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Employment Outcomes and Export Orientation of Firms in Kenya's Manufacturing Sector

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THE KENYA INSTITUTE FOR PUBLIC POLICY RESEARCH AND ANALYSIS (KIPPRA)

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Research and Analysis

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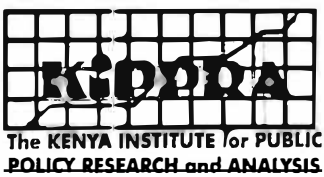

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Abstract

Kenya's manufacturing sector accounts for over 10 per cent of GDP. Intensification of trade liberalization reforms in the 1990s saw the share of exporting firms increase. This seems to have coincided with a rise in use of temporary workers compared to permanent workers. Given the high level of unemployment and widespread poverty, the implications of such employment outcomes cannot be over-emphasized. Little attention has been given to Africa's trade and employment outcomes. This paper explores the employment outcomes in relation to firms' export-orientation. The main sources of data are the surveys undertaken under the World Bank's project on "Regional Programme on Enterprise Development" (RPED) in early 1990s and in 2003.

The analysis shows that the proportion of exporting firms in the manufacturing sector increased, with over 50 per cent of firms exporting their product(s) in 2003. Use of temporary workers also increased, with 36 per cent of workers being casual and part time employees. In general, there has been a shift towards a more skilled labour force, which is slightly higher for exporting (78%) than non-exporting firms (68%). Employment is male-dominated (over 80% are male), with exporting firms having a relatively higher proportion of female workers.

Export-oriented firms employed more workers, on average, but the gap has narrowed. Taken together, the proportion employed by exporting firms declined from an average of 76.2 per cent in early 1990s to 54.2 per cent in 2003. Results of regression analysis show that exporting does not significantly influence the proportion of casual or permanent workers. Although using panel data estimation techniques based on survey data from the early 1990s suggested a positive relationship between exporting and casual employment, the empirical evidence regarding the extent to which exporting determines composition of casual workers in the workforce is weak. Arguably, other factors such as deregulation of labour market policies and high unemployment are likely to have exacerbated use of non-standard forms of employment. In addition to job creation, the government should direct attention towards the quality of jobs created.

Abbreviations and Acronyms

AGOA	African Growth and Opportunity Act
CBS	Central Bureau of Statistics
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
EPZs	Export Processing Zones
KMES	Kenya Manufacturing Enterprise Survey
LFS	Labour Force Survey
OLS	Ordinary Least Squares
RPED	Regional Programme on Enterprise Development
SNA	System of National Accounts
H-O	Heckscher-Ohlin

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1. Introduction

The 1990s witnessed comprehensive implementation of trade liberalization reforms in Kenya. A major component of the reforms was a policy shift from import-substitution to export-promotion strategy, and removal of tariff and non-tariff barriers to trade. Trade liberalization aimed at increasing trade openness, enhancing enterprise efficiency and export growth, leading to growth in employment and economic growth.

Kenya's manufacturing sector is the main means for the country's integration into world markets. The sector is fairly large by East African region standards, accounting for over 10 per cent of Gross Domestic Product (GDP). It is one of the major sources of income particularly in urban areas. The sector has the highest backward and forward linkages in the economy (Wanjala and Kiringai, 2007) and is, thus, critical in achieving the country's development objectives. Besides the domestic market, the manufacturing sector also produces for export market under the Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC), and African Growth Opportunity Act (AGOA) trading arrangements and is subject to foreign competition. A major component of the output has traditionally been in agro-processing industries. Increased investment in textile industries under Export Processing Zones (EPZs) mainly target the US market.

While promotion of trade-induced export-led economic growth has received due attention in Kenya, its implications on employment outcomes is often ignored. The high unemployment especially in urban areas, insecure jobs and declining earnings for less skilled labour remain a major challenge to development and poverty reduction initiatives. There has been concern that some of the trade liberalization reforms might have led to greater casualisation of the work force (Manda, 2002). Most of these employment effects seem to have been witnessed in the manufacturing sector during the period of intense trade liberalization. Surveys of the manufacturing sector in Kenya conducted in the early 1990s show that manufacturing is characterized by increased use of temporary (casual and part-time) labour contracts. Often, this category of "irregular" or flexible workers operate without security and non-wage employment benefits.[1] Poor working conditions, long working hours, poor remuneration and lack of access to employment benefits such as

[1] Such forms of employment are also referred to as "non-standard forms of employment" or "precarious employment".

medical allowances are some of the concerns that have been raised. These have implications for poverty, especially in the urban areas where such forms of employment are becoming prevalent. To the extent that women are relatively unskilled and form a cheap source of labour, they are likely to be the most affected by adverse changes on the labour market. However, there has been little analytical work on these issues.

Using the manufacturing sector as a case study, this paper investigates the extent to which the emerging employment patterns, in terms of use of different labour categories (casual versus permanent/regular; skilled versus unskilled) can be attributed to the firms' export-orientation,[2] taking into consideration the different sectors in the manufacturing industries. The empirical evidence for the paper derives from survey data collected on a number of manufacturing firms in Kenya under the World Bank's project on "Regional Programme on Enterprise Development (RPED)" in the early 1990s and in 2003.

[2] The term 'export orientation' as used in this paper refers to the exporting status of a firm, i.e. whether a firm exports or not.

2. Overview of Employment Structure in Kenya

2.1 General Employment Structure

Table 2.1 shows an overview of employment growth in formal and informal sectors since independence. While formal sector employment has been on the decline, informal sector employment has grown rapidly at an average of 39 per cent during 1990-1995 and 13 per cent during 1996-2000.[3] Growth in total wage employment declined from an average of 3.8 per cent during 1964-1989 to 1.3 per cent during 2001-2005. The decline in employment was partly attributed to the collapse of private firms and retrenchment due to stiff competition from imports following trade reforms, the public sector reform programme of the 1990s and the decline in economic growth (Manda, 2002; Government of Kenya, 2002). Figure 2.1 shows that growth in formal sector employment seems to have followed the decline in economic growth, particularly since around mid 1980s.[4]

Table 2.1: Average growth in formal and informal sector employment (%)

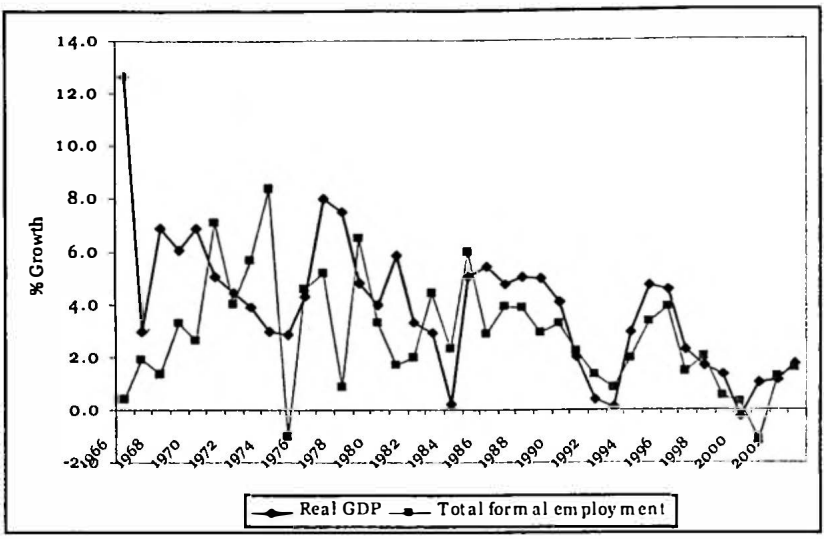
	1964-73	1974-79	1980-89	1990-95	1996-00	2001-05
Public sector	6.2	6.1	4.9	0.1	-0.5	-1.1
Private sector	1.2	2.9	2.3	4.0	3.0	2.8
Total wage employment	3.6	4.2	3.5	2.1	1.5	1.3
Informal sector	-	23	13	39	13	8.8

Source: National Development Plan 2002-2008, Statistical Abstract 2004 & Economic Survey 2006

[3] It is difficult to get precise estimates of the informal sector, given its diversity. The numbers reported for the latter years are projections given by the Kenya National Bureau of Statistics (KNBS) based on estimates from the 1998/99 Labour Force Survey together with the 1999 Population and Housing Census projections for the labour force (Government of Kenya, 2005). In addition, growth rates in informal sector employment should be interpreted with care since definitions and coverage of informal sector have changed over time. The sector covers all small-scale activities that are not registered with the Registrar of Companies, and generally use low level or no technology.

[4] The national accounts data for 2004 onwards is based on the new System of National Accounts 1993, which was recently adopted by CBS. Since there are a number of changes in the computation of GDP, the new data series is not directly comparable with the previous series.

Figure 2.1: Growth in real GDP and formal employment, 1966-2003

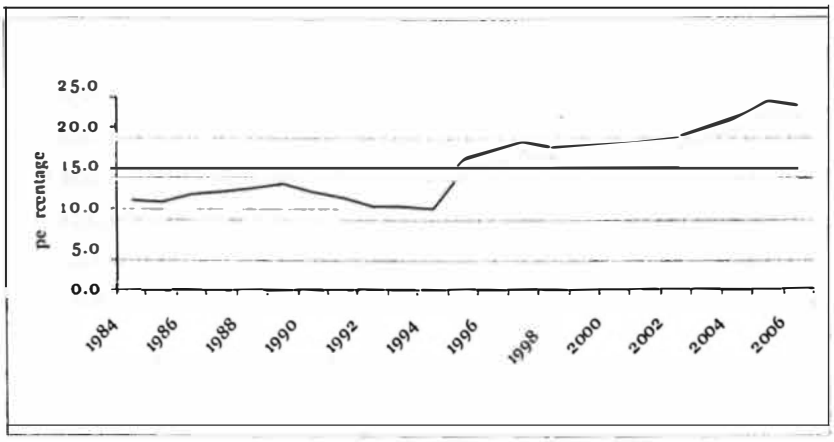


Source: Author's computation from Government of Kenya Economic Survey (various)

Formal wage employment declined from 76.2 per cent in 1989 to 23.6 per cent in 2003 while the share of the informal sector in total employment outside small-scale agriculture increased from 21.3 per cent to 75.5 per cent over the same period. Most of those retrenched (both from private and public sectors) ended up in the informal sector, leading to a further surge.

The relationship and contrast between formal and informal sectors is no longer straightforward as it seemed in the 1970s (King, 1996). It was argued that the formal sector, mainly concentrated in urban centers, offered 'real jobs' and better prospects for workers. However, the formal sector also engages informal activities or utilizes informal labour arrangements, e.g. reliance on casual or seasonal workers by most firms, a dimension of informalization that has hardly been given due attention. Available data shows that casual employment as a proportion of total wage employment has been rising since around 1994 (Figure 2.2), relative to regular or permanent employment, whose share declined from 87 per cent in the early 1990s to 79 per cent in 2004. Casual employment as a percentage of wage employment increased from an average of 13 per cent in the first half of 1990s to 21 per cent in the period 2001-2006. Unfortunately, the secondary data is not disaggregated by sectors, making

Figure 2.2: Casual employment as % of total wage employment



Source: Author's computation from Economic Survey (various)

it difficult to disentangle the proportion of casual employment in the manufacturing sector.

Formal sector employment is male-dominated, and women currently constitute about 30 per cent. The recent increase in female wage employment has largely been in casual employment; casual female employees as a percentage of total casual employment increased to 34 per cent in 2004 from 32 per cent in the previous year. Women are mostly engaged in activities traditionally dominated by females (domestic services, teaching/education, clerical, etc) while men are relatively evenly distributed across sectors. Besides the informal sector, agriculture, particularly small-scale agriculture, has continued to be the main source of employment. Data from the Labour Force Survey of 1998/99 shows that rural areas absorbed 70.1 per cent of the employed persons, where the majority are engaged in farm-related activities.

2.2 Employment in the Manufacturing Sector

Employment creation has been at the centre of Kenya's economic policy, in which manufacturing sector is expected to play a critical role. The formal manufacturing sector comprises large and small to medium industries, but employment statistics for the sector are scanty. Moreover, the estimated employment data largely capture the formal employment, and is not disaggregated by various sub-sectors. Estimates show that total wage employment increased from 148,700 persons in 1983 to

253,800 persons in 2006, a 71 per cent increase (Table 2.2). EPZs have been the main driver of employment creation in the manufacturing industry since the late 1990s. Employment of locals increased 4 times from 6,487 persons in 2000 to 26,447 persons in 2002, and to 37,325 persons in 2006. Employment in EPZs accounted for 16 per cent of total employment in the manufacturing sector in 2004, but the number of people employed declined from 39,111 persons in 2003 to 37,325 persons in 2006.

Informal manufacturing activities continued to create more jobs than the modern sector. As seen in Table 2.2, the number of persons engaged in informal manufacturing activities is estimated to have increased from 418,300 in 1993 to 1,532,400 persons in 2006. Overall, the manufacturing sector has the second highest number of people engaged in informal activities after wholesale and retail trade, hotels and restaurants sector.

The manufacturing sector employment is male-dominated, with over 80 per cent of those employed in wage employment being men (Table 2.2). However, there is a general rise in the share of female employment relative to male employment since mid 1990s, having increased to 18 per cent in 2006.

Table 2.2: Employment in the manufacturing sector

Year	Wage employment '000s	% female (in wage employment)	Employment in informal manufacturing activities ('000s)
1983	148.7	9.3	
1984	153.1	9.8	
1985	158.8	9.9	
1986	164.8	10.3	
1987	168.6	10.2	
1988	177.4	10.2	
1989	182.8	9.8	
1990	187.7	10.7	
1991	188.9	11.3	
1992	190.3	11.5	
1993	193.5	12.0	418.3
1994	197.6	12.2	492.4
1995	204.8	15.1	616.9
1996	210.5	16.1	710.9
1997	214.5	16.3	803.1
1998	216.9	16.6	779.9
1999	219.6	17.1	861.8
2000	217.9	17.2	943.2
2001	216.6	17.5	1,029.8
2002	229.8	17.4	1,121.0
2003	239.9	17.4	1,236.1
2004	244.5	17.4	1,318.5
2005	248.4	17.5	1,434.0
2006	254.9	18.0	1,532.4

Source: Government of Kenya Economic Survey (various)

3. Trade and Employment: Theory and Evidence

3.1. Theoretical Literature

Much of the available literature is discussed in the context of developed countries, based on the concern that demand for unskilled labour has fallen substantially, relative to skilled labour, leading to increased wage inequality. At the heart of this shift lies the competing forces of globalization: trade and trade liberalization, and skilled-biased technology. One hypothesis is that expansion of trade has led to this phenomenon (Wood, 1994; 1995; 1998). The alternative view emphasizes the role of skilled-biased technological change, and attribute a greater role to technology than to trade in explaining changes in the wage and employment structure (e.g. Autor *et al.*, 1998; Berman *et al.*, 1998; Katz and Murphy, 1992). These two views have been used to explain the decreased demand for unskilled labour. However, Wood (1995) observe that, "however one looks at it, trade and new technology are intertwined: no story that excludes one or the other of them is likely to be the whole story" (p.62).

The main theoretical framework for the analysis of international trade impact on labour market outcomes has been classical Heckscher-Ohlin (H-O) model, with skilled and unskilled labour as the two factors and North (developed) and South (developing) as the two countries. According to the theorem, a country has a comparative advantage in the good that intensively uses the country's relatively abundant factor. The model predicts an increase in wage inequality between less-skilled and more-skilled in developed countries, but decreasing wage inequality between these two groups in developing countries following increased trade between developed and developing countries (Sen, 2001). Trade with the South causes the North to specialize in the production of skill-intensive manufactures in which it has a comparative advantage. The Stolper-Samuelson theorem is the theoretical underpinning in the H-O framework, such that under perfect competition and perfectly mobile factors across industries, international trade fully determines national factor prices. Any trade-induced change in a country's product prices (e.g. through reducing trade barriers) alters the relative profit opportunities facing the price-taking firms, who respond by shifting their resources towards the industries whose relative profitability has increased. In turn, this leads to an increase in demand for factors used relatively intensively—abundant unskilled labour in the case of developing countries.

The H-O model has come under increasing criticism, particularly in terms of its applicability and relevance to developing countries (South) given its extreme assumptions. Additionally, issues of casualization of labour are not given due attention. The model also ignores the fact that globalization has been accompanied by significant technological differences between countries. Wood (1994; 1997) argue that international trade may have adverse effects on wages and employment of unskilled workers by bringing about technological change that leads to displacement of unskilled workers and/or by increasing the own-price employment elasticity of unskilled workers, therefore making such workers more vulnerable to economic shocks. The H-O theory is mainly discussed in the context of analysis between the North (developed countries) and the South (developing) at the macro level, hence leaving out meso or micro-level issues. The H-O model highlights importance of factor endowments for trade at a broad country or sector level and are not really designed to explain workforce composition at the firm-level. They also make a strong assumption of homogenous firms.

At the micro level is the firm-level theory, which emphasizes (observable) firm-level factors. Firm-level literature mainly explores exporting behaviour and the learning-by-doing hypothesis in relation to the positive link between exporting and productivity.[5] Generally, exporting firms have been found to have higher productivity and more human capital than non-exporting firms. One argument has been that increased openness through trade liberalization in a developing country affects the skill structure of labour demand—e.g. due to changing the production technology through importation of advanced capital goods, which increases productivity and raises demand for skilled labour.

The firm-level models are of particular interest to the study, which is based on firm-level datasets. Issues of workforce composition and how they relate to trade orientation are not emphasized in the firm-level literature. Feder (1982) argues that greater competition in export markets forces firms to be more flexible, adaptable and innovative while inducing better and more efficient use of their resources. Trade liberalization may also affect the efficiency with which firms use factors, thereby reducing labour demand, or it may also induce discipline effects in the case of wage determination (Milner and Wright 1998; Mouelhi, 2005). In many

[5]Learning-by-doing, i.e. if repetition of certain productive activities resulted in these activities becoming more productive, is also one way through which technology has been endogenized in trade models.

situations, firms or multinational corporations seek low-cost and 'flexible' labour relations in their production operations (Heintz and Pollin, 2003; Beneria 2001). They have shifted to informal employment arrangements and exacerbated use of precarious types of employment (Carr and Chen 2002; Beneria 2001). Labour costs have become an immediate and easy target for cost reductions aimed at boosting profits (Mangan, 2000).

These developments have resulted in significant changes in production, firm structure and employment conditions, ranging from down-sizing and outsourcing to changes in work organization, skill requirements and composition of workforce (Beneria, 2001). Cappelli (1999) observes that this changed relationship has led to new management practices that stress labour force flexibility. The old social contract between employers and workers based on stable employment and loyal dependency on the firm is being replaced by a much less stable workforce with unstable forms of employment (Beneria, 2001), a move towards *casualization* of labour. The fastest growing part of the labour force in many countries, including Kenya, has been in informalized work or temporary and part-time employment. Mangan (2000) has advanced some theoretical arguments concerning the increased incidence of non-standard work, and observes that for each individual firm, non-standard employment requirements will vary with size, type of productive process, nature of product(s) sold and the competitive environment. For instance, smaller firms are more attracted to the potential for cost savings offered by non-traditional employment or fearful of the legal implications of hiring traditional workers. Institutional factors such as easing of restrictive labour laws in some countries has had the effect of aiding the growth of non-standard forms of employment (Mangan, 2000). Demand-side factors relate to globalization, i.e the growth in global competition and the rate of technological change, creating a climate where labour market flexibility thrives.

Broadly, three approaches to workforce adaptability have been identified; numerical flexibility, functional flexibility and reward or wage flexibility. In practice, some of these approaches overlap. A brief description of each is given in Box 1.

3.2 Survey of Empirical Literature

Most of the empirical literature on trade and labour market outcomes typically focus on developed countries, and recently on East Asia and

Box 1: Principal forms of securing flexibility

At the firm level, there are three principal means of securing flexibility (Michie and Sheehan, 2003):

Numerical flexibility is the ability of firms to change the number of people they employ by making use of part-time, temporary and seasonal employees (whose contracts can be terminated using liberal provisions on hiring and dismissals), and short-fixed term contracts, freelance work, homework or outwork. Other quantitative changes include hours of work.

Functional flexibility is the ability of firms to vary the amount of labour they use without resorting to external labour market and is accomplished primarily by having a labour force that is able to carry out a wide range of tasks. This could involve use of high skills or high-quality labour. Specific features include broadening job design and job boundaries, as well as mobility across tasks.

Wage or reward flexibility is the ability of pay and payment systems to respond to labour market conditions and to reward and encourage improved performance (e.g. performance-related pay) (see also Beatson, 1995).

Latin America. Empirical evidence on the African continent is severely limited. For example, in a review of literature on globalization and labour market outcomes in the South, Sen (2001) provides only two empirical studies in Africa—for Morocco by Currie and Harrison (1997) and Mauritius by Milner and Wright (1998). Wood (1998)'s review of empirical evidence in developed countries suggests that most of it is consistent with the hypothesis that the main cause of the rise in labour market inequalities is trade (globalization). Bhorat and Lundall (2004) find evidence (though based on a restrictive sample of 11 countries none of which is in Africa) of increased skill intensity in terms of relative demand for non-production workers (at national and within manufacturing sector) in the late 1990s. They conclude that developing countries increased their preference for non-production (or highly skilled) workers relative to production (or less skilled) employees during the 1990s.

At the micro or sectoral level, there has been a growing empirical literature examining different aspects of firm behaviour, especially exporting behaviour and the productivity link. RPED survey data organized by the World Bank in early 1990s have been widely used to research on a variety of issues, including export participation. Bigsten and Söderbom (2005) provide an excellent review of research results from studies based on RPED surveys, focusing on firm performance with respect to firm growth, investment, technology acquisition and exports. The most striking general result is the substantial heterogeneity in performance across firms within countries. African firms are typically atypical.

Using RPED data for a sample of African countries, including Kenya, Bigsten *et al.* (2004) and van Biesebroeck (2005) conclude in favour of a positive exporting effect on productivity. Van Biesebroeck (2005) shows that there are important feedback effects from exporting to productivity, which go beyond self-selection and show that the finding is robust to the choice of econometric methodology. Based on Kenyan survey data, Kimuyu (1999) also concludes that efficiency is the outcome of a learning process. Enterprises that are active in export market are more productive. Other studies on export intensity/exporting behaviour in Kenya include those by Söderbom (2000), Bigsten *et al.* (1999; 2000) and Graner and Isakson (2002).[6] Söderbom (2000) uses years of education and tenure and technical efficiency, level of employment, the replacement value of capital stock, firm age, location and other control variables as explanatory variables for export participation. The regressions are estimated for Ghana, Kenya and Zimbabwe. Employment variable is found to be only significant for Kenya, but human capital is not significant. Using Kenyan data, Kimuyu (1999) finds that labour intensive firms are more likely to export, and also export a greater share of their production than other enterprises. Söderbom (2004) investigates key aspects of firm performance—productivity, firm growth, exports and earnings in Kenyan manufacturing sector over 1999-2002. Among other things, he finds that the decision to export is significantly determined by firm size (employment level) and concludes that if firms could grow, exports would too.

[6] There are also various studies based on Kenya's RPED data that focus on other issues such as finance, access to credit, earnings, among others.

The studies on export behaviour and productivity effects, however, hardly explore employment dynamics between exporting and non-exporting firms or how the productivity effects are linked with employment of different categories of workers. What some of these studies show is a causation from employment to exporting, but they do not explore causation from exporting to employment. The analysis of labour issues from the RPED survey data in Bigsten and Söderbom's (2005) review is limited to labour (unit) cost as a measure of global competitiveness which, as cited by Bigsten and Söderbom (2005), has been refuted by Eifert *et al.* (2005), among others.

Among studies that directly address employment issues is one for Tunisia by Mouelhi (2005), who investigates the impact of trade liberalization on firm's labour demand. Mouelhi (2005) uses effective rate of protection to measure effects of trade policy. Estimating the equation for total labour, unskilled and skilled labour using micro data for the period 1983-1994, Mouelhi finds that a reduction in the protection rate is associated with an increase in labour demand and that unskilled employment is relatively more responsive to changes in protection levels than skilled employment, implying that reduced protection would enhance employment as standard trade models would predict for unskilled-labour intensive firms in a developing country. However, disaggregation by type of firm shows that decreases in protection rate were associated with significant decreases in employment (for domestic-oriented firms).

Revenga (1997) analyzes the effect of the Mexican trade liberalization of 1985-87 period on employment and wages in the manufacturing sector and finds that trade liberalization put downward pressure on employment and wages by shifting down industry product and labour demand and, by extension, had additional negative effect on firm-level employment and wages. For an average tariff reduction of 20 percentage points, the implied wage response was on the order of 5 to 6 per cent. In terms of skill composition, firms with a higher proportion of skilled (non-production) workers manifested much stronger rent sharing than those with a higher fraction of unskilled (production) workers.

Milner and Wright (1998) investigate labour market adjustment to trade liberalization by estimating dynamic models of employment and wages for importable and exportable sectors based on a panel of manufacturing industries (1968-1991) in Mauritius. They find some support for the theoretical predictions of differential responses between

sectors—exportables employment rises (both in the long run and short run) while wages fall in the short run and rise in the long run. Contrary to prediction of theory, employment in importables is maintained (even increases slightly), and wages and employment move together in the short run and long run. Milner and Wright also insert trade variables (export-output ratio and import-output ratio) directly into employment and wage equations and find no significant impact of the export variable on employment. By contrast, they find evidence of a negative import effect; that is, greater import penetration lowers the level of labour demand. They interpret this as evidence of the disciplinary effect of trade. Both studies do not focus on composition of employment. Greenaway *et al.* (1999) conducted a similar study for United Kingdom (UK) and found a negative effect of both import and export penetration on labour demand in the manufacturing industry.

There is paucity of empirical studies that analyze determinants of composition of employment, especially with regard to growing forms of non-standard forms of employment such as use of casual workers. Mangan and Williams (1999) investigate the determinants of composition of casual employment in Australia using industry-level data. They find the proportion of casual employment within an industry to be inversely related to the proportion of employees who are members of a union, but positively related to other variables such as proportion of older employees.

Studies that attempt to directly address employment issues in relation to trade in Kenya are by Sen (2002), Manda (2002 and 2004) and Manda and Sen (2004). Sen (2002) uses highly aggregated industry-level data covering 1975-98 period to study the impact of trade on manufacturing employment in Kenya (and Bangladesh), without divulging the effects on different labour categories and forms of employment. Moreover, most of the dataset covers the import substitution period when the economy was relatively closed. Based on descriptive analysis, Manda (2002; 2004) shows that there has been an increase in demand for skilled labour and increased use of part time and casual workers (during the reform period 1970 to 1990s) but do not consider or empirically assess factors that could account for such trend. Combining the two sets of studies, Manda and Sen (2004) use factor content, growth accounting and regression analyses, and conclude that the effect of trade on employment has been unambiguously negative in the 1990s.

4. Methodology

The method of analysis is largely quantitative, based on firm-level data from Kenya's manufacturing sector. This entails exploratory analysis and empirical estimation of employment equations as modelled below.

4.1 The Model

The two principal methodologies or approaches used in investigating employment effects of increased trade at a macro level are factor content and growth accounting. These approaches normally rely on aggregate industry-level data, which may conceal effects at the firm level. There are some studies that use regression-based techniques, the majority of which are based on data from developed countries. This paper adopts a similar approach, grounded in a model of labour demand, with firm's demand for labour as a derived demand. A similar approach has been used by Greenaway *et al.* (1999) in the context of a developed country (UK), and by Milner and Wright (1998) in the context of industrializing economy (Mauritius 1998). However, both use industry-level data rather than firm-level data.

To derive the employment equation, a Cobb-Douglas production function for a representative firm is assumed:

$$Qi = A^{\lambda} K_i^{\alpha} L_i^{\beta} \qquad (1)$$

where Q =real output; K = capital stock; L = units of labour utilized; α, β represent the factor share coefficients whereas λ allows for factors changing the efficiency of the production process. One assumption is that the technical efficiency of the production process increases over time and that the rate of technological adoption is correlated with trade changes, implying that parameter A in the production function varies with trade variables.

A profit-maximizing firm will employ labour and capital such that the marginal revenue product of labour (MRP_L) equals the wage (ω) and the marginal revenue product of capital (MRP_K) equals the user cost (c). Marginal products of labour and capital are derived by differentiating equation (1) with respect to labour and capital, respectively. These are then multiplied by unit price (p) to obtain MRP_L and MRP_K as below:

$$MRP_L = p\beta A^{\lambda} K_i^{\alpha} L_i^{\beta-1} = w \qquad (2)$$

$$MRP_K = p\alpha A^{\lambda} K_i^{\alpha-1} L_i^{\beta} = c \qquad (3)$$

Solving this system simultaneously for K allows us to eliminate capital from the expression for firm output in equation (1). The resultant expression is given as:

$$Q_i = A^{\lambda}\left(\frac{\alpha L_i}{\beta}\frac{w}{c}\right)^{\alpha} L_i^{\beta} \qquad (4)$$

By taking logarithms and rearranging equation (4), we derive the firm's derived demand for labour as:

$$InL_i = \phi_0 + \phi_1 In\left(\frac{w}{c}\right) + \phi_2 InQ_i \qquad (5)$$

where

$$\phi_0 = -(\lambda InA + \alpha In\alpha - \alpha In\beta)/(\alpha+\beta)$$
$$\phi_1 = -\alpha/(\alpha+\beta)$$
$$\phi_2 = 1/(\alpha+\beta)$$

Assuming that A varies with trade, the common way of capturing trade impact on employment in literature is by import penetration (imports as a ratio of domestic demand) and export penetration (export-output ratio) defined at the industry level.[7] Since such data may not be easily available at the firm level, trade impact at the firm level is captured in terms of exporting status of the firm (as is often the case).[8] Letting vector X denote trade-related variables (e.g. whether a firm exports or not), the basic estimable equation is of the form:[9]

$$InL_i = \phi_0 + \phi_1 Inw_i + \phi_2 InQ_i + \phi_3 X_i + \phi_4 F_i + u_i \qquad (6)$$

where:

L_i = *total employment in firm* i

w_i = *average real wage in firm* i

Q_i = *real output in firm* i

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[7] Milner and Wright (1998) alternate import and export penetration with aggregate real trade values (of imports and exports) in the estimation.

[8] Percentage of output exported would also have been a good indicator of export orientation. Unfortunately, this variable was not available for all the datasets used.

[9] Normally, similar studies assume perfect capital markets such that the user cost of capital will only vary over time, so that in the estimation its variation is captured by time dummies, and hence its elimination from the equation (Greenaway *et al.*, 1999; Milner and Wright 1998, among others).

X_i=trade-related variables (i.e. exporting status of the firm)

F_i= firm specific variables such as location and sector dummies

In reality, workers are not homogeneous since firms employ workers on different terms and of different skills. Of interest in this paper are the factors explaining the composition of the workforce, i.e. proportion of non-standard forms of employment such as casual workers. Therefore, an equation for proportion of casual workers in the workforce, L^c is specified, with relative wage, w^c (wage of casual workers relative to total wage) as one of the explanatory variables. In the review of the theoretical literature, it was noted that such forms of non-standard employment vary with factors such as size, type of productive process and the competitive environment in which they operate. Mode of operation (whether a firm operates more than one shift or not) and number of competitors (whether a firm has over five competitors) are included as proxy variables for production capacity and competitive environment in which firms operate, respectively. These are denoted P_i and C_i, respectively. In addition to the variables specified above, these variables are included as possible explanatory variables to obtain,

$$L^c{}_i = \sigma_0 + \sigma_1 \omega^c{}_i + \sigma_2 InQ_i + \sigma_3 X_i + \sigma_4 F_i + \sigma_5 P_i + \sigma_6 C_i + e_i \quad (7)$$

Unionization is included in the above equation as one of the explanatory variables. Mangan and Williams (1999) incorporate similar variables like proportion of employees in the industry that are union members as one of the possible determinants of casual employment in Australia. Given the possibility that some firms were interviewed more than once, the above equations can be re-specified by incorporating a time dimension, in which case panel data assumptions and techniques are employed in the estimation.

4.2 Data

The data used for analysis is from the RPED surveys conducted in 1993-1995 and 2003. The first set of RPED datasets consists of a three-year panel of firms surveyed in February-March 1993, May-June 1994 and August -September 1995. A total of 276 firms were interviewed at least once. 224 firms were interviewed in 1994, 216 in 1994 and 218 in 1995.

The surveys covered firms in four manufacturing sub-sectors—food, textile, wood and metal—in four major urban centres in Kenya (Nairobi, Mombasa, Nakuru and Eldoret). The four sectors comprised about 73 per cent of manaufacturing employment, providing a reasonably comprehensive picture of the manufacturing sector in Kenya. The sample predominantly consists of formal sector firms (about 75%) located in Nairobi. The formal firms were chosen randomly from the CBS master file of registered firms. The informal sector firms were randomly selected from a sample frame constructed by undertaking a primary listing of firms in the four sectors. For a detailed description of the Kenyan RPED data, see Aguilar and Bigsten (2002).

The second set of data is the RPED Survey 2003. This was a result of a partnership between Kenya Institute for Public Policy Research and Analysis (KIPPRA) and the World Bank's RPED. The sample was drawn from a census conducted by CBS of nearly 2000 formal manufacturing firms (Blattman *et al.*, 2004). This survey had more sub-sectors: agro-industry, wood and furniture, textile and garments, metal, chemical and paints, construction, plastics, printing and publishing.[10] 368 firms were selected randomly from the clusters, representing about 20 per cent of all formal firms. However, only 282 firms completed the survey in the end, perhaps due to survey fatigue (Blattman *et al.*, 2004). The data used in this study have been cleaned from observations that could be seen to be erroneous or incomplete.

4.3 Methods of Analysis

Besides conducting exploratory analysis, a combination of estimation techniques is used in the empirical estimation of employment equations for robustness. Estimations were done using Ordinary Least Squares (OLS) method unless otherwise specified. However, it is worth noting that OLS estimations based on pooled cross-section data ignore unobserved effects. Arguably, firms with high quality managerial skills, for example, can easily venture into the world market, hence enhancing exporting opportunities. Pooled OLS estimator can be used to obtain

[10] For ease of comparison where necessary, these are re-classified under the four sectors (food, wood, textile and metal and chemicals) plus the additional one; paper, printing and publishing. This classification matches that used in the earlier surveys as much as possible. The food sector includes agro-industries and bakeries; wood, include furniture and construction materials. Textile includes textile and clothing, garments and leather. Metal and chemicals cover metal, chemicals, paints, machinery, and plastics.

consistent parameter estimates under the assumption that if there is unobserved firm heterogeneity, it is not correlated with the observed explanatory variables. However, if unobserved effect is correlated with any of the observed explanatory variables, then pooled OLS will be biased—a straightforward example of missing variable bias (Wooldridge, 2002).

In a bid to overcome these limitations, an attempt is made to estimate employment equations using panel data techniques, albeit based on a short period (the early RPED surveys of 1993-1995), since 2003 survey covered different firms. Panel data techniques control for unobserved individual firm heterogeneity, allowing for ability to study dynamic relationships and take care of omitted-variable estimation bias. There are two methods of estimating panel data models: fixed effects and random effects methods. The key issue is whether the unobserved effect is correlated with the explanatory variables. Fixed effects model assumes that unobserved effects (omitted variables) differ between cases (in this case across firms) but are constant over time. However, the limitation of using a fixed effects estimator is that it is not possible to estimate coefficients on time-invariant variables (such as location and sector dummies), and all inference is conditional on the unobserved effects in the sample.

The random effects approach assumes that the unobserved effects are not correlated with the explanatory variables, but are random and can vary over time, and thus treats them as part of the error term.

Some of the potential econometric problems given the type of data are heteroskedasticity and endogeneity problems. Heteroskedasticity occurs often in cross-section data. This is addressed using the commonly applied White's heteroskedasticity consistent standard errors approach. In the firm-level literature, endogeneity between firm size (employment level) and exporting is often assumed in export determination equations. The question is whether this should be the case in regard to proportion of casual workers (or proportion of permanent workers) and exporting. To establish, a test for endogeneity is conducted using Durbin-Wu-Hausman chi square test (and Wu-Hausman F test). The method of Instrumental Variable (IV) (more generally 2 Stage Least Squares) provides a general solution to the problem of endogeneity (Wooldridge, 2002).

5. Empirical Results

This section provides analytical results on employment outcomes in relation to the exporting status of firms. A detailed descriptive analysis is provided before proceeding to econometric investigations.

5.1. Firms' Export Orientation

Export orientation is measured in terms of whether a firm exports its products or not. Table 5.1 shows the proportion of exporting firms (by sector) for the different surveys undertaken over time. Export participation increased dramatically between 1995 and 2003 for all sectors, particularly the textile sector.[11] Overall, the proportion of firms directly exporting their product(s) increased from 21.5 per cent in 1993 to over 50 per cent in 2003. Based on the earlier surveys (1993-1995), the metal sector had the highest proportion of exporting firms, followed by the food sector. However, the 2003 survey data show that the textile industry had the highest proportion of exporting firms (69.2%), followed by metal (and chemicals) (56.6 %), printing and publishing (52.9%), wood (and construction)(50.0%) and food (and agro-related)(43.8%) sector, respectively.[12] This notable increase in export orientation can be attributed to increased trade openness, following the implementation of trade liberalization reforms and export promotion programmes such as the introduction of EPZs (in the early 1990s) and the AGOA initiative (in 2000), which have particularly spurred exports in the textile and garments industry. The textile sector was one of the most highly protected sectors under the import substitution strategy. By 1993/94, most of the reforms had or were just taking effect and impact on exports had just begun.

Unlike the earlier surveys, the 2003 survey had more sub-sectors. At least 50% of the firms in 7 out of the 9 sub-sectors were exporting their product(s). Textile as well as chemical and paints industries had the highest percentage of exporting firms (74% each), followed by garments (61.5%), construction (59%), printing/publishing (55%), plastics (54.2%), wood (50%), agro-based industries (54.7%) and metal (43.7%). In all the surveys, Nairobi had the highest proportion of exporting firms

[11] Includes garments sector.

[12] The 2003 Survey had nine sub-sectors, which have been re-classified (Table 5.1) to map the four sectors in the earlier surveys.

Table 5.1: Proportion (%) of exporting firms by sector

Sector	1993	1994	1995	2003
Food	24.5	26.5	29.6	43.8
Textiles	13.6	18.4	23.1	69.2
Wood	15.3	18.6	15.5	50.0
Metal	34.0	30.4	37.0	56.6
Printing & publishing				52.9
All	21.5	23.5	26.2	54.2

Source: Author's computation from RPED surveys

followed by Mombasa. Exporting is positively related to firm size (based on the level of employment). In all the surveys, over 63 per cent of large scale firms (with 100 and above employees) exported their product(s). This could be due to scale economies associated with large firms.

5.2 Composition of the Workforce

Table 5.2 shows the breakdown of total employees by employment status.[13] Over time, there has been a consistent rise in the use of temporary forms of employment (part-time workers and casual workers).[14] This is evidenced by the increase of part time and casual workers, both as average number of workers and as a percentage of total workers. This may have been largely undertaken as a cost-cutting strategy as the latter usually do not enjoy fringe benefits and other employment benefits such as severance pay, medical allowances, etc. On average, the number of part-time workers per firm more than tripled from 9 in 2000 to 29 in 2003. There was a decline in the average number of full time permanent or regular workers between 1993 and 1994 and between 1995 and 2000,

[13] Unfortunately, the data is not disaggregated by gender.

[14] Casual workers often have no formal or lon term employment contract with the employer and their services may be done away without notice. Part time workers are usually not employed full time but may be engaged by firms from time to time or for short periods, e.g. during peak seasons. The definition here is slightly different from conventional use of the term where people work part time by choice and usually have other job(s). According to the Kenya labour force survey 1998/99, a person hired more than three months would fall under casual workers. In both cases, payment is often at end of day or week or piece rate.

Table 5.2: Number and proportion of employees per firm by employee status

Average no. of workers	RPED 1993	RPED 1994	RPED 1995	KMES 2000	RPED 2003
Part-time workers	0.3	2	8	9	29
Casual workers	23	21	24	39	57
Permanent workers	93.7	57	63	56	117
All workers	117	80	95	104	202
Sample size (n)	222	21 4	218	224	260*
% of total workers					
Part-time workers	1	3	3		11
Casual workers	27	27	30		25
Permanent workers	72	70	67		64
Total	100	100	100		100

Source: RPED Surveys, with KMES 2000 obtained from Manda and Sen (2004), Table 7.
** of this sample, 4 firms did not indicate the disaggregation of workforce.*

but 2003 survey data shows an increase.[15] However, the percentage of permanent workers show a decline from 72 per cent in 1993 to 64 per cent in 2003, in comparison to the share of part time and casual workers, which increased to 36 per cent from 28 per cent.

5.2.1 Employee status by firm size

The earlier surveys (1993-1995) generally show that casualisation is inversely related to size, i.e. the proportion of casual and part time workers is relatively high among micro and small firms compared to medium to large firms.[16] Arguably, it is small firms that would find it relatively harder to compete and would, therefore, want to rely more on

[15] Responses to separate questions on the number of permanent employees (by employee type, age and education) showed variations ranging from 98 to 109. On average, firms reported that they had only 62 full-time paid employees when they started operations in Kenya.

[16] Firm size is defined as follows: micro (less than or equal to 5 workers), small (6-20 workers), medium (21-99 workers and large (100 and more workers).

the use of flexible and cheaper forms of employment to cut on costs. On the other hand, given that most of the large firms also export, high turnover of workforce can affect quality and hence export performance. Appropriate balance of regular and casual workers could be a key consideration. However, more recent data (2003 survey) seem to indicate that the proportion of casual and part time workers is now rising with the firm size, with about 39 per cent of workers in large firms working as part time and casual workers, compared to 35 and 32 per cent among small and medium firms. Basically, over one-third of workers in medium and large-scale firms fall under precarious forms of employment.

5.2.2 Composition of workforce by exporting status of firms

Table 5.3 shows summary statistics of categories of workers by exporting status, based on 1995 and 2003 survey data. Both surveys show that exporting firms employed more workers than non-exporting firms (regardless of employee category). As already indicated, exporting firms are generally large, employing over 50 employees. In 1995, exporting firms employed an average of 58 full-time casual workers and 29 part-time workers compared to non-exporting firms, which employed 12 and 1 workers of the two categories, respectively. Between 1995 and 2003, the average number of permanent workers hired by exporting firms decreased from 176 to 151 while that of casual and part time increased to 75 and 44, respectively (Table 5.3). Generally, there were wide variations across exporting firms than non-exporting ones, as depicted by big standard deviations, particularly for 1995 data.

Additionally, exporting firms fired or laid off relatively higher number of workers and hired more workers in the previous year, which might be due to high turnover of workers. However, mean permanent employees hired by exporting firms in the previous year show a decline from 16 in 1995 to 11 in 2003. Exporting firms hired three times more casual and part time workers in the previous year than non-exporting firms. During peak season, exporting firms hired more additional full-time workers and part-time workers.[17]

[17]This question was not disaggregated into permanent full-time and casual full-time.

Table 5.3: Summary statistics for different employee categories by exporting status of firms

	Exporting firms		Non-exporting firms	
1995	Mean	Std dev.	Mean	Std dev
All workers	263	444	35	65
Casual	58	120	11	25
Part-time	29	186	1	5
Permanent	176	319	23	48
Permanent hired previous year	16	32	2	4
Permanent fired previous year	8	22	3	20
Additional fulltime during peak season	44	193	3	9
Additional part time during peak season	6	12	2	3.8
2003				
All workers	268	353	128	241
Casual	75	171	37	109
Part-time	44	155	12	61
Permanent	151	237	80	154
Permanent hired previous year	11	25	4	20
Permanent fired previous year	6	16	2	5
Casual workers hired	71	163	24	57
Casual workers laid off	10	34	3	9

Source: Author's computation from RPED surveys

Exporting firms generally account for a larger proportion of employment in the manufacturing sector. Table 5.4 shows that exporting firms absorbed a far much higher percentage of (all) workers relative to non-exporting. However, the data shows a declining trend, from 78.5 per cent in 1993 to 54.2 per cent in 2003, with a rising proportion of workers in non-exporting firms. Thus, although the proportion of exporting firms increased between 1990s and 2003, contribution of exporting firms to total employment in the manufacturing sector failed to grow as would be expected. This seems to be in line with the shrinking job opportunities that have generally been experienced in the economy in the recent past. Table 5.4 and Figure 5.1 indicate that casualisation phenomena or use of non-standard forms of employment is not restricted to exporting firms only, though exporting firms, as already demonstrated, employed the largest number of casual workers by virtue of their large firm size. The 1993 and 1995 data show that non-exporting firms had a higher proportion of casual and part time workers (30% and 35%, respectively). However, the proportion of casual and part time workers

Table 5.4: Percent of total, casual and permanent workers by exporting status of firms

	Exporting	Non-exporting
1993		
Casual & part time	18	30
Permanent	82	70
% of total workers	78.5	21.5
1994		
Casual & part time	31	30
Permanent	69	70
% of total workers	76.5	23.5
1995		
Casual & part time	25	35
Permanent	75	65
% of total workers	73.8	26.2
2003		
Casual & part time	37	35
Permanent	63	65
% of total workers	54.2	45.8

Source: Author's computation from RPED surveys

employed by exporting firms increased from 26 per cent in 1995 to 37 per cent in 2003 (Table 5.4 and Figure 5.1).

5.2.3 Employee characteristics by sector

Table 5.5a and Table 5.5b show average number and proportion of different categories of employment by sector (based on 1995 and 2003 surveys, respectively). In 1995, the textile industry employed the highest number of workers followed by food sector, metal and wood, respectively. The textile sector also had the highest number and proportion of permanent full-time workers. On the other hand, metal sector, which also had the highest proportion of exporting firms in 1995, had the highest number and proportion of full time casual workers, followed by textile industry. The food sector ranked first in terms of number and proportion of casual and part time workers followed by metal industry. The standard deviations are generally big, showing the wide variations across firms

Figure 5.1: Composition of employment by exporting status of firm

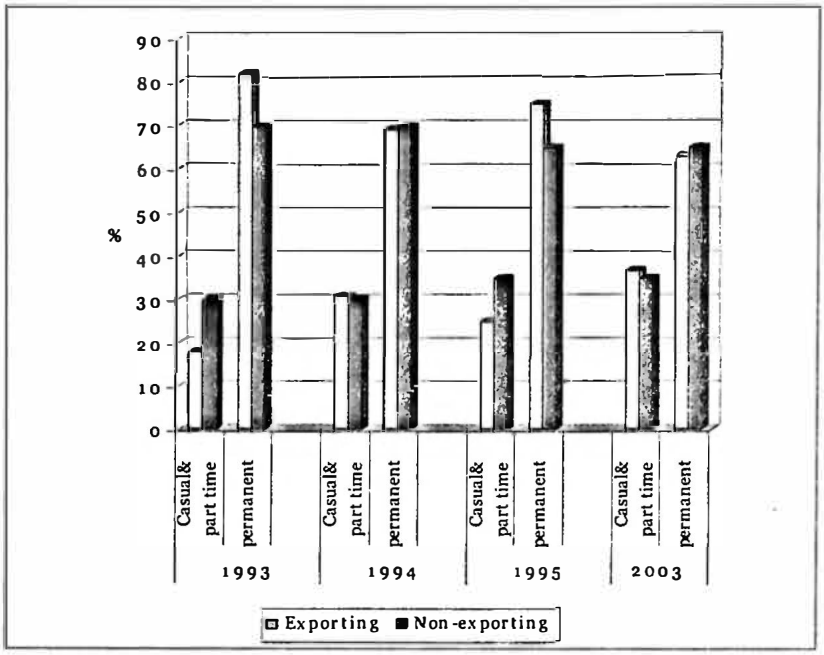


Table 5.5a: Composition of workers by sector, 1995

1995 Survey	Food	Wood	Textile	Metal
The average no. of workers by sector (standard deviation in brackets)				
All workers	97 (225)	95 (185)	115 (358)	93 227)
Permanent workers	53 (83)	53 (124)	88 (309)	61 (129)
Casual and part time	44 (189)	22 (69)	28 (71)	33 (102)
Proportion of workers (%)				
Permanent workers	63.3	63.6	79.2	61.6
Casual and part time workers	36.7	36.4	20.8	36.4

Source: Author's computation from RPED surveys

Table 5.5b: Composition of workers by sector, 2003

2003 Survey	Food	Wood	Textile	Metal	Printing
The average no. of workers by sector (standard deviation in brackets)					
All workers	317	143	194	159	81
	(423)	(236)	(308)	(233)	(66)
Permanent workers	192	98	77	94	61
	(305)	(155)	(156)	(131)	(65)
Casual and part time	125	47	111	68	20
	(200)	(118)	(253)	(162)	(25)
Proportion of workers (%)					
All workers					
Permanent workers	62.4	63.5	57.0	66.2	75.8
Casual and part time	37.6	36.5	43.0	33.8	24.2

Source: Author's computation from RPED surveys

especially in textile, metal and food sub-sectors. The wood sub-sector has the least variation.

In 2003, food (and agro-related) sector employed the highest number of workers on average, followed by textile (and garments) sector, with the printing and publishing sector employing the least after the wood (and construction) sector (Table 5.5b). In 1995, the textile sector, which ranked third in terms of proportion of exporting firms, had the highest permanent employees but in the 2003 survey, it had the highest proportion of exporting firms but now had the least number of permanent employees (among the four sectors). It also had the highest proportion of non-standard forms of employment (casual and part time) (43%) followed by the food sector (37.6%). Overall, food (and other agro-related) as well as textile sectors were the largest employers, respectively.

5.2.4 Skill composition of the workforce

Skill composition is analyzed based on the education level attained. Generally, there has been a shift towards a more skilled labour force in the manufacturing sector. This is reflected by the rise in the level of education of the workforce over time (Figure 5.2). The proportion of the manufacturing workforce with primary education has declined steadily while that with secondary and higher education increased, with over 60

per cent of the workers having attained secondary school education. The 2003 survey particularly shows a steady increase in the proportion of workers with university education.[18]

Table 5.6 shows the composition of permanent workers (excludes casual and part time) by education level, for exporting and non-exporting firms based on 2003 data.[19] In absolute terms, exporting firms employed more workers of all education categories. In terms of proportions, exporting firms employed a higher proportion of workers with secondary school education (67%) relative to non-exporting (58%). Similarly, the proportion of workers with primary education was less in exporting firms (19%) compared to non-exporting firms (28%). The proportion of workers with university education was slightly higher for the former (11%) than the latter (10%). Generally, exporting firms employed a relatively higher

Table 5.6: Composition of workers by education level, 2003

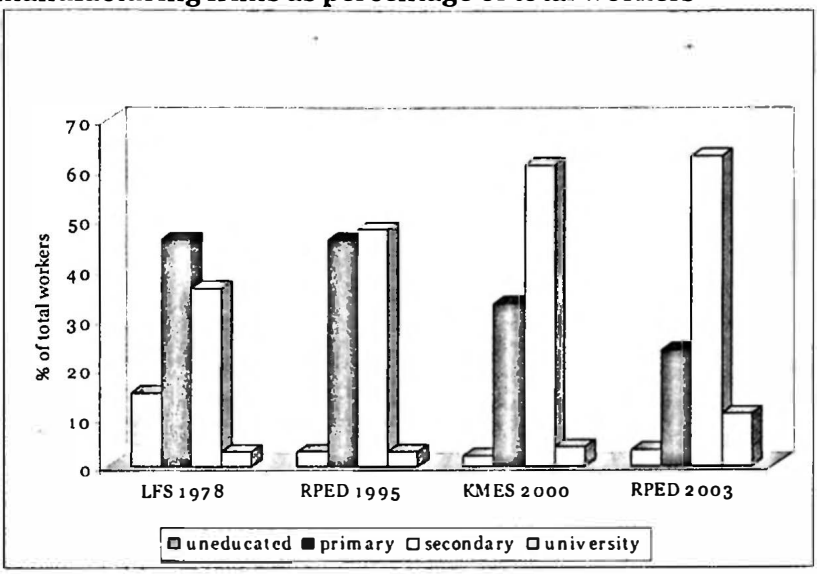
	Exporting firms		Non-exporting		All firms
	Mean	Std dev	Mean	Std dev	Mean
Average number of workers					
Less than 6 years	4	20	1	5	3
Primary	31	108	14	38	23
Secondary	87	122	38	76	63
University(all degrees)*	12	24	8	32	10
Masters and PhD	1	3	0.4	1.1	1
(as a % of total workers)					
Less than 6 years	2.8	8.3	3.2	9	3.4
Primary	19	21.4	28	28	23.4
Secondary	67	24	58	30	62.6
University (all)*	11	12.3	10	18.5	10.6
Masters and PhD	0.8	1.68	1	4	0.9
Female workers (% of total workers)					
All female	15.3	15.2	13.0	14.0	14.2
Less than 6 years	0.4	1.5	0.3	1.8	0.4
Primary	2.5	6.3	3.1	8.7	2.7
Secondary	11.0	11.8	8.0	10.2	9.4
University (all)*	1.5	3.5	1.7	5.7	1.6

*university education includes first degree, masters and PhD.
Source: Author's computation from RPED surveys

[18] University education includes Masters and PhD.

[19] This question was asked in reference to permanent workers only.

Figure 5.2: Educational level of workforce in Kenyan manufacturing frims as percentage of total workers



Notes: LFS=Labour Force Survey; RPED=Regional Programme on Enterprise Development; KMES=Kenyan Manufacturing Enterprise Survey. For 2003, uneducated include those with less than 6 years of education.

proportion of workforce with high levels of education than non-exporting firms. Defining skill in terms of production (unskilled) and non-production (skilled) yielded similar results.

In terms of gender, the data shows that total female workers as a per cent of total permanent workers was slightly higher for exporting firms (15.3%) compared to non-exporting firms (13.0%). Overall, the proportion of permanent female workers (based on education attainment) is about 14 per cent. Given that a substantial number of women also work as casual or part time workers, it is likely that this is an under-estimation of female employment in the manufacturing sector. Nonetheless, the proportion of female workers is fairly closer to the proportion of female employment in the manufacturing sector based on secondary data as detailed in section 2.2. For both exporting and non-exporting firms, female employees with secondary school education constitute the highest percentage among education categories. The proportion is higher (11%) for exporting firms than for non-exporting (8%). There is no much difference in the proportion of female workers with university education.

5.3 Results of Regression Analysis

Data from the early 1990s was used to create a two-year panel. Since it was not possible to trace the same firms in the 2003 survey and given the time lapse, separate estimations were conducted for 2003. The main drawback encountered in creating panel data based on the early RPED waves of 1993, 1994 and 1995 was the high attrition rate of firms, particularly after the first wave. For instance, only 22 firms from the 1993 wave had observations for at least one other year (from either 1994 or 1995 wave), the rest were interviewed only once. Consequently, the panel was created using data for 1994 and 1995 waves only. There were 186 firms interviewed twice(i.e. in both waves of 1994 and 1995), making 372 observations used in the balanced panel data analysis.[20] Both fixed and random effects model are estimated and results compared to pooled OLS regressions where possible.

Descriptive statistics for the 2-year panel data are given in Table 5.7. The variables are a proportion of casual workers;[21] export orientation of firms (firm exports=1 and 0 otherwise); real wage rate i.e. average wage in a firm (computed as firm's total wage bill divided by total employment);[22] real output; union status of firm's employees (i.e. firms with unionized employees =1 and 0 otherwise); and mode of operation (1= firm operates more than one shift and 0 if firm operates only one shift). Arguably, more shifts can be taken as indication of more capacity and hence more ability to employ more workers. Additionally, firms that face stiff competition (1= a firm has over 5 competitors and 0 otherwise) would prefer relying on casual workers to cut down on costs. Real variables (output and average wage) are in natural logs. These variables were computed by deflating the nominal variables by consumer price indices for the respective years. Other variables in the analysis are sector and location dummies. Also of interest is the proportion of permanent workers and total workers.

[20] The actual sample used in the analysis could be less since there were variables with less than 372 observations.

[21] Part time workers are considered as half full time casual workers in the empirical analysis.

[22] Ideally, relative wage of casual workers would have been a better wage variable (as initially specified in the equation for proportion of casual workers in section 4) rather than average firm wage. However, in the absence of the former, the latter was used. Arguably, variations in relative wages across firms can be sufficiently captured by controlling for sector and location dummies (as explicitly done in the OLS regressions).

Table 5.7: Descriptive statistics for panel data (1994-1995)

Variable		Mean	Std. Dev.	Observations
Proportion of casual workers	Overall	0.30	0.29	N=372
	Between		0.25	n=186
	Within		0.15	T=2
Proportion of permanent workers	Overall	0.70	0.30	N=372
	Between		0.26	n=186
	Within		0.15	T=2
Total workers	Overall	88.0	236.69	N=372
	Between		232.85	n=186
	Within		44.18	T=2
Real output	Overall	14.0	2.59	N=350
	Between		2.54	n=183
	Within		0.55	bar=1.91
Real wage	Overall	11.8	1.98	N=339
	Between		1.93	n=183
	Within		0.50	bar=1.85
Exporter	Overall	0.26	0.44	N=371
	Between		0.42	n=186
	Within		0.14	bar=1.99
Unionised employees	Overall	0.42	0.49	N=369
	Between		0.47	n=186
	Within		0.16	bar=1.98
Operate more than one shift	Overall	0.18	0.39	N=371
	Between		0.37	n=186
	Within		0.12	T=1.99

Std. Dev. = Standard deviation

The overall mean is the mean of variables computed across the entire sample. Additionally, panel data descriptive statistics also tell us how much variation is due to variation between firms and how much is due to variation within firms across the two-year period. If a variable does not vary over time periods (as is the case with location), the within variation is zero. The summary statistics show that for all the variables, variation across firms is bigger than variation within the same firm. The data shows that 30 per cent of all workers were casual workers while 70 per cent worked on permanent employment basis. The average number of workers per firm was 88. 42 per cent of all firms had unionized employees.

The panel data models for proportion of casual workers are reported in Table 5.8a together with pooled OLS results for comparison. The explanatory variables are real output, real wage rate, exporting status of the firm, mode of operation, union status of firms' employees, number of competitors, sector, location and year dummies (1995 is the omitted

category). The metal sector and Eldoret town are the omitted categories for the sector and location dummies, respectively. Notice that location and sector dummies are automatically dropped from the fixed-effects model since they are constant over the two-year period. Besides proportion of casual workers, regressions are also conducted for proportion of permanent workers, as well as all the workers. The regression results for the former are reported in Table 5.8b.

Heteroskedasticity was tested and confirmed using Breusch-Pagan/ Cook-Weisberg test. The endogeneity of the export variable was tested using the Durbin-Wu-Hausman (and Wu-Hausman) tests. Since this requires estimating an IV regression, the export variable was instrumented using the proportion of imported raw materials. This was motivated by correlation of this variable with exporting. For all equations, we failed to reject the null, which states that the OLS estimator would yield consistent estimates (see the test statistics and the IV regression results in the Appendix Table).

5.3.1 Proportion of casual workers

The results for the random and pooled OLS models (Table 5.8a), as well as those based on 2003 data (Table 5.9) show insignificant exporting effect on composition of casual workers in total employment. This follows from the exploratory analysis in sub-section 5.2.2, which did not show a clearly distinct or obvious positive relationship between export-orientation and proportion of casual workers). However, there could be (omitted) unobserved effects not picked up by the other models since the fixed-effects model shows that export variable is positive albeit not highly significant (it is significantly different from zero only at 10 per cent level of significance). Hence, the evidence of exporting leading to a higher proportion of casual workers is weak. The usual test statistic for Ramsey regression specification error test (RESET) for the OLS model is not significant, implying that there is no mis-specification error.

The choice between fixed effects versus random effects models is statistically testable using Hausman test. All the three models in Table 5.8a show that real wage rate, operating more than one shift, unionized firms and 1994-year dummy are insignificant. The insignificance of real wage rate might probably be due to the fact that real wage is correlated with output. Also, the average wage might not be a better proxy for the wage rate of casual workers, given earning disparity between casual and

Table 5.8a: Proportion of casual workers (panel data models & pooled OLS– 1994-95)

	Fixed Effects		Random Effects		Pooled OLS	
	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Constant	-0.02	-0.04	0.44	2.22**	0.46	2.69***
Exporter	0.12	1.89*	0.01	0.23	-0.01	-0.17
Real output	-0.0002	-0.01	-0.03	-1.76*	-0.03	-1.87*
Real wage rate	0.02	0.79	0.03	1.48	0.03	1.57
Operate more than one shift	-0.002	-0.03	0.03	0.67	0.03	0.66
Have unionised employees	-0.01	-0.20	-0.05	-1.32	-0.05	-1.22
1994	0.01	0.43	0.01	0.40	0.005	0.15
Have over five competitors	0.04	0.76	0.06	1.79*	0.07	2.07**
Food			-0.01	-0.12	-0.01	-0.27
Wood			-0.05	-1.05	-0.07	-1.51
Textile			-0.16	-3.19***	-0.16	-3.66***
Nairobi			-0.10	-1.24	-0.11	-1.61
Mombasa			0.06	0.61	0.05	0.67
Nakuru			-0.04	-0.45	-0.05	-0.66
F-statistic	0.80		37.0***		4.0***	
R-squared	0.03		0.13		0.13	
RESET						0.82(0.48)
No. of observations	324		324			324

***, **, * *denote level of significance at 1%, 5% and 10%, respectively*

Table 5.8b: Proportion of permanent workers (panel & pooled OLS– 1994-95)

	Fixed Effects		Random Effects		Pooled OLS	
	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Constant	1.11	2.59***	0.52	2.53***	0.50	2.90***
Exporter	-0.15	-2.17**	-0.03	-0.73	-0.01	-0.27
Real output	-0.002	-0.11	0.03	1.89*	0.03	1.98**
Real wage rate	-0.03	-0.93	-0.02	-1.37	-0.03	-1.43
Operate more than one shift	0.0005	0.01	-0.03	-0.74	-0.03	-0.76
Have unionized employees	-0.03	-0.67	0.03	0.88	0.03	0.87
1994	-0.02	-0.63	-0.02	-0.68	-0.01	-0.29
Have over five competitors	-0.04	-0.86	-0.06	-1.83*	-0.07	-2.15**
Food			0.002	0.04	0.01	0.23
Wood			0.04	0.81	0.06	1.28
Textile			0.17	3.17***	0.17	3.74***
Nairobi			0.11	1.23	0.11	1.62
Mombasa			-0.06	-0.63	-0.06	-0.77
Nakuru			0.03	0.30	0.04	0.45
F-statistic	1.11		35.5***		4.1***	
R-squared	0.04		0.13		0.13	
RESET					1.0(0.39)	
No. of observations	324		324		324	

***, **, * denote level of significance at 1%, 5% and 10%, respectively

Table 5.9: Proportion of casual & permanent workers (2003)

	Propn. of Casual		Propn. of permanent	
	Coefficient	t-statistic	Coefficient	t-statistic
Constant	0.32	1.11	0.69	2.76***
Exporter	-0.04	-0.83	0.04	0.85
Output	0.03	1.71*	-0.04	-2.46**
Average wage rate	-0.05	-2.57**	0.06	2.61***
Firms with unioniszd employees	-0.05	-1.14	0.06	1.33
Agro industry	-0.04	-0.73	0.06	1.06
Wood	0.06	0.69	-0.04	-0.53
Textile	0.06	0.88	-0.04	-0.55
Chemical & paints	-0.04	-0.55	0.09	1.17
Construction	-0.12	-1.57	0.16	1.99**
Plastics	0.01	0.18	-0.005	-0.06
Paper & printing	-0.05	-0.71	0.08	1.29
Nairobi	0.18	3.63***	-0.09	-1.26
Mombasa	0.31	4.89***	-0.30	-4.00***
Nakuru	0.27	3.46***	-0.21	-2.33**
Kisumu	0.19	2.14***	-0.13	-1.22
Proportion of workforce that use computer	-0.31	-3.27***	0.38	3.88***
F-statistic	3.37***		5.3(0.0)***	
R squared	0.25		0.328	
RESET	1.72(0.16)		3.32(0.02)**	
No. of observations	155		155	

***, **, * denote level of significance at 1%, 5% and 10%, respectively

permanent employees. The fact that most casual workers are not unionized might explain the insignificance of the union variable.

The random effects and the pooled OLS models show that firms that faced stiffer competition (i.e. firms that had over five competitors for their principal product) employed a higher proportion of casual workers. Such firms would be under more pressure to cut-down on costs (e.g. by resorting to casual workers) to remain profitable. The fixed-effects model shows that this variable is not significant, implying that there is likely to be unobserved effects that are correlated with the variable.

The textile sector dummy was found to be significant in all the equations based on 1994-1995 data. That is, in relation to the metal sector (omitted sector), the textile sector employed a significantly lower proportion of casual workers. It was one of the most affected sectors following trade liberalization in the early 1990s. The negative relationship can, thus, be explained in line with the lay-offs or retrenchment following

collapse of some firms. Location and year dummies were found to be insignificant. The coefficient for output was negative but significant at only 10 per cent significance level under the random and pooled OLS models in Table 5.8a.[23] Further analysis by interacting export and output as well as export and wage produced similar results—the interaction terms were found to be insignificant in both cases.

The 2003 survey had more sub-sectors (agro-industry, wood and furniture, textile and garments, metal, chemical and paints, construction, plastics, printing and publishing). Changes in technology are often cited as a factor in increased use of non-standard workers (Mangan, 2000). Given structural changes that have taken place since the early 1990s, particularly in the area of information technology, additional variable—proportion of workforce that regularly use a computer—was included as a proxy for technology variable. The results of 2003 in Table 5.9 show that both the output and the wage rate have the expected signs (and are significant at 10% and 5% levels, respectively). That is, the higher the output, the higher the proportion of casual workers and, the higher the average wage, the lower the proportion of casual workers. However, given the size of the coefficients, the impact is quite small. All location dummies have positive and significant coefficients, implying that compared to firms located in Eldoret (omitted category), firms located in other towns (Nairobi, Mombasa, Nakuru and Kisumu) significantly employed a higher proportion of casual workers. This indicates that casualisation of workforce phenomenon has become widespread across towns in recent times.

Firms where a higher proportion of workforce regularly use a computer had a lower proportion of casual workers. This variable had a significant and can also be taken as an indication of the changing industrial environment particularly with the recent revolution in information and communication technology. Union status and all the sector dummies were found to be insignificant.

5.3.2 Proportion of permanent workers

The panel data models for proportion of permanent workers are reported in Table 5.8b alongside the pooled OLS results. Broadly, the results expectedly show opposite coefficient signs to those obtained for

[23] Using real output per worker instead of real output yielded similar results.

proportion of casual workers. Like before, the pooled OLS and random effects models, as well as OLS results for 2003 (Table 5.9) show that the export variable is not significant. However, the fixed-effects model show that exporting has a negative effect on the proportion of permanent workers employed. All the three models in Table 5.8b show that real wage rate, operating more than one shift, unionized firms and 1994-year dummy are insignificant.

Results for 2003 show that the higher the proportion of workforce that use computers, the higher the proportion of permanent workers—employees with permanent employment contracts are likely to be more skilled. Average wage rate is significant but positive, while output is negatively related to the proportion of permanent workers employed. This could possibly imply that permanent workers are probably more productive and efficient, most likely because they are relatively more skilled.

Table 5.10a: Log of all workers (panel data models & pooled OLS—1994-95)

	Fixed Effects		Random Effects		Pooled OLS	
	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Constant	-0.57	-0.72	-4.04	-10.2***	-4.55	-13.6***
Exporter	0.06	0.29	0.32	2.61***	0.26	2.45**
Real output	0.12	2.26**	0.25	6.34***	0.22	5.12***
Real wage rate	0.17	2.96***	0.32	6.31***	0.39	6.69***
Operate more than one shift	0.14	0.95	0.25	2.08**	0.29	2.45**
Have unionised employees	-0.04	-0.25	0.24	2.11**	0.32	3.20***
1994	-0.14	-3.49***	-0.18	-4.24***	-0.16	-2.25**
Have over five competitors	0.07	0.96	0.07	1.00	0.06	0.72
Food			-0.08	-0.66	-0.16	-1.48
Wood			0.21	1.86*	0.23	2.38**
Textile			0.11	0.75	0.05	0.45
Nairobi			-0.24	-1.24	-0.28	-1.60
Mombasa			-0.41	-1.91*	-0.36	-1.94**
Nakuru			-0.16	-0.80	-0.13	-0.68
F-statistic	5.33***		1282***		163***	
R-squared	0.25		0.85		0.86	
RESET					1.48(0.18)	
No. of observations	324		324		324	

***, **, * denote level of significance at 1%, 5% and 10%, respectively

Table 5.10b: Log of workers (regressions for 2003)

	Coefficient	t-statistic
Exporter	0.40	2.16**
Output	0.54	5.92***
wage rate	-0.40	-3.99***
Firms with unionized employees	0.12	0.81
Agro industry	0.08	0.30
Wood	0.08	0.39
Textile	0.23	1.20
Chemical & paints	-0.02	-0.10
Construction	-0.12	-0.48
Plastics	-0.02	-0.11
Paper & printing	-0.14	-0.62
Nairobi	0.02	0.06
Mombasa	0.22	0.80
Nakuru	-0.03	-0.09
Kisumu	0.53	1.71*
Proportion of workforce that use computer	-0.07	-0.16
Constant	-1.12	-1.15
F-statistic	18.7(0.0)***	
R- squared	0.64	
RESET	4.82(0.01)***	
No. of observations	155	

***, **, * denote level of significance at 1%, 5% and 10%, respectively

5.3.3 All workers

The panel data results are reported in Table 5.10a while results for 2003 are reported in Table 5.10b. Contrary to the results for proportion of casual or permanent workers, the export variable was found to be significant and positive in all the regressions except in the fixed effects model. The results for 2003 also show a positive exporting effect. Again, it is possible that unobserved fixed-effects are correlated with exporting, causing an upward bias in the pooled and random effects model estimates. If we assume away the bias created by exporting being correlated with other unobserved effects such as quality of managerial skills, superior technology, etc, we can possibly argue that exporting has had a positive effect on overall employment. Other variables that positively influenced the level of employment based on the 1990s (in all the models) are output and average wage rate . The positive wage effect was not expected– perhaps the variable used i.e. the average wage rate in a firm, may not be a good proxy given wage disparities among different categories of workers. Operating more than one shift and unionization variables were

found positive only under the random effects and pooled OLS models. The dummy for 1994 was found to be significant and negative. 1994 is a year that experienced high turbulence in most macro variables such as inflation and foreign exchange rate following liberalization of the forex market. This affected employment in manufacturing firms negatively. The wood sector employed more workers in relation to the metal sector (omitted variable). Mombasa town employed fewer workers than Eldoret (omitted category). The results for 2003 show positive output and negative wage effects as would be expected.

Overall, the results depict the kind of structural adaptation that has taken place between the early 1990s and the 2000s, most likely in response to the changing economic and global environment. Additionally, although export orientation is important, casualisation of workforce is likely to be exacerbated by other factors beyond just exporting.

6. Conclusion and Policy Implications

The paper sought to explore employment outcomes in the manufacturing sector in relation to firms' export orientation and based on manufacturing surveys data.proportion of exporting firms has increased over time, with over 50 per cent of firms exporting their product(s), according to the 2003 survey. Generally, export-oriented firms employed more workers compared to non-exporting firms, though the gap has narrowed. However, the proportion of total workers employed by exporting firms shrunk from an average of 76.2% in the early 1990s to 54.2% in 2003.

Use of casual forms of employment in the manufacturing firms has increased—with 36 per cent of the workers being casual and part time workers in 2003. Casualisation phenomenon is, however, not unique to exporting firms only, although export-oriented firms employed more casual and part time workers by virtue of their bigger size. In 2003, for instance, the proportion of casual and part time workers was 37 per cent and 35 per cent in exporting and non-exporting firms, respectively. The agro-based as well as the textile (and garments) sectors are the largest employers but also rank highest in use of non-standard forms of employment. There has been a shift towards a more skilled labour force as depicted by a rise in the proportion of workers with secondary and university education, which is slightly higher for exporting than non-exporting firms. Employment is male-dominated (over 80%), with exporting firms employing a slightly higher proportion of female workers (11%).

Exporting status was not found to significantly influence the proportion of casual workers. Although fixed effects model results under panel data analysis showed some positive evidence, in general the empirical evidence was found to be weak.However, exporting was found to have a positive effect on overall employment, but the impact could be positively biased. Real output was not found to be a significant determinant of the proportion of casual workers. The negative effect of use of computers on proportion of casual workers employed reflects the impact of changes in information and communication technology, which may require relatively high skills.

While export-orientation is a crucial factor, casualisation of the workforce is likely to be exacerbated by additional factors beyond just exporting. The liberalization and deregulation of the labour market policies coupled with high rates of unemployment and poor economic growth are likely

to have intensified the use of non-standard forms of employment. Further empirical investigation is required—e.g. using new datasets as they become available, while controlling for more factors, including supply-side factors.

While the policy of promoting export-oriented industries as an engine of growth and employment creation should be encouraged, there is need for measures that are sensitive to the plight of casual workers and other vulnerable groups such as female and less skilled workers. Attention should also be directed towards the quality of jobs created, particularly in the absence of safety nets for unemployed and vulnerable groups of workers. Strengthening and strict enforcement of labour regulations governing casual and other precarious forms of employment is important. Policies aimed at targeting and promoting job creation in other sectors of the economy, such as agriculture and service industry should also be encouraged. As the economy continues to open up more and more to the global forces, more research focusing on the linkages between trade orientation and labour market outcomes is needed to inform economic policy.

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Appendix Table: Instrumental variable regressions

	Propn. of Casual		Propn. of permanent		Log of workers	
Coeff.	t-statistic	Coeff.	t-statistic	Coeff.	t-statistic	
Constant	0.88	1.71	0.19	0.38	-3.95	-3.58
Exporter	0.41	1.18	-0.34	-1.01	0.88	1.18
Real output	-0.05	-1.41	0.04	1.29	0.17	2.42
Real wage rate	0.003	0.09	-0.004	-0.15	0.38	5.96
Operate more than one shift	-0.03	-0.51	0.03	0.42	0.10	0.74
Have unionized employees	-0.03	-0.40	0.02	0.34	0.39	2.80
1994	-0.03	-0.65	0.03	0.63	-0.17	-1.89
Have over five competitors	0.13	2.20	-0.13	-2.21	0.17	1.31
Food	0.06	0.71	-0.04	-0.50	-0.02	-0.11
Wood	-0.03	-0.49	0.03	0.55	0.23	1.72
Textile	-0.08	-1.25	0.09	1.48	0.19	1.37
Nairobi	-0.17	-2.02	0.16	1.97	-0.44	-2.39
Mombasa	0.002	0.02	-0.02	-0.20	-0.40	-2.18
Nakuru	-0.13	-1.09	0.13	1.11	-0.38	-1.49
Durbin-Wu-Hausman test statistic	1.03(0.31)		1.31 (0.27)	0.67(0.41)		
Wu-Hausman test statistic	0.97(0.32)		1.31(0.25)		0.63(0.42)	