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International Trade and Manufacturing Employment in the South: Four Country Case Studies

RHYS JENKINS & KUNAL SEN*

ABSTRACT *This paper investigates the impact of international trade on manufacturing employment in developing countries, by undertaking a comparative study of four countries—Bangladesh, Kenya, South Africa and Vietnam. It does so by employing a variety of methodological approaches: factor content; growth accounting; and econometric modelling. The main empirical finding is that international trade seems to be associated with the net creation of jobs in Bangladesh and Vietnam, with female workers being the key beneficiaries. In contrast, international trade has been associated with adverse employment outcomes in Kenya, and possibly in South Africa. This suggests that there may be crucial differences between Asia and Africa in terms of the impact of globalization on employment opportunities in manufacturing. Some alternative explanations for such differences are offered in the paper.*

1. Introduction

The period since 1980 has been described as a third wave of globalization, which is distinguished from the earlier post-World War II period (the second wave) by the increased integration of developing countries into the global economy (World Bank, 2002, pp. 4–5). A novel feature has been the rapid expansion of two-way North–South trade in manufactures, with many developing countries emerging as major exporters of manufactured goods and opening up their protected manufacturing industries to import competition and foreign investment.

These trends have given rise to concern and debate in both developed and developing countries. In the former, these have centred on the effects of increased imports from the South on wage inequality and unemployment and have generated an extensive academic literature.¹ In the developing world, concerns have been expressed over the loss of “good” manufacturing jobs as a result of import competition and the growth of “bad” jobs in sweatshops producing for exports (Ghose, 2003, p. 41) and over possible de-industrialization (Pieper, 1998). However, in contrast to the North, surprisingly little

*Rhys Jenkins and Kunal Sen, School of Development Studies, University of East Anglia, Norwich NR4 7TJ, UK.

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systematic empirical work has been carried out on the effects of these trends on manufacturing employment in developing countries.²

Although both the absolute numbers employed in manufacturing in the South and the South's share of global manufacturing employment have increased since 1980, this expansion has been uneven across countries (Ghose, 2003, Table 2.8). While some have seen rapid growth in manufacturing employment, in others it has stagnated or declined.

This paper undertakes a *comparative* study of the trade–employment relationship by examining the experiences of the manufacturing sectors of four developing countries: Bangladesh, Kenya, South Africa and Vietnam. All four countries have experienced rapid international integration of their economies in the past decade or so. The study uses three different methods of assessing the impact of trade on employment—factor content, growth decomposition and labour demand—and applies each of them to all four of the countries, providing a firmer basis for comparative lessons to be drawn.

The key question that the paper sets out to answer is whether trade integration has created or destroyed jobs in the manufacturing sector of each of the four countries. It also provides some insights into the importance of trade relative to other influences on employment outcomes. It differentiates the impacts on employment by gender where the data permit, which provides some indication of the winners and losers. Finally, possible explanations are considered of the differences in employment outcomes observed between the two Asian and two African countries.

The rest of the paper is in seven sections. The next section sets out the theoretical framework. Section 3 introduces the three empirical methods. Section 4 outlines the trade reforms in the four countries. Sections 5, 6 and 7 apply, respectively, the factor content, growth decomposition and labour demand approaches to the four countries. Section 8 concludes with a discussion of alternative interpretations of the results.

2. Trade and Manufacturing Employment: Theoretical Linkages

The overall level of manufacturing employment in an economy is by definition equal to the level of manufacturing output times the weighted average employment coefficient for the manufacturing sector.

$$L = Q \cdot \sum w_i (L/Q)_i, \quad (1)$$

where L is total manufacturing employment, Q is total manufacturing output, $w_i = Q_i/Q$ and i refers to branches of manufacturing.

The impact of trade on manufacturing employment can therefore be decomposed into three elements represented in Equation (1). First, it may have an impact on the total output of the manufacturing sector (Q). Increased exports have a positive effect on the level of output, tending to increase employment, while greater import penetration depresses output and displaces labour. Second, trade influences the shares of different industries in overall manufacturing output (w_i), increasing the output of exportables and reducing output of import competing industries. Finally, trade can have an impact on employment by changing labour coefficients within industries $(L/Q)_i$. These three impacts are referred to in this paper as the *scale* effect, the *composition* effect and the *process* effect of trade.

Theory suggests that trade might influence manufacturing employment through each of these effects. One determinant of the size of the manufacturing sector is a country's comparative advantage, which may in turn reflect factor endowments. In the model first

proposed by Krueger (1977) and extended by Leamer (1987), the crucial variable determining trade and production structure is the land/labour ratio. Thus, land-abundant developing countries, such as those in Africa and Latin America, would be more likely to specialize in primary commodities, while developing countries in Asia would be more likely to specialize in (labour-intensive) manufactures. Wood (2003) found persuasive evidence for the Krueger–Leamer variant of the Heckscher–Ohlin model—differences in factor endowments between Africa and Asia seem to explain why Africa’s export structure is biased towards natural resource-based commodities rather than labour-intensive manufacturing exports. Increased trade would therefore tend to lead to slower growth (or even contraction) of the manufacturing sector in African countries compared to Asian countries.

An alternative view would explain a country’s comparative (dis)advantage in manufacturing in Ricardian terms, where differences in technology across sectors explain the effects of trade. In this case, the size of the manufacturing sector in a country is determined by its overall competitiveness, which in turn is partly a result of technological capabilities in manufacturing. In this case, it is the acquisition of technological capabilities that determines the impact of trade on manufacturing employment rather than factor endowments. For countries that have a comparative disadvantage in manufacturing, this view is less optimistic that a contraction of the manufacturing sector as a result of increased trade is matched by expansion of other non-manufacturing sectors. This is particularly true when greater trade openness occurs in the presence of specific factors or labour market rigidities. We refer to the impact of trade on employment via the overall size of the manufacturing sector as the *scale* effect, irrespective of the ultimate causes of changes in manufacturing output.

The composition effect of trade depends on the impact of trade on the share of different branches in total manufacturing output. An increase in the share of labour-intensive industries in aggregate output would tend obviously to raise the overall level of manufacturing employment. A key prediction of the standard two-factor Heckscher–Ohlin model is that, with international trade, developing countries with plentiful supplies of labour will export labour-intensive commodities and import commodities with relatively higher capital requirements. Thus, as a developing country gradually integrates with the world economy, it will observe a change in the composition of its output towards more labour-intensive activities. This will shift the national demand for labour curve to the right, and under an assumption of a fairly elastic supply of labour, will lead to an increase in overall employment.³

Not all trade theories suggest that increased trade will necessarily lead to a more labour-intensive composition of output in developing countries. This is mainly applicable to cases of inter-industry trade and far less relevant where there is intra-industry trade.⁴ Indeed, as Feenstra and Hanson have shown, it is possible in the latter case that, contrary to the orthodox Heckscher–Ohlin prediction, trade increases the demand for the scarce factor in developing countries.⁵ In any case, intra-industry trade may be more a reflection of economies of scale and product differentiation than of factor endowments. Once again we refer to the effects of changes in the weights of different branches of manufacturing on employment as the *composition* effect, irrespective of the factors that have contributed to such changes.

The final way in which international trade can impact on manufacturing employment is that it can lead to change within a sector, which affects the quantity and kind of labour

required to produce a given output. Within the standard trade theory such changes are due to a shift in relative factor prices brought about by changes in relative factor demand as the economy opens up (the Stolper–Samuelson effect). These in turn lead to factor substitution in production.

Industry-level impacts on employment may also occur via induced productivity effects, as firms shed labour in response to external competitive pressures, due either to greater export orientation or to increased import penetration (Greenaway *et al.*, 1999). Such a trade-induced productivity effect could be due to a decrease in X-inefficiency as trade reform leading to increased international competition brings about a reduction in “slack” in labour input (Horn *et al.*, 1996).⁶ It could also be due to trade-induced technological transfers (e.g. via an increase in the importation of capital goods). We refer to all these effects of trade on employment within industrial branches as the *process* effect of international trade.

In this paper, we attempt to assess the importance of the scale effect, the composition and the process effect of international trade on employment for the four countries under consideration. In order to do this, we need to implement a set of methodologies that allow us to capture all three effects.

3. The Methodological Approaches

The paper employs three commonly used methodological approaches to study the impact of international trade on employment. These are *factor content*, *growth accounting* and *labour demand* approaches.

3.1. Factor Content Approach

Factor content studies have been widely used both in order to test theories of international trade and to estimate the employment effects of trade, particularly between developed and developing countries.⁷ This approach allows us to examine whether a change in the structure of production as a result of greater outward orientation leads to an increase in the labour intensity of production and, hence, overall employment. It does this by computing direct and indirect labour requirements per unit of exports and import substitutes, with indirect labour requirements calculated using input–output tables. In this paper, we shall examine only the direct labour requirements per unit of exports and import substitutes, as we lack the requisite input–output tables for the countries in question for the more recent periods.

3.2. Growth Accounting Approach

Factor content studies consider only the impact of trade on employment, but growth accounting can be used to go beyond this to analyse the impact of different forces on changes in employment. This approach decomposes changes in employment into the effects of changes in domestic demand, exports, imports and productivity.

Starting from the basic accounting identity that

$$Q_{it} = D_{it} + X_{it} - M_{it}, \quad (2)$$

where D_{it} is domestic absorption of industry i at time t , Q_{it} is domestic production of industry i at time t , X_{it} is exports of industry i at time t and M_{it} is imports of industry i at time t .

Employment can be calculated as

$$L_{it} = l_{it}(D_{it} + X_{it} - M_{it}), \quad (3)$$

where L_{it} is employment in industry i at time t and $l_{it} = L_{it}/Q_{it}$.

Changes in employment between $t = 0$ and $t = 1$ can then be decomposed using the equation:

$$\Delta L_i = l_{i1}(1 - m_{i0})\Delta D_i + l_{i1}\Delta X_i + l_{i1}(m_{i0} - m_{i1})D_{i1} + (\Delta l_i)Q_{i0}, \quad (4)$$

where $m_{it} = M_{it}/D_{it}$.

The first term on the right-hand side measures the impact of changes in domestic demand on employment, the second the effect of changes in exports, the third the impact of changes in import penetration and the final term indicates the effect of productivity changes. This corresponds to a Chenery type of decomposition. This approach assumes that increases in exports create additional employment, while increased import penetration reduces employment.

The impact of exports and imports on employment can be decomposed further to separate out the scale and composition effects on employment. From Equation (4), the aggregate growth of employment over all i industries can be written as:

$$\Sigma \Delta L_i = \Sigma l_{i1}(1 - m_{i0})\Delta D_i + \Sigma l_{i1}\Delta X_i + \Sigma l_{i1}(m_{i0} - m_{i1})D_{i1} + \Sigma (\Delta l_i)Q_{i0}. \quad (5)$$

The second term on the right-hand side of Equation (5) can be rewritten as:

$$\Sigma l_{i1}\Delta X_i = l_{m1}\Delta X_m + (\Sigma l_{i1}\Delta X_i - l_{m1}\Delta X_m), \quad (6)$$

where l_m is the average labour coefficient for the manufacturing sector ($\Sigma L_i/\Sigma Q_i$), and ΔX_m is the total increase in manufactured exports ($\Sigma \Delta X_i$). The first term on the right-hand side of Equation (6) is the scale effect of export growth on employment, while the term in brackets represents the composition effect of exports. Both these terms could be further decomposed, but here we shall mention only the intuition behind such further decomposition. The contribution of exports to the growth of employment through the scale effect depends on the rate of growth of exports and on the share of exports in total output. The contribution via the composition effect depends on the relative labour intensity of exports compared to production overall and changes in the composition of exports towards more labour-intensive products.

The third term on the right-hand side of Equation (5), which measures the effect of changes in import penetration on employment, can also be decomposed in a similar way

$$\Sigma l_{i1}(m_{i0} - m_{i1})D_{i1} = l_{m1}(m_{i0} - m_{i1})D_{m1} + [\Sigma l_{i1}(m_{i0} - m_{i1})D_{i1} - l_{m1}(m_{i0} - m_{i1})D_{m1}]. \quad (7)$$

The first term on the right-hand side measures the scale effect of changes in import penetration, while the term in the square brackets measures the impact of changes in composition. As with exports, there are two factors that determine both the scale effect and the composition effect. The scale effect reflects the change in aggregate import penetration and the ratio of domestic absorption to domestic supply.⁸ Once more, the composition effect will depend both on the relative labour intensity of import-competing industries compared to domestic production as a whole, and the changes in the composition of imports towards more or less labour-intensive products.

The growth accounting approach has been subject to methodological criticisms, including the arbitrariness of the decompositions involved and the fact that, since they derive from basic accounting identities, they cannot be interpreted in a causal way (Martin & Evans, 1982). Moreover, as Wood (1994) has argued, part of the technological change that occurs may be defensive, where firms respond to increased competitive pressure from imports. Therefore, it is invalid to assume that reduced employment as a result of increased productivity is independent of trade. Nevertheless, despite these limitations, growth accounting has been used extensively in the literature, both in developed and developing countries, and as such provides a useful first approximation to considering the impacts of trade flows on employment. Furthermore, as shown above, growth accounting provides a useful way of separating out the scale effects from the composition effect of trade on employment.

3.3. *Labour Demand Modelling*

The first two approaches estimate the effect of international trade on employment via changes in the labour intensity of production *across* industries (as in the factor content approach) or via the expansion or contraction of output due to export expansion or import penetration (as in the growth accounting approach). However, as we have argued earlier, international trade can also lead to changes in the efficiency of labour use within the same industry. This can be captured by the estimation of labour demand equations at the industry level, where employment is regressed at the industry level against a number of explanatory variables, derived from a standard labour demand framework.⁹ This approach has been used by Hine & Wright (1998) and Greenaway *et al.* (1999) to analyse the impact of trade on employment in UK manufacturing and, in a developing country context, by Milner & Wright (1998) for Mauritius.

Consider a standard derived demand for labour equation at the industry level, augmented by a variable that captures the extent of integration of the industry with the world market

$$L_{it} = \alpha + \beta_1 W_{it} + \beta_2 Q_{it} + \varphi Z_{it}, \quad (8)$$

where L_{it} is employment in industry i at time t , W_{it} is real wage in industry i at time t , Q_{it} is real output in industry i at time t , and Z_{it} measures the degree of openness of industry i in time t .

We shall estimate the equations using the natural logarithms of L , W and Q , so that the coefficients on W and Q in Equation (5) can be interpreted as the wage and output elasticities of labour demand. As is standard in the literature, we capture the degree of openness (Z_{it}) by the import penetration ratio (IM) and the export–output ratio (EO) defined at the industry level (Hine & Wright, 1998; Greenaway *et al.*, 1999).¹⁰ The use of these two variables also allows us to separate the effects of import competition from export orientation on the efficiency of labour use. Thus, we can rewrite Equation (8) as:

$$L_{it} = \alpha + \beta_1 W_{it} + \beta_2 Q_{it} + \varphi_1 IM_{it} + \varphi_2 EO_{it}. \quad (9)$$

This approach can take account of the indirect impact of trade on employment via trade-induced productivity changes. In fact, since the output variable incorporates the direct effects of changes in exports and imports, the import and export penetration variables

capture the indirect effects. We would expect that $\beta_1 < 0$ and $\beta_2 > 0$. Also, following our discussion in the previous section, we would expect that $\varphi_1 < 0$ and $\varphi_2 < 0$.

We can write Equation (9) in first-difference form,

$$\Delta L_{it} = \beta_1 \Delta W_{it} + \beta_2 \Delta Q_{it} + \varphi_1 \Delta IM_{it} + \varphi_2 \Delta EO_{it}. \quad (10)$$

The labour demand equation as specified above is our preferred equation for estimation purposes as it allows us to assess the impact of a *change* in trade orientation on changes in employment, for given changes in output.

4. Trade Policy and Increased Openness in the Four Countries

Our choice of the four countries in the study has been guided by the fact that all the four countries witnessed significant changes in economic policy in the 1980s and 1990s and an increased degree of integration with the global economy. Vietnam and South Africa showed the most striking changes, with the disintegration of the communist bloc and the lifting of sanctions on South Africa ending their isolation from the global capitalist economy.

This was reflected in the significance of international trade in their economies.¹¹ Exports plus imports as a ratio of GDP is often used as an outcome-based measure of openness. We found that all four countries observed an increase in openness using this measure in the 1990s, with Vietnam showing the most spectacular increase (Figure 1).

This was partly a result of major trade reforms introduced during this period. Bangladesh established its first export processing zone (EPZ) in 1983 and a second one near Dhaka in 1993, to become an important supplier of garments to the world market. After 1991 import quotas were almost completely abolished and the average effective rate of protection (ERP) reduced from 75.7% in 1992/93 to 24.5% in 1999/2000 (World Bank, 1999). In the early 1980s, the Kenyan government embarked on a phased tariff reduction and a rationalization of tariff bands, followed in 1993 by the revocation of import licensing schedules (Glenday & Ryan, 2000).¹² In South Africa the ANC government, which came to power in 1994, undertook as part of its Uruguay Round commitments, to reduce industrial tariffs by a third, rationalize tariff lines and to convert quantitative restrictions into tariffs (WTO, 1998). Finally, Vietnam went from a centrally planned economy in which trade was managed through agreements with foreign governments to one where tariffs and, to a lesser extent, quotas were applied to imports. Despite reductions in tariff levels and quota coverage during the 1990s, Vietnam remains the most protected of the four economies, with an average ERP of around 50% (Institute of Economics, 2001, p. 15).

In addition to liberalizing imports, the two Asian countries have also strongly promoted exports. Bangladesh offers liberal incentives to firms to set up operations in the EPZs—in particular, a 10-year tax holiday, zero duties on the imports of capital and intermediate goods, and the full repatriation by foreign firms of the principal and profits generated in the EPZs. Vietnam has also adopted a number of measures, including import duty rebates for exports and the creation of EPZs. South Africa has not given as much emphasis to export promotion, ending the General Export Incentive System in the mid-1990s, while Kenya's attempts to develop EPZs have not been successful.

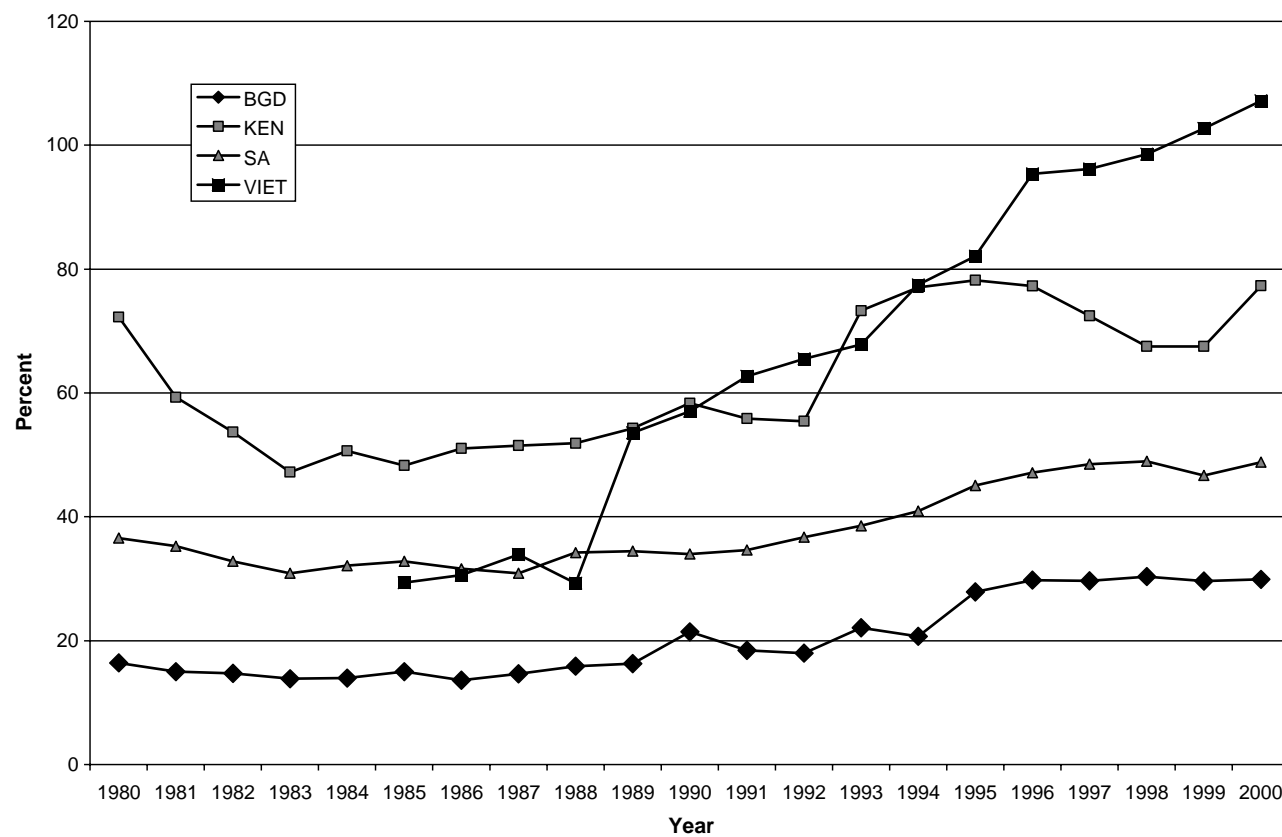


Figure 1. Openness (exports plus imports as a percentage of GDP). *Note:* Exports, imports and GDP are in constant local prices. *Source:* World Bank, *World Development Indicators* for Bangladesh, Kenya and South Africa, and World Bank data for Vietnam.

5. A Factor Content Approach

We begin this section by examining the factor intensity of manufacturing exports, as a prelude to the factor content calculations.¹³ In order to do so, we apply Krause's (1982) classification of ISIC manufacturing industries according to their dominant factor input.¹⁴ This distinguishes between natural resource-intensive, labour-intensive, technology-intensive and human capital-intensive industries. The natural resource-intensive industries are further subdivided into agricultural and mineral-based industries. Unskilled labour-intensive industries are those with the lowest value added per worker. The remaining industries are divided into technology-intensive and human capital-intensive, with the industries with a high ratio of R&D to value added being classified as technology-intensive.¹⁵

Looking at Table 1, there is a sharp contrast to be noted between the two Asian economies and the two African ones in the 1990s. The major share of exports in both Bangladesh and Vietnam is made up of unskilled labour-intensive products, whereas these account for less than 10% of South African exports and only 16% of Kenyan exports.

In Bangladesh the significant share of unskilled labour-intensive exports reflects the growth of the ready-made garment sector, which formed 72% of total manufacturing exports in 1996–98, as compared with 0.08% in 1976–80. This expansion in ready-made garments was made possible to a great extent by preferential treatment accorded to Bangladesh's exports by the European Union under the Generalized System of Preferences (GSP) scheme, and the substantial quotas made available in the US market, coupled with the imposition of quota restrictions by the Multi-Fibre Agreement (MFA) on Bangladesh's main competitors, mainly China and India (Spinanger & Wogart, 2000).

In Vietnam, manufactured exports are predominantly garments and footwear, which grew extremely rapidly during the 1990s. By the late 1990s, unskilled labour-intensive industries accounted for almost 60% of total manufactured exports as compared with between 10 and 15% during the 1980s. The share of human capital-intensive exports also increased during the 1990s, but from a very low base.

In the two African countries, the structure of exports has changed very little over the past two decades and the rate of growth has been much slower than in Bangladesh or Vietnam. Resource-based exports continue to be the leading sectors, with agriculture-intensive industries accounting for 65% of Kenyan manufactured exports in the late 1990s, while in South Africa agricultural and mineral-based manufactures were 45% of total exports. However, in neither of these countries has agricultural and mineral resource-intensive exports increased significantly over the period 1976–98, as a share of total manufacturing exports.

5.1. *Employment Coefficients of Exports and Import-competing Domestic Production*

The discussion so far has focused solely on the composition of exports. However, in order to examine the impact of trade on employment, we need to look at the labour intensity of both exports and imports. To do this, we derive employment coefficients at the industry level, which are then weighted by the share of each industry in exports and imports. We calculate employment coefficients separately for female and male labour, as there is micro-level evidence that labour intensity of production differs by gender in some of the sample

countries.¹⁶ The employment coefficients are presented in Table 2.¹⁷ We found that for Bangladesh and Vietnam, exports are significantly more labour-intensive than import-competing domestic production (Table 2). Furthermore, exports are far more intensive in female labour (both absolutely and relative to male labour) than import-competing domestic production. This implies that the increased openness witnessed in these two countries in the past decade has led primarily to greater employment opportunities for female workers. For Kenya, exports are marginally more labour-intensive than import-competing domestic production, with male labour being predominantly used in both types of activities. In South Africa, the overall labour intensity of exports is lower than for import-competing products, confirming the belief that South Africa's comparative advantage is not in labour-intensive manufactures. Finally, exports in Bangladesh and Vietnam are appreciably more labour-intensive in absolute terms than in Kenya and South Africa.

Table 1. Structure of total manufacturing exports

Percentage share (except total exports)	1976–80	1981–85	1986–90	1991–95	1996–98
<i>Bangladesh</i>					
Agricultural resource intensive	25.8	27.1	21.7	9.9	7.0
Mineral resource intensive	6.8	7.6	2.8	1.5	0.7
Unskilled labour intensive	63.8	62.3	72.8	84.7	89.9
Technology intensive	3.4	2.3	2.3	3.4	1.7
Human capital intensive	0.2	0.6	0.4	0.6	0.7
Total manufacturing exports (in US\$ million)	287.8	423.0	981.1	2340.3	4008.2
<i>Kenya</i>					
Agricultural resource intensive	65.8	64.8	73.9	63.4	64.7
Mineral resource intensive	16.8	15.6	2.5	3.2	4.2
Unskilled labour intensive	4.1	5.0	7.6	15.9	15.8
Technology intensive	8.5	10.0	11.7	13.1	8.6
Human capital intensive	4.9	4.6	4.4	4.4	6.8
Total manufacturing exports (in US\$ million)	285.9	283.9	319.8	384.9	403.2
<i>South Africa</i>					
Agricultural resource intensive	26.9	20.3	19.5	17.9	16.1
Mineral resource intensive	28.4	32.5	38.0	32.5	29.4
Unskilled labour intensive	4.8	6.5	6.6	9.4	9.9
Technology intensive	9.1	15.0	11.1	11.4	13.1
Human capital intensive	30.7	25.7	24.9	28.8	31.5
Total manufacturing exports (in US\$ million)	4432.6	4704.8	6640.0	8654.8	12643.7
<i>Vietnam</i>					
Agricultural resource intensive	63.5	83.9	80.6	38.6	21.0
Mineral resource intensive	5.9	2.4	1.2	4.3	2.1
Unskilled labour intensive	21.4	10.2	14.2	49.7	58.7
Technology intensive	6.8	2.4	1.5	1.9	5.6
Human capital intensive	2.3	1.1	2.5	5.6	12.7
Total manufacturing exports (in US\$ million)	34.6	56.2	210.8	1637.5	4941.4

Source: Own elaboration from International Economic Database, ANU.

Table 2. Employment coefficients of manufacturing exports and import-competing domestic manufacturing production (per million dollars of output)

	Exports	Import-competing
<i>Bangladesh (1997)</i>		
Female	131	7
Male	128	84
Total	259	91
<i>Kenya (1996)</i>		
Female	7	5
Male	30	30
Total	37	35
<i>South Africa (1996)</i>		
Total	16	21
<i>Vietnam (1998)</i>		
Female	156	49
Male	56	47
Total	214	96

Source: Own elaboration from International Economic Databank (IEDB), ANU and UNIDO data.

6. Decomposition of Employment Changes

As was seen above, there have been substantial changes in all four countries in terms of openness in recent years, with both exports and imports growing rapidly. A first stab at estimating the effects of increased openness on manufacturing employment can be made using a growth accounting methodology that divides employment changes over a period of time into those attributable to changes in domestic demand, exports, import penetration and productivity.

The employment decomposition was carried out for all four countries.¹⁸ For Bangladesh and Kenya the data used were the three-digit ISIC data for imports and exports from the International Economic Database at ANU, and UNIDO data on manufacturing output and employment, also at the three-digit level. In the South African case data from the Trade and Industrial Policy Secretariat (TIPS) Standardized Industrial Database were used, which had a similar level of disaggregation and had the advantage of extending up to 2001. Unfortunately, in the case of Vietnam, disaggregated data on industrial production were available only for the late 1990s.¹⁹

The analysis of the sources of employment growth in Table 3 reinforces the contrast between the two Asian and the two African economies, described in the previous section. In Bangladesh, there was a marked increase in the growth of manufacturing employment from the late 1980s. This was led by the growth in exports of labour-intensive manufactures and, to a much lesser extent, by the growth of domestic demand. Although import penetration increased somewhat in the 1990s, the net effect of trade on employment was highly positive, and although productivity growth partly offset the employment impact, the overall growth in jobs was considerable.

Manufacturing employment also grew in Vietnam during the 1990s and the data for the latter half of the decade indicate that, as in Bangladesh, this was driven primarily by exports, followed by the growth of domestic demand. The net effect of trade on employment was reduced by increased import penetration during this period, but was still

Table 3. Decomposition of manufacturing employment changes

	Total employment effect	Domestic demand	Productivity growth	Export growth	Import penetration	Net employment growth from trade
<i>Bangladesh</i>						
1975–80	55	3	18	60	–26	34
1980–85	56	75	–49	51	–21	30
1985–90	559	277	27	247	8	255
1990–97	864	435	–316	802	–57	745
<i>Kenya</i>						
1975–80	39	53	–23	4	5	9
1980–85	19	45	–43	5	12	17
1985–90	25	46	–37	3	13	16
1990–94	10	7	8	5	–10	–5
1994–98	10	–26	49	–8	–5	–13
<i>South Africa</i>						
1970–80	354	386	–160	16	112	128
1980–90	103	94	–69	64	14	78
1990–95	–125	123	–230	108	–126	–18
1996–2001	–169	14	–255	78	–6	72
<i>Vietnam</i>						
1995–99	340	435	–570	699	–224	475

Note: Figures in thousands.

Source: Authors' calculations, from industry and trade data.

highly positive. Overall employment creation was also reduced as a result of productivity growth.

Kenya, in contrast, experienced very limited manufacturing employment growth throughout the period, with a tendency to slow down in the 1990s. During the 1970s and 1980s, domestic demand was the main source of employment growth, followed by import substitution. During the 1990s, however, domestic demand growth slowed down and trade liberalization led to increased import penetration in the manufacturing sector without any compensating increase in employment being generated by exports. Unlike the other three countries, there was no increase in manufacturing productivity in Kenya during the 1990s, so that this factor did not contribute to a fall in employment.

The rate of growth of manufacturing employment in South Africa has declined, decade on decade, since the 1970s, turning negative in the 1990s. During the 1980s, the economic slowdown as a result of the increasing problems of the apartheid regime, and the increased difficulty of further import substitution, contributed to the slower rate of job creation. During the first half of the 1990s, as in Kenya, trade liberalization led to increased import penetration with negative effects on employment. The 1990s also saw exports become a more significant factor in employment generation than it had been in earlier decades. Between 1996 and 2001, export growth was sufficient to reverse the negative impact that trade had on employment in the first half of the decade. However, the substantial negative effect of productivity growth meant that total manufacturing employment fell significantly after 1990.

The two Asian countries that have succeeded in integrating into the global economy as exporters of labour-intensive manufactures enjoyed significant increases in industrial employment during the 1990s, whereas employment stagnated in Kenya and declined in South Africa. Whereas in the two Asian countries the impact of increased openness on employment has been positive, the net effect of trade on employment in the African countries has been less favourable. In Kenya, trade had a negative overall impact during the 1990s, as it did in South Africa during the first half of the decade. The South African picture between 1996 and 2001 was more favourable, but still a long way from the positive outcomes in Asia, particularly when the overall decline in manufacturing employment is taken into account.

Although manufacturing employment in South Africa declined during the 1990s, the data in Table 3 indicate that this was primarily a reflection of increased productivity rather than increasing trade. This is consistent with the findings of other studies on South Africa that show that within-sector changes, associated with technological change, are more important than structural changes, brought about by trade flows, in explaining the demand for labour (Bhorat, 2000; Edwards, 2001). It has also often been argued in the literature on trade and employment in the advanced industrial countries that technical change is a more significant factor than trade flows in explaining the decline in demand for unskilled labour.

Even in Bangladesh and Vietnam, where employment grew during the 1990s, the rate of growth was considerably lower as a result of productivity growth. If, as the decomposition analysis implicitly assumes, the different sources of employment growth were independent of each other, then this would not present a problem and the impact of increased openness on employment could be judged directly from the decomposition exercise. However, as we have argued earlier, there are strong reasons for supposing that there is a relationship between trade flows and productivity, and hence on employment. This question will be addressed in the next section.

6.1. *Separating out Scale and Composition Effects of Trade Changes on Employment*

As was shown in Section 3 of the paper, the overall impact of the different components of demand on employment can be separated into a scale effect and a composition effect. Further insights into the performance of the manufacturing sector in the four countries during the 1990s can be obtained by disaggregating the impacts of exports and import substitution to see the extent to which they reflect these changes.

The scale effects of exports on manufacturing employment reflect in part the competitiveness²⁰ of the manufacturing sector in a country (as indicated by the rate of growth of exports), which is in turn determined by policy which, together with geographical and other factors, influences the share of production that is exported. Scale effects of exports on manufacturing employment may also reflect higher-level compositional effects on the structure of total exports—in countries whose endowments in unskilled labour (relative to land) give them a comparative advantage in manufacturing, increased openness to trade can lead to an expansion of overall manufacturing output. As far as imports are concerned, scale effects are mainly policy related in that they reflect changes in import penetration that are affected by the trade regime and the trade deficit in manufactures, which is partly a result of policy (the macroeconomic position and its impact and the overall deficit) and partly reflects the competitiveness of the manufacturing sector.

Composition effects within the manufacturing sector reflect, to a large extent, comparative advantage. Exports will generate most employment when the country's exports are highly labour-intensive relative to its domestic production and where the share of labour-intensive exports is increasing. Conversely, if a country's comparative advantage is in capital-intensive industries, increased import penetration will displace more labour than is generated by an equivalent increase in exports, and this will be reinforced as the composition of imports becomes increasingly labour-intensive.

The easiest way to separate out the scale and composition effects of trade changes empirically is to compare the disaggregated estimates of employment creation with an aggregate figure calculated on the basis of data for the manufacturing sector as a whole. The latter figure gives an estimate of the scale effect of trade changes since, by its very nature, it abstracts from the sectoral composition of manufacturing output and trade. The composition effect can then be estimated as the difference between the aggregate manufacturing estimates and the sum of the disaggregated sectoral estimates.

Table 4 estimates the contribution of trade to manufacturing employment growth via the scale and the composition effects during the 1990s for the four countries. The effects of productivity growth and the overall rate of growth of manufacturing employment are also included in the table. To facilitate comparisons between countries and over different time periods, the average annual compound growth rate of employment relative to total employment in the base year has been calculated in each case.

In terms of overall manufacturing employment growth, Bangladesh shows the most impressive performance, increasing at over 9% per annum. Trade has had a significant positive effect both in terms of the scale of exports and the highly labour-intensive nature of these exports. In contrast Vietnam, which had an even more impressive performance in terms of the scale effects of exports, experienced a shift in composition away from the most labour-intensive sectors so that the overall impact of trade on manufacturing employment was less striking than in Bangladesh. Productivity also grew faster in Vietnam and this tended to dampen the rate of job creation.

Table 4. Scale and composition effects and manufacturing employment growth in the 1990s (per cent per annum)

	Trade effect scale	Trade effect composition	Productivity	Total employment
<i>Bangladesh</i>				
1990–97	5.2	3.8	– 5.1	9.1
<i>Kenya</i>				
1990–94	0.9	– 1.6	1.0	1.3
1994–98	0.2	– 1.7	5.7	1.2
<i>South Africa</i>				
1990–95	– 0.2	0.0	– 3.1	– 1.7
1996–2001	1.3	– 0.3	– 3.8	– 2.9
<i>Vietnam</i>				
1995–99	5.6	– 1.1	– 6.7	3.5

Note: The Table measures only the trade and productivity effects on employment growth and does not include the effect of domestic demand, so that the sum of the first three columns does not equal the total rate of growth of employment in the last column.

Source: As for Table 3.

As already noted, the two African economies performed far worse than their Asian counterparts. In Kenya, although there was a slightly positive scale effect as exports grew in the early 1990s and the level of import penetration declined slightly during the period, the composition effect was negative. In other words, as Table 2 indicates, Kenyan exports were only marginally more labour-intensive than its imports during this period. Moreover, import competition was increasingly felt in the more labour-intensive industries. The overall effect of trade on manufacturing employment in Kenya during the 1990s was negative and the only reason that employment overall did not fall was because of declining levels of productivity in manufacturing.

In South Africa, trade had a limited impact on manufacturing employment in the 1990s. Increased import competition meant that in the early 1990s the scale effect was negative, although this was reversed in the late 1990s. The composition effects of trade were negligible during this period, reflecting the fact that South Africa does not have a revealed comparative advantage in labour-intensive manufactures. As noted above, the major factor contributing to the decline in manufacturing employment in South Africa in the 1990s was the growth of productivity.

In terms of our earlier analysis, this suggests that Bangladesh has been successful both in terms of a policy of international competitiveness, which has led to rapid export growth, and in terms of its exploitation of a comparative advantage in labour-intensive products. Vietnam has also been highly successful in terms of international competitiveness, but has not been able to increase its specialization in labour-intensive sectors.²¹ Kenya, in contrast, has not performed well either in terms of its international competitiveness, or in having a comparative advantage in labour-intensive manufactures. Moreover, its poor productivity performance does not bode well for future competitiveness, although it shored up employment in the short term. Finally, South Africa does not have a comparative advantage in labour-intensive products, and its liberalization policy has not had a positive scale effect, although matters improved in the late 1990s. Productivity growth has been significant and this may hold out hope for increased competitiveness in the future.

7. Labour Demand Approach

The previous section examined the direct effects of international trade on manufacturing employment via trade-induced adjustments in output. In this section, we study the indirect impact of international trade on employment via changes in the efficiency of labour use. To capture the indirect effects of trade, we estimate constant-output labour demand equations at the industry level, augmented by variables that capture trade orientation.

The industry and trade data for the four countries are drawn from different sources and for different periods. For Bangladesh and Kenya, we obtained the three-digit ISIC industry data from UNIDO.²² In the case of Kenya, we had continuous data for 22 industries for 17 years for the period 1982–98. Thus, for Kenya, we could estimate Equation (10) using pooled time-series and cross-sectional techniques. In the case of Bangladesh, data for 25 industries are available until 1997; however, the years 1993, 1994 and 1996 are missing, as there were no industrial censuses conducted for these years. Here, we constructed a panel of 25 industries, the time periods being 1983, 1986, 1989, 1992, 1995 and 1997. The export and import data matched to the ISIC three-digit level were obtained from the International Economic Databank at the Australian National University.

For South Africa, industry and trade data at the ISIC three-digit level are available from the TIPS database. In the case of South Africa, we estimated Equation (10) using pooled time-series and cross-sectional techniques for the period 1982–2001 and for 28 industries. As noted earlier, industry data on Vietnam are available only for the period 1995–99. In this case, we estimated a cross-sectional regression for the 21 industries for which data are available.

The regression results for Bangladesh and Kenya are presented in Table 5 and those for South Africa and Vietnam in Table 6. We first discuss the results for Bangladesh (columns 1–3, Table 5). Owing to the lack of data for some years, we used a panel of five 3-year cross-sections. In column 2, we present estimates where we introduce industry-specific dummies to control for unobservable time-invariant differences across industries (such as in the rate of technological progress). Finally, in column 3, we add year dummies to capture economy-wide shocks to labour demand. We use one-period lagged values of *IM* and *EO* to allow for short-run rigidities in adjusting employment in a given year, and to control for possible endogeneity in the estimates of the import penetration and export orientation variables.²³ The coefficients on real output and real wage have the expected signs and are statistically significant in all cases. A 1% increase in output leads to a 0.5–0.6% increase in employment, and a 1% increase in the real wage rate leads to a fall in employment of between 0.34 and 0.46%. The sign on the import penetration variable is negative as expected, but only statistically significant at the 10% level in the third specification. Export orientation is also only statistically significant in column 3, but in this case it shows that increased export orientation tends to be associated with increased employment.

Moving on to Kenya, we estimate Equation (10) in column 4, adding industry and year dummies in columns 5 and 6. In general, the results are weak, with output and the wage rate not statistically significant. We also find that there is little evidence of increased international trade having any discernible effect on employment in Kenyan manufacturing, as neither lagged *IM* nor *EO* is significant at the 10% level.

We turn to the results for South Africa and Vietnam next (Table 6). For South Africa, we follow a similar procedure as in the earlier cases, with column 1 presenting estimates of

Table 5. Regression results—Bangladesh and Kenya^{a,b}

Variables	Bangladesh			Kenya		
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
ΔQ	0.61 (6.07)***	0.56 (5.57)***	0.49 (4.73)***	0.008 (0.56)	−0.005 (0.39)	0.009 (0.53)
ΔW	−0.46 (2.25)**	−0.43 (2.05)**	−0.34 (1.86)*	−0.04 (1.18)	−0.05 (1.56)	0.014 (0.21)
$\Delta IM(-1)$	−0.004 (0.51)	−0.004 (1.29)	−0.005 (1.92)*	0.00004 (0.36)	−0.0005 (0.47)	−0.0006 (0.43)
$\Delta EO(-1)$	0.007 (0.28)	0.014 (0.77)	0.025 (3.14)***	−0.026 (1.44)	−0.026 (1.42)	−0.022 (1.08)
Industry dummies?	Yes	Yes	Yes	No	Yes	Yes
Time dummies?	No	No	Yes	No	No	Yes
Method?	Panel of 3-year cross-sections ^c	Panel of 3-year cross-sections ^c	Panel of 3-year cross-sections ^c	Pooled time-series and cross-section	Pooled time-series and cross-section	Pooled time-series and cross-section
Number of industries (<i>i</i>) and time periods (<i>t</i>)	<i>i</i> = 25, <i>t</i> = 5	<i>i</i> = 25, <i>t</i> = 5	<i>i</i> = 25, <i>t</i> = 5	<i>i</i> = 22, <i>t</i> = 17	<i>i</i> = 22, <i>t</i> = 17	<i>i</i> = 22, <i>t</i> = 17
Adjusted <i>R</i> -square	0.54	0.45	0.58	−0.02	0.012	0.009
<i>SE</i> of regression	0.4914	0.5345	0.4698	0.1047	0.1027	0.1028
<i>DW</i> statistic	1.99	2.27	2.67	1.91	2.09	2.13

^a ΔL is the dependent variable.^b All standard errors are White (1980) heteroskedasticity consistent.^c The periods are 1983–86, 1986–89, 1989–92, 1992–95 and 1995–97. Note that the last period covers 2 years.

*, ** and *** denote statistical significance at the 10, 5 and 1% levels, respectively.

Table 6. Regression results—South Africa and Vietnam^{a,b}

Variables	South Africa			Vietnam
	Column 1	Column 2	Column 3	Column 4
ΔQ	0.16 (3.92)***	0.15 (4.09)***	0.15 (3.46)***	0.45 (3.37)***
ΔW	−0.07 (1.42)	−0.06 (1.62)*	−0.06 (1.92)*	−0.0002 (1.25)
ΔIM	—	—	—	−0.04 (2.33)**
$\Delta IM(-1)$	−0.002 (2.37)**	−0.002 (2.33)**	−0.003 (2.90)**	—
ΔEO	—	—	—	0.13 (1.12)
$\Delta EO(-1)$	−0.001 (1.90)**	−0.0009 (1.18)	−0.00005 (0.06)	—
Industry dummies?	No	Yes	Yes	—
Time dummies?	No	No	Yes	—
Method?	Pooled time-series and cross-section	Pooled time-series and cross-section	Pooled time-series and cross-section	Cross-section
Number of industries (<i>i</i>) and time periods (<i>t</i>)	<i>i</i> = 28, <i>t</i> = 20	<i>i</i> = 28, <i>t</i> = 20	<i>i</i> = 28, <i>t</i> = 20	<i>i</i> = 21
Adjusted <i>R</i> -square	0.05	0.13	0.21	0.16
<i>SE</i> of regression	0.065	0.063	0.060	0.118
<i>DW</i> statistic	1.73	1.97	2.08	—

^a ΔL is the dependent variable.^b All standard errors are White (1980) heteroskedasticity consistent.

*, ** and *** denote statistical significance at the 10, 5 and 1% levels, respectively.

Equation (10) first, and then adding industry dummies and year dummies in columns 2 and 3, respectively. We find that the results are strong and robust across all three estimates. An increase in output of 1% leads to an increase in employment of 0.15%, while an increase in real wage of 1% leads to a fall in employment of 0.06%. Import penetration has a discernible negative impact on employment across all three estimates—the coefficient on $IM(-1)$ is statistically significant at the 5% level. Export orientation also leads to a fall in employment in the ordinary least squares estimate of Equation (10), though this effect washes out with the industry and time dummies. On the whole, the evidence for South Africa is that international trade has had a negative impact on employment via an increase in trade-induced productivity. Given the existence of unionized labour and high rates of protection in the South African case prior to trade reforms, such a finding is not surprising.

In view of the consistent statistical significance of the results for import penetration in South Africa, it is interesting to consider the quantitative impact of this indirect employment effect. Between 1990 and 2001 the import penetration ratio for the manufacturing sector increased from 16 to 26%. From Table 6, column 3, the coefficient on the lagged import penetration variable is 0.003, so that a 10% increase in import penetration would lead to a fall of 0.03 in the log of employment. In 1990, manufacturing employment in South Africa was 1 558 210, so that this would imply a reduction in employment of just over 46 000. While this figure needs to be treated with caution, it does give an idea of a plausible order of magnitude.

This figure represents the indirect effect of increased import penetration on employment reflecting rationalization leading to increased labour productivity, which is in addition to the direct effects as a result of domestic production being displaced by imports. In order to put this into perspective, the direct effect of import penetration on employment in South Africa in the 1990s was a job loss of 130 000 (see Table 3), so that the rationalization effect increased job losses by about a quarter. However, compared with the total decline of employment attributable to productivity growth of almost half a million over this period, only around 10% appears to be explained by increased import competition (see Table 3). This is consistent with the findings of a firm level study of South Africa, which found that trade liberalization was one of a number of factors causing firms to reduce employment in the 1990s (Edwards, 2003).

The estimates for Vietnam are presented in column 4. Owing to the relatively short period for which data are available for Vietnam, and the lack of annual data on wages by industry, a panel was not worthwhile, and only cross-section regressions have been estimated. The rate of growth of wages from 1995 to 19999 was obtained by extrapolating industry-level estimates of changes in total earnings per person employed between 1995 and 1998. The lack of a more suitable proxy may account for the lack of significance of the wage variable in the regression, although it does have the expected negative sign. As in the South African case, the share of imports in Vietnam has a negative effect on employment, again supporting the view that greater openness may have had an indirect impact on employment in the industries most affected.

8. Interpretations and Conclusion

This paper has examined the effect of international trade on manufacturing employment in four developing countries utilizing a variety of approaches. It has shown that it is not possible to generalize about the impacts of closer integration with the global economy on

manufacturing employment since this is highly context dependent. International trade seems to be associated with the net creation of jobs in Bangladesh and Vietnam, with female workers being the key beneficiaries. In contrast, international trade has been associated with adverse employment outcomes in Kenya and South Africa. In the Kenyan case, there has been a net decline in manufacturing employment due to falling exports and increasing import penetration in the 1990s. In South Africa, there has been a relatively small net increase in jobs via a scale effect of export expansion. However, this has been dominated by job losses due to a significant increase in labour productivity since the mid-1990s. Our econometric results suggest that increased import penetration may have been a causal factor for such a productivity increase. Thus, the net effect of international trade on manufacturing employment in South Africa is ambiguous.

Although the research on which this paper is based was not primarily designed to analyse continental differences in the impact of openness on manufacturing employment, the striking contrast between the two Asian and two African countries included make it worthwhile considering whether they are indicative of such regional contrasts, and if so, whether any light can be thrown on the causes of such differences. Previous studies have pointed to sharp differences in the labour market outcomes associated with closer integration with the global economy amongst East Asian and Latin American countries (Robbins, 1996; Wood, 1997). More recently, Wood (2002) has suggested that the African economies are similar to the Americas, implying that a similar contrast can be drawn between African and Asian economies.

A number of possible explanations of the contrast between East Asia and Latin America have been put forward. One view emphasizes differences in factor endowments, with Latin America being relatively abundant in natural resources/land, while the East Asian countries were abundantly endowed with unskilled labour. A second interpretation emphasizes the later integration of the Latin American economies and the increasing significance of skill-biased technological change, which limited the demand for unskilled labour in the 1980s and 1990s compared to the 1960s and 1970s when the East Asian countries broke into world markets for manufactured goods. Moreover, since the 1980s, it is often argued, the rapid growth of China as a producer of labour-intensive manufactures has made it difficult for other countries to compete in such industries, which again limits potential employment creation for countries integrating with the global economy in recent years.

The fact that this study compares countries that have globalized during similar periods immediately suggests that explanations which depend on timing will not account for differences in employment impacts between the Asian and African countries studied. However, this still leaves open competing explanations for the contrasting experiences of the two regions.

The interpretation that stresses differences in factor endowments between the two regions is supported by the evidence in Section 5 of the paper, which shows that manufactured exports from Bangladesh and Vietnam are highly labour-intensive, both compared to their imports and absolutely compared to the two African economies. However, the evidence presented in Table 4 shows that although in Bangladesh changes in the composition of manufacturing as a result of trade contributed significantly to the overall growth of employment, this was not the case in Vietnam.

Table 4 also shows that the main factor accounting for differences in the impact of trade on manufacturing employment in Asia compared to Africa was the differential effects on

the size of the manufacturing sector, with the Asian countries showing much larger increases. The evidence presented in Section 6 does not explain these differences. It is of course consistent with a factor endowment story at a higher level where the African economies have abundant endowments of natural resources/land while the Asian countries have abundant labour. Increased trade would then lead to the growth of manufacturing in Asia, while in Africa growth would be concentrated on primary commodities. While this is consistent with the experience of the two Asian countries where the share of manufacturing in GDP increased, it is less consistent with the experience of the two African countries where the weak performance of manufacturing has been replicated in the primary sector.

Table 7 indicates that the share of manufacturing in value added in goods (i.e. GDP excluding services) in fact increased during the 1990s in all four countries and that the most significant increase occurred in Kenya. The Table further shows that the share of manufactures (broadly defined) in total exports increased in three of the four countries in this period, with South Africa showing the most significant increase. The Kenyan figures are more consistent with a shift in resources towards exports of primary products, although as just noted this is not reflected in changes in GDP shares. Moreover, the share of resource-based manufactures within total exports of manufactures declined between the late 1980s and the late 1990s in both Kenya and South Africa (see Table 1).

This evidence indicates that the poor performance of the manufacturing sector in the two African countries has not been compensated by increased output of primary products. It also suggests that differences between the two Asian and the two African countries in terms of the scale effect of manufacturing growth on employment were not a reflection of a shift away from manufacturing towards primaries in the African countries.

The alternative interpretation emphasizes the growing competitiveness of the manufacturing sector in the Asian countries in contrast to Africa. Some evidence of this is provided by the rapid growth of productivity in the two Asian countries compared to declining labour productivity in Kenya and moderate growth in South Africa during the 1990s (Table 4). Other studies have also pointed to the lag in productivity and competitiveness in Kenya and South Africa compared with some Asian countries.²⁴ The fact that poor performance in manufacturing in the African countries is not offset by a booming primary sector suggests that problems of competitiveness in the region are not confined to industry. There are many possible causes for such differences in competitiveness, which include government policies, institutions and location factors that have not been explored in this paper.

Table 7. Share of manufacturing in output and exports, 1990, 2000 (per cent)

	Share of GDP excluding services		Share of exports of goods	
	1990	2000	1990	2000
Bangladesh	25.3	30.0	79.2	85.9 ^a
Kenya	24.4	33.8	38.4	23.2 ^a
South Africa	52.9	54.1	29.7	56.3
Vietnam	26.8	30.3	47.6 ^b	63.1

^a 1998.

^b 1994.

Source: Own elaboration from World Bank, *World Development Indicators 2004* and country data.

Once it is recognized that the impacts of trade on employment in manufacturing can differ significantly between developing countries there is a strong need for further country case studies using similar approaches to see whether certain regional patterns are in fact generalizable and, if so, what explanations can be offered to account for inter-country differences in outcomes.

Notes

- ¹ For reviews of this literature, see Cline (1997) and Lawrence (1996).
- ² See Rama (2003) for a recent review of the limited research in this area. In addition to Ghose (2003), two other studies that examine the trade-manufacturing employment relationship in the developing country context are Revenga (1997) for Mexico and Moreira & Najberg (2000) for Brazil.
- ³ This is the assumption made by the individual country studies in the NBER project on trade and employment led by Krueger, and is a fairly plausible assumption for most low-income developing countries.
- ⁴ Strictly speaking, intra-industry trade would not lead to any change in the composition of output because imports and exports are in the same industry. In practice, however, if intra-industry is defined in terms of relatively broad industrial categories while a more detailed classification of production is used, then it is possible for intra-industry trade to have some impact on the composition of output and hence on employment.
- ⁵ In their model the factors of production are unskilled and skilled labour and they show trade increasing the demand for skilled labour in the less developed country (Feenstra & Hanson, 1996).
- ⁶ That trade reforms often lead to productivity gains in the manufacturing sector is well documented in the literature—see Levinsohn (1993) and Harrison (1994).
- ⁷ For reviews of such studies, see Wood (1994, chapter 3) and Lawrence (1996, chapter 2).
- ⁸ The intuition here is that a high ratio of domestic absorption to domestic supply will tend to magnify the effects of changes in import penetration (which is measured in relation to domestic absorption) on employment that is related to domestic production (supply).
- ⁹ There have also been firm-level econometric studies of trade–employment linkages, but these are not discussed here.
- ¹⁰ We define the import penetration ratio for a particular industry as its imports as a ratio of domestic demand (i.e. imports + output – exports); while the export–orientation ratio is exports as a ratio of output.
- ¹¹ The main emphasis of the paper is on the impact of trade rather than trade *liberalization* on employment. This is a broader question that focuses on changes in a country's integration with the global economy rather than just on its trade policy, although of course trade policy is a factor that affects trade flows. A similar point is made with reference to the literature on trade and poverty in UNCTAD (2004, part II, chapter 1).
- ¹² Rodrik (2000) classifies Kenya as among the 10 countries with the largest proportionate cuts in tariff since the early 1980s.
- ¹³ It should be noted that the paper uses the International Standard Industrial Classification (ISIC) definition of manufacturing, which is broader than the Standard International Trade Classification (SITC) and includes processing of many primary products.
- ¹⁴ The trade data for the four countries came from the International Economic Database of the Australian National University and have been reclassified from COMTRADE data according to the International Standard Industrial Classification (ISIC Rev. 2). Since the trade data are only available at the four-digit level and in a small number of cases Krause used a five-digit classification, we have had to modify his groupings slightly.
- ¹⁵ A more conventional trade theory approach could regard both these categories as capital-intensive.
- ¹⁶ The years were chosen such that these were the most recent for which data on female and male employment were available for most industries. Unfortunately, data on employment were not available for South Africa by gender.
- ¹⁷ To compute the employment coefficients, we use employment per dollar of output rather than per dollar of value added as the export and import figures are in gross terms.

- ¹⁸ One limitation of the data used for this exercise is that they cover only employment in the formal manufacturing sector. In the case of South Africa where the industrial census covers firms of all sizes and the informal sector is relatively small, the data cover 80% of all manufacturing employment as measured in the Labour Force Survey, which includes informal employment, in 2001. In Vietnam too, most manufacturing employment is in the formal sector and the data cover 86% of the broad figure for manufacturing derived from the 1999 population census, which includes informal manufacturing. In Bangladesh, where the size of the informal manufacturing sector is considerable, employment in the formal manufacturing sector comprises 42% of all manufacturing employment according to the 1995–96 Labour Force Survey. In Kenya, comparable figures are not available as the data on employment do not distinguish between the rural and urban informal sectors—in 1998, 50% of all employment was in the formal sector.
- ¹⁹ Gross output and employment data came from GSO (2000) and export and import data for 1999 from GSO (2001). The trade data for 1995 were calculated by Mekong Economics by reclassifying data from the Vietnam trade database from the HS system to the ISIC.
- ²⁰ The term “competitiveness”, while widely used in the business literature, remains controversial, particularly amongst trade economists. For a discussion of these issues and a defence of the concept of competitiveness, see Lall (2001).
- ²¹ This is somewhat surprising given the difference in labour intensity between exports and import-competing products in Vietnam, as indicated in Table 2. The data here cover only a relatively short period in the late 1990s and, as Table 1 indicates, the sharp rise in the share of unskilled labour-intensive products in Vietnam’s exports took place in the early 1990s, so that the picture for the 1990s as a whole might indicate a more significant impact of exports on employment through the composition effect. However, in another paper one of the authors has shown that composition effects have had a relatively limited impact on manufacturing employment in Vietnam compared to scale and process effects for the 1990s as a whole (Jenkins, 2004).
- ²² The wage and output data in UNIDO are in nominal values—in the absence of price data at the ISIC three-digit level, we deflated nominal output data by the GDP manufacturing deflator of the country in question.
- ²³ For example, positive shocks to productivity leading to a fall in employment may lead to a fall in import penetration or an increase in export orientation (via a fall in the price of the industry’s product).
- ²⁴ See Dollar & Zeufack (1999) quoted in Kingdon *et al.* (2005) for a comparison between firms in Kenya and Thailand, and Edwards & Golub (2004) for a study of South Africa.

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