IDS Working Paper 155

Modelling the effects of trade on women: the case of Zambia

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March 2002

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ISBN 1 85864 417 8

Summary

This paper describes an application of a gendered computable general equilibrium (CGE) model to a set of 1995 data for Zambia. The principles of a gendered CGE approach are to account for household activities and leisure in addition to standard market sectors, and to treat men and women as separate factors of production, as discussed in earlier work. Two main trade strategies are analysed: the abolition of tariffs on manufactured imports and the effects of non-traditional agricultural export promotion. The experiments show that liberalisation of manufactured imports causes smaller employment and wage gains for women than for men. Introduction of incentives in non-traditional agricultural exports suggests that women are favoured more by expansion of horticulture and groundnuts than by expansion of tobacco and coffee. Moreover it reveals that the impact on female workers is different depending on their level of education. The simulation also shows that reallocation of assets from maize to female-intensive crops makes women more productive but reduces their leisure time. A further experiment analyses the effects of a rise in the world price of copper and finds that women with higher education gain more than other female workers from better wages and more leisure time.

Acknowledgements

This paper is an output of the IDS research project 'Modelling the effects of trade on women, at work and at home', directed by Professor Adrian Wood and funded by the UK's Department for International Development under Research Scheme R7240. Many thanks to Adrian Wood for his guidance and comments, to Milasoa Cherel-Robson and Mark Blackden for help at early stages of the work, to Shahin Yaqub for helpful suggestions, and to the Trade and Macroeconomic Division of IFPRI for institutional support. Further comments are welcome, and can be sent to M.Fontana@cgiar.org

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1 Introduction

Despite substantial economic liberalisation since the early 1990s, non-traditional exports in Zambia have grown only moderately and agricultural performance overall has been disappointing. Though agriculture accounts for less than 20 per cent of gross domestic product (GDP), it is the most important source of employment, especially for women. Interpretations of Zambia's poor performance variously emphasise external factors, such as declining copper prices and vulnerability to weather shocks, and market imperfections. Several authors (Blackden and Selim 1993 and Wold 1997) point to the importance of women in agriculture and explain the very low supply response by the constraints that women face, in terms of both limited access to assets and burden of work within households.

Attention to gender is beginning to inform economic modelling. Fontana and Wood (2000), for example, have developed a computable general equilibrium (CGE) model with two innovative features: it includes social reproduction (or household work) and leisure activities as sectors, in addition to the usual market-economy sectors, and treats men and women as separate factors of production. This paper describes an application of the Fontana and Wood approach to Zambia. An application to Bangladesh is discussed in another IDS working paper (Fontana 2001).

The model used in this paper is based on a social accounting matrix (SAM) of Zambia for 1995 (Hausner 1999) which has been extended to include details on the gender composition of the labour market, household work and leisure. The SAM distinguishes four household types (classified according to location and income level) and eight categories of workers (differentiated by both education and gender). It defines 12 market activities: five agricultural sectors, mining, construction and utilities, two manufacturing sectors and three types of services. In addition, it has four social reproduction and four leisure sectors – as many as the number of household types, since these activities cannot be traded among households.

Two main trade strategies are analysed in this paper. One experiment simulates abolition of tariffs on manufactured imports. Another illustrates the effects of non-traditional agricultural export promotion. It compares the impact of export incentives in horticulture, a promising though still small sector which uses a high share of female labour, with the impact of export incentives in tobacco and coffee, which are male-intensive crops. The simulation of promotion of horticultural exports 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. A further experiment analyses the effects of an improvement in Zambia's terms of trade resulting from a rise in the world price of copper.

The paper is organised as follows. Section two describes the extended SAM and section three outlines the structure of the model. Section four analyses the results of the main simulations and section five discusses simulations with alternative gender-related parameter values. Section six concludes.

2 The 1995 gendered SAM

The social accounting matrix used for the model experiments in this paper is an extension of the 1995 SAM for Zambia documented in Hausner (1999). The Hausner SAM includes 28 sectors, of which 12 are agricultural, 11 are manufacturing and 5 are services. It distinguishes six factors of production: four labour categories (no education, primary, secondary and post-secondary), land and capital. It has four household types: urban households, divided between low-income and high-income households, and rural households, also divided between low-income and high-income.[1]

The SAM household types differ in gender and skill composition as well as in sources of income. The biggest difference is between the urban households which are richer and better educated (but despite this receive higher transfers from the government) and the rural households which are more reliant on low educated and female labour. Workers with no or primary education constitute more than 90 per cent of the working population in poor rural households (where, as shown in Table 2.1, they provide about 53 per cent of household income) while they are only about 35 per cent of the working population in urban high-income households (where they provide only six per cent of household income). These latter households derive a large proportion of their income (68 per cent) from capital while only poor rural households derive some income (about four per cent) from land.[2] Female-headed households are about 27 per cent of total households in rural, especially poor, households while are only 19 per cent in urban households. Income distribution in Zambia is quite unequal with a Gini coefficient of 0.52 in 1996 (McCulloch *et al.* 2000). As can be seen in the last two columns of Table 2.1, urban high-income households receive 19 per cent of total (market-earned) income and constitute only three per cent of the total working population, while the rural poor receive 46 per cent of total income and comprise 68 per cent of the working population.

To gender the Hausner SAM, each of the four labour value added categories was disaggregated by gender, using available information on employment and wages.[3] Employment is measured in hours, which is useful because it allows us to record time spent on different activities by the same worker, both in the market and in the non-market sphere. This way of accounting for employment does not permit, however,

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1 The household categories in this paper are labelled slightly differently than by Hausner. His categories are: 'Metropolitan low-income', 'Metropolitan high-income', 'Non-metropolitan rural', 'Non-metropolitan urban'. Analysis of raw data from the 1996 Living Conditions Monitoring Survey (LCMS) (Republic of Zambia 1997) – which is one of the main sources for the Hausner SAM, and for the extensions described in this paper – indicates that 'Non-metropolitan rural households' are small-scale and medium-scale agricultural households while 'Non-metropolitan urban households' are large scale agricultural households and rural non-agricultural households. It was therefore preferred to call these two household types 'Rural low-income' and 'Rural high-income'. 'Urban (or metropolitan) high-income' households include urban households in high cost housing residential areas while 'Urban low-income' households include households in urban low and medium cost housing residential areas. For further details see 'Enumerator's instruction manual' of the 1996 LCMS. Jung and Thorbecke (2001) adopt the same classification used in this paper.

2 This is what is described in the Hausner SAM. It is likely however that what is recorded as income from capital of the rural high-income households includes also some revenue from land.

3 The data used are from the Living Conditions Monitoring Survey 1996 (Republic of Zambia 1997). Appendix 1 contains a more detailed account of the estimation.

consideration of activities which are undertaken simultaneously by the same person (which, evidence suggests, are more frequent among women than among men, see Floro 1995).

Table 2.1 Sources of household income (percentage of total income), Zambia 1995

	Earnings from labour													
House-hold Type	F no ed	F prim ed	F sec ed	F post ed	M no ed	M prim ed	M sec ed	M post ed	Land	Capi-tal	Gov tsfer	Total	Inc-ome	Pop-ulat-ion
Urban high-income	0.3	1.4	3.9	2.6	1.7	2.7	10.3	6.4	0.0	68.0	2.8	100.0	19.3	2.7
Urban low-income	1.4	7.7	6.1	1.3	1.8	13.9	25.7	4.0	0.0	28.9	9.2	100.0	27.8	25.1
Rural high-income	1.8	5.9	1.5	0.3	3.1	18.3	11.2	1.5	0.0	54.3	2.1	100.0	6.6	4.0
Rural low-income	6.7	16.6	2.6	0.2	5.3	24.7	8.2	1.0	3.9	28.3	2.6	100.0	46.3	68.2
Total													100.0	100.0

Source: Gendered 1995 Zambia SAM

Value added in social reproduction and leisure activities[4] was constructed for each household type. This meant adding eight new sectors, two for each household category, to the original SAM. Members of each type of household 'produce' particular kinds of social reproduction and leisure (reflecting each household type's educational and gender composition), which are not traded among households but 'consumed' by the members of that household category only.

Following the approach described in Fontana and Wood (2000) and applied in Fontana (2001), the value added in the social reproduction and leisure sectors was estimated in the following way. First the time spent by household members (of working age) on reproduction and leisure was calculated. Information on time allocation is scattered for rural areas and lacking for urban areas. The figures for social reproduction time are rough estimates which, however reflect as accurately as possible the evidence available (for a review of time-use studies see Blackden and Selim 1993 and Brown and Haddad 1995). Time spent on leisure is calculated residually and can thus be a function of lack of employment. No distinction is made between 'free time' – which one chooses to spend without working, and 'idle time' – which one is forced to spend without working. The output in these sectors was then

[4] Social reproduction includes services provided within 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). For further details on these classifications refer to Fontana and Wood (2000).

derived by valuing labour, for each educational 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 a discussion of the limitations of this approach see Fontana and Wood (2000).

The 28 market sectors in the Hausner SAM were aggregated into 12 sectors,[5] so that experiments would be easier to interpret but keeping some detail relevant to gender aspects of the economy. So, for example, two agricultural activities, horticulture and groundnuts as one sector and food as another sector, group together female intensive production, with groundnuts and horticulture being of interest also because of its export potential. Of the other two agricultural sectors, maize and commercial crops (such as tobacco and coffee), commercial crops are more male intensive and the most open agricultural sector (exports are 16 per cent of output). Mining is singled out as one of the most important sectors of the Zambian economy, mostly male, and providing about 17 per cent of GDP and 78 per cent of total export earnings. Manufacturing is grouped into two broad sectors, labour-intensive and capital-intensive. These differ in terms of female participation (females constitute 43 per cent of the work input in labour-intensive manufacturing, but only four per cent in capital-intensive manufacturing) as well as trade openness (in capital-intensive manufacturing imports account for 65 per cent of domestic use, the highest share of any sector). Trade and transport services, which are the largest sector (21 per cent of GDP), and in which female employment is about half of the total, are separated from other market services and public services which are more male intensive. The resulting structure is shown in Table 2.2 and Table 2.3.

About 68 per cent of Zambian women have primary education while only seven per cent has higher education (see Table 4.1). They spend 45 per cent of their waking time working in the market economy. They are involved mainly in agriculture (which accounts for 64 per cent of total female market time), especially food production, but also in trade and transport (21 per cent of total female market time). They spend about 33 per cent of their time in household work and 22 per cent in leisure. By contrast, men spend 42 per cent of their time in market activities (about 55 per cent of this time in non-agricultural sectors), only 6 per cent in household work and 52 per cent in leisure activities. Thus women work considerably longer hours than men, both in the market only and in the market and household combined. These differences are even more marked for women and men with primary education, mainly employed in agriculture, who work 88 per cent and 55 per cent of their waking time respectively. Female wages are only 65 per cent and 60 per cent of male wages for women with no education and women with primary education respectively. They are almost equal to male wages for workers with higher education.

[5] Table A1 shows the correspondence between the sectors of the SAM used in this paper and the sectors of the Hausner SAM. The aggregation involved also incorporating marketing margins in each activity instead of recording them in a separate account, and collapsing home production and market production of agricultural goods.

Table 2.2 Sectoral structure of Zambia, 1995

	Net output (% of GDP)	Exports as share of output (%)	Imports as share of domes-tic use (%)	Labour as share of total VA (%)	F labour as share of total labour (%)	M labour as share of total labour (%)
All market sectors, of which:	**100.0**	**16.5**	**20.3**	**50.9**	**44.7**	**42.0**
Horticulture and groundnuts	5.6	3.0	3.0	90.6	9.2	5.5
Commercial crops	1.4	15.8	17.2	55.6	0.9	1.2
Food and livestock	6.7	2.0	4.8	80.7	12.6	4.8
Fishing and forestry	4.8	0.1	0.2	55.7	0.3	3.5
Maize	4.3	4.5	15.1	69.5	5.7	4.3
Construction and utilities	6.4	10.1	0.2	17.7	0.0	1.2
Mining	17.3	93.3	23.7	13.9	0.1	1.5
Labour-intensive manufacturing	9.6	4.0	13.0	51.7	2.8	3.3
Capital-intensive manufacturing	3.1	9.1	64.8	35.2	0.0	1.1
Market services	13.0	8.6	25.1	52.8	1.9	3.6
Trade and transport	20.6	0.0	7.7	57.9	9.4	8.1
Public services	7.3	0.0	0.0	77.1	1.8	3.9
All social reproduction, of which:	**20.8**	**0.0**	**0.0**	**100.0**	**32.9**	**5.7**
Urban high-income	2.7	0.0	0.0	100.0	2.0	0.5
Urban low-income	6.6	0.0	0.0	100.0	7.2	1.8
Rural high-income	0.7	0.0	0.0	100.0	1.1	0.4
Rural low-income	10.7	0.0	0.0	100.0	22.5	3.0
All leisure, of which:	**67.8**	**0.0**	**0.0**	**100.0**	**22.4**	**52.3**
Urban high-income	10.8	0.0	0.0	100.0	2.3	5.7
Urban low-income	27.0	0.0	0.0	100.0	5.9	18.2
Rural high-income	3.3	0.0	0.0	100.0	0.7	3.2
Rural low-income	26.7	0.0	0.0	100.0	13.5	25.3
Total	**188.6**	**12.2**	**15.1**	**74.0**	**100.0**	**100.0**

Source: Gendered 1995 Zambia SAM

Table 2.3 Female share of total hours worked in each sector (per cent), Zambia, 1995

		of which, by educational level:			
	Total F	**No**	**Primary**	**Sec**	**Post-sec**
All market sectors	**48.7**	**12.1**	**33.0**	**3.1**	**0.5**
Horticulture and groundnuts	60.0	4.4	55.6	0.0	0.0
Commercial crops	41.0	41.0	0.0	0.0	0.0
Food and livestock	70.0	10.8	59.2	0.0	0.0
Fishing and forestry	7.0	1.6	5.1	0.3	0.0
Maize	54.0	14.8	39.2	0.0	0.0
Construction and utilities	3.4	0.4	0.9	1.7	0.5
Mining	6.5	0.8	1.1	4.1	0.6
Labour-intensive manufacturing	42.8	24.5	16.7	1.5	0.1
Capital-intensive manufacturing	3.7	0.1	0.9	1.8	1.0
Market services	32.2	5.0	16.2	9.9	1.0
Trade and transport	50.7	20.9	24.6	5.0	0.2
Public services	29.2	2.4	3.0	18.0	5.8
All social reproduction	**83.6**	**22.7**	**46.6**	**12.5**	**1.8**
Urban high-income	76.6	4.7	18.5	38.4	14.9
Urban low-income	77.9	9.9	40.5	24.4	3.1
Rural high-income	72.9	18.5	45.6	8.2	0.6
Rural low-income	87.0	29.2	51.5	6.0	0.2
All leisure	**27.4**	**8.7**	**8.6**	**8.9**	**1.2**
Urban high-income	26.1	1.1	2.1	16.7	6.1
Urban low-income	22.2	2.8	5.4	12.6	1.5
Rural high-income	15.7	5.1	6.1	4.2	0.3
Rural low-income	32.1	14.3	12.1	5.5	0.2

Source: Gendered 1995 Zambia SAM

3 The model

The model used in this paper is an adaptation of the computable general equilibrium (CGE) model described in Lofgren *et al.* (2001). This kind of model follows the neoclassical-structuralist modelling tradition described in Dervis, de Melo and Robinson (1982) and incorporates additional features, of particular relevance to developing countries.

The production function, which is important on the supply side of goods markets and on the demand side of factor markets, is a three-level CES (constant elasticity of substitution) function. 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. This differs across sectors, and varies with changes in the wage rate of women relative to men, which induce substitution between them. To reflect the rigidity of gender roles, particularly within the household, female/male substitution is limited by setting (the absolute value of)

elasticities lower than is usual in CGE models: –0.5 in the market sectors and –0.25 in social reproduction and leisure. The production function has an intermediate level that aggregates the four educational types of composite labour, with a substitution elasticity of –0.6, into one larger labour bundle. [6] This larger labour bundle is the 'output' of the reproduction and leisure sectors, which in the SAM use neither capital, land nor intermediate inputs. In the market sectors, the production function has an upper level that 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 this upper level varies by sector, ranging from –0.3 in agricultural sectors to –0.5 in industry and –0.8 in services (following Jung and Thorbecke 2001).[7]

The relative quantities of female and male labour, capital and land demanded vary inversely with relative factor prices (due to substitution), while the absolute quantities demanded in each sector depend mainly on the level of demand for the sector's output. The supply of capital and land in each sector is fixed (so profit and rental rates may vary across sectors), but labour is mobile, so that the supply to each sector responds freely to demand, within limits set by the fixed total supplies of female and male labour. Economy-wide average factor prices are set to clear factor markets – that is, to employ all factors fully – and so vary with the economy-wide demand for each factor, relative to its fixed supply.

All wages, profits[8] and rents accrue to households, who pay part in taxes, save part, and spend the rest. Households initially divide their expenditure among sectors in the proportions shown in the SAM, but the consumption function lets the mixture vary with relative prices (the 'prices' of social reproduction and leisure are the opportunity cost of the labour used in them, which is based on the average wage in the market sectors). The consumption function is a linear expenditure system (LES), in which the demand for each good consists of a subsistence minimum plus a fixed share of the residual income after meeting all the minima. The income elasticities of demand for market goods are based on estimates from Hazell and Hajjati (1995) and are assumed to vary only slightly across household types. In the absence of information on different households' attitudes towards social reproduction, it is assumed that all households value it as a basic necessity and hence the price elasticity of demand for social reproduction is set even lower than that for food, at about –0.4.[9]

In addition to household demands for the market goods, there are demands from government and for investment and intermediate use. Government consumption in each sector is fixed in real terms, as is the demand for investment goods (since total investment is exogenous). Demand for intermediate use depends on the levels of output in all sectors and fixed input-output coefficients. The balancing of supply and demand in these sectors also involves foreign trade flows. Buyers in each sector divide their

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6 This elasticity is also quite low. It is based on Jung and Thorbecke (2001) and supported by several studies.

7 The value chosen by Jung and Thorbecke for agriculture is very low, to reflect significant rigidities in agricultural supply. I set the substitution elasticity between labour and non-labour factors in the two most female-intensive agricultural sectors, horticulture and food, even lower, to –0.2, to indicate further constraints on women's crops.

8 More specifically, profits accrue to enterprises which then distribute them among households in fixed shares.

9 Table A2 shows details of income and price elasticities.

expenditure between imports and domestically produced goods in shares which vary in response to changes in the ratio of domestic prices to import prices – the import share rising, for example, if the domestic price rises (import prices being determined by fixed world prices plus tariffs). 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 (world prices net of export taxes and subsidies). These 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. In the model used in this paper, the elasticity of substitution in these functions is set at –1.2 in agricultural sectors, -–0.8 in industry and –0.6 in services (again following Jung and Thorbecke 2001). The balance between total exports and total imports must match a fixed inflow of foreign capital: this is achieved by letting the exchange rate float.

4 Trade policy simulations

This section analyses four trade-related changes: a rise in the export price of copper, the abolition of tariffs on manufactured imports, the introduction of export incentives in commercial crops, and the introduction of export incentives in horticulture. This last experiment is re-run with alternative gender-related parameter values in section five.

The discussion of each simulation is limited to a few gender-related aspects of the results. For each educational group, the following features are analysed: (i) the allocation of female labour between employment in the market economy (and among its different sectors), social reproduction and leisure; (ii) the female wage rate, both absolute and relative to male wages. Table 4.1 describes employment and wages in the SAM (or base case) while the following tables report percentage changes from the base case.

4.1 Higher export price of copper

The economy of Zambia is dominated by copper, which is by far the largest export. The mining sector[10] is about 17 per cent of GDP and is the most open sector, with 93 per cent of its output being exported. It is also the most capital-intensive sector (the capital share in its total value added is 86 per cent).

This experiment simulates the effects of a 50 per cent rise in the world price of copper. This would be approximately equivalent to bringing up the price to its early 1970s level. This increase causes an appreciation of the exchange rate, by 40 per cent, which is large because of the high share of copper in total exports. Export volumes (excluding copper which remains almost unchanged – a decline of only 0.3 per cent) fall, particularly in agriculture, while imports, especially of food and labour-intensive manufactures (which include processed food), increase significantly. As a result, the export structure becomes even more dominated by copper (84 per cent of the total). These changes in exports and imports cause output to fall in most market sectors, particularly capital-intensive manufacturing (in which more

[10] Copper accounts for most of the sector but other minerals are also included.

than 60 per cent of domestic use is supplied by imports), by 10.8 per cent, and male-intensive commercial crops, which is the most open sector in agriculture, by 10.9 per cent. Maize production also declines (by two per cent) as consumers switch to the imported kind. Labour-intensive manufacturing and public services increase moderately, as a consequence of higher domestic demand.

Table 4.1 Employment and wages in the base case

	F no ed	F prim ed	F sec ed	F post ed	M no ed	M prim ed	M sec ed	M post ed
Employment (million hours)								
All market sectors, of which	**905.5**	**2471.4**	**231.5**	**39.4**	**557.2**	**2365.2**	**813.9**	**105.9**
Horticulture and g'nuts	55.5	694.5	0.0	0.0	19.5	480.5	0.0	0.0
Commercial crops	76.9	0.0	0.0	0.0	35.6	75.0	0.0	0.0
Food and livestock	158.4	865.6	0.0	0.0	17.6	270.4	150.0	0.0
Fishing and forestry	5.4	17.5	0.9	0.0	20.0	283.4	15.8	0.2
Maize	127.2	337.0	0.0	0.0	44.7	350.8	0.0	0.0
Construction and utilities	0.4	1.0	1.9	0.5	11.0	49.8	44.5	4.4
Mining	1.3	1.6	6.1	0.9	9.9	44.7	79.3	6.2
Labour-intensive mfg	128.7	87.9	7.8	0.3	98.6	168.4	29.9	3.2
Capital-intensive mfg	0.1	0.9	1.9	1.0	6.1	36.8	53.2	5.5
Market services	24.1	78.6	48.0	5.0	60.7	143.7	109.9	14.2
Trade and transport	315.6	371.5	75.0	2.3	210.6	366.3	154.1	13.4
Public services	11.8	15.3	90.0	29.3	22.9	95.4	177.1	58.8
All social reproduction, of which:	**723.4**	**1486.1**	**400.3**	**58.8**	**59.6**	**273.3**	**164.0**	**25.5**
Urban high-income	9.8	38.4	79.4	30.9	5.5	8.3	23.8	10.9
Urban low-income	74.4	305.0	183.4	23.1	8.7	62.1	86.0	9.8
Rural high-income	21.8	53.7	9.7	0.7	3.4	19.1	8.7	0.8
Rural low-income	617.4	1089.0	127.7	4.1	42.0	183.8	45.5	3.9
All leisure, of which:	**572.6**	**565.5**	**586.4**	**80.8**	**426.2**	**2144.6**	**1892.2**	**314.3**
Urban high-income	7.7	14.6	116.4	42.5	39.5	65.0	274.6	134.7
Urban low-income	58.9	116.1	268.7	31.8	62.1	487.5	992.5	121.3
Rural high-income	17.2	20.5	14.2	0.9	24.0	150.0	100.5	9.6
Rural low-income	488.8	414.4	187.1	5.6	300.5	1442.1	524.6	48.7
Hourly wages								
(Kwacha per hour)	96.6	102.8	385.1	647.5	148.5	173.7	403.8	647.5

Source: Author's estimates from various sources

Output increases moderately in all non-market sectors (which are entirely non-traded and use only labour) – in leisure more than in social reproduction. Income and consumption levels rise for all household types. Income of urban high-income households rises the most. Rural households increase consumption of

social reproduction and leisure the most. This is because the prices of the two non-market sectors rise less for this household category relative to the urban groups, reflecting their lower skill-intensity. As discussed below, wages, and hence the opportunity cost of household work and leisure, increase more for the highly educated than for the uneducated.

The pattern of employment changes reflects that of the changes in output. Market employment declines in most sectors (except for some increase in food processing and public services), for both women and men. The decline is larger for workers with secondary education, by 3.1 per cent for women and by 3.7 per cent for men, as this is the skill more intensively used by capital-intensive manufacturing (in this sector employment declines by 26.1 per cent for women and by 25.4 per cent for women). The second most affected group are the uneducated, whose market employment declines by 2.8 for women and by 2.4 for men. In this case the fall results mainly from the decline in production of commercial crops which employs this educational group relatively intensively. Labour shifts from market activities into household work and leisure, with the increase in each non-market activity being in most cases similar in percentage terms for women and men, but with the absolute increases being on average largest for women in social reproduction and for men in leisure. In urban households, however, both high-income and low-income ones, time spent in social reproduction by men with secondary education rises, while inputs by women of same educational level decline, as the opportunity cost of their time has increased by two per cent relative to that of men, hence encouraging substitution.

Wages rise significantly for all educational and gender categories, because the economy-wide demand for labour increases relative to the demand for capital and land, as a result of the expansion of non-market sectors. Women gain more than men because on average the non-market sectors use more female time than male time (and also because the market sectors which contract the most are relatively more male-intensive). The highest increase is for women with secondary education whose salary rises by 9.9 per cent compared to 8.0 per cent for men. The wage rate increases by 9.0 per cent for women with tertiary education and by 8.7 per cent for women with primary education. The relative wage of the latter group declines, however, by almost one per cent. Uneducated women experience an absolute 8.8 per cent rise in their wages as well as a relative increase, by 1.5 per cent.

The impact on the well-being on women is likely to be positive, but different for different groups of women. The overall level of market output is lower but consumption levels are higher as the economy can now afford more imports. Women's market employment declines for all educational groups, but their wages increase (absolutely and, except for the workers with primary education, relative to men) as well as their leisure. There is also an increase in time inputs in social reproduction by both men and women and a redistribution of household tasks from women to men in urban households.

Table 4.2 Higher export price of copper (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Employment	**%**	**%**	**%**	**%**
All market sectors, of which:	**-2.8**	**-1.1**	**-3.1**	**-1.5**
Horticulture and groundnuts	0.9	0.7	-	-
Commercial crops	-17.3	-	-	-
Food and livestock	-0.6	-0.7	-	-
Fishing and forestry	8.2	8.0	7.5	7.8
Maize	-3.2	-3.3	-	-
Construction and utilities	-7.2	-7.3	-7.8	-7.5
Mining	-7.4	-7.6	-8.1	-7.8
Labour-intensive manufacturing	2.4	2.2	1.7	2.1
Capital-intensive manufacturing	-25.5	-25.7	-26.1	-25.9
Market services	-7.1	-7.3	-7.8	-7.4
Trade and transport	-3.1	-3.3	-3.8	-3.4
Public services	1.2	0.9	0.4	0.8
All social reproduction, of which:	**1.4**	**1.1**	**0.2**	**0.2**
Urban high-income	0.5	0.2	-0.3	0.0
Urban low-income	0.5	0.3	-0.1	0.2
Rural high-income	1.2	1.0	0.6	0.9
Rural low-income	1.5	1.3	0.8	1.2
All leisure, of which:	**2.7**	**2.0**	**1.1**	**0.6**
Urban high-income	0.9	0.2	0.1	0.2
Urban low-income	1.1	0.5	0.5	0.6
Rural high-income	2.8	2.2	2.3	2.3
Rural low-income	2.9	2.4	2.4	2.5
Hourly wages				
Absolute change	8.78	8.67	9.92	9.02
Relative to males*	1.46	-0.80	1.96	0.54

Source: Model simulations
*This is just the difference between the absolute percentage change for females and the absolute percentage change for males. A positive value indicates that the female/male wage gap has become smaller.

4.2 Tariff reduction in manufacturing

In the early 1990s Zambia embarked on a program of tariff liberalisation. On average tariffs were lowered from 27 per cent in the early 1990s to 19 per cent in 1995 (IMF, Zambia country report, 1997: 21). Further reductions have been recommended (WTO 1996). Other studies (e.g. Evans 2001) have provided an assessment of the impact on Zambia of various tariff changes, including those arising from regional trade agreements. This experiment considers only unilateral trade liberalisation. The tariff structure in the SAM is the following:

Table 4.3 Tariff structure in the 1995 Hausner SAM

	%
Horticulture and groundnuts	21.0
Commercial crops	0.4
Food and livestock	18.6
Fishing and forestry	15.9
Maize	3.1
Construction and utilities	19.5
Mining	20.3
Labour-intensive manufacturing	11.8
Capital-intensive manufacturing	14.1
Market services	13.4
Trade and transport	13.4

Tariffs are higher on average in agriculture than in manufacturing but it is in these latter sectors that the bulk of imports (80 per cent of the total) can be found. The simulation reduces tariffs in manufacturing, both in the labour-intensive sector and in the capital-intensive sector, to zero. The abolition of tariffs increases the total volume of imports by 1.5 per cent and the volume of manufactured imports by 3.0 per cent, and thus causes a 5.4 per cent depreciation of the exchange rate to restore the trade balance. As a result, imports other than manufactures, especially maize and other food staples, decline, while exports rise, particularly in agriculture. These changes in exports and imports cause domestic production to increase in most market sectors, especially commercial crops, maize, mining and market services (which include tourism), which are among the most outward-oriented sectors. Production of labour-intensive manufacturing declines slightly, while production of capital-intensive manufacturing falls by more than one per cent. Output falls on average also in social reproduction (by 0.2 per cent) and leisure (by 0.4 per cent). This overall decline however masks differences between high-income households, both in the urban and in the rural areas, whose production of social reproduction and leisure marginally increases, and low-income households, whose housework and leisure time falls. Tariff reduction causes the real income and consumption of rich (especially urban) households to rise the most.[11] This is because the main source of revenue for this household category is capital, the returns to which increase more than the returns to labour. Although one of the sectors in which protection is reduced (capital-intensive manufacturing) is more capital-intensive than most sectors in the economy, the sectors that contract as result of the simulation are, on average, more labour intensive than the sectors that expand.

The increase in market labour force participation is small on average (less than one per cent) for all educational groups, both women and men. Female workers with no education are those whose employment rises most from expansion of commercial crops. Women with primary education are the

[11] The findings of Evans (2001) support the result of a worsening of income distribution from tariff reduction.

most negatively affected by the decline in manufacturing employment which is, however, more than offset by increased work opportunities in agriculture, trade and other services. Total female market participation rises the most for the group with secondary education (0.8 per cent), with the highest proportional increase being in mining (6.5 per cent) but the largest absolute increase occurring in market services and trade. Time devoted to social reproduction declines slightly for women of all skill groups in poor urban and rural households, as does, by a larger extent, their leisure time. In rich households household work and leisure increase for all women, roughly in the same proportion. The increases are marginally higher for female workers with secondary education who constitute the majority of women in rich households. The pattern of time change in non-market activities for male workers is similar to that of female workers in proportional terms, but in absolute terms the changes are larger in leisure than in social reproduction, given the small initial value of male time input in household activities.

Table 4.4 Tariff reduction in manufacturing (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Employment	**%**	**%**	**%**	**%**
All market sectors, of which:	**0.7**	**0.4**	**0-8**	**0.3**
Horticulture and groundnuts	0.4	0.2	-	-
Commercial crops	2.7	0.0	-	-
Food and livestock	0.5	0.3	-	-
Fishing and forestry	0.2	0.1	0.3	0.1
Maize	1.3	1.1	-	-
Construction and utilities	3.4	3.2	3.5	3.3
Mining	6.4	6.2	6.5	6.3
Labour-intensive manufacturing	0.0	-0.2	0.1	-0.1
Capital-intensive manufacturing	-4.0	-4.1	-3.9	-4.0
Market services	1.5	1.4	1.7	1.5
Trade and transport	0.5	0.4	0.6	0.5
Public services	0.1	-0.1	0.2	0.0
All social reproduction, of which:	**-0.3**	**-0.4**	**0.0**	**-0.1**
Urban high-income	0.1	0.0	0.3	0.1
Urban low-income	-0.1	-0.2	0.0	-0.2
Rural high-income	0.2	0.0	0.2	0.1
Rural low-income	-0.4	-0.5	-0.3	-0.5
All leisure, of which:	**-0.8**	**-0.7**	**-0.3**	**-0.1**
Urban high-income	0.2	0.2	0.4	0.2
Urban low-income	-0.3	-0.4	-0.2	-0.4
Rural high-income	0.2	0.2	0.3	0.2
Rural low-income	-0.9	-0.9	-0.8	-0.9
Hourly wages				
Absolute change	0.45	0.75	0.33	0.71
Relative to males	-0.44	0.11	-0.41	-0.04

Source: Model simulations

Female wages rise, although moderately, for all skill categories. Male wages increase (by about one per cent) slightly more than female wages, except for workers with primary education. This is because the sectors that decline as a result of tariff liberalisation – particularly social reproduction – are relatively more female intensive. Women's wage rates rise the most for workers with primary education (by 1.0 per cent) and the least for workers with secondary education (by 0.2 per cent).

The distributional impact of tariff reduction does not depend only on the sectors which contract or expand, and the resulting sectoral shifts in employment. It is also affected by what tax policy the government chooses to recover its loss of revenue from imports. It is assumed in most CGE models that the government will maintain its revenue level by introducing higher direct taxes. Two alternatives (or closures) are possible: 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) – this was the closure chosen in the experiment described above – or the changes are larger for institutions with relatively high base-year rates. In the Hausner SAM only enterprises and high-income urban households pay income taxes. The latter indicates a more progressive tax system.

Rich urban households face a decline in total private consumption (including that of non-market services) by 9.5 per cent under progressive taxation compared with an increase of about one per cent under uniform taxation. Consumption of low-income urban households and high-income rural households increases more than in the previous simulation, but it is rural poor households who benefit the most (with a 1.5 per cent increase in real consumption, compared to a 0.4 per cent decline under uniform taxation).

These changes have important implications, especially for the demand for non-market services. The decline in leisure is marked in urban high-income households, but there are increases in the other types of households, especially the rural poor. Time spent in social reproduction in poor households also increases (compared to a decline in the previous simulation), while it falls in rich urban households (though less than leisure). Leisure increases significantly for women with no education and primary education, who are the majority in poor rural households (the category which also has the highest proportion of female-headed households). The rise in their leisure time reflects an employment decline in trade and labour-intensive manufacturing. Time spent on agricultural production increases more than in the previous simulation, however, especially for maize, for which domestic demand rises (maize is the main staple of rural poor households while urban rich households consume more processed food). Involvement in household work for uneducated females declines but it rises for more educated women (and uneducated men), because of the lower opportunity cost of their time compared to the case of uniform taxation. Market participation rises more than under uniform taxation for women with secondary and tertiary education. The sectoral increase (in absolute terms) is larger in trade and other market services for women with secondary education, and in the public sector for women with more education.

Wages increase more for uneducated women (by 3.5 per cent) and for female workers with primary education (by 2.9 per cent). They decline (compared to a slight increase in the previous simulation) by

1.2 per cent and 5.5 per cent for female workers with secondary education and with tertiary education respectively, reflecting the reduced demand for social reproduction in rich educated urban families.[12]

Table 4.5 Tariff reduction in manufacturing with progressive tax system (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Employment	**%**	**%**	**%**	**%**
All market sectors, of which:	**0.0**	**0.2**	**1.1**	**3.4**
Horticulture and groundnuts	0.1	0.2	-	-
Commercial crops	1.6	0.0	-	-
Food and livestock	-0.2	-0.1	-	-
Fishing and forestry	0.8	0.9	2.8	5.7
Maize	1.5	1.7	-	-
Construction and utilities	1.0	1.2	2.9	5.3
Mining	4.7	4.8	6.8	9.8
Labour-intensive manufacturing	-1.0	-0.9	1.1	3.9
Capital-intensive manufacturing	-6.1	-6.1	-4.3	-1.6
Market services	-0.3	-0.2	1.7	4.6
Trade and transport	-0.6	-0.5	1.5	4.3
Public services	-1.8	-1.7	0.2	3.0
All social reproduction, of which:	**-0.3**	**-0.3**	**0.1**	**0.5**
Urban high-income	-7.4	-7.5	-5.6	-3.0
Urban low-income	-0.8	-0.7	1.2	4.1
Rural high-income	-0.1	-0.1	1.8	4.7
Rural low-income	-0.1	0.0	2.0	4.7
All leisure, of which:	**0.4**	**0.1**	**-0.5**	**-1.9**
Urban high-income	-12.3	-12.5	-11.0	-8.5
Urban low-income	0.5	0.3	2.0	5.0
Rural high-income	1.1	0.9	2.6	5.6
Rural low-income	0.6	0.5	2.2	5.1
Hourly wages				
Absolute change	2.52	2.19	-1.15	-5.52
Relative to males	1.07	-0.39	-1.86	-1.33

The impact on women's well-being varies according to their educational level and the household type they belong to. Under uniform taxation market employment increases most for women with either secondary education or no education, but wage rates rise most for women with primary education. Leisure declines for all women in poor households but increases for women in rich households. Female workers with

[12] These are all gross (pre-tax) wages. Accounting for the progressive tax increases would make the differences between more educated and less educated women even more pronounced.

higher education are therefore more advantaged, as a large proportion of them live in high-income families. Under progressive taxation it is women with no education or primary education who gain in terms of their leisure, as a result of the greater income enjoyed by the household they belong to (poor households, especially in rural areas). In these household categories the level of social reproduction increases, too, but with less uneducated female workers' time inputs and more inputs from women with more education. Women with secondary education and tertiary education experience a decline in their wages (both in absolute and relative terms) compared with a small increase under uniform taxation.

4.3 Export incentives in agriculture

Agriculture has long been dominated by maize, which has been heavily subsidised by the government. This has led to the extension of maize cultivation into unsuitable areas and to Zambia losing ground even in production of commodities such as tobacco, where it had once been a leading producer in the region (Deininger and Olinto 2000). Liberalisation in the early 1990s was aimed at eliminating some of these distortions. The performance of agriculture has been quite disappointing since, however, as the expected increases in productivity and diversification have not taken place. Some evidence (for example Wold 1997) points to a very low supply response among small farmers, especially women, who lack access to capital and land and are further constrained by their multiple roles within the household.

Agricultural products account for a small share of Zambia's total exports (about three per cent). Zambia's main agricultural export crops are tobacco, coffee, cotton and, more recently, horticultural and floricultural goods, which have grown from a very small base. Maize also, depending on the harvest, is exported to neighbouring countries. The production of most export-oriented crops is dominated by commercial farmers, although small-scale farmers also are periodic exporters, especially of groundnuts and tobacco. Zambia does not provide any export assistance to farmers. Under the Export Development Program (EDP) the European Union, however, finances a project to increase non-traditional crops (WTO 1996).

The experiments described in this section compare the impact of export incentives in commercial crops (tobacco, coffee, cotton and sugar) with the impact of export incentives in horticulture (including roses, sugar beans and onions) and groundnuts. These two types of crop have a very different production structure. Commercial crops use more land and capital than other agricultural sectors and employ a higher proportion of male workers. The female workers in this sector (providing 41 per cent of total labour time) do not have any education. By contrast, horticulture and groundnuts use very little land and capital and employ a higher proportion of women (60 per cent of total labour time), the vast majority of whom have primary education. Thus choosing to support one crop or the other is likely to have a differential impact on women and men, and on workers with different levels of education. For simplicity, export incentives are simulated in both cases by the introduction of a 50 per cent export subsidy. In reality such subsidies

would be challenged under WTO rules and hence other ways of facilitating and encouraging exports would need to be used. The subsidy is financed by increasing direct taxes uniformly.[13]

4.3.1 Commercial crops

The introduction of a 50 per cent export subsidy in commercial crops causes the volume exported to increase by 47.6 per cent, but the total volume of exports to increase only by 0.3 per cent. Because the trade deficit is held constant, there is a rise in the volume of imports, which increase slightly in all market sectors, except mining, as a result of a 0.6 per cent appreciation of the exchange rate. Output rises by 7.4 per cent in commercial crops, and falls by a small proportion in other agricultural sectors and manufacturing. Social reproduction and leisure decline too, except in poor rural households where they increase slightly (these households are the only group whose total consumption rises, from higher returns to land).

Employment in commercial crops increases by 14.6 per cent for workers with no education, both women and men, but the rise is larger in absolute terms for women (the female workers in this sector are all uneducated). The increase in total uneducated female market participation is about one per cent. Employment growth in commercial crops occurs through shifts from food production, labour-intensive manufacturing and trade. The most significant change for women, however, is in social reproduction and leisure. Uneducated women reduce their time inputs especially in poor rural families where, conversely, females with more education devote longer hours to household tasks. Women with primary education marginally increase their time in horticulture, but also in maize and trade services, while they too work less in food production. For this group of female workers, total market participation is unchanged, overall leisure declines (by 0.1 per cent) while involvement in social reproduction on average rises (by 0.1 per cent, driven by increases in time inputs in poor rural households). Female workers with secondary and tertiary education are only slightly affected by the introduction of non-traditional agricultural export incentives as none of the higher educational categories is involved in agricultural production. Moreover the changes brought about by the simulation are too small to be transmitted to the rest of the economy in significant ways.

Uneducated male workers increase participation in commercial crop production by moving away from all other market sectors, and also especially at the expense of their leisure (which declines on average by 0.5 per cent). The employment increase in commercial crops is even larger for men with primary education both in percentage terms (15.0 per cent) and absolutely (11 million hours compared with five million hours for the uneducated). Male workers with primary education too reduce their leisure time, and also their participation in other agricultural production as well as in manufacturing.

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[13] In this experiment, the choice of government closure does not significantly affect results. This is because the income tax increase required to keep the government revenue level constant is much smaller than in simulation 4.2.

Table 4.6 Export incentives in commercial crops (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Employment	**%**	**%**	**%**	**%**
All market sectors, of which:	**0.7**	**-0.0**	**0.0**	**0.1**
Horticulture and groundnuts	-0.6	0.0	0.0	0.0
Commercial crops	14.6	0.0	0.0	0.0
Food and livestock	-0.7	-0.1	0.0	0.0
Fishing and forestry	-0.5	0.1	0.2	0.3
Maize	-0.5	0.1	0.0	0.0
Construction and utilities	-0.6	-0.1	-0.1	-0.0
Mining	-1.1	-0.5	-0.4	-0.4
Labour-intensive manufacturing	-0.8	-0.2	-0.2	-0.1
Capital-intensive manufacturing	-1.0	-0.4	-0.3	-0.3
Market services	-0.7	-0.2	-0.1	-0.0
Trade and transport	-0.5	0.1	0.1	0.2
Public services	-0.6	-0.1	0.0	0.1
All social reproduction, of which:	**-0.5**	**0.1**	**0.0**	**0.0**
Urban high-income	-0.7	-0.2	-0.1	-0.0
Urban low-income	-0.7	-0.1	-0.1	0.0
Rural high-income	-0.6	-0.1	0.0	0.1
Rural low-income	-0.4	0.1	0.2	0.3
All leisure, of which:	**-0.5**	**-0.1**	**-0.0**	**-0.1**
Urban high-income	-0.8	-0.4	-0.1	-0.1
Urban low-income	-0.8	-0.4	-0.1	-0.1
Rural high-income	-0.7	-0.3	-0.1	-0.0
Rural low-income	-0.4	0.0	0.2	0.3
Hourly wages				
Absolute change	0.89	-0.08	-0.11	-0.26
Relative to males	0.19	-0.43	0.12	0.01

The growth in commercial crops increases the economy-wide demand for female uneducated labour more than the demand for male uneducated labour. Consequently, the wage rate for women of this educational category rises slightly both absolutely (by 0.9 per cent) and relative to that of men (by 0.2 per cent). For workers with primary education, the economy-wide demand for females is unchanged while the demand for males increases. Hence, in this skill group, the female/male wage gap widens (by 0.4 per cent).

The effect on the well-being of women is ambiguous, and differs by level of education. While women with higher education (who are a small proportion of the Zambian female working population – about seven per cent) are only slightly affected, women with primary education (about 68 per cent of the total female labour force) are negatively affected: their leisure time declines, on average, and so does their market participation, while their housework increases. Their wages are almost unchanged in absolute

terms and increase by 0.2 per cent in relative terms. Women with no education benefit from increased market employment and higher wages, both in absolute and relative terms, but at the expense of their leisure. They also participate less in social reproduction, in most household categories. It is not even possible to say whether uneducated female workers would enjoy the higher revenue resulting from their increased participation in agriculture. Although the evidence is mixed, several studies suggest that in many African economies women, especially if unskilled, provide unpaid labour to commercial crops managed by their male relatives with no control over the income earned (Baden 1993). To investigate this aspect, better data and different assumptions regarding the functioning of the household, such as a non-unitary approach, would be required.

4.3.2 Horticulture and groundnuts

The introduction of a 50 per cent export subsidy in horticulture and groundnuts production causes their export volume to increase by 62.7 per cent and the total volume of exports to rise marginally (by 0.1 per cent). In this case, too, there is a slight rise in the volume of imports as a result of a 0.5 per cent appreciation of the exchange rate. Output rises by 2.5 per cent in horticulture and groundnuts, and falls in other sectors, especially food, maize and commercial crops. Leisure marginally falls, except in poor rural families, while social reproduction declines in all households.

Employment in horticulture and groundnuts increases by 3.0 per cent and 2.6 per cent for women with no education and women with primary education respectively. This causes an increase in total female market participation by 0.1 per cent for the uneducated and by about 0.4 per cent for workers with primary education. The absolute increase is highest for women with primary education (18 million hours). The higher participation of female workers with primary education in horticulture is achieved by reduction in their employment in food, maize, trade and, to a larger extent, from less time spent on non-market activities, especially social reproduction. Male employment increases by 3.0 per cent and 2.8 per cent for the uneducated and workers with primary education respectively. As in the previous experiment, the shift for men occurs mainly from their leisure time. Changes are slight for both female and male workers with more education.

By contrast with the simulation of export incentives for commercial crops, growth in horticulture and groundnuts increases the economy-wide demand for female workers with primary education more than the demand for female workers with no education. This is because horticultural production employs a larger share of workers with primary education relative to commercial crops, which use uneducated labour more intensely. As a result, the wage rate for women with primary education rises more, both absolutely (by 0.9 per cent) and relative to that of men of same skill (by 0.5 per cent). The wages of women with no education also increase (although less than from expansion of commercial crops) in absolute terms, by 0.3 per cent. The female/male uneducated wage gap narrows as much as in the previous experiment, by 0.2 per cent.

Table 4.7 Export incentives in horticulture (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Employment	**%**	**%**	**%**	**%**
All market sectors, of which:	**0.1**	**0.4**	**0.0**	**0.1**
Horticulture and groundnuts	3.0	2.6	-	-
Commercial crops	-0.4	-	-	-
Food and livestock	0.0	-0.5	-	-
Fishing and forestry	0.0	-0.4	0.2	0.3
Maize	0.0	-0.5	-	-
Construction and utilities	-0.3	-0.7	-0.1	-0.1
Mining	-0.6	-1.0	-0.4	-0.3
Labour-intensive manufacturing	-0.2	-0.6	0.0	0.1
Capital-intensive manufacturing	-0.5	-0.9	-0.3	-0.3
Market services	-0.3	-0.8	-0.1	-0.1
Trade and transport	-0.1	-0.5	0.1	0.2
Public services	-0.2	-0.6	0.0	0.1
All social reproduction, of which:	**0.0**	**-0.5**	**0.1**	**0.0**
Urban high-income	-0.3	-0.7	-0.1	0.0
Urban low-income	-0.2	-0.6	0.0	0.1
Rural high-income	-0.1	-0.5	0.1	0.2
Rural low-income	0.0	-0.4	0.2	0.3
All leisure, of which:	**-0.1**	**-0.4**	**0.0**	**-0.1**
Urban high-income	-0.4	-0.7	-0.2	-0.2
Urban low-income	-0.3	-0.6	-0.1	0.0
Rural high-income	-0.3	-0.6	-0.1	0.0
Rural low-income	-0.1	-0.4	0.1	0.2
Hourly wages				
Absolute change	0.26	0.94	-0.08	-0.22
Relative to males	0.23	0.54	0.10	0.04

The effect on the well-being of women appears to be more positive than in the previous simulation. Women with no education still benefit, although to a lesser extent, from increased market employment and higher wages. These small gains are however offset by reduction in their leisure, and also by an increase in their housework in poor rural households. Women with primary education – the majority of the female labour force – gain the most in terms of market participation and wages, but at the expense of their leisure. Because of women's greater participation than men in horticulture, social reproduction declines marginally also in poor rural families (while there was no change for this type of household from expansion of commercial crops). Time inputs into it from uneducated women are larger than in the previous case while time inputs from women with primary education are smaller. Women working in horticulture are also likely to have greater control over their (higher) wages because the organisation of

production in this sector often differs from more traditional forms of agriculture. Production of flowers and high value vegetables is often organised in large farms owned by non-relations. A contractual wage labour force whose terms and conditions of employment are akin to those of industrial workers is often used (Joekes 1995: 47). Participation in horticultural activities thus is likely to require no ownership of productive assets other than labour and less mediation through male relatives. Note also, however, that the decline in the production of food (maize as well as other staple crops) is slightly larger than when growth of commercial crops occurs, with possible negative effects on the nutritional levels of women and children.

5 Gender differentiated constraints in supply response

The simulation of export promotion in horticulture and groundnuts is re-run with alternative elasticities in consumption and production, and with a different allocation of productive assets (land and capital) across crops. The gender and economics literature points to gender-differentiated market imperfections and structural limitations at the household level which hamper women's ability to respond to economic incentives. One important constraint results from the 'double burden' (for example Elson 1992): women's workloads, given their multiple responsibilities for household production as well as for their families, prevent them from taking full advantage of new market opportunities. With reference to rural Zambia, Wold (1997) finds that: '. . . female headed farm households would give a negative supply response [to higher producer prices for maize] due to their family obligations and time constraints . . .' The first experiment in this section 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 between the market and the household).

Women are also constrained by norms governing the gender division of labour both in the household and in the market which often result in women not being allowed to take up 'men's roles' (and vice versa) even when this would be economically efficient. The second simulation in this section 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.

Women also often have less command over productive assets. In their study of Zambia, Deininger and Olinto (2000) find that access to credit, ownership of cattle and the ability to mobilise family labour significantly increase output and productivity**.** In all these respects women are likely to be at a disadvantage. In the last experiment the availability of land and capital in horticulture and groundnuts is increased by 25 per cent to assess the impact of better access by women to productive assets.

5.1 Higher price elasticity of demand for social reproduction

In this variant of the main experiment the price elasticity of demand for social reproduction is set close to –1.0, from –0.4 in the main experiment. The main effect of higher responsiveness of consumption of

reproduction services to changes in their relative price is that women's non-market time declines less in leisure and more in social reproduction. The higher elasticity of demand for household work permits a larger outflow of female labour from social reproduction (which allows the outflows from leisure to be smaller). This is especially so for women in poor households, both rural and urban. Uneducated female workers in poor rural household experience an increase in their leisure (rather than a decline) and a fall in their participation to social reproduction (rather than a small increase). They also slightly increase their participation in production of food crops, which declines less overall than in the main experiment. Gains in both absolute and relative wages for female workers with no education and primary education are slightly smaller. Overall consumption of social reproduction declines more than in the main experiment while leisure declines less.

Table 5.1 Higher price elasticity of demand for social reproduction elasticity (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Employment	**%**	**%**	**%**	**%**
All market sectors, of which:	**0.1**	**0.4**	**0.0**	**0.1**
Horticulture and groundnuts	3.0	2.6	-	-
Commercial crops	-0.3	-	-	-
Food and livestock	0.0	-0.4	-	-
Fishing and forestry	0.1	-0.3	0.3	0.4
Maize	0.0	-0.4	-	-
Construction and utilities	-0.3	-0.7	0.0	0.0
Mining	-0.6	-1.0	-0.4	-0.3
Labour-intensive manufacturing	-0.1	-0.5	0.1	0.2
Capital-intensive manufacturing	-0.5	-0.9	-0.3	-0.2
Market services	-0.3	-0.7	-0.1	0.0
Trade and transport	-0.1	-0.5	0.1	0.2
Public services	-0.1	-0.5	0.1	0.2
All social reproduction, of which:	**-0.1**	**-0.6**	**0.0**	**-0.1**
Urban high-income	-0.4	-0.8	-0.2	-0.1
Urban low-income	-0.3	-0.7	-0.1	0.0
Rural high-income	-0.3	-0.7	-0.1	0.0
Rural low-income	-0.1	-0.5	0.1	0.2
All leisure, of which:	**0.0**	**-0.4**	**0.0**	**0.0**
Urban high-income	-0.4	-0.7	-0.2	-0.1
Urban low-income	-0.2	-0.5	0.0	0.0
Rural high-income	-0.2	-0.6	0.0	0.0
Rural low-income	0.0	-0.3	0.2	0.3
Hourly wages				
Absolute change	0.19	0.85	-0.18	-0.33
Relative to males	0.12	0.38	-0.04	-0.09

Source: Model simulations

5.2 Higher elasticity of substitution in production

In this simulation, 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 -2.25 in all non-market sectors. This higher elasticity does not affect the rise in total market participation for women with primary education, which is still 0.4 per cent. However, the increase in their participation in horticulture is marginally larger than in the main experiment. The fall in participation of female workers with primary education in agricultural sectors (which are on average more female intensive) is less, while the fall in participation in more male-intensive sectors, such as manufacturing and most services, is larger. The higher substitution elasticity has the effect of increasing the economy-wide demand for men with primary education slightly more and the economy-wide demand for women of this skill level slightly less. Thus the gains in female wage rates are smaller, both in absolute and relative terms.

In the non-market sectors, participation in social reproduction declines less and leisure time declines more, for both men and women. This is because, reflecting smaller increases in the cost of social reproduction and larger increases in the cost of leisure, household demand falls, on average, less for the former and more for the latter.

Table 5.2 Higher elasticity of substitution in production (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Employment	**%**	**%**	**%**	**%**
All market sectors, of which:	**0.1**	**0.4**	**0.0**	**0.1**
Horticulture and groundnuts	3.0	2.6	-	-
Commercial crops	-0.3	-	-	-
Food and livestock	0.0	-0.4	-	-
Fishing and forestry	0.1	-0.4	0.3	0.4
Maize	0.0	-0.5	-	-
Construction and utilities	-0.3	-0.8	-0.1	0.0
Mining	-0.7	-1.1	-0.4	-0.3
Labour-intensive manufacturing	-0.2	-0.6	0.1	0.1
Capital-intensive manufacturing	-0.6	-1.0	-0.3	-0.2
Market services	-0.4	-0.8	-0.1	-0.1
Trade and transport	-0.1	-0.5	0.1	0.2
Public services	-0.2	-0.7	0.0	0.1
All social reproduction, of which:	**0.0**	**-0.4**	**0.1**	**0.0**
Urban high-income	-0.3	-0.7	-0.1	0.0
Urban low-income	-0.2	-0.5	0.0	0.1
Rural high-income	-0.1	-0.5	0.1	0.2
Rural low-income	0.0	-0.4	0.2	0.3
All leisure, of which:	**-0.1**	**-0.6**	**0.0**	**-0.1**
Urban high-income	-0.4	-0.9	-0.2	-0.2
Urban low-income	-0.3	-0.7	-0.1	0.0
Rural high-income	-0.3	-0.7	-0.1	0.0
Rural low-income	-0.1	-0.5	0.1	0.2
Hourly wages				
Absolute change	0.17	0.69	-0.13	-0.24
Relative to males	0.04	0.14	0.02	0.01

Source: Model simulations

5.3 Reallocation of assets

In this last variant of the experiment land and capital are increased in horticulture and groundnuts by about 25 per cent, through reallocation from maize crops. In the model each sector has a given allocation of land and capital – no endogenous mobility of these two factors is allowed. When more land and capital are allocated to horticulture and groundnuts, their production grows by 6.3 per cent, more than in the main experiment, while maize production declines more, by 4.4 per cent. There is also a larger decline in social reproduction and leisure of the poor rural households. These households are the most negatively affected in terms of real consumption by the much higher price of maize (due to decline in its production), and by the higher opportunity cost of their social reproduction (reflecting higher wages for women with primary education, who constitute about 52 per cent of rural low-income social reproduction).

The increase in participation of uneducated women in horticulture is 2.5 per cent higher and the decline in maize employment is 0.6 per cent higher. Participation in food production however increases slightly (while it had declined in the previous simulation). The net outcome for uneducated female workers is higher employment levels in agriculture and in the market overall. Reduction of leisure, especially in poor rural households, is larger than in the main experiment. Total market participation for female workers with primary education rises more (by 0.6 per cent compared with a 0.4 per cent increase in the main simulation). This reflects higher participation in horticulture, by 4.7 per cent compared with 2.6 per cent in the main experiment. The decline in non-market activities is also larger, more in social reproduction than in leisure in absolute terms, and especially in poor rural families. Because the higher growth in horticulture and groundnuts raises more the demand for women with primary education, their wages increase more both in absolute terms and relative to male workers of the same level of education. Their gains are also more pronounced than those of uneducated women, whose wages rise less than in simulation 4.3.2.

Table 5.3 Reallocation of assets (percentage changes from the base case)

	F no ed	F prim ed	F sec ed	F post ed
Employment	**%**	**%**	**%**	**%**
All market sectors, of which:	**0.1**	**0.6**	**0.0**	**0.0**
Horticulture and groundnuts	5.5	4.7	-	-
Commercial crops	-0.4	-	-	-
Food and livestock	0.1	-0.7	-	-
Fishing and forestry	0.0	-0.7	0.2	0.2
Maize	-0.6	-1.4	-	-
Construction and utilities	-0.4	-1.1	-0.3	-0.2
Mining	-0.5	-1.3	-0.3	-0.3
Labour-intensive manufacturing	-0.2	-1.0	0.0	0.0
Capital-intensive manufacturing	-0.6	-1.4	-0.4	-0.4
Market services	-0.4	-1.2	-0.2	-0.2
Trade and transport	-0.2	-0.9	0.0	0.1
Public services	-0.1	-0.9	0.0	0.1
All social reproduction, of which:	**0.0**	**-0.8**	**0.1**	**0.1**
Urban high-income	-0.2	-1.0	-0.1	0.0
Urban low-income	-0.1	-0.9	0.1	0.1
Rural high-income	0.0	-0.8	0.1	0.2
Rural low-income	0.0	-0.7	0.2	0.3
All leisure, of which:	**-0.2**	**-0.8**	**0.0**	**-0.1**
Urban high-income	-0.3	-0.9	-0.2	-0.1
Urban low-income	-0.2	-0.8	0.0	0.0
Rural high-income	-0.2	-0.8	0.0	0.0
Rural low-income	-0.2	-0.8	0.0	0.0
Hourly wages				
Absolute change	0.08	1.35	-0.24	-0.32
Relative to males	0.30	0.91	0.10	0.09

In summary, higher price elasticity for social reproduction results in less loss of leisure time for women but also in a larger decline in household activities. Higher substitution elasticities in production seem to reinforce the distinction between 'women's activities' (mainly in agriculture) and 'men's activities' (mainly in non-agriculture) in market employment. The experiment also has the effect of reducing social reproduction less, but this is offset by a larger decline in leisure for both women and men. The reallocation of assets increases both female market participation and wages but causes a decline in their leisure. It is not easy to say which of these changes improve women's well-being. It is likely that some of them would occur simultaneously, with some of the effects offsetting each other and some reinforcing each other.

6 Conclusions

The purpose of this paper was to see what insights can be gained into the gender effects of trade in Zambia by using a disaggregated SAM and CGE model. The gendered Zambia SAM described in this paper has 12 market sectors, differentiates workers by both gender and education (a total of eight labour types), and accounts for land as well as for capital. It distinguishes four household types, by income level and location, and estimates for each of them the amounts of social reproduction and leisure. This level of detail permits an understanding of how the effects of economic changes on women vary, depending on their characteristics and circumstances, including their obligations and tasks within the household.

The simulation of an increase in the world price of copper highlighted that contraction of domestic output resulting from an improvement in terms of trade occurs mostly in two male-intensive sectors, capital-intensive manufacturing and commercial crops. It also showed that women with secondary and tertiary education gain more than other female workers from higher wages and more leisure time, and that men in urban households take up some of their female relatives' tasks in social reproduction.

The abolition of tariffs on manufactured imports resulted in smaller employment and wage gains for women than for men. The experiment showed also that what tax policy is implemented to recover loss of import revenue matters for income distribution. A progressive taxation which favours rural poor families benefits also uneducated women while a less progressive taxation causes larger gains for urban rich households and more educated female workers.

The experiment of an introduction of incentives in non-traditional agricultural exports made apparent that women are favoured more by expansion of horticulture and groundnuts than by expansion of commercial crops. It also made visible differences among women, between female workers with primary education, who are employed relatively more intensively in horticulture, and female workers with no education, who work largely as unpaid family labour in commercial crops. The simulation also showed that reallocation of productive assets to women's crops makes female workers more productive but reduces their leisure time.

Finally, the experiments highlighted the vulnerability of Zambia to changes in copper prices and the dominance still in the economy of the copper sector. The price increase in the first simulation was about the same magnitude as in the last simulation. However, while higher copper prices have a significant impact, with repercussions on the rest of the economy, the effects of higher producer prices in non-traditional agriculture on other sectors are slight.

The simulations showed how important it is to include social reproduction and leisure as sectors, and thus to integrate the analysis of women's time in the household with their work in the market economy. They also highlighted that when there is great rigidity in gender roles, as well as in market structures, the positive effects of better price incentives are likely to be small. It is thus important to design complementary policies to reduce the many competing demands on women's time and to enhance their ability to respond to economic reforms.

The limitations of the approach used in the paper should also be noted. The behaviour of the social reproduction and leisure sectors resembles that in the unitary model of the household and does not allow for differences in preferences and control over resources between family members. Thus, for example, it was not possible to capture differences in well-being between women with primary education, who are likely to have greater control over their larger earnings from horticulture, and uneducated women, who receive higher income from expansion of commercial crops but who are likely to have less say on how to spend it. Some of these aspects will be addressed in future work.

Appendices

Appendix 1 Employment and wages in the 1995 Zambia SAM

The four kinds of labour in the Hausner SAM (no education, primary education, secondary education and post-secondary education) were each split between females and males using employment data by education and gender from the 1996 LCMS. Employment figures were then converted into hours worked, using information on time use from various sources, mainly Saito (1994) for agriculture, and an early Labour Force Survey (Republic of Zambia 1986) for the non-agricultural sectors. The 1996 LCMS provides only data on agriculture overall, with no details on various crops. Information on the gender-intensity of different agricultural sub-sectors was taken from Kumar (1994).

Estimates for social reproduction are tentative. Information on time allocation between market and non-market activities by gender was available for women and men on average – without educational breakdown – and only in rural areas. An assumption was thus made that the same pattern of time allocation applies to all educational groups and to all households – including urban types. Another limitation is that the contribution of several people (mainly women) who are reported in the 1996 LCMS as being full time 'house-workers' was not included. This might have lead to underestimating the value of output of the social reproduction sectors. Time spent on leisure was calculated residually for all working household members in each household type.

Information on wages by both education and gender is sparse and not too reliable. Some values were extracted from the LCMS 1996 but seemed quite odd (similarly odd appeared to be wage rates reported in other various Zambia Bureau of Statistics reports). There was also the additional problem that a strange wage structure (in terms of both sector and education ranking) would result from dividing value added by worked hours. This problem could reflect all sorts of discrepancies. After various attempts it was then decided to alter the employment figures (which could mean correcting for problems with either people employed or worked hours per employee, or both) so to obtain a structure which reflects some stylised facts about wage, education and gender in Zambia. These facts are: men often earn more than women (while women work more hours than men). This is particularly true for workers with no or little education, while women with secondary or tertiary education earn as much as men with the same educational level. Agriculture (which is where more than 60 per cent of total Zambian labour force is) is where wages are the lowest, and also where the gender wage gap is the highest (according to data from WISTAT women's wages are about 65 per cent of men's wages in agriculture and 75 per cent of men's wages in non-agricultural sectors). Wages for workers with primary education are only slightly higher than wages for the uneducated, while the gap between one educational level and the next widens for secondary and post-secondary education.

Households' labour endowments by gender and education were also calculated from the 1996 LCMS.

Table A1 Correspondence between SAM sectors

	SAM in this paper		**Hausner SAM**
1	Horticulture and groundnuts	= 1	Groundnuts
		2	Horticulture (onions, sugar beans, roses)
2	Commercial crops	= 3	Tobacco
		4	Coffee
		5	Sugar
		6	Cotton
3	Food and livestock	= 7	Staple resistant crops
		8	Wheat
		9	Other crops (potatoes, sunflowers, soybeans)
		10	Livestock
4	Fishing and forestry	=11	Fish
		12	Forestry
5	Maize	=13	Small maize
		14	Commercial maize
6	Construction and utilities	=15	Construction
		16	Energy
7	Mining	=17	Metal mining
8	Labour-intensive manufacturing	=18	Food, beverages and tobacco
		19	Textiles and garments
		20	Wood, furniture and paper
9	Capital-intensive manufacturing	=21	Fertiliser and basic chemicals
		22	Capital goods
		23	Other manufacturing
10	Other services	=24	Market services
		25	Finance
		26	Tourism
11	Trade and transport	=27	Trade and transport
12	Public sector	=28	Public non-market services
13	Reproduction Urban high-income		
14	Reproduction Urban low-income		
15	Reproduction Rural high-income		
16	Reproduction Rural low-income		
17	Leisure Urban high-income		
18	Leisure Urban low-income		
19	Leisure Rural high-income		
20	Leisure Rural low-income		

Table A2 Expenditure and price elasticities by commodity and household type (base case)

	Urban high-income		Urban low-income		Rural high-income		Rural low-income	
	Exp	**Price**	**Exp**	**Price**	**Exp**	**Price**	**Exp**	**Price**
Horticulture & groundnuts	0.80	-0.64	0.80	-0.54	0.80	-0.57	0.90	-0.53
Commercial crops	1.00	-0.80	1.00	-0.67	1.00	-0.67	1.00	-0.57
Food and livestock	0.60	-0.49	0.60	-0.41	0.60	-0.42	0.70	-0.42
Fishing and forestry	1.00	-0.80	0.80	-0.54	0.80	-0.56	1.00	-0.60
Maize	0.60	-0.48	0.60	-0.40	0.60	-0.42	0.70	-0.43
Construction and utilities	1.25	-1.00	1.50	-1.00	1.50	-1.00	1.50	-0.86
Mining	1.50	-1.20	1.50	-1.00	1.50	-1.00	1.50	-0.86
Labour-int mfg	0.80	-0.69	0.80	-0.62	0.80	-0.62	0.80	-0.54
Capital-int mfg	1.25	-1.00	1.35	-0.91	1.35	-0.90	1.60	-0.92
Market services	1.25	-1.00	1.49	-0.99	1.44	-0.96	1.46	-0.85
Trade and transport	1.25	-1.00	1.35	-0.90	1.35	-0.90	1.60	-0.92
Public services	1.00	-0.80	1.00	-0.67	1.00	-0.67	1.20	-0.69
Social reproduction								
Urban high income	0.55	-0.47	-	-	-	-	-	-
Urban low income	-	-	0.50	-0.37	-	-	-	-
Rural high income	-	-	-	-	0.56	-0.40	-	-
Rural low income	-	-	-	-	-	-	0.60	-0.40
Leisure								
Urban high income	1.10	-0.94	-	-	-	-	-	-
Urban low income	-	-	1.18	-0.90	-	-	-	-
Rural high income	-	-	-	-	1.32	-0.93	-	-
Rural low income	-	-	-	-	-	-	1.20	-0.81

Table A3 Higher export price of copper (absolute and percentage changes from the base case)

	F no ed		F prim ed		F sec ed		F post ed		M no ed		M prim ed		M sec ed		M post ed	
Employment	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%
All market sectors, of which:	**-25.60**	**-2.83**	**-26.88**	**-1.09**	**-7.12**	**-3.07**	**-0.60**	**-1.52**	**-13.24**	**-2.38**	**-40.86**	**-1.73**	**-30.21**	**-3.71**	**-2.99**	**-2.82**
Horticulture and groundnuts	0.48	0.87	4.97	0.72	0.00	0.00	0.00	0.00	0.31	1.59	2.19	0.46	0.00	0.00	0.00	0.00
Commercial crops	-13.26	-17.25	0.00	0.00	0.00	0.00	0.00	0.00	-5.94	-16.67	-13.22	-17.62	0.00	0.00	0.00	0.00
Food and livestock	-0.89	-0.56	-5.87	-0.68	0.00	0.00	0.00	0.00	0.02	0.14	-2.53	-0.94	-0.37	-0.25	0.00	0.00
Fishing and forestry	0.45	8.23	1.39	7.96	0.07	7.46	0.00	7.78	1.80	8.99	21.77	7.68	1.34	8.46	0.01	8.04
Maize	-4.03	-3.17	-11.19	-3.32	0.00	0.00	0.00	0.00	-1.11	-2.48	-12.53	-3.57	0.00	0.00	0.00	0.00
Construction and utilities	-0.03	-7.19	-0.07	-7.26	-0.15	-7.79	-0.04	-7.45	-0.72	-6.54	-3.73	-7.50	-3.08	-6.93	-0.32	-7.23
Mining	-0.09	-7.41	-0.12	-7.65	-0.49	-8.08	-0.07	-7.79	-0.67	-6.75	-3.53	-7.89	-5.73	-7.23	-0.47	-7.57
Labour-intensive manufacturing	3.14	2.44	1.97	2.25	0.14	1.73	0.01	2.07	3.12	3.17	3.34	1.98	0.80	2.68	0.07	2.32
Capital-intensive manufacturing	-0.02	-25.54	-0.24	-25.75	-0.49	-26.09	-0.27	-25.86	-1.53	-25.02	-9.54	-25.94	-13.51	-25.40	-1.42	-25.69
Market services	-1.71	-7.07	-5.72	-7.28	-3.72	-7.76	-0.37	-7.44	-3.89	-6.41	-10.80	-7.52	-7.58	-6.90	-1.02	-7.22
Trade and transport	-9.78	-3.10	-12.15	-3.27	-2.84	-3.78	-0.08	-3.44	-5.08	-2.41	-12.90	-3.52	-4.45	-2.89	-0.43	-3.21
Public services	0.14	1.16	0.14	0.93	0.37	0.41	0.22	0.75	0.43	1.87	0.63	0.66	2.37	1.34	0.59	0.99
All social reproduction, of which:	**9.90**	**1.35**	**15.84**	**1.06**	**0.70**	**0.17**	**0.12**	**0.20**	**0.97**	**1.59**	**2.43**	**0.89**	**1.03**	**0.63**	**0.11**	**0.42**
Urban high-income	0.06	0.53	0.07	0.19	-0.25	-0.30	0.01	0.03	0.05	0.88	0.00	0.06	0.04	0.16	0.02	0.15
Urban low-income	0.41	0.54	1.02	0.34	-0.18	-0.10	0.04	0.19	0.08	0.89	0.13	0.21	0.31	0.36	0.03	0.31
Rural high-income	0.29	1.20	0.53	0.96	0.07	0.63	0.01	0.85	0.06	1.56	0.16	0.83	0.10	1.10	0.01	0.97
Rural low-income	9.14	1.47	14.08	1.30	1.06	0.82	0.05	1.17	0.78	1.83	2.14	1.17	0.59	1.29	0.05	1.29
All leisure, of which:	**15.70**	**2.71**	**11.19**	**1.98**	**6.42**	**1.08**	**0.48**	**0.58**	**12.28**	**2.82**	**38.42**	**1.79**	**29.18**	**1.54**	**2.88**	**0.91**
Urban high-income	0.08	0.85	0.03	0.18	0.12	0.11	0.09	0.22	0.50	1.21	0.03	0.05	1.57	0.57	0.46	0.34
Urban low-income	0.66	1.09	0.62	0.54	1.41	0.52	0.19	0.58	0.92	1.44	1.98	0.41	9.77	0.98	0.86	0.70
Rural high-income	0.53	2.82	0.46	2.22	0.36	2.26	0.04	2.29	0.81	3.18	3.15	2.09	2.79	2.73	0.26	2.41
Rural low-income	14.43	2.94	10.08	2.45	4.53	2.39	0.16	2.50	10.05	3.30	33.26	2.31	15.05	2.86	1.30	2.63
Hourly wages		**8.78**		**8.67**		**9.92**		**9.02**		**7.32**		**9.47**		**7.96**		**8.48**

Table A4 Tariff reduction in manufacturing (absolute and percentage changes from the base case)

	F no ed		F prim ed		F sec ed		F post ed		M no ed		M prim ed		M sec ed		M post ed	
Employment	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%
All market sectors, of which:	**6.76**	**0.75**	**10.45**	**0.42**	**1.83**	**0.79**	**0.11**	**0.28**	**3.37**	**0.61**	**15.22**	**0.64**	**7.12**	**0.88**	**0.57**	**0.54**
Horticulture and groundnuts	0.20	0.35	1.44	0.21	0.00	0.00	0.00	0.00	0.03	0.15	1.24	0.26	0.00	0.00	0.00	0.00
Commercial crops	2.08	2.71	0.00	0.00	0.00	0.00	0.00	0.00	0.89	2.50	1.97	2.62	0.00	0.00	0.00	0.00
Food and livestock	0.73	0.46	2.63	0.30	0.00	0.00	0.00	0.00	0.04	0.25	0.96	0.36	0.53	0.35	0.00	0.00
Fishing and forestry	0.01	0.20	0.01	0.08	0.00	0.31	0.00	0.13	0.00	-0.01	0.38	0.13	0.02	0.13	0.00	0.13
Maize	1.62	1.28	3.82	1.13	0.00	0.00	0.00	0.00	0.48	1.07	4.15	1.18	0.00	0.00	0.00	0.00
Construction and utilities	0.01	3.39	0.03	3.25	0.07	3.48	0.02	3.30	0.35	3.18	1.64	3.30	1.46	3.29	0.15	3.30
Mining	0.08	6.36	0.10	6.23	0.39	6.47	0.05	6.28	0.61	6.14	2.81	6.29	4.98	6.28	0.39	6.29
Labour-intensive manufacturing	-0.06	-0.05	-0.16	-0.18	0.00	0.05	0.00	-0.13	-0.25	-0.25	-0.22	-0.13	-0.04	-0.13	0.00	-0.13
Capital-intensive manufacturing	0.00	-3.99	-0.04	-4.09	-0.07	-3.88	-0.04	-4.05	-0.26	-4.18	-1.49	-4.05	-2.16	-4.05	-0.22	-4.05
Market services	0.37	1.55	1.12	1.42	0.80	1.66	0.07	1.47	0.81	1.34	2.12	1.48	1.63	1.48	0.21	1.48
Trade and transport	1.71	0.54	1.50	0.40	0.48	0.64	0.01	0.45	0.70	0.33	1.66	0.45	0.71	0.46	0.06	0.46
Public services	0.01	0.06	-0.01	-0.06	0.16	0.17	0.00	-0.02	-0.03	-0.14	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
All social reproduction, of which:	**-2.36**	**-0.32**	**-6.26**	**-0.42**	**-0.16**	**-0.04**	**-0.04**	**-0.06**	**-0.22**	**-0.36**	**-1.01**	**-0.37**	**-0.21**	**-0.13**	**-0.03**	**-0.11**
Urban high-income	0.01	0.13	0.01	0.04	0.22	0.27	0.03	0.08	0.00	0.02	0.01	0.06	0.04	0.18	0.01	0.08
Urban low-income	-0.08	-0.11	-0.72	-0.24	-0.03	-0.02	-0.04	-0.19	-0.02	-0.21	-0.13	-0.21	-0.09	-0.11	-0.02	-0.19
Rural high-income	0.04	0.15	0.02	0.03	0.02	0.23	0.00	0.07	0.00	0.05	0.01	0.05	0.01	0.14	0.00	0.07
Rural low-income	-2.33	-0.37	-5.58	-0.51	-0.37	-0.29	-0.02	-0.47	-0.20	-0.48	-0.90	-0.49	-0.17	-0.38	-0.02	-0.47
All leisure, of which:	**-4.40**	**-0.76**	**-4.19**	**-0.74**	**-1.67**	**-0.28**	**-0.07**	**-0.08**	**-3.15**	**-0.72**	**-14.21**	**-0.66**	**-6.91**	**-0.36**	**-0.54**	**-0.17**
Urban high-income	0.02	0.21	0.03	0.20	0.42	0.35	0.10	0.23	0.04	0.10	0.15	0.23	0.72	0.26	0.31	0.23
Urban low-income	-0.20	-0.34	-0.44	-0.38	-0.65	-0.24	-0.11	-0.35	-0.28	-0.44	-1.71	-0.35	-3.27	-0.33	-0.43	-0.35
Rural high-income	0.04	0.22	0.04	0.18	0.05	0.31	0.00	0.21	0.03	0.11	0.31	0.21	0.22	0.22	0.02	0.21
Rural low-income	-4.25	-0.87	-3.82	-0.93	-1.48	-0.78	-0.06	-0.90	-2.95	-0.97	-12.96	-0.90	-4.58	-0.87	-0.45	-0.90
Hourly wages		**0.45**		**0.75**		**0.33**		**0.71**		**0.89**		**0.64**		**0.74**		**0.75**

Table A5 Tariff reduction in manufacturing with progressive tax system (absolute and percentage changes from the base case)

	F no ed		F prim ed		F sec ed		F post ed		M no ed		M prim ed		M sec ed		M post ed	
Employment	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%
All market sectors, of which:	**-0.41**	**-0.04**	**3.92**	**0.16**	**2.61**	**1.13**	**1.32**	**3.36**	**1.80**	**0.32**	**1.37**	**0.06**	**4.96**	**0.61**	**3.16**	**2.98**
Horticulture and groundnuts	0.06	0.12	1.69	0.24	0.00	0.00	0.00	0.00	0.13	0.66	0.27	0.06	0.00	0.00	0.00	0.00
Commercial crops	1.26	1.64	0.00	0.00	0.00	0.00	0.00	0.00	0.78	2.19	1.17	1.55	0.00	0.00	0.00	0.00
Food and livestock	-0.33	-0.21	-0.47	-0.05	0.00	0.00	0.00	0.00	0.06	0.33	-0.65	-0.24	1.38	0.92	0.00	0.00
Fishing and forestry	0.04	0.82	0.15	0.87	0.03	2.83	0.00	5.74	0.27	1.36	1.94	0.68	0.30	1.89	0.01	5.04
Maize	1.94	1.53	5.57	1.65	0.00	0.00	0.00	0.00	0.93	2.08	5.13	1.46	0.00	0.00	0.00	0.00
Construction and utilities	0.00	1.03	0.01	1.18	0.06	2.93	0.03	5.30	0.17	1.57	0.49	0.99	0.89	1.99	0.20	4.59
Mining	0.06	4.74	0.08	4.79	0.42	6.83	0.09	9.84	0.52	5.31	2.06	4.60	4.64	5.85	0.57	9.11
Labour-intensive manufacturing	-1.25	-0.97	-0.77	-0.87	0.08	1.07	0.01	3.89	-0.43	-0.44	-1.78	-1.06	0.04	0.15	0.10	3.20
Capital-intensive manufacturing	-0.01	-6.13	-0.06	-6.10	-0.08	-4.28	-0.02	-1.57	-0.34	-5.63	-2.31	-6.27	-2.74	-5.15	-0.12	-2.23
Market services	-0.08	-0.31	-0.19	-0.24	0.83	1.73	0.23	4.58	0.14	0.23	-0.61	-0.43	0.88	0.80	0.55	3.88
Trade and transport	-1.91	-0.60	-1.83	-0.49	1.10	1.47	0.10	4.29	-0.14	-0.07	-2.49	-0.68	0.83	0.54	0.48	3.59
Public services	-0.21	-1.82	-0.27	-1.75	0.18	0.20	0.88	3.02	-0.29	-1.28	-1.84	-1.93	-1.26	-0.71	1.37	2.33
All social reproduction, of which:	**-1.99**	**-0.27**	**-4.66**	**-0.31**	**0.41**	**0.10**	**0.29**	**0.48**	**-0.37**	**-0.61**	**-1.25**	**-0.46**	**-0.02**	**-0.01**	**0.21**	**0.83**
Urban high-income	-0.87	-7.44	-2.94	-7.45	-4.56	-5.64	-0.94	-3.01	-0.41	-7.19	-0.63	-7.54	-1.45	-6.07	-0.37	-3.33
Urban low-income	-0.60	-0.78	-2.10	-0.69	2.22	1.20	0.95	4.06	-0.05	-0.51	-0.49	-0.78	0.63	0.74	0.37	3.71
Rural high-income	-0.03	-0.14	-0.04	-0.07	0.19	1.75	0.06	4.66	0.00	0.13	-0.03	-0.17	0.11	1.29	0.04	4.30
Rural low-income	-0.49	-0.08	0.42	0.04	2.55	1.97	0.22	4.73	0.08	0.19	-0.10	-0.05	0.69	1.51	0.18	4.38
All leisure, of which:	**2.39**	**0.41**	**0.74**	**0.13**	**-3.02**	**-0.51**	**-1.62**	**-1.94**	**-1.43**	**-0.33**	**-0.12**	**-0.01**	**-4.94**	**-0.26**	**-3.37**	**-1.06**
Urban high-income	-1.14	-12.31	-1.88	-12.54	-13.08	-11.02	-3.64	-8.48	-4.97	-12.07	-8.33	-12.62	-31.53	-11.43	-11.92	-8.79
Urban low-income	0.29	0.49	0.37	0.32	5.44	2.00	1.60	4.96	0.48	0.76	1.10	0.23	15.25	1.54	5.63	4.61
Rural high-income	0.21	1.13	0.20	0.94	0.41	2.59	0.09	5.58	0.36	1.41	1.27	0.84	2.16	2.12	0.56	5.22
Rural low-income	3.02	0.61	2.06	0.50	4.20	2.22	0.33	5.10	2.70	0.89	5.84	0.41	9.19	1.75	2.36	4.75
Hourly wages		**2.52**		**2.19**		**-1.15**		**-5.52**		**1.45**		**2.58**		**0.71**		**-4.19**

Table A6 Export incentives in commercial crops (absolute and percentage changes from the base case)

	F no ed		F prim ed		F sec ed		F post ed		M no ed		M prim ed		M sec ed		M post ed	
Employment	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%
All market sectors, of which:	**6.21**	**0.69**	**-0.56**	**-0.02**	**0.02**	**0.01**	**0.03**	**0.07**	**2.38**	**0.43**	**4.87**	**0.21**	**-0.03**	**0.00**	**0.05**	**0.05**
Horticulture and groundnuts	-0.32	-0.58	0.07	0.01	0.00	0.00	0.00	0.00	-0.10	-0.50	-1.17	-0.24	0.00	0.00	0.00	0.00
Commercial crops	11.23	14.60	0.00	0.00	0.00	0.00	0.00	0.00	5.23	14.69	11.22	14.96	0.00	0.00	0.00	0.00
Food and livestock	-1.10	-0.69	-0.80	-0.09	0.00	0.00	0.00	0.00	-0.11	-0.62	-0.93	-0.35	0.02	0.02	0.00	0.00
Fishing and forestry	-0.02	-0.46	0.02	0.10	0.00	0.18	0.00	0.26	-0.08	-0.38	-0.43	-0.15	0.04	0.24	0.00	0.26
Maize	-0.66	-0.52	0.21	0.06	0.00	0.00	0.00	0.00	-0.20	-0.45	-0.67	-0.19	0.00	0.00	0.00	0.00
Construction and utilities	0.00	-0.64	0.00	-0.13	0.00	-0.11	0.00	-0.04	-0.06	-0.57	-0.19	-0.38	-0.02	-0.05	0.00	-0.03
Mining	-0.01	-1.07	-0.01	-0.52	-0.03	-0.44	0.00	-0.36	-0.10	-0.99	-0.34	-0.77	-0.30	-0.38	-0.02	-0.36
Labour-intensive manufacturing	-1.05	-0.81	-0.21	-0.24	-0.01	-0.18	0.00	-0.10	-0.73	-0.74	-0.83	-0.49	-0.03	-0.11	0.00	-0.09
Capital-intensive manufacturing	0.00	-0.95	0.00	-0.40	-0.01	-0.32	0.00	-0.25	-0.05	-0.88	-0.24	-0.65	-0.14	-0.26	-0.01	-0.24
Market services	-0.18	-0.74	-0.14	-0.17	-0.05	-0.11	0.00	-0.03	-0.41	-0.67	-0.61	-0.43	-0.05	-0.05	0.00	-0.03
Trade and transport	-1.59	-0.50	0.30	0.08	0.10	0.13	0.00	0.21	-0.90	-0.43	-0.63	-0.17	0.30	0.20	0.03	0.22
Public services	-0.07	-0.61	-0.01	-0.05	0.02	0.02	0.03	0.10	-0.12	-0.53	-0.29	-0.30	0.15	0.09	0.06	0.11
All social reproduction, of which:	**-3.50**	**-0.48**	**0.96**	**0.06**	**0.10**	**0.03**	**0.02**	**0.03**	**-0.29**	**-0.48**	**-0.21**	**-0.08**	**0.08**	**0.05**	**0.01**	**0.06**
Urban high-income	-0.08	-0.71	-0.07	-0.16	-0.07	-0.09	0.00	-0.01	-0.04	-0.68	-0.02	-0.29	-0.01	-0.06	0.00	-0.01
Urban low-income	-0.53	-0.69	-0.38	-0.12	-0.09	-0.05	0.01	0.03	-0.06	-0.65	-0.16	-0.25	-0.01	-0.02	0.00	0.03
Rural high-income	-0.15	-0.61	-0.04	-0.07	0.00	0.04	0.00	0.11	-0.02	-0.57	-0.04	-0.19	0.01	0.07	0.00	0.11
Rural low-income	-2.75	-0.44	1.44	0.13	0.26	0.20	0.01	0.28	-0.17	-0.40	0.01	0.01	0.11	0.23	0.01	0.28
All leisure, of which:	**-2.71**	**-0.47**	**-0.40**	**-0.07**	**-0.13**	**-0.02**	**-0.04**	**-0.05**	**-2.09**	**-0.48**	**-4.67**	**-0.22**	**-0.06**	**0.00**	**-0.07**	**-0.02**
Urban high-income	-0.07	-0.76	-0.05	-0.35	-0.17	-0.14	-0.04	-0.08	-0.30	-0.73	-0.31	-0.47	-0.31	-0.11	-0.11	-0.08
Urban low-income	-0.47	-0.78	-0.40	-0.35	-0.38	-0.14	-0.03	-0.08	-0.47	-0.74	-2.30	-0.47	-1.07	-0.11	-0.10	-0.08
Rural high-income	-0.13	-0.71	-0.06	-0.29	-0.01	-0.08	0.00	-0.02	-0.17	-0.68	-0.64	-0.42	-0.05	-0.04	0.00	-0.02
Rural low-income	-2.04	-0.41	0.12	0.03	0.44	0.23	0.02	0.29	-1.15	-0.38	-1.42	-0.10	1.37	0.26	0.14	0.29
Hourly wages		**0.89**		**-0.08**		**-0.11**		**-0.26**		**0.70**		**0.35**		**-0.23**		**-0.27**

Table A7 Export incentives in horticulture (absolute and percentage changes from the base case)

	F no ed		F prim ed		F sec ed		F post ed		M no ed		M prim ed		M sec ed		M post ed	
Employment	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%
All market sectors, of which:	**0.63**	**0.07**	**9.19**	**0.37**	**-0.01**	**-0.01**	**0.03**	**0.07**	**0.31**	**0.06**	**8.12**	**0.34**	**0.15**	**0.02**	**0.06**	**0.06**
Horticulture and groundnuts	1.67	3.02	17.92	2.58	0.00	0.00	0.00	0.00	0.61	3.13	13.63	2.84	0.00	0.00	0.00	0.00
Commercial crops	-0.29	-0.37	0.00	0.00	0.00	0.00	0.00	0.00	-0.09	-0.26	-0.39	-0.52	0.00	0.00	0.00	0.00
Food and livestock	-0.03	-0.02	-3.90	-0.45	0.00	0.00	0.00	0.00	0.02	0.09	-0.55	-0.20	0.36	0.24	0.00	0.00
Fishing and forestry	0.00	0.05	-0.06	-0.37	0.00	0.24	0.00	0.32	0.03	0.16	-0.33	-0.12	0.05	0.29	0.00	0.34
Maize	-0.05	-0.04	-1.54	-0.46	0.00	0.00	0.00	0.00	0.03	0.08	-0.73	-0.21	0.00	0.00	0.00	0.00
Construction and utilities	0.00	-0.31	-0.01	-0.68	0.00	-0.14	0.00	-0.07	-0.02	-0.20	-0.22	-0.43	-0.04	-0.10	0.00	-0.05
Mining	-0.01	-0.62	-0.02	-1.03	-0.03	-0.43	0.00	-0.35	-0.05	-0.51	-0.35	-0.78	-0.30	-0.38	-0.02	-0.33
Labour-intensive manufacturing	-0.21	-0.16	-0.51	-0.58	0.00	0.04	0.00	0.12	-0.05	-0.05	-0.56	-0.33	0.03	0.09	0.00	0.14
Capital-intensive manufacturing	0.00	-0.54	-0.01	-0.95	-0.01	-0.34	0.00	-0.27	-0.03	-0.42	-0.26	-0.70	-0.16	-0.30	-0.01	-0.25
Market services	-0.08	-0.34	-0.60	-0.76	-0.07	-0.14	0.00	-0.06	-0.14	-0.22	-0.74	-0.51	-0.11	-0.10	-0.01	-0.04
Trade and transport	-0.36	-0.11	-2.00	-0.54	0.07	0.09	0.00	0.17	0.00	0.00	-1.06	-0.29	0.21	0.13	0.03	0.19
Public services	-0.02	-0.17	-0.09	-0.59	0.02	0.02	0.03	0.10	-0.01	-0.06	-0.32	-0.34	0.12	0.07	0.07	0.12
All social reproduction, of which:	**-0.12**	**-0.02**	**-6.67**	**-0.45**	**0.24**	**0.06**	**0.03**	**0.05**	**0.00**	**0.00**	**-0.92**	**-0.34**	**0.14**	**0.08**	**0.02**	**0.08**
Urban high-income	-0.04	-0.30	-0.29	-0.73	-0.10	-0.12	-0.01	-0.04	-0.01	-0.24	-0.05	-0.61	-0.02	-0.10	0.00	-0.03
Urban low-income	-0.14	-0.18	-1.79	-0.59	0.04	0.02	0.02	0.10	-0.01	-0.12	-0.29	-0.46	0.04	0.05	0.01	0.11
Rural high-income	-0.03	-0.13	-0.29	-0.52	0.01	0.07	0.00	0.15	0.00	-0.07	-0.08	-0.40	0.01	0.10	0.00	0.16
Rural low-income	0.08	0.01	-4.31	-0.40	0.28	0.22	0.01	0.30	0.03	0.07	-0.50	-0.27	0.11	0.24	0.01	0.31
All leisure, of which:	**-0.51**	**-0.09**	**-2.52**	**-0.45**	**-0.22**	**-0.04**	**-0.05**	**-0.06**	**-0.31**	**-0.07**	**-7.20**	**-0.34**	**-0.29**	**-0.02**	**-0.08**	**-0.03**
Urban high-income	-0.04	-0.38	-0.11	-0.74	-0.26	-0.22	-0.06	-0.15	-0.13	-0.32	-0.40	-0.61	-0.55	-0.20	-0.19	-0.14
Urban low-income	-0.15	-0.26	-0.69	-0.59	-0.20	-0.07	0.00	0.00	-0.13	-0.20	-2.29	-0.47	-0.51	-0.05	0.00	0.00
Rural high-income	-0.05	-0.27	-0.13	-0.60	-0.01	-0.09	0.00	-0.02	-0.05	-0.21	-0.72	-0.48	-0.07	-0.07	0.00	-0.01
Rural low-income	-0.27	-0.06	-1.59	-0.39	0.26	0.14	0.01	0.21	0.00	0.00	-3.78	-0.26	0.84	0.16	0.11	0.22
Hourly wages		**0.26**		**0.94**		**-0.08**		**-0.22**		**0.03**		**0.42**		**-0.18**		**-0.26**

Table A8 Higher price elasticity of demand for social reproduction (absolute and percentage changes from the base case)

	F no ed		F prim ed		F sec ed		F post ed		M no ed		M prim ed		M sec ed		M post ed	
Employment	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%
All market sectors, of which:	**1.04**	**0.11**	**10.35**	**0.42**	**0.12**	**0.05**	**0.05**	**0.13**	**0.25**	**0.04**	**7.76**	**0.33**	**0.10**	**0.01**	**0.06**	**0.05**
Horticulture and groundnuts	1.68	3.03	18.06	2.60	0.00	0.00	0.00	0.00	0.60	3.09	13.40	2.79	0.00	0.00	0.00	0.00
Commercial crops	-0.24	-0.32	0.00	0.00	0.00	0.00	0.00	0.00	-0.09	-0.26	-0.40	-0.53	0.00	0.00	0.00	0.00
Food and livestock	0.05	0.03	-3.38	-0.39	0.00	0.00	0.00	0.00	0.02	0.09	-0.56	-0.21	0.34	0.23	0.00	0.00
Fishing and forestry	0.01	0.12	-0.05	-0.28	0.00	0.33	0.00	0.42	0.04	0.18	-0.29	-0.10	0.05	0.31	0.00	0.37
Maize	0.02	0.01	-1.35	-0.40	0.00	0.00	0.00	0.00	0.03	0.07	-0.76	-0.22	0.00	0.00	0.00	0.00
Construction and utilities	0.00	-0.26	-0.01	-0.66	0.00	-0.05	0.00	0.04	-0.02	-0.20	-0.24	-0.48	-0.03	-0.07	0.00	-0.01
Mining	-0.01	-0.58	-0.02	-0.98	-0.02	-0.37	0.00	-0.28	-0.05	-0.52	-0.36	-0.80	-0.31	-0.39	-0.02	-0.33
Labour-intensive manufacturing	-0.14	-0.11	-0.46	-0.52	0.01	0.11	0.00	0.19	-0.05	-0.05	-0.56	-0.34	0.03	0.09	0.00	0.15
Capital-intensive manufacturing	0.00	-0.49	-0.01	-0.90	-0.01	-0.28	0.00	-0.20	-0.03	-0.43	-0.26	-0.71	-0.16	-0.30	-0.01	-0.24
Market services	-0.07	-0.30	-0.56	-0.71	-0.04	-0.08	0.00	0.00	-0.14	-0.24	-0.75	-0.52	-0.11	-0.10	-0.01	-0.04
Trade and transport	-0.23	-0.07	-1.81	-0.49	0.11	0.14	0.01	0.23	-0.03	-0.01	-1.11	-0.30	0.19	0.12	0.02	0.18
Public services	-0.02	-0.14	-0.08	-0.54	0.07	0.07	0.05	0.16	-0.02	-0.08	-0.34	-0.36	0.10	0.05	0.07	0.11
All social reproduction, of which:	**-0.91**	**-0.12**	**-8.21**	**-0.55**	**-0.18**	**-0.05**	**-0.03**	**-0.05**	**-0.08**	**-0.13**	**-1.30**	**-0.47**	**-0.09**	**-0.06**	**-0.01**	**-0.05**
Urban high-income	-0.05	-0.41	-0.33	-0.82	-0.17	-0.21	-0.04	-0.12	-0.02	-0.38	-0.06	-0.73	-0.05	-0.22	-0.02	-0.15
Urban low-income	-0.23	-0.30	-2.15	-0.70	-0.17	-0.09	0.00	0.00	-0.02	-0.27	-0.38	-0.61	-0.09	-0.10	0.00	-0.03
Rural high-income	-0.07	-0.29	-0.37	-0.68	-0.01	-0.08	0.00	0.00	-0.01	-0.26	-0.11	-0.59	-0.01	-0.09	0.00	-0.02
Rural low-income	-0.56	-0.09	-5.36	-0.50	0.16	0.13	0.01	0.21	-0.03	-0.06	-0.74	-0.40	0.05	0.12	0.01	0.18
All leisure, of which:	**-0.13**	**-0.02**	**-2.14**	**-0.38**	**0.07**	**0.01**	**-0.02**	**-0.02**	**-0.17**	**-0.04**	**-6.47**	**-0.30**	**0.00**	**0.00**	**-0.04**	**-0.01**
Urban high-income	-0.03	-0.36	-0.11	-0.71	-0.22	-0.18	-0.05	-0.11	-0.14	-0.33	-0.41	-0.62	-0.54	-0.19	-0.18	-0.13
Urban low-income	-0.12	-0.20	-0.57	-0.49	-0.10	-0.04	0.01	0.03	-0.11	-0.17	-1.95	-0.40	-0.46	-0.05	0.01	0.01
Rural high-income	-0.04	-0.22	-0.12	-0.56	-0.01	-0.04	0.00	0.04	-0.05	-0.19	-0.71	-0.47	-0.05	-0.05	0.00	0.01
Rural low-income	0.06	0.01	-1.35	-0.33	0.39	0.21	0.02	0.28	0.13	0.04	-3.40	-0.24	1.04	0.20	0.13	0.26
Hourly wages		**0.19**		**0.85**		**-0.18**		**-0.33**		**0.07**		**0.47**		**-0.14**		**-0.24**

Table A9 Higher elasticity of substitution in production (absolute and percentage changes from the base case)

	F no ed		F prim ed		F sec ed		F post ed		M no ed		M prim ed		M sec ed		M post ed	
Employment	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%
All market sectors, of which:	**0.68**	**0.08**	**9.32**	**0.38**	**0.01**	**0.00**	**0.03**	**0.07**	**0.27**	**0.05**	**8.49**	**0.36**	**0.10**	**0.01**	**0.06**	**0.06**
Horticulture and groundnuts	1.68	3.03	17.98	2.59	0.00	0.00	0.00	0.00	0.61	3.14	13.86	2.89	0.00	0.00	0.00	0.00
Commercial crops	-0.26	-0.34	0.00	0.00	0.00	0.00	0.00	0.00	-0.08	-0.23	-0.44	-0.58	0.00	0.00	0.00	0.00
Food and livestock	-0.03	-0.02	-3.64	-0.42	0.00	0.00	0.00	0.00	0.02	0.09	-0.36	-0.13	0.28	0.19	0.00	0.00
Fishing and forestry	0.00	0.06	-0.07	-0.43	0.00	0.29	0.00	0.37	0.03	0.17	-0.39	-0.14	0.05	0.33	0.00	0.38
Maize	-0.03	-0.02	-1.60	-0.47	0.00	0.00	0.00	0.00	0.04	0.08	-0.66	-0.19	0.00	0.00	0.00	0.00
Construction and utilities	0.00	-0.34	-0.01	-0.82	0.00	-0.10	0.00	-0.02	-0.03	-0.23	-0.27	-0.54	-0.03	-0.07	0.00	-0.01
Mining	-0.01	-0.65	-0.02	-1.14	-0.03	-0.42	0.00	-0.34	-0.05	-0.55	-0.38	-0.85	-0.30	-0.38	-0.02	-0.33
Labour-intensive manufacturing	-0.19	-0.15	-0.54	-0.61	0.00	0.05	0.00	0.13	-0.04	-0.04	-0.55	-0.32	0.03	0.09	0.00	0.14
Capital-intensive manufacturing	0.00	-0.57	-0.01	-1.04	-0.01	-0.33	0.00	-0.25	-0.03	-0.46	-0.28	-0.76	-0.15	-0.29	-0.01	-0.23
Market services	-0.09	-0.36	-0.63	-0.80	-0.06	-0.13	0.00	-0.06	-0.15	-0.25	-0.73	-0.51	-0.10	-0.09	-0.01	-0.04
Trade and transport	-0.37	-0.12	-2.04	-0.55	0.07	0.09	0.00	0.16	-0.02	-0.01	-0.96	-0.26	0.19	0.13	0.02	0.17
Public services	-0.02	-0.19	-0.10	-0.67	0.03	0.04	0.03	0.11	-0.02	-0.08	-0.36	-0.38	0.14	0.08	0.07	0.13
All social reproduction, of which:	**-0.04**	**-0.01**	**-6.00**	**-0.41**	**0.25**	**0.06**	**0.02**	**0.04**	**0.03**	**0.04**	**-0.51**	**-0.19**	**0.15**	**0.09**	**0.02**	**0.08**
Urban high-income	-0.04	-0.31	-0.27	-0.67	-0.08	-0.10	-0.01	-0.04	-0.01	-0.22	-0.04	-0.44	-0.02	-0.07	0.00	-0.03
Urban low-income	-0.12	-0.16	-1.64	-0.54	0.05	0.03	0.02	0.09	-0.01	-0.08	-0.19	-0.31	0.05	0.06	0.01	0.10
Rural high-income	-0.03	-0.11	-0.27	-0.50	0.01	0.08	0.00	0.15	0.00	-0.02	-0.05	-0.27	0.01	0.11	0.00	0.16
Rural low-income	0.14	0.02	-3.82	-0.35	0.27	0.21	0.01	0.27	0.05	0.11	-0.22	-0.12	0.11	0.24	0.01	0.28
All leisure, of which:	**-0.64**	**-0.11**	**-3.32**	**-0.59**	**-0.26**	**-0.04**	**-0.05**	**-0.07**	**-0.30**	**-0.07**	**-7.98**	**-0.37**	**-0.26**	**-0.01**	**-0.08**	**-0.03**
Urban high-income	-0.04	-0.45	-0.13	-0.88	-0.26	-0.22	-0.06	-0.15	-0.15	-0.36	-0.43	-0.65	-0.53	-0.19	-0.19	-0.14
Urban low-income	-0.17	-0.29	-0.85	-0.74	-0.22	-0.08	0.00	-0.01	-0.13	-0.20	-2.46	-0.51	-0.49	-0.05	0.00	0.00
Rural high-income	-0.06	-0.29	-0.16	-0.75	-0.01	-0.09	0.00	-0.01	-0.05	-0.21	-0.78	-0.52	-0.06	-0.06	0.00	0.00
Rural low-income	-0.37	-0.08	-2.18	-0.53	0.24	0.12	0.01	0.20	0.03	0.01	-4.31	-0.30	0.82	0.16	0.10	0.21
Hourly wages		0.17		0.69		-0.13		-0.24		0.13		0.55		-0.15		-0.25

Table A10 Reallocation of assets (absolute and percentage changes from the base case)

	F no ed		F prim ed		F sec ed		F post ed		M no ed		M prim ed		M sec ed		M post ed	
Employment	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%
All market sectors, of which:	**1.16**	**0.13**	**15.97**	**0.65**	**-0.08**	**-0.03**	**0.01**	**0.03**	**0.54**	**0.10**	**13.96**	**0.59**	**0.09**	**0.01**	**0.03**	**0.03**
Horticulture and groundnuts	3.06	5.52	32.58	4.69	0.00	0.00	0.00	0.00	1.11	5.67	24.76	5.15	0.00	0.00	0.00	0.00
Commercial crops	-0.29	-0.38	0.00	0.00	0.00	0.00	0.00	0.00	-0.08	-0.23	-0.51	-0.68	0.00	0.00	0.00	0.00
Food and livestock	0.10	0.06	-6.34	-0.73	0.00	0.00	0.00	0.00	0.04	0.21	-0.79	-0.29	0.46	0.31	0.00	0.00
Fishing and forestry	0.00	0.02	-0.13	-0.74	0.00	0.19	0.00	0.24	0.03	0.17	-0.85	-0.30	0.04	0.24	0.00	0.28
Maize	-0.79	-0.62	-4.68	-1.39	0.00	0.00	0.00	0.00	-0.21	-0.47	-3.35	-0.95	0.00	0.00	0.00	0.00
Construction and utilities	0.00	-0.42	-0.01	-1.10	0.00	-0.26	0.00	-0.22	-0.03	-0.27	-0.33	-0.66	-0.09	-0.21	-0.01	-0.18
Mining	-0.01	-0.50	-0.02	-1.26	-0.02	-0.33	0.00	-0.28	-0.04	-0.36	-0.37	-0.82	-0.22	-0.28	-0.01	-0.24
Labour-intensive manufacturing	-0.30	-0.23	-0.88	-1.00	0.00	-0.05	0.00	0.00	-0.08	-0.08	-0.94	-0.56	0.00	0.00	0.00	0.04
Capital-intensive manufacturing	0.00	-0.60	-0.01	-1.36	-0.01	-0.43	0.00	-0.39	-0.03	-0.46	-0.34	-0.92	-0.20	-0.38	-0.02	-0.35
Market services	-0.09	-0.38	-0.90	-1.15	-0.10	-0.20	-0.01	-0.15	-0.14	-0.23	-1.03	-0.71	-0.17	-0.15	-0.02	-0.11
Trade and transport	-0.51	-0.16	-3.50	-0.94	0.02	0.02	0.00	0.07	-0.03	-0.01	-1.84	-0.50	0.11	0.07	0.02	0.11
Public services	-0.02	-0.14	-0.14	-0.90	0.03	0.04	0.03	0.09	0.00	0.01	-0.44	-0.46	0.16	0.09	0.08	0.13
All social reproduction, of which:	**-0.02**	**0.00**	**-11.46**	**-0.77**	**0.38**	**0.09**	**0.03**	**0.05**	**0.03**	**0.04**	**-1.53**	**-0.56**	**0.20**	**0.12**	**0.03**	**0.10**
Urban high-income	-0.03	-0.25	-0.41	-1.03	-0.08	-0.09	-0.01	-0.04	-0.01	-0.17	-0.07	-0.81	-0.02	-0.07	0.00	-0.02
Urban low-income	-0.07	-0.10	-2.59	-0.85	0.17	0.09	0.03	0.14	0.00	-0.02	-0.39	-0.63	0.10	0.12	0.02	0.16
Rural high-income	-0.01	-0.04	-0.42	-0.76	0.02	0.15	0.00	0.19	0.00	0.03	-0.10	-0.54	0.02	0.17	0.00	0.21
Rural low-income	0.10	0.02	-8.05	-0.74	0.27	0.21	0.01	0.26	0.04	0.09	-0.96	-0.52	0.11	0.23	0.01	0.28
All leisure, of which:	**-1.14**	**-0.20**	**-4.51**	**-0.80**	**-0.30**	**-0.05**	**-0.04**	**-0.05**	**-0.57**	**-0.13**	**-12.44**	**-0.58**	**0.04**	**0.24**	**-0.06**	**-0.02**
Urban high-income	-0.03	-0.31	-0.14	-0.94	-0.22	-0.18	-0.06	-0.14	-0.10	-0.24	-0.48	-0.73	-0.44	-0.16	-0.16	-0.12
Urban low-income	-0.10	-0.16	-0.89	-0.77	-0.01	0.00	0.01	0.04	-0.05	-0.09	-2.68	-0.55	0.21	0.02	0.08	0.06
Rural high-income	-0.04	-0.20	-0.17	-0.80	-0.01	-0.05	0.00	0.00	-0.03	-0.13	-0.88	-0.58	-0.02	-0.02	0.00	0.02
Rural low-income	-0.98	-0.20	-3.31	-0.80	-0.06	-0.03	0.00	0.02	-0.38	-0.13	-8.40	-0.58	-0.04	-0.01	0.02	0.04
Hourly wages		**0.08**		**1.35**		**-0.24**		**-0.32**		**-0.22**		**0.44**		**-0.34**		**-0.41**

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