Appendix A: Short Description of the Model

THE STAGE_LAB COMPUTABLE general equilibrium (CGE) model[1] is a development of the STAGE model that provides a richer treatment of factor markets, particularly labor markets.[2] The model has several distinctive features. First, it allows for a generalized treatment of trade relationships by incorporating provisions for nontraded exports and imports. Second, it allows the relaxation of the small-country assumption for exported commodities. Third, it includes provision for multiple product activities. Fourth, value-added production technologies are specified as a generalized system of nested constant elasticity of substitution (CES) functions, which permits the endogenous modeling of unemployment for all factors and the ability for factors to migrate between regions/areas and/or factor "classification," for example, between semiskilled and unskilled labor. And fifth, household consumption expenditure is modeled using Stone-Geary utility functions. The model is a social accounting matrix–based CGE model, wherein the matrix serves to identify the agents in the economy and provides the database with which the model is calibrated.

BEHAVIORAL RELATIONSHIPS

Households are assumed to choose the bundles of commodities they consume so as to maximize utility where the utility function is Stone-Geary. The households choose their consumption bundles from a set of "composite" commodities that are aggregates of domestically produced and imported commodities. These composite commodities are formed as CES aggregates that embody the presumption that domestically produced and imported commodities are imperfect substitutes. The optimal ratios of imported and domestic commodities are determined by the relative prices of the imported and domestic commodities. This is the so-called Armington "insight,"[3] which has the advantage of rendering the model practical by avoiding the extreme specialization and price fluctuations associated with other trade assumptions. In this model, the country is assumed to be a price taker for all imported commodities.

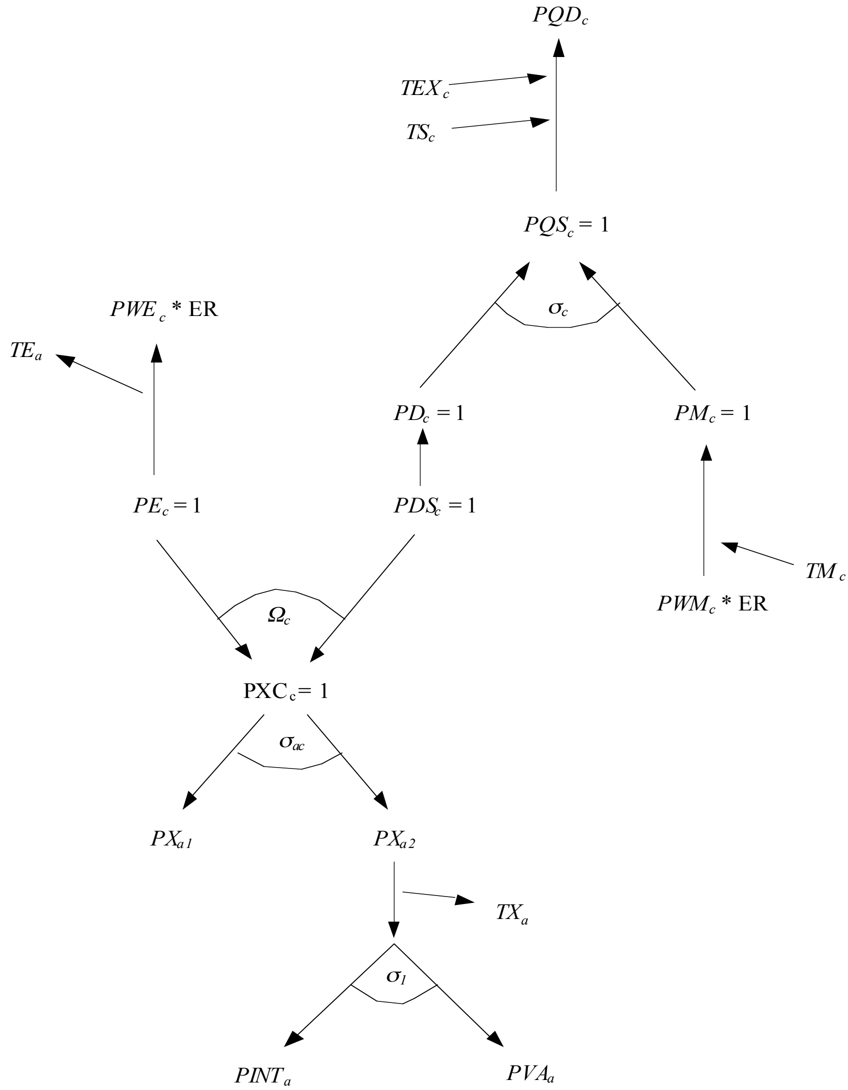
Domestic production uses a multistage production process. The vector of commodities demanded is determined by the domestic demand for domestically produced commodities and export demand for domestically produced commodities. Using the assumption of imperfect transformation between domestic demand and export demand, in the form of a constant elasticity of transformation function, the optimal distribution of domestically produced commodities between the domestic and export markets is determined by the relative prices on the alternative markets. The model can be specified as a small country—that is, price taker—on all export markets, or selected export commodities can be deemed to face downward-sloping export-demand functions—that is, a large-country assumption.

The other behavioral relationships in the model are generally linear. A few features do, however, justify mention. First, all the tax rates are declared as variables that can adjust endogenously to satisfy fiscal policy constraints. Similar adjustment mechanisms are available for a number of key parameters, for example, household and enterprise savings rates and interinstitutional transfers. Second, technology changes can be introduced through changes in the activity-specific efficiency variables—adjustment and/or scaling factors are also available for the efficiency parameters. Third, the proportions of current expenditure on commodities defined to constitute subsistence consumption can be varied. And fourth, the model is set up with a range of flexible macroeconomic closure rules and market-clearing conditions. Though the base model has a standard neoclassical model closure—for example, full employment, savings-driven investment, and a floating exchange rate—the version of the model used in this study features, as explained, labor markets with unemployment.

PRICE AND QUANTITY RELATIONSHIPS

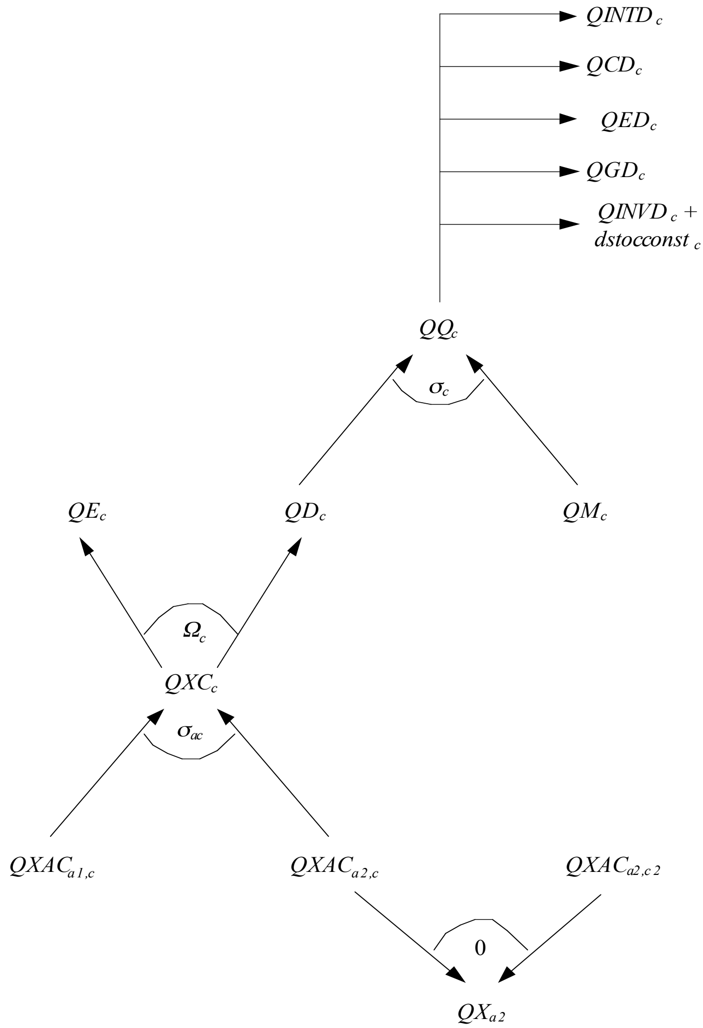
Figures A.A.1 and A.A.2 provide detail on the interrelationships between the prices and quantities for commodities and activities. The supply prices of the composite commodities (PQS_c) are defined as the weighted averages of the domestically produced commodities that are consumed domestically (PD_c) and the domestic prices of imported commodities (PM_c), which are defined as the products of the world prices of commodities (PWM_c) and the exchange rate (ER) uplifted by ad valorem import duties (TM_c). These weights are updated in the model through first-order conditions for optima. The average prices

FIGURE A.A.1 PRICE RELATIONSHIPS FOR THE STAGE_LAB MODEL



exclude sales taxes, and hence must be uplifted by ad valorem sales taxes (TS_c) and excise taxes (TEX_c) to reflect the composite consumer price (PQD_c).[4] The producer prices of commodities (PXC_c) are similarly defined as the weighted averages of the prices received for domestically produced commodities sold on domestic (PQS_c) and export (PE_c) markets. These weights are updated in the model through first-order conditions for optima. The prices received on the export market are defined as the products of the world price of exports (PWE_c) and the exchange rate less any export duties due, which are defined by ad valorem export duty rates (TE_c).

FIGURE A.A.2 QUANTITY RELATIONSHIPS FOR THE STAGE_LAB MODEL



The average price per unit of output received by an activity (PX_a) is defined as the weighted average of the domestic producer prices, where the weights are constant. After paying indirect/production/output taxes (TX_a), this is divided between payments to aggregate value added (PVA_a), that is, the amount available to pay primary inputs, and aggregate intermediate inputs ($PINT_a$). Total payments for intermediate inputs per unit of aggregate intermediate input are defined as the weighted sums of the prices of the inputs (PQD_c).

Total demand for the composite commodities (QQ_c) consists of the demand for intermediate inputs ($QINTD_c$), consumption by households (QCD_c), enterprises (QED_c) and government (QGD_c), gross fixed capital formation ($QINVD_c$), and stock changes, (*dstoc-*

const$_c$). The supply from domestic producers (QDD_c) plus imports (QM_c) meets this total demand; equilibrium conditions ensure that the total supply and demand for all composite commodities equate. Commodities are delivered to both the domestic and export (QE_c) markets, subject to equilibrium conditions that require all domestic commodity production (QXC_c) to be either domestically consumed or exported.

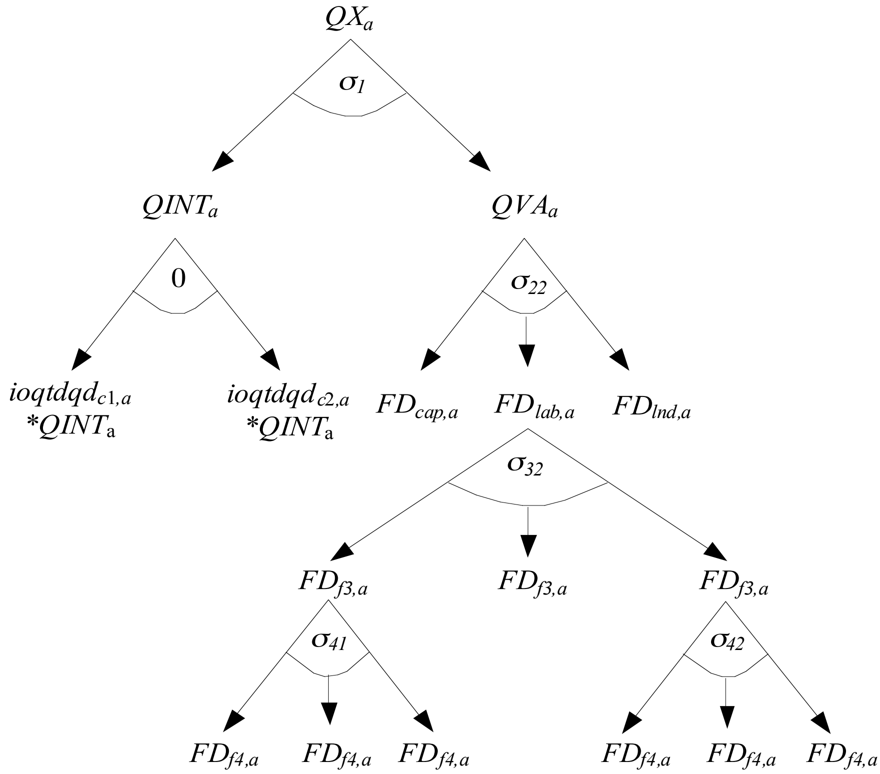
The presence of multiproduct activities means that domestically produced commodities can come from multiple activities; that is, the total production of a commodity is defined as the sum of the amount of that commodity produced by each activity. Hence, the domestic production of a commodity (*QXC)* is a CES aggregate of the quantities of that commodity produced by a number of different activities (*QXAC*), which are produced by each activity in activity-specific fixed proportions; that is, the output of *QXAC* is a Leontief (fixed-proportions) aggregate of the output of each activity *QX* (figure A.A.3).

Production relationships by activities are defined by a series of nested CES production functions.[5] Mathematically, the limit on the number of levels of nests is only constrained by the number of different factor types included in the database. However, there are additional limits imposed by economic meaningfulness and the availability of empirical data that allow the inclusion of information (elasticities of substitution) about the possibilities for substitution between and within subgroups of factors. Figure A.A.4 shows a four-level production nest, in quantity terms; to simplify exposition two intermediate inputs, nine natural/actual primary inputs, and three aggregate primary inputs are identified, and only the labor accounts are nested beyond the second level.

Activity output is a CES aggregate of the quantities of aggregate intermediate inputs (*QINT*) and value added (*QVA*), whereas the aggregate intermediate inputs are a Leontief aggregate of the (individual) intermediate inputs and the aggregate value added is a CES aggregate of the quantities of "primary" inputs demanded by each activity (*FD*), where the primary inputs can be natural factors—types of labor, capital, and land that exist—and aggregate factors that are aggregates of natural factors and/or other aggregate factors. Any factor at the end of any branch in figure A.A.3 is by definition a natural factor; that is, it is not an aggregate. Thus, all the factors $FD_{f4,a}$ are natural factors, as are $FD_{f3,a}$, $FD_{cap,a}$, and $FD_{lnd,a}$, whereas all $FD_{f3ag,a}$ and $FD_{lab,a}$ are aggregates. In the model, the set *ff* is defined as the set of all natural factors and aggregates, while the set *f*, a subset of *ff*, is defined as the set of all natural factors; other subsets of *ff* define the level of each factor—natural or aggregate—in the nesting structure.

Starting from the bottom of the value-added nests in figure A.A.3: The six types of natural labor (f_4) form two groups of labor that can be substituted within the subgroup to form two aggregates ($FD_{f3ag,a}$). These two aggregates, along with another natural factor ($FD_{f3,a}$), are also substitutes that form an aggregate labor factor ($FD_{lab,a}$), which combines with

FIGURE A.A.3 PRODUCTION RELATIONSHIPS FOR THE STAGE_LAB MODEL: QUANTITIES



the natural factors capital ($FD_{cap,a}$) and land ($FD_{lnd,a}$) to generate aggregate value added (QVA). The optimal combinations of each natural and/or aggregate in each CES aggregate are determined by first-order conditions based on relative prices.

The advantage of using such a nesting structure is that it avoids making the assumption that all natural factors are equally substitutable in the generation of value added. In the case illustrated by figure A.A.3, the implicit presumption is that different types of labor are not equally substitutable but that aggregate labor, capital, and land are equally substitutable. For instance, the level 3 labor aggregates, $FD_{f3ag,a}$, may be defined as the aggregate labor employed by an activity class, which is made up of three types of labor that have different sets of skills *n*. However, the activity cannot choose to "substitute" between different labor type segments.

This highlights an important consideration. The adoption of a nesting structure carries with it the presumption that factor markets are segmented; that is, while labor of one type can be part of an aggregate labor factor, labor from another segment never can. Implicit to this structure, therefore, is the presumption that labor cannot migrate between segments, whereas in reality there is strong evidence that people are prepared to migrate in search of improved employment opportunities. To address this consideration, STAGE_LAB includes a series of migration functions that allow net migration of factors of production between the subnests of the production structure; for example, unskilled labor can migrate between different segments in response to employment opportunities. The incentives to migrate are determined by the changes in the relative wages received by the factors in different subnests.

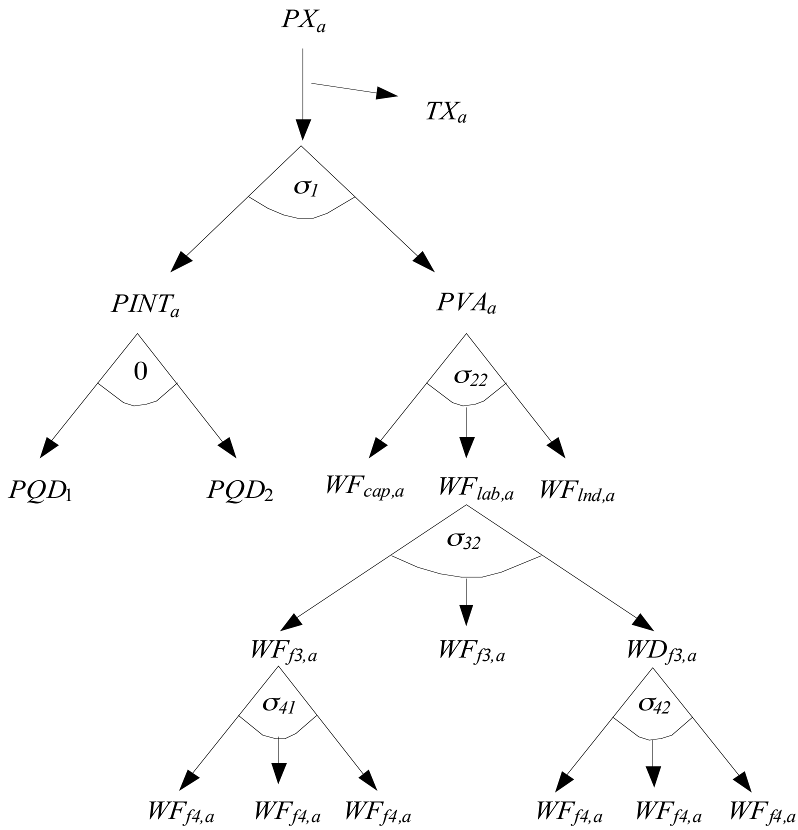
The model includes a constant elasticity supply function for each factor type. If the relative wage of the factor in a subnest increases or decreases, the supply of that factor to a subnest can increase or decrease, subject to the condition that the total supply of that factor type in the economy is fixed. The resultant migrations represent a partial adjustment in response to changes in relative wages and, combined with the constraint, ensure market clearing without any increase in labor supply. The degrees of mobility are controlled by the supply elasticities, which can vary for each and every factor; for example, unskilled labor in one segment may be more or less mobile than unskilled labor in another segment. In practice, this version of the model operates a pooling system; the labor supply functions either as supply or demand to or from a series of pools rather than as bilateral migration between subnests; thus, only net migration is modeled. Full bilateral tracking of labor migration could be readily achieved, but this would require the imposition of many more supply elasticities, for which there is limited information.[6] The choice of the pooling mechanism is accordingly driven by the decision to achieve a balance between detail and the imposition of exogenous information that has limited empirical basis.

The operation of the migration functions requires the specification of which types of labor can supply labor from a specific pool. This requires the association of factors with particular pools, and it is important to ensure that these associations are meaningful. Although it may be reasonable to argue that there may be some migration between skill types (segments), for example, between semiskilled and unskilled labor, although the ease of migration may depend upon the direction—semiskilled may be easily able to become unskilled, but unskilled may be much less easily transformed into semiskilled. Other migrations may not be appropriate.

Consider a scenario where there is discrimination in labor markets on the basis of some readily observable characteristic—race, gender, religion, and the like—and labor in a skill class is subdivided according to the characteristic used in discrimination. In such a scenario, migration between subnests is clearly not straightforward because the characteristic used in discrimination cannot be transformed. Consequently, care needs to be exercised when defining the possible channels for migration.

Until now, it has been assumed that labor supplies are fixed. However, STAGE_LAB allows the possibility of unemployment for every natural factor. This is achieved by defining

FIGURE A.A.4 PRODUCTION RELATIONSHIPS FOR THE STAGE_LAB MODEL: PRICES



the supply of each factor by reference to current total demand plus the stock of the factor currently unemployed. In the case of labor, if there is current unemployment for a class of labor—for example, unskilled—the real wage of that class is fixed until all the stock of unemployed unskilled workers has been absorbed by the labor market; thereafter, the real wage of the factor is flexible.[7] This form of regime switching is attractive because it increases the realism with which the labor markets are modeled, but it does have some implications for the modeling of labor migration. Given that labor migration decisions depend on changes in relative wage rates, there can only be net migration when a factor within a migration pool is fully employed, because only then can relative wages change.

The price relations for the production system are illustrated in figure A.A.4. Note how the prices paid for intermediate inputs (*PQD*) are the same as paid for final demand; that is, a "law" of one price relationship holds across all domestic demand. Note also that factor prices are factor- and activity-specific ($WF_{ff,a}$), which means that the allocation of finite supplies of factors (*FS*) between competing activities depends on relative factor prices via first-order conditions for optima.

These extensions to the representation of the labor market increase the degree of realism achieved in the modeling of labor market transactions. One dimension of this increased realism is that the model reduces the degree of factor market response to changes in prices. This is achieved in several ways. First, the nested structure reduces the extent of substitution possibilities. Second, the ease of substitution between factors is dampened by the nested structure. And third, the migration functions further reduce substitution possibilities through the partial adjustment to changes in wage rates.

Appendix B: Description of the Social Accounting Matrix and Data for the India Country Model

THE SOCIAL ACCOUNTING MATRIX (SAM) reports all the flows of receipts accruing to and expenditures incurred by all the agents in the economy for a particular year. The agents in the economy are typically the production sectors, social groups (households), firms, government, and the foreign sector. These flows take place on account of commodity transactions (buying/selling) between the agents for the purposes of consumption, intermediate use, investment, and so on, and by way of interagent transfers. The SAM is constructed in two stages. The first is a "macro SAM" that presents the aggregates of these flows for the economy as a whole. Next is the "micro SAM" that disaggregates the commodities, activities, factors, and households into their respective components. This top-down approach is adopted over the United Nations System of National Accounts bottom-up method to ensure that the final micro SAM is consistent with the published national accounts aggregates.

THE MACRO SAM

Figure A.3.1 gives the structure of the macro SAM, and the flow values for the year 1998–1999. Most of the data for the macro SAM come from the input-output (IO) Table

Table A.3.1 Macroeconomic Social Accounting Matrix for India, 1998-1999
(Rupees Billions)

	Commodity	Activity	Factors	Households	Private firms	Public firms	Direct taxes	Import duties	Export subsidies	Domestic net indirect taxes	Government	Gross fixed capital	Changes in stocks	Rest of world	Total
Commodity	0	14,001	0	11,893	0	0	0	0	0	0	2,140	3,951	-21	1,997	33,961
Activity	29,982	0	0	0	0	0	0	0	0	0	0	0	0	0	29,982
Factors	0	15,981	0	0	0	0	0	0	0	0	0	0	0	81	16,063
Households	0	0	13,228	0	0	0	0	0	0	0	1,184	0	0	432	14,845
Private firms	0	0	403	0	0	0	0	0	0	0	57	0	0	0	460
Public firms	0	0	151	0	0	0	0	0	0	0	0	0	0	0	151
Direct taxes	0	0	0	283	245	0	0	0	0	0	0	0	0	0	528
Import duties	407	0	0	0	0	0	0	0	0	0	0	0	0	0	407
Export subsidies	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	-7
Domestic net indirect taxes	1,116	0	0	0	0	0	0	0	0	0	0	0	0	0	1,116
Government	0	0	369	0	0	0	528	407	-7	1,116	0	0	0	0	2,413
Gross fixed capital	0	0	1,681	2,669	214	151	0	0	0	0	-995	0	0	210	3,930
Changes in stocks	0	0	0	0	0	0	0	0	0	0	0	-21	0	0	-21
Rest of world	2,463	0	231	0	0	0	0	0	0	0	27	0	0	0	2,721
Total	33,961	29,982	16,063	14,845	460	151	528	407	-7	1,116	2,413	3,930	-21	2,721	0

Source: Own construction as detailed in Appendix B.

for 1998–1999 and from the National Accounts Statistics (NAS), both prepared by the Central Statistical Organization of the Government of India. It must be noted here that the IO table is balanced and is consistent with the NAS data available at the time of its preparation. However, all the revisions that the NAS undergoes after the preparation of the IO table are not carried over to the IO table. Thus, there are some small differences in the macro aggregates between these two sources. Where such differences are observed, we defer to the values in the IO table, due to its internal consistency across its rows and columns. These two data sources are supplemented with data on government transfers from Pradhan, Saluja, and Singh.[8]

Some of the entries of the macro SAM are derived residually to maintain row-column balance. In the rest of world (RoW) account, data are available for all the row entries, and for all the column entries except capital transfers to RoW. The latter was then obtained residually as the difference between the row total and sum of column entries for which we have data. Next, we worked out the net household savings in the gross fixed capital account row residually as the difference between the column total, for which we had all the information, and the sum of the row entries, for which we had data. Factor payments to households, firms, and government were also derived sequentially following a similar procedure.

THE MICRO SAM

The macro SAM gives a snapshot of the economy and also provides several control totals for the micro SAM. The micro SAM distinguishes 115 commodities, 115 activities, 49 factors, and 352 households. The 115 commodities and 115 activities directly correspond to the IO table. With regard to factors, we distinguish 1 capital (nonlabor) and 48 labor types based on the following characteristics:

- location (rural/urban),
- social group ("scheduled tribes" / "scheduled castes" / "other backward classes" / "others"),
- education/skill (illiterate/education up to some college years/college graduates and above),
- sex (male/female).

Households are distinguished into 32 types based on the following characteristics:

- location (rural/urban),
- social group ("scheduled tribes" / "scheduled castes" / "other backward classes" / "others"),

- four mean per capita expenditure (MPCE) classes (the first nine deciles divided in three equal groups and the top decile).

Database. The data for the micro SAM are from (1) the IO table mentioned above, (2) unit (household)–level data from sample surveys on consumer expenditures and employment/unemployment, 55th Round for 1999–2000, carried out by the National Sample Survey Organization (NSSO), (3),[9] and (4).[10] The IO table gives data on intermediate flows (use matrix), sectoral value added, the commodity composition (make matrix), and commodity-wise total private consumption and other final demand vectors. Of these, the use matrix, make matrix, and the final demands (except private) are used directly in the micro SAM.

Distribution of factor income. The sectoral value added from the IO table is distributed first into labor and capital (nonlabor) based on the labor-capital shares derived from Pradhan, Saluja, and Singh.[11] The value added accruing to labor is then distributed to the 48 labor types based on information from the NSSO employment/unemployment survey. The survey provides information on household characteristics (location, social group, region, and mean per capita expenditures); characteristics of each household member (age, sex, and education level); employment status (usually employed or unemployed); and, for those who are employed, the sector of usual employment (at the National Industrial Classification, NIC, 5-digit level) and the total wages received during the week preceding the survey. From the unit-level data, we first generate the labor types as described above. Second, for each labor type, the sector of employment was mapped from the NIC 5-digit level to our 115-sector level, and the deployment of each labor type by sector was generated. Third, for each labor type, an average daily wage rate was constructed from the data on wages available at the unit level. With the sectoral employment and average wage information, we could obtain sectoral wage income for each labor type. The structure implied by these data was used to disaggregate the total sectoral labor value added from the IO table across our 48 labor types by adjusting the wage rate for each labor type.

Household labor endowment. The household characteristics reported in the employment/unemployment survey enables us to construct household groups as defined above. For each of these household categories, we then develop the total endowment of different types of labor from the unit-level information. Given the characteristics used to classify labor types, every household category will have more than one labor type. This information on labor endowments and the wage rates obtained above are used to generate total labor income for each household category.

Household consumption expenditures. The NSSO consumption expenditure provides information on household characteristics (location, social group, region, and mean per capita expenditures) and also detailed information on commodity-wise consumption at the household level. The common information on household characteristics from the two NSSO surveys enables us to use a consistent definition of household categories across both surveys. Thus, for our 32 household categories, we develop the commodity-wise consumption expenditures by mapping the detailed commodity list in the survey to the 115 commodities in the IO table. It is well known that the aggregate total consumption expenditure data from the survey usually do not tally with the estimates of consumption from the NAS data, due to differences in the methodology of the two approaches and their coverage. Because the IO table is the main basis for the SAM, we use the consumption structure across households from the survey and apply them on the commodity-wise total private consumption expenditures reported in the IO table. This enables us to maintain internal consistency in the SAM.

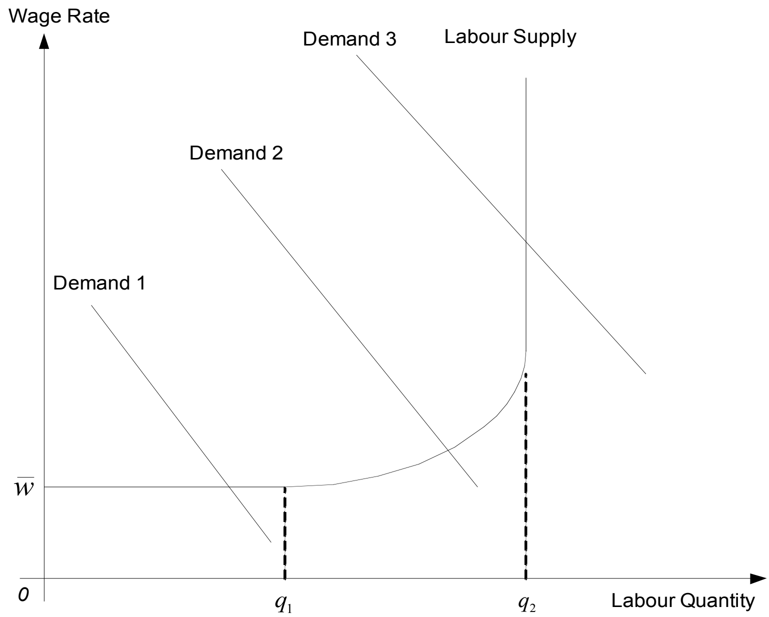
Household income expenditure balance. Thus far, we have only labor income and consumption expenditures for each household, which is insufficient to close the income-expenditure accounts for households. Detailed data on savings, transfers, and nonlabor income are not available for our household categories. The NCAER-MIMAP Survey[12] allows us to compute decile-wise savings or dissavings rates for rural and urban areas separately. We have assumed that these rates prevail for each decile within rural and urban areas independent of other household characteristics, namely, region, and social group. Thus we could generate household savings. Total household income was then obtained with certain assumptions on the distribution of direct taxes and transfers. Given this total income and the wage income estimated above, the income from capital nonlabor factors was obtained for all the household categories.

Appendix C: Modeling Labor Markets

A CORE CONSIDERATION when evaluating the impact of Rural Employment Act activities is their effects on the operation of labor markets. Among the more obvious issues are the extent to which the act's program causes wage rates to rise for labor types employed in other activities by having an impact upon the supply of those types of labor. Such a formulation, in the context of a price driven model, would be driven by changes in relative (real) wage rates causing "migrations" between labor types. The STAGE_LAB model contains the necessary behavioral relationships for such "migrations," but the relationships require that the wage rates for labor types that can "migrate" can change, which means that for those labor types the labor supply curves must be upward sloping. One approach to simulating such effects would be to assume the existence of some form of upward-sloping labor supply curves, for example, "wage curves, whereby the drawing of additional labor into labor markets requires increases in wage rates."[13]

Consider the labor market illustrated in figure A.C.1. The labor supply schedule is perfectly elastic until $0q_1$ labor is employed (fixed real wage rate), has a positive (constant) elasticity between q_1 and q_2 (an increase in wage rate is needed to draw more labor into the market), and an infinite elasticity (full employment) at q_2. In standard microeconomic terms, the horizontal portion of the curve implies no labor/leisure trade-off, the upward-sloping portion the existence of a labor/leisure trade-off at an increasing marginal rate, and the vertical portion the existence of no trade-off because increasing wages does not bring forth any more labor. The determination of the wage rate and level of employment

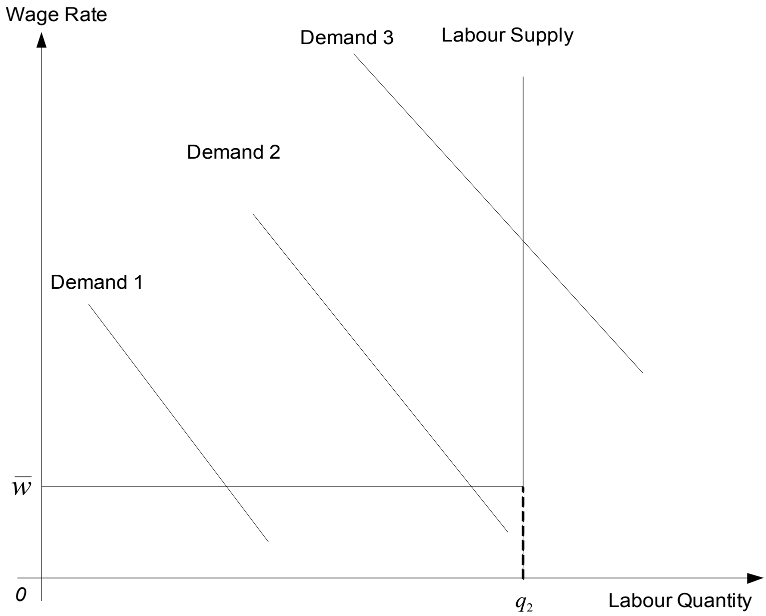
FIGURE A.C.1 LABOR MARKETS, THREE SEGMENTS



then depend upon the level of demand. But difficulties arise, inter alia, over the determination of q_1 and q_2 and the elasticity/slope of the upward-sloping portion of the curve.

Although it is relatively easy to introduce the labor supply relationship in figure A.C.1 into the model, it is also necessary to introduce more assumptions (q_1 and q_2 and the elasticity of the curve) that arguably obfuscate the operation of the model. Consequently, for this study it was assumed that the labor supply curves had only two segments, that is, perfectly elastic until $0q_2$ labor is employed (fixed real wage rate) and infinite elasticity (full employment) thereafter (figure A.C.2). This requires the user only to specify the degree of unemployment in the base period, because if the increased demand for labor does not intersect with the vertical portion of the curve—for example, the change from Demand 1 to Demand 2—the wage rate stays constant, but if the demand increases sufficiently—for example, Demand 3—the wage rate increases once $0q_2$ of labor is employed. This means that migration between labor types only occurs once full employment has been achieved, that is, once relative wage rates can change.

FIGURE A.C.2 LABOR MARKETS, TWO SEGMENTS



Notes

1. S. McDonald and K. Thierfelder, *Globe v2: A SAM Based Global CGE Model using GTAP Data*, mimeo., 2009, www.cgemod.org.uk.

2. The STAGE model is a member of the class of single-country CGE models that are descendants of the approach to CGE modeling described by Kemal Dervis, Jaime de Melo, and Sherman Robinson, *General Equilibrium Models for Development Policy* (New York: Cambridge University Press, 1982).

3. Paul Armington, "A Theory of Demand for Products Distinguished by Place of Production," IMF Staff Papers, XVI (Washington, D.C.: International Monetary Fund, 1969).

4. For simplicity, only one tax on domestic commodity sales is included in this figure.

5. Peroni and Rutherford demonstrate that nested CES function can approximate any flexible functional form, for example, translog. See Carlo Perroni and Thomas Rutherford, "A Comparison of the Performance of Flexible Functional Forms for Use in Applied General Equilibrium Analysis," The Warwick Economics Research Paper Series (TWERPS) 441, University of Warwick, Department of Economics, 1995.

6. It could be argued that migration between regions that are "geographically" close would be greater than between regions that are far apart. However, it is also possible that there will be a series of migration decisions whereby labor simultaneously enters and leaves the same region.

7. This requires that the model operates with one regime when there is unemployment and with another regime when there is full employment. To switch between regimes, the model uses the mixed complementarity specification. The variant used here generates a two segments labor supply function—horizontal until full employment, and then vertical—but more complex options are possible, for example, three segments—horizontal until unemployment rate fall below some level, upward sloping until full employment, and thereafter vertical.

8. B. K. Pradhan, M. R. Saluja, and S. K. Singh, *Social Accounting Matrix for India: Concepts, Construction and Application* (New Delhi: Sage Publications, 2006).

9. B. K. Pradhan and P. K. Roy, *The Well Being of Indian Households: MIMAP-India Survey Report* (New Delhi: Tata-McGraw Hill, 2003).

10. Pradhan et al., *Social Accounting Matrix for India*.

11. Ibid.

12. Pradhan and Roy, *The Well Being of Indian Households*.

13. Note that there are reasons to believe that Blanchflower and Oswald are less that convinced by a "simple" rendition of the wage curve concept into CGE models: "In short, the evidence does not offer support for the idea that the negative correlation between pay and unemployment is explained by a labour supply function." See David Blanchflower and Andrew Oswald, "Estimating a Wage Curve for Britain 1973–1990," NBER Working Paper 4770 (Cambridge: National Bureau of Economic Research, 1995), 159.