

Technical notes

Note 1: Model parameters for the RAMSEY simulation in 1.2.3

The healthy life expectancy at birth is 67.00 for the Rich and 59.00 for the Poor. The Rich start out with a population of 37.07 in the 0-14 age group, 100.00 in the 15-64 age group, and 23.31 in the 65+ bracket. The corresponding figures for the Poor are 132.97, 200.00, and 17.90, respectively. Since the number of Adult Consumption Equivalents (ACE) of the 0-14 year-olds is 0.6 and that of the population over 65 equals 0.8, the total number of initial adult consumer units is 140.89 for the Rich and 294.10 for the Poor. The Total Fertility Rate (TFR) is 2.50 for the Rich and 4.00 for the Poor, with an onset of fertility at 21 years for the Rich and 18 for the Poor. Both Rich and Poor dedicate 11 years to raising each child (generally with overlaps between children), a burden which, in the base scenario, falls entirely on women who during this period do not participate in the labour force. Migration is governed by parameters chosen so that the average annual amount of remittances entering the economy is about 7.5% of the total domestic product.

The α and β exponents of the (Cobb-Douglas) production functions for consumption goods and human capital, respectively, are 0.35 and 0.65. The technological and institutional coefficient for the production of consumer goods (A) is constant at 0.75 for the Rich and 0.60 for the Poor, whereas the corresponding coefficient B for the production of human capital is 0.25, both for Rich and Poor. Physical capital depreciation is 10% per year. The Rich start out with a hypothetical stock of 5,000 (arbitrary) units of physical capital and 1,000 units of human capital, divided among their working age population. The Poor have 1,000 units of physical capital and 1,000 units of human capital, equally divided between two categories of workers, labeled as high and low aptitude, who differ in terms of their degree of trainability. The ratio between the trainability of high and low aptitude workers is 1.6 in the case of the Rich and 1.4 for the Poor. Free schooling before age 15 amounts to 6 units (years) for the Rich and 4 for the Poor; after this, further acquisition of human capital is considered an investment, apart from a 1% p.a. increase due to on-the-job experience. Income varies proportionally with the amount of human capital of each worker. Because human capital formation is endogenous, the earnings profile of each worker with age shapes itself in a manner that resembles the typical life-cycle curve in the case of men, but has an important “dent” during the childbearing years in the case of women.¹

The labour market (of the Poor for the Rich) is considered to be predominantly competitive, but has some degree (30%) of monopsonic wage determination which benefits

¹ Like all model parameters, the gender division of labour can be changed exogenously, e.g. to attribute some proportion of child raising responsibilities to men, allowing women to maintain a higher level of labour force participation and human capital formation during the childbearing period.

the Rich. The subsistence minimum, below which consumption is not allowed to fall, is 0.2 units. The annual intrinsic discount rate of the future, which expresses preference for present over future benefits, is 1% p.a., for both Rich and Poor. In addition, individuals discount the future by 1.5% p.a. for each surviving adult descendant, whereas the crude death rate serves as the third component of the annual discount rate.

Health costs are implemented according to the following parameters:

Private curative health costs per year of morbidity:	Rich: 1.00	Poor: 0.40
Public curative health costs per year of morbidity:	Rich: 0.40	Poor: 0.40
Private preventive health costs per life saved:	Rich: 0.90	Poor: 0.15
Public preventive health costs per life saved:	Rich: 0.25	Poor: 0.25

The morbidity parameters are implicit in the difference between life expectancy and the healthy life expectancy.

The optimisation process in terms of the time-discounted utility accruing to the Rich and the Poor is complicated by the fact that the best strategy for each group depends on the behaviour of the other group. The standard solution for this problem, which is not uncommon in dynamic optimisation processes, is the so-called “cobweb” strategy. To find an equilibrium solution, the utility obtained by the Rich was first optimized in terms of their control variables, while assuming some arbitrary behaviour on the part of the Poor. Given this optimal trajectory for the Rich, the control parameters of the Poor were optimised, and so on until the conditional utilities of both the Rich and the Poor converged their respective maxima.

Note 2: Different methodological options for the coefficients that define the income generating capacity of different categories of household members in 1.2.4

If the relative income generation capacity of male heads of households aged 35-49 is (arbitrarily) defined as 1, others generally have a relative capacity that is a fraction thereof. The coefficients that define the income generating capacities of different kinds of individuals in the DMPAP model can be estimated according to 5 different methods. In the so-called direct methodology, productivity levels are determined simply by measuring the relative incomes of different kinds of household members. Paes de Barros et al. applied this method at the level of each individual household to assess how the total household income would vary as its composition changed (Variant 1, called Heterogeneous Direct Method). In DMPAP, the coefficients are determined at a more aggregate level. In the Venezuelan variant, this so-called Homogeneous Direct Method computed relative income generating capacities for each category of household members based on the entire population (Variant 2). In the Brazilian variant, the population was first broken down into four categories of income per capita: less than half the poverty line, between 50% and 100% of the poverty line, between once and twice the poverty line, and over twice the poverty line (Variant 3). This breakdown is justified, among other reasons, by the well-documented tendency of poor families

to mobilise additional household members for economic activities, particularly when their total income has recently declined. More in particular, the procedure has the advantage of allowing a better representation of the relative income generating capacities of members of household living close to the poverty line.

However, direct methods of either kind have the drawback that they do not consider the effect of the presence of certain categories of household members on the income generating capacity of others. Thus, dependent children do not have merely a coefficient of 0, but their contribution may actually be negative, as they make it more difficult for their mothers to find employment outside the home.² On the other hand, elderly women may not have an income of their own, but they may allow others to earn an income by assuming certain household tasks.

In the Brazilian variant of the model, this problem was addressed in a relatively simple, albeit somewhat arbitrary manner, by defining Modified Direct coefficients (Variant 4). These were determined in a way similar to the homogeneous direct weights above, including disaggregation into four per capita income categories, but with the difference that only households without children under age 15 and dependent elderly persons (i.e. who were not heads of households or spouses) were taken into consideration. It was then assumed that the presence of children under age 10 takes away a certain amount of income generating capacity from spouses aged 15-34 whereas the presence of elderly persons, particularly elderly women, restores part of this capacity. Based on earlier empirical observations, it was also assumed that the largest negative effect is reached with 3 children; when there are more than 3, their hampering effect on income generation diminishes somewhat as the older ones start to take care of the younger ones.

In the case of Venezuela, a different approach was used, based on indirectly determined weights (Variant 5). These are estimated through a somewhat time consuming process similar to regression in which the coefficients are chosen in such a way as to maximize the explanatory power of household composition (see Hakkert, 2006, for details). This process should also be subject to correction, to avoid biases resulting from different average household structures among the poor and the non-poor (a type of endogeneity bias associated with reverse causation). Although the directly and indirectly determined productivity coefficients are highly correlated, the modified and indirect coefficients tend to predict stronger population effects on poverty than the direct ones.

² It is noteworthy, however, that ECLAC (2003: Figure III.15) did not find any marked differences between female labour force participation rates in 14 Latin American countries depending on the number of children under age 15 in the household. What they did find – somewhat unexpectedly – was a rise of male labour force participation rates as the number of dependent children increased. This may explain the lack of consistency in the indirectly estimated coefficients by number of children aged 0-9 and 10-14 in the DMPAP model, which was encountered in both Venezuela and Brazil.

Glossary of abbreviations

ACE – Adult Consumption Equivalents
AIDS – Acquired Immunodeficiency Syndrome
ARV – Antiretrovirals
CAREC – Caribbean Epidemiology Centre
CARICOM – Caribbean Community and Common Market
CBR – Crude Birth Rate / Community Based Rehabilitation
CCA – Common Country Assessment
CELADE – *Centro Latinoamericano y Caribeño de Demografía* (Latin American and Caribbean Demographic Center)
CGE – Computable General Equilibrium
CLAP – *Centro Latinoamericano de Perinatología* (Center for Perinatology and Human Development) (Uruguay)
CONAPO – *Consejo Nacional de Población* (National Population Council) (Mexico/Bolivia)
DALY – Disability Adjusted Life Years
DHS – Demographic and Health Surveys
DMPAP – Demographic Model for Poverty Analysis and Projection
ECLAC – Economic Commission for Latin America and the Caribbean
ENADID – *Encuesta Nacional de Dinámica Demográfica* (National Survey of Demographic Dynamics) (Mexico)
ENDEF - *Estudo Nacional de Despesa Familiar* (National Study on Family Expenditures) (Brazil)
ENESF – *Encuesta Nacional de Epidemiología y Salud Familiar* (National Survey of Epidemiology and Family Health) (Honduras)
ENIGH – *Encuesta Nacional de Ingresos y Gastos de los Hogares* (National Survey of Household Incomes and Expenditures) (Mexico)
ENPOFAM – *Encuesta de Población y Familia* (Population and Family Survey) (Venezuela)
EOC – Emergency Obstetric Care
EPHPM – *Encuesta Permanente de Hogares de Propósitos Múltiples* (Permanent Survey of Households and Family Budgets) (Honduras)
FAO – Food and Agriculture Organization
FDI – Foreign Direct Investment
GCIM – Global Commission on International Migration
GER – Gross Enrolment Rate
HDI – Human Development Index
HIPC – Highly Indebted Poor Countries
HIV – Human Immunodeficiency Virus

HPV – Human Papilloma Virus
HTA – Home Town Association
IADB – Interamerican Development Bank
ICPD – International Conference on Population and Development (Cairo)
ICPD PoA – ICPD Programme of Action
ILO – International Labour Organization
IMPP – International Migration Policy Programme
IMR – Infant Mortality Rate
IMF – International Monetary Fund
INCAP – *Instituto de Nutrición de Centroamérica y Panamá* (Institute of Nutrition of Central America and Panama)
IOM – International Organization for Migration
IUD – Intrauterine Device
IPEA – *Instituto de Pesquisa Econômica Aplicada* (Institute for Applied Economic Research) (Brazil)
IPU – Interparliamentary Union
IUGR – Intrauterine Growth Retardation
IUSSP – International Union for the Scientific Study of Population
LAC – Latin America and the Caribbean
LBW – Low Birth Weight
LDC – Less Developed Country
LSMS – Living Standards Measurement Survey
MCH-FP – Maternal and Child Health / Family Planning
MDGs – Millennium Development Goals
MMR – Maternal Mortality Ratio
MTCT – Mother-To-Child Transmission
NIDI – Netherlands Interdisciplinary Demographic Institute
NTA – National Transfer Accounts
ODA – Official Development Assistance
OECD – Organization for Economic Cooperation and Development
PMCLA – Programme for Mexican Communities Living Abroad
PEP – Post-Exposure Prophylaxis
PNAD – *Pesquisa Nacional por Amostragem de Domicílios* (National Household Survey) (Brazil)
PoA – Programme of Action (ICPD)
POF – *Pesquisa de Orçamentos Familiares* (Household Expenditure Survey) (Brazil)
PPP – Parity of Purchasing Power
PRSP – Poverty Reduction Strategy Paper
PSA – Population Situation Analysis
RQNLA – Reintegration of Qualified Latin American Nationals
RH – Reproductive Health
RHCS – Reproductive Health Commodity Security

- SABE – *Salud, Bienestar y Envejecimiento* (Health, Wellbeing, and Aging)
SEDESOL – *Subsecretaría de Desarrollo Social y Humano* (Secretariat for Social Development) (Mexico)
SRH – Sexual and Reproductive Health
SRR – Sexual and Reproductive Rights
STI – Sexually Transmitted Infection
SUS – *Sistema Único de Saúde* (Unified Health System) (Brazil)
TB – Tuberculosis
TBA – Traditional Birth Attendant
TFR – Total Fertility Rate
U5MR – Under 5 Mortality Rate
UNAIDS – Joint United Nations Programme on HIV/AIDS
UNCED – United Nations Conference on Environment and Development
UNDP – United Nations Development Programme
UNDAF – United Nations Development Assistance Framework
UNIFEM – United Nations Development Fund for Women
UNFPA – United Nations Population Fund
WEAHR – Women’s Economic Activity and Human Reproduction Survey (Bolivia)
WEDO - Women’s Environment and Development Organization
WFS – World Fertility Survey
WHO – World Health Organization

