenders to actually seize borrowers' assets in case of default. This approach amounts to specifying the premium as a positive function of the ratio of the amount lent DL_P over "effective" collateral (as is done here) or separately as a negative function of $P_K \cdot K_P - ER \cdot FL_P$, with possibly a lower elasticity than that associated with DL_P.

Finally, it should be noted that the assumption that banks borrow at will on world capital markets to satisfy the demand for domestic loans may not be appropriate for all low-income countries, because domestic financial intermediaries (even local subsidiaries of foreign banks) may have either limited access to these markets—and thus be subject to quantity rationing—or may face themselves a rising risk premium on external funds (as, for instance, in Agénor and Aizenman (1998)). An alternative approach, which avoids introducing credit rationing of domestic borrowers and its complications, is to assume that commercial banks hold excess liquid reserves (above and over required reserves), and that movements in such reserves adjust endogenously

to equilibrate the credit market—with foreign borrowing taken as exogenous.

3.9 Public Sector

The public sector in our framework consists of the government and the central bank. We consider them in turn and relate changes in official reserves to the balance of payments.

3.9.1 Central Bank and the Balance of Payments

From the central bank's balance sheet, its net worth, NW_{CB}, is given by

$$NW_{CB} = DC_G + ER \cdot FF - MB, \tag{94}$$

where DC_G denotes domestic credit to the government, FF the stock of foreign reserves, and MB the monetary base. Assuming that capital gains and losses are not monetized, changes in the monetary base reflect changes in credit to the government, as well as changes in official reserves:

$$MB = MB_{-1} + \Delta DC_G + ER \cdot \Delta FF. \tag{95}$$

Assuming no operating costs, net profits of the central bank, $PROF^{CB}$, are given by the sum of interest payments on loans to the government, and interest receipts on holdings of foreign assets:

$$PROF^{CB} = IL_{-1} \cdot DC_{G,-1} + IF_G \cdot FF_{-1}. \tag{96}$$

where IF_G is the interest rate on foreign loans to the government. We assume that net profits of the central bank are transferred to the government.

Whereas domestic credit to the government, DC_G, is treated as an exogenous policy variable, the accumulation of foreign reserves depends on the balance of payments (see Figure 5), as any current account surplus (or deficit) must be compensated by a net flow of foreign capital:

$$\begin{aligned} \Delta FF \;=\; & \sum_i (wpe_i E_i - wpm_i M_i) + IF \cdot \sum_h FD_{h,-1} \\ & -IF \cdot FL_{P,-1} - IF_G(FL_{G,-1} - FF_{-1}) - IF \cdot FL_{B,-1} \\ & -\sum_h \Delta FD_h + \Delta FL_G + \Delta FL_P + \Delta FL_B. \end{aligned} \tag{97}$$

Equation (97) determines the change in the foreign-currency value of official reserves, ΔFF, required to clear the balance of payments, given changes in households' holdings of foreign assets, $\sum_h \Delta FD_h$, changes in foreign loans made to the government, ΔFL_G, and to private firms, ΔFL_P (both taken to be exogenous), changes in loans to domestic banks, ΔFL_B, and the current account.

The monetary base consists of currency, H^s, and reserve requirements, RR. The supply of currency to households is thus given by

$$H^s = MB - RR. \tag{98}$$

Note that the model can also be solved with a flexible exchange rate (as opposed to a fixed exchange rate), in which case FF would be kept constant (that is, $\Delta FF = 0$) and equation (97) would be solved for the nominal exchange rate (which affects trade volumes). Under this regime, currency fluctuations can have sizable effects not only on the banking system but also on private sector balance sheets and the functioning of the economy; as discussed earlier, the "finance premium" depends not only on the capital stock but more generally on the net worth of private borrowers, which accounts for foreign borrowing.

Finally, given (94) and (95), the central bank's net worth evolves over time according to:

$$NW_{CB} = NW_{CB,-1} + \Delta ER \cdot FF_{-1}, \tag{99}$$

where the last term represents valuation effects.

3.9.2 Government

We assume that government expenditures consist of government consumption, which only has demand-side effects, and public investment, which has both demand- and supply-side effects. Public investment consists of investment in infrastructure, education, and health.[26] We define investment in infrastructure as the expenditure affecting the accumulation of public infrastructure capital, which includes public assets such as roads, power plants and railroads. Investment in education affects the stock of public education

[26]It should be noted that this treatment of public investment differs from standard data classification reported in national accounts; in many instances these investments are classified as current expenditures.

capital, which consists of assets such as school buildings and other infrastructure affecting skills acquisition, but does not represent human capital. In a similar fashion, investment in health adds to the stock of public assets such as hospitals and other government infrastructure affecting health.

Government saving is defined as minus the government budget deficit:

$$\begin{aligned} -DEF &= [PV_G X_G - W_M U_G - W_S S_G] + PROF^{CB} \\ &\quad + TXREV - TRH - G - IF_G \cdot ER \cdot FL_{G,-1} \\ &\quad - IL_{-1}(DC_{G,-1} + DL_{G,-1}). \end{aligned} \tag{100}$$

The term in square brackets represents profits by the government from sales of the public good. $TXREV$ denotes total tax revenues whereas TRH is government transfers to households. G represents total government expenditures. $PROF^{CB}$ represent profits from the central bank. The final two terms in the government budget include interest payments on loans from abroad, and interest payments on domestic loans by the central bank and commercial banks (see Figure 6).

Using the definition of net profits of the central bank given in equation (96), government saving can be rewritten as

$$\begin{aligned} -DEF &= PV_G X_G - W_M U_G - W_S S_G \\ &\quad + TXREV - TRH - G - IF_G \cdot ER \cdot (FL_{G,-1} - FF_{-1}) \\ &\quad - IL_{-1} DL_{G,-1}. \end{aligned} \tag{101}$$

Total tax revenues, $TXREV$, consist of revenue generated by import tariffs (net of export subsidies), sales taxes, and income taxes:

$$\begin{aligned} TXREV &= (wpm_{AN} tm_{AN} M_{AN} ER) + (wpm_P tm_P M_P ER) \\ &\quad - (wpe_{AT} te_{AT} E_{AT} ER) - (wpe_P te_P E_P ER) + \sum_i indtax_i PX_i X_i \\ &\quad + inctax_r (YH_{AT} + YH_{AN}) + inctax_{UU} (YH_{UF} + YH_S) \\ &\quad + inctax_{KAP} (YH_{KAP}). \end{aligned} \tag{102}$$

Note that in this prototype framework we do not account explicitly for payroll taxes, although this could be important to study complementarities between tax and labor market reforms.

Government expenditure is defined as investment in infrastructure, I_{INF}, investment in health, I_H; investment in education, I_E, and other current

expenditures besides labor costs, G_C, which are all considered exogenous policy variables:

$$G = I_{INF} + I_E + I_H + G_C. \tag{103}$$

Government investment increases the stock of public capital in either infrastructure, education or health. The stock of public capital in education includes items such as school buildings, whereas the stock of health capital includes hospitals and the like. Infrastructure capital includes all other stocks of public property, such as roads, railroads, and power plants. Accumulation of each type of capital is defined as:

$$K_i = K_{i,-1}(1 - \delta_i) + \frac{I_{i,-1}}{PQ_{P,-1}}, \text{ where } i = INF, H, E, \text{ and where } 0 < \delta_i < 1. \tag{104}$$

The main reason for treating government capital at a disaggregated level is that, as noted earlier, we want to capture the different long-run effects that the allocation of public resources may have on the economy and ultimately on the poor. For instance, in our model the stock of capital in education affects skills acquisition according to equation (24). Infrastructure and health capital affect the production process in the private sector as they both combine to produce the stock of government capital, K_G:

$$K_G = CES(K_{INF}, K_H). \tag{105}$$

As discussed below, the various channels through which different forms of government investment flows affect the economy figure prominently in our analysis of the impact of debt-reduction strategies and expenditure reallocation. In particular, we discuss the issue of how, for a given reduction in the stock of foreign loans to the government (and thus lower interest payments on external public debt), public spending should be reallocated in order to achieve specific poverty reduction goals and growth targets.

The government deficit is financed by either an increase in foreign loans, domestic loans, or domestic credit by the central bank:

$$DEF = ER \cdot \Delta FL_G + \Delta DL_G + \Delta DC_G. \tag{106}$$

In general, a variety of financing rules can be specified in IMMPA. For instance, it could be assumed that the deficit is financed by domestic loans (through either commercial banks or the central bank) or foreign borrowing, or that it be closed by cuts in government spending. Considering domestic

financing alternatives could be useful for analyzing the crowding-out effects of public spending on private investment, as is done for instance by Agénor and El Aynaoui (2003). In the numerical results reported below, we assume that the sources of deficit financing are set exogenously and thus that the public sector deficit is determined from "below the line." The variable that adjusts expenditures to make them consistent with the available financing and the level of revenues is the level of lump-sum transfers to households. The choice of a specific financing rule (which is critical for simulations of many shocks) is an important aspect of adapting the IMMPA prototype to specific countries.

The net worth of the government, NW_G, is defined as:

$$NW_G = PK(K_G + K_E) - (DL_G + DC_G) - ER \cdot FL_G, \qquad (107)$$

and evolves over time according to

$$\begin{aligned} NW_G &= NW_{G,-1} + PK(\Delta K_G + \Delta K_E) - (\Delta DL_G + \Delta DC_G) - ER \cdot \Delta FL_G \\ &\quad + \Delta PK(K_{G,-1} + K_{E,-1}) - \Delta ER \cdot FL_{G,-1}, \end{aligned} \qquad (108)$$

with the last two terms on the right-hand side representing again valuation effects associated with changes in the price of capital and the nominal exchange rate.

Finally, from (94) and (107), the net worth of the consolidated public sector, NW_{PS}, is given by

$$NW_{PS} = PK(K_G + K_E) - DL_G + ER \cdot (FF - FL_G) - MB. \qquad (109)$$

4 Poverty and Income Distribution Indicators

There are several alternative approaches to the analysis of the poverty and distributional effects of policy and exogenous shocks in applied general equilibrium models. A popular approach in the CGE literature consists in specifying a relatively large number of homogeneous household groups and calculating average income for each group following a shock and treating the group as a whole as being poor if average income is lower than a given poverty line. This is the procedure followed, for instance, by Lofgren (2001), in a study

based on a classification of households in fourteen groups, of the impact of external shocks on poverty in Malawi. In IMMPA, the distributional and poverty effects of shocks are assessed in two ways: first by calculating a set of indicators (for income distribution) based directly on the model's simulation results; second, by linking IMMPA simulation results to a household expenditure survey.

Specifically, two measures of income distribution are generated directly from IMMPA: the Gini coefficient and the Theil inequality index (see, for instance Litchfield (1999) or Cowell (1998)).[27] Both are based on the six categories of households that were identified earlier, that is, workers located in the rural traded sector, rural nontraded sector, urban (unskilled) informal economy, urban unskilled formal sector, urban skilled formal sector, and capitalists. Thus, these indicators allow the analyst to study changes in income distribution and poverty between groups, under the assumption of complete homogeneity *within* groups (or representative households). Formally, they are defined as

$$\text{Gini} = \frac{1}{2n^2 \cdot \overline{YH}} \sum_i \sum_j |YH_i - YH_j|, \qquad i,j = AN, AT, UI, UF, S, KAP,$$

where $n = 6$ is the number of household categories and $\overline{YH} = \sum_i YH_i/n$ is the arithmetic mean level of disposable income for household categories.

The Theil inequality index is measured as

$$\text{Theil} = \frac{1}{n} \sum_i \frac{YH_i}{\overline{YH}} \log(\frac{YH_i}{\overline{YH}}), \qquad i = AN, AT, UI, UF, S, KAP,$$

and other variables are as defined above. We also calculate these two indicators using consumption, instead of disposable income.[28]

[27] Other commonly-used indicators include the Atkinson index which, like the Gini index, ranges from 0 to 1. For a detailed analytical discussion of the pros and cons of various measures of income inequality, see Cowell (1998). For instance, the Atkinson index is sensitive to inequality changes in the lowest part of the income distribution; the Gini coefficient is sensitive to inequality changes around the median; and the Theil index and coefficient of variation are both sensitive to inequality changes in the top part of the income distribution.

[28] The initial values from IMMPA are 0.512 and 0.515 for the consumption-based and income-based Gini coefficients respectively, and 0.199 and 0.203 for the consumption-based and income-based Theil indexes.

Following a shock, IMMPA generates three measures for these indicators (as well as those derived from household surveys, as discussed below): a *short-term* measure (first two periods following a shock), a *medium-term* measure (between 3 and 5 periods), and a *long-term* measure (between 6 and 10 periods).[29] While somewhat arbitrary in the choice of intervals, the importance of these measures (which can obviously be calculated only with a dynamic model) is clear: they allow the analyst to identify and discuss possible *dynamic trade-offs* in the analysis of policy choices, by contrasting their short- and longer-run effects on the poor.

To assess the poverty effects of alternative shocks, we link IMMPA to a household income and expenditure survey, such as an Integrated Survey (IS) or Living Standards Measurement Survey (LSMS), which typically collect extensive information on migration, household income and expenditure (including own consumption), household assets, credits and savings, levels of education, apprenticeship and training, employment, occupational characteristics and status, as well as geographical location.[30] The various steps involved in our approach are illustrated in Figure 7. To begin with, we assume that the available survey consists of a relative large sample. This is needed to reduce non-sampling errors that may cause household income and expenditure to be underestimated—particularly in the least monetized regions of predominantly nontraded agricultural production (see Fofack (2000))—and ensure sound inference on poverty effects following changes in factor allocation and resource flows across sectors. The approach that we propose proceeds as follows:

Step 1. The user uses the information provided in the household survey of

[29] Specifically, let x_0^h denote the initial (base period) value of consumption (or income) for household group h and $\{g_t\}_{t=1}^{10}$ the (discounted) growth rate in consumption (or income) generated by the model for the first 10 years following a shock. The short-run measure of consumption, x_{SR}^h, is calculated as a geometric average of the period-1 and period-2 values of x^h, calculated at the average growth rate for the period, $x_{SR}^h(1)$ and $x_{SR}^h(2)$: $x_{SR}^h = \sqrt{x_{SR}^h(1)x_{SR}^h(2)} = \sqrt{x_0^h(1+g_{SR})x_0^h(1+g_{SR})^2}$, where $g_{SR} = \sqrt{(1+g_1)(1+g_2)} - 1$. Thus, $x_{SR}^h = x_0^h(1+g_{SR})^{1.5}$. Similarly, it can be shown that the medium-run value of consumption, x_{MR}^h, is given by $x_{MR}^h = x_2^h(1+g_{MR})^2$, where $g_{MR} = \sqrt[3]{\Pi_{t=3}^5(1+g_t)} - 1$, whereas the long-run level of consumption, x_{LR}^h, is given by $x_{LR}^h = x_5^h(1+g_{LR})^3$, with $g_{LR} = \sqrt[5]{\Pi_{t=6}^{10}(1+g_t)} - 1$. See Chen et al. (2001) for more details on this procedure.

[30] For more details on the scope and content of these surveys, see Delaine et al. (1992) for Integrated Surveys and Grosh and Glewwe (2000) for LSMS surveys. See also Deaton (1997) for a general discussion.

its choice (presumably the most recent information available) to classify the available sample into the six categories of households contained in the IMMPA framework (using, say, information on the main source of income of household heads) so as to establish an interface between the model's predictions and actual household income and expenses.

Step 2. Following a shock to the model, IMMPA generates real growth rates in per capita consumption and disposable income for all six categories of households in the economy, up to the end of the simulation horizon (say, T periods).

Step 3. These growth rates are applied separately to the per capita (disposable) income and consumption expenditure of each household (in each of the six groups) in the survey. This gives absolute income and consumption levels for each individual (and averages for each group) following the shock, for T periods.

Step 4. Assuming different initial poverty lines for the rural and urban sectors (expressed in monetary units and adjusted over time to reflect increases in rural and urban price indexes), and using the new absolute nominal levels of income and consumption for each individual and each group, the model calculates a poverty headcount index, a poverty gap index, as well as the two indicators of income distribution described above (the Gini coefficient and the Theil inequality index). These calculations are performed for the three different horizons identified earlier.

Step 5. Compare the post-shock poverty and income distribution indicators with the baseline values to assess the impact of the shock on the poor. These comparisons, as indicated above, are based on the assumption that the poverty line is constant in real terms in both the rural and urban sectors—an assumption that can obviously be relaxed.

The two poverty indexes that are described in Step 4 are defined as follows. The poverty headcount index is the ratio of the number of individuals in the group whose income is below the poverty line to the total number of

individuals in that group.[31] The poverty gap index is defined as:

$$P_G = \frac{1}{n \cdot YH^*} \sum_{k=1}^{n} (YH^* - YH_k),$$

where k is an individual whose income is below the poverty line, n is the total number of people in the group below the poverty line, YH_k is the income of individual k, and YH^* is the poverty line.

In practice, of course, whether income or expenditure data should be preferred depends on the scope and quality of the data in the available household survey. In the illustrative simulations reported below, we used instead of an actual household income and expenditure survey a "fictitious" one, that we built as follows. First, we calculated real per capita disposable income and consumption expenditure for each of our six household categories, using the initial values that are provided to solve the model numerically. Second, using a random number generator and a log-normal distribution, we produced a sample of 1,397 observations (corresponding to the total number of workers and capitalists in the initial data set). We thus considered each individual worker and capitalist to represent one household. Third, we used the initial per capita income and consumption data as mean values and imposed a standard error of 0.5 for all household categories, except for skilled workers and capitalists, for which we chose a standard error of 0.35. We set (somewhat arbitrarily) the income poverty line for the rural sector at 0.45 and 0.5175 for the urban sector (or 15% higher than the rural poverty line). For the consumption data, we used initial poverty lines of 0.4 and 0.46 for the rural and urban sectors (again, with the latter being 15% higher than the former). We assume for simplicity that these poverty lines remain constant in real terms for the whole horizon of the simulation period that we consider below (10 periods). Figures 8 and 9 show a log-normal approximation to the initial data on income and consumption that we generated for each of

[31] As is well known, the headcount index suffers from several limitations (see for instance Blackwood and Lynch (1994) and Ravallion (1994)). In particular, it does not indicate how poor the poor really are–it remains unchanged even if all people with incomes below the poverty line were to experience, say, a 50 percent drop in income. Put differently, when a poor person becomes poorer, the index does not increase. Moreover, it implies that the distribution of income among the poor is homogeneous (it does not distinguish between a poor person who earns one monetary unit less than the poverty line and a poor person who earns 100 monetary units less than the poverty line). But to the extent that the analyst is interested only in the number of poor, the headcount index is a useful measure.

our six categories of households. This parametric approximation is of course very good, given that the artificial samples that we generated were based on the log-normal distribution itself. More generally, a number of alternative statistical distributions—such as the beta distribution—can be specified in IMMPA to approximate the actual distribution of any given income group (see Agénor and Grimm (2003)).

These results produced an income-based headcount index of 61.8 % in the agricultural sector (86.1% in the nontraded sector and 37.2% in the traded sector), 52.8% for urban unskilled households (78.8% in the informal sector and 14.0% for unskilled workers in the formal sector), and 0% for skilled workers and capitalists. For the economy as a whole, the income-based poverty rate amounted to 53.2%. With the income-based poverty gap, the results obtained were 38.9 % for the agricultural sector (44.0% in the nontraded sector and 26.8% in the traded sector), 40.8% for urban unskilled households (43.8% in the informal sector and 15.7% for unskilled workers in the formal sector) and again 0% for skilled workers and capitalists.[32] The aggregate poverty gap index reached 38.7%. For the consumption-based headcount index, the results are 64.4 % in the agricultural sector (88.7% in the nontraded sector and 39.8% in the traded sector), 62.3% for urban unskilled households (91.8% in the informal sector and 18.4% for unskilled workers in the formal sector), and 0% for skilled workers and capitalists. For the economy as a whole, the consumption-based poverty rate amounted to 56.9%. With the consumption-based poverty gap, we obtained 40.6 % for the agricultural sector (47.0% in the nontraded sector and 26.1% in the traded sector), 46.3% for urban unskilled households (50.0% in the informal sector and 18.9% for unskilled workers in the formal sector) and again 0% for skilled workers and capitalists. The aggregate poverty gap index reached 41.4%. These numbers are broadly in line with the evidence for sub-Saharan Africa.

For each policy or exogenous shock, therefore, the user can assess the short-, medium-, and long-term effects on poverty and income distribution and thus examine possible trade-offs with other policy objectives. The main benefit of this approach is that it allows us to link IMMPA simulation results directly with *actual* patterns of income and expenditure and to provide a

[32]For unemployed skilled workers (who do not receive wage income but are assumed to receive interest income on financial assets as well as government transfers and a share of distributed profits by firms in the private sector), the average income is close to the poverty line in the base period. For simplicity, we treat the group of skilled workers as a homogeneous one and generate a distribution in which no skilled worker is poor.

more accurate derivation of poverty indicators. However, as noted above, it assumes that intra-group distribution is constant. Put differently, the within-group homogeneity assumption implies that the within-group rank ordering of households and individuals remains unchanged following any shock. As noted by Kanbur (1987) and Demery and Addison (1993) in a related context, the assumption that within-group distributions are unchanged and unaffected by policy shocks implies that workers are withdrawn from the sector of origin in a representative manner (leaving the distribution of income there unchanged) and that, as they move from one sector to another, they assume the income distribution characteristics of the sector of destination (in particular, the variance of income in that sector is assumed to apply to all new entrants).[33] Thus, some workers may be poor not because of their personal characteristics but because of the economic circumstances that characterize their sector of employment. Whether the assumption of constant within-group distributions is always warranted is not entirely clear; it represents therefore a potential weakness in this approach.

The procedure described above assumes that the modeler matches households as defined in the macro component of IMMPA and a household survey using information on the main source of income of household heads. An alternative treatment is also possible and depends on whether or not the household survey provides sufficient detail regarding the composition of income among individual members of each household; "light surveys" tend to concentrate on the household head, whereas more in-depth surveys provide richer information. To the extent that the information is detailed enough, and as long as each member of a household can be "allocated" to one of the six income groups identified earlier, growth rates of income and consumption can be applied separately to each individual income earner (as in Step 3 above). A more accurate measure of the change in each household's income can therefore be calculated and poverty and income indicators can be generated using either "individual" income earners or "composite" households. However, whether accounting for heterogeneity in the sources of income among individual household members makes a difference or not is generally case specific; it depends on both the characteristics of the intra-household distribution of income (which depends on each household's risk

[33]It also implies that income transfers between households in any given group are ignored. In practice, intra-group income reallocation may be large in periods of hardship and may represent an important factor in understanding the poverty effects of adverse economic shocks.

diversification strategies) and the extent to which the growth rates of income and consumption generated by the macro component of IMMPA following a given shock differ among the various income groups on which it is based. If, for instance, the intra-household distribution as given in the survey is such that most of the income of each composite unit is generated by the household head, treating the household as a homogeneous unit and applying the same growth rate of income to each member should not result in significant errors.

Several recent studies have attempted to drop the assumption of a stable within-group distribution to analyze the poverty and distributional effects of policy and exogenous shocks in applied general equilibrium models; they include Cockburn (2001), Decaluwé, Dumont and Savard (1999), and Decaluwé, Patry, Savard, and Thorbecke (1999). Individual data in these studies are included directly in the general equilibrium model and (assuming that the within-group distribution follows a well-defined statistical distribution, such as the lognormal or a beta distribution) micro-simulation techniques are used to exploit intra-group information. This approach has the benefit of allowing the analyst to distinguish, in the evolution of poverty indicators, the specific contribution of three factors: changes in the poverty line (when it is treated as endogenous), average income variations, and income distribution. It provides therefore a potentially important direction for future research.[34] At the same time, however, it must be recognized that it is relatively complex to implement (particularly in conjunction with a fully specified macroeconomic model, like ours), because it requires manipulating a sizable amount of data. Moreover, whether changes in the intra-group distribution matter a lot appears to be shock dependent; indeed, in some of the simulation results reported by Decaluwé, Dumont and Savard (1999), such changes only account for a small proportion in changes in poverty measures. A possible way of testing for whether this type of techniques should be used is to compare the aggregated results of two (or more, where feasible) household surveys and test statistically (using parametric or non-parametric tests) for any evidence of a shift in intra-group distributions. This test is not, however, fully satisfactory, because evidence of stability across surveys cannot necessarily be construed as providing definite support to any model-based experiment—particularly those involving "atypical" shocks.

It is also worth noting that in the artificial survey that we constructed,

[34] Another approach, based also on micro-simulation techniques, is pursued by Robilliard, Alatas, Bourguignon, and Robinson (2001).

we did not account for openly unemployed workers, of either variety. In practice, however, surveys may report a head of household as being unemployed (and therefore with no declared wage income), while at the same time receiving non-wage income from, say, holdings of financial assets and government transfers. Instead of simply assuming that the rate of growth of income or consumption is zero for the unemployed (an assumption that may lead to unrealistic results for medium-term exercises), our inclination would be to treat these observations as follows. For unskilled workers, it would seem reasonable to assume that the openly unemployed are actually employed in the informal sector or the nontradable agricultural sector (even if they don't declare it), depending on the sector of occupation, at the going wage. One can thus apply the growth rates of consumption and "full" disposable income taken from the macro component of IMMPA for that category of workers, as in the sequence described previously. By contrast, for skilled workers, the assumption that the unemployed are actually working in the informal sector may not be very satisfactory, for the reasons discussed earlier. We would suggest using the growth rate of pre-tax, non-wage income only, for that category of workers, and adjust the rate of growth of consumption taken from the macro component of IMMPA in proportion to the differential between disposable income of employed workers and pre-tax non-wage income.

Finally, it should be noted that we have abstracted in the above discussion from issues associated with differences between national accounts data (on which IMMPA is based) and survey data (from which poverty measures are calculated). However, in practice, large discrepancies can arise between these two sets of data. In particular, it is possible that the composition of employment, output, and the inter-group income distribution generated by IMMPA and the household survey (following step 1 above) are different.[35] Indeed, it is well recognized that national accounts and survey estimates of income and consumption patterns can differ significantly. Moreover, these differences may even be increasing in some cases, as appears to be the case in India (see Deaton (2001)). In general, the evidence suggests that nominal consumption growth rates estimated from survey data tends to be substantially lower than

[35] As indicated earlier, for the simulation exercises reported in this paper, we generated an artificial sample (based on a log-normal distribution) using the mean per capita real income data generated by the initial calibration of the model. The inter-group Gini coefficients that are calculated from the model and from the household survey are thus very close, given the relatively large number of replications. In practice, however, this may or may not be the case.

those estimated from national accounts data. Various factors may account for these discrepancies, as discussed by Deaton (2001) and Ravallion (2000). For instance, consumption in national accounts is typically determined as a residual and is thus contaminated by errors and omissions elsewhere in the accounts. In practice, researchers often end up treating one source or the other as the "correct" or "most reliable" one—despite the fact that it is likely that both sources of information are subject to error. In the present context, because both sources are used jointly, the issue of reconciling them arises. For instance, if it is believed that the national accounts data provide an accurate measure of the level of consumption, one approach could be to scale up survey data so as to match the former, and use the rescaled data for poverty assessment. There are several potential problems, of course, with this approach—the assumption that household consumption levels as measured in the survey are correct up to a multiplicative constant is by no means a reliable one, given the likely discrepancies between urban and rural data. More generally, the decision as to which data are correct is a difficult one, and the reconciliation process is likely to be country specific.

5 Calibration

Assessing the properties of the model presented in the previous section requires calibration and numerical simulations. Given that the objective of the model is to analyze the poverty impact of adjustment policies in highly-indebted, low-income countries, we have calibrated it to reflect what we believe to be a "representative" country. While parameters and initial values for each of the variables in the model are provided in Appendix C, we also provide a brief summary for the key variables below. Many of these parameters (such as demand and supply elasticities) reflect conventional values used in the literature. A financial social accounting matrix (FSAM), following the lines of Thorbecke et al. (1992), Easterly (1990), Rosensweig and Taylor (1990), and Thissen (1999, 2000), presents all initial values in a more pedagogical format.

We now provide a brief overview of the calibration of initial values and parameters. A detailed analysis is provided in Chen et al. (2001).

5.1 Initial Values

5.1.1 Endogenous Variables

For the first period, we assume that our "representative" economy has a nominal GDP of approximately 850 units and we set agricultural production to be about 30 percent of GDP, with slightly more than four-fifths of it being traded and the remainder being nontraded. We further assume that the private, formal urban sector produces 15 percent, the informal sector about 43 percent, and the public sector 12 percent of the country's total output.

The size of the total workforce in the first period has been set to 1416, with 829 persons residing in the rural area, about 40 percent of which are employed in the traded agricultural sector. There are about 467 urban unskilled workers, eighty percent of which are employed in the informal economy. There are 121 skilled workers, with 46 of them being employed in the private urban formal sector, and another 50 are working in the public sector. This implies that the initial open unemployment rate for skilled workers is about 20 percent. The reproductive growth rate of urban unskilled individuals has been set to 2.2 percent in the initial period.

The skilled nominal wage rate has been set to approximately 30 percent above that of the binding minimum wage paid to unskilled workers employed in the formal-urban economy. Rural workers employed in the traded agricultural sector receive about 35 percent of the urban minimum wage.

Aggregate demand consists of households' consumption, private investment and government expenditures. Demand for the formal, private urban good is approximately 600 units, whereas demand for the nontraded agricultural good is 190 units. Demand for the public good is 286 units, and demand for informal goods is 152 units.

The level of agricultural goods exported is 371 units and imports of nontraded agricultural goods have been assumed to be 75 units in the first period. Domestic demand for nontraded agricultural goods is set at 123 units. Imports of the formal private good are assumed to be 486 units. Also, we have assumed exports and domestic demand of the private formal good to be 215 units and 114 units, respectively.

First-period values for household incomes range from a value of 61 for the nontraded agricultural sector household to 217 for the capitalist household. Private urban formal firms made the highest profits with a profit level of 179. The nontraded agricultural firms were assumed to have the lowest profit levels

of about 30. Incomes of firms mirror that of profits with private urban firms earning the highest income (168 units), and nontraded agricultural firms the lowest income (30 units).

The return to capital is initially set to 12 percent, whereas the lending rate is set to 7 percent, with a financial premium of 1.07. The amount of domestic loans to private urban firms is assumed to be 154, whereas banks have foreign liabilities of 62. The stock of private capital has been set to 1500, whereas the initial capital stock in infrastructure has been set to 500, and that for education and health have been set to 50 each. The initial stock of public capital has also been set at 50 units. With a reserve requirement ratio of 10 percent, and total bank deposits of 213, the level of required reserves is 21. The money supply is initially at 152. The initial values of tax revenue, transfers to households, the budget deficit and total government expenditure as shares of GDP are 23 percent, 15 percent, 1.3 percent and 37 percent, respectively.

5.1.2 Exogenous Variables

Both the initial numbers of skilled and unskilled workers in the public sector have been set to 50 persons and grow at a constant rate of 2 percent annually. The real minimum wage rate of urban workers and the real wage rate paid to workers in the rural traded sector are kept constant throughout. The reproductive growth rate of rural workers has been set to 2 percent per annum.

Constant income tax rates of 15 percent, 23 percent and 33 percent are being levied on unskilled (both agricultural and urban), skilled and capitalists. There are no tariffs or export subsidies for agricultural goods. Private urban goods have a 4 percent import tariff imposed but also enjoy a 5 percent export subsidy.

Foreign loans to private firms amount initially to 136.6 and grow at 9 percent in every period. The initial values for investment in infrastructure, health and education have been set to 10 and each grows at a fixed rate of 2 percent per period. We have assumed that depreciation for infrastructure capital occurs at 1 percent per annum.

Government consumption has a initial value of 40 and grows at 2 percent thereafter. Domestic credit to government has an initial value of 50 and grows also at an annual rate of 2 percent thereafter. Domestic loans to the government has an initial value of 100 and is kept constant, whereas foreign

loans to the government have a starting value of 1567 and grow at 1 percent annually. Indirect tax rates on output have been all set to zero.

5.2 Parameter Values

Recall that all sectors, with the exception of the informal sector, have CES production functions. Elasticities of substitution between the various inputs in these production functions have been calibrated to values between 0.4 and 1.2, reflecting low to medium values.

The input share parameters have been chosen to reflect labor-intensive production technologies typical of a developing country. In the agricultural sector, the labor share parameter is 0.92 for the traded good and 0.63 for the nontraded good. Similarly, the labor (versus public capital) share parameter in the public good production function, β_{XG1}, is also relatively high at 0.90. Production of the private good not only leans heavily toward usage of labor, with the skilled labor-private capital composite input share parameter being 0.90, but also uses more unskilled labor rather than skilled labor or capital, with the unskilled labor share parameter having a value of 0.97. The reproductive growth rate of the urban unskilled workers has an elasticity to relative expected wages of 0.3.

Recall that only the agricultural goods and private formal goods can be traded. The demand functions for these goods are therefore expressed as Armington functions over import and domestic demand. The values for the share parameter (for import demand) and elasticity of substitution for the demand for agricultural goods are 0.5 and 0.8, respectively, whereas those for the demand for private formal goods are 0.8 and 1.01, respectively. For all households, the largest consumption share is on goods produced by the sectors in which they are employed. With the exception of the urban informal households, for all households the smallest share of consumption went to informal goods.

For the construction of the consumer price index, private urban goods were assigned the largest share whereas in the construction of the rural price index, agricultural goods had the largest weight. For the urban unskilled price index, informal goods had the largest share. Lastly, for the construction of the urban skilled price index, private urban goods were weighted most heavily. Money demand elasticities to the domestic and foreign interest rates have all been set at 0.5, whereas the elasticity to real income has been assigned a uniform value of 1.0.

6 Some Illustrative Experiments

This section presents and discusses the numerical results associated with three types of shocks: a temporary terms-of-trade shock, a permanent cut in domestic credit to the government, and a poverty reduction program consisting of partial external debt forgiveness coupled with a reallocation of savings on debt service payments to three alternative forms of government expenditure: lump-sum transfers to households, spending on infrastructure, and outlays on education.[36] Both the short- and longer-run effects of these shocks are analyzed, with a particular focus on poverty as measured by the indicators described above.[37]

6.1 Terms-of-Trade Shock

We first simulate the impact of a temporary terms-of-trade shock that takes the form of a transitory (one period only) 10 percent increase in the world market price of the agricultural traded good (see Tables 2 and 3). This type of shocks has indeed played a pervasive role in explaining changes in real incomes in sub-Saharan Africa and has been analyzed in a number of empirical studies (see, most recently, Dorosh and Sahn (2000)). Because we have assumed that product wages of unskilled agricultural traded workers are fixed (that is, the ratio of the nominal wage to the value added price of the good is constant), nominal wages will tend to match the increase in the producer price.[38] Had we excluded financial sector effects from the model, the demand for labor would remain constant and so would production of the traded good. But because we assume that firms in this sector borrow to finance wage payments, the effective price of labor includes the loan rate, as noted earlier. As we shall explain later, interest rates experience an initial decline after the positive terms-of-trade shock, implying that the effective price of labor goes down. In itself, this tends to increase the demand for unskilled labor. However, a decline in the real value of public investment,

[36] For a description of the IMMPA simulation program, which consists of both Eviews and GAMS versions combined with Ecel input and output sheets, see Chen et al. (2001).

[37] It should be kept in mind that the choice of a particular set of poverty measures always involves a value judgement and can have considerable bearing on simulation results and policy choices. The open architecture of IMMPA, however, allows users to program alternative measures if deemed necessary.

[38] They do not match the increase in price of the agricultural good one to one because producer prices also reflect changes in intermediate input prices.

due to increasing formal sector goods prices, leads to an overall reduction in value added and output in this sector, and lowers unskilled labor demand. Given that at any point in time the total supply of unskilled labor in the agricultural sector is predetermined and that this segment of the labor market must clear at the aggregate level, workers laid off from the agricultural traded sector are absorbed by the nontraded sector. But because of the decline in public investment, output also declines in the nontraded agricultural sector. All these dynamics occur in the period following that of the shock, given our assumption that the cost of credit in loan contracts is agreed upon one period in advance and therefore interest rate effects take one period to materialize. At the time of the shock though, interest rate effects are absent and as a result value added in both rural sectors remains constant, implying no changes in the rural traded and rural nontraded workforce. This occurs because product wages in both sectors remain constant, implying that nominal wages match the increase in value added price of their respective good.

The increase in wages in the agricultural sector yields higher income and higher consumption for households in that sector; this raises aggregate demand and put upward pressure on domestic prices. A strong price increase actually leads to a switch in the demand for formal sector goods, away from domestic production and toward imported goods. Production in the private formal sector therefore decreases in response to the expansion in spending. The supply response is partly brought about by the decline in the public capital stock and partly by price-driven increases in the skilled (product) wage, which lowers the demand for skilled labor. As a result, unemployment of skilled workers increases. The decline in skilled employment, in turn, lowers the marginal product of unskilled labor in the private formal sector, lowering demand for unskilled labor as well. Because a constant minimum real wage prevails for unskilled formal workers, there is a shift in the supply of unskilled labor from the formal into the informal economy, until the marginal product of labor matches the minimum wage. As a consequence, the product wage falls in that sector and the size of the informal economy expands.

We next focus on the effects of this shock on migration between rural and urban areas. The major determinant of this decision is the ratio of average expected rural consumption wages to average expected urban consumption wages.[39] In the case at hand, the increase in the price of the agricultural

[39] As defined earlier, consumption wages are defined as nominal wages deflated by the price index corresponding to the consumption basket of workers in a particular sector.

traded good raises the average rural wage by more than the average urban wage, providing incentives to remain in the agricultural sector. This brings migration down after the shock, but the situation is gradually reversed as the effect of the shock dies out. In a similar fashion, skills acquisition depends on relative consumption wages of urban unskilled versus skilled workers. The fact that the expected consumption wage of skilled workers goes up whereas that of unskilled workers goes down leads to an increase in the rate of skills acquisition and an increase in unemployment. This increase is gradually reversed as the effect of the shock fades away.

Higher incomes and aggregate demand lead to a rise in tax collection. Because the public sector deficit is determined by its sources of financing (which are taken as exogenous), and the selected closure rule implies that additional revenue is devoted to an increase in government transfers to households, the initial positive impact of the terms-of-trade shock is reinforced by an expansionary fiscal policy. But there is also an additional effect of public sector finances: higher taxes relative to the existing debt service are interpreted by investors as a reduction in confiscation risk, resulting thereby in a rise in private investment. This in turn generates an increase in the demand for loans by firms which, in itself, puts upward pressure on the domestic bank lending rate (as noted earlier, banks charge a premium over the cost of funds, which depends inversely on the effective value of collateral relative to the size of loans). Nevertheless, because the price of capital jumps up by more than the increase in loans, the premium goes down and so does the lending rate on impact.

On the financial side, money holdings for all households are higher on impact, and eventually go back to their original levels as the effects of the shock vanish. Although savings across households increase as a consequence of higher incomes, they do not rise proportionally to income because savings rates are smaller on impact due to the temporary increase in inflation. Given that the allocation of savings between domestic and foreign deposits is made after choosing the desired level of money holdings, and that the latter increases at a higher rate than total financial savings, then holdings of domestic and foreign deposits fall on impact, but quickly increase relative to the base scenario once inflation drops and savings rates go up again.

Higher export prices for the agricultural good, coupled with the increase in foreign loans from domestic banks to finance the higher level of private investment, more than offset the increase in imports. As a result, the central bank accumulates foreign reserves and this in turn leads to an expansion of

money supply. These variables also return close to their baseline values as the effects of the shock fade away.

We now turn to poverty and income distribution indices based on our fictitious household survey data. The impact and short-run effects of the terms-of-trade shock generally result in reductions in consumption-based poverty headcount indices. There is a decrease in the poverty headcount index of the agricultural nontraded sector, but the largest decrease occurs in the agricultural traded sector. The decrease in the latter index is expected, given the 10 percent increase in the world price of the exported agricultural good and the existence of fixed real wages in that sector. The decrease in poverty in the rural nontraded sector is mainly due to higher wages, because increasing nontraded agricultural goods demand leads to increasing labor demand in that sector. Because there are only smaller changes in consumption poverty headcount indices for the remaining sectors, there is a negative net effect on the economy-wide consumption poverty index in the short run. In the long run, however, there is only a slight decrease in the poverty index for the agricultural traded and nontraded sectors (given the size and temporary nature of the shock), which leads to a slight decrease in the consumption-based poverty headcount indices for the rural sector and the economy as a whole. Poverty headcount indices based on disposable income depict similar results: there is a relatively strong decline in the economy-wide poverty index in the short run, and a small decrease in the long run.

Consumption-based poverty gap indices indicate that poverty decreases in the agricultural traded and nontraded sectors and in the urban informal sectors in the short run. Given these decreases, the economy-wide poverty gap index also decreases despite an increase in poverty in the formal unskilled labor group. In the long run, there is also a decrease in the poverty gap index, although its magnitude is much smaller. A similar picture emerges when income-based poverty gap indices are used instead: the economy experiences a decrease in poverty in the short run, which reverses itself in the long run.

In summary, a temporary terms-of-trade shock has relatively unambiguous effects on poverty. Both headcount and poverty gap indices indicate that declines in poverty rates in the short run are reversed in the longer run.

With regard to income distribution indicators, the Gini coefficients generally indicate short and long run declines in income inequality, whereas the Theil indices shows short- and long-run increases in income inequality. Long-run effects are generally much smaller than short-run effects. Again, this is not surprising, given the temporary nature of the shock.

6.2 Cut in Domestic Credit to Government

We next exploit the financial nature of the model to track the impact of a permanent, 30 percent cut in the level of domestic credit by the central bank to the non-financial public sector, keeping its growth rate constant after the first period (see Tables 4 and 5). This has two effects on impact. First, the fall in credit reduces the financing available for the public sector, therefore requiring a reduction in the deficit "above the line"; and second, there is a fall in the monetary base (and consequently the money supply), which creates deflationary pressures.

The reduction in the deficit is accomplished by a proportional cut in total lump-sum transfers to households.[40] This lowers households' income and consumption of all goods.[41] Lower government revenue relative to the existing level of debt service payments increases the perceived risk of confiscation on impact and leads to a fall in both investment and the demand for domestic loans. The drop in firms' loans is smaller than the initial fall in the price of collateral, providing incentives for banks to increase the premium on the cost of funds, thereby increasing the loan rate. This has a negative effect on output in production sectors that rely on bank credit to finance working capital needs (wage payments here), namely the agricultural traded and urban private formal sectors, because the effective price of labor increases *after* the initial jump in the loan rate (given our assumption that the cost of credit in loan contracts is agreed upon one period in advance). Nevertheless, production expands in both the traded agricultural and urban private formal sectors. A lower price of formal sector goods leads to an increase in real investment by the government, and the expansion of public capital dominates the increase in working capital costs in both sectors. In addition, the product wage of skilled labor declines, given that the fall in the price of the composite factor is much smaller than that of nominal skilled wages. The latter effect dominates over the interest rate effect, leading to an increase in demand for formal skilled labor, and an increase in output in the private formal sector. The urban unskilled workforce also increases, because the increase in the (expected) urban consumption wage is larger than the increase in the (expected) agricultural consumption wage.

In spite of higher interest rates, the increase in the public capital stock

[40] Transfers could be negative, in which case they can be interpreted as non-distortionary taxes.

[41] With the exception of the informal good.

leads to a higher demand of unskilled labor in the rural traded sector, and a transfer of unskilled workers from the rural nontraded into the rural traded sector. Notwithstanding the decline in labor supply in the nontraded agricultural sector, output in that sector expands due to the increase in public capital. In subsequent periods, wage increases lead to increases in the product wage. But because households in the rural nontraded sector consume a bundle of goods whose price index increases more than nominal wages, consumption wages fall for workers employed there.

The contraction in aggregate demand, together with the increase in output in the urban private formal sector, leads to a strong decline in imports and a smaller expansion in exports; the improvement in the trade balance leads to higher official reserves, which tend to mitigate the impact of the original reduction in domestic credit to the government on domestic liquidity. In subsequent periods, the fall in both private investment and the associated demand for domestic loans reduces the need for external financing of banks, thereby reducing the rate of accumulation of foreign reserves. The initial fall in money demand leads to a reallocation of financial assets, namely, an increase in holdings of both domestic and foreign deposits.[42] The increase in domestic deposits lessens the need for external financing of domestic banks, whereas the increase in foreign deposits abroad by domestic households generates a capital outflow. Both factors put downward pressure on foreign reserves and the expansion of money supply. The final outcome of all these forces is a fall in money supply, which has deflationary effects that are consistent with the observed initial fall in the price level.

Because we assume that domestic credit grows at the same rate as in the base scenario beyond the initial period, most variables converge to their preshock levels in the long run. The reason for a relatively rapid convergence is that the initial value of domestic credit to the government as a share of GDP is relatively small, implying that (given our assumption of a constant deficit) the initial level cut does not alter significantly the path of domestic credit for government budget financing purposes in future periods.

Consumption per capita falls temporarily for all categories of workers. On the one hand, consumption wages of unskilled workers in the rural traded sector as well as in the urban formal sector increase, whereas those of unskilled

[42]Even though savings fall as a consequence of lower income, the reduction in the inflation rate increases savings rates on impact. This, coupled with the fall in money demand, lead to higher resources available for investment into other financial assets (domestic and foreign deposits).

workers in the rural nontraded and urban informal sectors and skilled workers in the formal sector decrease. On the other, all households face lower transfer receipts from the government, mainly as a direct consequence of the drop in government domestic credit, but also because of lower tax revenues resulting from the fall in aggregate demand. This impact of lower transfer receipts counteracts any wage gains, leading to falls in household income and lower consumption levels.

Consumption-based poverty headcount indices show that poverty decreases only in the formal unskilled labor group in the short run. Nevertheless, poverty is unchanged for all groups in the long run. Turning to income-based poverty headcount indices, we observe that poverty decreases in the formal unskilled labor group in both the short and the long run. The economy-wide income-based poverty headcount index increases less than its consumption-based counterpart in the short run, whereas both indices are unchanged in the long run. Poverty gap indices, both consumption and income-based, show that poverty at the aggregate level increases both in the short and the long run. However, they also indicate that the increase in poverty is greater in the short run than in the long run. Hence, all four poverty indices show that poverty changes, as a result of the domestic credit shock, are relatively small in the long run.

Both consumption- and income-based Gini coefficients indicate that the domestic credit shock has a negative effect on income distribution, both in the short and the long run. However, Theil indices generally imply that income distribution becomes more equal with the domestic credit shock. Thus, the effect of the shock on income distribution is ambiguous.

6.3 Debt Reduction and Expenditure Reallocation

An important policy experiment for highly-indebted low-income countries involves debt relief and fiscal adjustment. We analyze three different deficit-neutral scenarios that differ in the allocation of the savings resulting from a permanent, 5 percent reduction in the stock of public external debt.[43] The first scenario (which we take as our benchmark) corresponds to the case in which savings are allocated to an increase in lump-sum transfers to households, in proportion to their initial shares. The next two scenarios focus

[43]Because we assume that contracted foreign public sector debt has infinite maturity, debt service consists of interest payments only.

on the allocation of savings to investment in education and investment in infrastructure, respectively.[44] One of the attractive features of our model is that it also permits the analysis of the effects of mixed policies—a combination, for instance, of investment in education with investment in infrastructure—a particularly relevant consideration for policymakers who must determine the allocation of public expenditure. We contrast the effects of a mixed policy package with those of "pure" policies that imply full allocation to just one type of investment, but for brevity we do not go over a detailed account of this additional simulation.

Throughout the discussion we assume that the non-financial public sector deficit remains constant at base scenario levels. For many developing countries, the initial position may be one in which the fiscal deficit is unsustainable and creating undue pressure on inflation. In such conditions, there is a good case for using savings from debt reduction to bring the deficit down to sustainable levels, if increases in taxation are not feasible. We abstract, however, from these considerations and examine the effects of alternative ways of spending the income saved from debt reduction, because our interest lies in understanding the effects of alternative strategies for expenditure allocation. We implicitly assume that the starting fiscal position is sustainable, be it because of continuing foreign aid or proper fiscal management, although this can be easily modified (by considering alternative sources of financing) to consider jointly the case of debt reduction coupled with a cut in the fiscal deficit.

6.3.1 Transfers to Households

We first consider the case in which the savings (current and future) associated with debt reduction are rebated to all households in the form of lump-sum transfers (see Tables 6 and 7). Specifically, we assume that the government allocates these transfers according to initial household shares.[45] This policy has immediate demand-side effects: the positive impact on households' incomes leads to an increase in some components of consumption and money

[44] As noted earlier, the model also incorporates investment in health; but because its effects are similar to investment in infrastructure (that is, both types of investment increase labor productivity) they are not reported separately.

[45] This implies that as long as groups differ in size, transfers per capita are not the same across groups. An alternative scenario would be to assume that only poor households receive transfers.

holdings.[46] At the same time, the reduction in the stock of external debt reduces interest payments, and the increase in income yields higher government revenues. These two effects have a positive impact on private capital formation, because both contribute to a reduction in confiscation risk. Higher private investment implies a higher demand for domestic loans to firms, which in turn leads to an increase in the premium charged by domestic banks[47] and a proportional increase in the loan rate.

The higher lending rate increases the effective price of labor in the agricultural traded sector, thereby reducing labor demand and output in that sector. Laid-off workers are absorbed in the agricultural nontraded sector, leading to an increase in output and a reduction in the product wage in that sector. By contrast, in the formal urban sector, the rise in investment increases the private sector capital stock; because skilled labor is (to some degree at least) a substitute to private physical capital, this implies that the demand for skilled labor goes down, resulting in an initial decrease in output of the formal private good. However, the subsequent switch of unskilled workers from the informal economy to the formal sector leads to a rise in output in the private formal sector. At the same time, it reduces output in the informal sector, but increases both the product wage and the consumption wage in the informal economy.

The resulting smaller differential between average expected urban consumption wages and rural wages eventually leads to a dampening of migration flows into urban areas, which tend to support the initial increase in informal sector wages. There is also an increase in the expected skilled consumption wage and a fall in the expected unskilled consumption wage (due, in the case of the latter, to the increase in the price index of the unskilled consumption basket). This leads to a higher rate of skills acquisition and increased unemployment relative to the baseline scenario. In terms of real per capita consumption, all working households benefit from the increase in transfers, except the urban unskilled labor group.

Poverty, as measured by the economy-wide consumption-based poverty headcount index, decreases in the short run when savings from lower debt service are applied to transfers to households. The reduction in poverty becomes somewhat larger in the medium run, but is reduced in the long run.

[46] Specifically, consumption of the agricultural traded and private formal sector goods increases, whereas consumption of informal and public sector goods decreases.

[47] See our discussion of the terms-of-trade shock section for a more detailed explanation of this effect on the premium.

In both the short and the long run, poverty reduction only occurs in the rural and urban informal sectors.[48] Short- and long-run poverty reduction is somewhat larger when using income-based poverty measures, but remains confined to the rural sectors.

When using consumption-based poverty gap indices as indicators, poverty again falls in the short and the long run, with a larger decrease at a longer horizon. However, in contrast to headcount indices, poverty reduction here occurs across all unskilled labor groups in the long run. In the case of income-based poverty gap measures, economy-wide poverty decreases in the short and long run, confirming results obtained from the consumption-based poverty gap measure. Among the four indices of income distribution, the Gini coefficients show that debt reduction reduces income inequality, whereas the Theil indices shows the opposite result.

6.3.2 Investment in Infrastructure

The use of savings from debt reduction to increase the stock of capital in infrastructure has not only demand-side effects but also supply-side effects (see Tables 8 and 9). We focus on the latter, because demand-side effects are similar to those already described above. In particular, higher infrastructure provides a boost to production in the rural traded, rural nontraded, and private formal sectors. It increases the marginal product of all factors of production in these sectors, given our assumption that infrastructure facilitates a more efficient use of available resources. Therefore demand for labor goes up, as well as private investment. But there is also an additional channel that contributes to the rise in capital formation, and that is the reduction in confiscation risk resulting from the long-run increase in tax revenue, paired with a cut in interest payments following the reduction in external debt.

These two channels of transmission have a compounded effect on output in the private formal sector, which increases strongly when compared to the case in which savings from debt relief are used to finance lump-sum transfers. Skilled labor unemployment is reduced in contrast to the transfers scenario. The behavior of the rural sector is quite different as well: increased productivity both in the agricultural traded and nontraded sectors leads to an expansion in total agricultural output. Similar results to those of the transfers policy apply to consumption per capita levels among working households,

[48]This is mainly due to the fact that, in our base-period calibration, the share of total transfers allocated to rural households is assumed to be higher.

except for agricultural traded households who experience declining consumption levels.

Consumption-based poverty headcount indices show that debt reduction has no effect on poverty in the short run, but it does have some positive effects in the long run. The latter is mainly due to poverty reduction in the rural nontraded sector. Similarly, income-based poverty headcount indices show that poverty is reduced only in the long run, and the main gains accrue to households in the rural nontraded sector. The consumption-based poverty gap index indicates that poverty decreases in both the short and the long run, with long-run gains being significantly larger. This reduction in poverty occurs for all unskilled labor groups in the long run. Looking at income-based poverty gap measures, we observe that poverty increases in the rural traded and urban unskilled households almost outweigh poverty decreases among rural nontraded and urban informal labor households in the long run, resulting in a small decrease in the aggregate poverty gap index. Finally, the results indicate that income distribution, both in the short and the long run, becomes more (less) egalitarian when we use the Gini coefficient (Theil index), and that improvements are more significant at a longer horizon.

Interestingly enough, on comparing the effects of poverty reduction when savings are allocated to infrastructure relative to the effects under a transfers policy, we find that every poverty indicator under the first scenario, except the income-based poverty gap, outperforms indicators under the transfers scenario in the long run. The fact that investment in infrastructure shifts the private sector production possibility frontier (whereas the transfers policy does not) explains why poverty reduction may be more significant when resources are devoted to infrastructure instead of transfers.

6.3.3 Investment in Education

Investment in education provides incentives for higher skills acquisition by unskilled urban workers and this has a direct impact on the supply of skilled labor (see Tables 10 and 11). Debt reduction leads to an increase in open unemployment of skilled labor, in spite of increasing investment due to lower confiscation risk, because private capital and skilled labor are substitutes in production. Moreover, skills acquisition grows at a faster pace than labor demand over time, implying that open unemployment starts accelerating. This highlights the importance of considering both demand- and supply-side effects in designing policy reforms. For instance, we have performed a simula-

tion in which half the savings from debt reduction are applied to investment in education whereas the other half is allocated to investment in infrastructure. This mixed policy yields better results (in the sense of skilled unemployment being much lower) than the case in which public savings associated with debt relief are fully allocated to investment in education.

As urban unskilled workers enter the skilled labor force, and informal workers are absorbed into the formal sector, the expected average wage for unskilled workers in the urban labor market decreases (despite the fact that excess demand for labor in the informal sector tends to put upward pressure on wages there), but a larger initial decline in agricultural wages creates incentives to migrate from rural areas. This pushes workers out of the rural sector and into the urban unskilled labor market. However, migration flows are reversed in the long run as (expected) urban unskilled wages starts to decline.

Consumption-based poverty headcount indices show no decrease in poverty in the short run, and only workers in the agricultural nontraded sector benefit from poverty reduction in the long run. The aggregate income-based poverty headcount index shows little change in either the short or the long run. The economy-wide, consumption-based poverty gap index shows a decrease in both the short and the long run. In the short run, decreases in poverty gaps take place for rural non-traded and urban informal groups; in the long run, decreases are only observed for urban unskilled household categories, including formal and informal unskilled workers. Income-based poverty gap indices indicate a decrease in the poverty gap in the rural non-traded and urban informal sectors in the short run; this translates into a decrease in the aggregate poverty gap, despite an increase in the value of that indicator for rural traded and urban formal unskilled households. However, in the long run poverty increases in the rural and urban unskilled groups are greater than the poverty reduction in the urban informal group. This leads to an increase in the aggregate poverty gap in the long run. Finally, indices of income distribution again convey a mixed picture; the Gini coefficient shows a more egalitarian distribution whereas the Theil index indicates the opposite.

Poverty reduction under this scenario is clearly not as substantial as in the case where savings are allocated to infrastructure. This is due in part to the fact that investment in education does not necessarily translate into a shift in the private sector production possibilities frontier (PPF) as long as newly-skilled workers remain unemployed, whereas investment in infrastructure (as indicated earlier) does so unambiguously. Comparison between investment in

education vs. a transfers policy is more ambiguous, as results vary depending on the chosen indicators.

7 Conclusions

The purpose of this paper has been to present an integrated quantitative macroeconomic framework developed recently at the World Bank for the purpose of analyzing the impact of policy and external shocks on income distribution and poverty in developing countries. The prototype described in this paper captures important structural features of low-income, highly-indebted countries: the existence of a negative relation between external debt and private investment, a large urban informal economy, a limited menu of financial assets, the impact of credit constraints on the decision to acquire skills, and a predominant role of banks in the economy. Taken together, these features create a variety of channels through which adjustment policies may affect growth and poverty in the short and the long run.[49]

Section II discussed the main features of the model and how they affect the transmission channels of policy and exogenous shocks. Section III provided a detailed analytical presentation of the model's structure and Section IV discussed calibration and solution issues. Section V analyzed the results of several simulation experiments. In particular, we used the model to analyze a temporary terms-of-trade shock, a permanent cut in domestic credit to the government, and a poverty-reduction program consisting of partial external debt forgiveness coupled with a reallocation of savings on debt service payments. The latter experiment is particularly important for many low-income countries. Recent international evidence suggests that external debt remains at unsustainable levels in many poor countries, even after accounting for aid from international debt relief programs. For sure, the direct short-term impact of debt reduction is to reduce pressure on the government budget constraint; and if one considers a country starting from an initially high fiscal deficit (with a high degree of monetization and inflation, or a significant crowding-out effect on the private sector) then it is indeed be beneficial to allocate savings from debt reduction to reducing the deficit.

[49] We described in another paper (see Agénor, Fernandes, Haddad, and van der Mensbrugghe (2003)) how the prototype version described here should be amended or modified to make it more suitable for the analysis of poverty-reduction strategies in middle-income countries.

But in more general circumstances, the question remains as to what the allocation of expenditure should be in order to maximize the impact of debt relief on poverty reduction. Our model allows us to address this question. Specifically, we considered an experiment that consists of a permanent cut in the level of external debt, with the savings resulting from lower debt service being allocated to either lump-sum transfers to households, expenditure on infrastructure (which has complementary effects on private investment and a direct effect on the productivity of private inputs), education (which affects incentives to acquire skills), or education and health (which raises productivity of the labor force). The results illustrated the importance of accounting for the various channels through which poverty alleviation programs based on debt reduction and expenditure reallocation may ultimately affect the poor.

The model that we have developed can be used to analyze a variety of other policy shocks—such as a reduction in external tariffs, fiscal adjustment (such as public sector layoffs or changes in the structure of income taxes, for instance), labor market reforms (such as changes in the minimum wage), a devaluation of the nominal exchange rate, or a financial liberalization program based on an increase in bank deposit rates. An important point that we want to emphasize is that our model is not meant to be applied "blindly" to any particular country. Although the "prototype" version described in this paper is general enough to be applied to a variety of cases (at least as a "first pass") we view our framework as a flexible tool that can (and should) be amended or extended to fit particular circumstances and needs. For instance, regarding the credit market, whether the "collateral" view or the "monitoring and enforcement costs" view are appropriate should be gauged on the basis of the evidence on the determinants of interest rate spreads.[50] More generally, we have assumed that the credit market clears because commercial banks can borrow (and lend) as much as they desire on world capital markets; if banks are unable to do so, it could be assumed that they carry significant excess liquid reserves that would play the equilibrating role. Alternatively, credit rationing can be introduced (see, for instance, Decaluwé and Nsengiyumva (1994)), with possibly significant implications for the behavior of private investment and the behavior of output in the short term. Finally, we have completely ignored informal financial markets. A good argument for doing

[50]Note that, in practice, although interest rate spreads reflect the riskiness of loans they are not strictly speaking measures of borrowers' risk, because the amount lent may be rationed or may reflect lenders' perceptions of risk.

so is that financial liberalization in many developing countries has proceeded to such an extent that these markets play a much less prominent role than they used to. However, it is also true that in some countries (mostly in sub-Saharan Africa) informal *credit* markets continue to play a significant role in the financial system. Modeling the channels through which such markets operate could proceed along the lines of Agénor, Montiel and Haque (1993) but would add another layer of complexity.

There are several other changes in, or extensions of, our prototype framework that may be worth pondering, depending on country circumstances. In particular, we did not account in our analysis for the possibility of unskilled unemployment. We assumed, as does the "conventional" view, that the urban informal labor market is characterized by ease of entry, a high degree of wage flexibility, and limited labor protection. As a result, adverse shocks to the formal economy tend to translate into lower (average) productivity in the informal sector. However, despite the absence of restrictions to entry in the informal sector, urban open unemployment is often high in developing countries, and tends to affect both skilled and unskilled workers (which account for the majority of the poor). This evidence suggests that the extent of labor mobility between the formal and the informal sectors, although very high, is not perfect. Our analysis could be extended to account for unskilled unemployment along the lines of Agénor (*1999, 2003*) for instance, who argued that informational frictions may force unskilled workers to remain unemployed while they are searching for a job in the formal sector. As a result, a Harris-Todaro type mechanism can be used to determine the supply of unskilled labor to the formal sector.

Another issue that requires some more thinking is how to endogenize productivity growth, in addition to the level effects that efficiency wage considerations bring in the model and the endogenous fertility rate. Recent studies, most notably by Easterly and Levine (2001), have emphasized the importance of total factor productivity (TFP) growth in accounting for output growth in developing countries. One possibility could be to relate effort to the capital-labor ratio, through an Arrow-type "learning by doing" mechanism (see for instance Villanueva (1994)). A second possibility is to relate TFP growth to policy variables that may affect incentives to acquire and use new technologies or to use resources efficiently. Yet another possibility, following Lee (1995), is to endogenize growth by accounting for the transfer of technology and know-how that occurs through imports of capital goods. Such goods account for an important share part of total imports and domes-

tic investment of developing countries (see, for instance, Agénor and Montiel (1999, Chapter 1)) and have been shown to have a significant impact on per capita income growth in cross-section and panel data studies (see Lee (1995) and Mazumdar (2001)).

These possible modifications and extensions to adapt our framework to particular country circumstances also lead us to emphasize the importance of adequate econometric research to estimate key behavioral relationships and provide reliable parameters for calibration purposes. For instance, assessing whether private investment is responsive to the debt-to-taxes ratio or not matters a great deal in assessing the incentive effects of debt reduction; and determining whether the stock of public capital in infrastructure has a large complementarity effect on private investment is crucial to calculate the growth implications of alternative investment allocation strategies by the public sector. Likewise, estimating the parameters of the rural-urban migration function (and whether factors that income differentials matter), as well as the skills acquisition function, is essential to assess the medium- and long-term effects of policy shocks on poverty. Finally, assessing the sensitivity of the finance premium to the ratio of borrowers' net worth to the amount lent is also critical to assess the degree of interaction between the real and financial sectors.

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Appendix A
List of Equations

PRODUCTION

$$V_i = \left[\alpha_{Xi}\{\beta_{Xi}U_i^{-\rho_{Xi}} + (1-\beta_{Xi})K_G^{-\rho_{Xi}}\}^{-\frac{1}{\rho_{Xi}}}\right]^{1-\eta_{Xi}} \quad \text{for } i = AN, AT \tag{A1}$$

$$X_i = V_i + \sum_i a_{i,j}X_i \quad \text{for } i = AN, AT \tag{A2}$$

$$X_I = \alpha_{XI}U_I^{\beta_{XI}} + \sum_i a_{iI}X_I \tag{A3}$$

$$\begin{aligned} X_G \;=\; & \alpha_{XG}\{\beta_{XG1}[\beta_{XG2}S_G^{-\rho_{XG2}} + (1-\beta_{XG2})U_G^{-\rho_{XG2}}]^{\frac{\rho_{XG1}}{\rho_{XG2}}} \\ & +(1-\beta_{XG1})K_G^{-\rho_{XG1}}\}^{-\frac{1}{\rho_{XG1}}} + \sum_i a_{iG}X_G \end{aligned} \tag{A4}$$

$$X_P = \alpha_{XP}\{\beta_{XP}T_1^{-\rho_{XP}} + (1-\beta_{XP})K_G^{-\rho_{XP}}\}^{-\frac{1}{\rho_{XP}}} + \sum_i a_{iP}X_P \tag{A5}$$

$$T_1 = \alpha_{XP1}\{\beta_{XP1}T_2^{-\rho_{XP1}} + (1-\beta_{XP1})U_P^{-\rho_{XP1}}\}^{-\frac{1}{\rho_{XP1}}} \tag{A6}$$

$$T_2 = \alpha_{XP2}\{\beta_{XP2}(ef \cdot S_P)^{-\rho_{XP2}} + (1-\beta_{XP2})K_P^{-\rho_{XP2}}\}^{-\frac{1}{\rho_{XP2}}} \tag{A7}$$

$$X_P = \alpha_{TP}\{\beta_{TP}E_P^{\rho_{TP}} + (1-\beta_{TP})D_P^{\rho_{TP}}\}^{\frac{1}{\rho_{TP}}} \quad \text{(solved for } D_P\text{)} \tag{A8}$$

$$X_{AN} = D_{AN} \tag{A9}$$

$$E_{AT} = (1-a_{AT,AT})X_{AT} \tag{A10}$$

$$RGDP_{FC} = \Sigma_i PV_i X_i / PGDP_{FC} \tag{A11}$$

EMPLOYMENT

$$U_R = U_{R,-1}(1+g_R) - MIGR \tag{A12}$$

$$U_{AT}^d = \left(V_{AT}^{1+\frac{\rho_{XAT}}{1-\eta_{XAT}}} \frac{1-\eta_{XAT}}{(1+IL_{-1}).w_{AT}} \cdot \frac{\beta_{XAT}}{\alpha_{XAT}^{\rho_{XAT}}}\right)^{\frac{1}{1+\rho_{XAT}}} \tag{A13}$$

$$V_{AT} = X_{AT} - INT_{AT} \tag{A14}$$

$$U_{AN}^s = U_R - U_{AT}^d \tag{A15}$$

$$U_P^d = T_1 \left(\frac{\beta_{XP1} PT_1}{\alpha_{XP1}^{\rho_{XP1}} W_M (1 + IL_{-1})} \right)^{\frac{1}{1+\rho_{XP1}}} \tag{A16}$$

$$U_U = U_{U,-1}(1 + g_U) + MIGR - SKL \tag{A17}$$

$$g_U = \lambda_g \alpha_{gu} \left[\frac{(S_P + S_G) W_S / S}{[U_I W_I + (U_P + U_G) W_M] / U_U} \right]^{-\gamma_{gu}} + (1 - \lambda_g) g_{U,-1} \tag{A18}$$

$$U_I^s = U_U - U_G - U_P^d \tag{A19}$$

$$S_P^d = T_2 \kappa_s \left(\frac{\beta_{XP2} PT_2}{\alpha_{XP2}^{\rho_{XP2}} W_S (1 + IL_{-1})} \right)^{\frac{1}{1+\rho_{XP2}}} \tag{A20}$$

$$S = S_{-1} + SKL \tag{A21}$$

$$UNEMP_S = \frac{S - S_G - S_P^d}{S} \tag{A22}$$

$$W_{AT} = w_{AT} PV_{AT} \tag{A23}$$

$$W_{AN} = PV_{AN} \frac{\beta_{XAN}(1 - \eta_{XAN})}{\alpha_{XAN}^{\rho_{XAN}}} \left(\frac{V_{AN}^{1 + \frac{\rho_{XAN}}{1 - \eta_{XAN}}}}{(U_{AN}^s)^{1+\rho_{XAN}}} \right) \tag{A24}$$

$$V_{AN} = X_{AN} - \sum a_{iAN} X_{AN} \tag{A25}$$

$$W_M = w_M PT_1 \tag{A26}$$

$$W_S = w_S PT_2 \tag{A27}$$

$$w_S = \frac{\beta_{XP2} \gamma_{ef} (1 - ef)}{\alpha_{XP2}^{\rho_{XP2}}} \left(\frac{T_2}{ef S_P} \right)^{1+\rho_{XP2}} \frac{P_{US}}{PT_2} \tag{A28}$$

$$ef = 1 - ef_m \left[\frac{\Omega_W}{(W_S / P_{US})} \right]^{\gamma_{ef}} \tag{A29}$$

$$W_I = \beta_{XI} \frac{V_I}{U_I^s} PV_I \tag{A30}$$

$$V_I = X_I - \sum_i a_{iI} X_I \tag{A31}$$

$$MIGR = \lambda_m \left[U_{R,-1} \sigma_M \ln \left(\frac{E w_U}{E w_A} \right) \right] + \frac{U_{R,-1}}{U_{R,-2}} (1 - \lambda_m) MIGR_{-1} \tag{A32}$$

$$Ew_U = \frac{\theta_U W_{M,-1} + (1-\theta_U) W_{I,-1}}{P_{UU,-1}} \tag{A33}$$

$$Ew_A = \frac{\theta_R W_{AT,-1} + (1-\theta_R) W_{AN,-1}}{P_{R,-1}} \tag{A34}$$

$$\begin{aligned} SKL &= (1-\lambda_S) SKL_{-1} \\ &+\lambda_S \left[\left(\frac{WT_{UI,-1} + WT_{UF,-1}}{U_{U,-1}} \right)^{\alpha_{edu}} \kappa_e \left(\frac{Ew_S}{Ew_U} \right)^{\sigma_W} (K_{E,-1})^{\sigma_E} \right] \end{aligned} \tag{A35}$$

$$Ew_S = \theta_S \frac{W_{S,-1}}{P_{US,-1}} \tag{A36}$$

SUPPLY AND DEMAND

$$INT_j = \sum_i a_{ji} X_i, \text{ where } i,j = AN, AT, I, P, G \tag{A37}$$

$$Q^s_{AN} = \alpha_{QA} \{ \beta_{QA} M_{AN}^{-\rho_{QA}} + (1-\beta_{QA}) D_{AN}^{-\rho_{QA}} \}^{-\frac{1}{\rho_{QA}}} \tag{A38}$$

$$Q^s_I = X_I \tag{A39}$$

$$Q^s_G = X_G \tag{A40}$$

$$Q^s_P = \alpha_{QP} \{ \beta_{QP} M_P^{-\rho_{QP}} + (1-\beta_{QP}) D_P^{-\rho_{QP}} \}^{-\frac{1}{\rho_{QP}}} \text{ (solved for } M_P) \tag{A41}$$

$$Q^d_{AN} = C_{AN} + INT_{AN} \tag{A42}$$

$$Q^d_I = C_I + G_I + INT_I \text{ (solved for } C_I) \tag{A43}$$

$$Q^d_G = C_G + Z_G + INT_G \text{ (solved for } C_G) \tag{A44}$$

$$Q^d_P = C_P + G_P + Z_P + INT_P \tag{A45}$$

$$C_i = \frac{\sum_h cc_{i,h} CON_h}{PQ_i} \quad \text{for } i = AN, I, G, P \tag{A46}$$

$$G_i = gg_i \frac{G}{PQ_i} \quad \text{for } i = AN, I, G, P \tag{A47}$$

$$Z_i = zz_i \frac{Z \cdot PK}{PQ_i} \quad \text{for } i = G, P \tag{A48}$$

TRADE

$$E_P = D_P \left(\frac{PE_P}{PD_P} \frac{1-\beta_{TP}}{\beta_{TP}} \right)^{\sigma_{TP}} \tag{A49}$$

$$M_P = D_P \left(\frac{PD_P}{PM_P} \frac{\beta_{QP}}{1-\beta_{QP}} \right)^{\sigma_{QP}} \quad \text{(solved for } PD_P\text{)} \tag{A50}$$

$$M_{AN} = D_{AN} \left(\frac{PD_{AN}}{PM_{AN}} \frac{\beta_{QA}}{1-\beta_{QA}} \right)^{\sigma_{QA}} \tag{A51}$$

PRICES

$$PV_i = V_i^{-1} \left\{ PX_i(1 - indtax_i) - \sum_j a_{ji} PQ_j \right\} X_i, \text{ where } i,j = AN, AT, I, P, G \tag{A52}$$

$$PE_{AT} = wpe_A(1 + te_A)ER \tag{A53}$$

$$PE_P = wpe_P(1 + te_P)ER \tag{A54}$$

$$PM_{AN} = wpm_A(1 + tm_A)ER \tag{A55}$$

$$PM_P = wpm_P(1 + tm_P)ER \tag{A56}$$

$$PX_{AN} = PD_{AN} \tag{A57}$$

$$PX_{AT} = PE_{AT} \tag{A58}$$

$$PX_i = PQ_i \quad \text{for } i = I, G \tag{A59}$$

$$PX_P = \frac{PD_P D_P + PE_P E_P}{X_P} \tag{A60}$$

$$PQ_i = \frac{PD_i D_i + PM_i M_i}{Q_i} \quad \text{for } i = AN, P \tag{A61}$$

$$PT_1 = \frac{PT_2 T_2 + (1 + IL_{-1}) W_M U_P}{T_1} \tag{A62}$$

$$PT_2 = \frac{PROF_P + (1 + IL_{-1}) W_S S_P}{T_2} \tag{A63}$$

$$PK = \frac{PQ_G Z_G + PQ_P Z_P}{Z} \tag{A64}$$

$$PINF = \frac{PLEV - PLEV_{-1}}{PLEV_{-1}} \tag{A65}$$

$$PLEV = CPI = \sum_i wt_i PQ_i \tag{A66}$$

$$P_R = \sum_i wr_i PQ_i \tag{A67}$$

$$P_{UU} = \sum_i wu_i PQ_i \tag{A68}$$

$$P_{US} = \sum_i ws_i PQ_i \tag{A69}$$

$$PGDP_{FC} = \sum_i v_i PV_i \tag{A70}$$

INCOME

$$PROF_i = PV_i V_i - W_i U_i \quad \text{for } i = AN, I \tag{A71}$$

$$PROF_{AT} = PV_{AT} V_{AT} - (1 + IL_{-1}) W_{AT} U_{AT} \tag{A72}$$

$$PROF_P = PV_P V_P - (1 + IL_{-1}) W_M U_P - (1 + IL_{-1}) W_S S_P \tag{A73}$$

$$YF_i = PROF_i \quad \text{for } i = AN, AT, I \tag{A74}$$

$$YF_P = PROF_P - IL_{-1} DL_{P,-1} - IF \cdot FL_{P,-1} ER \tag{A75}$$

$$\begin{aligned} YF_{PB} \;=\; & IL_{-1} [DL_{P,-1} + DL_{G,-1} + U_{AT} W_{AT} + W_M U_P + W_S S_P \\ & - ID \sum_h DD_{h,-1} - IF \cdot ER \cdot FL_{B,-1} \end{aligned} \tag{A76}$$

$$YH_{AN} = \gamma_{AN} TRH + U_{AN} W_{AN} + ID \cdot DD_{AN,-1} + IF \cdot FD_{AN,-1} ER + YF_{AN} \tag{A77}$$

$$YH_{AT} = \gamma_{AT} TRH + U_{AT} W_{AT} + ID \cdot DD_{AT,-1} + IF \cdot FD_{AT,-1} ER \tag{A78}$$

$$YH_{UI} = \gamma_I TRH + U_I W_I + ID \cdot DD_{UI,-1} + IF \cdot FD_{UI,-1} ER + YF_I \tag{A79}$$

$$YH_{UF} = \gamma_{UF} TRH + (U_P + U_G) W_M + ID \cdot DD_{UF,-1} + IF \cdot FD_{UF,-1} ER \tag{A80}$$

$$YH_S = \gamma_S TRH + (S_P + S_G) W_S + ID \cdot DD_{S,-1} + IF \cdot FD_{S,-1} ER \tag{A81}$$

$$\begin{aligned} YH_{KAP} \;=\; & ID \cdot DD_{KAP,-1} + IF \cdot FD_{KAP,-1} ER + YF_{AT} \\ & + (1 - re) YF_P + YF_{PB} + \gamma_{KAP} TRH \end{aligned} \tag{A82}$$

$$CON_h = (1 - inctax_h) YH_h - SAV_h \tag{A83}$$

$$SAV_h = savrate_h YH_h (1 - inctax_h) \tag{A84}$$

$$savrate_h = s_{o,h} \left(\frac{1 + ID}{1 + PINF} \right)^{\sigma_{S,h}} \tag{A85}$$

$$WT_h = WT_{h,-1} + SAV_h + \Delta ER \cdot FD_{h,-1} \tag{A86}$$

FINANCIAL SECTOR AND INVESTMENT

$$\frac{H_h^d}{PLEV} = \left(\frac{YH_h}{PLEV}\right)^{\sigma_H} (1+ID)^{-\beta_{hD}} [(1+IF)(1+dev)]^{-\beta_{hF}} (1+PINF)^{-\beta_{hPINF}} \quad \text{(A87)}$$

$$H^s = \sum_h H_h^d \quad \text{(A88)}$$

$$\frac{\gamma_{Bh}}{1-\gamma_{Bh}} = \phi_{Bh}\left(\frac{1+ID}{(1+IF)(1+dev)}\right)^{\sigma_{Bh}} \quad \text{(A89)}$$

$$\gamma_{Bh} = \frac{DD_h}{DD_h + ER \cdot FD_h} \quad \text{(A90)}$$

$$ER \cdot FD_h = WT_h - H_h - DD_h \quad \text{(A91)}$$

$$IK = \frac{PROF_P}{PK \cdot K_P} \quad \text{(A92)}$$

$$DL_P = DL_{P,-1} - ER\Delta FL_P + PK\ Z - re \cdot YF_P \quad \text{(A93)}$$

$$K_P = K_{P,-1}(1-\delta_P) + Z_{-1} \quad \text{(A94)}$$

$$Z = K_{P,-1}\left(\frac{K_{INF}}{K_{INF,-1}}\right)^{\sigma_K}\left\{(1+\frac{\Delta RGDP_{FC}}{RGDP_{FC,-1}})^{\sigma_{ACC}} \frac{\phi_Z}{(1+PINF_{-1})^{\sigma_P}}\left(\frac{(1+IK)(1-inctax_{KAP})}{1+IL}\right)^{\sigma_{IK}} -\phi_D\left(\frac{IF_G \cdot FL_{G,-1}ER}{TXREV}\right) - \phi_{DD}\left(\frac{IF_G \cdot FL_{G,-1}ER}{TXREV}\right)^2\right\} \quad \text{(A95)}$$

$$RR = rreq\sum_h DD_h \quad \text{(A96)}$$

$$\Delta FL_B ER = \Delta DL_G - (1-rreq)\sum_h \Delta DD_h - \Delta DL_P \quad \text{(A97)}$$

$$IL = \frac{PR \cdot\ ID^{\alpha_b}[(1+IF)(1+dev)-1]^{1-\alpha_b}}{1-rreq} \quad \text{(A98)}$$

$$PR = \xi_{pr}\left[\lambda_{pr}\left(\frac{\delta_c(NW_P + DL_P)}{DL_P}\right)^{-\gamma_{pr}}\right] + (1-\xi_{pr})PR_{-1} \quad \text{(A99)}$$

$$NW_{PB} = NW_{PB,-1} - \Delta ER \cdot FL_{B,-1}, \tag{A100}$$

$$\begin{aligned} NW_P &= NW_{P,-1} + PK \cdot \Delta K_P - \Delta DL_P - ER \cdot \Delta FL_P - \Delta ER \cdot FL_{P,-1} \\ &\quad -\Delta PK \cdot K_{P,-1} \end{aligned} \tag{A101}$$

PUBLIC SECTOR

$$\begin{aligned} \Delta FF &= \sum_i (wpe_i E_i - wpm_i M_i) + IF \cdot \sum_h FD_{h,-1} \\ &\quad -IF \cdot FL_{P,-1} - IF_G(FL_{G,-1} - FF_{-1}) - IF \cdot FL_{B,-1} \\ &\quad -\sum_h \Delta FD_h + \Delta FL_G + \Delta FL_P + \Delta FL_B \end{aligned} \tag{A102}$$

$$NW_{CB} = NW_{CB,-1} + \Delta ER \cdot FF_{-1} \tag{A103}$$

$$MB = MB_{-1} + \Delta DC_G + ER \cdot \Delta FF \tag{A104}$$

$$H^S = MB - RR \tag{A105}$$

$$\begin{aligned} -DEF &= PV_G X_G - W_M U_G - W_S S_G \\ &\quad +TXREV - TRH - G \\ &\quad -IF_G \cdot (FL_{G,-1} - FF_{-1})ER - IL_{-1} DL_{G,-1} \end{aligned} \tag{A106}$$

$$G = I_{INF} + I_H + I_E + G_C \tag{A107}$$

$$\begin{aligned} TXREV &= ER \sum_i (wpm_i tm_i M_i - wpe_i te_i E_i) + \sum_i indtax_i PX_i X_i \\ &\quad +inctax_r(YH_{AT} + YH_{AN}) + inctax_{UU}(YH_{UF} + YH_S) \\ &\quad +inctax_{KAP}(YH_{KAP}) \end{aligned} \tag{A108}$$

$$\Delta FL_G ER = DEF - \Delta DC_G - \Delta DL_G \tag{A109}$$

$$\begin{aligned} NW_G &= NW_{G,-1} + PK(\Delta K_G + \Delta K_E) - (\Delta DL_G + \Delta DC_G) - ER \cdot FL_{G,-1} \\ &\quad +\Delta PK(K_{G,-1} + K_{E,-1}) - \Delta ER \cdot FL_{G,-1} \end{aligned} \tag{A110}$$

$$K_G = \alpha_G \{\beta_G K_{INF}^{-\rho_G} + (1 - \beta_G) K_H^{-\rho_G}\}^{-\frac{1}{\rho_G}} \tag{A111}$$

$$K_m = K_{m,-1}(1-\delta_m) + \frac{I_{m,-1}}{PQ_{P,-1}} \quad \text{for } m = INF, H, E \tag{A112}$$

$$NW_{PS} = PK(K_G + K_E) - DL_G + ER \cdot (FF - FL_G) - MB \tag{A113}$$

Appendix B
Variable Names and Definitions

Endogenous Variables[51]

Name	Definition
C_i	Aggregate consumption of good $i = AN, G, I, P$
CON_h	Consumption by household h
CPI	Weighted average of composite good prices
D_i	Domestic demand for domestic good $i = AN$, P
DD_h	Domestic deposits by household h
DEF	Government deficit
dev	Expected devaluation rate
DL_P	Domestic loan by private urban formal firm
E_i	Export of traded good $i = AT$, P
ef	Effort
Ew_U	Expected urban unskilled wages
Ew_A	Expected agricultural wages
Ew_S	Expected skilled wages
FD_h	Foreign deposits by household h
FF	Foreign reserves
FL_B	Banks' foreign liabilities
G	Government expenditures
G_i	Government spending in good $i = AN$, G, I, P
H^s	Money supply
H_h	Money held by household h
H_h^d	Money demand by household h
IK	Return from equities
IL	Interest rate for domestic loan
INT_i	Intermediate good demand for good i
K_E	Capital in education
K_G	Public capital
K_H	Capital in health
K_{INF}	Capital in infrastructure
K_P	Private capital

[51] The index i (respectively, h) is used below to refer to all production sectors (household groups, respectively), that is, AT, AN, G, I, P (AN, AT, UI, UF, KAP, R, US, UU, respectively), unless otherwise indicated.

M_i	Import of good $i = AN$, P
MB	Money base
$MIGR$	Migration to urban area
NW_{PB}	Net worth of banks
NW_{PS}	Net worth of the consolidated public sector
NW_{CB}	Net worth of the central bank
NW_i	Net worth of sector $i = P$, G
Ω_W	Opportunity cost (wage) for skilled workers
P_R	Rural price index
PD_i	Domestic price of domestic sales of good $i = AN$, P
PE_i	Price of exported traded good $i = AT$, P
$PGDP_{FC}$	Price deflator for RGDP at factor cost
$PINF$	Inflation rate
$PIND_i$	Price indeces used to index nominal wages where $i = S$, AT, M
PK	Price of capital
$PLEV$	Price level (PLEV_EQ with partial adjustments)
$PLEV^e$	Price level equilibrating the money market
PM_i	Price of imported good $i = AN$, P
PQ_i	Composite good price of good $i = AN$, G, I, P
PR	Premium
$PROF_i$	Profit by good i firm where $i = AN$, AT, I, P
PT_1	Price of T_1
PT_2	Price of T_2
P_h	Urban price index for household $h = US$, UU
PV_i	Value added price of good i
PX_i	Sale price of good i
Q_i	Demand of composite good $i = AN$, G, I, P
Q_i^d	Demand of good $i = AN$, G, I, P
Q_i^s	Supply of good $i = AN$, G, I, P
$RGDP_{FC}$	Real GDP at factor cost
RR	Reserve requirements
S	Skilled workers
SAV_h	Saving by household h
$Savrate_h$	Saving rate for household h
SKL	New skilled workers
S_P	Skilled labor employed in private urban formal
S_P^d	Demand for skilled labor in private urban formal

T_1	Composite input from T_2 and unskilled labor
T_2	Composite input from capital and skilled labor
TRH	Transfers to households
$TXREV$	Tax revenues
U_i	Unskilled labor employed in sectors $i = AN, AT, I, P$
U_i^d	Unskilled labor demand in sectors $i = AN, AT, I, P$
U_i^s	Unskilled labor supply in sectors $i = AN, I$
$UNEMP_S$	Unemployment of skilled workers
U_R	Unskilled workers in rural economy
U_U	Unskilled workers in urban economy
V_i	Value added in good i
W_i	Nominal wage for unskilled labor in sector $i = AN, AT, I$
w_i	Real wage rate for unskilled labor in sector $i = I$
W_M	Nominal wage rate for unskilled labor in the private formal sector
w_M	Real wage rate for unskilled labor in the private formal sector
W_S	Nominal wage rate for skilled labor
w_S	Real wage rate for skilled labor
WT_h	Total wealth by household h
X_i	Production of good i
YF_i	Income by good i firm where $i = AN, AT, I, P$
YF_{PB}	Income by private bank
YH_h	Household income for h
Z	Total investment
Z_i	Investment demand for good $i = G, P$

Exogenous Variables

Name	Definition
DC_G	Domestic credit to government
DL_G	Domestic loans to government
ER	Nominal exchange rate
FL_i	Foreign loans to sector $i = G, P$
G_C	Government consumption
g_R	Population growth in rural economy
g_U	Population growth in urban economy
ID	Interest rate on domestic deposits
I_E	Investment in education
IF	Interest rate on foreign deposit
IF_G	Interest rate on government foreign loans
I_H	Investment in health
I_{INF}	Investment in infrastructure
$inctax_h$	Income tax for household $h = KAP, R, US, UU$
$indtax_i$	Sales tax rate on good $i = AN, AT, P, G$
S_G	Skilled workers in public sector
te_i	Export subsidy for good $i = A$(agricultural good), P
tm_i	Import tariff for good $i = A$ (agricultural good), P
U_G	Unskilled workers in public sector
w_i	Real wage rate in sector $i = AN, AT$
wpe_i	World price of export of good $i = A$ (agricultural good), P
wpm_i	World price of import of good $i = A$ (agricultural good), P

Parameters

Name	Definition
a_{ij}	Input-output coefficient for good i and j
α_b	Share of domestic funding in total bank funding
α_{edu}	Elasticity of skills acquisition to cost of education
α_G	Shift parameter for public capital
α_{gu}	Shift parameter for urban unskilled worker population growth rate
α_{Qi}	Shift parameter in composite good $i = A$ (agricultural good), P
α_{TP}	Shift parameter in transformation function between exported and domestic private production
α_{Xi}	Shift parameter in production of good i
α_{XP1}	Shift parameter in composite input of unskilled and skilled/capital composite input
α_{XP2}	Shift parameter in composite input of skilled workers and private capital
β_G	Shift parameter for public capital
β_{QA}	Shift parameter in agricultural composite good
β_{QP}	Shift parameter in urban composite good
β_{TP}	Shift parameter between exported and domestic private production
β_{Xi}	Shift parameter in production of good $i = AN$, AT
β_{XG1}	Shift parameter between labor and public capital in public production
β_{XG2}	Shift parameter between skilled and unskilled workers in public production
β_{XI}	Shift parameter in informal production
β_{XP}	Share parameter between inputs and public capital in private production
β_{XP1}	Share parameter between unskilled and skilled/capital composite input
β_{XP2}	Share parameter between skilled workers and private capital
β_{hD}	Money demand elasticity on domestic rate
β_{hF}	Money demand elasticity on foreign rate
β_{hPINF}	Money demand elasticity on inflation
cc_{ij}	Shares of household consumption in goods i and j
δ_C	Collateral parameter
δ_E	Depreciation of education capital
δ_H	Depreciation of health capital
δ_{INF}	Depreciation of infrastructure

δ_P	Private capital's depreciation rate
ef_m	Minimum effort level
ξ_{pr}	Partial adjustment coefficient for premium
η_{Xi}	Coefficient of returns to scale for good $i = AN$, AT
γ_{Bi}	Share of domestic deposits in total deposits for household h
γ_{gu}	Elasticity of urban unskilled worker population growth rate to the proportion of skilled workers in total urban population
γ_{ef}	Elasticity of of effort to wages
γ_h	Share of transfers allocated to household h
γ_{pr}	Elasticity of premium to firms' net worth position
gg_i	Share of government expenditure on good $i = AN$, I, G, P
κ_E	Shift parameter in skills acquisition function
κ_S	Shift parameter for skilled private sector employment
λ_g	Coefficient of distributed lag of effect of past income on growth rate of urban unskilled population
λ_m	Partial adjustment rate on migration
λ_{pr}	Premium shift parameter
λ_s	Partial adjustment rate on skills acquisition
$\overline{\Omega}_W$	Shift parameter of skilled reservation wage function
ϕ_D	Shift parameter of external debt effect
ϕ_{DD}	Shift parameter of external debt effect
ϕ_u	Elasticity of skilled reservation wage to the unemployment rate of skilled workers
ind_S	Elasticity of skilled nominal wage to the skilled price index
ϕ_k	Parameters used in calculating skilled nominal wage $k = 1, 2, 3$
ϕ_Z	Shift parameter of rate of return to capital
ϕ_{Bh}	Domestic/foreign deposits shift parameter for household h
re	Percentage of profits retained
ρ_G	Substitution parameter for public capital
ρ_{Qi}	Substitution parameter in composite good $i = A$ (agricultural good), P
ρ_{TP}	Substitution parameter between exported and domestic private production
ρ_{Xi}	Substitution parameter in production of good $i = AN$, AT
ρ_{XG1}	Substitution parameter between workers and public capital in public production
ρ_{XG2}	Substitution parameter between skilled and unskilled workers in public production

ρ_{XP}	Substitution parameter between inputs and public capital in private production
ρ_{XP1}	Substitution parameter between unskilled and skilled/capital composite input
ρ_{XP2}	Substitution parameter between skilled workers and private capital
$rreq$	Reserve requirement ratio
σ_{ACC}	Elasticity of investment to growth rate of real GDP at factor cost
σ_{Bh}	Domestic/foreign deposits elasticity for household h
σ_E	Elasticity of skills acquisition to capital in education
σ_H	Money demand elasticity on real income
σ_I	Elasticity of rate of return to capital
σ_{IK}	Elasticity of investment to return to capital
σ_K	Elasticity of investment to gross growth rate of infrastructure capital
σ_M	Elasticity of migration to wage differentials
σ_P	Elasticity of inflation on investment
σ_{Qi}	Elasticity of composite good $i = A$ (agricultural good), P
$\sigma_{S,h}$	Elasticity of saving rate to deposit rate
σ_{TP}	Elasticity of transformation between exported and domestic private production
σ_W	Elasticity of skills acquisition to wage differential
σ_{XP1}	Elasticity of substitution between unskilled workers and composite input of skilled workers and private capital
σ_{XP2}	Elasticity of substitution between skilled workers and private capital
$s_{o,h}$	Saving coefficient for household h
θ_R	Share of rural workers employed in traded sector
θ_U	Share of urban unskilled workers employed in formal sector
θ_s	Initial ratio of the number of workers employed in the private sector
v_i	Weight for good i real GDP at factor cost price deflator
wt_i	Initial share of good i in aggregate consumption for $i = A, I, P, G$
wr_i	Initial share of good i in rural consumption for $i = A, I, P, G$
ws_i	Initial share of good i in skilled workers' consumption
wu_i	Initial share of good i in urban unskilled workers' consumption for $i = A, I, P, G$
zz_i	Share of investment expenditure on good $i = AN, I, P, G$

Appendix C
Parameter Values

Production

σ_{XP1}	Elasticity of substitution between unskilled workers and composite input of skilled workers and private capital	1.2000
σ_{XP2}	Elasticity of substitution between skilled workers and private capital	0.4000
σ_{TP}	Elasticity of transformation between exported and domestic private production	1.0100
α_{XAN}	Shift parameter in nontraded agricultural production	0.5407
β_{XAN}	Share parameter in nontraded agricultural production	0.6310
ρ_{XAN}	Substitution parameter in nontraded agricultural production	0.3333
α_{XAT}	Shift parameter in traded agricultural production	0.7944
β_{XAT}	Share parameter in traded agricultural production	0.9151
ρ_{XAT}	Substitution parameter in traded agricultural production	0.3333
α_{XI}	Shift parameter in informal production	0.1315
β_{XI}	Share parameter in informal production	0.1500
α_{XG}	Shift parameter in public production	4.0000
β_{XG1}	Share parameter between labor and public capital in public production	0.8953
β_{XG2}	Share parameter between skilled and unskilled workers in public production	0.7605
ρ_{XG1}	Substitution parameter between workers and public capital in public production	0.3333
ρ_{XG2}	Substitution parameter between skilled and unskilled workers in public production	0.1667
α_{XP}	Shift parameter in private production	0.3393
β_{XP}	Share parameter between inputs and public capital in private production	0.8953
ρ_{XP}	Substitution parameter between inputs and public capital in private production	0.3333
α_{XP1}	Shift parameter in composite input of unskilled and skilled/capital composite input	28.5784
β_{XP1}	Share parameter between unskilled and skilled/capital composite input	0.0310
ρ_{XP1}	Substitution parameter between unskilled and skilled/capital composite input	0.1667

α_{XP2}	Shift parameter in composite input of skilled workers and private capital	4.6174
β_{XP2}	Share parameter between skilled workers and private capital	0.0350
ρ_{XP2}	Substitution parameter between skilled workers and private capital	1.5000
α_{TP}	Shift parameter in transformation function between exported and domestic private production	2.1201
β_{TP}	Share parameter between exported and domestic private production	0.3349
ρ_{TP}	Substitution parameter between exported and domestic private production	1.9901
$a_{AN,AN}$	Input-output coefficient	0.0500
$a_{AT,AN}$	Input-output coefficient	0.0000
$a_{I,AN}$	Input-output coefficient	0.0000
$a_{P,AN}$	Input-output coefficient	0.1000
$a_{G,AN}$	Input-output coefficient	0.1000
$a_{AN,AT}$	Input-output coefficient	0.0000
$a_{AT,AT}$	Input-output coefficient	0.0500
$a_{I,AT}$	Input-output coefficient	0.0000
$a_{P,AT}$	Input-output coefficient	0.1000
$a_{G,AT}$	Input-output coefficient	0.2000
$a_{AN,I}$	Input-output coefficient	0.0000
$a_{AT,I}$	Input-output coefficient	0.0000
$a_{I,I}$	Input-output coefficient	0.0500
$a_{P,I}$	Input-output coefficient	0.1000
$a_{G,I}$	Input-output coefficient	0.1000
$a_{AN,P}$	Input-output coefficient	0.1000
$a_{AT,P}$	Input-output coefficient	0.0000
$a_{I,P}$	Input-output coefficient	0.0000
$a_{P,P}$	Input-output coefficient	0.2000
$a_{G,P}$	Input-output coefficient	0.2000
$a_{AN,G}$	Input-output coefficient	0.0000
$a_{AT,G}$	Input-output coefficient	0.0000
$a_{I,G}$	Input-output coefficient	0.0000
$a_{P,G}$	Input-output coefficient	0.1000
$a_{G,G}$	Input-output coefficient	0.0000

η_{XAN}	Coefficient of returns to scale	0.30
η_{XAT}	Coefficient of returns to scale	0.30
Employment		
γ_{ef}	Elasticity of effort to wages	0.1701
ef_m	Minimum effort level	0.2356
$\overline{g}_R$	Population growth in rural economy	0.0222
θ_U	Share of urban unskilled workers employed in formal sector	0.2222
θ_R	Share of rural workers employed in traded sector	0.5000
σ_M	Elasticity of migration to wage differentials	0.5000
κ_E	Shift parameter in skills acquisition function	0.0150
σ_W	Elasticity of skills acquisition to wage differential	0.5000
σ_E	Elasticity of skills acqusition to capital in education	0.8273
λ_m	Partial adjustment rate on migration	0.3000
λ_s	Partial adjustment rate on skills acquisition	0.3000
κ_S	Shift parameter for skilled private employment	0.3946
α_{gu}	Shift parameter for urban unskilled worker population growth rate	0.0210
γ_{gu}	Elasticity of urban unskilled worker population growth rate to the proportion of skilled workers in total urban population	0.1000
α_{edu}	Elasticity of skills acqusition to cost of education	0.1000
$\overline{\Omega}_W$	Shift parameter for skilled reservation wage function	1.0000
ϕ_u	Elasticity of skilled reservation wage to the unemployment rate of skilled workers	0.0000
ind_S	Elasticity of skilled nominal wage to the skilled price index	1.00
λ_g	Coefficient of distributed lag of effect of past income on growth rate of urban unskilled population	0.0000
θ_s	Initial ratio of the number of workers employed in the private sector	0.1000
Demand		
σ_{QA}	Elasticity of agricultural composite good	0.8000
σ_{QP}	Elasticity of private urban composite good	1.0100
α_{QA}	Shift parameter in agricultural composite good	2.0000
β_{QA}	Share parameter in agricultural composite good	0.5000
ρ_{QA}	Substitution parameter in agricultural composite good	0.2500
α_{QP}	Shift parameter in urban composite good	1.6519

β_{QP}	Share parameter in urban composite good	0.7978
ρ_{QP}	Substitution parameter in urban composite good	-0.0100
$cc_{AN,A}$	Shares of household consumption in goods	0.5000
$cc_{AT,A}$	Shares of household consumption in goods	0.5000
$cc_{A,UI}$	Shares of household consumption in goods	0.1500
$cc_{A,UF}$	Shares of household consumption in goods	0.2000
$cc_{A,US}$	Shares of household consumption in goods	0.1000
$cc_{A,KAP}$	Shares of household consumption in goods	0.1000
$cc_{I,NA}$	Shares of household consumption in goods	0.0500
$cc_{I,TA}$	Shares of household consumption in goods	0.0500
$cc_{I,UI}$	Shares of household consumption in goods	0.7992
$cc_{I,UF}$	Shares of household consumption in goods	0.1158
$cc_{I,US}$	Shares of household consumption in goods	0.0600
$cc_{I,KAP}$	Shares of household consumption in goods	0.0200
$cc_{G,NA}$	Shares of household consumption in goods	0.1711
$cc_{G,TA}$	Shares of household consumption in goods	0.1711
$cc_{G,UI}$	Shares of household consumption in goods	0.0200
$cc_{G,UF}$	Shares of household consumption in goods	0.2500
$cc_{G,US}$	Shares of household consumption in goods	0.1832
$cc_{G,KAP}$	Shares of household consumption in goods	0.1950
$cc_{P,NA}$	Shares of household consumption in goods	0.2789
$cc_{P,TA}$	Shares of household consumption in goods	0.2789
$cc_{P,UI}$	Shares of household consumption in goods	0.0308
$cc_{P,UF}$	Shares of household consumption in goods	0.4342
$cc_{P,US}$	Shares of household consumption in goods	0.6568
$cc_{P,KAP}$	Shares of household consumption in goods	0.6850
gg_{AN}	Share of government expenditure on nontraded agricultural goods	0.0000
gg_I	Share of government expenditure on informal goods	0.0000
gg_G	Share of government expenditure on public goods	0.0000
gg_P	Share of government expenditure on formal private goods	1.0000
zz_{AN}	Share of investment expenditure on agricultural goods	0.0000
zz_I	Share of investment expenditure on informal goods	0.0000
zz_G	Share of investment expenditure on public goods	0.3684
zz_P	Share of investment expenditure on formal private goods	0.6316
Prices		
wt_A	Share of agriculture in aggregate demand	0.2000
wt_G	Share of government in aggregate demand	0.2000

wt_P	Share of private urban good in aggregate demand	0.5000
wt_I	Share of informal good in aggregate demand	0.1000
wr_A	Share of agricultural good in rural consumption	0.5000
wr_G	Share of government good in rural consumption	0.1711
wr_P	Share of private urban good in rural consumption	0.2789
wr_I	Share of informal good in rural consumption	0.0500
wu_A	Share of agricultural good in urban unskilled workers' consumption	0.1750
wu_G	Share of government good in urban unskilled workers' consumption	0.1350
wu_P	Share of private urban good in urban unskilled workers' consumption	0.2325
wu_I	Share of informal good in urban unskilled workers' consumption	0.4575
ws_A	Share of agricultural good in skilled workers' consumption	0.1000
ws_G	Share of government good in skilled workers' consumption	0.1832
ws_P	Share of private urban good in skilled workers' consumption	0.6568
ws_I	Share of informal good in skilled workers' consumption	0.0600
v_{an}	Weight for AN real GDP at factor cost price deflator	0.0589
v_{at}	Weight for AT real GDP at factor cost price deflator	0.2347
v_i	Weight for I real GDP at factor cost price deflator	0.0721
v_p	Weight for P real GDP at factor cost price deflator	0.3852
v_g	Weight for G real GDP at factor cost price deflator	0.2492
Income		
re	Percentage of profits retained	0.2020
$\sigma_{S,h}$	Elasticity of saving rate to deposit rate	0.5000
$s_{o,AN}$	Saving coefficient for agricultural workers in nontraded sector	0.1623
$s_{o,AT}$	Saving coefficient for agricultural workers in traded sector	0.1063
$s_{o,UI}$	Saving coefficient for unskilled urban workers in informal economy	0.2027
$s_{o,UF}$	Saving coefficient for unskilled urban workers in formal economy	0.1063

$s_{o,US}$	Saving coefficient for skilled workers	0.1063
$s_{o,KAP}$	Saving coefficient for capitalists	0.1063
γ_{AN}	Share of transfers allocated to workers in agricultural nontraded sector	0.1667
γ_{AT}	Share of transfers allocated to workers in agricultural traded sector	0.5000
γ_{UI}	Share of transfers allocated to workers in urban informal sector	0.0000
γ_{UF}	Share of transfers allocated to workers in urban formal sector	0.0833
γ_S	Share of transfers allocated to workers in skilled sector	0.2500
γ_{KAP}	Share of transfers allocated to capitalists	0.0000
Financial Sector		
δ_P	Private capital's depreciation rate	0.1092
ϕ_{BAN}	Domestic/foreign deposits shift parameter	2.9603
ϕ_{BAT}	Domestic/foreign deposits shift parameter	2.9603
ϕ_{BUI}	Domestic/foreign deposits shift parameter	2.9603
ϕ_{BUF}	Domestic/foreign deposits shift parameter	2.9603
ϕ_{BS}	Domestic/foreign deposits shift parameter	2.9603
ϕ_{BKAP}	Domestic/foreign deposits shift parameter	2.9603
σ_{BAN}	Domestic/foreign deposits elasticity	0.7000
σ_{BAT}	Domestic/foreign deposits elasticity	0.7000
σ_{BUI}	Domestic/foreign deposits elasticity	0.7000
σ_{BUF}	Domestic/foreign deposits elasticity	0.7000
σ_{BS}	Domestic/foreign deposits elasticity	0.7000
σ_{BKAP}	Domestic/foreign deposits elasticity	0.7000
ϕ_Z	Shift parameter of rate of return to capital	0.1738
ϕ_D	Shift parameter of external debt effect	0.0092
ϕ_{DD}	Shift parameter of external debt effect	0.0199
σ_I	Elasticity of rate of return to capital	0.8000
σ_P	Elasticity of inflation on investment	0.1000
β_{hD}	Money demand elasticity on domestic rate	0.5000
β_{hF}	Money demand elasticity on foreign rate	0.5000
β_{hPINF}	Money demand elasticity on inflation	0.5000
σ_H	Money demand elasticity on real income	1.0000
γ_{BAN}	Share of domestic deposits in total deposits	0.75
γ_{BAT}	Share of domestic deposits in total deposits	0.75

γ_{BKAP}	Share of domestic deposits in total deposits	0.75
γ_{BS}	Share of domestic deposits in total deposits	0.75
γ_{BUF}	Share of domestic deposits in total deposits	0.75
γ_{BUI}	Share of domestic deposits in total deposits	0.75
σ_{IK}	Elasticity of investment to return to capital	0.8000
α_b	Share of domestic funding in total bank funding	0.9000
γ_{pr}	Elasticity of premium to firms' net worth position	0.0500
λ_{pr}	Premium shift parameter	1.0934
ξ_{pr}	Partial adjustment coefficient for premium	1.0000
δ_C	Collateral parameter	0.1475
σ_K	Elasticity of investment to gross growth rate of infrastructure capital	0.1000
σ_{ACC}	Elasticity of investment to growth rate of real GDP at factor cost	0.05

Public Sector

α_G	Shift parameter for public capital	0.2140
β_G	Share parameter for public capital	0.7500
ρ_G	Substitution parameter for public capital	0.3333
δ_{INF}	Depreciation of infrastructure	0.0100
δ_H	Depreciation of health capital	0.1400
δ_E	Depreciation of education capital	0.1400
$rreq$	Reserve requirement ratio	0.1000

Table 1
IMMPA: Financial Balance Sheets
(in domestic-currency terms, at current prices)

Households

Assets	Liabilities
Cash holdings (H)	Financial wealth (WT)
Domestic bank deposits (DD)	
Foreign bank deposits ($ER \cdot FD$)	

Firms

Assets	Liabilities
Stock of private capital ($PK \cdot K_P$)	Domestic borrowing from banks (DL_P)
	Foreign borrowing ($ER \cdot FL_P$)
	Net worth (NW_P)

Commercial Banks

Assets	Liabilities
Domestic loans to government (DL_G)	Domestic bank deposits (DD)
Domestic loans to firms (DL_P)	Banks' foreign liabilities ($ER \cdot FL_B$)
Reserve requirements (RR)	Net worth (NW_B)

Central Bank

Assets	Liabilities
Loans to government (DC_G)	Cash in circulation (H)
Foreign reserves ($ER \cdot FF$)	Reserve requirements (RR)
	Net worth (NW_{CB})

Government

Assets	Liabilities
Capital in education ($PK \cdot K_E$)	Loans from central bank (DC_G)
Capital in health ($PK \cdot K_H$)	Loans from commercial banks (DL_G)
Capital in infrastructure ($PK \cdot K_{INF}$)	Foreign borrowing ($ER.FL_G$)
	Net worth (NW_G)

Consolidated Public Sector

Assets	Liabilities
Capital in education ($PK \cdot K_E$)	Cash in circulation (H)
Capital in health ($PK \cdot K_H$)	Reserve requirements (RR)
Capital in infrastructure ($PK \cdot K_{INF}$)	Loans from commercial banks (DL_G)
Foreign reserves ($ER \cdot FF$)	Foreign loans to government ($ER \cdot FL_G$)
	Net worth (NW_{PS})

Table 2
IMMPA: Macroeconomic Indicators
10 percent increase in the world price of the agricultural traded good
(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Real Sector:																														
Total resources	1983.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	2096.4	2005.4	2044.6	2077.4	2110.6	2144.0	2177.5	2211.2	2245.2	2314.0	103.08	-3.69	0.50	0.41	0.41	0.43	0.45	0.47	0.48	0.51
Gross domestic product	1232.7	1244.3	1267.1	1288.8	1310.6	1332.6	1354.7	1376.9	1399.3	1444.7	1305.3	1241.7	1267.6	1289.1	1311.0	1333.0	1355.1	1377.3	1399.7	1445.1	72.60	-2.55	0.46	0.33	0.34	0.36	0.38	0.39	0.40	0.43
Imports of goods & NFS	760.7	764.6	776.9	788.2	799.6	810.9	822.3	833.8	845.4	868.8	791.2	763.6	777.0	788.3	799.6	811.0	822.4	833.9	845.4	868.8	30.48	-1.14	0.05	0.08	0.07	0.07	0.08	0.08	0.08	0.08
Total expenditures	1983.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	2096.4	2005.4	2044.6	2077.4	2110.6	2144.0	2177.5	2211.2	2245.2	2314.0										
Private consumption	911.0	914.7	934.0	951.2	968.8	986.4	1004.1	1021.9	1039.8	1076.9	977.4	910.2	934.6	951.8	969.4	987.0	1004.7	1022.5	1040.4	1076.5	66.41	-4.50	0.83	0.51	0.53	0.56	0.57	0.58	0.60	0.62
Public consumption	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment	267.8	265.2	268.4	271.5	274.7	278.0	281.4	284.9	288.4	295.8	271.5	269.2	268.2	271.5	274.7	278.0	281.4	284.8	288.4	295.8	3.68	0.95	-0.23	0.03	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02
Public investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports of goods & NFS	743.3	756.3	767.4	778.5	789.4	800.3	811.1	821.9	832.8	854.7	778.1	758.2	767.3	778.3	789.3	800.2	811.0	821.8	832.7	854.6	32.79	-0.15	-0.09	-0.13	-0.11	-0.11	-0.11	-0.10	-0.10	-0.10
Memorandum item:																														
Private disposable income	1019.3	1028.8	1049.5	1069.0	1088.8	1108.4	1128.2	1148.1	1168.1	1208.5	1090.8	1026.7	1050.2	1069.6	1089.2	1109.0	1128.8	1148.7	1168.8	1209.2	71.52	-2.12	0.68	0.58	0.59	0.61	0.63	0.64	0.66	0.68
External Sector:																														
Current account	-73.0	-67.2	-70.9	-74.0	-77.3	-80.9	-84.7	-88.7	-92.9	-102.0	-69.7	-66.1	-70.9	-74.0	-77.3	-80.9	-84.7	-88.7	-92.9	-102.0	3.33	1.11	0.04	-0.03	0.00	0.00	0.00	0.00	0.00	0.00
Exports of goods & NFS (excl. subsidies)	725.3	737.9	748.7	759.4	770.0	780.5	791.0	801.5	812.0	833.2	758.2	737.8	748.6	759.3	769.9	780.4	790.9	801.4	811.9	833.1	32.96	-0.14	-0.09	-0.13	-0.11	-0.11	-0.10	-0.10	-0.10	-0.08
Imports of goods & NFS (excl. tariffs)	735.9	739.9	751.6	762.6	773.6	784.6	795.6	806.6	817.9	840.6	765.5	738.7	751.7	762.7	773.6	784.7	795.7	806.8	818.0	840.7	29.64	-1.12	0.05	0.08	0.07	0.07	0.08	0.08	0.08	0.06
Factor services	-62.3	-65.3	-68.0	-70.8	-73.7	-76.8	-80.1	-83.5	-87.0	-94.6	-62.3	-65.1	-67.8	-70.6	-73.6	-76.7	-79.9	-83.3	-86.8	-94.4	0.00	0.13	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Capital account	94.4	85.5	83.0	87.5	90.9	94.7	98.8	103.0	107.5	117.1	101.5	78.2	79.3	87.8	90.9	94.8	98.8	103.1	107.5	117.1	7.15	-7.33	-3.76	0.36	0.00	0.02	0.01	0.01	0.01	0.01
NFPS financing	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private financing	78.7	69.7	67.1	71.3	74.6	78.3	82.1	86.2	90.6	99.8	85.8	62.4	63.3	71.7	74.6	78.3	82.2	86.3	90.6	99.8	7.15	-7.33	-3.76	0.36	0.00	0.02	0.01	0.01	0.01	0.01
Change in net international reserves	21.4	18.3	12.1	13.5	13.6	13.8	14.1	14.3	14.5	15.1	31.9	12.1	8.4	13.8	13.6	13.9	14.1	14.4	14.5	15.1	10.48	-6.22	-3.72	0.33	0.00	0.01	0.01	0.01	0.01	0.01
Nonfinancial Public Sector:																														
Total revenue	435.7	433.0	435.2	436.5	437.7	438.8	439.7	440.6	441.4	442.7	463.3	433.3	435.2	436.5	437.7	438.8	439.7	440.6	441.4	442.7	27.57	0.25	0.03	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Total expenditures	452.4	449.9	452.2	453.7	455.1	456.4	457.5	458.6	459.5	461.2	480.0	450.1	452.3	453.7	455.1	456.4	457.5	458.5	459.5	461.2	27.57	0.25	0.03	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Consumption	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transfers to households	311.5	306.7	308.8	308.0	305.3	304.2	303.0	301.7	300.3	297.2	339.1	308.9	308.8	308.0	305.2	304.2	303.0	301.7	300.3	297.2	27.57	0.25	0.03	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Domestic interest payments	6.8	7.1	7.2	7.3	7.4	7.5	7.6	7.6	7.6	7.7	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign interest payments	62.7	63.3	64.0	64.6	65.2	65.9	66.6	67.2	67.9	69.3	62.7	63.3	64.0	64.6	65.2	65.9	66.6	67.2	67.9	69.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total financing	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net foreign financing	15.7	15.8	16.0	16.1	16.3	16.5	16.6	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.6	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, central bank	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central Bank:																														
Total assets	243.4	262.7	275.9	290.5	305.1	320.1	335.3	350.8	366.6	398.9	253.9	267.0	278.4	291.3	306.0	321.0	336.2	351.7	367.5	399.9	10.48	4.26	0.54	0.87	0.86	0.88	0.89	0.91	0.92	0.95
Net foreign assets	192.4	210.7	222.8	236.3	249.9	263.8	277.9	292.2	306.8	336.6	202.9	215.0	223.4	237.2	250.8	264.7	278.8	293.1	307.7	337.7	10.48	4.26	0.54	0.87	0.88	0.88	0.89	0.91	0.92	0.95
Net domestic assets	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to government	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other domestic assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total liabilities/reserve money	243.4	262.7	275.9	290.5	305.1	320.1	335.3	350.8	366.6	398.9	253.9	267.0	278.4	291.3	306.0	321.0	336.2	351.7	367.5	399.9	10.48	4.26	0.54	0.87	0.86	0.88	0.89	0.91	0.92	0.95
Currency in circulation	214.9	224.6	227.4	231.5	235.5	239.5	243.5	247.6	251.6	259.9	225.6	228.4	227.2	231.6	235.6	239.6	243.6	247.7	251.8	260.0	10.70	3.80	-0.22	0.12	0.11	0.11	0.12	0.12	0.12	0.13
Reserve requirements	28.5	38.1	48.5	58.9	69.7	80.6	91.8	103.3	114.9	139.1	28.3	38.6	49.2	59.7	70.4	81.4	92.6	104.0	115.7	139.9	-0.22	0.48	0.76	0.74	0.76	0.77	0.78	0.79	0.80	0.82
Memorandum items																														
Money demand (M1)	214.9	224.6	227.4	231.5	235.5	239.5	243.5	247.6	251.6	259.9	225.6	228.4	227.2	231.6	235.6	239.6	243.6	247.7	251.6	260.0	10.70	3.80	-0.22	0.12	0.11	0.11	0.12	0.12	0.12	0.13
Gross foreign exchange reserves in months of imports	3.1	3.4	3.6	3.7	3.9	4.0	4.2	4.3	4.5	4.8	3.2	3.5	3.6	3.7	3.9	4.0	4.2	4.4	4.5	4.8	0.04	0.07	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Commercial Banks:																														
Total assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.8	1874.9	2096.8	2557.4	478.2	662.7	853.2	1048.5	1248.8	1454.4	1665.4	1881.9	2103.9	2564.9	4.26	5.99	6.19	6.35	6.50	6.65	6.80	6.96	7.12	7.45
Net foreign assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.8	1874.9	2096.8	2557.4	478.2	662.7	853.2	1048.5	1248.8	1454.4	1665.4	1881.9	2103.9	2564.9	4.26	5.99	6.19	6.35	6.50	6.65	6.80	6.96	7.12	7.45
Loans to government	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to firms	343.4	518.6	698.5	883.2	1072.7	1267.2	1466.8	1671.7	1881.8	2318.4	347.9	524.1	704.0	888.8	1078.4	1273.1	1472.8	1677.8	1888.2	2325.0	4.48	5.53	5.44	5.61	5.74	5.88	6.02	6.17	6.32	6.63
Other domestic assets	28.5	38.1	48.5	58.9	69.7	80.6	91.8	103.3	114.9	139.1	28.3	38.6	49.2	59.7	70.4	81.4	92.6	104.0	115.7	139.9	-0.22	0.48	0.76	0.74	0.76	0.77	0.78	0.79	0.80	0.82
Total liabilities	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.8	1874.9	2096.8	2557.4	478.2	662.7	853.2	1048.5	1248.8	1454.4	1665.4	1881.9	2103.9	2564.9	4.26	5.99	6.19	6.35	6.50	6.65	6.80	6.96	7.12	7.45
Banks' foreign liabilities	187.1	275.5	362.4	452.7	545.7	641.8	740.4	842.3	947.3	1166.8	193.5	276.8	361.0	451.5	544.6	640.8	739.5	841.4	946.5	1166.0	6.43	1.36	-1.40	-1.09	-1.08	-1.01	-0.96	-0.91	-0.86	-0.76
Deposits	284.9	381.3	484.6	589.4	696.6	806.2	918.2	1032.6	1149.5	1390.6	282.7	385.9	492.2	596.9	704.2	813.9	926.0	1040.5	1157.4	1398.9	-2.17	4.62	7.60	7.44	7.55	7.66	7.76	7.87	7.96	8.31
Memorandum Items:																														
Real GDP growth rate	0.9	1.7	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	0.7	1.8	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	-0.12	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inflation rate (economy-wide)	6.5	-0.8	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	10.3	-4.3	0.9	0.5	0.6	0.7	0.7	0.7	0.7	0.7	3.76	-3.84	0.31	-0.02	0.00	0.00	0.00	0.00	0.00	0.00
Deposit rate	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Borrowing rate	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	7.7	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	-0.24	-0.15	-0.10	-0.08	-0.07	-0.06	-0.05	-0.05	-0.04	-0.04
Risk premium	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	-0.0004	0.0006	0.0004	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002

Table 3
IMMPA: Structural, Poverty and Income Distribution Indicators
10 percent increase in the world price of the agricultural traded good
(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Production Structure																														
Size of informal sector (% of total output)	12.8	12.6	13.0	13.3	13.7	14.0	14.4	14.7	15.1	15.5	13.6	12.4	13.0	13.3	13.7	14.0	14.4	14.8	15.2	15.5	0.81	-0.16	0.05	0.03	0.04	0.04	0.04	0.04	0.04	0.04
Size of agricultural sector (% of formal sector output)	50.7	51.5	52.1	52.6	53.1	53.6	54.0	54.3	54.6	54.9	55.7	51.4	52.1	52.6	53.1	53.6	54.0	54.3	54.6	54.9	5.07	-0.06	0.02	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Composition of Employment and Wages																														
Employment in rural sector (% of total employment)	53.5	49.5	46.2	43.4	41.2	39.3	37.7	36.4	35.3	34.4	53.5	49.5	46.2	43.5	41.2	39.3	37.8	36.4	35.4	34.5	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03
Employment in rural non-traded sector (% of rural employment)	56.6	53.4	50.4	47.8	45.1	42.8	40.8	39.0	37.5	36.2	56.6	53.4	50.4	47.6	45.1	42.8	40.8	39.1	37.6	36.3	0.00	0.01	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.05
Employment in informal sector (% of total employment)	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.1	47.0	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.1	47.0	0.02	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03
Employment in informal sector (% of urban employment)	59.7	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.4	71.7	59.6	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.4	71.7	0.05	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Employment in public sector (% of total employment)	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in public sector (% of urban employment)	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rural traded and rural non-traded sector wage differential	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban unskilled formal and informal sector wage differential	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public sector wages (% of total public expenditure)	24.6	25.0	25.3	25.7	26.1	26.5	26.9	27.3	27.6	28.2	24.2	25.0	25.4	25.7	26.1	26.5	26.9	27.3	27.6	28.2	-0.44	-0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aggregate Demand																														
Private consumption (% of GDP)	73.9	73.5	73.7	73.8	73.9	74.0	74.1	74.2	74.3	74.4	74.9	73.3	73.7	73.8	73.9	74.0	74.1	74.2	74.3	74.4	0.98	-0.21	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Private consumption (% of total consumption)	95.8	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	96.1	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	0.27	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment (% of GDP)	21.7	21.3	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	20.8	21.4	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	-0.91	0.12	-0.03	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Private investment (% of total investment)	89.5	89.2	89.1	89.0	88.9	88.8	88.8	88.7	88.6	88.6	89.6	89.2	89.1	89.1	89.0	88.9	88.8	88.8	88.7	88.6	0.13	0.03	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fiscal Indicators																														
Public investment in infrastructure (% of total public investment)	32.7	32.0	31.4	30.8	30.2	29.6	29.0	28.4	27.9	27.3	32.7	32.0	31.4	30.8	30.2	29.6	29.0	28.4	27.9	27.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public investment in health (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public investment in education (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial Indicators																														
Currency (% of M2)	43.0	37.1	31.9	28.2	25.3	22.9	21.0	19.3	18.0	16.8	44.4	37.2	31.6	28.0	25.1	22.7	20.8	19.2	17.9	16.7	1.38	0.11	-0.38	-0.24	-0.19	-0.16	-0.13	-0.11	-0.09	-0.08
M2 (% of GDP)	40.5	48.7	58.2	63.7	71.1	78.5	85.8	93.0	100.1	107.2	38.9	49.5	56.8	64.3	71.7	79.0	86.3	93.5	100.7	107.8	-1.60	0.78	0.56	0.57	0.57	0.58	0.56	0.55	0.55	0.55
Bank credit to private sector (% of GDP)	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.6	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lending - deposit rate differential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External Sector																														
Agricultural exports (% of total exports)	49.1	48.8	48.7	48.6	48.4	48.2	48.0	47.8	47.6	47.4	51.7	48.8	48.7	48.6	48.4	48.2	48.0	47.8	47.6	47.4	2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports of non-agricultural goods (% of total imports)	84.7	84.7	84.7	84.6	84.5	84.5	84.4	84.4	84.3	84.3	84.3	84.8	84.8	84.6	84.5	84.5	84.4	84.4	84.3	84.3	-0.49	0.04	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
External debt (% of GDP)	128.4	128.5	127.4	126.6	125.7	124.9	124.0	123.3	122.5	121.8	121.3	128.8	127.4	126.5	125.7	124.8	124.0	123.2	122.5	121.7	-7.14	0.26	-0.05	-0.03	-0.03	-0.03	-0.03	-0.03	-0.04	-0.04
Degree of openness (exports plus imports divided by GDP)	122.0	122.2	121.9	121.6	121.2	120.9	120.6	120.3	119.9	119.6	120.1	122.4	121.8	121.5	121.2	120.9	120.5	120.2	119.9	119.6	-1.94	0.15	-0.05	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.04

Poverty Indicators	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run
Rural poverty line (consumption-based) in real terms	0.35	0.35	0.35	0.35	0.35	0.35	0.0000	0.0000	0.0000
Rural poverty line (consumption-based) in nominal terms	0.37	0.38	0.39	0.38	0.38	0.39	0.0098	0.0049	0.0008
Rural poverty line (income-based) in real terms	0.50	0.50	0.50	0.50	0.50	0.50	0.0000	0.0000	0.0000
Rural poverty line (income-based) in nominal terms	0.37	0.38	0.39	0.38	0.38	0.39	0.0098	0.0049	0.0008
Urban poverty line (consumption-based) in real terms	0.44	0.44	0.44	0.44	0.44	0.44	0.0000	0.0000	0.0000
Urban poverty line (consumption-based) in nominal terms	0.47	0.49	0.51	0.49	0.50	0.51	0.0214	0.0109	0.0019
Urban poverty line (income-based) in real terms	0.63	0.63	0.63	0.63	0.63	0.63	0.0000	0.0000	0.0000
Urban poverty line (income-based) in nominal terms	0.68	0.70	0.73	0.71	0.72	0.73	0.0308	0.0156	0.0026
Agricultural non-traded household (consumption-based) poverty headcount index	0.89	0.74	0.51	0.87	0.72	0.51	-0.0220	-0.0180	-0.0020
Agricultural traded household (consumption-based) poverty headcount index	0.43	0.44	0.45	0.38	0.41	0.45	-0.0488	-0.0243	-0.0030
Urban informal household (consumption-based) poverty headcount index	0.87	0.94	0.98	0.85	0.93	0.98	-0.0125	-0.0093	0.0000
Urban formal unskilled household (consumption-based) poverty headcount index	0.20	0.21	0.22	0.21	0.21	0.23	0.0067	0.0000	0.0067
Urban formal skilled household (consumption-based) poverty headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household poverty (consumption-based) headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (consumption-based) poverty gap index	0.49	0.40	0.32	0.47	0.40	0.32	-0.0139	-0.0047	-0.0003
Agricultural traded household (consumption-based) poverty gap index	0.28	0.29	0.30	0.28	0.29	0.30	-0.0033	-0.0016	-0.0005
Urban informal household (consumption-based) poverty gap index	0.47	0.53	0.58	0.45	0.52	0.58	-0.0123	-0.0038	-0.0022
Urban formal unskilled household (consumption-based) poverty gap index	0.24	0.25	0.26	0.24	0.25	0.26	0.0072	0.0075	-0.0062
Urban formal skilled household (consumption-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household (consumption-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (income-based) poverty headcount index	0.80	0.74	0.52	0.68	0.73	0.52	-0.0220	-0.0120	-0.0020
Agricultural traded household (income-based) poverty headcount index	0.50	0.51	0.53	0.45	0.48	0.52	-0.0428	-0.0304	-0.0061
Urban informal household (income-based) poverty headcount index	0.85	0.93	0.98	0.83	0.93	0.98	-0.0156	-0.0051	0.0000
Urban formal unskilled household (income-based) poverty headcount index	0.28	0.28	0.30	0.28	0.28	0.30	0.0201	0.0000	0.0000
Urban formal skilled household (income-based) poverty headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household poverty (income-based) headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (income-based) poverty gap index	0.49	0.41	0.33	0.47	0.40	0.32	-0.0127	-0.0071	-0.0002
Agricultural traded household (income-based) poverty gap index	0.30	0.30	0.30	0.29	0.30	0.30	-0.0082	0.0013	0.0011
Urban informal household (income-based) poverty gap index	0.48	0.52	0.58	0.45	0.51	0.57	-0.0092	-0.0068	-0.0021
Urban formal unskilled household (income-based) poverty gap index	0.24	0.23	0.25	0.23	0.24	0.25	-0.0024	0.0081	0.0018
Urban formal skilled household (income-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household (income-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Income Distribution Indicators	**Short-Run**	**Medium-Run**	**Long-Run**	**Short-Run**	**Medium-Run**	**Long-Run**	**Short-Run**	**Medium-Run**	**Long-Run**
Gini coefficient (consumption-based)	0.60	0.60	0.59	0.60	0.59	0.59	-0.0029	-0.0018	-0.0006
Gini coefficient (income-based)	0.63	0.62	0.62	0.63	0.62	0.62	-0.0025	-0.0014	-0.0004
Theil index (consumption-based)	0.31	0.32	0.33	0.34	0.33	0.33	0.0300	0.0141	0.0024
Theil index (income-based)	0.35	0.35	0.36	0.38	0.37	0.36	0.0303	0.0143	0.0012

Table 4

IMMPA: Macroeconomic Indicators

30 percent cut in domestic credit to government

(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Real Sector:																														
Total resources	1993.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	1963.1	2011.7	2044.3	2077.3	2110.5	2143.9	2177.4	2211.1	2245.0	2313.9	-30.23	2.60	0.23	0.31	0.33	0.34	0.34	0.35	0.37	0.39
Gross domestic product	1232.7	1244.3	1267.1	1288.8	1310.6	1332.6	1354.7	1376.9	1399.3	1444.7	1214.0	1246.0	1267.2	1288.9	1310.8	1332.7	1354.8	1377.0	1399.4	1444.9	-18.61	1.76	0.03	0.12	0.12	0.12	0.13	0.13	0.14	0.15
Imports of goods & NFS	760.7	764.8	776.9	788.2	799.6	810.9	822.3	833.8	845.4	868.8	749.1	765.6	777.1	788.4	799.8	811.2	822.6	834.0	845.6	869.0	-11.62	0.84	0.21	0.19	0.21	0.21	0.22	0.22	0.23	0.24
Total expenditures	1993.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	1963.1	2011.7	2044.3	2077.3	2110.5	2143.9	2177.4	2211.1	2245.0	2313.9										
Private consumption	911.0	914.7	934.0	951.2	968.6	986.4	1004.1	1021.9	1039.8	1075.9	880.5	917.8	934.0	951.5	969.1	986.7	1004.4	1022.2	1040.1	1076.2	-30.47	3.06	0.05	0.25	0.26	0.26	0.28	0.29	0.30	0.32
Public consumption	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment	287.6	265.2	268.4	271.5	274.7	278.0	281.4	284.9	288.4	295.6	286.3	264.7	268.8	271.5	274.7	278.0	281.4	284.9	288.5	295.9	-1.30	-0.51	0.18	0.03	0.05	0.05	0.05	0.05	0.05	0.06
Public investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports of goods & NFS	743.3	756.3	767.4	778.5	789.4	800.3	811.1	821.9	832.8	854.7	744.8	758.4	767.4	778.5	789.4	800.3	811.1	822.0	832.8	854.7	1.55	0.04	0.01	0.03	0.02	0.02	0.02	0.01	0.01	0.01
Memorandum item:																														
Private disposable income	1019.3	1028.8	1049.5	1069.0	1088.6	1108.4	1128.2	1148.1	1168.1	1208.5	988.8	1030.6	1049.7	1069.2	1088.9	1108.7	1128.5	1148.4	1168.4	1208.9	-32.54	1.79	0.20	0.28	0.30	0.31	0.32	0.33	0.34	0.37
External Sector:																														
Current account	-73.0	-67.2	-70.9	-74.0	-77.3	-80.9	-84.7	-88.7	-92.9	-102.0	-60.2	-67.5	-70.6	-73.6	-77.0	-80.5	-84.3	-88.3	-92.6	-101.6	12.79	-0.27	0.31	0.36	0.35	0.36	0.36	0.37	0.38	0.39
Exports of goods & NFS (excl. subsidies)	725.3	737.9	748.7	759.4	770.0	780.5	791.0	801.5	812.0	833.2	726.7	737.9	748.7	759.4	770.0	780.6	791.1	801.5	812.0	833.2	1.48	0.04	0.01	0.03	0.02	0.02	0.02	0.01	0.01	0.01
Imports of goods & NFS (excl. tariffs)	735.9	739.8	751.6	762.6	773.6	784.6	795.6	806.8	817.9	840.6	724.6	740.7	751.6	762.8	773.8	784.8	795.9	807.0	818.2	840.8	-11.31	0.82	0.20	0.19	0.20	0.20	0.21	0.21	0.22	0.22
Factor services	-82.3	-85.3	-88.0	-70.6	-73.7	-76.8	-80.1	-83.5	-87.0	-94.6	-82.3	-84.8	-87.5	-70.3	-73.2	-76.3	-79.5	-82.9	-86.4	-94.0	0.00	0.51	0.50	0.51	0.53	0.54	0.56	0.57	0.59	0.62
Capital account	94.4	85.5	83.0	87.5	90.9	94.7	98.8	103.0	107.5	117.1	92.5	88.2	85.1	87.2	90.9	94.7	98.8	103.0	107.5	117.1	-1.88	2.70	2.09	-0.22	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02
NFPS financing	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private financing	78.7	69.7	67.1	71.3	74.6	78.3	82.1	86.2	90.6	99.8	76.8	72.4	69.2	71.1	74.6	78.2	82.1	86.2	90.5	99.8	-1.88	2.70	2.09	-0.22	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02
Change in net international reserves	21.4	18.3	12.1	13.5	13.6	13.9	14.1	14.3	14.6	15.1	32.3	20.7	14.5	13.8	13.9	14.2	14.4	14.7	14.9	15.5	10.93	2.43	2.40	0.14	0.34	0.34	0.34	0.35	0.36	0.37
Nonfinancial Public Sector:																														
Total revenue	435.7	433.0	435.2	436.5	437.7	438.8	439.7	440.6	441.4	442.7	426.8	433.7	436.0	437.4	438.6	439.7	440.7	441.5	442.3	443.7	-8.90	0.69	0.82	0.85	0.87	0.89	0.91	0.92	0.94	0.98
Total expenditures	452.4	449.9	452.2	453.7	455.1	456.4	457.5	458.6	459.5	461.2	428.3	450.3	452.7	454.2	455.7	456.9	458.1	459.1	460.1	461.8	-24.10	0.38	0.50	0.54	0.55	0.56	0.57	0.58	0.59	0.61
Consumption	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transfers to households	311.5	306.7	306.8	306.0	305.2	304.2	303.0	301.7	300.3	297.2	287.4	307.0	307.3	306.8	305.7	304.7	303.6	302.3	300.9	297.8	-24.10	0.38	0.51	0.54	0.55	0.56	0.57	0.58	0.58	0.61
Domestic interest payments	6.6	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	6.6	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign interest payments	62.7	63.3	64.0	64.8	65.2	65.9	66.6	67.2	67.9	69.3	62.7	63.3	64.0	64.8	65.2	65.9	66.6	67.2	67.9	69.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total financing	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net foreign financing	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, central bank	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-15.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-15.30	-0.31	-0.31	-0.32	-0.32	-0.33	-0.34	-0.34	-0.35	-0.37
Central Bank:																														
Total assets	243.4	262.7	275.9	290.5	305.1	320.1	335.3	350.8	366.6	398.9	254.4	276.1	291.7	306.4	321.4	336.7	352.2	368.1	384.2	417.3	10.93	13.36	15.77	15.90	16.24	16.58	16.92	17.27	17.62	18.36
Net foreign assets	192.4	210.7	222.8	236.3	249.9	263.8	277.9	292.2	306.8	336.8	203.4	224.1	238.6	252.2	266.2	280.4	294.8	309.5	324.5	355.1	10.93	13.36	15.77	15.90	16.24	16.58	16.92	17.27	17.62	18.36
Net domestic assets	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to government	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other domestic assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total liabilities/reserve money	243.4	262.7	275.9	290.5	305.1	320.1	335.3	350.8	366.6	398.9	239.1	260.5	275.7	290.1	304.8	319.8	335.0	350.5	366.3	398.7	-4.37	-2.24	-0.15	-0.33	-0.32	-0.32	-0.31	-0.31	-0.30	-0.29
Currency in circulation	214.9	224.8	227.4	231.5	235.5	239.5	243.5	247.6	251.6	259.9	210.6	222.6	227.7	231.6	235.5	239.5	243.6	247.6	251.7	260.0	-4.39	-2.00	0.25	0.05	0.07	0.07	0.07	0.07	0.08	0.08
Reserve requirements	28.5	38.1	48.5	58.9	69.7	80.8	91.9	103.3	114.9	139.1	28.5	37.9	48.1	58.6	69.3	80.2	91.4	102.9	114.6	138.7	0.02	-0.24	-0.40	-0.39	-0.39	-0.38	-0.38	-0.38	-0.38	-0.38
Memorandum items																														
Money demand (M1)	214.9	224.8	227.4	231.5	235.5	239.5	243.5	247.6	251.6	259.9	210.6	222.6	227.7	231.6	235.5	239.5	243.6	247.6	251.7	260.0	-4.39	-2.00	0.25	0.05	0.07	0.07	0.07	0.07	0.08	0.08
Gross foreign exchange reserves in months of imports	3.1	3.4	3.6	3.7	3.9	4.0	4.2	4.3	4.5	4.8	3.4	3.6	3.8	4.0	4.1	4.3	4.4	4.6	4.8	5.1	0.23	0.21	0.25	0.25	0.25	0.25	0.25	0.26	0.26	0.26
Commercial Banks:																														
Total assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.8	1874.9	2096.8	2557.4	470.3	654.3	844.6	1039.7	1239.9	1445.3	1656.2	1872.5	2094.4	2555.0	-1.61	-2.41	-2.44	-2.45	-2.45	-2.45	-2.45	-2.45	-2.44	-2.43
Net foreign assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.8	1874.9	2096.8	2557.4	470.3	654.3	844.6	1039.7	1239.9	1445.3	1656.2	1872.5	2094.4	2555.0	-1.61	-2.41	-2.44	-2.45	-2.45	-2.45	-2.45	-2.45	-2.44	-2.43
Loans to government	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to firms	343.4	518.6	698.5	883.2	1072.7	1267.2	1466.8	1671.7	1881.9	2318.4	341.8	518.4	698.5	881.1	1070.6	1265.1	1464.7	1669.8	1879.8	2316.3	-1.53	-2.18	-2.04	-2.06	-2.06	-2.06	-2.07	-2.06	-2.06	-2.05
Other domestic assets	28.5	38.1	48.5	58.9	69.7	80.6	91.8	103.3	114.9	139.1	28.5	37.9	48.1	58.6	69.3	80.2	91.4	102.9	114.6	138.7	0.02	-0.24	-0.40	-0.39	-0.39	-0.38	-0.38	-0.38	-0.38	-0.38
Total liabilities	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.8	1874.9	2096.8	2557.4	470.3	654.3	844.6	1039.7	1239.9	1445.3	1656.2	1872.5	2094.4	2555.0	-1.61	-2.41	-2.44	-2.45	-2.45	-2.45	-2.45	-2.45	-2.44	-2.43
Banks' foreign liabilities	187.1	275.5	362.4	452.7	545.7	641.8	740.4	842.3	947.3	1166.8	185.3	275.5	364.0	454.1	547.1	643.0	741.8	843.7	948.7	1168.1	-1.80	0.03	1.59	1.42	1.42	1.40	1.38	1.37	1.35	1.32
Deposits	284.9	381.3	484.6	589.4	696.6	806.2	918.2	1032.6	1149.5	1390.6	285.0	378.8	480.6	585.5	692.8	802.4	914.4	1028.8	1145.7	1388.9	0.19	-2.44	-4.03	-3.87	-3.87	-3.85	-3.83	-3.81	-3.79	-3.75
Memorandum Items:																														
Real GDP growth rate	0.9	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inflation rate (economy-wide)	6.5	-0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	4.5	1.5	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.7	-2.04	2.12	-0.18	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Deposit rate	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Borrowing rate	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	7.7	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	-0.24	-0.15	-0.11	-0.09	-0.07	-0.06	-0.05	-0.05	-0.05	-0.04
Risk premium	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	0.0002	-0.0003	-0.0002	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001

Table 5
IMMPA: Structural, Poverty and Income Distribution Indicators
30 percent cut in domestic credit to government
(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Production Structure																														
Size of informal sector (% of total output)	12.8	12.8	13.0	13.3	13.7	14.0	14.4	14.7	15.1	15.5	11.8	12.7	13.0	13.3	13.8	14.0	14.4	14.7	15.1	15.5	-1.00	0.11	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Size of agricultural sector (% of formal sector output)	50.7	51.5	52.1	52.6	53.1	53.6	54.0	54.3	54.6	54.9	50.6	51.5	52.1	52.6	53.1	53.6	54.0	54.3	54.6	54.9	-0.08	0.03	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Composition of Employment and Wages																														
Employment in rural sector (% of total employment)	53.5	49.5	46.2	43.4	41.2	39.3	37.7	36.4	35.3	34.4	53.5	49.5	46.2	43.4	41.2	39.3	37.7	36.4	35.3	34.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in rural non-traded sector (% of rural employment)	56.8	53.4	50.4	47.8	45.1	42.8	40.8	39.0	37.5	36.2	56.8	53.4	50.4	47.8	45.0	42.8	40.8	39.0	37.5	36.2	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Employment in informal sector (% of total employment)	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.1	47.0	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.2	47.0	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in informal sector (% of urban employment)	59.7	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.4	71.7	59.7	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.4	71.7	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in public sector (% of total employment)	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in public sector (% of urban employment)	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rural traded and rural non-traded sector wage differential	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban unskilled formal and informal sector wage differential	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public sector wages (% of total public expenditure)	24.6	25.0	25.3	25.7	26.1	26.5	26.9	27.3	27.6	28.2	25.2	25.0	25.3	25.7	26.1	26.5	26.9	27.3	27.6	28.2	0.58	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aggregate Demand																														
Private consumption (% of GDP)	73.9	73.5	73.7	73.8	73.9	74.0	74.1	74.2	74.3	74.4	72.5	73.7	73.7	73.8	73.9	74.0	74.1	74.2	74.3	74.4	-1.38	0.14	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Private consumption (% of total consumption)	95.8	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	-0.14	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment (% of GDP)	21.7	21.3	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	21.9	21.2	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	0.23	-0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment (% of total investment)	89.5	89.2	89.1	89.1	89.0	88.9	88.8	88.8	88.7	88.6	89.4	89.2	89.1	89.1	89.0	88.9	88.8	88.8	88.7	88.6	-0.05	-0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fiscal Indicators																														
Public investment in infrastructure (% of total public investment)	32.7	32.0	31.4	30.8	30.2	29.6	29.0	28.4	27.9	27.3	32.7	32.0	31.4	30.8	30.2	29.6	29.0	28.4	27.9	27.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public investment in health (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public investment in education (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial Indicators																														
Currency (% of M2)	43.0	37.1	31.9	28.2	25.3	22.9	21.0	19.3	18.0	16.8	42.5	37.0	32.1	28.3	25.4	23.0	21.0	19.4	18.0	16.8	-0.52	-0.05	0.21	0.14	0.11	0.09	0.07	0.06	0.05	0.05
M2 (% of GDP)	40.5	48.7	56.2	63.7	71.1	78.5	85.8	93.0	100.1	107.2	40.8	48.3	55.9	63.4	70.8	78.2	85.5	92.7	99.9	106.9	0.28	-0.42	-0.30	-0.30	-0.30	-0.29	-0.29	-0.28	-0.28	-0.27
Bank credit to private sector (% of GDP)	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.6	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lending - deposit rate differential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External Sector																														
Agricultural exports (% of total exports)	49.1	48.6	48.7	48.6	48.4	48.2	48.0	47.8	47.6	47.4	49.0	48.8	48.7	48.6	48.4	48.2	48.0	47.8	47.6	47.4	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports of non-agricultural goods (% of total imports)	84.7	84.7	84.7	84.6	84.5	84.5	84.4	84.4	84.3	84.3	85.0	84.7	84.7	84.6	84.5	84.5	84.4	84.4	84.3	84.3	0.24	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External debt (% of GDP)	128.4	128.5	127.4	126.6	125.7	124.9	124.0	123.3	122.5	121.8	130.4	128.3	127.4	126.5	125.7	124.8	124.0	123.3	122.5	121.8	1.97	-0.18	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Degree of openness (exports plus imports divided by GDP)	122.0	122.2	121.9	121.8	121.2	120.9	120.6	120.3	119.9	119.6	123.1	122.1	121.9	121.6	121.2	120.9	120.6	120.3	119.9	119.6	1.04	-0.10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00

Poverty Indicators	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run
Rural poverty line (consumption-based) in real terms	0.35	0.35	0.35	0.35	0.35	0.35	0.0000	0.0000	0.0000
Rural poverty line (consumption-based) in nominal terms	0.37	0.38	0.39	0.36	0.37	0.39	-0.0045	-0.0022	-0.0002
Rural poverty line (income-based) in real terms	0.50	0.50	0.50	0.50	0.50	0.50	0.0000	0.0000	0.0000
Rural poverty line (income-based) in nominal terms	0.37	0.38	0.39	0.36	0.37	0.39	-0.0045	-0.0022	-0.0002
Urban poverty line (consumption-based) in real terms	0.44	0.44	0.44	0.44	0.44	0.44	0.0000	0.0000	0.0000
Urban poverty line (consumption-based) in nominal terms	0.47	0.49	0.51	0.46	0.48	0.51	-0.0138	-0.0069	-0.0008
Urban poverty line (income-based) in real terms	0.63	0.63	0.63	0.63	0.63	0.63	0.0000	0.0000	0.0000
Urban poverty line (income-based) in nominal terms	0.68	0.70	0.73	0.66	0.69	0.73	-0.0198	-0.0099	-0.0011
Agricultural non-traded household (consumption-based) poverty headcount index	0.89	0.74	0.51	0.90	0.75	0.51	0.0140	0.0040	0.0000
Agricultural traded household (consumption-based) poverty headcount index	0.43	0.44	0.45	0.43	0.44	0.45	0.0030	0.0030	0.0000
Urban informal household (consumption-based) poverty headcount index	0.87	0.94	0.98	0.89	0.95	0.98	0.0280	0.0031	0.0000
Urban formal unskilled household (consumption-based) poverty headcount index	0.20	0.21	0.22	0.18	0.21	0.22	-0.0067	0.0000	0.0000
Urban formal skilled household (consumption-based) poverty headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household poverty (consumption-based) headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (consumption-based) poverty gap index	0.49	0.40	0.32	0.49	0.41	0.32	0.0097	0.0075	0.0007
Agricultural traded household (consumption-based) poverty gap index	0.28	0.29	0.30	0.28	0.29	0.30	0.0007	-0.0006	0.0000
Urban informal household (consumption-based) poverty gap index	0.47	0.53	0.58	0.47	0.53	0.58	0.0045	0.0068	0.0012
Urban formal unskilled household (consumption-based) poverty gap index	0.24	0.25	0.26	0.24	0.24	0.26	0.0017	-0.0033	-0.0008
Urban formal skilled household (consumption-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household (consumption-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (income-based) poverty headcount index	0.90	0.74	0.52	0.90	0.75	0.52	0.0040	0.0100	0.0020
Agricultural traded household (income-based) poverty headcount index	0.50	0.51	0.53	0.50	0.51	0.53	0.0000	0.0000	0.0000
Urban informal household (income-based) poverty headcount index	0.85	0.93	0.98	0.87	0.93	0.98	0.0249	0.0031	0.0000
Urban formal unskilled household (income-based) poverty headcount index	0.26	0.29	0.30	0.24	0.28	0.30	-0.0134	-0.0134	-0.0067
Urban formal skilled household (income-based) poverty headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household poverty (income-based) headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (income-based) poverty gap index	0.49	0.41	0.33	0.50	0.41	0.32	0.0144	0.0035	-0.0006
Agricultural traded household (income-based) poverty gap index	0.30	0.30	0.30	0.30	0.30	0.30	0.0021	0.0008	0.0000
Urban informal household (income-based) poverty gap index	0.48	0.52	0.58	0.48	0.52	0.58	0.0058	0.0068	0.0012
Urban formal unskilled household (income-based) poverty gap index	0.24	0.23	0.25	0.24	0.24	0.25	0.0000	0.0084	0.0049
Urban formal skilled household (income-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household (income-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Income Distribution Indicators	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run
Gini coefficient (consumption-based)	0.60	0.60	0.59	0.61	0.60	0.59	0.0044	0.0022	0.0004
Gini coefficient (income-based)	0.63	0.62	0.62	0.63	0.63	0.62	0.0040	0.0021	0.0002
Theil index (consumption-based)	0.31	0.32	0.33	0.31	0.32	0.32	-0.0045	-0.0020	-0.0008
Theil index (income-based)	0.35	0.35	0.36	0.34	0.35	0.36	-0.0037	-0.0016	0.0002

Table 6
IMMPA: Macroeconomic Indicators
5 percent government foreign debt reduction with increased transfers to households
(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Real Sector:																														
Total resources	1993.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	2000.5	2015.6	2051.1	2084.3	2117.9	2151.5	2185.3	2219.3	2253.6	2323.1	7.11	6.69	7.05	7.34	7.65	7.98	8.28	8.60	8.93	9.56
Gross domestic product	1232.7	1244.3	1267.1	1288.8	1310.6	1332.6	1354.7	1376.9	1399.3	1444.7	1236.9	1248.3	1271.4	1293.3	1315.3	1337.5	1359.8	1382.3	1404.9	1450.5	4.29	4.01	4.27	4.48	4.69	4.91	5.14	5.37	5.60	6.06
Imports of goods & NFS	760.7	764.8	776.9	788.2	799.6	810.9	822.3	833.8	845.4	868.8	763.5	767.5	779.7	791.1	802.5	814.0	825.5	837.1	848.7	872.3	2.81	2.68	2.78	2.87	2.96	3.05	3.14	3.23	3.33	3.52
Total expenditures	1993.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	2000.5	2015.6	2051.1	2084.3	2117.9	2151.5	2185.3	2219.3	2253.6	2323.1										
Private consumption	911.0	914.7	934.0	951.2	968.8	986.4	1004.1	1021.9	1039.8	1075.9	917.7	920.8	940.4	957.8	975.6	993.4	1011.3	1029.3	1047.4	1084.0	6.71	6.13	6.40	6.59	6.79	7.00	7.20	7.42	7.63	8.07
Public consumption	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment	267.6	265.2	268.4	271.5	274.7	278.0	281.4	284.9	288.4	295.8	268.4	266.1	269.3	272.5	275.7	279.1	282.5	286.1	289.7	297.2	0.78	0.88	0.92	0.96	1.03	1.09	1.15	1.21	1.26	1.38
Public investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports of goods & NFS	743.3	756.3	767.4	778.5	789.4	800.3	811.1	821.9	832.8	854.7	742.9	756.0	767.1	778.3	789.2	800.2	811.0	821.9	832.8	854.9	-0.38	-0.32	-0.27	-0.22	-0.17	-0.12	-0.07	-0.02	0.03	0.14
Memorandum item:																														
Private disposable income	1019.3	1028.8	1049.5	1069.0	1088.8	1108.4	1128.2	1148.1	1168.1	1208.5	1026.5	1035.7	1056.6	1076.3	1096.2	1116.2	1136.2	1156.4	1176.6	1217.5	7.14	6.90	7.15	7.37	7.59	7.82	8.05	8.29	8.53	9.02
External Sector:																														
Current account	-73.0	-67.2	-70.9	-74.0	-77.3	-80.9	-84.7	-88.7	-92.9	-102.0	-72.9	-67.0	-70.7	-73.8	-77.2	-80.8	-84.6	-88.7	-93.0	-102.1	0.04	0.23	0.18	0.15	0.12	0.08	0.04	0.00	-0.04	-0.13
Exports of goods & NFS (excl. subsidies)	725.3	737.9	748.7	759.4	770.0	780.5	791.0	801.5	812.0	833.2	724.9	737.6	748.4	759.2	769.8	780.4	791.0	801.5	812.1	833.4	-0.36	-0.30	-0.26	-0.21	-0.17	-0.12	-0.07	-0.02	0.03	0.13
Imports of goods & NFS (excl. tariffs)	735.9	739.9	751.6	762.8	773.8	784.6	795.8	806.8	817.9	840.6	738.6	742.5	754.3	765.4	776.4	787.5	798.7	809.9	821.2	844.0	2.74	2.61	2.70	2.79	2.87	2.96	3.05	3.14	3.23	3.42
Factor services	-62.3	-65.3	-68.0	-70.6	-73.7	-76.8	-80.1	-83.5	-87.0	-94.8	-59.2	-62.1	-64.8	-67.6	-70.6	-73.7	-76.9	-80.3	-83.8	-91.5	3.13	3.13	3.14	3.15	3.16	3.16	3.18	3.17	3.17	3.16
Capital account	94.4	85.5	83.0	87.5	90.9	94.7	98.8	103.0	107.5	117.1	95.2	85.9	82.9	87.4	90.9	94.8	98.9	103.2	107.7	117.4	0.90	0.34	-0.11	-0.01	0.02	0.08	0.10	0.15	0.19	0.29
NFPS financing	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private financing	78.7	69.7	67.1	71.3	74.6	78.3	82.1	86.2	90.6	99.8	79.6	70.0	67.0	71.3	74.6	78.3	82.2	86.4	90.7	100.1	0.90	0.34	-0.11	-0.01	0.02	0.08	0.10	0.15	0.19	0.29
Change in net international reserves	21.4	18.3	12.1	13.5	13.6	13.9	14.1	14.3	14.6	15.1	22.3	18.9	12.2	13.6	13.7	14.0	14.2	14.5	14.7	15.3	0.94	0.57	0.08	0.14	0.14	0.14	0.14	0.15	0.15	0.16
Nonfinancial Public Sector:																														
Total revenue	435.7	433.0	435.2	436.5	437.7	438.8	439.7	440.6	441.4	442.7	437.9	435.2	437.5	438.8	440.1	441.2	442.2	443.1	443.9	445.3	2.18	2.21	2.28	2.33	2.38	2.43	2.48	2.52	2.57	2.65
Total expenditures	452.4	449.9	452.2	453.7	455.1	456.4	457.5	458.6	459.5	461.2	454.6	452.1	454.5	456.0	457.5	458.6	460.0	461.1	462.1	463.9	2.18	2.21	2.28	2.33	2.38	2.43	2.48	2.52	2.57	2.65
Consumption	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transfers to households	311.5	306.7	306.8	306.0	305.2	304.2	303.0	301.7	300.3	297.2	316.8	312.0	312.2	311.5	310.7	309.7	308.6	307.4	306.0	303.0	5.31	5.34	5.41	5.48	5.51	5.56	5.61	5.65	5.70	5.79
Domestic interest payments	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign interest payments	62.7	63.3	64.0	64.8	65.2	65.9	66.8	67.2	67.9	69.3	59.6	60.2	60.8	61.5	62.1	62.8	63.4	64.1	64.8	66.1	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13
Total financing	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net foreign financing	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, central bank	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central Bank:																														
Total assets	243.4	262.7	275.9	290.5	305.1	320.1	335.3	350.8	366.8	398.9	244.4	264.2	277.5	292.2	307.0	322.1	337.5	353.1	369.0	401.7	0.94	1.50	1.58	1.72	1.85	1.99	2.14	2.29	2.44	2.76
Net foreign assets	192.4	210.7	222.8	236.3	249.9	263.8	277.9	292.2	306.8	336.8	193.4	212.2	224.4	238.0	251.8	265.8	280.0	294.5	309.3	339.5	0.94	1.50	1.58	1.72	1.85	1.99	2.14	2.29	2.44	2.76
Net domestic assets	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to government	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other domestic assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total liabilities/reserve money	243.4	262.7	275.9	290.5	305.1	320.1	335.3	350.8	366.8	398.9	244.4	264.2	277.5	292.2	307.0	322.1	337.5	353.1	369.0	401.7	0.94	1.50	1.58	1.72	1.85	1.99	2.14	2.29	2.44	2.76
Currency in circulation	214.9	224.6	227.4	231.5	235.5	239.5	243.5	247.6	251.6	259.9	215.9	226.1	228.9	233.0	237.0	241.1	245.1	249.2	253.3	261.7	0.94	1.45	1.44	1.49	1.53	1.58	1.62	1.67	1.71	1.81
Reserve requirements	28.5	38.1	48.5	58.9	69.7	80.6	91.8	103.3	114.9	139.1	28.5	38.2	48.6	59.2	70.0	81.0	92.3	103.9	115.7	140.0	0.00	0.05	0.14	0.23	0.32	0.42	0.52	0.62	0.72	0.95
Memorandum items																														
Money demand (M1)	214.9	224.6	227.4	231.5	235.5	239.5	243.5	247.6	251.6	259.9	215.9	226.1	228.9	233.0	237.0	241.1	245.1	249.2	253.3	261.7	0.94	1.45	1.44	1.49	1.53	1.58	1.62	1.67	1.71	1.81
Gross foreign exchange reserves in months of imports	3.1	3.4	3.6	3.7	3.9	4.0	4.2	4.3	4.5	4.8	3.1	3.4	3.6	3.7	3.9	4.0	4.2	4.4	4.5	4.8	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Commercial Banks:																														
Total assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.6	1874.9	2096.8	2557.4	472.8	658.6	850.0	1046.3	1247.7	1454.5	1666.8	1884.6	2106.1	2572.2	0.85	1.86	2.97	4.15	5.41	6.75	8.17	9.69	11.29	14.77
Net foreign assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.6	1874.9	2096.8	2557.4	472.8	658.6	850.0	1046.3	1247.7	1454.5	1666.8	1884.6	2106.1	2572.2	0.85	1.86	2.97	4.15	5.41	6.75	8.17	9.69	11.29	14.77
Loans to government	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to firms	343.4	518.6	698.5	883.2	1072.7	1267.2	1466.8	1671.7	1881.9	2318.4	344.3	520.4	701.4	887.1	1077.8	1273.5	1474.5	1680.7	1892.4	2332.2	0.85	1.82	2.83	3.92	5.09	6.33	7.66	9.07	10.57	13.83
Other domestic assets	28.5	38.1	48.5	58.9	69.7	80.6	91.8	103.3	114.9	139.1	28.5	38.2	48.6	59.2	70.0	81.0	92.3	103.9	115.7	140.0	0.00	0.05	0.14	0.23	0.32	0.42	0.52	0.62	0.72	0.95
Total liabilities	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.6	1874.9	2096.8	2557.4	472.8	658.6	850.0	1046.3	1247.7	1454.5	1666.8	1884.6	2106.1	2572.2	0.85	1.86	2.97	4.15	5.41	6.75	8.17	9.69	11.29	14.77
Banks' foreign liabilities	187.1	275.5	362.4	452.7	545.7	641.6	740.4	842.3	947.3	1166.8	187.9	276.9	364.0	454.8	547.9	644.2	743.4	845.8	951.4	1172.1	0.89	1.39	1.59	1.88	2.21	2.59	3.02	3.51	4.05	5.32
Deposits	284.9	381.3	484.6	589.4	696.6	806.2	918.2	1032.6	1149.5	1390.6	284.8	381.7	486.0	591.7	699.9	810.4	923.4	1038.8	1156.7	1400.1	-0.04	0.47	1.38	2.27	3.20	4.16	5.15	6.18	7.24	9.46
Memorandum items:																														
Real GDP growth rate	0.9	1.7	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	0.9	1.7	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inflation rate (economy-wide)	6.5	-0.6	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	7.0	-0.7	0.6	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.48	-0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Deposit rate	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Borrowing rate	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	7.7	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	-0.24	-0.15	-0.11	-0.08	-0.07	-0.06	-0.05	-0.05	-0.04	-0.04
Risk premium	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Table 7

IMMPA: Structural, Poverty and Income Distribution Indicators

5 percent government foreign debt reduction with increased transfers to households

(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Production Structure																														
Size of informal sector (% of total output)	12.8	12.6	13.0	13.3	13.7	14.0	14.4	14.7	15.1	15.5	13.0	12.8	13.2	13.5	13.9	14.2	14.6	15.0	15.3	15.7	0.21	0.19	0.19	0.19	0.20	0.20	0.20	0.21	0.21	0.21
Size of agricultural sector (% of formal sector output)	50.7	51.5	52.1	52.8	53.1	53.6	54.0	54.3	54.6	54.9	50.7	51.5	52.1	52.8	53.1	53.5	53.9	54.3	54.6	54.8	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06
Composition of Employment and Wages																														
Employment in rural sector (% of total employment)	53.5	49.5	46.2	43.4	41.2	39.3	37.7	36.4	35.3	34.4	53.5	49.5	46.2	43.4	41.2	39.3	37.7	36.4	35.3	34.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Employment in rural non-traded sector (% of rural employment)	56.6	53.4	50.4	47.6	45.1	42.8	40.8	39.0	37.5	36.2	56.6	53.4	50.4	47.6	45.1	42.8	40.8	39.0	37.5	36.3	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02
Employment in informal sector (% of total employment)	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.1	47.0	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.1	47.0	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01
Employment in informal sector (% of urban employment)	59.7	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.4	71.7	59.7	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.4	71.7	0.01	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01
Employment in public sector (% of total employment)	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	7.2	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in public sector (% of urban employment)	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rural traded and rural non-traded sector wage differential	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban unskilled formal and informal sector wage differential	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public sector wages (% of total public expenditure)	24.6	25.0	25.3	25.7	26.1	26.5	26.9	27.3	27.8	28.2	24.6	25.0	25.3	25.7	26.1	26.5	26.9	27.3	27.7	28.2	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
Aggregate Demand																														
Private consumption (% of GDP)	73.8	73.5	73.7	73.8	73.9	74.0	74.1	74.2	74.3	74.4	74.2	73.8	74.0	74.1	74.2	74.3	74.4	74.5	74.6	74.6	0.28	0.25	0.29	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Private consumption (% of total consumption)	95.8	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.8	95.8	95.8	95.8	95.8	95.7	95.7	95.7	95.7	95.7	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Private investment (% of GDP)	21.7	21.3	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	21.7	21.3	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	-0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Private investment (% of total investment)	89.5	89.2	89.1	89.1	89.0	88.9	88.8	88.8	88.7	88.6	89.5	89.2	89.2	89.1	89.0	88.9	88.9	88.8	88.7	88.6	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.05
Fiscal Indicators																														
Public investment in infrastructure (% of total public investment)	32.7	32.0	31.4	30.8	30.2	29.6	29.0	28.4	27.9	27.3	32.7	32.0	31.4	30.8	30.2	29.6	29.0	28.4	27.9	27.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public investment in health (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public investment in education (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial Indicators																														
Currency (% of M2)	43.0	37.1	31.9	28.2	25.3	22.9	21.0	19.3	18.0	16.8	43.1	37.2	32.0	28.3	25.3	22.9	21.0	19.3	18.0	16.8	0.11	0.12	0.08	0.05	0.04	0.02	0.02	0.01	0.01	0.00
M2 (% of GDP)	40.5	48.7	58.2	63.7	71.1	78.5	85.8	93.0	100.1	107.2	40.5	48.7	58.2	63.8	71.2	78.8	85.9	93.2	100.4	107.5	-0.07	0.00	0.03	0.07	0.11	0.14	0.17	0.21	0.24	0.27
Bank credit to private sector (% of GDP)	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.6	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Lending - deposit rate differential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External Sector																														
Agricultural exports (% of total exports)	49.1	48.9	48.7	48.5	48.4	48.2	48.0	47.8	47.6	47.4	49.1	48.9	48.7	48.6	48.4	48.2	48.0	47.8	47.6	47.4	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.00	-0.01	-0.01
Imports of non-agricultural goods (% of total imports)	84.7	84.7	84.7	84.6	84.5	84.5	84.4	84.4	84.3	84.3	84.7	84.7	84.6	84.5	84.5	84.4	84.4	84.3	84.3	84.2	-0.05	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04
External debt (% of GDP)	128.4	128.5	127.4	126.6	125.7	124.9	124.0	123.3	122.5	121.8	121.8	121.8	120.9	120.1	119.3	118.5	117.8	117.1	116.4	115.8	-6.78	-6.69	-6.59	-6.49	-6.40	-6.31	-6.23	-6.14	-6.06	-5.98
Degree of openness (exports plus imports divided by GDP)	122.0	122.2	121.9	121.6	121.2	120.9	120.6	120.3	119.9	119.6	121.8	122.0	121.7	121.3	121.0	120.7	120.3	120.0	119.7	119.4	-0.23	-0.20	-0.21	-0.22	-0.22	-0.23	-0.23	-0.23	-0.24	-0.24

Poverty Indicators	Short-Run	Medium-Run	Long-Run								Short-Run	Medium-Run	Long-Run								Short-Run	Medium-Run	Long-Run							
Rural poverty line (consumption-based) in real terms	0.35	0.35	0.35								0.35	0.35	0.35								0.0000	0.0000	0.0000							
Rural poverty line (consumption-based) in nominal terms	0.37	0.39	0.39								0.37	0.38	0.39								0.0010	0.0014	0.0014							
Rural poverty line (income-based) in real terms	0.50	0.50	0.50								0.50	0.50	0.50								0.0000	0.0000	0.0000							
Rural poverty line (income-based) in nominal terms	0.37	0.38	0.39								0.37	0.38	0.39								0.0010	0.0014	0.0014							
Urban poverty line (consumption-based) in real terms	0.44	0.44	0.44								0.44	0.44	0.44								0.0000	0.0000	0.0000							
Urban poverty line (consumption-based) in nominal terms	0.47	0.49	0.51								0.48	0.49	0.51								0.0031	0.0041	0.0043							
Urban poverty line (income-based) in real terms	0.63	0.63	0.63								0.63	0.63	0.63								0.0000	0.0000	0.0000							
Urban poverty line (income-based) in nominal terms	0.68	0.70	0.73								0.68	0.71	0.73								0.0044	0.0058	0.0061							
Agricultural non-traded household (consumption-based) poverty headcount index	0.89	0.74	0.51								0.89	0.74	0.51								-0.0020	-0.0080	-0.0020							
Agricultural traded household (consumption-based) poverty headcount index	0.43	0.44	0.45								0.43	0.44	0.45								0.0000	0.0000	0.0000							
Urban informal household (consumption-based) poverty headcount index	0.87	0.94	0.88								0.86	0.94	0.97								-0.0031	-0.0062	-0.0031							
Urban formal unskilled household (consumption-based) poverty headcount index	0.20	0.21	0.22								0.20	0.21	0.23								0.0000	0.0000	0.0087							
Urban formal skilled household (consumption-based) poverty headcount index	0.00	0.00	0.00								0.00	0.00	0.00								0.0000	0.0000	0.0000							
Capitalists household poverty (consumption-based) headcount index	0.00	0.00	0.00								0.00	0.00	0.00								0.0000	0.0000	0.0000							
Agricultural non-traded household (consumption-based) poverty gap index	0.49	0.40	0.32								0.48	0.40	0.32								-0.0025	-0.0020	-0.0042							
Agricultural traded household (consumption-based) poverty gap index	0.28	0.29	0.30								0.28	0.29	0.30								-0.0005	-0.0008	-0.0005							
Urban informal household (consumption-based) poverty gap index	0.47	0.53	0.58								0.46	0.53	0.58								-0.0023	-0.0009	-0.0018							
Urban formal unskilled household (consumption-based) poverty gap index	0.24	0.25	0.28								0.24	0.25	0.28								0.0014	0.0018	-0.0057							
Urban formal skilled household (consumption-based) poverty gap index	0.00	0.00	0.00								0.00	0.00	0.00								0.0000	0.0000	0.0000							
Capitalists household (consumption-based) poverty gap index	0.00	0.00	0.00								0.00	0.00	0.00								0.0000	0.0000	0.0000							
Agricultural non-traded household (income-based) poverty headcount index	0.90	0.74	0.52								0.90	0.74	0.51								-0.0040	0.0000	-0.0080							
Agricultural traded household (income-based) poverty headcount index	0.50	0.51	0.53								0.49	0.50	0.53								-0.0030	-0.0030	0.0000							
Urban informal household (income-based) poverty headcount index	0.85	0.93	0.95								0.85	0.93	0.96								0.0000	-0.0031	0.0000							
Urban formal unskilled household (income-based) poverty headcount index	0.28	0.28	0.30								0.28	0.28	0.30								0.0000	0.0000	0.0000							
Urban formal skilled household (income-based) poverty headcount index	0.00	0.00	0.00								0.00	0.00	0.00								0.0000	0.0000	0.0000							
Capitalists household poverty (income-based) headcount index	0.00	0.00	0.00								0.00	0.00	0.00								0.0000	0.0000	0.0000							
Agricultural non-traded household (income-based) poverty gap index	0.49	0.41	0.33								0.49	0.40	0.32								-0.0013	-0.0051	-0.0016							
Agricultural traded household (income-based) poverty gap index	0.30	0.30	0.30								0.30	0.30	0.30								0.0015	0.0013	-0.0004							
Urban informal household (income-based) poverty gap index	0.48	0.52	0.58								0.45	0.51	0.57								-0.0038	-0.0028	-0.0037							
Urban formal unskilled household (income-based) poverty gap index	0.24	0.23	0.25								0.24	0.24	0.25								0.0015	0.0019	0.0021							
Urban formal skilled household (income-based) poverty gap index	0.00	0.00	0.00								0.00	0.00	0.00								0.0000	0.0000	0.0000							
Capitalists household (income-based) poverty gap index	0.00	0.00	0.00								0.00	0.00	0.00								0.0000	0.0000	0.0000							
Income Distribution Indicators	Short-Run	Medium-Run	Long-Run								Short-Run	Medium-Run	Long-Run								Short-Run	Medium-Run	Long-Run							
Gini coefficient (consumption-based)	0.60	0.60	0.59								0.60	0.60	0.59								-0.0009	-0.0013	-0.0013							
Gini coefficient (income-based)	0.63	0.62	0.62								0.63	0.62	0.62								-0.0009	-0.0012	-0.0011							
Theil index (consumption-based)	0.31	0.32	0.33								0.31	0.32	0.33								0.0010	0.0012	0.0012							
Theil index (income-based)	0.35	0.35	0.36								0.35	0.36	0.36								0.0008	0.0011	0.0011							

Table 8
IMMPA: Macroeconomic Indicators
5 percent government foreign debt reduction with increased infrastructure investment
(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Real Sector:																														
Total resources	1993.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	1998.1	2015.7	2052.6	2087.5	2122.6	2158.0	2193.5	2229.2	2265.2	2338.0	4.70	6.61	8.50	10.48	12.43	14.43	16.44	18.46	20.49	24.56
Gross domestic product	1232.7	1244.3	1267.1	1288.8	1310.6	1332.6	1354.7	1376.9	1399.3	1444.7	1233.9	1246.9	1271.0	1294.0	1317.2	1340.6	1364.0	1387.7	1411.5	1459.7	1.30	2.57	3.88	5.23	6.59	7.97	9.36	10.75	12.16	14.97
Imports of goods & NFS	760.7	764.8	776.9	788.2	799.6	810.9	822.3	833.8	845.4	868.8	764.1	768.8	781.6	793.4	805.4	817.4	829.4	841.5	853.7	878.3	3.41	4.04	4.62	5.23	5.84	6.45	7.08	7.70	8.33	9.60
Total expenditures	1993.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	1998.1	2015.7	2052.6	2087.5	2122.6	2158.0	2193.5	2229.2	2265.2	2338.0										
Private consumption	911.0	914.7	934.0	951.2	968.8	986.4	1004.1	1021.9	1039.8	1075.9	912.3	916.9	937.3	955.7	974.4	993.2	1012.0	1031.0	1050.1	1088.7	1.24	2.21	3.30	4.42	5.57	6.73	7.91	9.10	10.31	12.75
Public consumption	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment	267.6	265.2	268.4	271.5	274.7	278.0	281.4	284.9	288.4	295.5	268.3	268.0	269.2	272.3	275.4	278.7	282.1	285.6	289.2	296.6	0.67	0.80	0.76	0.78	0.75	0.75	0.76	0.77	0.78	0.85
Public investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	34.6	35.2	35.8	36.5	37.2	37.8	38.5	39.2	40.0	41.4	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13
Exports of goods & NFS	743.3	756.3	767.4	778.5	789.4	800.3	811.1	821.9	832.8	854.7	743.0	756.8	768.7	780.8	792.4	804.1	815.7	827.4	839.0	862.6	-0.34	0.48	1.31	2.15	2.98	3.81	4.63	5.45	6.25	7.84
Memorandum item:																														
Private disposable income	1019.3	1028.6	1049.5	1069.0	1088.6	1108.4	1128.2	1148.1	1168.1	1208.5	1020.6	1031.3	1053.2	1073.9	1094.9	1115.9	1137.0	1156.3	1179.6	1222.8	1.30	2.48	3.69	4.94	6.22	7.52	8.84	10.18	11.53	14.26
External Sector:																														
Current account	-73.0	-67.2	-70.9	-74.0	-77.3	-80.9	-84.7	-88.7	-92.9	-102.0	-73.5	-67.5	-71.0	-73.8	-76.9	-80.2	-83.6	-87.6	-91.6	-100.2	-0.47	-0.31	-0.05	0.19	0.43	0.67	0.90	1.13	1.36	1.81
Exports of goods & NFS (excl. subsidies)	725.3	737.9	748.7	759.4	770.0	780.5	791.0	801.5	812.0	833.2	724.9	738.4	750.0	761.5	773.0	784.3	795.6	806.9	818.2	841.0	-0.33	0.47	1.31	2.14	2.98	3.78	4.60	5.40	6.19	7.76
Imports of goods & NFS (excl. tariffs)	735.9	739.9	751.6	762.5	773.6	784.6	795.6	806.6	817.9	840.6	739.2	743.6	756.1	767.6	779.2	790.8	802.5	814.2	826.0	849.9	3.28	3.90	4.48	5.05	5.64	6.24	6.84	7.45	8.06	9.29
Factor services	-62.3	-65.3	-68.0	-70.8	-73.7	-76.6	-80.1	-83.5	-87.0	-94.6	-59.2	-62.2	-64.9	-67.7	-70.6	-73.7	-76.9	-80.3	-83.8	-91.3	3.13	3.11	3.10	3.10	3.11	3.12	3.15	3.19	3.23	3.35
Capital account	94.4	85.5	83.0	87.5	90.9	94.7	98.8	103.0	107.5	117.1	95.0	86.2	83.4	87.8	90.8	94.4	98.2	102.3	106.5	115.7	0.62	0.68	0.32	0.11	-0.11	-0.33	-0.55	-0.77	-0.98	-1.39
NFPS financing	15.7	15.8	16.0	16.1	16.3	16.5	16.6	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.6	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private financing	78.7	69.7	67.1	71.3	74.6	78.3	82.1	86.2	90.6	99.8	79.3	70.4	67.4	71.4	74.5	77.9	81.6	85.5	89.8	98.4	0.62	0.68	0.32	0.11	-0.11	-0.33	-0.55	-0.77	-0.96	-1.39
Change in net international reserves	21.4	18.3	12.1	13.5	13.8	13.9	14.1	14.3	14.6	15.1	21.5	18.7	12.4	13.8	13.9	14.2	14.4	14.7	15.0	15.5	0.14	0.37	0.27	0.29	0.31	0.33	0.35	0.37	0.39	0.42
Nonfinancial Public Sector:																														
Total revenue	435.7	433.0	435.2	436.5	437.7	438.8	439.7	440.6	441.4	442.7	436.6	434.3	436.8	438.5	440.1	441.6	442.9	444.1	445.3	447.3	0.83	1.28	1.65	2.04	2.42	2.79	3.17	3.54	3.90	4.63
Total expenditures	452.4	449.9	452.2	453.7	455.1	456.4	457.5	458.6	459.5	461.2	453.2	451.1	453.9	455.7	457.5	459.2	460.7	462.1	463.4	465.8	0.83	1.28	1.65	2.04	2.42	2.79	3.17	3.54	3.90	4.63
Consumption	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.6	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	34.6	35.2	35.8	36.5	37.2	37.8	38.5	39.2	40.0	41.4	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13
Transfers to households	311.5	306.7	308.8	308.0	305.2	304.2	303.0	301.7	300.3	297.2	312.3	307.9	308.4	308.1	307.6	307.0	306.2	305.3	304.2	301.6	0.83	1.28	1.65	2.03	2.41	2.79	3.17	3.54	3.90	4.63
Domestic interest payments	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign interest payments	62.7	63.3	64.0	64.8	65.2	65.9	66.6	67.2	67.9	69.3	59.6	60.2	60.8	61.5	62.1	62.8	63.4	64.1	64.8	66.1	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13
Total financing	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net foreign financing	15.7	15.8	16.0	16.1	16.3	16.5	16.6	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.6	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, central bank	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central Bank:																														
Total assets	243.4	262.7	275.9	290.5	305.1	320.1	335.3	350.8	366.6	398.9	243.6	263.3	276.7	291.5	306.5	321.8	337.4	353.3	369.4	402.6	0.14	0.51	0.78	1.08	1.39	1.72	2.07	2.44	2.83	3.66
Net foreign assets	192.4	210.7	222.8	236.3	249.9	263.8	277.9	292.2	306.8	336.5	192.6	211.2	223.6	237.4	251.3	265.5	280.0	294.7	309.7	340.4	0.14	0.51	0.78	1.08	1.39	1.72	2.07	2.44	2.83	3.66
Net domestic assets	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to government	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other domestic assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total liabilities/reserve money	243.4	262.7	275.9	290.5	305.1	320.1	335.3	350.8	366.6	398.9	243.6	263.3	276.7	291.5	306.5	321.8	337.4	353.3	369.4	402.6	0.14	0.51	0.78	1.08	1.39	1.72	2.07	2.44	2.83	3.66
Currency in circulation	214.9	224.8	227.4	231.5	235.5	239.5	243.5	247.6	251.6	259.9	215.1	225.1	228.2	232.5	236.8	241.0	245.3	249.6	254.0	262.8	0.15	0.51	0.78	1.02	1.28	1.55	1.82	2.09	2.37	2.93
Reserve requirements	28.5	38.1	48.5	58.9	69.7	80.6	91.8	103.3	114.9	139.1	28.5	38.1	48.5	58.0	69.8	80.8	92.1	103.6	115.4	139.8	0.00	0.00	0.02	0.06	0.11	0.17	0.25	0.35	0.46	0.72
Memorandum items																														
Money demand (M1)	214.9	224.8	227.4	231.5	235.5	239.5	243.5	247.6	251.6	259.9	215.1	225.1	228.2	232.5	236.8	241.0	245.3	249.6	254.0	262.8	0.15	0.51	0.78	1.02	1.28	1.55	1.82	2.09	2.37	2.93
Gross foreign exchange reserves in months of imports	3.1	3.4	3.6	3.7	3.9	4.0	4.2	4.3	4.5	4.8	3.1	3.4	3.5	3.7	3.9	4.0	4.2	4.3	4.5	4.8	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.00	0.00	0.00
Commercial Banks:																														
Total assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.8	1874.9	2096.8	2557.4	472.5	658.0	848.9	1044.6	1245.4	1451.4	1662.7	1879.5	2101.9	2563.5	0.60	1.29	1.92	2.51	3.07	3.60	4.10	4.60	5.09	6.06
Net foreign assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.8	1874.9	2096.8	2557.4	472.5	658.0	848.9	1044.6	1245.4	1451.4	1662.7	1879.5	2101.9	2563.5	0.60	1.29	1.92	2.51	3.07	3.60	4.10	4.60	5.09	6.06
Loans to government	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to firms	343.4	518.8	688.5	883.2	1072.7	1267.2	1468.8	1671.7	1881.9	2318.4	344.0	519.9	700.4	885.6	1075.8	1270.8	1470.7	1675.9	1886.5	2323.7	0.60	1.29	1.90	2.45	2.96	3.42	3.85	4.25	4.63	5.34
Other domestic assets	28.5	38.1	48.5	58.9	69.7	80.6	91.8	103.3	114.9	139.1	28.5	38.1	48.5	59.0	69.8	80.8	92.1	103.6	115.4	139.8	0.00	0.00	0.02	0.06	0.11	0.17	0.25	0.35	0.46	0.72
Total liabilities	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.8	1874.9	2096.8	2557.4	472.5	658.0	848.9	1044.6	1245.4	1451.4	1662.7	1879.5	2101.9	2563.5	0.60	1.29	1.92	2.51	3.07	3.60	4.10	4.60	5.09	6.06
Banks' foreign liabilities	187.1	275.5	362.4	452.7	545.7	641.6	740.4	842.3	947.3	1166.8	187.7	276.8	364.1	454.8	547.7	643.4	742.0	843.5	947.9	1165.6	0.61	1.30	1.70	1.92	1.98	1.86	1.57	1.12	0.51	-1.17
Deposits	284.9	381.3	484.6	589.4	696.6	806.2	918.2	1032.6	1149.5	1390.6	284.8	381.2	484.8	590.0	697.7	808.0	920.7	1036.1	1154.0	1397.9	-0.01	-0.01	0.22	0.59	1.09	1.74	2.53	3.47	4.57	7.23
Memorandum Items:																														
Real GDP growth rate	0.9	1.7	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	0.9	1.8	1.8	1.8	1.5	1.5	1.5	1.4	1.4	1.4	0.00	0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.08	0.08
Inflation rate (economy-wide)	6.5	-0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	6.7	-0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.12	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.04	0.04
Deposit rate	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Borrowing rate	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	7.7	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	-0.24	-0.15	-0.11	-0.08	-0.07	-0.06	-0.05	-0.05	-0.04	-0.04
Risk premium	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Table 9

IMMPA: Structural, Poverty and Income Distribution Indicators

5 percent government foreign debt reduction with increased infrastructure investment

(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Production Structure																														
Size of informal sector (% of total output)	12.8	12.8	13.0	13.3	13.7	14.0	14.4	14.7	15.1	15.5	12.9	12.9	13.0	13.4	13.7	14.1	14.5	14.9	15.3	15.7	0.02	0.04	0.06	0.08	0.09	0.11	0.12	0.14	0.15	0.17
Size of agricultural sector (% of formal sector output)	50.7	51.5	52.1	52.8	53.1	53.8	54.0	54.3	54.8	54.9	50.8	51.5	52.2	52.8	53.4	53.9	54.4	54.8	55.1	55.5	-0.06	0.00	0.08	0.16	0.23	0.31	0.38	0.45	0.52	0.59
Composition of Employment and Wages																														
Employment in rural sector (% of total employment)	53.5	49.5	46.2	43.4	41.2	39.3	37.7	36.4	35.3	34.4	53.5	49.5	46.2	43.4	41.2	39.3	37.7	36.4	35.3	34.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Employment in rural non-traded sector (% of rural employment)	56.8	53.4	50.4	47.8	45.1	42.8	40.8	39.0	37.5	36.2	56.8	53.3	50.2	47.3	44.6	42.3	40.1	38.3	36.8	35.3	0.00	-0.09	-0.19	-0.30	-0.41	-0.52	-0.64	-0.75	-0.87	-0.97
Employment in informal sector (% of total employment)	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.1	47.0	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.1	47.0	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02	-0.02
Employment in informal sector (% of urban employment)	59.7	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.4	71.7	59.7	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.3	71.7	0.00	0.00	-0.01	-0.01	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03
Employment in public sector (% of total employment)	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in public sector (% of urban employment)	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rural traded and rural non-traded sector wage differential	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01
Urban unskilled formal and informal sector wage differential	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public sector wages (% of total public expenditure)	24.6	25.0	25.3	25.7	26.1	26.5	26.9	27.3	27.6	28.2	24.6	24.9	25.3	25.6	26.0	26.4	26.8	27.2	27.6	28.0	-0.02	-0.04	-0.06	-0.07	-0.09	-0.11	-0.12	-0.14	-0.15	-0.16
Aggregate Demand																														
Private consumption (% of GDP)	73.9	73.5	73.7	73.9	73.9	74.0	74.1	74.2	74.3	74.4	73.9	73.5	73.7	73.9	74.0	74.1	74.2	74.3	74.4	74.5	0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
Private consumption (% of total consumption)	95.8	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.8	95.7	95.8	95.8	95.7	95.7	95.7	95.7	95.7	95.7	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.04
Private investment (% of GDP)	21.7	21.3	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	21.7	21.3	21.2	21.0	21.0	20.9	20.8	20.7	20.6	20.5	0.03	0.02	0.00	-0.03	-0.05	-0.07	-0.09	-0.10	-0.12	-0.14
Private investment (% of total investment)	89.5	89.2	89.1	89.1	89.0	88.9	88.8	88.8	88.7	88.6	88.6	88.3	88.3	88.2	88.1	88.0	88.0	87.9	87.9	87.8	-0.90	-0.90	-0.89	-0.83	-0.87	-0.85	-0.84	-0.83	-0.82	-0.80
Fiscal Indicators																														
Public investment in infrastructure (% of total public investment)	32.7	32.0	31.4	30.8	30.2	29.6	29.0	28.4	27.9	27.3	29.7	29.2	28.7	28.2	27.6	27.1	26.7	26.2	25.7	25.2	-2.98	-2.85	-2.75	-2.64	-2.55	-2.45	-2.36	-2.27	-2.19	-2.10
Public investment in health (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	30.3	30.4	30.4	30.5	30.5	30.6	30.6	30.7	30.7	30.8	-3.02	-2.97	-2.91	-2.86	-2.81	-2.79	-2.71	-2.66	-2.61	-2.57
Public investment in education (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	30.3	30.4	30.4	30.5	30.5	30.6	30.6	30.7	30.7	30.8	-3.02	-2.97	-2.91	-2.86	-2.81	-2.78	-2.71	-2.66	-2.61	-2.57
Financial Indicators																														
Currency (% of M2)	43.0	37.1	31.9	28.2	25.3	22.9	21.0	19.3	18.0	16.8	43.0	37.1	32.0	28.3	25.3	23.0	21.0	19.4	18.0	16.9	0.02	0.05	0.08	0.07	0.07	0.08	0.08	0.08	0.08	0.08
M2 (% of GDP)	40.5	48.7	58.2	63.7	71.1	78.5	85.8	93.0	100.1	107.2	40.5	48.8	58.1	63.6	70.9	78.2	85.5	92.7	99.8	106.8	-0.03	-0.06	-0.09	-0.13	-0.15	-0.22	-0.27	-0.32	-0.37	-0.42
Bank credit to private sector (% of GDP)	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.6	0.3	0.4	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01
Lending - deposit rate differential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External Sector																														
Agricultural exports (% of total exports)	49.1	48.8	48.7	48.6	48.4	48.2	48.0	47.8	47.6	47.4	48.1	48.0	48.0	48.0	48.0	48.0	48.2	48.1	47.9	47.7	0.02	0.06	0.09	0.11	0.14	0.17	0.19	0.22	0.24	0.26
Imports of non-agricultural goods (% of total imports)	84.7	84.7	84.7	84.6	84.5	84.5	84.4	84.4	84.3	84.3	84.8	84.8	84.7	84.6	84.6	84.5	84.4	84.4	84.3	84.3	0.05	0.05	0.04	0.03	0.02	0.01	0.01	0.00	-0.01	-0.01
External debt (% of GDP)	128.4	128.5	127.4	126.6	125.7	124.9	124.0	123.3	122.5	121.8	121.9	122.0	120.9	120.0	119.1	118.3	117.5	116.7	115.9	115.2	-6.48	-6.56	-6.55	-6.56	-6.57	-6.58	-6.59	-6.60	-6.60	-6.61
Degree of openness (exports plus imports divided by GDP)	122.0	122.2	121.9	121.6	121.2	120.9	120.6	120.3	119.9	119.6	122.1	122.4	122.0	121.6	121.3	121.0	120.6	120.3	119.9	119.6	0.12	0.11	0.09	0.06	0.06	0.05	0.03	0.02	0.00	-0.01

	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run
Poverty Indicators									
Rural poverty line (consumption-based) in real terms	0.35	0.35	0.35	0.35	0.35	0.35	0.0000	0.0000	0.0000
Rural poverty line (consumption-based) in nominal terms	0.37	0.38	0.39	0.37	0.38	0.39	0.0002	0.0003	0.0005
Rural poverty line (income-based) in real terms	0.50	0.50	0.50	0.50	0.50	0.50	0.0000	0.0000	0.0000
Rural poverty line (income-based) in nominal terms	0.37	0.38	0.39	0.37	0.38	0.39	0.0002	0.0003	0.0005
Urban poverty line (consumption-based) in real terms	0.44	0.44	0.44	0.44	0.44	0.44	0.0000	0.0000	0.0000
Urban poverty line (consumption-based) in nominal terms	0.47	0.49	0.51	0.47	0.49	0.51	0.0008	0.0014	0.0026
Urban poverty line (income-based) in real terms	0.83	0.83	0.83	0.83	0.83	0.83	0.0000	0.0000	0.0000
Urban poverty line (income-based) in nominal terms	0.68	0.70	0.73	0.68	0.70	0.73	0.0008	0.0020	0.0036
Agricultural non-traded household (consumption-based) poverty headcount index	0.89	0.74	0.51	0.89	0.74	0.50	0.0000	-0.0040	-0.0080
Agricultural traded household (consumption-based) poverty headcount index	0.43	0.44	0.45	0.43	0.44	0.45	0.0000	0.0000	0.0000
Urban informal household (consumption-based) poverty headcount index	0.87	0.94	0.98	0.87	0.94	0.98	0.0000	0.0000	0.0000
Urban formal unskilled household (consumption-based) poverty headcount index	0.20	0.21	0.22	0.20	0.21	0.23	0.0000	0.0000	0.0067
Urban formal skilled household (consumption-based) poverty headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalista household poverty (consumption-based) headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (consumption-based) poverty gap index	0.49	0.40	0.32	0.48	0.40	0.31	-0.0004	-0.0022	-0.0084
Agricultural traded household (consumption-based) poverty gap index	0.29	0.29	0.30	0.29	0.29	0.30	0.0002	0.0004	0.0011
Urban informal household (consumption-based) poverty gap index	0.47	0.53	0.58	0.47	0.53	0.58	-0.0005	-0.0018	-0.0027
Urban formal unskilled household (consumption-based) poverty gap index	0.24	0.25	0.26	0.24	0.25	0.26	0.0001	0.0002	-0.0083
Urban formal skilled household (consumption-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalista household (consumption-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (income-based) poverty headcount index	0.90	0.74	0.52	0.90	0.74	0.50	0.0000	0.0000	-0.0180
Agricultural traded household (income-based) poverty headcount index	0.50	0.51	0.53	0.50	0.51	0.53	0.0000	0.0000	0.0000
Urban informal household (income-based) poverty headcount index	0.85	0.93	0.98	0.85	0.93	0.98	0.0000	0.0000	0.0000
Urban formal unskilled household (income-based) poverty headcount index	0.28	0.28	0.30	0.28	0.28	0.30	0.0000	0.0000	0.0000
Urban formal skilled household (income-based) poverty headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalista household poverty (income-based) headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (income-based) poverty gap index	0.49	0.41	0.33	0.49	0.40	0.32	-0.0004	-0.0043	-0.0041
Agricultural traded household (income-based) poverty gap index	0.30	0.30	0.30	0.30	0.30	0.30	0.0002	0.0004	0.0011
Urban informal household (income-based) poverty gap index	0.48	0.52	0.58	0.48	0.52	0.57	-0.0004	-0.0018	-0.0027
Urban formal unskilled household (income-based) poverty gap index	0.24	0.23	0.25	0.24	0.23	0.25	0.0001	0.0002	0.0009
Urban formal skilled household (income-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalista household (income-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Income Distribution Indicators	**Short-Run**	**Medium-Run**	**Long-Run**	**Short-Run**	**Medium-Run**	**Long-Run**	**Short-Run**	**Medium-Run**	**Long-Run**
Gini coefficient (consumption-based)	0.60	0.60	0.59	0.60	0.60	0.59	-0.0001	-0.0002	-0.0004
Gini coefficient (income-based)	0.63	0.62	0.62	0.63	0.62	0.62	-0.0001	-0.0002	-0.0003
Theil Index (consumption-based)	0.31	0.32	0.33	0.31	0.32	0.33	0.0004	0.0018	0.0044
Theil Index (income-based)	0.35	0.36	0.36	0.35	0.36	0.37	0.0003	0.0020	0.0046

Table 10
IMMPA: Macroeconomic Indicators
5 percent government foreign debt reduction with increased education investment
(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Real Sector:																														
Total resources	1993.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	1998.1	2013.8	2049.0	2082.2	2115.7	2149.2	2183.0	2217.0	2251.2	2320.5	4.70	4.69	4.96	5.20	5.45	5.71	5.97	6.24	6.51	7.07
Gross domestic product	1232.7	1244.3	1267.1	1288.8	1310.6	1332.6	1354.7	1376.9	1399.3	1444.7	1233.9	1245.6	1268.6	1290.4	1312.4	1334.6	1356.8	1379.2	1401.8	1447.5	1.30	1.30	1.47	1.63	1.80	1.97	2.15	2.32	2.51	2.88
Imports of goods & NFS	760.7	764.8	776.9	788.2	799.6	810.9	822.3	833.8	845.4	868.8	764.1	768.2	780.4	791.8	803.2	814.7	826.2	837.7	849.4	872.9	3.41	3.39	3.48	3.57	3.65	3.74	3.82	3.91	4.00	4.19
Total expenditures	1993.3	2009.1	2044.1	2077.0	2110.2	2143.5	2177.0	2210.7	2244.7	2313.5	1998.1	2013.8	2049.0	2082.2	2115.7	2149.2	2183.0	2217.0	2251.2	2320.5										
Private consumption	911.0	914.7	934.0	951.2	968.8	986.4	1004.1	1021.9	1039.8	1075.9	912.3	915.8	935.3	952.7	970.4	988.1	1006.0	1023.9	1041.9	1078.3	1.24	1.15	1.30	1.42	1.55	1.69	1.82	1.96	2.11	2.40
Public consumption	40.0	40.8	41.8	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.8	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment	267.6	265.2	268.4	271.5	274.7	278.0	281.4	284.9	288.4	295.6	268.3	265.9	269.2	272.3	275.6	278.9	282.4	285.9	289.6	297.1	0.67	0.69	0.75	0.81	0.88	0.94	1.00	1.07	1.13	1.25
Public investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	34.8	35.2	35.8	36.5	37.2	37.8	38.5	39.2	40.0	41.4	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13
Exports of goods & NFS	743.3	756.3	767.4	778.5	788.4	800.3	811.1	821.9	832.6	854.7	743.0	756.1	767.2	778.3	789.3	800.2	811.1	822.0	832.9	855.0	-0.34	-0.28	-0.22	-0.17	-0.11	-0.05	0.01	0.07	0.14	0.27
Memorandum item:																														
Private disposable income	1019.3	1028.8	1049.5	1069.0	1088.8	1108.4	1128.2	1148.1	1168.1	1208.5	1020.6	1030.1	1050.9	1070.5	1090.4	1110.3	1130.2	1150.3	1170.5	1211.2	1.30	1.29	1.45	1.59	1.73	1.88	2.04	2.20	2.36	2.69
External Sector:																														
Current account	-73.0	-67.2	-70.9	-74.0	-77.3	-80.9	-84.7	-88.7	-92.9	-102.0	-73.5	-67.8	-71.4	-74.5	-77.9	-81.5	-85.4	-89.4	-93.7	-102.9	-0.47	-0.42	-0.47	-0.52	-0.57	-0.61	-0.67	-0.72	-0.77	-0.89
Exports of goods & NFS (excl. subsidies)	725.3	737.9	748.7	759.4	770.0	780.5	791.0	801.5	812.0	833.2	724.9	737.6	748.4	759.2	769.9	780.5	791.0	801.6	812.2	833.5	-0.33	-0.26	-0.21	-0.16	-0.11	-0.05	0.01	0.07	0.13	0.25
Imports of goods & NFS (excl. tariffs)	735.9	739.9	751.6	762.8	773.8	784.6	795.6	806.8	817.9	840.6	739.2	743.1	755.0	766.0	777.1	788.2	799.3	810.5	821.8	844.6	3.26	3.27	3.35	3.43	3.52	3.60	3.68	3.77	3.86	4.04
Factor services	-62.3	-63.3	-68.0	-70.8	-73.7	-76.8	-80.1	-83.5	-87.0	-94.6	-59.2	-62.2	-64.9	-67.7	-70.7	-73.8	-77.1	-80.5	-84.1	-91.7	3.13	3.11	3.10	3.08	3.06	3.03	3.01	2.98	2.95	2.89
Capital account	94.4	85.5	83.0	87.5	90.9	94.7	98.6	103.0	107.5	117.1	95.0	86.1	83.5	88.0	91.5	95.4	99.5	103.9	108.4	118.0	0.62	0.58	0.50	0.56	0.61	0.67	0.72	0.77	0.83	0.95
NFPS financing	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central bank financing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private financing	78.7	69.7	67.1	71.3	74.6	78.3	82.1	86.2	90.6	99.8	79.3	70.2	67.6	71.9	75.2	78.9	82.9	87.0	91.4	100.7	0.62	0.58	0.50	0.56	0.61	0.67	0.72	0.77	0.83	0.95
Change in net international reserves	21.4	18.3	12.1	13.5	13.8	13.9	14.1	14.3	14.6	15.1	21.5	18.4	12.1	13.5	13.8	13.9	14.2	14.4	14.7	15.2	0.14	0.14	0.03	0.05	0.05	0.06	0.05	0.06	0.06	0.06
Nonfinancial Public Sector:																														
Total revenue	435.7	433.0	435.2	436.5	437.7	438.8	439.7	440.6	441.4	443.7	436.6	433.9	436.1	437.5	438.6	439.8	441.0	441.9	442.7	444.2	0.83	0.86	0.83	1.00	1.07	1.14	1.21	1.28	1.35	1.47
Total expenditures	452.4	449.8	452.2	453.7	455.1	456.4	457.5	458.6	459.5	461.2	453.2	450.7	453.1	454.7	456.2	457.5	458.7	459.8	460.9	462.7	0.83	0.85	0.83	1.00	1.07	1.14	1.21	1.28	1.35	1.47
Consumption	40.0	40.8	41.8	42.4	43.3	44.1	45.0	45.9	46.8	48.7	40.0	40.8	41.8	42.4	43.3	44.1	45.0	45.9	46.8	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investment	31.4	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.8	38.3	34.6	35.2	35.8	36.5	37.2	37.8	38.5	39.2	40.0	41.4	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13
Transfers to households	311.5	306.7	308.8	308.0	305.2	304.2	303.0	301.7	300.3	297.2	312.3	307.5	307.7	307.0	306.3	305.3	304.2	303.0	301.7	298.7	0.83	0.85	0.83	1.00	1.07	1.14	1.21	1.28	1.34	1.47
Domestic interest payments	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign interest payments	62.7	63.3	64.0	64.6	65.2	65.9	66.6	67.2	67.9	69.3	59.6	60.2	60.8	61.5	62.1	62.8	63.4	64.1	64.8	66.1	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13	-3.13
Total financing	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	16.7	16.9	17.0	17.2	17.4	17.6	17.8	18.0	18.1	18.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net foreign financing	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	15.7	15.8	16.0	16.1	16.3	16.5	16.8	16.8	17.0	17.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, central bank	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic credit, commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central Bank:																														
Total assets	343.4	282.7	275.9	290.5	305.1	320.1	335.3	350.8	366.6	398.8	343.6	283.0	276.2	290.8	305.5	320.6	335.8	351.4	367.2	399.7	0.14	0.28	0.31	0.36	0.41	0.46	0.51	0.58	0.62	0.75
Net foreign assets	192.4	210.7	222.8	236.3	249.9	263.8	277.9	292.2	306.8	336.8	192.6	211.0	223.2	236.7	250.3	264.2	278.4	292.8	307.4	337.5	0.14	0.28	0.31	0.36	0.41	0.46	0.51	0.58	0.62	0.75
Net domestic assets	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to government	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	51.0	52.0	53.1	54.1	55.2	56.3	57.4	58.6	59.8	62.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to commercial banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other domestic assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total liabilities=reserve money	343.4	282.7	275.9	290.5	305.1	320.1	335.3	350.8	366.6	398.8	343.6	283.0	276.2	290.8	305.5	320.6	335.8	351.4	367.2	399.7	0.14	0.28	0.31	0.36	0.41	0.46	0.51	0.58	0.62	0.75
Currency in circulation	214.9	224.8	227.4	231.5	235.6	239.5	243.5	247.6	251.6	259.8	215.1	224.9	227.7	231.8	235.8	239.9	243.9	248.0	252.1	260.4	0.15	0.28	0.29	0.32	0.35	0.39	0.42	0.45	0.48	0.55
Reserve requirements	28.5	38.1	48.5	58.9	69.7	80.6	91.8	103.3	114.9	139.1	28.5	38.1	48.5	59.0	69.7	80.7	91.9	103.4	115.1	139.3	0.00	0.00	0.02	0.04	0.05	0.07	0.09	0 12	0.14	0.20
Memorandum items:																														
Money demand (M1)	214.9	224.8	227.4	231.5	235.6	239.5	243.5	247.6	251.6	259.8	215.1	224.9	227.7	231.8	235.8	239.9	243.9	248.0	252.1	260.4	0 15	0.28	0.29	0.32	0.35	0.39	0.42	0.45	0.48	0.55
Gross foreign exchange reserves in months of imports	3.1	3.4	3.6	3.7	3.9	4.0	4.2	4.3	4.5	4.8	3.1	3.4	3.5	3.7	3.9	4.0	4.2	4.3	4.5	4.8	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Commercial Banks:																														
Total assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.6	1874.9	2096.8	2557.4	472.5	658.0	848.9	1044.8	1245.9	1452.3	1664.1	1881.5	2104.5	2567.8	0.60	1.23	1.93	2.71	3.58	4.48	5.49	6.57	7.74	10.33
Net foreign assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net domestic assets	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.6	1874.9	2096.8	2557.4	472.5	658.0	848.9	1044.8	1245.9	1452.3	1664.1	1881.5	2104.5	2567.8	0 60	1.23	1.93	2.71	3.58	4.48	5.49	6.57	7.74	10.33
Loans to government	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loans to firms	343.4	518.8	698.5	883.2	1072.7	1267.2	1466.8	1671.7	1881.9	2318.4	344.0	518.8	700.5	885.9	1076.2	1271.8	1472.2	1678.1	1889.4	2328.5	0.60	1.22	1.91	2.67	3.51	4.41	5.39	6.45	7.59	10.13
Other domestic assets	28.5	38.1	48.5	58.9	69.7	80.6	91.8	103.3	114.9	139.1	28.5	38.1	48.5	59.0	69.7	80.7	91.9	103.4	115.1	139.3	0.00	0.00	0.02	0.04	0.05	0.07	0.09	0.12	0.14	0.20
Total liabilities	471.9	656.7	847.0	1042.1	1242.3	1447.8	1658.6	1874.9	2096.8	2557.4	472.5	658.0	848.9	1044.8	1245.9	1452.3	1664.1	1881.5	2104 5	2567.8	0.60	1.23	1.93	2.71	3.58	4.48	5.49	6.57	7.74	10.33
Banks' foreign liabilities	187.1	276.5	362.4	452.7	545.7	641.6	740.4	842.3	947.3	1166.6	187.7	278.7	364.1	456 1	548.7	645.3	745.0	847 7	953.7	1175.1	0.61	1.19	1.74	2.38	3.03	3 78	4.55	5.40	6.32	8.34
Deposits	284.9	381.3	484.8	589.4	696.6	806.2	918.2	1032.6	1149.5	1390.8	284.8	381.3	484.8	589.8	697.2	807.0	919.1	1033.8	1150.9	1392.6	-0.01	0.04	0.19	0.35	0.53	0.72	0.94	1.17	1.42	1.98
Memorandum Items:																														
Real GDP growth rate	0.9	1.7	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	0.9	1.7	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inflation rate (economy-wide)	6.8	-0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	6.7	-0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.12	-0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Deposit rate	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Borrowing rate	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	7.7	6.8	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.6	7.7	-0.34	-0.15	-0.11	-0.08	-0.07	-0.06	-0.05	-0.05	-0.04	-0.04
Risk premium	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	1.10	1.13	1.14	1.16	1.17	1.18	1.19	1.19	1.20	1.21	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0 0001	0.0001	0.0001

Table 11

IMMPA: Structural, Poverty and Income Distribution Indicators

5 percent government foreign debt reduction with increased education investment

(Absolute deviations from baseline, unless otherwise indicated)

	Base Values										Current Values										Difference Between Current and Base Values									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Production Structure																														
Size of informal sector (% of total output)	12.8	12.6	13.0	13.3	13.7	14.0	14.4	14.7	15.1	15.5	11.8	12.7	13.0	13.3	13.6	14.0	14.4	14.7	15.1	15.5	-1.00	0.11	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Size of agricultural sector (% of formal sector output)	50.7	51.5	52.1	52.6	53.1	53.6	54.0	54.3	54.6	54.9	50.6	51.5	52.1	52.6	53.1	53.6	54.0	54.3	54.6	54.9	-0.06	0.03	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Composition of Employment and Wages																														
Employment in rural sector (% of total employment)	53.5	49.5	46.2	43.4	41.2	39.3	37.7	36.4	35.3	34.4	53.5	49.5	46.2	43.4	41.2	39.3	37.7	36.4	35.3	34.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in rural non-traded sector (% of rural employment)	56.8	53.4	50.4	47.8	45.1	42.8	40.8	39.0	37.5	36.2	56.8	53.4	50.4	47.8	45.0	42.8	40.8	39.0	37.5	36.2	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Employment in informal sector (% of total employment)	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.1	47.0	27.8	31.9	35.2	38.0	40.3	42.2	43.8	45.1	46.2	47.0	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in informal sector (% of urban employment)	59.7	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.4	71.7	59.7	63.1	65.4	67.2	68.5	69.5	70.3	70.9	71.4	71.7	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in public sector (% of total employment)	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Employment in public sector (% of urban employment)	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	15.2	14.0	13.1	12.5	12.1	11.7	11.5	11.3	11.2	11.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rural traded and rural non-traded sector wage differential	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban unskilled formal and informal sector wage differential	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public sector wages (% of total public expenditure)	24.6	25.0	25.3	25.7	26.1	26.5	26.9	27.3	27.6	28.2	25.2	25.0	25.3	25.7	26.1	26.5	26.9	27.3	27.6	28.2	0.59	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aggregate Demand																														
Private consumption (% of GDP)	73.9	73.5	73.7	73.8	73.9	74.0	74.1	74.2	74.3	74.4	72.5	73.7	73.7	73.8	73.8	74.0	74.1	74.2	74.3	74.4	-1.38	0.14	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Private consumption (% of total consumption)	95.8	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	95.7	-0.14	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment (% of GDP)	21.7	21.3	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	21.8	21.2	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	0.23	-0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private investment (% of total investment)	89.5	89.2	89.1	89.1	89.0	88.9	88.8	88.8	88.7	88.6	89.4	89.2	89.1	89.1	89.0	88.9	88.8	88.8	88.7	88.6	-0.05	-0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fiscal Indicators																														
Public investment in infrastructure (% of total public investment)	32.7	32.0	31.4	30.8	30.2	29.6	29.0	28.4	27.9	27.3	32.7	32.0	31.4	30.8	30.2	29.6	29.0	28.4	27.9	27.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public investment in health (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public investment in education (% of total public investment)	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial Indicators																														
Currency (% of M2)	43.0	37.1	31.9	28.2	25.3	22.9	21.0	19.3	18.0	16.8	42.5	37.0	32.1	28.3	25.4	23.0	21.0	19.4	18.0	16.8	-0.52	-0.08	0.21	0.14	0.11	0.09	0.07	0.06	0.05	0.05
M2 (% of GDP)	40.5	48.7	58.2	63.7	71.1	78.5	85.8	93.0	100.1	107.2	40.8	48.3	58.9	63.4	70.8	78.2	85.5	92.7	99.9	106.9	0.28	-0.42	-0.30	-0.30	-0.30	-0.29	-0.29	-0.28	-0.28	-0.27
Bank credit to private sector (% of GDP)	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.5	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lending - deposit rate differential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External Sector																														
Agricultural exports (% of total exports)	49.1	48.9	48.7	48.5	48.4	48.2	48.0	47.8	47.6	47.4	49.0	48.8	48.7	48.6	48.4	48.2	48.0	47.8	47.6	47.4	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Imports of non-agricultural goods (% of total imports)	84.7	84.7	84.7	84.8	84.8	84.5	84.4	84.4	84.3	84.3	85.0	84.7	84.7	84.7	84.8	84.5	84.4	84.4	84.3	84.3	0.34	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
External debt (% of GDP)	128.4	128.5	127.4	126.8	125.7	124.9	124.0	123.3	122.5	121.8	130.4	129.3	127.4	126.5	125.7	124.8	124.0	123.3	122.5	121.8	1.97	-0.18	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Degree of openness (exports plus imports divided by GDP)	122.0	122.2	121.9	121.6	121.2	120.9	120.6	120.3	119.9	119.6	123.1	122.1	121.9	121.6	121.2	120.9	120.6	120.3	119.9	119.6	1.04	-0.10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00

Poverty Indicators	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run
Rural poverty line (consumption-based) in real terms	0.35	0.35	0.35	0.35	0.35	0.35	0.0000	0.0000	0.0000
Rural poverty line (consumption-based) in nominal terms	0.37	0.38	0.39	0.36	0.37	0.39	-0.0045	-0.0022	-0.0002
Rural poverty line (income-based) in real terms	0.50	0.50	0.50	0.50	0.50	0.50	0.0000	0.0000	0.0000
Rural poverty line (income-based) in nominal terms	0.37	0.38	0.39	0.36	0.37	0.39	-0.0045	-0.0022	-0.0002
Urban poverty line (consumption-based) in real terms	0.44	0.44	0.44	0.44	0.44	0.44	0.0000	0.0000	0.0000
Urban poverty line (consumption-based) in nominal terms	0.47	0.49	0.51	0.46	0.48	0.51	-0.0138	-0.0069	-0.0006
Urban poverty line (income-based) in real terms	0.63	0.63	0.63	0.63	0.63	0.63	0.0000	0.0000	0.0000
Urban poverty line (income-based) in nominal terms	0.66	0.68	0.73	0.66	0.68	0.73	-0.0198	-0.0099	-0.0011
Agricultural non-traded household (consumption-based) poverty headcount index	0.89	0.74	0.51	0.90	0.75	0.51	0.0140	0.0040	0.0000
Agricultural traded household (consumption-based) poverty headcount index	0.43	0.44	0.45	0.43	0.44	0.45	0.0000	0.0000	0.0000
Urban informal household (consumption-based) poverty headcount index	0.87	0.94	0.98	0.88	0.96	0.98	0.0280	0.0031	0.0000
Urban formal unskilled household (consumption-based) poverty headcount index	0.20	0.21	0.22	0.19	0.21	0.22	-0.0067	0.0000	0.0000
Urban formal skilled household (consumption-based) poverty headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household poverty (consumption-based) headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (consumption-based) poverty gap index	0.49	0.40	0.32	0.49	0.41	0.32	0.0097	0.0073	0.0007
Agricultural traded household (consumption-based) poverty gap index	0.28	0.29	0.30	0.28	0.29	0.30	0.0007	-0.0008	0.0000
Urban informal household (consumption-based) poverty gap index	0.47	0.53	0.58	0.47	0.53	0.58	0.0048	0.0089	0.0012
Urban formal unskilled household (consumption-based) poverty gap index	0.24	0.25	0.26	0.24	0.24	0.26	0.0017	-0.0033	-0.0006
Urban formal skilled household (consumption-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household (consumption-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (income-based) poverty headcount index	0.90	0.74	0.52	0.90	0.75	0.52	0.0040	0.0100	0.0020
Agricultural traded household (income-based) poverty headcount index	0.50	0.51	0.53	0.50	0.51	0.53	0.0000	0.0000	0.0000
Urban informal household (income-based) poverty headcount index	0.85	0.93	0.98	0.87	0.93	0.98	0.0249	0.0031	0.0000
Urban formal unskilled household (income-based) poverty headcount index	0.38	0.28	0.30	0.34	0.38	0.30	-0.0134	-0.0134	-0.0067
Urban formal skilled household (income-based) poverty headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household poverty (income-based) headcount index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Agricultural non-traded household (income-based) poverty gap index	0.49	0.41	0.33	0.50	0.41	0.32	0.0144	0.0035	-0.0008
Agricultural traded household (income-based) poverty gap index	0.30	0.30	0.30	0.30	0.30	0.30	0.0021	0.0008	0.0000
Urban informal household (income-based) poverty gap index	0.48	0.52	0.58	0.48	0.52	0.58	0.0056	0.0086	0.0012
Urban formal unskilled household (income-based) poverty gap index	0.24	0.29	0.25	0.24	0.24	0.25	0.0060	0.0084	0.0048
Urban formal skilled household (income-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Capitalists household (income-based) poverty gap index	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000
Income Distribution Indicators	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run	Short-Run	Medium-Run	Long-Run
Gini coefficient (consumption-based)	0.60	0.60	0.59	0.61	0.60	0.59	0.0044	0.0022	0.0004
Gini coefficient (income-based)	0.63	0.62	0.62	0.63	0.63	0.62	0.0040	0.0031	0.0022
Theil index (consumption-based)	0.31	0.32	0.33	0.31	0.32	0.32	-0.0045	-0.0020	-0.0008
Theil index (income-based)	0.36	0.36	0.36	0.34	0.35	0.36	-0.0037	-0.0016	0.0002

Figure 1
Production Process

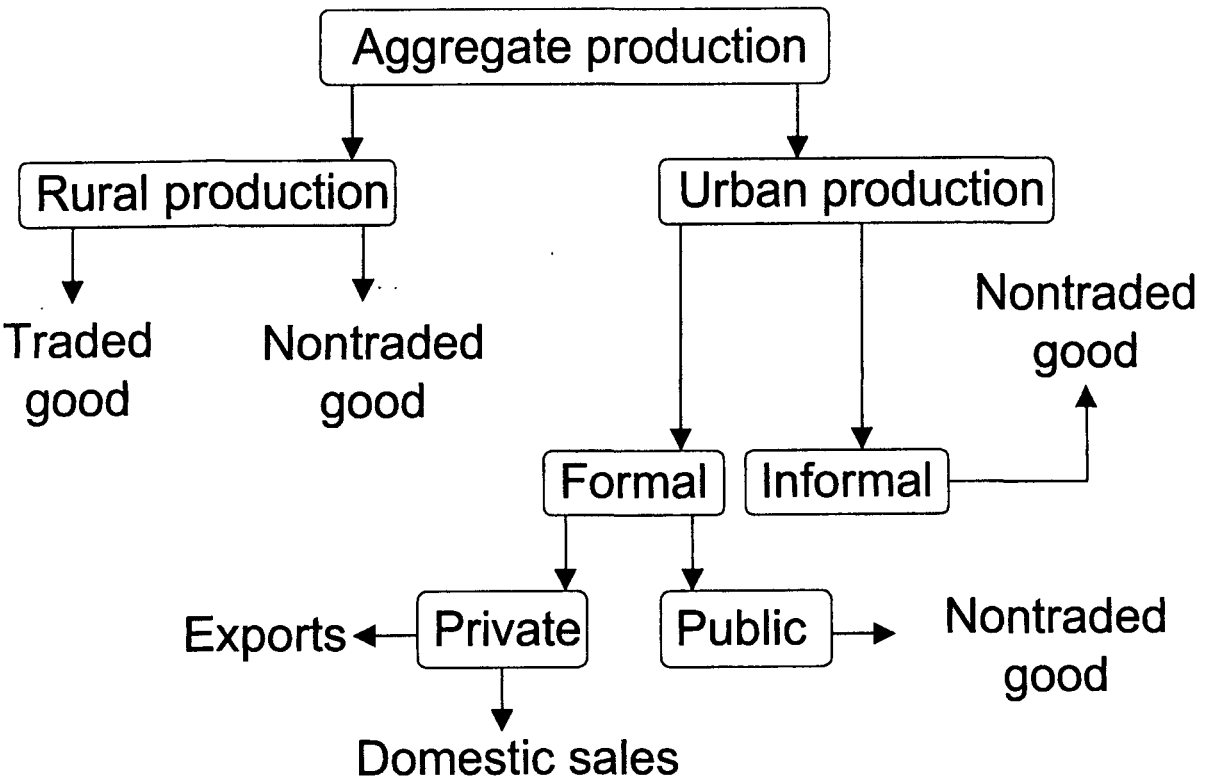


Figure 2
Employment and Skills

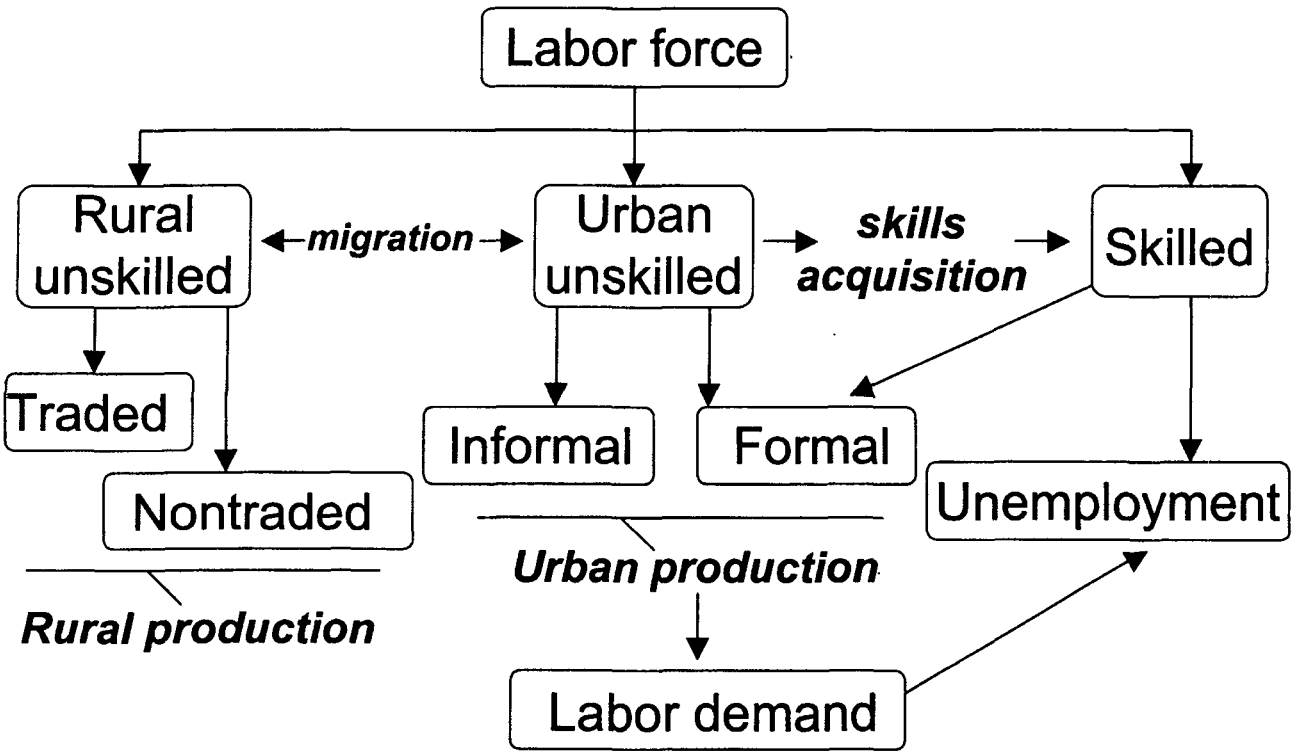


Figure 3
Financial Assets and the Money Market

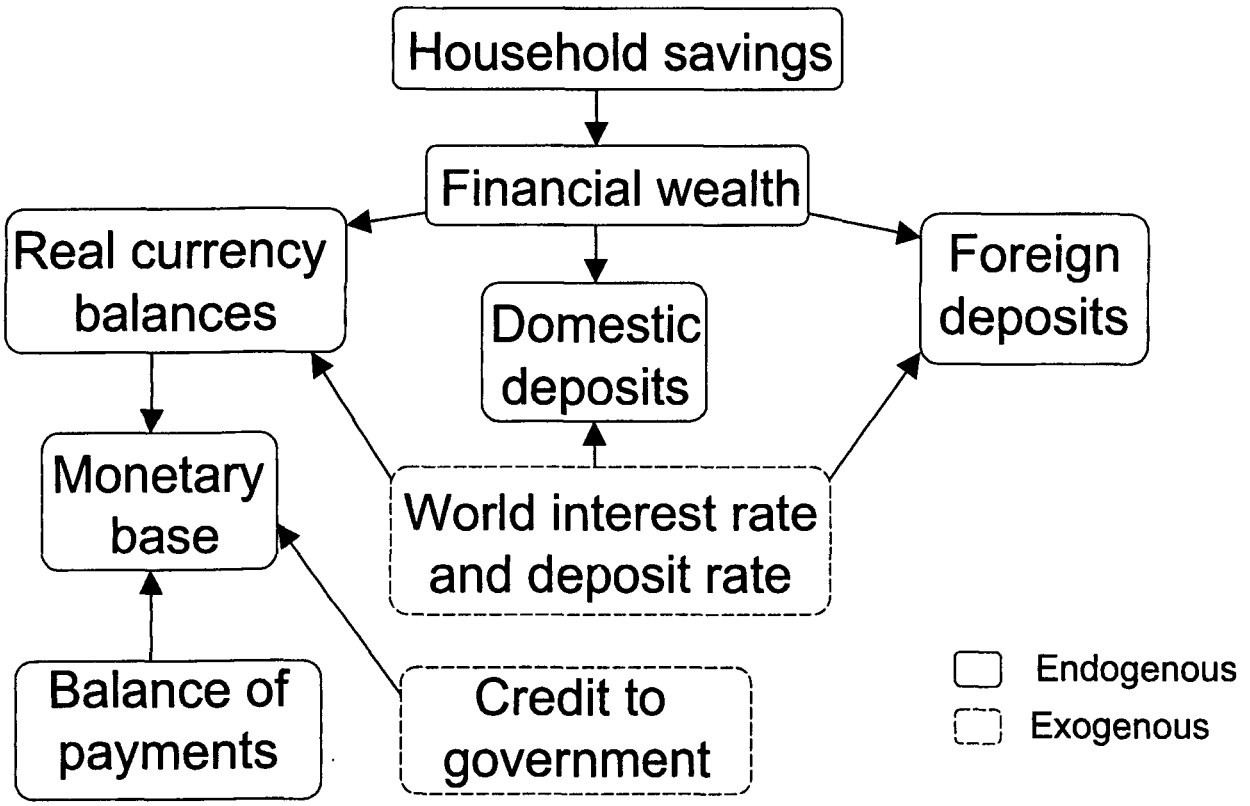


Figure 4
The Credit Market

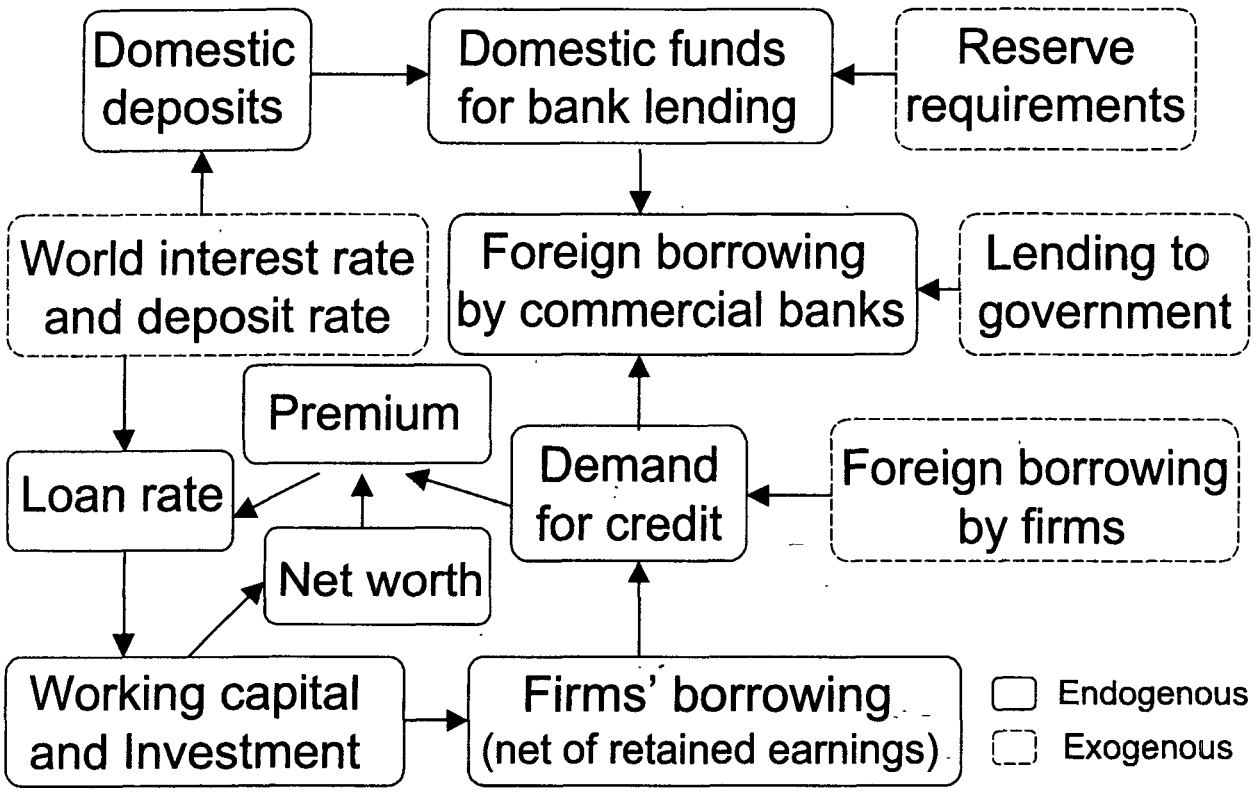


Figure 5
Balance of Payments

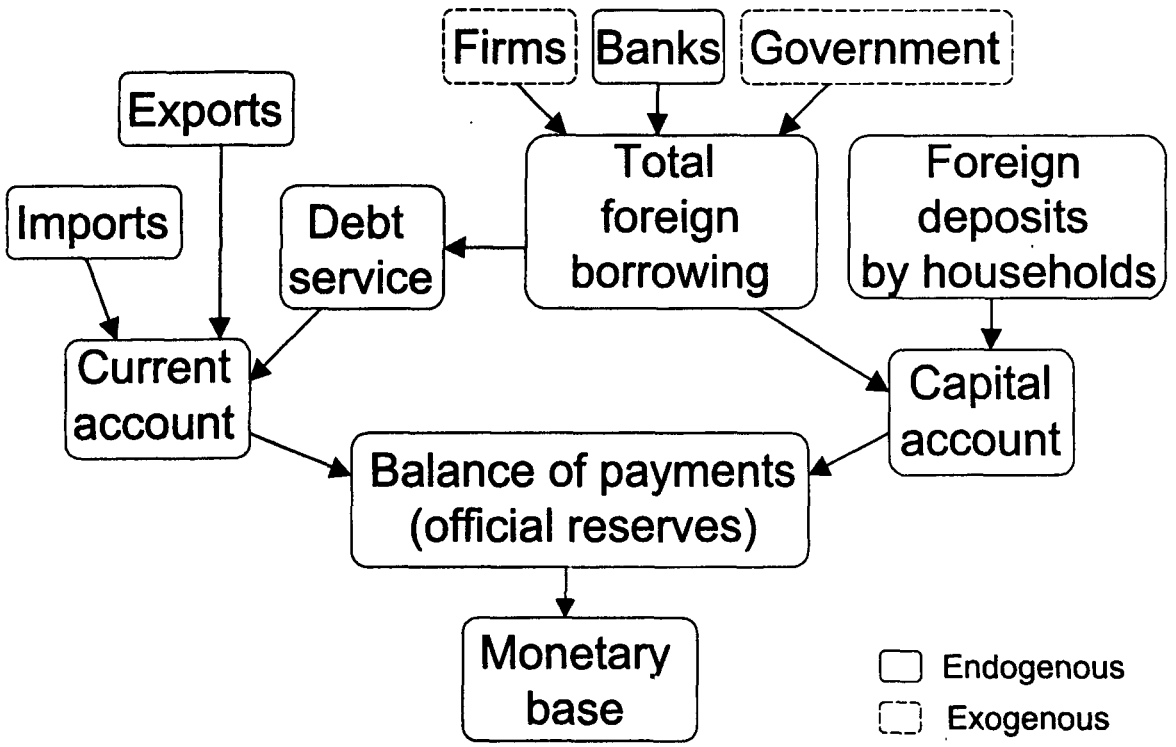


Figure 6
Public Sector

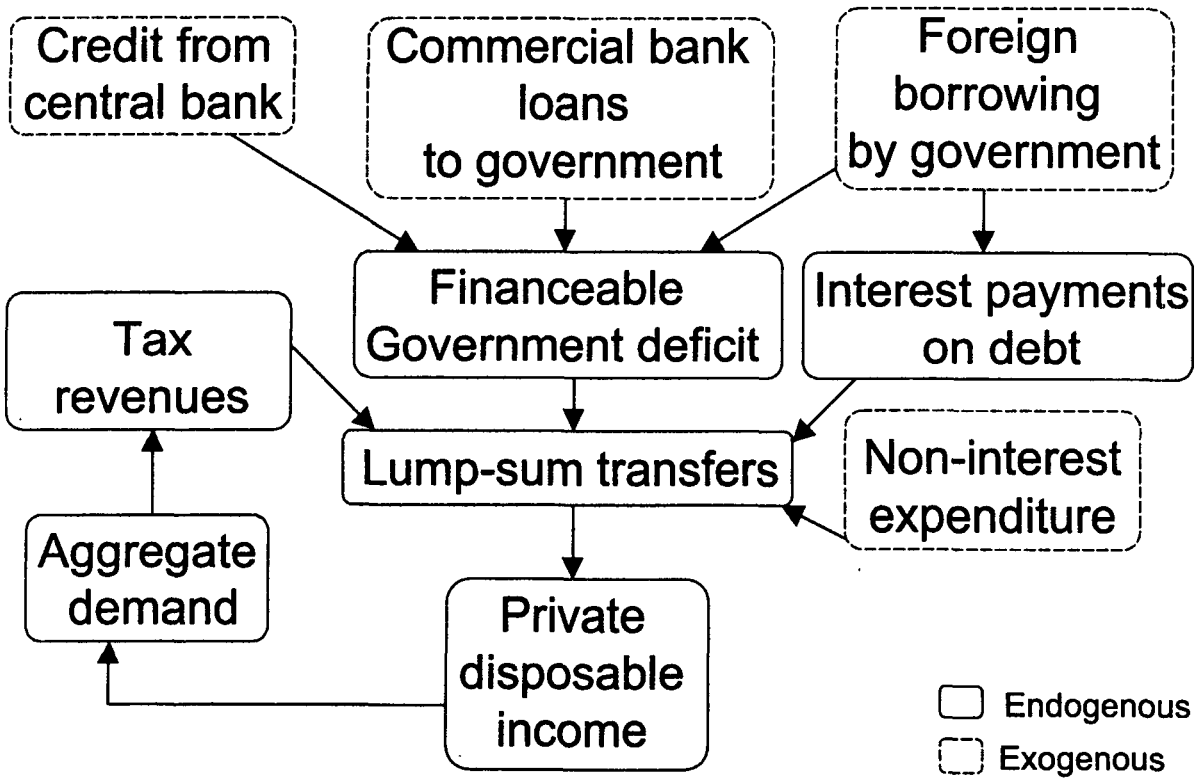


Figure 7
Link IMMPA-Household Survey

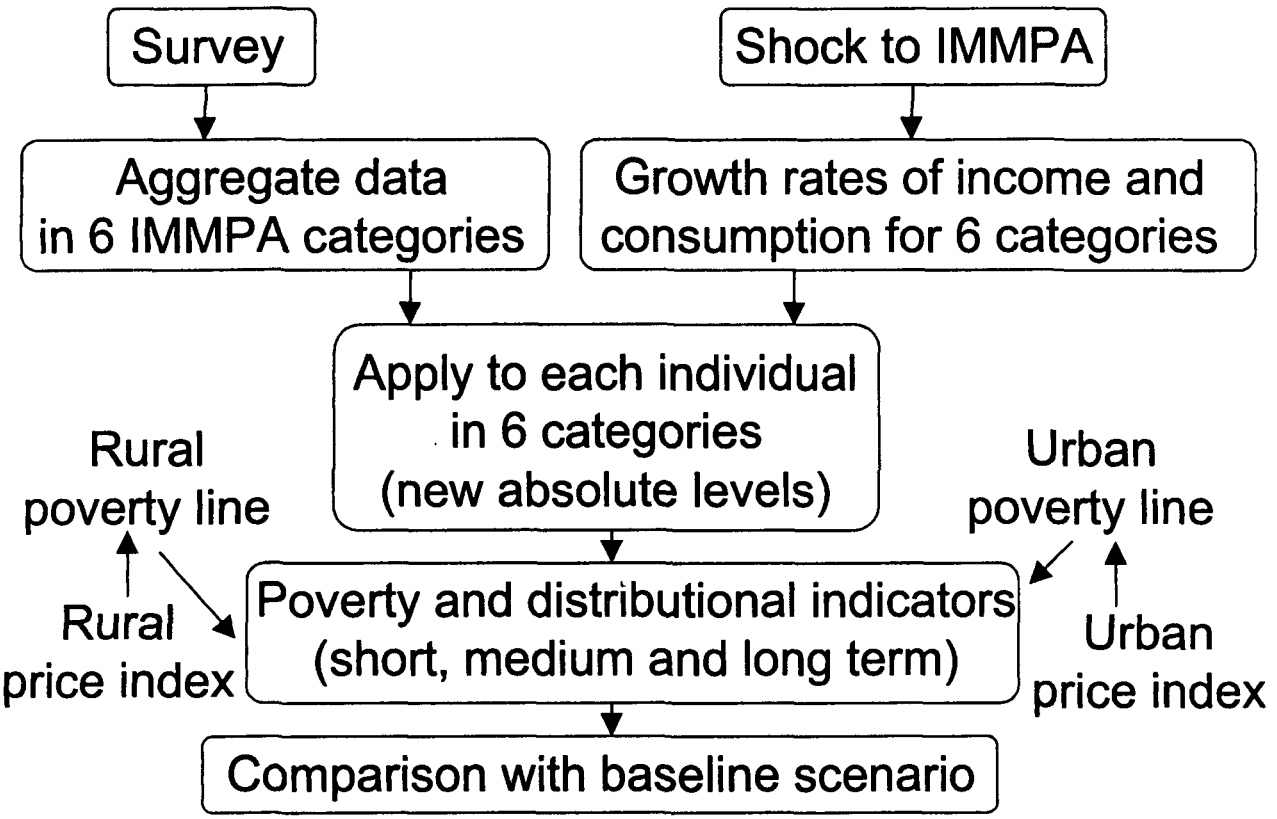
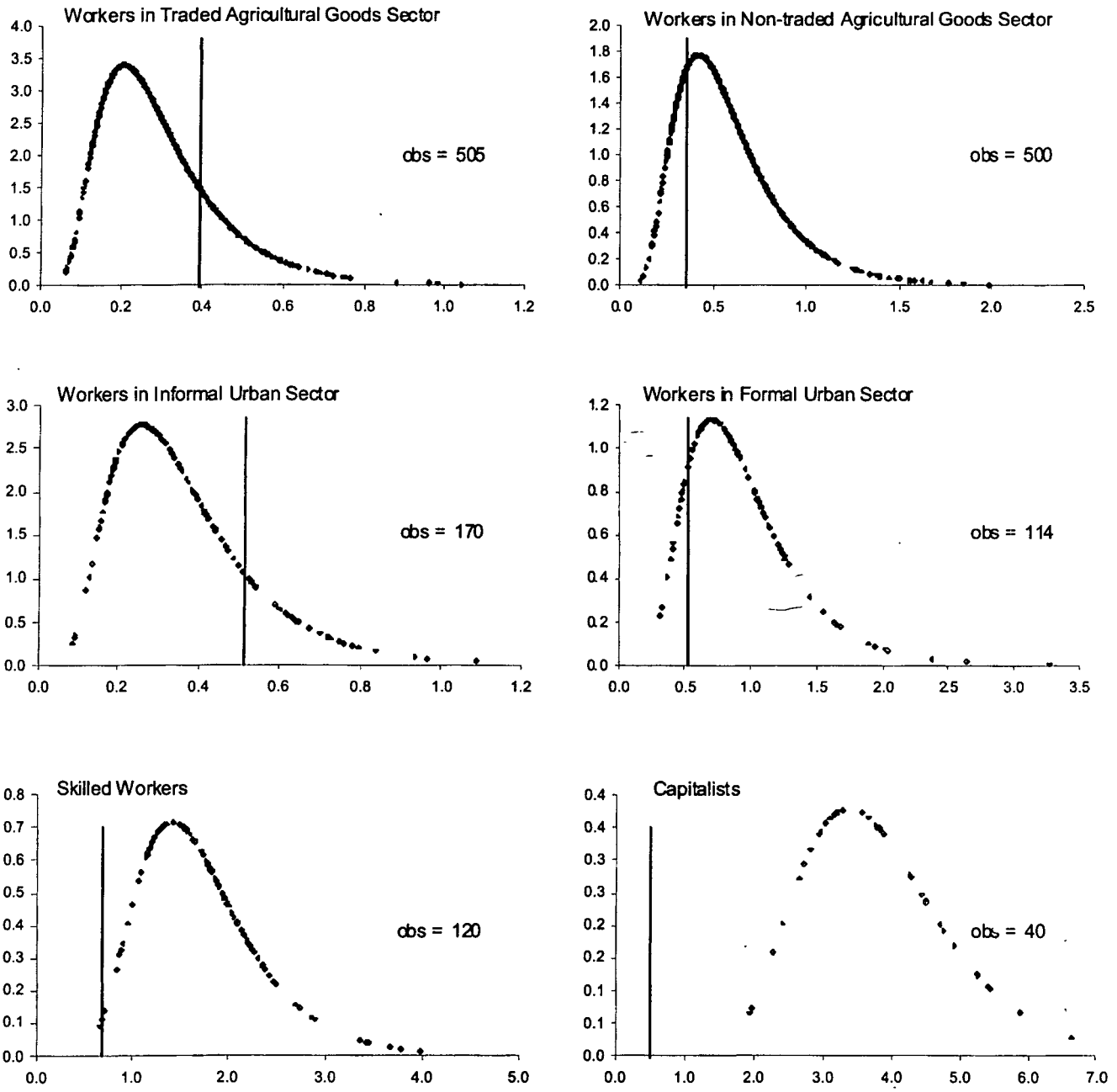
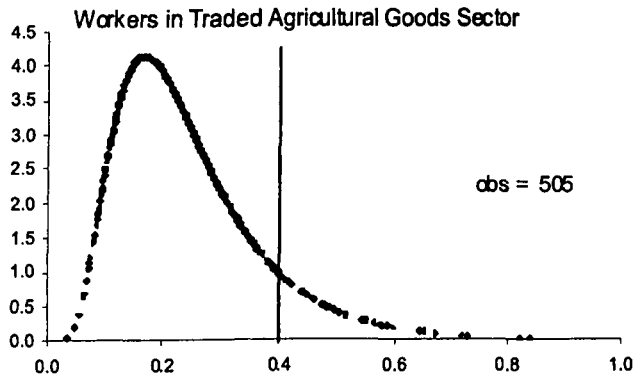


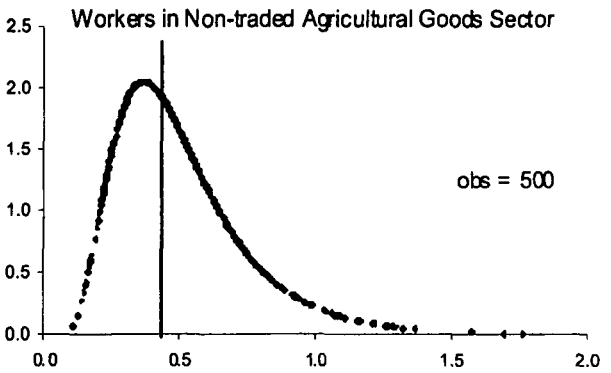
Figure 8
Initial Distribution of Income, Based on Log-Normal Approximation
(obs denotes the number of households in each group)

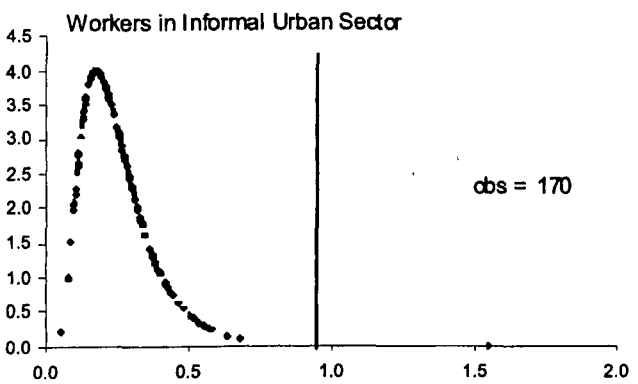


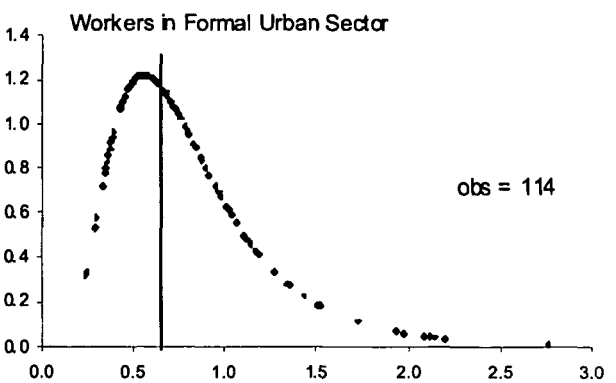
Note: Vertical lines represent poverty line. It is 0.45 in rural sectors and 0.52 in urban sectors.

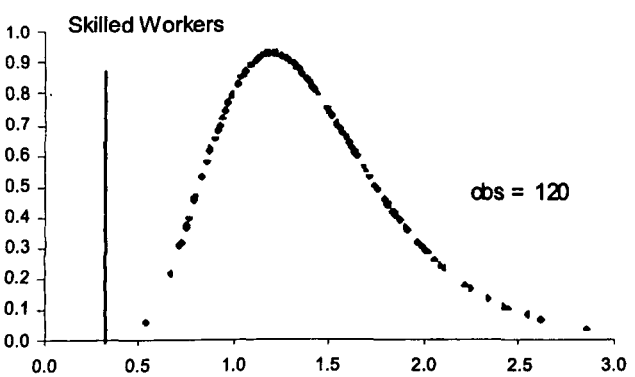
Figure 9
Initial Distribution of Consumption, Based on Log-Normal Approximation
(obs denotes the number of households in each group)

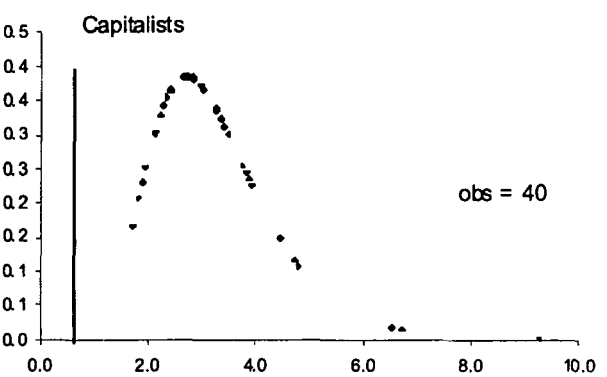












Note: Vertical lines represent poverty line. It is 0.4 in rural sectors and 0.46 in urban sectors.

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