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DSGD Discussion Paper No. 36

Has Trade Liberalization in South Africa Affected Men and Women Differently?

James Thurlow

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ACKNOWLEDGMENTS

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

ABSTRACT

Trade liberalization is a central part of South Africa's post-Apartheid development strategy. However, despite considerable reforms, the country has failed to generate pro-poor growth, with both unemployment and inequality worsening over the last ten years. This has raised concern that trade liberalization may have worked against the country's development objectives. This study uses a dynamic general equilibrium and microsimulation model to assess the effects of trade liberalization on growth, employment and poverty in South Africa. More specifically, it examines how men and women have been affected differently and whether liberalization has contributed to the faster rise in female unemployment and poverty. The results suggest that trade policies have not contributed to increased poverty and that trade-induced technological change has accelerated growth. However, liberalization has changed the sectoral structure of production and has exacerbated income inequality. While male and female workers have benefited from trade-induced growth, it is male-headed households who have benefited more from rising factor incomes. Trade reforms have however contributed to the observed decline in the gender wage gap, but this has been driven by rising employment amongst higher-skilled female workers. As such, the decline in poverty amongst female-headed households has remained small. While further liberalization may increase growth and reduce poverty, it is men and male-headed households who are more likely to benefit. These findings suggest that, while there is no trade-off between trade reform and poverty reduction, the country should not rely on further liberalization to generate pro-poor growth or address the prevailing inequalities between different population groups, such as men and women.

HAS TRADE LIBERALIZATION IN SOUTH AFRICA AFFECTED MEN AND WOMEN DIFFERENTLY?

James Thurlow [1]

I.   INTRODUCTION

The 1990s marked a turning point for South Africa. The country emerged from Apartheid and reentered the global economy after more than a decade of isolation. However, the new democratic government inherited the challenges of slow growth and severe poverty and inequality, thus demanding a shift in the country's development path. In 1995 the government unveiled its 'Growth, Employment and Redistribution' (GEAR) strategy (Republic of South Africa, 1995). The objective of this broad package of policies was to establish a "fast-growing economy that creates employment and encourages a redistribution of incomes in favor of the poor". To achieve the necessary growth, GEAR called for a "transformation towards a competitive outward-oriented economy". Accordingly, trade liberalization has been one of the central policies of South Africa's development strategy over the last ten years.

Trade liberalization since 1994 has been pronounced, reflecting the government's strong commitment to outward-oriented industrialization. However, the country has so far failed to generate pro-poor growth (Hoogeveen and Ozler, 2005). Despite some success in job creation during the 1990s, both unemployment and poverty have worsened due to rapid increases in the workforce and falling real wages (Casale *et al.*, 2004).[2] This coexistence of substantial trade liberalization and rising poverty raises concern that trade policies may have worked against the country's development objectives and questions the government's commitment to further liberalization. Moreover, the 1990s saw sharp differences in economic outcomes between men and women. The rapid 'feminization' of

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[1] James Thurlow is a Post Doctoral Fellow at IFPRI's Development Strategy and Governance Division.

[2] Woolard and Leibbrant (2001) review changes in poverty in South Africa. Recent evidence suggests that the rise in poverty during the 1990s may have slowed (Meth and Dias, 2004) or possibly reversed (Van der Berg *et al.*, 2005).

the labor market has been only partially offset by faster growth in female employment and a narrowing gender wage gap. As a result, unemployment amongst women has risen rapidly and poverty has remained most severe amongst female-headed households.[3] While the increased participation of women in the labor market may reflect improved opportunities and a reversal of past discrimination, it has also increased the susceptibility of women to changes in trade and industrial policies. Therefore, determining the effects of trade liberalization on employment and wages, and examining how men and women are affected differently, is important for understanding why the current development strategy has failed to reduce poverty and inequality. Accordingly, this study assesses the impact of trade liberalization on employment and poverty amongst men and women in South Africa.

Section 2 provides an overview of South Africa's trade policies over the last ten years. This section also considers how growth, employment and wages have changed during the 1990s, and reviews the existing empirical evidence on liberalization's impact on each of these aspects. In particular, the different experiences of men and women are considered, as well as variations in their employment patterns and wages. Although a number of studies have examined specific aspects of the recent liberalization episode, few studies have attempted to reconcile the evidence to provide a comprehensive assessment of its impact on poverty. Section 3 describes the dynamic general equilibrium and microsimulation model that is used in this study to jointly assess the impact of trade liberalization on growth, employment and poverty, and to examine how trade policies have influenced the distribution of incomes across men and women. Section 4 presents the results from the model simulations. Three scenarios are considered: the static effects of reducing tariffs; the dynamics gains from liberalization; and the likely impact of further tariff rationalization. The final section summarizes the influence of past and future

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[3] Headship is based on the *de jure* head of the household. Female-headed households accounted for 30.7 percent of all households in 1995. Disproportionately more female heads are African and over the age of 35. This is true in both rural and urban areas, although women are far more likely to head households in rural areas than are men. This distribution of headship may reflect HIV/AIDS, whose prevalence is highest amongst Africans and in rural areas.

trade policies on men and women's livelihoods, and reconsiders the trade-off between liberalization and poverty reduction.

II. TRADE POLICY, GROWTH AND EMPLOYMENT IN SOUTH AFRICA

South Africa has substantially changed its trade regime over the last three decades. Prior to 1970 the country adopted a policy of import-substitution industrialization. Since then trade policy has shifted towards achieving greater openness, first through the stimulation of exports during the 1970s and 1980s, and then later through a more concerted attempt at trade liberalization during the 1990s. This section focuses on this more recent period and reviews the nature and extent of trade reforms over the last ten years. It then examines the country's growth and trade performance and its effects on employment and wages amongst men and women.

Trade Reform in South Africa during the 1990s

Despite previous attempts at trade reform, South Africa entered the 1990s with high and variable tariffs and a complex system of quantitative restrictions. Although the 1990s was a period of unprecedented trade liberalization, the earliest years of the decade saw an increase in protection. The average nominal tariff rate climbed to almost 20 percent by 1993 and varied considerably across commodities (Figure 1). Unlike most developing countries, South Africa imposed high tariffs on consumer products and lower tariffs on imported machinery and capital goods. This uneven structure of protection contributed to the country's long-standing dependence on exports as a means of financing imported investment goods. The resulting current account constraint was exacerbated by the introduction of sanctions during the 1980s. The Apartheid government responded by introducing *ad hoc* import surcharges and actively promoting exports.

Trade liberalization did not start in earnest until the new government came into power. Import surcharges were removed on capital goods in 1994 and consumer goods in 1995 (Tsikata, 1999). The pace of liberalization culminated in the 1995 Uruguay Round and an offer to the World Trade Organization consisting of a five-year tariff reduction and rationalization program (Cassim *et al*., 2004). The government's commitment to trade reforms was reflected in its proposal to halve average tariffs in manufacturing. However, with the exception of consumables, initial tariff rates were already below the

offered rates and special dispensation was granted to the 'sensitive' textiles and vehicles sectors, which were given eight years to comply to the reform program. The proposed rationalization program involved removing quantitative restrictions, phasing-out export incentives, and reducing the number of tariff lines and applied tariff rates.

Figure 1.   Nominal Tariffs and Surcharges, 1988-2004
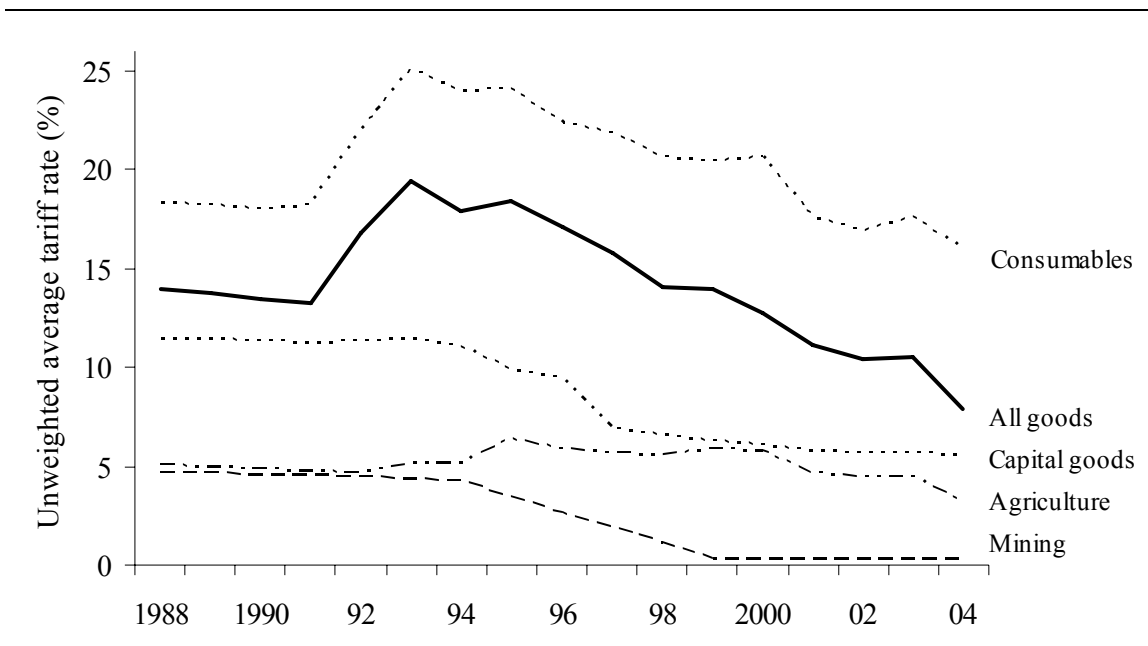
Source: Own calculations using Customs and Excise data provided by Edwards (2005).

Note: Rates are unweighted and include import surcharges. Quantitative restrictions have been converted into their ad valorum tariff equivalent. Consumables include processed food, beverages, textiles, clothing and furniture. Capital goods include machinery and vehicles, as well as intermediate goods such as chemicals and metal products.

The reduction in tariffs during the 1990s was pronounced. The largest absolute declines were on consumables. Quantitative restrictions were replaced with their tariff equivalents, although in the case of agriculture this led to an increase in protection. The export incentive scheme was abolished by 1997 and the number of tariff lines had declined by 40 percent by 1999 (Lewis, 2001). Average tariff rates have halved and the country has moved towards its proposed rationalization targets. However, the pace of reforms has slowed considerably. In 1999 there were still 47 different applied tariff rates, with a highest rate of 55 percent (Lewis, 2001). This falls far short of the proposed six

tariff bands. The removal of export incentives meant that trade reforms had a negative effect on the anti-export bias (Tsikata, 1999). Furthermore, the continued favoring of consumables caused the effective protection rate to increase (Fedderke and Vase, 2001). Therefore, the system of protection still remains complex in spite of the successful opening of the economy. Accordingly, future reforms are likely to focus on tariff rationalization and the strengthening of regional trading agreements (Cassim *et al*., 2004; Thurlow, 2006b).

Trade and Economic Growth

The South African economy performed poorly during the years leading up to the recent liberalization episode. Gross domestic product (GDP) grew at just over one percent per year during 1985-1993, which failed to offset two percent population growth (Table 1). Investment fell during this period due to political instability and declining foreign capital inflows. However, the depletion of inventories allowed the capital stock to accumulate and contribute positively to overall growth. By contrast, labor employment and total factor productivity (TFP) were relatively stagnant.[4] Agriculture, mining and manufacturing either grew slowly or contracted in spite of subsidized exports. What growth did exist was primarily due to public services and government expenditures.

The country's performance changed dramatically during the trade liberalization period. Most notable was the acceleration of economic growth driven by rising factor productivity. A number of studies find that this increased productivity was partly a result of trade liberalization (Arora and Bhundia, 2003; Fedderke, 2003). For example, Jonsson and Subramanian (2001) econometrically examine the relationship between nominal tariff reductions and average TFP growth during the 1990s. They find a strong and robust relationship in which a one percentage point decline in tariff rates raised the TFP growth rate by 0.74 percentage points. Harding and Rattso (2005) update the study and find its conclusions robust. Trade liberalization therefore appears to have contributed positively to the accelerated growth of the 1990s.

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[4] TFP is measured as the simple Solow residual between factor accumulation and GDP growth.

Table 1.   Decomposition of Economic Growth, 1985-2003

	Share of GDP (%)			Annual Change (%)	
	1985	**1993**	**2003**	**1985-93**	**1993-03**
Real gross domestic product (GDP)	100.0	100.0	100.0	1.1	2.7
Private consumption	61.2	62.8	64.0	1.3	2.7
Investment	15.7	12.2	16.9	-0.7	3.9
Government consumption	19.3	21.4	19.0	2.7	1.4
Exports	19.7	23.0	26.1	2.3	4.3
Imports	-15.9	-19.5	-26.0	3.5	3.9
Real gross domestic product (GDP)	100.0	100.0	100.0	1.1	2.7
Agriculture	4.5	4.7	4.0	0.8	1.5
Mining	8.6	7.6	5.5	-1.2	-0.7
Manufacturing	22.0	20.6	19.8	0.4	2.2
Energy and construction	7.0	6.6	6.7	1.0	2.7
Private services	42.9	43.7	50.9	1.3	4.4
Public services	14.9	16.8	13.2	2.6	0.1
Real gross domestic product (GDP)	100.0	100.0	100.0	1.1	2.7
Capital	38.5	43.0	49.2	1.1	1.3
Labor	61.5	57.0	50.8	0.1	0.9
Total factor productivity (TFP)	-	-	-	0.6	1.7
Population growth	-	-	-	2.3	2.0

Source: Own calculations using data from SARB (2006), TIPS (2006), and SASID (2005).
Note: All measures are in constant 2000 prices.

Both imports and exports increased rapidly during the liberalization period. The empirical evidence suggests that higher export growth was due to changes in trade policies (Fedderke and Vaze, 2001; Edwards and Golub, 2002; Edwards, 2003). However, the depreciation of the real exchange rate during this time may have also been an important factor in determining export competitiveness (Edwards and Golub, 2002). Furthermore, the removal of trade sanctions at the end of Apartheid may have accounted for some of the sudden increase in trade experienced during the mid-1990s (Tsikata, 1999; Edwards and Golub, 2002), although the evidence remains ambiguous (Golub and Ceglowski, 2002). Some studies find a positive relationship between exports and productivity growth (Belli *et* al., 1993; Jonsson and Subramanian 2001), possibly because increased import competition and imported capital goods have resulted in productivity-enhancing technological change (Black, 1996; Edwards, 2003). Therefore, one of the

mechanisms through which liberalization appears to have influenced economic growth is through its stimulation of exports, import competition, and improved access to foreign technology.

Finally, investment also grew strongly during the liberalization period. This is likely due to a resurgence of foreign investment after the reestablishment of political and economic stability. However, Jonsson and Subramanian (2001) find that trade liberalization may have contributed positively to faster capital accumulation due to cheaper imports. Despite higher investment growth, the increase in capital accumulation was smaller then than the increase in either labor employment or productivity. This is reflected in the sectoral structure of growth. Although the more capital-intensive mining and manufacturing sectors grew faster during the 1990s, it was the more labor-intensive service sectors that were the primary sources of overall economic growth.

The 1990s therefore represents at least a structural break if not a positive turning-point for economic growth in South Africa. The stagnation of the 1980s was reversed, with renewed growth driven by productivity gains from the augmentation of technology and greater efficiency (Fedderke, 2001). Trade performance improved and foreign markets became increasingly important. More importantly for this study, there is considerable empirical evidence to suggest that trade liberalization enhanced productivity. However, this positive effect on economic growth is insufficient evidence to conclude that liberalization has had a positive effect on employment and wages and household incomes.

Trade, Employment and Wages

Unemployment increased during the 1990s, despite the country's stronger economic performance. Under the broad definition, which includes the non-searching unemployed, the national unemployment rate increased from 29.4 to 42.9 percent during 1995-2003 (Casale *et al*., 2004). Rising unemployment affected all population groups and was caused by labor force participation rising considerably faster than job creation. Poverty also increased during 1995-2000, especially amongst the country's poorest

16

population (Hoogeveen and Ozler, 2005). This rising unemployment and poverty raises concern over the possible effects of foreign competition and structural adjustment on labor employment and wages.

Most studies find a negative relationship between liberalization and net aggregate employment. For example, Bell and Cattaneo (1997) and Edwards (1999) use a factor content approach and find that import penetration has reduced employment. However, these studies also find that this effect has been small. This is supported by Edwards (2001a), who finds that employment losses from import penetration were matched by gains from export growth, and by Jonsson and Subramanian (2001) who find an insignificant relationship between tariff-changes and sectoral employment. Furthermore, Edwards (2003) uses firm-level data and finds that large firms affected by trade liberalization tended to reduce employment, but that there is no evidence of this amongst smaller firms. Therefore, the empirical evidence suggests that liberalization has had little or no effect on net aggregate employment during the 1990s.

Movements in real wages indicate that changes in the labor market affected skill-groups differently (Edwards and Abdi, 2003). A number of studies have focused on the factor-bias of trade-induced changes in net employment. Bhorat (1999) finds that increased trade during the 1990s only benefited skilled labor, with lower-skilled employment declining. Edwards (2002) decomposes the structure of production and trade and finds that, although small, the effect of increased trade was to raise the skill-intensity of production. Edwards (2003) uses firm-level data and concludes that trade-induced technological change explains some of the shift towards skill-intensive production and falling unskilled labor employment. These studies suggest that focusing on the effect of liberalization on *aggregate* employment hides the differential effect of trade on employment and wages across workers.

Trade liberalization's bias towards higher-skilled labor may be due to the rising capital-intensity of production that took place during the 1990s. Jonsson and Subramanian (2001) find a positive relationship between tariff-reductions and sectoral capital growth. Since no structural relationship is specified, the authors tentatively

conclude that sectors experiencing reduced import protection might have used *existing* capital more efficiently. By contrast, Edwards (2003) uses firm-level data and finds that firms affected by trade liberalization invested more heavily in capital equipment. This corroborates observed labor trends, since increased investment has been found to be associated with a rising skill intensity of employment (Fedderke *et al*., 2003).

The above studies have focused on the effects of liberalization on *net* employment and do not examine the adjustment costs associated with trade reforms. Therefore, while the empirical evidence finds that liberalization has had little effect on the level of employment, it does not suggest that there has not been any 'churning' of the labor market resulting from sectoral changes in the structure of production. Furthermore, while the evidence suggests that higher-skilled workers have benefited more than lower-skilled workers, the extremely high level of unemployment in South Africa makes it difficult to draw inferences about the effects of trade on the distribution of household incomes and poverty. Given the focus of this study on the distributional effects of liberalization, it is necessary to go beyond the existing literature and examine not only aggregate growth, employment and wages, but also household incomes and expenditures.

Gender Dimensions of Employment, Wages and Poverty

Male workers account for the largest share of total employment in South Africa. However, employment grew faster for women than for men during the 1990s (Table 2). This was offset by increased female participation or the 'feminization' the labor force, such that the broad female unemployment rate increased from 37.8 to 49.0 percent during 1995-2003 (Casale and Posel, 2005). While unemployment grew more rapidly for men, the male unemployment rate in 2003 remained significantly lower at 36.2 percent. Apart from changes in overall unemployment, there were also substantial differences in sectoral employment across male and female workers, especially in the primary and secondary sectors. Male employment increased faster in the mining sector, while female employment grew in the agricultural sector. Both men and women experienced stagnant employment in the manufacturing and public sectors and rapidly expanding employment

in private services. The latter was particularly important for women, since almost three quarters of total female employment in 1995 was in this sector. Manufacturing employment was equally important for men and women, suggesting that both male and female workers were likely to be affected by trade liberalization.

Table 2.　　Employment by Gender and Sector, 1995 and 2003

	Employment Numbers 1995 (1000s)		Employment Shares 1995 (%)		Annual Change 1995-2003 (%)	
	Men	Women	Men	Women	Men	Women
All sectors	5,621	3,638	100.0	100.0	0.8	2.4
Agriculture	983	262	17.5	7.2	-2.4	3.8
Mining	415	19	7.4	0.5	2.6	0.4
Manufacturing	954	465	17.0	12.8	-0.5	0.1
Energy and construction	487	39	8.7	1.1	2.9	11.5
Private services	2,219	2,652	39.5	72.9	2.8	2.7
Public services	563	202	10.0	5.5	-4.4	-2.3

Source: Own calculations using the 1995 OHS and IES (StatsSA, 1996a and 1996b) and own estimates from the 2003 (Sept) LFS (StatsSA, 2004) provided by Casale et al. (2004).

Note: Weights have been revised according to the 2001 population census and thus differ from Casale et al. (2004).

In terms of livelihoods, rising employment was offset by falling real wages (Table 3). This is partly due to the expansion of the informal sector, which may have accounted for as much as a half of the new jobs created during 1995-2003 (Casale *et al*., 2005).[5] 'Informalization' has been more pronounced for men, with formal sector employment rising faster for female workers. Although men's wages have remained considerably higher than women's, they fell at an average annual rate of 2.5 percent during 1995-2003, compared to 0.6 percent for women. More importantly for this study, both men and women experienced falling wages in the manufacturing sector. Therefore, while declining wages did not offset total increases in employment, the net effect on workers in the manufacturing sector was negative. This was more so for men, whose total manufacturing wage bill declined by 2.9 percent per year, compared to 1.7 percent for women. Overall, there has been a decline in wage gap between men and women,

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[5] Part of the rise of the informal sector undoubtedly reflects improvements in survey design and capture.

19

although male workers on average still earn substantially more than female workers. This study aims to determine the extent to which trade liberalization has contributed to falling manufacturing employment and the differential changes in labor incomes experienced by men and women.

Table 3. **Monthly Wage or Labor Remuneration by Gender and Sector, 1995 and 2003**

	Monthly Wage 1995 (in 2000 Prices)		Female-to-Male Wage Ratio (%)		Annual Real Change 1995-2003 (%)	
	Men	Women	1995	2003	Men	Women
All sectors	3,744	2,266	60.5	70.4	-2.5	-0.6
Agriculture	1,443	820	56.8	52.8	-3.9	-4.8
Mining	3,207	2,960	92.3	98.5	-1.5	-0.7
Manufacturing	4,221	2,192	51.9	54.6	-2.4	-1.8
Energy and construction	3,103	2,584	83.3	96.2	-5.4	-3.7
Private services	4,553	2,367	52.0	64.3	-3.1	-0.5
Public services	3,825	2,969	77.6	82.2	2.7	3.5

Source: Own calculations using the 1995 OHS and IES (StatsSA, 1996a and 1996b) and own estimates from the 2003 (Sept) LFS (StatsSA, 2004) provided by Casale et al. (2004).
Note: Real wages for 1995 and 2003 are in constant 2000 prices.

Poverty in South Africa is also severe, with 58.4 percent of the population living below the basic needs poverty line in 1995.[6] Poverty falls disproportionately on African-headed households and rural areas. As with employment and wages, poverty is unevenly distributed across men and women. Three out of four people living in female-headed households in 1995 were poor, compared to two out of four in male-headed households.[7] This unequal distribution of incomes also exists at higher income levels, with a smaller share of the richest population living in female-headed households (Figure 2). Therefore, not only have women become more susceptible to changes in trade policies due to their increased participation in labor markets, but they are also more vulnerable to poverty and account for a significant share of inequality in South Africa.

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[6] The basic needs poverty line is R322 per person per month in 2000 prices (Hoogeveen and Ozler, 2005). See Table 10 for a profile of poverty across male and female-headed households.
[7] See Table 10 later in this study.

Figure 2.   **Household Population Distribution by National Expenditure Deciles, 1995**
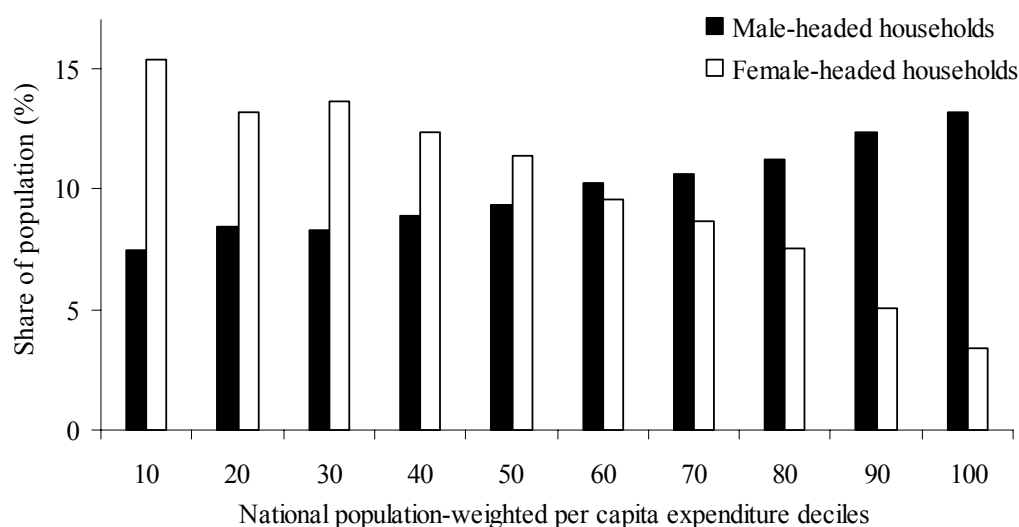
Note: Expenditure deciles are based on per capita expenditures and population weighted so that the number of people in each decile equals ten percent of the total national population.

In summary, the empirical evidence suggests that trade reforms over the last decade have been pronounced and contributed positively to economic growth. However, import competition and technological change may have undermined employment, especially amongst lower-skilled workers. Both men and women suffered stagnant or falling manufacturing employment and wages since 1995. Accordingly, this study examines whether liberalization has contributed to rising unemployment and poverty experienced during the 1990s and to the unequal distribution of incomes and poverty across male and female-headed households. Since trade reforms are a key component of South Africa's pro-poor growth strategy, this study also considers the implications of completing the tariff rationalization program proposed by the government at the start of the recent liberalization episode. However, to determine the effects of trade reform on growth and poverty, it is necessary to employ an analytical method that can link macroeconomic policies to their microeconomic impacts, and which captures distributional changes across male- and female-headed households.

III. MODELING THE EFFECTS OF TRADE LIBERALIZATION ON
MEN AND WOMEN

A number of studies have reviewed the relationship between trade, gender and poverty (Fontana, 2003; Fontana and Wood, 2000; Winters *et al*., 2004). McCulloch *et* al. (2002) identify four transmission mechanisms: (i) the effects of reforms on trade, productivity and growth; (ii) the impact of growth on employment, wages and household incomes; (iii) the effects of falling import tariffs on relative prices and household expenditures; and (iv) the effects of lower tariff revenues on government transfers. Each of these interrelated mechanisms depends on the specific institutional and structural characteristics of the households and markets within a given country. This section describes the dynamic computable general equilibrium (CGE) model that is used to capture these various transmission mechanisms. The model is calibrated to a highly-disaggregated social accounting matrix (SAM), which is an economy-wide database describing the detailed structure of the South African economy (Lofgren *et al*., 2001; Thurlow, 2005). This 1993 SAM is purpose-built to capture the differences between male and female workers and male- and female-headed households in South Africa (Thurlow, 2006a). Finally, the CGE model is linked to a microsimulation module, which allows it to retain the full detail of the household survey when estimating changes in poverty and inequality.

Drawing on the SAM, the CGE model identifies 39 sectors/commodities. Three geographic regions are also separately identified, thus implying that there are a total of 117 productive activities or representative producers in the model. The three regions include (i) the main coastal provinces (Western Cape, Eastern Cape, and KwaZulu-Natal); (ii) the inland core industrial provinces (Gauteng and Mpumulanga); and (iii) the remaining inland provinces (Northern Cape, Free State, North West, and Limpopo). While production activities are defined at the regional level, an integrated national market for commodities is assumed (i.e., the model does not capture interregional trade). Imperfect factor markets are assumed for the 18 different types of labor identified in each of the three regions. Labor is disaggregated across (i) three skill groups based on

occupational category (skilled, semi-skilled, and unskilled); (ii) three population groups (African, White, and Other); and (iii) male and female workers. Skilled and white labor have upward sloping labor supply curves reflecting their low unemployment rates (Casale *et al.*, 2005). Semi-skilled and unskilled, non-white labor are unemployed with sector-specific real wages fixed relative to those of skilled workers. Labor markets are defined at the regional level (i.e., labor is mobile across sectors *within* regions but not *between* regions). By contrast, capital is nationally mobile. The 117 representative producers in the model make decisions in order to maximize profits, but are constrained by factor market imperfections when choosing inputs. A nested production system is employed. At the lower levels, a constant elasticity of substitution (CES) function is defined over factors, while at the highest level, fixed-share intermediates are combined with factor value-added in a Leontief specification. Factor substitution elasticities are econometrically estimated and vary across activities (IDC, 1997).[8] Within the nesting of labor demand, a workers' skill is assumed have the highest importance, followed by population or racial group, and finally their gender. Profit maximization implies that the factors receive income where marginal revenue equals marginal cost based on endogenous relative prices. By disaggregating production across sectors and employment across labor categories, the model captures how the changing structure of growth caused by liberalization influences employment and wages amongst male and female workers (i.e., the second transmission mechanism described above).

Within each sector, substitution possibilities exist between production for domestic and foreign markets. This decision of producers is governed by a constant elasticity of transformation (CET) function which distinguishes between exported and domestic goods, and by doing so, captures any differences between the two products. Profit maximization drives producers to sell in those markets where they can achieve the

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[8] The empirically estimated component of the elasticity governs substitution between capital and labor of different skills. This is further decomposed across race and gender assuming that substitution between genders is easier than across races. The high elasticity for gender (1.5) assumes that producers' see little difference between genders after controlling for skill, relative wages, and initial employment-intensities. The latter reflects sector-specific technology (e.g., male-intensive mining) and past discrimination and labor practices (e.g. female-intensive domestic services).

highest returns. These returns are based on domestic and export prices (where the latter is determined by the world price times the exchange rate). Under the small-country assumption, South Africa is assumed to face a perfectly elastic world demand at fixed world prices. The final ratio of exports to domestic goods is determined by the endogenous interaction of relative prices for these two types of commodities. Similar substitution possibilities exist between imported and domestic goods under a CES Armington specification. Such substitution can take place both in final and intermediates usage. The Armington elasticities are econometrically estimated and vary across sectors, with lower elasticities reflecting greater differences between domestic and imported goods (IDC, 1997). Again under the small country assumption, South Africa is assumed to face infinitely elastic world supply at fixed world prices. The final ratio of imports to domestic goods is determined by the cost minimizing decision-making of domestic demanders based on the relative prices of imports and domestic goods (both of which include relevant tariffs and taxes). By capturing relative price movements and substitution-effects, the model allows demand to shift towards cheaper imports following tariff reductions (i.e., the third transmission mechanism).

The model also distinguishes between various 'institutions' within the South African economy, including enterprises, the government, and many representative households. These households are derived from the 1995 Income and Expenditure Survey (IES) and 1995 October Household Survey (OHS) (StatsSA, 1996a and 1996b). Households are disaggregated across the three regions and, within each region, according to rural and urban areas, the population group and gender of the household head, and across national expenditure deciles. In total there are 240 aggregate households in the model. Households and enterprises receive income in payment for producers' use of their factors of production. Both institutions pay direct taxes to government (based on fixed tax rates), save (based on marginal propensities to save), and make transfers to the rest of the world. Enterprises pay their remaining income to households in the form of dividends. Households, unlike enterprises, use their income to consume commodities under a linear expenditure system (LES) of demand. The government receives income from imposing

24

import tariffs and sales and direct taxes, and then makes transfers to households, enterprises and the rest of the world. The government also purchases commodities in the form of government consumption expenditure, and the remaining income of government is (dis)saved. All savings from households, enterprises, government and the rest of the world (foreign savings) are collected in a savings pool from which current investment is financed. By separating demand into its component parts and capturing government income and expenditure patterns, the model considers how changes in tariff revenues influence the fiscal budget. Furthermore, by retaining the detailed income and expenditure patterns of households, the model can better capture distributional change.

The model includes three broad macroeconomic accounts: (i) the savings and investment account; (ii) the current account, and (iii) the government balance. In order to balance these accounts, it is necessary to specify a set of 'closure' rules, which provide the mechanism through which macroeconomic balance is achieved. Based on evidence for South Africa, a savings-driven closure is assumed to balance the savings-investment account (Nel, 2003). Under this closure, the marginal propensities to save of households and enterprises are fixed, and real investment quantities adjust to ensure that the level of investment and savings are equal at equilibrium. For the current account it was assumed that a flexible exchange rate adjusts in order to maintain a fixed level of foreign savings. In other words, the external balance is held fixed in foreign currency and the government cannot borrow abroad to replace falling tariff revenues. For the government account, the level of direct and indirect tax rates, as well as real government consumption expenditure, are held constant. As such the balance on the government budget is assumed to adjust to ensure that public expenditures equal receipts. The model assumes that the government does not reduce transfers to households due to falling tariff revenues, but rather borrows domestically through deficit financing (i.e., the fourth transmission mechanism).

In order to account for the dynamic growth-effects of trade liberalization, the model described above is extended to a recursive dynamic specification in which selected parameters are updated based on the modeling of intertemporal behavior and results from previous periods. Current economic conditions, such as the availability of capital, are

endogenously dependent on past outcomes but remain unaffected by forward-looking expectations. The dynamic model is also exogenously updated to reflect demographic and technological changes based on observed trends. For example, population growth is exogenously imposed on the model based on changes from the 1995 IES/OHS and the 2000 IES (StatsSA, 2001). It is assumed that a growing population generates a higher level of consumption demand and therefore raises the supernumerary income level of household consumption within the LES demand system.

Unlike total factor productivity (TFP) growth, which is updated exogenously, the process of capital accumulation is modeled endogenously, with previous-period investment generating new capital stock for the subsequent period. Although the allocation of new capital across sectors is influenced by each sector's initial share of aggregate capital income, the final sectoral allocation of capital in the current period is dependent on the depreciation rate and on sectoral profit-rate differentials from the previous period. Sectors with above-average capital returns receive a larger share of the new capital stock. The model therefore captures the growth-effects of liberalization by allowing for both an exogenous adjustment in productivity growth and an endogenous accumulation of capital due to cheaper imported capital goods (i.e., the first transmission mechanism).

The model is initially calibrated to the information contained in the 1993 SAM. The dynamic model is then solved for the 1993-2003 period as a series of equilibria each one representing a single year. By imposing observed trends in sectoral GDP growth and other dynamic adjustments from the literature, the model reproduces a counterfactual or base growth path. Trade liberalization is then expressed as a change in tariffs and productivity and the model is re-solved for a new series of equilibria. Differences between the policy-influenced growth path and the counterfactual are interpreted as the economy-wide impact of trade policies.

The poverty and distributional impacts of trade liberalization are modeled inside the same household survey that was used to construct the SAM and CGE model (i.e., the 1995 IES). This microsimulation model fully employs the household survey data. Each

26

representative household in the CGE model is linked to its corresponding household within the microsimulation model. Similar to the use of sample weights in the survey, each representative household in the CGE model is an aggregation of a larger number of households. Since poverty in this study is defined according to per capita expenditure, changes in household expenditure for each of the 39 commodities in the CGE model are passed down to the survey, where the poverty measure is updated and poverty and inequality are recalculated.

The model therefore captures the four main transmission mechanisms between trade and poverty. However, the model does not capture all of the effects of liberalization on men and women. Most importantly, the model cannot capture how liberalization influences the intra-household distribution incomes or expenditures (Fontana, 2003) nor its impact on household production and leisure (Decaluwe *et al.*, 2005). Rather the model assumes that the distribution of incomes within households remains constant. This is a reasonable assumption given the lack of appropriate intra-household data. Furthermore, the model cannot capture the short-run adjustments costs of liberalization, and the results should therefore be interpreted as the medium-run implications of trade reforms. Despite these limitations, the model does capture the heterogeneity of household income and expenditure patterns, and the detailed structure of production and labor markets in South Africa. These factors are particularly important for identifying the distributional effects of trade policy across men and women (Fontana, 2003).

IV. MODEL RESULTS

The CGE model is used to examine the impact of recent liberalization, as well as the potential gains from future trade reforms. For the former, the static efficiency gains from tariff reductions are separated from the dynamic gains from trade in order to determine the relative importance of the various transmission mechanisms between trade and poverty. However, the *Baseline* scenario first assesses the effects of the 'pre-liberalization' growth path on poverty, thus providing a counterfactual for the trade policy scenarios.

Baseline Scenario

The *Baseline* scenario is calibrated to replicate the growth path that would have been achieved if South Africa had continued with the same level and structure of growth experienced during the pre-liberalization period (Table 1). The GDP growth rates for each of 39 sectors in the model are calibrated to the observed growth rates for 1985-1993 (SASID, 2006), with both sectoral TFP and factor employment adjusting. The model then solves endogenously for the remaining dimensions of growth (Table 4). Capital accumulation and labor employment are both endogenous implying that the Solow-decomposition of growth is determined by changes in factor demands both across and within sectors. Similarly, the expenditure composition of growth is endogenous, with the only exception being government consumption whose growth is fixed at the observed 2.6 percent growth rate.

The projected *Baseline* scenario closely matches the pre-liberalization growth path to which it is calibrated. For example, aggregate GDP growth for 1993-2003 averages 1.1 percent per year, which is identical to the growth experienced during 1985-1993 (Tables 1 and 4). The *Baseline* growth path is also similar to observed trends at the disaggregated level. For example, the model reproduces the contraction of investment and the slow private consumption growth experienced during 1985-1992 (Table 5). The model also correctly estimates the productivity growth required to meet the aggregate GDP growth rate. However, it understates capital stock growth and overstates labor

28

employment growth. This is because changes in inventories are exogenous in the model, yet were the main driver of rising capital stocks during the late 1980s (Section 2). Furthermore, the model does not capture the political instability of the 1980s, which may have caused firms to favor capital over labor. However, despite these small differences, the *Baseline* scenario successfully tracks the pre-liberalization growth path.

Table 4. **Macroeconomic Results from the Simulations, 1993-2003**

	Initial Share (%) 1993	Base Scenario	Tariff Reduction	Dynamic Gains	Future Reforms
		Simulated Average Annual Growth Rate (%), 1993-2003			
Real GDP (market prices)	100.0	1.1	1.2	1.8	1.9
Private consumption	61.8	1.2	1.3	1.9	2.0
Investment	14.7	-1.3	-1.2	0.4	0.7
Government	20.1	2.6	2.6	2.6	2.6
Exports	21.2	2.0	2.9	3.3	3.5
Imports	-17.8	2.3	3.4	3.9	4.1
Real GDP (factor cost)	100.0	1.1	1.2	1.8	1.9
Capital	43.0	0.9	1.0	1.4	1.5
Labor	57.0	0.5	0.5	0.9	1.0
Skilled	16.2	0.7	0.8	1.1	1.2
Semi-skilled	59.9	0.5	0.4	0.8	0.8
Unskilled	23.9	0.7	0.7	1.0	1.1
Productivity (TFP)		0.4	0.5	0.7	0.8
Real exchange rate		-3.9	-3.2	-4.7	-4.8
		Percentage point change from initial share, 1993-2003			
Current account deficit / GDP	0.9	-0.1	-0.1	-0.2	-0.2
Import taxes / GDP	0.8	0.2	-0.3	-0.3	-0.4
Government deficit / GDP	6.7	0.6	1.0	-0.4	-0.6

Source: Results from the South African CGE-microsimulation model.

Note: *The real exchange rate is in units of local currency per unit of foreign currency (i.e., an increase is a real depreciation). Tariff reduction and Dynamic gains scenarios include observed changes in nominal tariff rates; Future reforms includes rationalization of current tariff system to five applied rates; Dynamic gains and Future reforms include trade-induced TFP growth.*

Table 5.   Sectoral GDP Growth Results from the Simulations, 1993-2003

	Initial Share (%) 1993	Observed Growth Rates (%)		Simulated Annual Growth Rate (%), 1993-2003			
		1985-92	1993-03	Base Scenario	Tariff Reduction	Dynamic Gains	Future Reforms
GDP factor cost	100.0	1.1	2.7	1.1	1.2	1.8	1.9
Agriculture	4.5	0.8	1.5	0.8	0.9	1.7	1.9
Mining	7.7	-1.2	-0.7	-0.8	-0.6	0.2	0.2
Manufacturing	21.5	0.4	2.2	0.5	0.4	1.7	1.9
Food / beverages	3.7	0.3	0.4	0.7	0.7	2.0	2.2
Textiles / clothing	1.6	-2.7	-1.1	-2.6	-4.7	-1.7	-1.0
Wood / paper	2.2	-1.0	0.7	-1.0	-1.2	-0.3	-0.2
Chemicals	4.2	1.9	3.3	2.6	2.7	3.5	3.4
Non-metals	0.9	-0.4	0.7	-0.2	-0.3	0.8	0.9
Metal products	4.5	-2.7	4.2	-2.1	-2.3	-1.4	-1.4
Electrical machinery	1.0	2.8	1.3	3.2	3.4	5.4	5.3
Vehicles	1.8	0.6	4.7	1.6	1.8	3.1	4.1
Other manufacturing	1.7	10.5	1.4	1.9	1.7	4.6	4.6
Energy and construction	6.7	1.0	2.7	1.4	1.5	2.0	2.1
Private services	43.5	1.3	4.4	1.3	1.4	1.9	2.0
Public services	16.1	2.6	0.1	2.6	2.6	2.6	2.6

Source: Results from the South African CGE-microsimulation model.

Note: *Tariff reduction and Dynamic gains scenarios include observed changes in nominal tariff rates; Future reforms includes rationalization of current tariff system to five applied rates; Dynamic gains and Future reforms include trade-induced TFP growth.*

The Impact of Recent Trade Liberalization

Two scenarios are presented in this section that determines the effects of recent trade liberalization on growth and poverty. Although both scenarios simulate the impact of tariff reductions, only does the second scenario include the dynamic trade-induced productivity gains that have been estimated by other studies. The design of the two scenarios is described first before presenting the findings.

Tariff reductions during the 1990s were concentrated in the manufacturing sector, where the largest absolute declines were on consumable products, such as food and textiles (Table 6). Tariffs also declined for capital and intermediate goods, such as on chemicals, machinery and metal products. As seen in the table, there is a difference between the nominal tariff rate as it appears in the tariff schedule, and the duty that is actually collected by customs officials. For example, the collection rate in 1993 was less than a third of the nominal rate due to collection inefficiency and tariff exemptions. This was certainly true for the vehicles sector, which received large duty-drawbacks as part of the government's industrial strategy. Since the SAM captures the actual flow of funds between importers and the government, it is collection rates and not nominal rates that appear in the model. However, recent trade liberalization episode is simulated by reducing tariff collection rates by the percentage change in the nominal rate. These scenarios therefore assume that collection efficiency is unaffected by liberalization.

The estimated dynamic gains from trade liberalization are drawn from Jonsson and Subramanian (2001). Each percentage point decline in the nominal tariff rate raises a sector's TFP growth rate by 0.74 percent (Section 2). This elasticity gives the *average* relationship between tariffs and TFP growth across all sectors. Therefore, by uniformly applying this elasticity, the model does not capture the unique response of each sector to trade reforms. However, the absolute size of the productivity gains is unique since each sector experiences different changes in their tariffs. As such, the model provides a best estimate of the effects of the dynamic gains from trade for each individual sector.

Table 6.   **Observed Changes in Tariffs under Trade Liberalization, 1993-2003**

	Import Share (%) 1993	Collected Rates (%) 1993	Nominal Tariff Rates (%)				Ration Tariffs[1]
			1993	2003	Change Point	(%)	
All sectors	100.0	4.3	15.8	5.2	-10.7	-67.4	4.1
Agriculture	2.9	0.5	10.5	4.5	-6.0	-57.4	3.2
Mining	8.8	0.2	3.0	0.9	-2.1	-71.3	0.9
Manufacturing	76.3	5.5	20.0	7.3	-12.7	-63.7	5.8
Food / beverages	4.3	5.0	30.6	13.3	-17.3	-56.7	10.4
Textiles / clothing	4.0	18.9	50.7	24.0	-26.7	-52.7	19.1
Wood / paper	4.9	4.8	15.7	6.0	-9.7	-61.9	5.1
Chemicals	15.0	5.0	13.5	3.8	-9.6	-71.5	3.7
Non-metals	1.3	11.9	17.4	6.0	-11.4	-65.4	5.7
Metal products	20.6	3.7	13.3	3.9	-9.4	-70.5	3.7
Electrical machinery	9.5	5.3	19.9	3.4	-16.5	-82.8	3.2
Vehicles	13.4	3.2	25.0	11.9	-13.0	-52.2	6.8
Other manufacturing	3.2	13.0	27.7	7.4	-20.3	-73.2	7.3
Energy and construction	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Private services	11.7	0.6	0.6	0.6	0.0	0.0	0.6
Public services	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Import shares from 1993 SAM (Thurlow, 2006a); nominal rates from Edwards (2005); and TFP growth from Jonsson and Subramanian (2001).

[1] Nominal tariff rates that would apply in 2003 had the rationalization program been successfully implemented.

The results for the *Tariff Reduction* and *Dynamic Gains* scenarios are described sequentially. The initial effect of reducing tariffs is to lower import prices and stimulate import demand (Table 4). However, increased imports places pressure on the current account, which is held fixed in foreign currency. The real exchange rate therefore depreciates to maintain macroeconomic balance.[9] This partly offsets the initial fall in import prices and raises export competitiveness. The overall effect of reducing tariffs is therefore an acceleration in *both* import and export growth. Falling import prices also benefits import-intensive investment, which in turn accelerates capital accumulation. Falling tariff revenues and increases in the government deficit only partially offset faster investment and capital accumulation. The net effect is therefore positive, implying that reducing tariffs during the 1990s contributed positively to capital accumulation.

[9] The real exchange rate is measured in the model as the amount of local currency required to purchase a unit of foreign currency. Therefore, a depreciation is reflected as an increase in the real exchange rate.

TFP growth accelerates under the *Tariff Reduction* scenario because production shifts towards more efficient sectors. However, it is when the dynamic gains from trade liberalization are included that productivity growth is significantly enhanced. The faster economic growth under the *Dynamic Gains* scenario raises household incomes and hence government revenues and private savings. The resulting increase in loanable funds strengthens investment and fosters higher production and exports. However, rising export growth exceeds import growth in the *Dynamic Gains* scenario, thus causing the real exchange rate to appreciate. The results for this scenario suggest that trade liberalization contributed to the changes observed during the 1990s, such as the acceleration of trade, investment and growth. Furthermore, the larger increase in the capital stock growth rate relative to labor employment indicates that liberalization raised the capital-intensity of production.

Trade liberalization also contributed to the changes in sectoral production that took place during 1993-2003 (Table 5). For example, the consumables sectors were hurt by falling tariffs and increased import competition, yet benefited from faster productivity growth. This is certainly the case for the textiles and clothing sectors, which suffer under the *Tariff Reduction* scenario, but whose growth rate rises considerably under the *Dynamic Gains* scenario. The net effect is a slower decline in the textile sector, which is similar to what was actually observed during the 1990s. Although the other manufacturing sectors did not benefit as much from trade-induced productivity, they did benefit from improved export competitiveness and cheaper imports. This led to improvements in their net trading positions. Furthermore, all sectors benefited from increased domestic demand resulting from higher overall economic growth. The model captures these linkages between the manufacturing and services sectors. Faster trade-induced growth in manufacturing generates additional demand for private services, which grow more rapidly as a result. The predicted acceleration of services under the *Dynamic Gains* scenario mirrors the sector's actual performance during the 1990s. Liberalization therefore explains some of the structural changes that took place in South Africa over the last ten years, such as the expansion of the manufacturing and service sectors.

Trade reforms also influenced South Africa's labor market. At the aggregate level, rising import competition under the *Tariff Reduction* scenario causes a slight decline in employment amongst semi-skilled workers but has little effect on unskilled workers. These simulation results match the findings of other empirical studies. However, faster trade-induced growth under the *Dynamic Gains* scenario generates employment for *all* skill-groups, although it is skilled employment that expands fastest. While this trade-induced increase in the skill-intensity of employment is confirmed by other studies, this is not the case for unskilled labor, where the literature suggests that liberalization may have caused a decline in employment. One explanation for this difference is that the model estimates the 'general equilibrium' effects of liberalization thereby explicitly capturing both its direct *and* indirect effects on employment. Isolating indirect transmission mechanisms is difficult in ex-post econometric studies. Furthermore, the model captures the 'economy-wide' effects of trade policies, whereas previous empirical studies have tended to focus on manufacturing and therefore do not capture the effects of liberalization on the service sector. Finally, another explanation is that the model does not capture how the technology embodied in imported goods has changed during the 1990s. For example, the nature of imported electrical machinery has changed dramatically over the last ten years with the rise of personal computers. Predicting such innovations is obviously beyond the ability of the model. Therefore, while the model correctly predicts the increase in imports, it underestimates the rising skill-bias caused by these imported capital goods.

Despite differences in methodology, both the model and the empirical evidence produce similar results at the aggregate level. However, the objective of this study is to go beyond the aggregate level of existing studies to estimate the distributional effects of trade liberalization on men and women. The results for the *Tariff Reduction* scenario suggest that women were more severely affected by import competition, with female employment declining, especially in the manufacturing sector (Table 7). By contrast, male employment increased, albeit only slightly. The reason for these differences lies in the effect of liberalization on the consumables sectors. The food and textile sectors

Table 7.   **Employment Results from the Simulations, 1993-2003**

	Initial Employed (1000s)	Simulated Total Growth (%), 1993-2003			
		Base Scenario	Tariff Reduction	Dynamic Gains	Future Reforms
Male workers	5,779	6.3	6.5	10.1	10.6
Skilled	932	7.2	7.5	11.5	12.1
Semi-skilled	3,617	5.8	5.8	9.4	9.9
Unskilled	1,230	7.3	7.6	11.1	11.7
Agriculture	292	3.3	4.4	7.1	8.6
Mining	701	-8.3	-6.2	-2.2	-2.8
Manufacturing	1,288	-5.2	-7.4	-5.2	-5.2
Private services	1,489	9.9	11.1	16.6	18.0
Public services	1,559	9.4	9.4	9.4	9.4
African	3,750	6.2	6.5	9.9	10.4
White	1,232	5.7	5.9	9.2	9.7
Other	796	7.8	7.4	12.4	13.3
Female workers	2,416	5.2	4.2	8.1	8.8
Skilled	399	8.1	8.5	13.7	14.6
Semi-skilled	1,292	3.7	1.8	5.1	5.7
Unskilled	725	6.4	6.1	10.3	11.0
Agriculture	65	3.0	4.0	6.4	7.8
Mining	8	-2.5	-0.4	-3.8	-4.6
Manufacturing	540	-10.2	-17.2	-15.5	-15.9
Private services	1,266	10.0	11.1	17.1	18.5
Public services	512	9.2	9.2	9.1	9.1
African	1,410	5.9	5.0	9.2	9.9
White	657	6.9	7.0	10.2	10.8
Other	349	-0.6	-4.4	-0.2	0.4

Source: Employment from 1995 OHS and IES (StatsSA, 1996a and 1996b). Results from the South African CGE-microsimulation model.

Note: Tariff reduction and Dynamic gains scenarios include observed changes in nominal tariff rates; Future reforms includes rationalization of current tariff system to five applied rates; Dynamic gains and Future reforms include trade-induced TFP growth.

experienced the largest declines in nominal tariffs and hence rapid increases in import competition. However, these sectors are particularly important for female employment. For example, while female workers account for only one-third of national employment they account for two-thirds of employment in the textiles sector (Table 8). As such, the decline textiles production caused by falling tariffs hurts women more than men.

Table 8.   **Factor Employment Shares within Sectors, 1993**

	Share of total employment in each sector (%)								All Workers
	Male workers				Female workers				
	All Male	Skilled	Semi-skilled	Unskilled	All Female	Skilled	Semi-skilled	Unskilled	
All sectors	70.5	11.4	44.1	15.0	29.5	4.9	15.8	8.8	100.0
Agriculture	81.8	0.5	26.5	54.8	18.2	0.0	1.5	16.7	100.0
Mining	98.9	6.5	73.8	18.5	1.1	0.3	0.8	0.1	100.0
Manufacturing	70.4	9.4	49.2	11.9	29.6	1.6	20.6	7.3	100.0
Food / beverages	66.6	7.2	43.2	16.3	33.4	1.3	16.5	15.5	100.0
Textiles / clothing	33.6	3.4	26.7	3.4	66.4	0.6	58.4	7.5	100.0
Wood / paper	76.7	9.7	53.4	13.6	23.3	1.4	13.7	8.3	100.0
Chemicals	80.4	17.3	49.5	13.6	19.6	3.1	9.8	6.8	100.0
Non-metals	83.9	7.0	62.2	14.8	16.1	0.5	11.1	4.5	100.0
Metal products	87.6	11.0	65.4	11.2	12.4	1.5	7.6	3.2	100.0
Electrical machinery	78.5	18.8	46.2	13.5	21.5	4.4	15.7	1.4	100.0
Vehicles	85.4	11.8	62.0	11.6	14.6	2.8	11.7	0.2	100.0
Other manufacturing	62.5	4.3	41.9	16.3	37.5	0.6	25.1	11.8	100.0
Energy and construction	94.8	12.1	67.5	15.2	5.2	1.0	3.1	1.1	100.0
Private services	54.0	17.2	28.7	8.1	46.0	11.2	19.9	14.9	100.0
Public services	75.3	8.7	47.7	18.8	24.7	2.7	16.5	5.5	100.0

Source: Own calculations using the 1993 South African SAM (Thurlow, 2006a) and the 1995 OHS and IES (StatsSA, 1996a and 1996b).

Note: Skill groups based on occupational categories. Skilled includes professional and managerial workers; Semi-skilled includes clerical, sales, artisans and production supervisor workers; and Unskilled includes all other workers.

Furthermore, since textiles is a large employer of semi-skilled Asian and Colored women, it is these workers that experience the largest declines in employment after tariffs are reduced.

Although female workers suffered under the *Tariff Reduction* scenario, they benefit from higher employment under the *Dynamic Gains* scenario, with overall female employment growth doubling from 4.2 to 8.1 percent. However, these benefits involve considerable adjustment costs. While rising manufacturing growth does increase labor demand and offsets some of the negative effects of import competition, this accelerated growth is driven by factor productivity and hence a shedding of labor. The overall effect of trade liberalization on manufacturing employment therefore remains negative despite higher economic growth. Accordingly, most of the additional employment generated under the *Dynamic Gains* scenario occurs outside of manufacturing, especially in the agricultural and service sectors. This is especially important for female workers, who are dependent on these sectors and therefore benefit from rising non-manufacturing employment opportunities. However, migrating between sectors involves transaction costs and uncertainty and there is also no indication that the same women who lose manufacturing jobs find jobs elsewhere in the economy. This result suggests it is women who are more likely to suffer as the economy adjusts to the new policy environment. Furthermore, the new jobs created by trade-induced growth are biased towards higher-skilled workers and this is particularly pronounced amongst women. These results match the changes in employment that were observed during the 1990s, such as the rapid rise in female employment in the agricultural and services sectors and the slow growth in manufacturing employment (Table 2).

Despite its negative effects on manufacturing employment, trade liberalization appears to contributed to the observed decline in the gender wage gap. This is because female workers experienced larger increases in real wages due to rising productivity in the manufacturing sector (Table 9). However, these productivity-induced increases were partly offset by the migration of female workers out of manufacturing and into the lower-paying agricultural and service sectors. Accordingly, the decline in the gender wage gap

was more pronounced amongst semi-skilled manufacturing workers rather than unskilled workers. Furthermore, rising wages for unskilled and semi-skilled workers were offset by their slower employment growth such that it is skilled workers who experience the largest increases in labor incomes.

Table 9.   Changes in the Female-to-Male Wage Ratio in the Simulations, 1993-2003

	Monthly Wage, 1993		Wage Ratio (%) 1993	Simulated Final Wage Ratio (%), 2003			
	Male Workers	Female Workers		Base Scenario	Tariff Reduction	Dynamic Gains	Future Reforms
All workers	2,982	1,897	63.6	65.7	66.1	67.2	67.5
Skilled	7,436	4,001	53.8	54.8	54.9	55.5	55.7
Semi-skilled	2,424	1,890	78.0	81.7	82.2	83.9	84.3
Unskilled	1,252	752	60.1	61.0	61.1	62.2	62.4
African	1,854	1,356	73.1	75.4	75.5	77.4	77.8
White	6,697	3,311	49.4	50.6	50.6	51.1	51.2
Other	2,547	1,421	55.8	57.6	58.3	60.6	61.1

Source: Own calculations using the 1993 South African SAM (Thurlow, 2006a) and the 1995 OHS and IES (StatsSA, 1996a and 1996b). Results from the South African CGE-microsimulation model.

Note: Tariff reduction and Dynamic gains scenarios include observed changes in nominal tariff rates; Future reforms includes rationalization of current tariff system to five applied rates; Dynamic gains and Future reforms include trade-induced TFP growth.

The differential impact of trade liberalization across population groups is reflected in the changes in household poverty (Table 10). Under the *Baseline* scenario, the slow growth in private consumption is more than offset by population growth, and national poverty rises from 58.4 percent in 1993 to 66.8 percent in 2003.[10] Trade liberalization raises economic growth and consumption spending and hence lowers the final poverty rate to 65.3 percent. Although this change appears to be small, it implies that trade liberalization prevented over 700 000 people from falling into poverty during the 1990s.[11] However, the adjustment costs of liberalization play an important role. The poverty headcount amongst male-headed households declines under the *Tariff Reduction* scenario, while it rises amongst female-headed households. This is driven by rising

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[10] The 1993 CGE model is linked to the 1995 household survey, implying that the initial poverty rates and income distribution are for 1995.

[11] This is 1.5 percent (66.8 minus 65.3) of the total population of 47 million people in 2003.

female unemployment, especially amongst urban Asian and Colored households whose workers were more likely to be engaged in the textiles sector. This short-term rise effect of trade liberalization is also true for male-headed households, albeit to a lesser extent. By contrast, poverty declines amongst all population groups under the *Dynamic Gains* scenario.

Table 10.   **Changes in the Poverty Headcount from the Simulations, 1993-2003**

	Population Share in 1993 (%)	Poverty Rate in 1993 (%)	Simulated Poverty Headcount Rate in 2003 (%)			
			Base Scenario	Tariff Reduction	Dynamic Gains	Future Reforms
All households	100.0	58.4	66.8	66.7	65.3	65.2
Male-headed households	67.6	50.8	59.9	59.8	58.4	58.3
Rural	28.9	77.3	82.7	82.6	81.5	81.3
Urban	38.7	30.9	40.9	40.8	39.0	38.9
African	51.4	63.0	71.2	71.1	69.4	69.2
White	8.6	1.1	1.2	1.2	1.1	1.1
Other	7.6	37.1	36.4	36.6	35.6	35.4
Female-headed households	32.4	74.4	80.6	80.6	79.1	79.0
Rural	18.7	87.4	91.2	91.1	90.3	90.3
Urban	13.7	56.6	65.1	65.2	63.0	62.7
African	28.6	79.3	84.8	84.8	83.4	83.3
White	1.2	6.9	6.5	6.5	6.0	6.0
Other	2.5	53.7	51.1	51.7	49.8	49.7

Source: Population share and initial poverty rate from 1995 OHS and IES (StatsSA, 1996a and 1996b). Results from the South African CGE-microsimulation model.

Note: The poverty headcount is the share of the total population falling below the poverty line, which is set at R322 per person per month (see Hoogeveen and Ozler, 2005). Tariff reduction and Dynamic gains scenarios include observed changes in nominal tariff rates; Future reforms includes rationalization of current tariff system to five applied rates; Dynamic gains and Future reforms include trade-induced TFP growth.

Changes in poverty do not accurately reflect the effects of trade liberalization on the distribution of incomes. This can be seen in Figure 3, which shows how the additional private expenditure resulting from trade liberalization is distributed across expenditure deciles.[12] All households benefit under the *Dynamic Gains* scenario since the 'growth incidence curve' is always positive. However, high-income households benefit more than

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[12] More technically, it shows the difference between per capita expenditure growth in each of the trade scenarios and per capita expenditure growth in the *Baseline* scenario.

low-income households. This is because trade liberalization benefits capital and higher-skilled labor and it is high-income households that are more endowed with these two factors. By contrast, low-income households are more dependent on lower-skilled labor whose employment rises more slowly under trade liberalization. Furthermore, low-income households face considerable unemployment and are therefore effectively disconnected from the main benefits of liberalization (i.e., the factor market transmission mechanism). There are also significant distributional differences across male and female-headed households. While high-income male and female-headed households enjoy similar increases in expenditure, it is male-headed households that benefit more at the lower end of the distribution. This is because female workers are more likely to be unemployed or unskilled and hence experience smaller increases in factor incomes as a result of trade liberalization.

Falling import prices and rising import competition also contributed to real wages by lowering consumptions costs. While this benefits all households, it is higher-income households who have more import-intensive consumption patterns and thus benefit more than lower-income households. Accordingly, the direct price-effect of trade liberalization helps reduce poverty but worsens national inequality. However, there are few differences in consumption patterns across male and female-headed households at similar levels in the income distribution. As such, trade liberalization and falling import prices equally benefits both household groups. The price transmission mechanism therefore does not explain changes in gender-inequality.

The above findings suggest that South Africa's recent trade liberalization episode reduced poverty during the 1990s. However, this effect was relatively small and insufficient to offset the rise in poverty caused by slow growth and falling employment and wages. Liberalization has also increased the bias towards capital and skilled labor, thus reducing the gains from trade for poor households. However, low-income households did benefit from faster non-manufacturing employment caused by the economy-wide effects of liberalization. Although liberalization reduced poverty, it also exacerbated inequality, especially between men and women.

Future Gains from Trade Rationalization

The final scenario considers the effects that might have been realized had the government successfully implemented its tariff rationalization program. As mentioned earlier, the government's original proposal to the WTO was to reduce the number of applied tariff rates to six (i.e., zero, five, ten, 15, 20 and 30 percent). However, by 1999 there were still 47 different applied rates. Since the government has already reached its average tariff reduction targets, its future efforts are likely to focus on tariff rationalization. Accordingly, this scenario implements the original rationalization program by reducing nominal tariffs for each tariff line to the nearest of the six tariff bands. These adjustments are based on the final year and so include the actual tariff changes of the 1990s *plus* any additional decline in tariffs caused by rationalization. For example, a tariff rate that declined from 50 to 25 percent during 1993-2003 under the *Tariff Reduction* scenario is now reduced to 20 percent under the *Future Reforms* scenario. Furthermore, the estimated elasticity linking tariff reductions to productivity growth is still applies to this scenario. Therefore, the results for this scenario should be compared to the *Dynamic Gains* scenario to determine the possible impact of future reforms.

The changes in tariffs required to achieve the original rationalization targets are quite small (Table 6). Most sectors experience less than a one percentage point further decline in 2003 nominal tariffs. However, the textiles and vehicles sectors, who were deemed 'sensitive' under the WTO agreement, would experience larger declines. Overall, the consumables sectors would face the largest decline in tariffs since they still enjoy the highest levels of protection and were exempted from most of the tariffs reductions of the 1990s. The macroeconomic effect of further reducing tariffs under the rationalization program is to stimulate import demand and raise productivity (Table 4). Faster economic growth increases the supply of exports, which offsets rising imports and causes an appreciation of the real exchange rate. Economic growth raises household incomes and savings as well as government non-tariff revenues. This offsets the revenue-loss associated with lower tariff rates. The resulting increase in loanable funds facilitates

higher investment growth. These results suggest that completing the proposed tariff rationalization program will favor investment and capital accumulation but will have little effect on overall economic growth.

The increase in the capital stock under the *Future Reforms* scenario is matched by rising labor employment. However, manufacturing employment remains stagnant due to shedding of labor in the consumables sectors and the inability of faster export growth in other manufacturing sectors to offset this trend. Unskilled workers benefit from the economy-wide growth-effects of liberalization and rising employment in the non-manufacturing services. While this is true for both men and women, it particularly important for female workers who rely more heavily on agriculture and private services for their livelihoods (Table 8). Again it is skilled male and female workers that benefit the most from improved employment opportunities after trade reforms. However, while the gender wage gap narrows for all workers, the shift in female employment from manufacturing to lower-paying sectors offsets the rise in relative wages for women, especially for unskilled female workers (Table 9). Accordingly, while further tariff rationalization reduces poverty, its effect remains small and there are few difference between male and female-headed households (Table 10).

Focusing on the effects of trade liberalization on households near to the poverty line again hides its effect on inequality (Figure 3). High-income households benefit more than low-income households, implying that future reforms will exacerbate inequality in South Africa. However, it is high-income female-headed households who benefit the most due to more rapid increases in skilled female employment. By contrast, it is female-headed households at the lower-end of the income distribution that benefit the least from future reforms. Therefore, the increase in within-group inequality resulting from further tariff rationalization is likely to be more severe for female-headed households.

Figure 3.   Additional Per Capita Expenditure Relative to the Base Scenario, 1993-2003
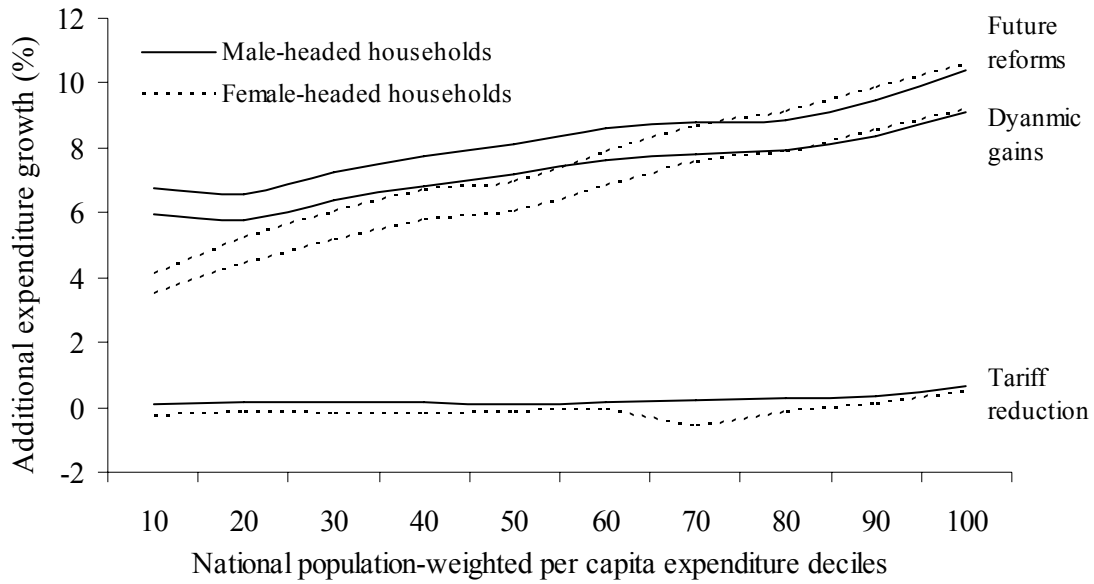
Source: Results from the South African CGE-microsimulation model.

V. CONCLUSION

This study has empirically examined the relationship between trade liberalization, employment and poverty. The findings suggest that liberalization has worked against the observed increase in poverty in South Africa. However, the positive effects of trade reform on the incomes of the poor are likely to have been small, especially since its primary transmission mechanism is through improved employment and wages. High levels of unemployment and inadequate human capital has meant that poor households are disconnected from the benefits of liberalization. Furthermore, rising import competition has contributed to the fall in manufacturing employment during the 1990s. While this has been more than offset by improved employment opportunities in the non-manufacturing sectors, the associated short-term adjustment costs will have increased the vulnerability of the poor and may have undermined their ability to participate in subsequent trade-induced growth.

Trade reforms have also worsened inequality in South Africa. While all workers benefited from faster economic growth, liberalization raised the capital- and skill-intensity of production. Trade reforms have therefore favored higher-income households. This is particularly pronounced for women, who were more heavily dependent on employment in the sensitive food and textiles sectors. These sectors suffered under import competition and, while they did eventually benefit from improved efficiency, the ultimate effect of trade reforms was a shedding of female labor. Unskilled female workers responded by moving to the lower-paying agricultural and services sectors. As a result, inequality between men and women worsened at the lower end of the income distribution. By contrast, higher-skilled women have greater sectoral mobility and were therefore able to overcome adjustment costs and benefit from trade-induced growth. Since this was equally true for skilled male workers, the effects of trade reforms at the high end of the income distribution were similar for male and female-headed households.

Trade liberalization therefore *has* affected men and women differently. Trade reforms have not increased poverty, but they have undermined South Africa's attempts to

reduce inequality. This study suggests that, while there may not be a trade-off between *pro-growth* trade reform and poverty reduction, the country should not rely on further liberalization to generate *pro-poor* growth or address the prevailing inequalities between different population groups, such as men and women. Rather, the government should engage more heavily in targeted pro-poor strategies, such as public works programs and social assistance, which can be better targeted towards poor and vulnerable groups. More importantly, the country's growth strategy should address the adjustment costs associated with trade reforms by providing for social protection and job retraining, especially for lower-skilled women.

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