MODELLING THE IMPACT OF TRADE LIBERALISATION

ON WOMEN, AT WORK AND AT HOME

Marzia Fontana and Adrian Wood[2]

m.fontana@cgiar.org   a-wood@dfid.gov.uk

Background and objectives

Greater exposure to the world economy has uneven effects on women and men in developing countries, which are imperfectly understood, making it hard to design appropriate policies. Earlier research has documented the contribution of export growth to the expansion of female employment in manufacturing in many countries, and the adverse effect of growing cash crops for export on women's production of food in some African countries (Joekes and Weston, 1994). However, a full assessment of the impact of trade on women's earnings, job opportunities and well-being must take account of (i) linkages and feedbacks among different sectors and (ii) interactions between the market economy and the household economy.

For example, trade liberalisation that creates more jobs in female-intensive exporting sectors also destroys jobs in sectors producing import-substitutes. The lost jobs may or may not be female, but even if they are male, women members of the households of the men concerned may be adversely affected, either by reduction of consumption or by being forced to take paid work in addition to domestic commitments, including child-rearing. Growth of employment of women in exporting sectors may also occur largely through mobility from other sectors, with little or no increase in their net cash earnings. Moreover, even if increased employment involves a rise in women's labour force participation, this may be at the expense of the time they can devote to caring for their families, or of their leisure, their sleep and their health.

As these examples show, a better understanding of the impact of trade on women cannot be achieved just by further research on particular sectors or firms, or even particular households. It requires a comprehensive framework, both to track how the effects in specific sectors percolate through the rest of the market economy, and to analyse how these effects in the market economy influence, and are influenced by, behaviour in the unpaid household economy where women are the main workers.

The main objective of our project was to provide such a framework by constructing a gendered CGE (computable general equilibrium) model. This tool can be effectively used to assess the disadvantages and advantages of the various sorts of policy interventions which might be supported by DFID to spread the gains of trade liberalisation in developing countries equitably between women and men.

Methods

CGE models could be useful for gender analysis in various ways. They allow for linkages among actors and sectors, and trace indirect effects under clear behavioural assumptions, generating hypotheses and identifying relationships for testing in other sorts of empirical work. Above all, they permit controlled experiments in which the effects of a specific policy measure or shock can be isolated from other influences. Moreover, CGE models are multi-purpose tools: thus, although our immediate aim was to analyse the effects of trade in

developing countries, the type of model we have constructed could be used to investigate many other gender-related issues.

A CGE model is a system of equations which simulates the working of a market economy. The prices and quantities of all the goods and factors are determined simultaneously in every market by the need to equate supply with demand. Most of the equations in the model are microeconomic – specifying exactly how the quantities supplied and demanded in each market respond to price changes – but there are also a few macroeconomic equations to make everything add up correctly (so that, for example, saving equals investment).

The starting point for a CGE model of a particular country is the construction of a social accounting matrix (SAM) which provides information about its economic and social structure. Parameters and exogenous variables in the equations are then given values such that the initial solution of the model exactly replicates the economy represented in the SAM (i.e. the model is 'calibrated'). Once calibration is achieved, an unlimited number of policy experiments of many kinds can be undertaken.

Our strategy was to start from a standard CGE model, but to extend its accounting framework (the SAM) to distinguish female from male labour in all activities and to treat social reproduction (or household work) and leisure as sectors, in addition to the market sectors. Labour use is measured in terms of hours rather than persons, since most people are involved in both market and non-market activities. These two extra non-market sectors are assumed to behave qualitatively like market sectors – with inputs and outputs responding to demand and supply – but to differ quantitatively from market sectors, in particular with social reproduction employing mainly women (and with greater rigidity in gender roles) and being less responsive to price changes, because many of its services are necessities.

The creation of these two extra sectors emerged from our review of alternatives as the best way of 'nesting' a household model within the framework of an economy-wide general equilibrium model. Its disadvantages are that it assumes 'unitary' household behaviour, which is probably less realistic than modelling household decisions as the outcome of the conflicting interests and differing power of different household members, and behaviour of a strictly 'economistic' kind. Its advantages, however, are that it fits immediately into the standard framework of a CGE model, and is thus much easier both to explain to readers and for other modellers to adopt, which are important for the dissemination of the approach.

In the original proposal, we envisaged a more complex household model, based on bargaining behaviour, and we went as far as designing a way of doing this before deciding that at this early stage of the development of gendered modelling, the additional complexity would not be worth the gain in realism, because it would reduce the likelihood of what we were doing being understood by non-model-specialist audiences or being copied by other modellers. Our approach of treating the household as a production sector in a broader model of the economy can convey much of the reality of how a gendered economy operates, without making the analysis significantly more complex.

We fitted the model to a simplified set of data from Bangladesh, distinguishing only four market sectors and making no distinctions among different types of household or skill categories of labour. In this stripped-down prototypical framework, we simulated the effects of changes in trade policies and foreign capital flows on the employment, wages, leisure and social reproduction activities of women and men. We also tested the sensitivity of the results to alterations in the specification of the gender-related aspects of the model – both the values of crucial parameters and the inclusion or exclusion of the leisure and social reproduction sectors. Details of this model and these experiments were published in Fontana and Wood (2000), and some of the findings are discussed in the following section.

The original plan in our research proposal was to construct models of both a South Asian and an African economy. This is because the economic structure and gender features of these two regions are quite different, so that the effects of the same policies (and policy simulations with a given model) are likely to vary. The first steps in this direction were to construct more detailed social accounting matrices for Bangladesh and Zambia, with a greater number of market sectors and factors of production, female and male labour subdivided by level of education, and various household types, distinguished by socio-economic characteristics.

This proved an extremely time-consuming task, because of difficulties in assembling the necessary data and dealing with inconsistencies between the different sources involved. Although gender-disaggregated data are now generally available in household and labour force surveys, information on wages by gender seems to be very sparse, as are data on time use, which are rarely nation-wide and in some cases report only women's allocation of time, disregarding men's. We hope that in future more accurate and relevant gender-differentiated data will be collected, for use in models and for other purposes.

Thus, although we built up the two necessary data sets, we ran out of time before being able to turn them into models. This stage of the work will be undertaken soon, as part of a successor activity to this project, to be carried out by Marzia Fontana in the trade and macroeconomics division of IFPRI (the International Food Policy Research Institute) in Washington.

Findings

Our model experiments have provided insights into gendered economic outcomes which could not have emerged in a partial equilibrium framework. In particular, the experiments make clear that, to understand or predict the effects of changes in policies or other economic circumstances on women, it is important to take into account the interactions both among different sectors of the market economy and between the market economy and the non-market sphere (both reproduction and leisure). By excluding the household sector from the analysis (as for instance most standard general equilibrium models do), sight of much of women's work is lost and thus a seriously incomplete picture of the impact of economic reform on the well-being of women and their dependents results.

Thus, for example, one of the experiments we run with our simplified model of Bangladesh was to simulate the increase in production and export of ready-made garments which occurred in the country over the last decade or so. The impact on the labour market is that employment in manufacturing increases for both women and men, but the increase is much larger for women. Thus there is a substantial rise in women's participation in market activities, by nine percent. The corresponding falls in employment for women are largest, absolutely, in social reproduction and in agriculture, although the biggest proportional fall – about six percent – is in women's leisure time. Women's wage rates rise as well, both absolutely and relative to those of men, so that the female/male wage gap is narrowed by about eight percent.

The results are less unambiguously positive for women when the non-market sphere is taken into account: women experience a significant reduction in their leisure time, suggesting that their well-being is not necessarily improved by the expansion of female-intensive manufactured exports. Moreover the number of hours devoted to social reproduction by both women and men falls by three percent, which could adversely affect children and other dependents, particularly if market substitutes for household services are not available.

Our experiments with alternative specifications show that the magnitudes of these results (although not their directions) vary, depending on the assumptions made about the values of key parameters. There is uncertainty and disagreement about the responsiveness of gendered aspects of the division of labour to changes in economic incentives – for example, about how much the amount of time women spend on household activities would fall as a result of a given improvement in their market wage or employment opportunities, or about how much the mixture of female and male labour in market sectors might be altered by changes in the relative wages of men and women. In the absence of empirical estimates for these parameters, we carried out some sensitivity analysis by assuming values within a plausible range derived from general knowledge and case studies.

Our simulations show that the increase in female labour force participation resulting from the expansion of the ready made garment sector in Bangladesh would be less, only five percent, while the decline in their leisure time would be greater, nine percent, if there were greater rigidity in gender roles, particularly a lower responsiveness of the production and consumption of reproduction services to changes in their relative prices. The rise in the relative wages of women would be much larger, 23 percent as compared with eight percent in the previous case. This is because part of the increased demand for female workers in

manufacturing would still need to be met by substituting male for female labour in other sectors (including social reproduction), but, with greater gender rigidity, a larger increase in relative wages is required to induce this substitution. Conversely, in a more flexible world, women's market employment would increase more, their leisure would decline less, and their wages would rise less in relative terms (and fall absolutely).

These results suggest that women's overall well-being, and more generally social welfare, do not necessarily improve when women achieve economic gains, and show that the magnitude of the impact is also influenced by the degree of gender rigidity. Even when the economic impact of trade liberalisation is favourable to women, as in the case of Bangladesh, it is important to design complementary policies to reduce the many competing demands on women's time. For instance, measures to improve water collection and food processing, which seem to take up so much of women's non-market time in many developing countries, and availability of market substitutes for household services, such as child care, can be valuable, particularly when redistribution of tasks between men and women within the household does not occur when women take up jobs in the market.

Further applications of the model to our more disaggregated data sets for Zambia and Bangladesh, with more sectors and factors and different resource endowments, could also help in assessing the effects of different sorts of policy interventions that might be used to improve the efficiency and equity of trade liberalisation, and how this varies, depending on circumstances and countries. Improved access of women to education and labour legislation could be particularly relevant to formal-sector employment in manufacturing while in agriculture measures to improve women's property rights over natural resource use might be important. To use our modelling jargon, these reforms would increase 'the elasticity of substitution' between male and female workers, and hence facilitate a greater female supply response to the economic incentives resulting from trade liberalisation.

Dissemination

The hard-copy written outputs of the project consist of:

- An article in the special issue of *World Development* on 'Growth, Trade, Finance, and Gender Inequality', published in July 2000 (which is attached). This is the journal's second special issue on gender and macroeconomics, the first having been published in November 1995. Both reflect the efforts of an International Working Group on Gender and Macroeconomics (coordinated by Nilufer Cagatay, Diane Elson and Caren Grown and supported by the Ford Foundation and UNDP), into which our work was welcomed.

- Two IDS Working Papers reporting the results of simulations with the Zambia and Bangladesh variants of the model, to be published in the next few months.

We did not produce the originally proposed modelling manual (although the model software has been made available to the several people who have asked for it), because we used

very standard software, so that the structure of the model could be readily understood from its equations.

As far as electronic dissemination is concerned, our research is presented in a page on the IDS website, and a draft of the World Development article was published electronically in two Social Science Network abstracting journals in February 2000. Within three weeks, it had been viewed 113 times and downloaded 58 times, putting it in the top 10 most frequently downloaded papers on the Network. We did not use ID21 (as envisaged in the original proposal) because our outputs were of a relatively technical nature.

Our work has been presented at several seminars and conferences:

- Workshop of the International Working Group on Gender and Macroeconomic, New York, March 1999

- Brown Bag Seminar, IFPRI, Washington D.C., March 1999

- Trade and Macroeconomics Division Technical Seminar, IFPRI, Washington D.C., October 1999

- Seminar of the Gender Network at the World Bank, Washington, December 1999

- Annual IAFFE (International Association for Feminist Economics) Conference, Istanbul, August 2000

- Fourth regional meeting of the IDRC-funded MIMAP (Micro Impacts of Macroeconomics and Adjustment Policies) network, Philippines, September 2000

- DFID Seminar, October 2000

Our WD paper was also circulated at the conference on 'Trade, poverty and the environment: methodologies for sustainability impact assessment of trade policy' held on 17 November 2000 at the University of Manchester.

In the near future, our work will be presented at an IFPRI workshop in Dhaka in February 2001, at a conference on 'Global tensions' at Cornell University in early March 2001 and at an UNCTAD Gender and Trade Workshop in South Africa in late March 2001 (a meeting on building capacities for integrating gender in development strategies in preparation for the Third UN Conference for the LDCs). As agreed with DFID, the presentations in Bangladesh and South Africa replace the final dissemination workshop we had originally planned, which was dropped because one of the researchers, Adrian Wood, left IDS a few months before the end of the project.

The project has produced much interest among both feminist economists and modelling specialists, in developed countries and in developing ones. This has resulted in plans for further collaborative work with both IFPRI and the MIMAP network, which may take the

form of a more complex gendered model of Bangladesh, some applications of it to other South Asian and African countries, and the publication of a general equilibrium modelling manual with treatment of gender issues, aimed at statisticians in developing countries. We feel therefore that the project has fully succeeded in achieving its most basic objective, which was to get people thinking about and working on gendered models as a way of approaching the practical issues involved.

References

Fontana, M. and Wood, A. (2000) 'Modeling the effects of trade on women, at work and at home' *World Development* 28(7).

Joekes, S. and Weston, A. (1994) *Women and the New Trade Agenda*, UNIFEM, New York.

Appendix

'Modeling the effects of trade on women, at work and at home' by Marzia Fontana and Adrian Wood, published in *World Development* 28(7).