



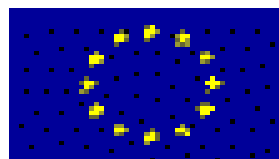
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Modeling the effects of Trade on women, at work and at
home: a comparative perspective

by Marzia Fontana



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**MODELLING THE EFFECTS OF TRADE ON WOMEN,
AT WORK AND AT HOME:
A COMPARATIVE PERSPECTIVE**

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Abstract - The effects of trade on women vary by socio-economic characteristics, sector and country. This paper assesses whether such effects can be adequately captured by a gendered social accounting matrix (SAM) and computable general equilibrium (CGE) model. These are applied comparatively to Bangladesh and Zambia to highlight how differences in resource endowments, labour market institutions and socio-cultural norms shape the way in which trade expansion affects gender equality. The paper analyses simulation results in the context of other approaches in the gender-and-economics literature, discusses strengths and limitations of the CGE methodology, and provides suggestions for further research.

Paper for the workshop on 'Methodological tools for assessing the sustainability impact of EU's trade policies', EU-CEPII, Brussels, 7-8 November 2002. This work draws on my doctoral research 'Modelling the effects of trade on women, at work and at home', completed partly at IDS, University of Sussex and partly at the Trade and Macroeconomics Division of IFPRI, Washington D.C. Many valuable suggestions from Adrian Wood, Shahin Yaqub, and Marcelle Thomas are most gratefully acknowledged.

I. Introduction

The effects of trade expansion on women in developing countries are mixed, differing by sector, geographical region, and socio-economic characteristics. A gender-aware approach to trade expansion would measure, first, the impact on women's current material status, given existing tasks and responsibilities under the gender division of labour – what in the literature has been termed 'practical gender needs' (Moser, 1989 and Molyneux, 1985). It should also aim to assess whether trade policies and outcomes contribute to more egalitarian gender relations, by reducing the basis of women's economic disadvantage and by modifying the gender division of labour in the labour market and/or in the household – what Molyneux and Moser would call 'strategic gender needs'. For example, a short-term increase in female market employment might address a practical gender need by providing women with new earning opportunities. The extent to which strategic gender needs would also be met would depend on the level and quality of that employment, on whether the jobs are regular, stable and safe and whether they would widen women's options.

Understanding how both practical and strategic gender interests are affected by greater exposure to trade would thus entail giving consideration to both short and long term changes in the labour market, in the household and in a range of other institutions– and to interactions among them. One would need to examine direct and indirect employment, price and income effects and also variations in access to resources. For instance, it would be important to assess not only whether women earn more income relative to men but also whether they gain greater control over it, what effect earnings have on women's own perceptions and on their social relations within the household and in the broader community. This would require taking into account not only objective but also subjective indicators of well-being. Possible shifts in government spending and taxes resulting from trade liberalisation, as well as changes in risk and vulnerability of households, should also be given attention as these are likely to have gender-differentiated outcomes (for example when a reduction in tariff revenue affects the public provision of infrastructure and social services that are more frequently used by women).¹

¹ McCulloch and Winters (2001) discuss these aspects in their chapter 4, but they do not highlight their implications for gender differences.

Computable general equilibrium (CGE) models can be designed to include gender dimensions. Fontana and Wood (2000), for example, distinguish female from male labour and include household work and leisure as sectors in the SAM, in addition to standard market activities. This paper develops their work methodologically and empirically. The Fontana and Wood approach is applied to Bangladesh and Zambia as these two countries have different resource endowments, with abundant labour in Bangladesh and abundant natural resources in Zambia. Gender relations in each are shaped by different labour market institutions, systems of property rights and socio-cultural norms, thus making comparison interesting.

Section II describes how a social accounting matrix (SAM) can be made gender-aware. It illustrates this with data sets from Zambia and Bangladesh that are then used for the model simulations analysed in Section III. Section IV analyses the simulation results in the context of other non-modelling approaches in the gender-and-economics literature, to identify methodological strengths and limitations. The paper concludes by suggesting improvements for future work.

II. Comparison of SAMs

II.1. SAMs as tools for gender analysis

By describing all transactions between sectors and institutions in the economy (at one point in time), social accounting matrices are a useful tool for analysis of income distribution. The SAM framework is flexible enough to represent a wide range of socio-economic characteristics, thus allowing an understanding of diverse economic, social and cultural settings important for the design of policies.

The demand for integrated systems of social and economic statistics has been rising, and so have attempts to extend the conventional structure of the SAM to incorporate a larger number of indicators. This can be done by providing a greater level of detail for existing material contained in the traditional national accounts (for example by disaggregating further agricultural sectors into female-intensive crops and male-intensive crops, if the issue of concern is gender relations in rural settings) – what are called ‘internal satellite accounts’ – and/or by adding new data and extending

definitions of what constitutes production or assets— what are called ‘external satellite accounts’. Examples of external satellite accounts are those which estimate environmental costs of production, and those that provide a valuation of household own activities.

Many of these new SAM extensions can contribute significantly to understand the gender effects of economic reforms, by providing better insights into the different roles of women and men in the generation and distribution of income and the interactions between households and the market economy. The development of satellite time-use modules, which keep a record of how much time people spend on various tasks and impute a monetary value to non-market time, spent either on household activities or on leisure, is of particular relevance to gender analysis.

As early as 1987 Pyatt recommended extension of SAM accounts by imputing value to time which is not explicitly marketed for financial remuneration. Pyatt notes that this would make a considerable difference to the welfare profile across socio-economic groups, especially from a gender perspective: ‘... since the economic activities of women are disproportionately concentrated on unremunerated activities, the present proposals would go a long way towards redressing the current practice of grossly discounting their contribution’ (1987:1).

To make these household services visible, beyond being important in itself, allows consideration of more constraints and interactions than with a standard accounting framework, particularly interactions between behaviour inside and outside the household which are crucial to understanding issues such as the response of female labour force participation to reform of economic policies. An accurate assessment of the gendered impact of economic policy changes also requires explicit consideration of time spent on leisure. This is because there are sharp differences in the extent of personal time between women and men and because changes in the market can alter the amount of time spent on rest and recreation, thus affecting welfare in ways that are overlooked in standard economic analysis. If two households have the same money income but in one its members have more personal time for leisure and relaxation, then there is an evident difference in their living standards, which should be taken into account in policy formulation.

Evaluations of this kind, however, are data demanding and often methodologically difficult, which might explain why only a few countries to date provide satellite accounts regularly. Most are developed countries such as the Netherlands (Kazemeir et al, 1998), Australia (Ironmonger, 1999) and Canada. One notable exception among developing countries is India, for which SAMs incorporating environmental concerns (Nugent and Sharma, 2002), the informal sector and gender-disaggregation in the labour market (Sinha, 2000) have been constructed.

Most of the (few) available SAMs with gender features limit these to disaggregation of some sort or other of conventional accounts. For example, Nyanzi (2000) in a SAM for Uganda distinguishes household types not only by location and income level but also by the gender of the household's head. This allows him to assess the gender implications of changes in both direct and indirect taxation, given that female-headed households and male-headed households appear to have markedly different sources of income and consumption patterns.

Fontana and Wood (2000) take the gender disaggregation of SAMs further. They not only distinguish factors, sectors and households by gender but also add estimates of social reproduction (or household work) and leisure to the standard accounting framework. This approach is used to extend two existing SAMs of Bangladesh and Zambia, which are compared in the following section.

II.2. Bangladesh and Zambia

Sub-Saharan Africa and South Asia are markedly different in their export structure, with Africa's exports heavily concentrated on primary products and South Asia's exports constituted mainly of labour-intensive manufactures. These differences largely reflect differences in the two regions' combination of human and natural resources relative to other regions: abundant natural resources and low level of education in Africa and few natural resources and low level of education relative to the supply of labour in South Asia (for useful accounts read Wood and Mayer, 2001 and Mayer and Wood, 2001). Zambia and Bangladesh are no exception to these patterns. In Zambia the main export is copper, which constitutes almost 80 percent of total exports, while in Bangladesh the main export is ready-made garments (RMG),

which provides over 60 percent of total foreign earnings. The Bangladeshi labour force is on average less educated than the Zambian one but the ratio of person-years of schooling to square km of land is 40 times larger in Bangladesh than in Zambia.²

Traditionally, women's participation in market activities in Bangladesh has been very low and confined to a narrow range of casual jobs on the margins of the labour market. However, since the establishment of the garment factories in the 1980s, significant changes in female labour force participation have taken place. These are documented in a rich literature (Kabeer, 2000, Sobhan and Khundker, 2001, Zohir, 1998, and many others). Women's contribution to agriculture is significant but still little studied, as women in this sector work mostly as unpaid family labour on activities carried out within the homestead.

Much of the analysis undertaken in Zambia on women's issues is concerned with the historical evolution of gender and economic relations in the context of gradual monetisation of the economy and of colonial policies which encouraged male labour migration to the cities and discouraged female migration, with a resulting increase of female headed households in the rural areas (Moore and Vaughan, 1993). Zambia has a high proportion of female-headed households who face particular constraints as producers and are over-represented among poor small farmers. There is a strong dualism in men's and women's rights and responsibilities in Zambian agriculture. Non-staple food crops are women's sole responsibility but, mostly, a 'mixed' farming system prevails, in which crops are grown with both male and female labour. In urban areas women are heavily concentrated in informal sector occupations.

The gendered social accounting matrices for Bangladesh and Zambia described in this section both refer to a similar time period, 1993 for Bangladesh and 1995 for Zambia. They were constructed by integrating existing data sets with additional information on the gender structure of the economy, both in the labour market and at the household level. The innovative feature of these two SAMs is the addition of social reproduction and leisure activities. Social reproduction includes services provided within

² In 1990 the ratio was 1100 for Bangladesh and 27 for Zambia: Wood and Mayer (2001) and Mayer and Wood (2001).

households for own-consumption, which the standard System of National Accounts (SNA) defines as ‘economic’ but not ‘productive’ (UN 1993), such as: cooking and cleaning; care of children, the sick and the elderly; repairing the house, furniture and clothes; and personal, social and community support services. Leisure covers activities which the SNA defines as ‘non-economic’ (because they cannot be delegated to a third person) but excludes the minimum time needed for sleeping, eating, personal hygiene, and medical treatment (assumed to be 10 hours for both men and women).³ The value added in the social reproduction and leisure sectors is estimated in the following way. First, the time spent by household members (of working age) on reproduction and leisure is calculated. The output in these sectors is then derived by valuing labour, for each skill and gender category, at its average market wage (considered to be the opportunity cost of each worker’s time), assuming that non-market sectors use neither capital, nor land nor intermediate inputs (for further details on the SAMs and the limitations of this approach see Fontana, 2001 and Fontana, 2002).

Table 1 – Export composition and gender structure of the labour force in Bangladesh and Zambia (%)

	Bangladesh		Zambia	
	Total exports	Female market employment	Total exports	Female market employment
Primary products*	8.1	68.9	81.2	64.4
of which copper	0.0	0.0	78.4	0.3
Manufactures	91.9	11.2	8.6	6.3
of which garments+	60.8	6.4	4.4	6.2
Services	0.0	19.9	10.2	29.3
of which infrastructure**	0.0	0.6	5.2	0.1
Total	100.0	100.0	100.0	100.0

Source: 1993 Bangladesh and 1995 Zambia gendered SAMs

Notes: * SITC definition (it includes processed primary)

** Infrastructure includes construction and utilities. Energy is exported by Zambia to neighbour countries, especially Zimbabwe.

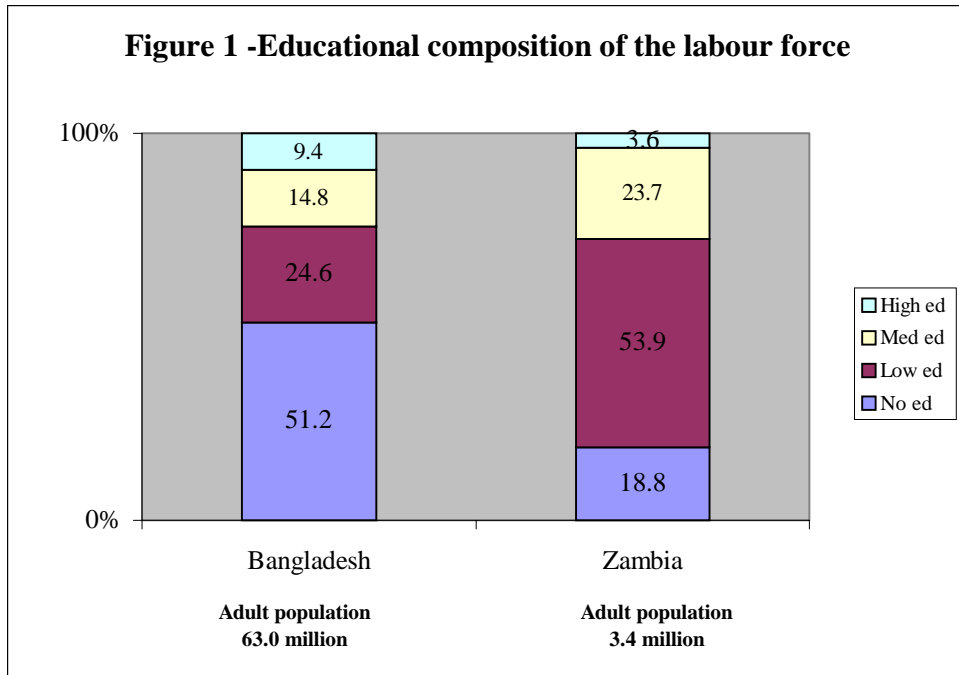
+ For Zambia, what is reported under ‘garments’ is a broader sector including all kind of textiles, food, beverages, tobacco and wood products. More disaggregated data are not available in the gendered SAM but can be found in the original Hausner SAM (1996).

³ Some studies, such as Zaman (1995) on Bangladesh, suggest that time spent eating and sleeping might also vary by gender. In these SAMs, however, for simplicity, differences in time spent on personal care by men and women are all captured by differences in leisure time.

Table 1 compares the export structure and the employment distribution of the female labour force in the two SAMs. It shows that exports are quite concentrated in both countries and that the proportion of the female labour force employed by the export sectors is higher in Bangladesh than in Zambia. Manufactures constitute about 92 per cent of total exports in Bangladesh and accounts for about 11 per cent of female market employment. In Zambia, copper constitutes about 78 per cent of exports but employs less than one per cent of the female labour force. In both Bangladesh and Zambia more than 60 per cent of women work in agriculture, a sector with few exports (and probably, in both countries, with few prospects of becoming a leading export sector).⁴ Women work also in services (30 per cent of the female labour force is in services in Zambia and 20 per cent in Bangladesh) but are mostly concentrated in sectors which are non-traded (trade and transport in Zambia and domestic services in Bangladesh).

Bangladesh is a much more populated country than Zambia, with an adult population of about 63 million compared with 3 million in Zambia. On average the adult population is better educated in Zambia than in Bangladesh. More than 50 per cent of the working population has no education in Bangladesh while in Zambia the share of illiterates is only 19 percent, as illustrated in figure 1.

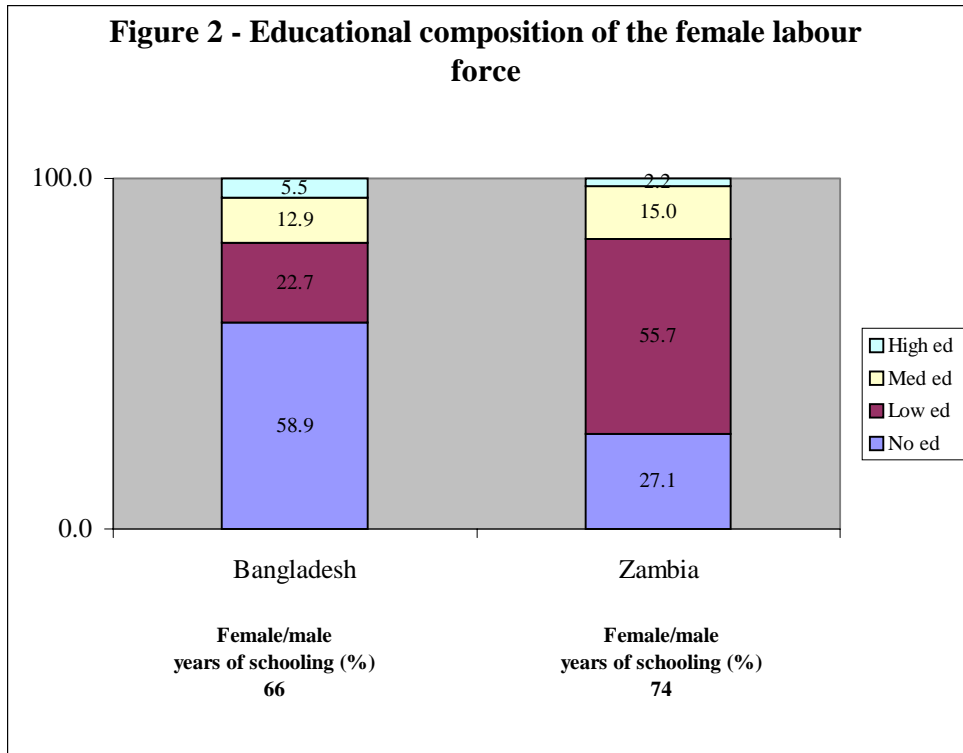
⁴ Some studies indicate that Zambia might have some advantage in the production of non-traditional agriculture and that women could benefit from it. However none of the experiments in this paper suggest the possibility of a significant expansion of female intensive agriculture, unless something drastic happens to the structure of the country.



Source: 1993 Bangladesh and 1995 Zambia gendered SAMs

The proportion of the workforce with primary or secondary education is about 77 per cent in Zambia and 39 per cent in Bangladesh. The level of education of women is lower than that of the total population in both countries, as shown in figure 2. Although Bangladesh has a much larger share of adult population with no schooling than Zambia, it also has a higher proportion of highly educated workers (9 per cent compared with 3 per cent in Zambia). For this reason the Gini coefficient for educational distribution reveals greater inequality in Bangladesh (57.9) than in Zambia (27.4). The Gini coefficient for income distribution is however higher in Zambia (52.4) than in Bangladesh (28.3).⁵ In Bangladesh the educational distribution of the adult population is more unequal not only across educational categories but also across genders: average years of schooling for women are about 66 per cent of average years for men in Bangladesh, and 74 per cent in Zambia.

⁵ Gini coefficients for educational distribution were calculated by the author and Gini coefficients for income distribution are taken from Deininger and Squire (1998).



Source: 1993 Bangladesh and 1995 Zambia gendered SAMs

Gender inequality is larger in Bangladesh than in Zambia also as far as wages are concerned. This is described in table 2. Women with no education earn less than 50 per cent of what men of the same group earn in Bangladesh compared with 65 per cent in Zambia. The sharpest difference is for women with secondary education who earn 95 per cent of what men of similar skill earn in Zambia but only 45 per cent in Bangladesh. The gender wage gap narrows with higher education in both Bangladesh and Zambia.⁶

Table 2 - Female/male wage gap by educational level

(female wages as percentage of male wages)

	No ed	Low ed	Med ed	High ed
Bangladesh	48	54	45	70
Zambia	65	59	95	95

Source: 1993 Bangladesh and 1995 Zambia gendered SAMs

⁶ This information should be taken with caution as reliable data on wages are not available.

As indicated in table 3, on average, the adult population of both Bangladesh and Zambia spend about 38 per cent of time on leisure and 62 per cent working. There are however differences between the two countries in how the work is distributed between the market and the household, with people in Bangladesh spending 28 per cent of the time on market work compared with 43 per cent in Zambia and 34 per cent on social reproduction compared with 19 per cent in Zambia. These different patterns mainly reflect women's lower market participation in Bangladesh, which results in more time overall being devoted to household work. Men spend the same share of time on market work in the two countries (42 per cent) but enjoy more leisure in Zambia (52 per cent of total time compared with 42 per cent in Bangladesh). A possible interpretation could be that, because of stricter socio-cultural norms that encourage women to stay within the homestead, in Bangladesh men are more inclined to get involved in household tasks such as food shopping, or anything else that involves 'being seen'. Fafchamps and Quisumbing (1999) find this type of specialisation in rural Pakistan, where men dominate in 'outside' housekeeping tasks such as firewood collection or visiting the market.

Table 3 -Allocation of time between market and non-market activities (%)

Bangladesh				
	Total	Female	Male	
Market	27.8	13.3	42.0	
Social reproduction	34.4	53.2	16.1	
Leisure	37.8	33.6	41.9	
Total	100.0	100.0	100.0	
Zambia				
	Total	Female	Male	
Market	43.4	44.9	42.0	
Social reproduction	18.5	32.9	5.7	
Leisure	38.1	22.2	52.3	
Total	100.0	100.0	100.0	

Source: 1993 Bangladesh and 1995 Zambia gendered SAMs

It is difficult to offer an explanation for these differences between Bangladesh and Zambia, especially since it is not even certain whether the time allocation surveys for the two countries adopt the same definition of household work.⁷ These patterns, however, are consistent with other evidence on time allocation in South Asia and Sub-Saharan Africa. Studies reviewed in Ilahi (2000) show that in Africa women spend longer hours in both agricultural and non-agricultural activities than do men, while in Asia (and Latin America) the picture is one of a more marked gender division of labour, with men concentrating on income generating work and women on housework. Comparison of table 3 with table 2 reveals another interesting pattern: a more unequal gender allocation of market and non-market time is associated with a wider gender wage gap. It is not always easy to understand the likely direction of causation between these two facts - whether women spend more time on household work because higher wage discrimination in the labour market (that makes it not profitable for them to work outside their home), or whether the gender wage gap is due to women performing more burdensome work at home, which reduces their energy and flexibility in the job. Research on these aspects is growing but limited to developed countries (for example Bonke, Gupta and Smith, 2002 on Denmark).

Tables 4 and 5 show that the skill and gender composition of both market and non-market sectors varies between Bangladesh and Zambia. Of the two non-market sectors, social reproduction is more female intensive in Zambia (female time is 84 per cent of total labour time) than in Bangladesh (76 per cent of total). Moreover, while in Zambia social reproduction is more female intensive than any market sector, in Bangladesh there is one market sector, garments, which is more female intensive than social reproduction (83 per cent of total time is female).⁸ The garment sector is also the most export oriented sector (88 per cent of its output is exported, as indicated in the third column of table 6) and one of the most labour intensive sectors (labour accounts for 77 per cent of total value added as shown in the second column of table 6).

⁷ Estimating the allocation of women's and men's time between market and non-market activities was not easy, as data on time-use, both in Bangladesh and Zambia, are sparse and cover neither all tasks nor all geographical areas (no detailed time-use study was available for the urban areas, for example).

⁸ This is true also when social reproduction is considered by household type, with the only exception of social reproduction in rural female-headed households in which female time is 92 per cent of the total.

Table 4-Educational and gender structure of the SAM sectors, Bangladesh

	Shares of sectoral employment (%)				
	No ed	Low ed	Med ed	High ed	Females
Grains	59	26	12	4	17
Commercial crops	57	28	11	4	3
Livestock&horticulture	61	25	11	3	47
Fishing	36	17	28	19	29
Food processing	48	26	18	9	30
Garments	43	34	17	7	83
Other textiles	31	35	20	14	12
Other manufacturing	37	31	20	12	16
Infrastructure	48	27	12	13	5
Trade	30	29	24	18	5
Transport	56	26	11	7	1
Public services	5	8	17	70	20
Financial services	3	9	13	75	6
Domestic services	48	25	17	9	43
All market sectors	49	26	15	11	24
All social reproduction	55	23	14	8	76
All leisure	50	25	15	10	44
ALL	51	25	15	9	49

Source: 1993 Bangladesh and 1995 Zambia gendered SAMs

Table 5-Educational and gender structure of the SAM sectors, Zambia

	Shares of sectoral employment (%)				
	No ed	Low ed	Med ed	High ed	Females
Maize	7	88	5	0	54
Commercial crops	6	94	0	0	41
Horticulture&groundnuts	19	54	24	4	60
Food and livestock	60	40	0	0	70
Fishing and forestry	12	78	10	0	7
Mining	10	45	41	4	7
Labour-intensive mfg	7	31	57	5	43
Capital-intensive mfg	43	49	7	1	4
Construction and utilities	20	80	0	0	3
Trade and transport	18	46	33	4	51
Public services	35	49	15	1	29
Market services	6	36	52	6	32
All market sectors	7	22	53	18	49
All social reproduction	20	65	14	2	84
All leisure	25	55	18	3	27
ALL	19	54	24	4	47

Source: 1993 Bangladesh and 1995 Zambia gendered SAMs

Leisure is more male intensive in Zambia (only 27 percent of total leisure time is female) than in Bangladesh (female share is 44 per cent). In fact, in Bangladesh leisure is more female intensive than most market sectors (with the exception of livestock and horticulture and, of course, garments). Conversely, in Zambia, most market sectors (except for mining, capital-intensive manufacturing, infrastructure and forestry) are more female intensive than leisure. The most female intensive sectors in Zambia are the agricultural sectors, especially food and livestock (in which 70 per cent of total time is female) and horticulture and groundnuts (60 per cent). These sectors are the least skill intensive sectors in the market economy in Zambia (although on average they are more skill intensive than similar sectors in Bangladesh, reflecting the higher average educational level of the workforce in Zambia). Other relatively female intensive sectors in Zambia are trade and transport, with female time being 51 per cent of total time. The same sectors in Bangladesh are very male intensive (less than 5 per cent of total time is female). Mining, which is by far the most open sector in Zambia (more than 93 per cent of its output is exported), is highly male intensive, with a female share in total time of only 7 percent. Mining is also the most capital-intensive sector (capital contributes 86 percent of total value added).

Table 6 – Sectoral structure of Bangladesh and Zambia

	Net output (% of GDP)	Labour as shr of VA (%)	Export intensity*	Import penetration*	Tariffs as shr of imports (%)
Bangladesh					
Grains	8.8	54.8	-	2.3	12.5
Commercial crops	3.6	33.2	0.1	6.6	2.0
Livestock and horticulture	6.9	44.5	0.2	1.9	8.5
Fishing	2.8	6.3	10.0	-	-
Food processing	4.5	13.1	1.4	1.8	61.4
Garments	1.5	84.9	87.5	8.2	4.1
Other textiles	2.7	72.2	18.5	28.3	11.8
Other manufacturing	3.9	42.2	1.9	45.8	20.8
Infrastructure	12.2	17.5	-	-	-
Trade	16.7	76.6	-	-	-
Transport	14.5	35.4	-	-	-
Public services	12.2	32.2	-	-	-
Financial services	5.5	20.4	-	-	-
Domestic services	3.9	92.7	-	-	-
All market sectors	100	43.6	11.4	19.6	18.4
All social reproduction	36.6	100.0	-	-	-
All leisure	52.6	100.0	-	-	-
Total	189.2				-
Zambia					
Maize	4.3	69.5	4.3	15.0	3.1
Commercial crops	1.4	55.6	15.6	16.9	0.4
Horticulture and groundnuts	5.6	90.6	2.9	2.7	21.0
Food and livestock	6.7	80.7	1.9	4.7	18.6
Fishing and forestry	4.8	55.7	-	0.2	15.9
Mining	17.3	13.9	93.3	23.3	20.3
Labour-intensive manufacturing	9.6	51.7	4.0	13.0	11.8
Capital-intensive manufacturing	3.1	35.2	9.1	65.0	14.1
Construction and utilities	6.4	17.7	10.1	0.2	19.5
Trade and transport	20.6	57.9	-	7.7	13.4
Public services	7.3	77.1	-	-	-
Market services	13.0	52.8	8.6	25.2	13.4
All market	100.0	50.9	16.5	20.3	13.4
All social reproduction	20.8	100.0			
All leisure	67.8	100.0			
Total	188.6				

Source: 1993 Bangladesh and 1995 Zambia gendered SAMs.

Note: *Export propensity is measured as the share of exports in gross output and import penetration is measured as the share of imports in domestic use.

III. Comparison of simulations

The previous section has highlighted several differences between Zambia and Bangladesh. Although the two countries have similar production structures (particularly the shares of both agriculture and manufacturing in GDP as can be seen in table 6), they differ in the sectoral composition of their foreign trade. The degree of their integration into world markets varies – with Zambia being more open than Bangladesh (as shown in table 7, exports plus imports are 77 per cent of GDP in Zambia and 20 percent of GDP in Bangladesh) – and so does the female intensity of their traded sectors – with export sectors employing more women in Bangladesh than in Zambia. The combination of their human and natural resources is significantly different and so is their distribution – with wealth inequalities being more marked in Zambia but gender inequalities in education and wages being higher in Bangladesh. It is to be expected therefore that same trade policies or shocks would have different gendered outcomes in the two countries.

Table 7 – Tariffs and openness (%)

	Bangladesh	Zambia
Average tariff rate	18.4	13.4
Tariffs as share of government revenue	30.7	30.0
Imports as share of GDP m.p.	12.1	41.0
Exports as share of GDP m.p.	7.5	36.1

Source: 1993 Bangladesh and 1995 Zambia gendered SAMs

A computable general equilibrium model applied to the Bangladesh and Zambia SAMs is used to analyse the effects of changes in trade policies. The main experiment described in the first part of this section simulates the abolition of all tariffs. Both Bangladesh and Zambia have, on average, moderate levels of protection. As shown in table 7, the average tariff rate, measured by the ratio of total tariff revenue over total imports, is about 18 percent in Bangladesh and about 13 percent in Zambia. The same table also shows that tariffs constitute approximately 30 percent of total government revenue in both countries. However, as indicated in the last column of table 6, the degree of tariff dispersion is higher in Bangladesh, ranging from 2 per cent in commercial crops (which in Bangladesh are mainly jute, sugar and tea) to more than 61 percent for food processing (due to very high protection in the edible oil

sector). In Zambia the tariff range goes from almost zero in commercial crops (cotton, sugar, tobacco and coffee) to 21 percent in horticulture and groundnuts.

In the second part of this section the simulation of tariff abolition is re-run with alternative parameter values to test the sensitivity of the results to different degrees of responsiveness of gendered aspects of the division of labour to economic change. Two other trade experiments are also analysed: an introduction of a uniform tariff and higher import price of food grains.

The model follows the ‘neoclassical structuralist’ approach developed by Dervis, de Melo and Robinson (1982). A standard version of the model is documented in Lofgren et al. (2001) while the principles underlying its gendered application are discussed in Fontana and Wood (2000), to which the reader is referred. A brief description of closures and exogenously specified elasticity parameters is provided in the following paragraphs.

The macro closures and the factor market closures, as well as the elasticities for factor substitution and foreign trade, are set the same for both Bangladesh and Zambia. This might not be ‘realistic’ but ensures that experiment outcomes are driven exclusively by differences in the economic structure of the two countries (including their initial tariff system), rather than by differences in behavioural parameters.

The production function in the model is a three-level constant elasticity of substitution (CES) function. The substitution elasticity values for each level are listed in table 8. At the lowest level, for each educational category, female labour and male labour of the same skill are aggregated into composite labour. The ratio of female to male labour depends on the share parameter of this aggregation function, which differs across sectors, and varies with the wage rate of women relative to men, which induces substitution between them. To reflect the rigidity of gender roles, particularly within the household, female/male substitution is limited by setting the value of the elasticities to -0.5 in the market sectors and -0.25 in social reproduction and leisure. The production function has an intermediate level which aggregates the four educational types of composite labour, with a substitution elasticity of -0.5 , into one

larger labour bundle. This larger labour bundle is the ‘output’ of the reproduction and leisure sectors, which in the SAM use neither capital nor land nor intermediate inputs. In the market sectors, however, the production function has an upper level which combines composite labour with capital and land to produce net output (which is then combined in fixed proportions with intermediate inputs to make gross output). The value of the substitution elasticity at the upper level varies by sector, ranging from – 0.5 in agriculture to –0.8 in manufacturing and services.

Table 8 – Values of substitution elasticities in the CES production function

	Market			Non-market
Lower level (Labour by gender for each educational group)	0.5			0.25
Intermediate level (Labour by education)	0.5			0.5
	Ag	Mfg	Sv	
Upper level (Labour and non-labour factors)	0.5	0.8	0.8	-

The treatment of foreign trade in the model is such that buyers in each sector divide their expenditure between imports and domestically produced goods in shares which vary in response to changes in the ratio of domestic to import prices. Likewise, producers in each sector divide their output between the home and the export markets in shares which vary with the ratio of domestic prices to export prices. These CES import Armington functions and export CET functions partially insulate domestic prices from world prices, unlike more standard trade models in which the domestic prices of traded goods are strictly determined by world prices. As shown in table 9, the elasticity of substitution in both these functions is set at –2.0 in agriculture, –1.5 in manufacturing and –0.8 in services.⁹

⁹ Elasticity values of –0.8 are considered ‘medium low’, –1.5 ‘medium high’ and –3.0 ‘very high’ (Sadoulet and de Janvry, 1995).

Table 9 – Values of trade elasticities

	CET	Armington
Agriculture	2.0	2.0
Manufacturing	1.5	1.5
Services	0.8	0.8

As for the model macro closures, foreign savings are fixed and exports and imports adjust through changes in the real exchange rate. Government consumption and total investment are fixed shares of absorption. The savings-investment balance is achieved through adjusting the household propensity to save. The government account balance is achieved through adjusting direct tax rates. It is assumed that loss of revenue from imports is fully recovered by introducing higher direct taxes. In the simulations described in this paper the government increases the income tax rate by a uniform number of percentage points for all income recipients, hence spreading the burden uniformly across households and enterprises. Alternative government account closure rules would be possible. For example, assuming less progressive taxation, or flexible government consumption, would lead to important differences in distributional effects, in terms of both income and gender.

As for the factor market closures, the assumption is that the supply of capital and land in each sector is fixed, but labour is mobile, so that supply to each sector responds freely to demand, within limits set by the fixed total supplies of female and male labour. Other features of the Bangladesh and Zambia models used in this paper are the same as in the models described in Fontana (2001) and Fontana (2002) respectively.

The simulation results described in the following pages are analysed with particular attention to: (i) changes in the allocation of female labour between employment in the market economy (and among its different sectors), social reproduction and leisure and (ii) the female wage rate, both absolute and relative to male wages. While the labour categories are identical in the two countries, the classification of production sectors and household types differs between them. To make comparison of results easier, changes are often reported for aggregated categories.

III.1. Abolition of tariffs

When all tariffs are removed, the total volume of imports increases by 3.5 per cent in Zambia and by 14.7 per cent in Bangladesh. Imports increase the most in manufacturing, but also in female-intensive agriculture in Zambia, and in manufacturing other than garments in Bangladesh, as these were previously the most protected sectors. In both cases the trade balance is restored by a depreciation of the exchange rate, which is higher in Zambia (7.6 percent) than in Bangladesh (0.6 percent). This has partly to do with the supply elasticity of the export sectors, which is greater in Bangladesh than in Zambia because of the much larger share of labour value added in garments as compared with mining. Since the assumption in the model is that labour is a mobile factor while the supply of capital and land in each sector is fixed, a sector that uses large inputs of labour relative to land and capital would be able to increase more easily its output in response to price changes.¹⁰

As a result of the exchange rate depreciation, exports rise in both countries, mainly in garments in Bangladesh, and in mining and in male-intensive agriculture in Zambia. These changes in exports and imports cause domestic market output to increase in both countries by about 0.5 percent. The results by sector are presented in table 10. The sectors which expand the most are manufacturing in Bangladesh and mining in Zambia. Within the Bangladesh manufacturing sector, it is garments that rise while food, beverages and tobacco, and other manufacturing decline. Manufacturing in Zambia is unchanged, because of offsetting changes between the capital-intensive sector, which declines, and the labour-intensive sector, which slightly increases. Agriculture (mainly grains) declines marginally in Bangladesh while it increases in Zambia, due to higher production of male-intensive commercial crops and maize, while output in both female-intensive sectors - food staples and horticulture – falls.

¹⁰ The sectoral price elasticity of supply is given by $\varepsilon_i = \sigma_i * \theta_{iL}/\theta_{iK}$, where σ_i is the elasticity of substitution in production between factors and θ_{iL} and θ_{iK} are the factor shares for labour and capital or, more in general, for the mobile factor (L) and the fixed factor (K) (Dervis, de Melo and Robinson, 1982: 264).

**Table 10 – Effects of tariff abolition on output
(percentage changes from the base case)**

	Bangladesh	Zambia
Market, of which:	0.5	0.6
Agriculture	-0.2	0.4
Mining	-	1.8
Manufacturing	3.2	0.1
Services	0.2	0.4
Social reproduction	-0.2	-0.3
Leisure	-0.3	-0.7

Source: Model simulations

The corollary of higher market production is an output fall in social reproduction and leisure. The effect of tariff elimination is to reduce the average price of traded relative to non-traded goods and services. Hence, in both countries, market sectors expand and non-market sectors, being non-traded, contract. The decline is higher in leisure than in social reproduction, since the consumption of leisure is more responsive to price changes than that of household work. Leisure, a male-intensive activity, declines in Zambia more than in Bangladesh, because its opportunity cost increases more in the former country than in the latter, reflecting a larger rise in male wages. The increase in total output (both market and non-market) is 0.2 percent in Bangladesh and negligible in Zambia.¹¹

Because of the different gender composition of the expanding and contracting sectors in the two countries, the increase in female market labour force participation in the experiment is larger in Bangladesh than in Zambia and so is the rise in female wages. Effects across educational groups also vary between the two countries.

Employment in the garment sector in Bangladesh rises by about 37 per cent for both women and men, but the absolute increase is higher for women than for men, because of their much larger initial share. Reflecting the educational composition of the

¹¹ Under the assumption of full employment of all factors, changes in total output from simulations can only be slight. A small increase in output could be the result of reallocation of resources from less productive sectors to more productive ones. Manufacturing is more productive than the average (as measured by the wage distortion factor $WFDIST > 1$) in Bangladesh and so is mining in Zambia, but agriculture is less productive than the average ($WFDIST < 1$) in both countries.

garment female labour force, the increase in market employment is largest for women with primary and secondary education (about three per cent), and less significant for the highly skilled (two per cent). Market participation of uneducated female workers rises only by one per cent, as the increase in their garment employment is partly offset by a decline in their time inputs in grain production. A shift in employment from agriculture to the manufacturing sector could have potentially significant positive effects, even when net increases in participation are slight, as this sector generally offer better working conditions than agriculture activities. Time spent in social reproduction by women with primary and secondary education declines on average by about 0.4 per cent, while their leisure time declines more. A similar pattern, although smaller in magnitude, can be observed for female workers with both higher education and no education. Because the abolition of tariffs causes a significant expansion of the most female intensive sector in the Bangladesh economy, the economy-wide demand for female labour rises more than the demand for male labour, and hence the wage rate of women becomes higher both absolutely and relative to men. The rise is largest for women with primary and secondary education. Their wage increases about three per cent in absolute terms, and by two per cent and one per cent respectively relative to that of men with similar skills. These results are described in table 11.

**Table 11 – Effects of tariff abolition on employment and wages, Bangladesh
(percentage changes from base case)**

	F no ed	F prim ed	F sec ed	F post ed	Total female	Total male
Employment						
All market sectors, of which:	1.4	3.1	3.4	2.2	2.1	0.3
Grains	-1.7	-2.0	-1.9	-1.7	-1.8	-1.4
Commercial crops	1.7	0.0	1.5	1.7	1.6	2.0
Livestock and horticulture	0.2	-0.1	0.0	0.2	0.1	0.5
Fishing	0.6	0.3	0.3	0.6	0.5	0.8
Food processing	-2.8	-3.1	-3.0	-2.8	-2.9	-2.6
Garments	36.8	36.4	36.5	36.8	36.6	37.1
Other textiles	10.5	10.2	10.2	10.5	10.4	10.7
Other manufacturing	-13.0	-13.3	-13.2	-13.0	-13.1	-12.9
Infrastructure	0.2	-0.1	-	0.2	0.2	0.4
Trade	0.5	0.2	0.2	0.5	0.4	0.7
Transport	0.7	0.4	-	0.7	0.6	0.9
Public services	0.2	-0.1	-0.1	0.2	0.1	0.3
Financial services	-	-0.1	0.0	0.2	0.1	0.3
Domestic services	0.0	-0.4	-0.3	-0.1	-0.1	0.1
All social reproduction	-0.2	-0.4	-0.4	-0.2	-0.3	-0.1
All leisure	-0.3	-0.5	-0.5	-0.4	-0.4	-0.3
Hourly wages						
Absolute	1.8	2.9	2.5	1.7		
Relative to males	0.9	1.8	1.4	0.5		

Source: Simulation results

Because the elimination of tariffs on traded market goods raises on average the demand for market goods relative to non-market goods, female market employment rises in Zambia too, and so does the female wage rate, but by a smaller proportion than in Bangladesh. An important difference, however, is that in Zambia the gender wage gap widens, instead of narrowing as in Bangladesh. This is because mining and commercial crops, the sectors that expand the most from tariff elimination in Zambia, are male-intensive sectors.

The increase in market labour force participation in Zambia is small on average (about one per cent) for all educational groups. Employment rises the most (1.1 per cent) for female workers with no education, because of expansion of commercial crops, and for women with secondary education, whose largest sectoral increase is in mining. While for this latter group the rise in market participation is entirely at the

expenses of their leisure, with only a negligible change in time spent on household work, for the former the decline in non-market time is by 0.5 in social reproduction and by more than one per cent in leisure. Although social reproduction and leisure decline on average, there are differences between some (rich) households, where non-market time rises, and other (poor) households, where it falls. Women of the same skill experience either a decline or a rise in their time inputs on household work and leisure, depending on the type of household they belong to.¹² It is because in Zambia women with higher education are concentrated in rich households, while women with less education mainly belong to poor ones, that the decline in female non-market time is larger for the latter than for the former. The impact on wages too differs between these two groups of female workers, with gains being smaller for the higher educated. Women with secondary education are in fact the ones for which wages increase the least in absolute terms (0.4 per cent) and decline the most (1.1 per cent) relative to men. This is because the sectors that increase in the experiment use on average uneducated female labour more intensively than secondary educated one. As for other categories of female workers, employment rises by 0.4 per cent for women with primary education, while their wages increase by 0.8 percent in absolute terms but fall by 0.5 per cent relative to men. Employment of women with tertiary education increases by 0.6 per cent and their wages by 1.0 per cent. The results are reported in table 12.

¹²Differences among households are not discussed in detail in this paper. Household-disaggregated results for this experiment are available on request. Fontana (2001) and Fontana (2002) analyse this aspect for other simulations.

Table 12 – Effects of tariff abolition on employment and wages, Zambia
(percentage changes from base case)

	F no ed	F prim ed	F sec ed	F post ed	Total female	Total male
Employment						
All market sectors, of which	1.1	0.4	1.1	0.6	0.7	1.1
Gdnuts & horticu	0.0	0.1	-	-	0.1	-0.2
Commercial crops	6.7	0.0	-	-	6.7	6.4
Food & livestock	-0.4	-0.3	-	-	-0.3	-0.6
Fishing & forestry	0.6	0.8	1.0	0.7	0.8	0.5
Maize	2.3	2.4	-	-	2.4	2.1
Infrastructure	5.7	5.8	6.0	5.7	5.9	5.5
Mining	13.8	14.0	14.2	13.9	14.1	13.7
Labour-intensive manufacturing	0.8	0.9	1.1	0.8	0.8	0.5
Capital-intensive manufacturing	-1.8	-1.7	-1.5	-1.8	-1.6	-2.0
Market services	0.9	1.0	1.2	0.9	1.1	0.7
Trade & Transport	0.5	0.6	0.8	0.6	0.6	0.3
Public services	0.1	0.2	0.4	0.1	0.3	-0.1
All social reproduction	-0.5	-0.4	0.0	-0.1	-0.4	-0.4
All leisure	-1.1	-0.9	-0.4	-0.2	-0.8	-0.8
Hourly wages						
Absolute	1.0	0.8	0.4	1.0		
Relative to males	-0.8	-0.5	-1.1	-0.3		

Source: Simulation results

Changes in the functional distribution of income favour female labour over male labour and labour over land and capital in Bangladesh, while in Zambia non-labour factors gain more than labour factors, and capital gains more than land.

To conclude, the gender impact of tariff abolition appears overall to be more positive in Bangladesh than in Zambia. In Bangladesh women gain in terms of higher market employment and wages. Importantly, it is not only their absolute wages that increase, but also their wages relative to men. In Zambia, absolute income gains are smaller than in Bangladesh while the gender wage gap widens. Thus, in Bangladesh, outcomes are favourable not only because a ‘practical’ gender interest (an increase in the total female wage bill) is satisfied, but also because an opportunity arises for a ‘strategic’ gender interest to be met (through redressing of the gender imbalance in economy-wide wages). In both Bangladesh and Zambia higher female market

employment means that women spend less time on caring for families and leisure activities. This decline in non-market time is more marked in Zambia than in Bangladesh. In Bangladesh, the narrowing of the gender wage gap, and thus the increase in the opportunity cost of female workers' time relative to that of male workers, encourages some substitution of male for female labour in social reproduction, potentially leading to a more equitable allocation of tasks within the household.¹³

III.2. Other experiments

Once the investment of constructing a model has been made, a large number of experiments of many kinds can easily be undertaken. In this section, four more simulations are described (but many more, and addressing a wider range of economic policies, could also be run). Two are variants of the main experiment analysed in section III.1. The first experiment increases the price elasticity of social reproduction as a proxy for greater responsiveness of the consumption or output of social reproduction to changes in its relative price (and hence more flexibility in the allocation of women's time). The second simulation increases the elasticity of substitution in production between male and female workers in both the market and the household to explore the effects of greater responsiveness of the mixture of female and male workers to changes in their relative wages. The other two simulations in this section analyse different sorts of trade changes: the third experiment simulates the introduction of an across-the-board tariff of 20 per cent and the fourth simulates an increase in the import price of food grains.

¹³ Of course this happens because the model assumes that the world works in a sort of 'Beckerian' way. According to Becker (1965), an increase in the market value of women's time of a sufficient magnitude would bring about a re-allocation in the division of labour with women increasing their time into market-oriented activities while men reallocated some of their time into domestic or other non-paid uses of their time. In reality, the intra-household division of labour might not be very responsive to economic incentives because many aspects are governed by strong social and cultural norms. Estimates of the relative role of economic incentives and social customs in determining the allocation of household work (for example, Fafchamps and Quisumbing, 1999, on rural Pakistan) show that both are important. A way of representing this in the current model is to vary the elasticity of substitution between male and female labour in non-market activities or the price elasticity of demand for social reproduction.

III.2.1. Higher price elasticity of demand for social reproduction

In this version of the main experiment the price elasticity of demand for social reproduction is set close to -1.0 , from -0.3 in the main experiment in Zambia and from -0.5 in Bangladesh.¹⁴ The main effect of higher responsiveness of consumption of social reproduction services to changes in their relative price is that women's non-market time declines more in social reproduction and less in leisure, compared with the main experiment. The higher elasticity of demand for household work permits a larger outflow of female labour from social reproduction both in Bangladesh and in Zambia, but the way in which women's time released from the household is reallocated to other activities varies between the two countries, depending on the female intensity of their other sectors, both in the market and the non-market sphere. As shown in tables 13 and 14, in Zambia the main effect is to make the increase in female market participation larger, especially for women with no education and with primary education, who work mainly in agriculture. Their involvement in crop production is higher than in the main experiment and, as a result, output in this sector rises more. On average, however, gains in female wages are smaller than in the main experiment, and the gender wage gap widens more. In Bangladesh, the main effect is to allow the outflows from leisure to be smaller. The increase in market participation is smaller too, especially for semi-skilled women (with primary and secondary education), who constitute the majority of workers in the garment sector. For these workers, gains in absolute wages are about the same as in the main experiment but the gender wage gap narrows less. Because of the smaller increase in manufacturing, market output rises slightly less than in the main experiment, social reproduction declines more while leisure falls less.

¹⁴ These were the values that the model would accept without producing error messages. Changing the elasticity value for one commodity involves changing all other elasticities and parameters for each household type. Engel's law (that sum of marginal budget shares must be equal to one) must be satisfied.

**Table 13 – Effects of higher demand elasticity for social reproduction on output
(percentage changes from the base case)**

	Bangladesh	Zambia	
Market, of which:		0.4	0.6
Agriculture		-0.3	0.5
Mining		-	1.8
Manufacturing		2.7	0.1
Services		0.2	0.4
Social reproduction		-0.3	-0.5
Leisure		-0.1	-0.7

Source: Simulation results

Since women appear to be more ‘time-poor’ in Zambia than in Bangladesh (recall from table 3 that leisure constitutes only 22 per cent of women’s time in Zambia and 34 per cent in Bangladesh), one would have hoped to see a more significant effect (i.e. a much smaller decline of) on women’s leisure in Zambia, from simulating a higher elasticity of demand for their household work. But because in Zambia commercial crops and maize, the production of which increases as a result of tariff abolition, are more female intensive than the leisure sectors, the effect is that most of the time released from social reproduction is spent on working more in agriculture. Conversely in Bangladesh, because leisure is more female intensive than most market sectors, the main result is that time freed up from household work attenuates the decline in leisure.

Table 14 – Effects of higher demand elasticity for social reproduction on female market participation and wages (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed	Total female	Total male
Bangladesh						
Market employment	1.2	2.8	3.2	2.4	1.8	0.1
Social reproduction	-0.3	-0.5	-0.5	-0.5	-0.4	-0.2
Leisure	-0.1	-0.2	-0.3	-0.1	-0.1	0.0
Wages						
Absolute	1.9	2.9	2.4	1.3		
Relative to males	0.9	1.7	1.1	-0.1		
Zambia						
Market employment	1.3	0.6	1.1	0.5	0.8	1.1
Social reproduction	-0.8	-0.6	-0.1	-0.1	-0.6	-0.6
Leisure	-1.0	-0.8	-0.4	-0.2	-0.7	-0.8
Wages						
Absolute	0.8	0.6	0.3	1.1		
Relative to males	-1.1	-0.8	-1.2	-0.3		

Source: Simulation results

III.2.2. Higher elasticity of substitution in production

In this variant of the experiment, the elasticity of substitution between male and female workers, for each skill category, is increased from -0.5 to -2.5 in all market sectors and from -0.25 to -1.25 in all non-market sectors. In Zambia there are no significant differences in sectoral output changes compared with simulation III.1. The higher substitution elasticity causes a marginally higher rise in total market participation for women with no education and women with secondary education, while the effect on market participation for women with primary and tertiary education is unchanged. Women with no education and secondary education experience also a larger decline in social reproduction time while the decline in leisure is the same as in the previous experiment. In Bangladesh, too, differences

with the main experiment, both in terms of output changes and of female market force participation, are slight. Changes in market participation for women with no education and secondary education are the same as in the main simulation. Market employment increases marginally less for women with primary education (while their leisure time declines more) and more for women with higher education.

Table 15 – Effects of higher elasticity of substitution in production on output (percentage changes from the base case)

	Bangladesh	Zambia	
Market, of which:		0.5	0.6
Agriculture		-0.2	0.4
Mining		-	1.8
Manufacturing		3.2	0.1
Services		0.2	0.4
Social reproduction		-0.2	-0.4
Leisure		-0.3	-0.7

Source: Simulation results

Table 16 – Effects of higher elasticity of substitution in production on female market participation and wages (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed	Total female	Total male
Bangladesh						
Market employment	1.4	3.0	3.4	2.3	2.0	0.3
Social reproduction	-0.1	-0.4	-0.3	-0.2	-0.2	0.0
Leisure	-0.4	-0.6	-0.5	-0.4	-0.4	-0.3
Wages						
Absolute	1.5	2.4	2.1	1.6		
Relative to males	0.5	1.0	0.8	0.3		
Zambia						
Market employment	1.2	0.4	1.2	0.6	0.7	1.1
Social reproduction	-0.6	-0.4	-0.1	-0.1	-0.4	-0.5
Leisure	-1.1	-0.8	-0.4	-0.2	-0.7	-0.8
Wages						
Absolute	1.3	1.0	0.9	1.1		
Relative to males	-0.2	-0.1	-0.3	-0.1		

Source: Simulation results

Even though these changes are negligible, it is interesting to note some dissimilarities

between Bangladesh and Zambia, particularly as regards patterns across educational categories. In Bangladesh, the higher elasticity of substitution affects female workers with primary and tertiary education, but alters little the impact on women with no education and secondary education. Conversely, in Zambia, it is these two latter categories which are most affected, while the effects on female workers with primary and tertiary education are unchanged compared with the main simulation. These differences can be explained by the different wage patterns by education in the two countries. For reasons discussed in section III.1, the abolition of tariffs has the effect of raising female wages more than male wages in Bangladesh. As shown in table 11, the narrowing of the gender wage gap is most marked for women with primary education and least pronounced for women with tertiary education. When higher elasticity in production is simulated, there is more substitution with male workers in the former case and less substitution in the latter case. Conversely in Zambia, as shown in table 12, tariff liberalisation causes smaller increases in female wages than in male wages, with the widening of the gender gap being largest for women with secondary education and for women with no education. Higher substitution elasticity induces more substitution of female workers for male workers and hence the economy-wide demand for men rises less and the economy-wide demand for women more than in the main simulation. In Bangladesh, the economy-wide demand for women increases less and the economy-wide demand for men more than in the main simulation.

To sum up, the variants of the main experiment described in section III.2.1 and section III.2.2 show that higher price responsiveness of social reproduction and higher elasticity of substitution in production between male and female labour matter for the overall impact of tariff abolition. These elasticities can be function of a variety of social and cultural factors. The effects of changing them can be positive or negative for gender equality, depending on the gender composition of the non-market sectors relative to market sectors, and the extent and nature of the gender wage gap.

III.2.3. Uniform tariff of 20 per cent

The introduction of an across-the board tariff of 20 per cent, just above the average tariff rate in the two countries, was also simulated. Uniform taxation has the effect of

making protection higher in sectors previously with low tariffs and lower in sectors previously with high tariffs. In both Zambia and Bangladesh the least protected sector is agriculture– especially commercial crops (coffee, cotton, tobacco and maize in Zambia and jute, tea and sugar in Bangladesh) while vegetable and food production, traditionally female intensive, are more protected. Commercial crops use on average more agricultural land than other crops and employ more male than female labour. In Zambia a larger share of the labour force (about 40 per cent) than in Bangladesh (about 3 per cent) in this sector is female, but constituted only by uneducated women, often working on their husband’s crops as unpaid family labour. Although different mechanisms operate in Bangladesh and Zambia, the main effect of uniform tariffs in both is an overall small decline in market output (with agriculture production increasing and all other activities declining), a slight increase in leisure and almost no change in social reproduction. This is shown in table 17.

**Table 17 – Effects of uniform protection on output
(percentage changes from the base case)**

	Bangladesh	Zambia	
Market, of which:		-0.2	-0.3
Agriculture		0.2	0.1
Mining		-	-1.0
Manufacturing		-1.2	-0.1
Services		-0.1	-0.2
Social reproduction		0.0	0.1
Leisure		0.0	0.2

Source: Simulation results

In agriculture, as expected, the rise is in male-intensive commercial crops and away from female-intensive crops. Production of the main export – copper in Zambia and ready-made garments in Bangladesh – falls, but more so in Bangladesh (8 per cent compared with 1 per cent in Zambia), where RMG are more dependent than mining in Zambia on imported inputs whose price increases as a result of the tariff (the tariff on other textiles used in garment production is below average in the base case). The resulting impact on the functional distribution of income in both countries is that returns to land rise while returns to all other factors fall. As described in table 18, female wages decline in absolute terms in both Bangladesh and Zambia, with the

exception of uneducated female workers in Zambia who gain slightly from expansion of commercial crops. Because of likely gender asymmetries in relations of production, however, it is not clear whether these women would have control over their higher income or whether this would be managed by their male relatives. Because in Bangladesh the economy-wide demand for female labour declines more than the demand for male labour, the gender wage gap widens. Conversely, in Zambia, because the economy-wide demand for male labour declines more than the demand for female labour, the gender wage gap narrows, except for women with primary education who are the most negatively affected by the decline in female-intensive agriculture.

Table 18 – Effects of uniform protection on female market participation and wages (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Bangladesh				
Market employment	-0.3	-0.6	-0.5	-0.2
Social reproduction	0.0	0.1	0.1	0.0
Leisure	0.1	0.1	0.1	0.0
Wages				
Absolute	-0.2	-0.4	-0.6	-0.8
Relative to males	-0.4	-0.6	-0.6	-0.4
Zambia				
Market employment	0.0	-0.1	-0.5	-0.3
Social reproduction	-0.1	0.1	0.0	0.0
Leisure	0.1	0.2	0.2	0.1
Wages				
Absolute	0.1	-0.4	-0.3	-0.7
Relative to males	0.5	-0.1	0.7	0.2

Source: Simulation results

III.2.4. Higher import price of food grains

Both Bangladesh and Zambia are net importer of grains. Reform of agricultural policies in OECD countries could cause a rise in the world price of food, which would adversely affect food-importing countries. An increase by (an arbitrary) 50 per cent of

the world price of rice and wheat in Bangladesh and of maize in Zambia was thus simulated to assess the likely gender effects of these reforms. Only 24 per cent of the labour force in grain production in Bangladesh is female, with the majority of it being uneducated. In Zambia maize production employs a larger proportion of women (54 per cent of the total labour force in this sector) and these women are mostly with primary education. The rise in the import price of grains causes an increase in its domestic production in both countries, although in Zambia by a larger extent than in Bangladesh. Output marginally declines in all other sectors. As shown in table 19, in Zambia social reproduction and leisure fall by the same proportion (0.2) while in Bangladesh leisure declines by 0.1 and social reproduction is unchanged. These differences in the behaviour of the non-market sectors reflect different wage effects in the two countries, namely small (both absolute and relative) increases in female wages in Zambia and declines in female wages in Bangladesh, that, on average, make the price of social reproduction lower in the latter country than in the former.

Table 19 – Effects of higher import price of grains on output (percentage changes from the base case)

	Bangladesh	Zambia	
Market, of which:		0.0	0.0
Agriculture		0.3	0.7
Mining		-	-0.1
Manufacturing		-0.5	-0.4
Services		-0.1	-0.1
Social reproduction		0.0	-0.2
Leisure		-0.1	-0.2

Source: Simulation results

Because the sectors that expand use land relatively more intensively than the sectors that contract, in both countries the resulting functional income distribution favours land over other factors of production. Female workers gain in terms of employment and wages in Zambia, while in Bangladesh the gender impact in the market economy appears ambiguous. The results are reported in table 20. The gender wage gap narrows for all women in Zambia. Female wages rise also in absolute terms, for women with no education and with primary education. Their market participation increases by about 0.5 per cent and their time inputs into household work and leisure decline slightly, by a similar proportion. Conversely, in Bangladesh female wages

decline for all, both absolutely and relative to men. Uneducated women's market participation increases (by 0.2 per cent) at the expense of their leisure while their participation in social reproduction remains the same. Employment changes for women with higher education – who do not work in agriculture - are slight in both countries but their wages decline, due to lower demand for non-market services, which is more marked in rich households (where the majority of female workers live).

Table 20 – Effects of higher import price of grains on female market participation and wages (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Bangladesh				
Market employment	0.2	0.2	0.2	0.2
Social reproduction	0.0	0.0	0.0	0.0
Leisure	-0.1	-0.1	-0.1	-0.1
Wages				
Absolute	-0.2	-0.3	-0.5	-0.7
Relative to males	-0.6	-0.5	-0.5	-0.3
Zambia				
Market employment	0.7	0.5	-0.1	0.0
Social reproduction	-0.4	-0.6	0.1	0.0
Leisure	-0.5	-0.7	0.0	0.0
Wages				
Absolute	0.3	0.6	-0.7	-0.8
Relative to males	0.6	0.3	0.2	0.1

Source: Simulation results

In both simulation III.2.3 and simulation III.2.4 the main change, although in each experiment for different reasons, is an increase in agricultural output and decline in other production, both market and non-market. Within agriculture, it is one particular crop that expands at the expense of other crops – commercial crops, as a result of uniform tariffs, and grains, as a result of possible agricultural reforms of OECD countries. In both cases, and in both countries, this expansion goes to the detriment of female-intensive agricultural production of vegetables and other basic food staples that are less exposed to international trade. The effects on women's well-being are ambiguous and vary between uneducated female workers, who are directly affected

by these changes, and women with higher education, who do not work in agriculture. Women's wages tend to decline in absolute terms in both countries but increase in relative terms in Zambia. This is however due to downward equalisation of wages rather than upward equalisation, with male wages declining even more than female wages. Increases in uneducated women's participation in agriculture goes at the expense of their leisure. Moreover, because of likely inequalities in intra-household allocation of power and resources, it is not clear whether these women, mostly working as unpaid family labour on fields managed by male relatives, would have control over higher income earned.

IV. Comparison of methods

IV.1. Model findings and other studies

This section compares model results with other work in the gender and trade literature and is divided in three parts. The first part highlights common points with other literature, the second part discusses ways in which the modelling approach contributed to a better understanding of the impact (its 'strengths') and the third part examines aspects that the model did not cover and that could be better addressed by other methodologies (its 'limitations').

IV.1.1. Points in common with other literature

The simulation findings that trade liberalisation raises female employment and wages in a labour-abundant country like Bangladesh but it is not as beneficial for women in a natural resource-abundant country like Zambia is consistent with other evidence. Several studies (reviewed in Joekes and Weston, 1994 and Joekes 1999a) show that the growth of export-oriented manufacturing, especially in South and South-east Asia, has created many jobs for women, at wages which, though lower than those of men, are higher than they could have earned in the alternative forms of work open to them. Very little research exists on the impact of trade on women in mineral resource-rich countries like Zambia. The limited research on Sub-Saharan Africa focuses on agriculture. It shows that the impact of expanding exports in this sector is generally less favourable to women and varies according to the prevailing systems of property rights and to other socio-cultural factors governing the gender division of labour (Gladwin, 1992, Koopman, 1992, Joekes, 1999b).

The SAMs and CGE models in this paper exposed reasons for differences in impact. They clearly showed where women are located in the economy, and highlighted the mechanisms through which changes in the domestic prices of imports and exports affect a country's output structure and hence its factor demand (and relative wages). Thus in Bangladesh, where the main export is female intensive (and low skill intensive), women benefit from trade liberalisation. Conversely in Zambia, where the main export is a mineral resource that is highly capital and male intensive in production, women are at disadvantage from greater exposure to trade. Moreover, when agricultural output rises because of other trade shocks – such as uniform protection or higher import prices for grains – women are negatively affected, in both Bangladesh and Zambia, despite being heavily involved in this sector. This outcome, as a glimpse at the two SAMs soon reveals, is due to a marked gender division of labour in both countries (although more so in Bangladesh than in Zambia) that assigns women to crops mainly used for household consumption and limits considerably their involvement in more profitable commercial crops.

An important point made in feminist economics research (most notably Elson, 1991) is that increases in female market employment might be at the expense of the time women can devote to caring for their families, or, more likely, of their leisure. This often results in heavier work burdens and a decline in well-being. Macro-economic analysis that excludes explicit consideration of household work and assumes that women's unpaid labour is infinitely elastic gets a seriously incomplete picture of the impact of changes in policies on the welfare of women, and of their dependents. By incorporating social reproduction and leisure sectors, the model used in this paper addresses these concerns and operationalise them numerically.

The responsiveness of gendered aspects of the division of labour to changes in economic incentives – for example, how much the amount of time women spend on household activities falls due to improvements in their market wage or employment opportunities– varies depending on a wide range of social and cultural norms. This point is often made in the sociological and anthropological literature. In an analysis of foreign direct investment in Indonesia, Braunstein (2000) discusses how family structures and institutional contexts influence female labour supply. She suggests that

women heads of households with few job alternatives available to them may be prepared to work for much lower wages than women in patriarchal households. Changes in institutional arrangements or economic circumstances might also affect women's reservation wages, such as when '... subcontracting in the form of industrial homework is introduced, so even in situations where male heads prefer their wives to stay at home, wives' reservation wages for homework might be very low while those for wages employment outside the home are still high.' (Braunstein, 2000:1164). Although not all of these interesting dimensions and nuances can be represented explicitly in the CGE framework, some can be implicitly captured by the value of key parameters in the model: for instance, the elasticity of substitution between male and female labour in market and non-market production, and the price elasticity of demand for social reproduction. Depending on the values assigned to these key parameters, the magnitudes of the effects of the experiments in this paper have been shown to vary, which is important to consider when designing policies.

IV. 1.2. Points not covered in other literature

The gendered CGE models of Bangladesh and Zambia have provided a nice integrated framework for the analysis of the effects of trade on women which has allowed consideration of more constraints and interactions than it is usual in other studies.

Most existing research on the gender impact of trade liberalisation looks at specific firms or sectors in isolation, or only at one aspect of welfare (employment or consumption), and hence does not provide sufficient analysis of linkages among different dimensions. Partial equilibrium analysis assumes that repercussions from one market to another will be slight and neglects indirect effects that change in one sector may have on prices, output and employment in other (both market and non-market) sectors. Such approaches would not produce an accurate measurement of net outcomes – it would not be possible to know whether, for example, the number of female jobs that are destroyed in sectors producing import-substitutes would be greater than the number of female jobs created in female-intensive exporting sectors.

Moreover, the use of a partial sectoral method to assess the impact of a trade shock in a non-female-intensive sector, would lead to conclude that the shock did not have any gender implication, even though the indirect effects on women were substantial. Most studies of the manufacturing sector in Bangladesh and elsewhere explore effects at the household level, in some cases (for example Zohir and Paul-Majumdar, 1996), but do not consider linkages with the rest of the market economy. Some of the Africa agricultural studies (for instance Kennedy, 1988 on Kenya, Kumar, 1994 on Zambia and Katz, 1995 on Guatemala) go beyond a single-sector approach, since they examine the effects of commercialisation of certain crops on the food production sector, on other non-farm activities, and on consumption as well as income effects - one important step towards a general equilibrium analysis.

By contrast with the sectoral studies, more conventional CGE models permit analysis of both direct and indirect effects of trade policies but by excluding the household and leisure sectors, yield wrong results about the impact of such reforms on standard market variables, and disregard important broader welfare implications.¹⁵

Finally, another advantage of the CGE method over other approaches is that it permits controlled experiments in which the effects of a specific policy measure or circumstance can be isolated from other influences.

IV. 1.3. Points better addressed by other methods

The Bangladesh and Zambia CGE models were not able to shed any light on whether gains in female employment from greater trade openness would be sustained over time. Recent studies based on time-series analysis (e.g. Kusago and Tzannatos, 1998, Joekes, 1999) point to a decline in women's share in the manufacturing labour force of several middle-income countries (such as Mexico, Malaysia and South Korea)– a phenomenon often referred to as 'de-feminisation' of employment. Female workers do not seem able to maintain their position within the industrial workforce as the composition of output of export-oriented industries moves towards more technologically sophisticated goods. Changes in gender patterns of production have

¹⁵ Fontana and Wood (2000) provide an example of this in their analysis of an archetype Bangladesh model, by comparing results of the same experiment run with and without the non-market sectors.

been observed also in some African agriculture— these too, often, at women's disadvantage. Evidence (Blackden and Selim, 1993, and Saito, 1994.) seems to suggest that, as the prospects for market sales of a crop rises, more men tend to move in their production. Both these trends indicate that, over time and under certain circumstances, greater exposure to international trade might be associated with adoption of more male-intensive (and skill-intensive) methods of production.

None of these trends would be captured by a static CGE model which assumes the production technology to be fixed.¹⁶ The model used in this analysis is a single period static model and hence does not permit analysis of long-term dynamic changes. Time-series analysis indicates dynamic processes of the gender patterns of work. This brings attention to 'surprises' - or deviations from expected trends which could not be anticipated by a model. For a better understanding of the nature of, and reasons for, these 'surprises', qualitative approaches based on in-depth interviews are particularly valuable. Even though qualitative methods have the disadvantage that their findings cannot be generalised, they add depth and nuances to the analysis that could not be captured by any of the quantitative methods. Kabeer (2000), for example, provides a fascinating analysis of the unexpected large rise in female employment in Bangladesh in the 1980s.

Another limitation of the comparative static framework is to disregard the process required to move from the initial to the final equilibrium state, thus potentially ignoring adjustment costs. For example, women who lose their jobs in import substituting industries sectors might not be able to take advantage of newly created opportunities elsewhere in the economy in the short run, or not at all, if adequate training and assistance is not provided or severe constraints to their physical mobility remain. Some studies of displaced workers (for example Beneria, 1998) provide information by gender on the circumstances of their lay-offs, availability of re-training, length of their unemployment spells, quality of any new employment available to them, and other impacts at the family level. The value of these studies is that of highlighting important short-term effects neglected by the modelling approach

¹⁶ Changes in production methods could of course be simulated as part of an experiment. Fontana and Wood, for example, simulate an increase in the female intensity of textile production in experiment T4 (2000: 1182).

but their disadvantage is that their findings cannot be generalised and are specific to the particular group of people interviewed.

The Bangladesh and Zambia models were not able to shed any light on whether rises in female employment and earnings could effectively translate into real gains for women. This is because the CGE approach used in this paper does not take into account the nature of production relations and the unequal distribution of power and resources between different people.

An intricate web of institutions and norms mediates individuals' access to resources and its translation into impact, which in-depth qualitative research is better able to explain. Several studies in the anthropological and sociological literature (Beneria and Roldan, 1987), for example, suggest that, in general, women are more likely to exercise control over the proceeds of their labour when it is carried out in forms of production which are independent of male household members and in social relationships outside the familial sphere. Kabeer (2000) provides an interesting example of this in her study of the effects of the clothing industry on two different groups of Bangladeshi women, one working in factories in Dhaka and one involved in home-based work in East London. While in Bangladesh the regularity of the wages from the factory jobs, and the location of the work outside the control of male relatives, has increased women's influence on household decisions, and permitted them to escape from situations of oppression, in London, the organisation of work around home-based piecework has meant that the empowering effects have been weak. The CGE model, in its current formulation, would record in both cases an increase in female income without being able to detect any difference in outcomes arising from differences in women's ability to control resources. This would be a limitation also in the analysis of the agricultural sector, where the organisation of production often differs by crop. A contractual wage labour force whose terms and conditions of employment are akin to those of industrial workers often prevails in non-traditional agriculture (such as cut flowers and beans in Zambia), while production of more traditional crops is organised in farms owned by male-relations where women work as unpaid family labour (Joekes, 1999b).

A more fully developed model of the household based on bargaining behaviour would be required to redress these limitations. Game-theoretic approaches – which introduce the idea of preference heterogeneity, bargaining power divergences and individual resource control – are increasingly used to model household decision-making (for example Smith, 1995 and Warner and Campbell, 2000). Collective household models have the advantage that they allow consideration of unequal intra-household resource allocation. However they assume the rest of the economy as given and thus neglect feedback effects.

Finally, the model could not say anything about women's and men's perceptions and feelings. The concept of subjective happiness is a valuable approach that covers many more aspects of human welfare than the standard concept of utility based on revealed preferences (for a review see Frey and Stutzer, 2002). '...Oddly, while economists generally think that people are the best judges of their own welfare, they resist asking people directly how they feel' (Ravallion, 2001 cited in Kanbur, 2002). Research needs to incorporate the possibility that, in some cases, women might not enjoy their higher income if they face increased social tensions as a result of taking paid work, or increased responsibilities within households. In other cases, women might derive important psychological benefits from paid work that more than compensate for the loss of leisure time and any social censure. Even as regards taking care of the children and the elderly in the household, women's own perceptions might vary from feeling happy to feeling overburdened. Satyajit Ray, in the 1960s Bengali movie 'Mahanagar' (The big city), beautifully illustrates the complexity facing women in these choices. Addressing these problems require information which is not found in conventional economic analysis but for which there is a growing literature in other disciplines (for example Chen, 1997).

IV.2. Suggestions for further research

A CGE model is often described as ‘a theory with numbers’. While a social accounting matrix provides a nice organising principle for describing facts, a CGE model provides an explanation for these facts, by specifying the connections and the nature of interactions between all the variables described in the SAM. Different explanations are possible for the same facts and the task of a good modeller is to choose a theory that provides the most plausible and realistic assumptions.

There is room for the approach used in this paper to be improved, both in terms of how facts are described and in terms how theories are chosen to provide explanations for the facts. Section IV.3.1 suggests ways in which a SAM could be extended to provide a more detailed description of gendered aspects of reality, and section IV.3.2 discusses model specifications.

IV.2.1. SAM extensions

There are many ways in which SAMs could be further extended or complemented to permit a richer gender analysis. The ones described here fall mostly under the category of ‘internal satellite accounts’, i.e. disaggregations of existing SAM accounts which could in principle be easily implemented but in practice are not because of lack of data. Some suggestions for a few additional ‘external satellite accounts’ are also made.

Internal satellite accounts:

Consumption, which is usually reported by household, could be instead recorded for each type of worker or individual household member. This would give an indication of how resources are allocated within the household and hence how policies which affect production or consumption of one particular commodity, or the income of one particular group of workers, would have different implications for consumption levels of different household members and for overall demand.

A distinction could be made between assets owned by female household members and assets owned by male household members, as well as any transfer received by them, as these could be useful indicators of bargaining power (Quisumbing and de la Briere, 2000). It would also be helpful to account separately for items of public expenditure

(health, education, etc.) and to trace by individual, and not by household, who benefits from government provision of public services.

Some SAMs (for example Zambia SAM (IFPRI, 1999) and a Mozambique SAM (IFPRI, 1998)) have a separate account for marketing costs by sector. It would be desirable to disaggregate them by gender as well. Marketing margins reflect transportation and other transaction costs which are often higher for women than for men, for example in most African agricultural sectors (Malmberg Calvo, 1994), which might explain why a high proportion of agricultural production by women remains non marketed.

The social reproduction sector could be broken up into several sub-sectors such as childcare, preparing meals, DIY activities, etc. This would allow a better understanding of gender roles within the household and would help identify which aspects of women's reproductive labour are likely to be most affected when their market time increase.

Several studies (most notably Floro and Miles, 1999) document that many household activities are carried out at the same time. This phenomenon appears to be more frequent among women, who experience greater intensity of work, but not necessarily an increase in working hours, when taking up paid employment. It would not be possible to disentangle the simultaneous undertaking of many activities such as cooking, housekeeping and childcare, but perhaps a way to record an activity in the SAM as producing joint outputs could be found.

External satellite accounts

Household caring activities have positive social effects and important implications for the well-being of the future workforce. It would be helpful to know what is the impact of time re-allocation on dependents when women take up paid market work.

Information could be incorporated, for example, on children's labour by gender, to monitor whether girls and boys are kept out of school to undertake household tasks that their employed mothers no longer have time to complete (see for example Katz,

1995). Some indicators could also be constructed to link the provision of care to outcomes – using for instance educational levels of the workforce or health statistics.

Perhaps the SAM format could also be used as organising principle for describing intra-household allocation of resources, time and power. This could be provided by constructing household level SAMs – as many as the household types in the corresponding economy-wide SAM. In each of the household-SAMs, the household would be treated as it were a national economy, with various non traded goods produced within the household for home consumption using male, female labour and ‘imported’ intermediate goods, and exports and imports being the household’s cash transactions with the rest of the economy. Household members would be represented in the same way as ‘institutions’ in the larger SAM, each with separately recorded sources of income, assets, consumption expenditures and transfers to other institutions/household members. Taylor and Adelman (1995) develop a SAM framework for village economies which are described with their own specific institutions and socio-cultural structures. Their study seeks to analyse the functioning of the village economy as well as economic interactions between different villages and between villages and the wider economy. The construction of household SAMs could be seen as a way of taking the idea of the village SAM one level further down.

IV.2.1. Model developments

If all the SAM extensions described in the previous section were implemented, the range of issues that could be analysed with the model would be significantly widened, even with little change to its specification. With all household data disaggregated by individuals, for example, it would be possible to explore intra-household allocation aspects by simply assigning different weights to individual utility functions of women and men, based on the value of their individually owned assets (taken as a measure of bargaining power). It might be desirable to take intra-household analysis a step further, by nesting a fully developed household model within the CGE framework. This would allow consideration of more interactions and constraints than in a standard CGE model (with individual disaggregations), but would have the disadvantage of high computational complexity.

Some of the long-term changes likely to affect strategic gender interests could be explored by adding a dynamic dimension to the model. For instance, case studies of Bangladesh (Kabeer, 2000, Zohir and Paul-Majumdar, 1996) suggest that increasing female employment has the potential to change families' attitudes towards considering daughters as assets instead of liabilities. This could lead to more girls being sent to school. This dynamic aspect of trade expansion could be captured in the model by considering a sequence of equilibria whereby in each period the skill level of the female labour force is updated, and the extent of this change is a function of increases in female intensive production or a similar such hypothesis.

Finally, it would be desirable to estimate model parameters by using econometric approaches more often than is commonly done. Values for elasticities of substitution between factors of production, income and price elasticities of household consumption, and trade elasticities – those parameters that must be set independently of the data in the SAM – are frequently based on 'educated guesses' (such is the case of the Bangladesh and Zambia models used in this paper). The use of econometric estimates would provide a more accurate description of the behavioural responses of different types of women to labour market changes. Econometric estimates could also be useful in guiding the choice of other features in the model – suggesting for example the socio-economic characteristics by which households should be classified in the SAM to capture gender features of the economy.

IV. 3. Conclusions

The CGE model used in this paper provided useful insights into the gendered economic outcomes of trade policies that could not have emerged using other approaches. However, discussion in previous sections also showed that some important effects are better analysed with other methods. In particular, the SAM/CGE approach appears to be more effective in answering questions regarding practical gender needs than in shedding light on how strategic gender needs are affected by economic reforms. No single approach can provide all the insights and information and, hence, the main suggestion of this paper is that a combination of methods be applied.

Methodological tools other than CGE models are useful not only for exploring those dimensions of the gender impact of trade – such as subjective well-being or sector-specific changes – that by their very nature require more in depth and more qualitative analyses than what the modelling can offer. Other methods can also be valuable in informing modelling choices. A constant ‘dialogue’ between methodologies should be encouraged in which insights from one approach are used to enrich, or challenge, findings from another approach. The extent to which different perspectives will be used and how they will be combined will depend, each time, on the particular focus of the analysis and specific country contexts.

References

- Becker, G.S., 1965, 'A Theory of the Allocation of Time', *Economic Journal*
- Beneria, L., 1998, 'The impact of industrial relocation on displaced workers: a case study of Cortland, NY' *Community Development Reports, Research Briefs & Case Studies*, Cornell Community and Rural Development Institute, Vol 6 No1
- Beneria, L. and Roldan, M. 1987, *The cross-road of class and gender*, Chicago: University of Chicago Press
- Bhattacharya, D. and Rahman, M., 2001, 'Prospects for internalising global opportunities in the apparel sector in Bangladesh' in Sobhan, R. and Khundker, N., op.cit.
- Blackden, M. and Selim, M., 1993, *Gender issues in Zambia's economic development*, Washington D.C.: The World Bank, Human Resources and Poverty Division Technical Department, Africa Region
- Bonke, J., Gupta, N.D. and N.Smith, 2002, 'Do housework and leisure harm your career? A panel study of the effects of non-market activities on the wages of men and women', Paper presented at the conference
- Braunstein, E., 2000, 'Engendering foreign direct investment: household structures, labor markets and the international mobility of capital' *World Development*, Vol 28 No 7
- Chen, M., 1997, 'A guide fro assessing the impact of micro-enterprise services at the individual level'. Mimeo. USAID
- Deininger, K. and Squire, L.,1998, 'Measuring income inequality: a new data set' <http://www.worldbank.org/research/growth/dddeisqu.htm>
- Dervis, K., de Melo, J. and Robinson, S., 1982, *General equilibrium models for development policy*, London: Cambridge University Press
- Elson, D., 1991, *Male bias in the development process*, Manchester University Press
- Fafchamps, M., and Quisumbing, A.R. 1999, 'Social roles, human capital, and the intra-household division of labor: evidence from Pakistan' *FCND Discussion Paper No. 73*. Washington, D.C.: International Food Policy Research Institute
- Floro, M. and Miles, M., 1999, 'Time use and overlapping activities: an empirical analysis'. Mimeo. Washington D.C.: American University.
- Fontana, M., 2002, 'Modelling the effects of trade on women: the case of Zambia', *IDS Working Paper 155*, Brighton: Institute of Development Studies

- Fontana, M., 2001, 'Modelling the effects of trade on women: a closer look at Bangladesh', *IDS Working Paper 139*, Brighton: Institute of Development Studies
- Fontana, M. and Wood, A., 2000, 'Modelling the effects of trade on women, at work and at home', *World Development*, Vol 28 No 7
- Frey, B.S. and Stutzer, A., 2002, 'What can economists learn from happiness research?' *Journal of Economic Literature*, Vol XL, No. 2.
- Gladwin, C., 1991, *Structural adjustment and African women farmers*, Gainesville: University of Florida Press.
- Ilahee, N., 2000, 'The intra-household allocation of time and tasks: what have we learnt from the empirical literature?' *Gender and Development Working Paper Series 13*, Washington D.C.: World Bank
- Joekes, 1999a, 'A gender-analytical perspective on trade and sustainable development' in UNCTAD, *Trade, sustainable development and gender*, Geneva: UNCTAD.
- Joekes, S., 1999b, 'Gender, property rights and trade: constraints to Africa growth' in King, K. and McGrath, S., eds., *Enterprise in Africa: between poverty and growth*, Oxford: Centre of African Studies.
- Joekes, S. and Weston, A., 1994, *Women and the new trade agenda*, New York: UNIFEM
- Kabeer, N., 2000, *The power to choose: Bangladeshi women and labour market decisions in London and Dhaka*, London: Verso
- Kanbur, R., 2002, 'Economics, social science and development' *World Development* Vol 30 No3
- Katz, E., 1995, 'Gender and trade within the household: observations from rural Guatemala' *World Development* Vol.23, N 2
- Kazemier, B., Keuning, S. and van de Ven, P., 1998, 'Measuring well-being with an integrated system of economic and social accounts: an application of the SESAME approach to the Netherlands' Paper prepared for the 25th General Conference of the International Association for Research in Income and Wealth, Cambridge, England, August 23-29.

- Kennedy, E.T., 1987, 'Income and nutritional effects of the commercialisation of agriculture in South-western Kenia', *IFPRI Research Report 63*. Washington, D.C.: IFPRI
- Kumar, S.K., 1994, 'Adoption of hybrid maize in Zambia: effects on gender roles, food consumption and nutrition' *IFPRI Research Report 100*. Washington, D.C.: IFPRI
- Löfgren, H., Lee Harris, R. and Robinson, S., 2001, 'A standard computable general equilibrium (CGE) model in GAMS', *TMD Discussion Paper 75*, Washington, D.C.: IFPRI
- Malmberg Calvo, C., 1994, 'Case study on the role of women in rural transport: access of women to domestic facilities', Washington D.C.: The World Bank
- Mayer, J. and Wood, A., 2001, 'South Asia's export structure in a comparative perspective' *Oxford Development Studies* Vol 29 No 1
- McCulloch, N., Winters, L.A. and X.Cirera, 2001, *Trade liberalisation and poverty: a handbook*, London: CEPR
- Molyneux, M., 1985, 'Mobilization without emancipation? Women's interests, state and revolution in Nicaragua' *Feminist Studies*, Vol 11, N 2
- Moore, H. and Vaughan, L., 1993, *Cutting down trees*, Lusaka: University of Zambia Press
- Moser, C., 1989, 'Gender planning in the Third World: meeting practical and strategic gender needs' *World Development* Vol 17 N 11
- Nugent, J.B. and Sharma, C. V. S. K., 2002, 'The three E's--efficiency, equity, and environmental protection--in search of "win-win-win" policies: a CGE analysis of India', *Journal of Policy Modelling*, Volume 24, Issue 1
- Nyanzi, T., 2000, 'Evaluation of the 1997 tax reforms in Uganda: an engendered general equilibrium model'. Unpublished Ph.D. dissertation. University of Bath
- Pyatt, G., 1987, 'Accounting for time use', Paper presented at the 20th Conference of the International Association for Research in Income and Wealth, Rome, August 1987
- Quisumbing, A. and de la Briere, B., 2000, 'Women's assets and intra-household allocation in rural Bangladesh: testing measures of bargaining power', *FCND Discussion Paper No. 86*, Washington, D.C.: International Food Policy Research Institute

- Sadoulet, E. and de Janvry, A., 1995, *Quantitative development policy analysis*, Baltimore: The Johns Hopkins University Press.
- Saito, K.A., 1994, 'Raising the productivity of women farmers in Sub-Saharan Africa' *World Bank Discussion Paper 230*, Africa Technical Department Series. Washington D.C.: The World Bank.
- Sinha, A, 2000, 'Value added from the informal sector: lessons from a SAM with formal-informal disaggregation for India'. Mimeo. New Delhi: NCAER
- Smith, L. and Chavas, J., 1999, 'Supply response of West African agricultural households: implications of intra-household preference heterogeneity', *FCND Discussion Paper No. 69*, Washington, D.C.: International Food Policy Research Institute
- Sobhan, R. and Khundker, N., 2001, *Globalisation and gender: changing patterns of women's employment in Bangladesh*, Dhaka: The University Press.
- Taylor, E. and Adelman, I., 1996, *Village economies*, New York: Cambridge University Press
- UN, 1993, 'System of national accounts 1993', Studies in Methods, Series F 2/Rev 4, New York: UN Statistical Division
- Zaman, H., 1995, 'Patterns of activity and use of time in rural Bangladesh: class, gender, and seasonal variations' *The Journal of Developing Areas*, Vol 29 No 3
- Zohir, S.C., 1998, 'Gender implications of industrial reforms and adjustment in the manufacturing sector of Bangladesh', Economics and Social Studies, University of Manchester, PhD thesis.
- Zohir, S.C., and Paul-Majumdar, P., 1996, 'Garment workers in Bangladesh: economic, social and health conditions', *Bangladesh Institute of Development Studies Research Monograph N.18*, Dhaka: Bangladesh Institute of Development Studies
- Warner, J.M. and Campbell, D.A., 2000, 'Supply response in an agrarian economy with non-symmetric gender relations' *World Development*, Vol 28 No 7
- Wood, A. and Mayer, J., 2001, 'Africa's export structure in a comparative perspective' *Cambridge Journal of Economics*, Vol. 25, Issue 3