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Foreign Ownership and Wages: Evidence from Five African Countries

by

Dirk Willem te Velde and Oliver Morrissey

Centre for Research in Economic Development and International Trade, University of Nottingham

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Abstract
This paper uses data on individual wages in manufacturing industry for five African countries in the early 1990s to test whether firms owned by foreigners pay higher wages than do forms owned by locals for apparently equivalent workers, and whether such benefits accrue to all or only certain types of workers. We present two main findings. First, foreign ownership is associated with a 20-40 per cent increase in individual wages (conditional on age, tenure and education) on average. This is halved to 8-23 per cent if we take into account the fact that foreign-owned firms are larger and locate in high-wage sectors and regions. Secondly, there is a tendency in some countries for more skilled workers (using occupation and education categories) to benefit more from foreign ownership than less skilled workers, and this conclusion holds after accounting for the size distribution of foreign firms. We discuss, but cannot directly test, the plausibility of two explanations for these findings: 1) foreign-owned firms employ technologies that are more skill-biased than technologies in local firms and 2) skilled workers in foreign firms are more effective in rent-sharing than other workers. We contend that these explanations may not be mutually exclusive, hence cannot be empirically distinguished

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1. Introduction
2. Foreign Ownership and Wages: Existing Evidence
3. Foreign Ownership and the Earnings Function
4. Data Description
5. Econometric Results
6. Conclusions and Policy Implications

I. INTRODUCTION

Investment by foreigners is an important source of funds for manufacturing firms in sub-Saharan African (SSA) countries. Foreign presence in SSA would be expected to increase as countries engage in privatisation and as, under the auspices of the WTO, investment is liberalised. Conventionally, the literature on the effects of foreign ownership is concerned with foreign direct investment (FDI). Does FDI contribute to growth, and do affiliates of multinationals behave differently to local firms (e.g. are they more capital-intensive, more productive, and do they pay higher wages)? This literature is reviewed elsewhere (see Velde, 2001) as few of the foreign-owned firms in the sample available to us are actually affiliates of multinationals. In our data foreign-owned is not equivalent to FDI as conventionally understood; in the early 1990s few African manufacturing firms (in the sample countries) were owned (or had significant investment) by foreign companies. In our definition, foreign-owned means some ownership by foreigners, usually individuals that are not nationals although including foreign companies. We will assume that ownership by foreign nationals captures important features of the differences in wage-setting behaviour of foreign and local firms (this is discussed further in the conclusion). This paper focuses on one specific issue, whether firms owned by foreigners (FOR) pay higher wages than do firms owned by locals (LOC) to equivalent workers (i.e. workers with similar levels of experience and education).

The availability of large-scale surveys has supported a noticeable increase in research on manufacturing enterprises in Africa. Much of this was initiated with the World Bank and bilateral donor-sponsored Regional Programme on Enterprise Development (RPED), which has funded surveys in a number of African countries during the 1990s. We use data from the first three waves of surveys (1990-93) for five countries - Cameroon, Ghana, Kenya, Zambia and Zimbabwe (available form the CSAE web-site). A particular advantage of the RPED data is that there are two data sets, one at the firm level with information on firm characteristics, and the other containing data on individuals (wages and employee characteristics). Our primary concern is with the information on individual employees, and the firm-level data is used to identify the characteristics of the firms in which they are employed (in particular whether there is foreign ownership). We

examine whether ownership by foreigners is associated with higher wages distinguishing between types of workers.

A number of recent studies analyse these surveys (e.g. Bigsten *et al*. 1997, 1999, 2000; Strobl and Thornton, 2001; Teal, 2000; Söderbom and Teal, 2001a and 2001b), but most are primarily concerned with firm-level data and none specifically address the questions raised in this paper. Some of these studies do include foreign ownership as a control variable. Bigsten *et al.* (2000) examine rates of return on physical and human capital and include results for earnings functions similar to those we estimate (we therefore check our results against theirs). Whilst they include ownership type as a control variable, they did not publish the results for this. Strobl and Thornton (2001), using the same cross-country data set that we use, do find that FOR tend to be larger and pay higher wages, as does Mazumdar (1995). However, theses studies are concerned with explaining the average wage paid by firms, and specifically with the employer size-wage effect, whereas we are concerned with factors influencing the wage received by workers. Söderbom and Teal (2001a: 18) find foreign ownership to be insignificant in estimating a Cobb-Douglas production function for Ghanaian firms, i.e. ownership does not have an independent effect on output, but are not concerned with earnings at the employee level. Where appropriate, we will refer to evidence from these other studies when interpreting our results.

The question of *which* type of worker gains from foreign ownership has largely been ignored in the literature. There are some initial, but crude, results showing that non-production workers benefit more from foreign ownership than production workers in terms of wages, see Lipsey and Sjöholm (2001) for Indonesia, Aitken *et al*. (1996) for Mexico and Venezuela, Feenstra and Hanson (1995) for Mexico. This paper tests whether foreign firms pay *all* of their workers more than similar workers in local firms, or whether a foreign ownership wage premium pertains to more skilled and educated workers only. Such evidence would shed new light on the potential direct effects of foreign ownership on low-income groups, as low-income workers are usually less skilled and less educated workers. As Strobl and Thornton (2001) observe, if larger firms tend to pay higher wages (and the same applies for FOR) this may contribute to (wage) inequality. However, this is only part of the full picture of the long-run effects of foreign ownership on income and employment of low-income workers, and we discuss this in

the paper. The results can also be used as a first step to assess whether foreign-owned firms employ technologies that are more skill-biased than local firms and/or whether skill workers in foreign-owned firms are more successful in rent-sharing than less skilled workers. We return to these issues in the conclusion.

Much of the evidence on foreign ownership and wages relates to the firm level, and not to the level of individuals. Consequently, it is difficult to assess which types of workers gain from foreign ownership. It may be observed that larger firms and/or FOR pay higher wages (on average) and employ a greater proportion of skilled workers, but this does not tell us whether an employee with given characteristics will earn more if employed by an FOR than by a local firm, for example. Furthermore, with firm level data alone it is difficult to distinguish between the contribution of the mix of worker characteristics to the average wage as against the effect of firm characteristics on the wage paid to an average worker (and to wage differentials among workers). Thus, for example, Strobl and Thornton (2001) find that the 'raw' size-wage differential is about 60% but this falls to 20-30% if one controls for observable worker and firm characteristics. They therefore find that large firms pay higher wages even controlling for other factors. We can ask the complementary question, do workers with given characteristics earn higher wages in large firms (and in FOR). Taking the two pieces of evidence together can shed more light on the nature of wage differentials in SSA countries.

The structure of the paper is as follows. Section 2 presents a brief review of theory and evidence on the effects of foreign ownership on wages. Section 3 then presents the wage determination model used, essentially a Mincerian framework. Section 4 discusses the data and relevant results from previous studies using this database. Section 5 presents our results, assessing whether foreign-ownership benefits specific type of workers. Conclusions are presented in Section with a discussion of alternative explanations for our results and the policy implications.

II. FOREIGN OWNERSHIP AND WAGES: EXISTING EVIDENCE

There is a considerable literature on the complex relationships between foreign ownership and wages, mostly concerned with affiliates of foreign firms rather than firms owned by foreign nationals. In both types of foreign ownership the difference with

locally owned firms is greater access to (foreign) capital, but whereas multinationals should also bring access to technology this is not obviously the case for foreign individuals. While greater access to capital implies a greater ability to import capital goods, and this is a determinant of skill-biased technical change, foreign individuals need not be as likely to do this as affiliates of foreign companies (the latter will have an incentive to import from the parent). This distinction is important when it comes to interpreting our results against alternative explanations for wage premium effects in the literature.

The literature on multinationals suggests that the presence of a firm-specific asset explains in part the observation of a wage differential between foreign-owned and local firms (Dunning, 1993). Affiliates of multinationals use more up-to-date technologies, require more skilled workers, have access to better inputs, are more productive and hence can pay more. Firms owned by foreign individuals may not exhibit these characteristics. However, there could also be other reasons for a wage differential. For instance, it is often argued that foreign firms want to attract the best workers with the highest ability and work effort and as a consequence need to pay more. This is linked to the efficiency-wage argument to pay workers more in order to raise effort and productivity. Another explanation could be that foreign-owned firms sort on education, in the absence of knowledge of the quality of local workers, and will pay more accordingly (this argument would apply to foreign nationals as well as to multinationals). Finally, foreign firms may be more profitable than local firms and, as Blanchflower *et al.* (1996) argue, wages can be positively correlated to profits, which is shown empirically in the case of Ghana (Söderbom and Teal, 2001a). We will return to these different hypotheses later.

Observing a correlation between foreign ownership and wages does not necessarily imply a causal link. To determine the effects of foreign ownership on wages, one should control for other determinants of wages. If we fail to control for such other determinants we ascribe effects on wages to foreign ownership, whereas the effects could be due to underlying factors which happen to be more prevalent in foreign-owned firms. When examining the relationship between foreign ownership and wages at the firm level (i.e.

why average wages vary by firm type), the following control variables are the most important: skill intensity, size, location and sector dummies.[1]

Skills Foreign-owned firms tend to have better access to best-practice technology, requiring more skills to operate complex production processes. A higher skill mix explains in part a higher average wage bill for employees in foreign-owned firms. Strobl and Thornton (2001) find that worker characteristics explain a large part of the employer size-wage effect in SSA countries. The different skill mix explains differences in average firm wages.

Size Foreign-owned firms are usually relatively large. Large firms pay more for observationally equivalent workers than small firms do, and also tend to hire more educated workers, particularly white-collar workers, possibly because greater monitoring problems in large firms require more productive managerial workers (Polachek and Siebert, 1993: 261). This different skill mix does not explain fully why large firms pay higher average wages. Strobl and Thornton (2001) show that there is a substantial size-wage premium (controlling for observable worker characteristics, large firms pay 20-30% higher wages in the five SSA countries), which is higher for non-production workers. Thus, it is important to control for firm size.

Industry Foreign firms may locate in particular industries. If there are large and persistent wage differentials across industries and FOR locate in higher paying industries, this will give rise to an apparent tendency for FOR to pay higher wages.

Location It is also important to control for location of operation. Multinationals (at least in manufacturing) tend to locate in areas where there is sufficient high-skill labour, which are often high-wage locations. There is also a tendency to agglomerate in clusters (often close to the capital city) and while this reduces firm costs in terms of learning it also pushes up local wages (e.g. Fujita *et al*, 2000). The impact of regional controls will be more important the less competitive and integrated labour markets are across the spatial dimension. Strobl and Thornton (2001) find that firms located in the capital city tend to be larger and to pay higher wages.

1 Other controls in the wage functions include union density, share of female workers, share of foreign workers and, less often, the firm age.

Why are some types of workers paid more?

The evidence cited above relates to the firm level, and not to the level of individuals; i.e. the controls are firm characteristics that explain higher average wages at a firm level. An ownership-wage premium at the firm level may not translate into the same wage premium for all types of workers within FOR, or within firms having any specific characteristic. Our concern is whether firm characteristics affect the wage paid to workers with the same observable characteristics, in particular if FOR pay higher wages to equivalent workers. We consider three explanations for why FOR may pay higher wages - bargaining, technology and management.

The bargaining explanation is based on the hypothesis that skilled workers are in a stronger bargaining position than less-skilled workers and hence are more effective in rent-sharing (i.e. can capture a greater share of profits). This can be because skilled workers are in relatively scarce supply, or simply because they are more effective in the bargaining process, e.g. due to better negotiation skills or a louder voice. While bargaining power helps to explain why skilled workers earn higher wages (than would be explained simply by their productivity), it does not explain why skilled workers in one type of firm (e.g. large or FOR) may be paid more than skilled workers in another type of firm. We need something more to explain differences in the skill premium by type of firm.

Söderbom and Teal (2001a) find that size is the single most important determinant of earnings, controlling for fixed firm effects, and try to test between rent-sharing and efficiency wage (risk-sharing) explanations. They find no evidence to support the efficiency wage hypothesis (earnings are not a predictor of productivity). However, evidence that predicted output and lagged profits do influence earnings is cited in support of the rent-sharing argument.[2] Thus, skilled workers earn higher wages in larger firms because of their bargaining power. However, controlling for the size effect, why

2 While convincing, the tests are not conclusive as it is difficult to distinguish the case where firms that pay higher wages are more productive or profitable (efficiency wages) from more profitable and productive firms being able to pay higher wages (rent-sharing).

should skilled workers have greater bargaining power in FOR as against LOC? Skilled workers may have relatively stronger bargaining power in FOR that want to attract relatively scarce skilled workers but lack detailed information on the local labour market. A number of surveys (UNCTAD, 2000a; Business Map, 2000) indicate that the availability of skills is one of the major barriers to investment in African countries. Thus, FOR are more likely to sort workers on the basis of observable skill characteristics, and this would give rise to rent sharing. Foreign-owned firms that are less familiar with the (availability of) skills in the local labour market are more likely to sort on observable worker characteristics when recruiting new employees.

The technology explanation, by contrast, is based on the idea that certain types of firms (larger or FOR) pay higher wages to skilled workers because such workers are more productive (after controlling for observable worker characteristics), while less-skilled workers have the same productivity in all firms. The basic argument is that some firms are more capital-intensive and/or use more advanced technologies, hence are more skill-intensive. In particular, FOR are expected to be more capital intensive. This need not be because they are more efficient than local firms. Rather, it is because FOR face a lower cost of capital and therefore use relatively more capital (and skill) intensive techniques. Söderbom and Teal (2001b) do not find that foreign firms are more efficient than local firms in Ghana, hence we cannot assume that relative productivity explains the wage differential (for FOR as against LOC). Technology can explain why FOFR employ relatively more skilled labour, but if it is to also explain why they are paid more one would have to show that skilled labour is more productive in FOFs. Görg and Strobl (2001) find that imports of capital goods (technology) explain skill-biased technological change in Ghana, but this relates to firm-level wage differentials.

Within this technology explanation, we need to account for the stylised fact that foreign firms are larger than local firms, as the employer-size wage premium appears to be larger for non-production than for production workers. We may find that foreign firms pay higher wages to more-skilled workers because they are larger, not because they are foreign-owned. Strobl and Thornton (2001) review various options and find that the technology explanation for the differential size-wage premium is the most promising. Using a special dataset for Ghana they find that the size premium varies by skill only in technology intensive firms. To the extent that foreign firms are more technology

intensive and produce more complex products than local firms, we would expect that foreign firms are associated with higher wage differentials for more skilled workers, over and above the effect on the wage differential by skill coming from size effects alone. We can test for this by accounting fully for a differential size-wage premium depending on employee's occupation.

The management explanation for why foreign-owned firms pay higher wages to skilled workers, but not to less-skilled workers, is that management and organisational techniques attach more importance to skilled workers. Foreign firms may be more prone to organisational change, especially when foreign firms acquire (or merge with) local firms, and such change can be more effectively managed by skilled workers. In addition, new management techniques introduced into a country by foreign-owned firms (e.g. just-in-time or lean management techniques), attach more importance to individuals operating at a lower level but who need considerable skills to be successful. The management explanation implies that skilled workers in foreign firms are more productive than in local firms, and is observationally equivalent to the technology explanation. In this paper, we treat the management explanation as part of the technology explanation.

III. FOREIGN OWNERSHIP AND THE EARNINGS FUNCTION

We use and extend the framework of Mincer (1974) to examine the effects of foreign ownership on wages of individuals. This basic framework has been applied by Bigsten *et al*. (2000) to the database we use. The starting point is to estimate the following equation:

$$\log(Y_{it}) = \alpha + \sum_j r_j S_{ij} + \beta_1 age_{it} + \beta_2 age_{it}^2 + \gamma_1 ten_{it} + \gamma_2 ten_{it}^2 + \varepsilon_{it} \qquad (1)$$

Y_{it} is a measure of the wage of individual i=1,…,N at time t=1,…,T. S_{ij} is a 0/1 dummy which is 1 for the highest level j of education completed (or number of years of schooling in the original Mincerian framework) – we include all levels of education except the first (no education), hence j=1,…,J-1, and r_j is the rate of return to the completion of education level j. Experience is captured by employee's *age* and *ten*, the number of years employed by the current firm (tenure), and the squared terms all for

non-linear effects. Appendix A discusses some issues concerning this type of equation, in particular concerning the underlying theory and estimating coefficient r_j. The substance of this paper is to include foreign ownership in (1) in a number of ways to assess which types of workers benefit from foreign ownership.

The first extension is to include a 0/1 dummy FOR_i denoting whether the firm in which individual i is employed has any foreign ownership:

$$\log(Y_{it}) = \alpha + \sum_j r_j S_{ij} + \beta_1 age_{it} + \beta_2 age_{it}^2 + \gamma_1 ten_{it} + \gamma_2 ten_{it}^2 + \varphi FOR_i + \varepsilon_{it} \qquad (2)$$

The coefficient φ is the percentage increase in wages enjoyed by individual i because s/he is employed in a foreign-owned firm. However, as discussed, the coefficient φ may overstate the true effects if foreign ownership is correlated with control variables (Z_k, the firm characteristics such as size, sector, etc.) that are positively correlated with the dependent variable. Equation (3) includes control variables (k=1,…,K).

$$\begin{aligned}\log(Y_{it}) = \alpha + \sum_j r_j S_{ij} + \beta_1 age_{it} + \beta_2 age_{it}^2 + \gamma_1 ten_{it} + \gamma_2 ten_{it}^2 \\ + \varphi FOR_i + \sum_k \zeta_k Z_{ik} + \varepsilon_{it}\end{aligned} \qquad (3)$$

We then estimate (4) to assess whether the mark-up in wages (=φ in (3)) occurs for workers in all sectors (control variables $Z_{SEC,l}$ equal 1 for sector l=1,…,L and 0 otherwise), or workers in some sectors only:

$$\begin{aligned}\log(Y_{it}) = \alpha + \sum_j r_j S_{ij} + \beta_1 age_{it} + \beta_2 age_{it}^2 + \gamma_1 ten_{it} + \gamma_2 ten_{it}^2 + \\ \sum_l \varphi_l FOR_i Z_{i,SEC,l} + \sum_k \zeta_k Z_{ik} + \varepsilon_{it}\end{aligned} \qquad (4)$$

Regression equation (5) estimates (3), but interacts the variable *FOR* with education level *S* (here for j=1,…,J) to assess whether foreign ownership is beneficial for individuals regardless of the level of education completed.

$$\log(Y_{it}) = \alpha + \sum_{j=1,..J-1} r_j S_{ij} + \beta_1 age_{it} + \beta_2 age_{it}^2 + \gamma_1 ten_{it} + \gamma_2 ten_{it}^2 + \sum_{j=1,..,J} \varphi_j FOR_i S_{ij} + \sum_k \zeta_k Z_{ik} + \varepsilon_{it} \quad (5)$$

Foreign ownership is more likely to have a direct and positive effect on poverty if φ_j is positive and significant for individuals with the lowest levels of education. Given the evidence discussed in Section 2, we would expect φ_j to be higher with higher levels of education. Finally, (6) repeats (5) but replaces levels of education with types of occupation (*OCCUP*) to assess whether foreign ownership affects individuals equally regardless of the type of occupation. Given the evidence and theory discussed earlier, we would expect φ_j in (6) to be higher with more complex and skilled occupations.

$$\log(Y_{it}) = \alpha + \sum_{j=1,..J-1} r_j OCCUP_{ij} + \beta_1 age + \beta_2 age^2 + \gamma_1 ten + \gamma_2 ten^2 + \sum_{j=1,..,J} \varphi_j FOR_i OCCUP_{ij} + \sum_k \zeta_k Z_k + \varepsilon_{it} \quad (6)$$

When using the interaction terms between foreign ownership and occupation/education we assume that observable worker and firm characteristics are the only determinants of worker wages. If this is not so, for instance if unobservable worker or firm characteristics affect wages, the φ_j coefficients will be biased if foreign ownership is correlated with the unobservables. One can allow for firm specific effects by first differencing and availing of the panel nature of the firm-level data (e.g. Söderbom and Teal, 2001a). However, it is not possible to allow for worker specific effects as we have data on a repeated cross-section basis and not a panel for individual employees. The same firms are interviewed over time, but the workers interviewed within these firms are not necessarily the same.[3]

IV. DATA DESCRIPTION

The data in this paper draw from firm-level surveys in Cameroon, Ghana, Kenya, Zambia and Zimbabwe as part of the Regional Programme on Enterprise Development

3 Strobl and Thornton (2001) note that as some workers are interviewed more than once, there is a potential for correlated errors if multiple observations for the same worker are included. They try to test for this with the Ghanaian data and find no evidence for a bias in results.

(RPED) conducted in repeated waves during the 1990s. In the data set we use (that available on the CSAE web-site) there are three years (waves) of data for most of the five countries, covering firms in four manufacturing sectors: food, wood, textiles and metal. The dataset includes formal and informal firms of various sizes, and is thought to be representative of the manufacturing sector in the respective countries.

We link two data sets, one containing data on firm characteristics (RPED), such as location, sector, ownership structure and another containing data on individuals (EARN), such as education, occupation, tenure, age and wages. The two databases can be linked through a country specific firm identifier in addition to data on waves. The data relate to two or three different years, and as there are insufficient time series, we pooled data across waves and focus on a static framework.

We use the variable 'any foreign ownership - ANYFOR ' as a 0/1 dummy to define if a firm is FOR. There are different types of wage data. We use monthly earnings data in current domestic prices and also in current dollars converted using PPP values (see Bigsten *et al*., 2000, for the PPP's used). The dependent variable in the regression analysis is in logs. An important part of the analysis in this paper relates to the education and occupation data. The data distinguish between five different levels of education: no education, some primary education, primary education completed, secondary education completed and university. Of course, quality of the various levels of education may not be comparable, so that we need to exercise caution in interpreting regression results that use data pooled across countries. There are also various types of occupations: management, administration, sales staff, supervisor, technician and production worker, and for some countries apprentice and/or master. We take the first four of these occupations (and master) as 'skilled' and the rest as 'unskilled', as does Teal (2000).

The Appendix Table A1 summarises information on key variables by country. It reports the mean, distinguishes between three waves and between two types of ownership: local firms (LOC) and foreign-owned firms (FOR). Individuals in foreign-owned firms appear to have higher wages, longer tenure within the present firm, are better educated, are older and are employed in firms that are larger. These are well-known facts about differences between foreign-owned and local firms in developing countries, as discussed

at great length in Dunning (1993). The differences exist for all five countries, but it would be interesting to test whether these differences are also significant.

Table 1 Influences on Likelihood of Foreign Ownership

Dependent variable = 1 if FOR, 0 otherwise

	Logit regression
Cameroon	1.24
	(5.3) *
Ghana	0.58
	(2.9) *
Kenya	0.20
	(1.0)
Zambia	-0.11
	(-0.5)
Located in capital city	0.12
	(0.9)
Wood and furniture sector	-0.02
	(-0.1)
Textile sector	0.35
	(1.7)
Metal sector	0.85
	(5.5) *
Log (employment)	0.68
	(14.2) *
Share of non-production workers	0.78
	(2.1) *
Constant	-5.0
	(-15.8) *
N	2060
Maximum Likelihood	-825.1

Notes: Zimbabwe is the omitted country, Food the omitted sector. White heteroscedasticity-consistent *t*-statistics in parenthesis; * indicates significance at least at the 5% level.

Table 1 presents the results of a simple logit estimation to see which characteristics are significantly correlated with foreign ownership in the pooled sample (i.e. pooling all five countries). Allowing for country and sector effects, larger firms and firms with a greater share of non-production workers are more likely to have foreign ownership. Firms in Cameroon and Ghana (relative to Zimbabwe) are more likely to have foreign ownership,

as are firms in the metal sector (relative to food). Location in the capital city does not appear to increase the probability of the firm having foreign ownership.

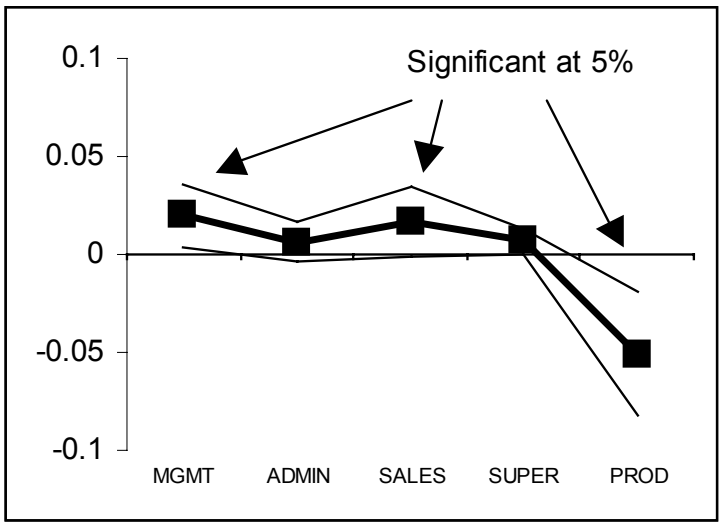
It is interesting to see which type of non-production worker is more prevalent in foreign firms. Chart 1 summarises the results of the following SUR estimation, where s_{ki} = employment share of occupation group k[4] in firm i and X includes relevant controls such as size, location, and country and sector dummies:

$$s_{ki} = \alpha_k + \beta_k FOR + \gamma_k' X_{ki} + \varepsilon_{ki}$$

The parameter of interest, β_k, reflects the difference in the proportions of occupation groups employed in foreign and local establishments. We can assume that errors ε_{ki} are correlated across groups (hence SUR estimation). The results indicate that foreign firms employ significantly more managers and specialised staff, but significantly fewer production workers. This is indeed one of the reasons why foreign firms are likely to pay higher wages on average.

Chart 1Foreign Ownership and Employment Structure of Firms by Occupation

(percentage point differences in shares between foreign and local establishments = β)



Thin lines delineate 95 per cent confidence interval around estimated values

4 The occupation group *TECH* has been omitted due to singularity in the SUR system.

Before presenting the results, it is helpful to be clear on the issues that we do not address (due to data constraints):

- Our results relate to firms with any foreign ownership; affiliates of multinationals (FDI) are too few in the sample for meaningful analysis.
- As the employee data is not a panel, we cannot account for unobserved worker-specific effects, nor are we able to account for any possible bias from having some multiple observations for the same worker.
- As we are concerned with earnings at the individual level, we cannot account for unobserved firm-specific effects nor are we able to consider skill-based wage differentials at the firm level.
- We cannot comment on any long-run impact of foreign ownership on wages, as the data cover at best three years over 1990-93.
- We cannot comment on the overall effect on employment, as we do not have information about manufacturing as a whole in each country.
- We cannot comment on effects of foreign firms on the level of wages in an economy or sector (we do not have data on the share of foreign employment in a sector as a whole, which is typically used in spillover studies).

V. ECONOMETRIC RESULTS

In this section we discuss the results of estimation of equations (1) to (6) (and others) for manufacturing in the five African countries. We began by estimating (1) for each country to check whether our results are consistent with those reported in table 4 of the working paper version of Bigsten *et al*. (2000).[5] The results are summarised in Table 2 (and presented in detail in Appendix A) and are the same except for minor differences, such as values of *t*-statistics, which may be due to the use of a different statistical package.[6] Most coefficients are well determined and consistent with expectations.[7] We can be reasonably confident that this framework is appropriate for testing effects of foreign ownership.

The effects of foreign ownership are positive, substantial and significant in all regressions (Table 2). The first row gives the raw 'FOR premium' without controls.

5 The published version collapses various levels of education into one education variable.

6 We us STATA. The *t*-statistics are computed using heteroscedastic consistent errors (White, 1980), and hence we do not report tests for heteroscedasticity.

Wages for individuals in foreign-owned firms are 20 per cent higher in Cameroon, 24 per cent in Kenya, 30 per cent in Zimbabwe, and 37 per cent in Ghana and Zambia. For most countries the inclusion of *FOR* does not alter the significance level of other variables in specifications (1) and (2), and has only a minimal effect on the values of some coefficients (Appendix Tables A2-A6). In the case of Ghana (Table A3), the coefficient on *tenure* becomes insignificant when *FOR* is included, suggesting that it is only long tenure in a foreign-owned firm, rather than tenure *per se*, that increases earnings. Employees of firms located in the capital city receive a wage premium of some 12-28%, controlling for other factors (Appendix A).

Table 2 Summary of Main Results from Wage Equations

	Cameroon	**Ghana**	**Kenya**	**Zambia**	**Zimbabwe**
'*FOR premium*'					
No controls	0.20	0.37	0.24	0.37	0.30
Firm controls	0.08	0.22	0.17	0.23	0.13
Which workers?					
Sectors	ns	ns	Wood Food	Metal Food	Food
Education	SECC	PRIMC SECC UNIVC	SECC	PRIMN SECC	PRIMC SECC
Occupation	MGMT ADMIN SALES	ns	All but Sales	non-Prod (all)	ns
Size premium					
With controls	0.13	0.15	0.09	0.10	0.14
ST estimates	0.23	0.27	0.27	0.21	0.39

Notes: Summary of results from Tables A2-A6; ns implies non-significant differences in coefficients (based on P-values). '*FOR* premium' is coefficient on *FOR* in specifications (2), no controls, and (3), with firm specific controls. Sectors are the significant interactive (*FOR**sector) terms in specification (4). Education are the significant interactive (*FOR**education) terms in specification (5). Occupation gives the significant interactive (*FOR**occupation) categories in specification (6). Size premium is the coefficient on log(employment) in specification (3),

7 We are not interested in the level of the coefficient for education, see appendix A.

Tables A2-A6. The final column gives estimates of the size-wage effect for all workers with all controls from Strobl and Thornton (2001: Table 3).

The effects of foreign ownership on earnings are substantially reduced when taking firm-specific control variables into account (the second row of Table 2). The results nevertheless suggest that individuals in foreign-owned firms earn higher wages, the premium ranging from eight per cent in Cameroon, 13 per cent in Zimbabwe, 17 per cent in Kenya, 22 per cent in Ghana, to 23 per cent in Zambia. Firm size, as expected, is significant for all countries. Controlling for the other variables, wages of employees in larger firms are higher by some 9-15% (the size-wage effect is smallest in Kenya and greatest in Ghana). Controlling for foreign ownership reduces significantly the size-wage premium estimated by Strobl and Thornton (the final two rows of Table 2) We show that the FOR premium applies fairly uniformly even when one accounts for firm size.

The premium associated with foreign-ownership applies to all workers, but tends to be more pronounced for skilled and non-production workers. However, these skill or occupation-specific results do vary by country, often quite significantly, and are the focus of the remainder of this section. Nevertheless, the most senior workers tend to benefit the most from being employed in foreign-owned firms. The FOR premium is also associated with the educational attainment of workers. In all countries, workers that have completed secondary education benefit from being employed in FOR rather than LOC. In some countries, workers with primary education also gain a FOR premium, but this is not a strong consistent result. There are also some sector effects, although these are difficult to interpret: there appears to be a premium to being employed in foreign-owned firms in the Food sector in Kenya, Zambia and Zimbabwe.

What type of worker benefits from foreign ownership?

To assess if the wage 'premium' from foreign ownership applies equally to different types of worker, we estimate specifications (5) and (6), which omit the *FOR* term. Given that there is a FOR premium, these specifications estimate how it is distributed by educational or occupational level. The results for (5) are presented in Table 3. There are some interesting patterns. Earnings do appear to increase with educational attainment.

The premium on completing primary education (PRIMC) varies from 12% to 37% where significant, whereas that on completing secondary education (SECC) varies from 31% to 81% and is always significant. The premium on a University education appears to be high. Individuals who have not completed primary education (either NONE or PRIMN) do not enjoy a wage premium in foreign-owned firms (the exception is Zambia but the P-value indicates that the coefficients are not significantly different). On the other hand, individuals who have completed secondary education benefit significantly from foreign ownership in all countries under consideration, with an implied premium ranging from 16 per cent in Cameroon to 33 per cent in Kenya.

Table 3 Wage Equations with Education Attainment, specification (5)

	Cameroon	**Ghana**	**Kenya**	**Zambia**	**Zimbabwe**
PRIMC	0.16	0.06	0.14	0.37	0.12
	(2.9) *	(0.9)	(4.8) *	(5.9) *	(2.5) *
SECC	0.53	0.31	0.35	0.81	0.53
	(9.1) *	(3.9) *	(10.6) *	(11.2) *	(8.4) *
UNIVC	1.31	1.44	1.28	1.82	1.73
	(15.5) *	(10.7) *	(10.3) *	(20.8) *	(20.5) *
Foreign ownership (FOR)					
Log (employment)	0.13	0.15	0.09	0.11	0.14
	(8.8) *	(9.1) *	(10.7) *	(6.1) *	(11.9) *
FOR * NONE	0.02	0.14		0.31	-0.08
	(0.1)	(0.1)		(0.9)	(-0.8)
FOR * PRIMN	-0.02	-	-0.05	0.25	0.06
	(-0.1)		(-1.1)	(2.0) *	(0.8)
FOR * PRIMC	-0.02	0.24	0.06	0.10	0.12
	(-0.4)	(6.6) *	(1.6)	(1.4)	(2.4) *
FOR * SECC	0.16	0.21	0.33	0.33	0.23
	(3.2) *	(3.2) *	(6.9) *	(4.3) *	(3.2) *
FOR * UNIVC	0.15	-0.38	0.37	0.40	-0.66
	(1.3)	(-2.0) *	(1.7)	(2.3)	(-2.3)
Time Dummies	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes
N	1534	2257	3035	1593	1866
R-squared	0.52	0.51	0.39	0.48	0.39
Test	P=0.07	P=0.00	P=0.00	P=0.16	P=0.004

Notes: Dependent variable is log of monthly wages in current domestic currency. White heteroscedasticity-consistent *t*-statistics in parenthesis; * indicates significance at least at the 5% level. Equation as specified in the text. The P-values are the probability level that coefficients on FOR*education interaction terms are significantly different. Standard worker controls (age, tenure, male, etc.) are included and reported in Appendix tables, which also report coefficients on firm location, state ownership.

For those countries where there are significant differences between coefficients on $FOR*S_j$, i.e. Ghana, Kenya and Zimbabwe, the latter two show a clear tendency for individuals with a higher level of education completed to benefit more from foreign ownership, at least for the first four levels of education identified. As there are relatively few observations for university educated individuals in foreign owned firms, we attach less weight to those observations. Nonetheless, individuals with low levels of education do not lose as a result of being employed in foreign-owned firms as none of the coefficients on low levels of education are estimated to be significantly negative.

Table 4 presents the results for the estimation of (6) using occupation rather than education dummies. As expected, managers earn more than most other types of occupations, followed by administrators, sales and supervisors, who earn more than technicians and production workers (the base line category). This can be partly explained by the fact that such occupations require more education and skills. Examining the interaction terms between *FOR* and the various occupations, there is a clear tendency for more senior occupations (managers and administrators) in almost all countries, and relatively skilled jobs - supervisors, sales and technicians (in some cases) - to benefit more from being employed in foreign owned firms. Production workers, except in Kenya, do not benefit from being employed by foreign-owned firms. These effects are significant only in those countries for which the null hypothesis of equal coefficients is rejected (see P-values), i.e. Cameroon, Kenya and Zambia. Other coefficients are consistent with earlier results.

Table 4 Wage Equations with Occupation, specification (6).

	Cameroon	Ghana	Kenya	Zambia	Zimbabwe
MGMT	0.87	0.98	0.84	1.19	1.23
	(8.9) *	(11.9) *	(6.4) *	(13.6) *	(9.8) *
ADMIN	0.34	0.37	0.45	0.52	1.41
	(5.1) *	(7.0) *	(6.7) *	(6.9) *	(9.2) *
SALES	0.22	0.27	0.30	0.36	0.62
	(4.1) *	(4.5) *	(3.8) *	(5.3) *	(10.6) *
SUPER	0.25	0.39	0.31	0.25	0.41
	(3.0) *	(7.0) *	(7.0) *	(4.3) *	(9.4) *
TECH	-0.09	0.09	0.06	0.16	0.41
	(-1.5)	(1.8)	(1.9)	(3.0) *	(7.0) *
MASTER	-0.36	0.11			
	(-7.8) *	(2.1) *			
APPRENTICE	-1.30	-1.36			0.24
	(-2.3) *	(-23.9) *			(1.1)
Log (employment)	0.17	0.11	0.11	0.17	0.16
	(10.9) *	(8.0) *	(10.1) *	(10.3) *	(14.0) *
FOR * MGMT	0.35	0.18	0.69	0.73	0.47
	(2.5) *	(1.6)	(2.0) *	(5.0) *	(2.5) *
FOR * ADMIN	0.25	0.15	0.49	0.30	-0.32
	(2.8) *	(2.1) *	(4.1) *	(2.1) *	(-0.8)
FOR * SALES	0.14	0.09	-0.21	0.25	0.09
	(2.0) *	(1.1)	(-1.2)	(2.2) *	(1.2)
FOR * SUPER	0.15	0.14	0.47	0.35	0.17
	(1.2)	(1.8)	(4.4) *	(3.3) *	(2.0) *
FOR * TECH	0.09	0.24	0.35	0.25	0.26
	(1.2)	(3.3) *	(3.2) *	(2.0) *	(1.6)
FOR * PROD	-0.02	0.04	0.15	-0.00	0.02
	(-0.4)	(1.1)	(3.4) *	(-0.1)	(0.5)
FOR * MASTER	0.11	0.03			
	(0.5)	(0.2)			
FOR * APPRENTICE		1.11			0.14
		(10.9) *			(0.6)

N	1534	2257	1937	1593	1866
R-squared	0.48	0.68	0.41	0.50	0.50
Test	P=0.02	P=0.12	P=0.00	P=0.00	P=0.08

Notes: As for Table 3. Time and Sector dummies included.

Foreign ownership, size and varying wage premia by skill level

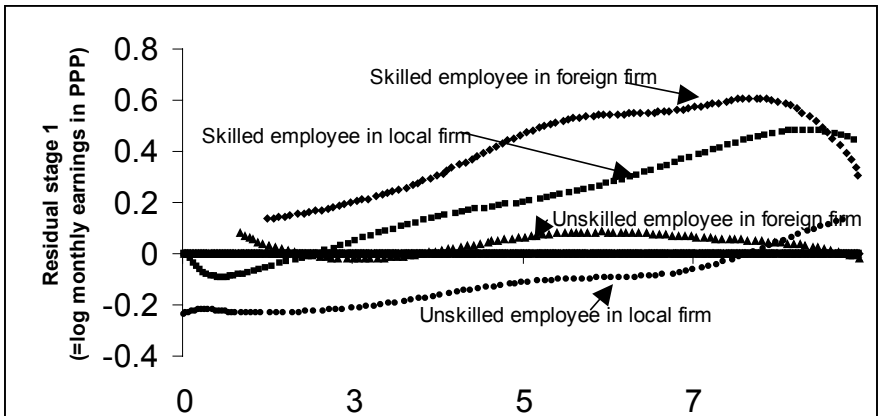
We now consider if the foreign ownership wage premium varies by skill level after taking into account that FOR tend to be large firms and the employer-size premium varies by skill level. Are senior and more skilled workers paid more in foreign-owned firms simply because such firms tend to be larger? We offer two pieces of evidence to suggest that this is not the case, i.e. controlling for size, relatively skilled workers earn a higher wage in *FOR*.. The first is a non-parametric regression on pooled data, and the second is a parametric regression for each country individually. We first estimate:

$$\log(Y_{itc}) = \alpha_c + \sum_j r_j S_{ij} + \beta_1 age + \beta_2 age^2 + \gamma_1 tenure + \gamma_2 tenure^2 + \sum_k \zeta_k Z_k + \varepsilon_{it} \qquad (7)$$

This is a variant of (2), excluding the *FOR* term and estimated on data pooled across all countries. The estimation includes fixed effects for four countries (c = Ghana, Kenya, Zambia and Zimbabwe), sectors, country-specific waves, dummies for male workers, location and state ownership. We save estimated residuals u_{it} from (7) and, in the second stage, regress u_{it} non-parametrically on the log of employment for two levels of skill (skilled and unskilled workers), and by ownership (FOR and LOC). Chart 2 contains the results of the Nadaraya-Watson kernel estimator with bandwidth 0.75 (approximation of true bandwidth that minimises the sum of errors), using a Gaussian kernel function for a 100-point grid (see Blundell and Duncan, 1998).

Chart 2 Kernel estimates of size-wage distributions

by skill of employee and ownership of firm, whole sample.



There are three important results. First, it confirms the existence of an employer-size pay premium (as found parametrically in Strobl and Thornton, 2001). Secondly, foreign firms pay a higher wage than local firms along the whole size distribution (except for some very large firms, but numbers of firms are low at this tail of the distribution). Finally, the pay-premium appears to be greater for skilled workers (and is fairly uniform by firm size), although the difference may not be significant; in general, unskilled workers also receive higher wages if employed in FOR. The tendency of larger firms to provide a pay premium predominantly for skilled workers is often explained by the introduction of skilled-biased technology in such firms (Görg and Strobl, 2001; Strobl and Thornton, 2001).[8] The evidence presented here is consistent with both the hypothesis that foreign firms introduce technologies that are more skill-biased than local firms, after accounting for the size distribution, and the hypothesis that skilled workers in foreign firms are more effective in rent-sharing.

Using parametric regressions, Table 5 includes an interaction term between size and skill. The significant coefficients suggest that larger firms pay higher wages at all skill levels, but the differential is greater for skilled workers (except for Cameroon, the differential is twice as great for skilled workers). Controlling for this, the significant and differing wage premia found for Cameroon, Kenya and Zambia in Table 4 still apply. The FOR wage differential for these countries (and Ghana) is also *significantly* different for different skill levels as indicated by the P-values at the bottom of each column. In Cameroon and Zambia, it appears that only skilled workers benefit from being employed in FOR, whereas for Kenya all workers benefit (but skilled by about twice as much). The results for Ghana are unusual, as it appears that only unskilled workers receive a FOR wage premium. However, in Table 4 the coefficients on *FOR**occupation for Ghana were not significantly different from each other. It does appear that apprentices in

8 Görg and Strobl (2001) do not actually include firm size, or foreign ownership, as determinants of the skilled/unskilled wage premium they estimate. However, they find that imports of foreign capital are a significant determinant of the skill premium, offering support for skill-biased technical change. We conjecture that larger and/or FOR are more likely to import capital (technology) from abroad.

particular are paid more if employed in foreign-owned firms (quite possibly, they are barely paid any wage in local firms), and this may explain the unusual result for Ghana.

Table 5 Who benefits from foreign ownership?

	Cameroon	Ghana	Kenya	Zambia	Zimbabwe
Male	0.13	0.09	0.15	0.08	0.16
	(3.5) *	(1.8)	(4.4) *	(1.8)	(4.7) *
Age	0.08	0.18	0.04	0.05	0.10
	(4.8) *	(17.0) *	(3.6) *	(3.8) *	(9.2) *
Age-squared	-0.0007	-0.002	-0.0004	-0.0004	-0.001
	(-3.0) *	(-14.6) *	(-2.8) *	(-2.5) *	(-8.1) *
Tenure	0.011	0.01	0.007	0.03	-0.007
	(1.8)	(1.9)	(1.3)	(3.1) *	(-1.2)
Tenure-squared	-0.0001	-0.0003	-0.0000	-0.0009	0.0002
	(-0.4)	(-1.2)	(-0.0)	(-2.8) *	(1.4)
PRIMC	0.13	0.03	0.07	0.28	0.09
	(3.0) *	(0.4)	(2.4) *	(5.1) *	(2.4) *
SECC	0.49	0.18	0.20	0.67	0.43
	(10.3) *	(2.4) *	(5.5) *	(9.9) *	(8.0) *
UNIVC	1.24	0.88	1.19	1.62	0.86
	(17.5) *	(7.1) *	(9.8) *	(14.0) *	(4.3) *
Constant	8.1	5.6	8.1	8.1	3.3
	(27.1) *	(29.3) *	(38.4) *	(38.4) *	(16.0) *
State ownership	-0.03	0.01	-0.37	0.27	0.01
	(-0.5)	(0.2)	(-3.4) *	(4.3) *	(0.2)
Located in capital city	0.15	0.27	0.29	0.15	0.12
	(4.1) *	(7.5) *	(12.0) *	(4.1) *	(4.5) *
FOR * SKIL	0.18	0.03	0.34	0.33	0.07
	(3.6) *	(0.6)	(4.9) *	(4.8) *	(1.2)
FOR * UNSKILLED	0.03	0.28	0.16	0.11	0.11
	(0.8)	(7.6) *	(4.2) *	(1.9)	(2.4) *
Log(emp) * SKIL	0.16	0.23	0.15	0.15	0.22
	(10.3) *	(12.6) *	(11.5) *	(8.2) *	(17.6) *
Log(emp) * UNSKILLED	0.10	0.11	0.07	0.07	0.11
	(6.1) *	(6.7) *	(7.0) *	(4.4) *	(9.5) *
Time Dummies	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes
N	1534	2257	1937	1593	1866
R-squared	0.55	0.52	0.45	0.50	0.48
Test H0: coefficients FOR*SK = FOR*UNSK	P=0.016	P=0.000	P=0.027	P=0.0135	P=0.704

Notes: As for Table 2. Dependent variable is log of monthly wages in current domestic currency.

Discussion

There is a large and significant wage premium associated with being employed in FOR. For all workers, without controls, this ranges from 20% in Cameron to 37% in Ghana and Zambia. The inclusion of firm specific controls reduces the premium, but it is still significant and ranges from 8% in Cameroon to about 22% in Ghana and Zambia. There is also an independent size wage-wage premium. There is thus convincing evidence that foreign-owned firms pay higher wages than local firms to workers with similar observable characteristics.

We can only speculate on why this might be so. Our results are in line with the technology explanation, such as provided by Strobl and Thornton (2001), if foreign firms are relatively technology intensive and skill-biased, at least during the early 90s. However, the technology explanation implies that foreign firms are more productive than local firms. The empirical evidence on this using the African data is mixed. Some researchers have found a significant and positive effect of the share of foreign ownership on technical efficiency in Ghana and Zimbabwe (Biggs *et al.*, 1995). Söderbom and Teal (2001b) did not find evidence for a significant effect of a foreign ownership dummy on technical efficiency, using system GMM estimators of production functions. Hence, the jury is still out on whether foreign firms are technically more efficient in specific cases and the results may vary by country, sector and perhaps by period of analysis. Furthermore, as our measure of foreign ownership refers to some ownership by a foreign national, and in few cases are FOR affiliates of multinationals, there is no presumption that they are more efficient.

To assess whether our results are consistent with a bargaining (rent-sharing) explanation we would need to demonstrate 1) that workers are better at capturing rents in foreign-owned than in local firms and 2) that within foreign-owned firms skilled workers are better at bargaining than less-skilled workers. The bargaining explanation follows from the premise that workers in more profitable firms are paid higher wages because they

can capture part of the rents (as formulated in Blanchflower *et al*, 1996). Söderbom and Teal (2001a) provide evidence in support of this in Ghana. We need to show that foreign firms are more profitable, to support point 1) above.

We use a specific database for Ghana, containing data on profits per employee and ownership, sector and location of the firms as well as the period (see Söderbom and Teal, 2001a, for a detailed description of this dataset). We regressed profits per employee (output minus material and labour costs per employee) on a foreign ownership dummy and controlled for other effects such as sector, location and period. For Ghana the average profit per employee is 36 percentage points higher in foreign firms than in local firms and the difference is significant (results available on request). If this were true for other African countries, and if skilled workers are indeed more effective at bargaining than less-skilled workers (because they are relatively scarce and more educated), our findings are consistent with a bargaining explanation. Further empirical work is required, however, to consolidate such an argument.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

This paper used data on individual wages in the manufacturing industry of five African countries (Cameroon, Ghana, Kenya, Zambia and Zimbabwe) in the early 1990s to test whether foreign ownership is associated with higher wages for all education and occupation groups. As our measure of foreign is some ownership by a non-national (individual or multinational enterprise), we are in effect asking if wages differ in firms with access to foreign capital as compared to local firms (assumed to have more restricted access to capital). Consequently, we can assume that capital is cheaper for foreign-owned firms, therefore they will tend to use more capital intensive techniques and more skilled labour. We do not implicitly assume that foreign-owned firms are more efficient (on which the empirical evidence is mixed); while this may be expected for multinationals, it need not be the case for investment by foreign individuals.

We presented two main findings. First, we showed that foreign ownership is associated with a 20-37% differential in average wages (for all workers) in five African countries, allowing for the employee's age, education and tenure (i.e. observable workers characteristics). This FOR wage differential is halved to 8-23 per cent controlling for firm-specific effects (foreign-owned firms are larger and locate in high-wage sectors and

regions). Secondly, there is a tendency for skilled workers (as represented by occupation and education) to benefit more from foreign ownership than less skilled workers. Such skill-specific FOR differentials vary by country, and unskilled workers tend to receive higher wages if employed in FOR, although the benefit from having completed secondary education is apparent in all countries.

While foreign-owned firms pay higher wages than local firms to apparently equivalent employees, this tendency is strongest for more educated and skilled workers. Further empirical analysis is required to distinguish between the two explanations out forward in this paper, whether higher wages to skilled-workers in foreign-owned firms are due to their higher productivity or their greater bargaining power. A lower cost of capital explains why foreign-owned firms employ relatively more skilled workers (as they will use relatively capital and skill-intensive techniques), but does not in itself explain why they pay them more. It is not evident that foreign-owned firms are more efficient, nor is there any particular reason why this should be the case if ownership is by non-resident individuals. On the other hand, it is difficult to test explicitly if skilled workers in foreign firms are more effective in rent-seeking. As such workers are relatively scarce and education, there is a strong presumption that their bargaining power is greater.

Perhaps the two explanations are not mutually exclusive. Consider the dominant case of foreign-ownership, investment by a non-national. The employer will have a preference for relatively skilled labour, given the lower cost of capital, but may have less information about the local labour market. Skilled workers may know this. Thus, the employer is willing and able to pay higher wages, and the skilled employees gain a greater share of rents. Relative ignorance of the local labour market would imply that foreign owners also pay higher wages to unskilled workers and there is evidence of this. It is plausible, and consistent with the available evidence, to contend that foreign owners pay higher wages because they have less knowledge about local labour. Educated workers can obtain a higher premium from working in foreign firms because they have greater bargaining power. If workers *are* more productive in foreign-owned firms, this would compensate employers for paying higher wages but is not necessary to explain why they pay higher wages.

There is no evidence that any workers are paid less in foreign-owned firms, even unskilled workers benefit. While wages are higher in foreign-owned firms, we have no information on which to infer aggregate effects on incomes and/or employment, and hence on wage inequality. Whilst it seems likely that increased foreign ownership would tend to increase wage inequality, the presumption would be that average wages increase and employment is, at least, not reduced (foreign-owned firms tend to e larger). To contend that foreign investment (ownership) is harmful, one would need to demonstrate that it displaces local employment and has no positive spillover on wages in local firms. Restricting foreign ownership may well be counter-productive, as foreign firms tend to pay higher wages (*ceteris paribus*). On the other hand, encouraging foreign ownership (e.g. by attracting foreign investment, especially FDI) may not be an effective and efficient way to raise absolute and relative wages of low-income workers in the short-run. Complementary policies would be required to ensure that foreign ownership benefits all types of workers equally.

Based on the evidence in this paper, there appear to be at least two types of complementary policies. First, governments could bring the level of education of individuals up to completed first and secondary education. While this may reduce the wage premium as skilled workers are less scarce, it should increase employment as investors are attracted by the availability of skilled workers. Secondly, the government can support training schemes aimed at specific vocational training for less-skilled workers. While a general increase in skill levels may reduce the private return to education and training there should be a net social benefit through increased employment and, ideally, productivity.

However, any definite answer on the effects of foreign ownership on incomes of low-income groups in these African countries would depend on information beyond what is available at present. For instance, based on the available data we were not able to specify what the effects were on the *level* of wages either in foreign or in local firms, but wage *differentials* between foreign and local firms only. Nor were we able to specify the direct employment effects, the indirect and long-run effects on wage and employment (especially in the informal sector), or the effects on non-manufacturing. Nevertheless, we are convinced by the evidence that employees of foreign-owned firms are paid higher wages than employees of locally-owned firms.

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APPENDIX A Mincer's Human Capital Earnings Functions

The human capital earnings function usually referred to as the standard human capital earnings function of Mincer (1974) is:

$$\ln Y_{it} = \alpha + rS_i + \beta_1 t_i + \beta_2 t_i^2 + u_{it} \quad \text{(A1)}$$

where ($\ln Y$) is the log of earnings for individual i at time t, S_i is number of years spent at school and t_i reflects post-school experience. The estimate of r can be seen as the rate of return to one more year of schooling.

The derivation of Mincer's equation A1 was originally based on human capital theory that a worker maximises discounted lifetime earnings, and that there is a choice between time spent on *current* earnings and time spent on learning (an investment that generates *future* earnings). The positive relationship between S and Y arises because schooling raises a worker's productivity and hence wages. This can be contrasted with a signalling or sorting explanation which explains a positive relationship between S and Y by the fact that education is correlated with real productivity-enhancing attributes (ability etc.), hence a signal on which to sort individuals. Equation A1 can also be seen as a simple accounting identity (and not based on human capital theory) in that earnings at t+1 are earnings at t plus the investment made in human capital times the rate of return on the investment.

There are a number of potential biases when estimating A1 by OLS, although these have not been shown to be serious in practice in the African case. First, S may be endogenous. In an optimising investment model we expect that schooling is positively correlated with the return to schooling and hence the OLS estimate of r is biased upwards. Secondly, an OLS estimate of r is biased because the schooling is often measured with error. Thirdly, an OLS estimate of r is biased upwards due to unobserved worker attributes with are correlated positively with schooling and earnings, often called the ability bias. Finally, the effect of schooling may vary systematically with family background characteristics that also affect the number of years of schooling. We acknowledge these problems. However, we do not specifically interpret the coefficient r, but focus on the effects of foreign ownership. As such it may be that foreign ownership captures ability or other bias, for instance, if more able individuals are employed by foreign-owned firms.

Table A1 Summary Statistics: Principal variables by Country

Country	Wave 1		Wave 2		Wave 3	
	LOC	**FOR**	**LOC**	**FOR**	**LOC**	**FOR**
Cameroon						
Wages	383.18	629.82	427.32	695.70	295.92	476.48
N (workers)	579	403	450	273	335	200
Primary	.5095	.5079	.4089	.4135	.3413	.2037
Secondary	.3251	.3395	.4427	.4346	.4960	.6420
University	.0628	.0526	.0703	.0802	.0992	.1111
Tenure	5.2199	8.7879	4.5761	9.7838	5.3204	9.6060
Age	33.0399	36.0605	31.3438	36.6076	33.1468	36.512
Firm size	3.1116	4.6409	2.9693	4.4362	2.8620	4.2797
Ghana						
Wages	153.868	231.983	155.098	256.125	135.008	247.693
N (workers)	541	143	574	185	889	225
Primary	.7375	.6763	.7651	.7717	.7037	.7265
Secondary	.1950	.2374	.1706	.1957	.2025	.2242
University	.0077	.0360	.0147	.0217	.0069	.0224
Tenure	5.107	8.034	5.160	8.190	4.441	7.781
Age	29.736	35.734	28.842	35.082	28.856	36.628
Firm size	3.212	4.365	3.198	4.345	3.330	4.548
Kenya						
Wages	297.366	393.885	230.547	484.285	350.517	645.294
N (workers)	886	299	833	212	832	200
Primary	.469	.332	.426	.316	.470	.345
Secondary	.343	.430	.351	.435	.371	.452
University	.007	.013	.007	.043	.021	.076
Tenure	7.531	9.432	6.830	9.184	7.268	8.614
Age	33.808	36.198	32.310	35.474	32.859	34.751
Firm size	3.684	4.615	3.568	4.608	3.609	4.648

Country	Wave 1		Wave 2		Wave 3	
	LOC	FOR	LOC	FOR	LOC	FOR
Zambia						
Wages	175.550	281.037	190.882	260.121	141.729	240.794
N (workers)	641	171	537	117	273	92
Primary	.5305	.3567	.5194	.3652	.4688	.4719
Secondary	.3376	.5146	.3527	.4261	.4297	.4719
University	.0370	.0702	.0426	.1043	.0391	.0449
Tenure	5.979	8.128	6.414	9.001	6.973	8.699
Age	33.330	36.298	33.295	37.452	34.293	37.191
Firm size	3.705	5.174	3.589	4.141	3.902	4.753
Zimbabwe						
Wages	290.905	474.258	273.967	506.180		
N (workers)	1,012	374	452	173		
Primary	.4745	.4595	.5309	.4452		
Secondary	.3457	.3216	.3041	.2710		
University	.010	.035	.008	.045		
Tenure	8.832	12.277	9.350	12.443		
Age	34.329	37.549	35.119	38.239		
Firm size	4.475	5.702	4.434	5.445		

Variables are mean of monthly wages in US$ PPP, number of workers (N), percentage with primary education completed, secondary education completed and university education, mean tenure within firm (years), mean age of individuals (years) and log of firm employment. FOR = foreign-owned firm; LOC = local firm.

Table A2 Wage equations for Cameroon

	(1)	(2)	(3)	(4)	(5)
Male	0.02	0.01	0.03	0.03	0.04
	(0.6)	(0.4)	(0.8)	(0.7)	(1.0)
Age	0.12	0.11	0.08	0.08	0.08
	(6.3)*	(5.8) *	(4.5) *	(4.5) *	(4.7) *
Age-squared	-0.001	-0.001	-0.0006	-0.0006	-0.0007
	(-4.5)*	(-4.0) *	(-2.7) *	(-2.7) *	(-2.9) *
Tenure	0.03	0.02	0.01	0.01	0.01
	(5.1) *	(3.6) *	(1.7)	(1.7)	(1.7)
Tenure-squared	-0.0004	-0.0002	-0.0001	-0.0001	-0.0001
	(-1.6)	(-0.8)	(-0.5)	(-0.6)	(-0.5)
Primary education completed (PRIMC)	0.20	0.16	0.16	0.15	0.16
	(4.1) *	(3.4)*	(3.4) *	(3.4) *	(2.9) *
Secondary education completed (SECC)	0.72	0.70	0.59	0.59	0.53
	(14.1) *	(14.0) *	(12.0) *	(12.0) *	(9.1) *
University completed (UNIVC)	1.57	1.53	1.36	1.36	1.31
	(22.2) *	(21.7) *	(19.2) *	(19.1) *	(15.5) *
Constant	7.8	8.0	8.1	8.1	8.1
	(22.9) *	(23.0) *	(26.3) *	(26.3) *	(26.3) *
Log (employment)			0.13	0.13	0.13
			(8.8) *	(8.7) *	(8.8) *
Foreign ownership (FOF)		0.20	0.08		
		(6.6) *	(2.4) *		
State ownership			0.01	-0.05	0.02
			(0.2)	(-0.1)	(0.3)
Located in capital city			0.15	0.15	0.16
			(4.0) *	(4.1) *	(4.1) *
Time dummies	Yes	Yes	Yes	Yes	Yes
Sector Dummies			Yes	Yes	Yes
FOR*sector Dummies				Yes	
FOR*Educ Dummies					Yes
N	1655	1631	1534	1534	1534
R-squared	0.47	0.48	0.52	0.52	0.52
Test				P=0.52	P=0.07

Notes: Dependent variable is log of monthly wages in current domestic currency. Equations as specified in the text. White heteroscedasticity-consistent *t*-statistics in parenthesis; * indicates significance at least at the 5% level.

Table A3 Wage Equations for Ghana

	(1)	(2)	(3)	(4)	(5)
Male	-0.02	-	0.03	0.03	0.03
	(-0.5)	0.03	(0.5)	(0.5)	(0.5)
		(-			
		0.1)			
Age	0.22	0.22	0.19	0.22	0.19
	(22.4) *	(21.	(17.7) *	(22.4) *	(17.5) *
		0) *			
Age-squared	-0.002	-0.002	-0.002	-0.002	-0.002
	(-18.5) *	(-17.6) *	(-14.9) *	(-14.8) *	(-14.7) *
Tenure	0.02	0.01	0.01	0.01	0.01
	(2.5) *	(1.7)	(1.8)	(1.9)	(1.8)
Tenure-squared	-0.0003	-0.0001	-0.0001	-0.0001	-0.0001
	(-1.1)	(-0.6)	(-0.6)	(-0.8)	(-0.6)
Primary education	0.25	0.17	0.08	0.08	0.06
completed (PRIMC)	(3.9) *	(2.5) *	(1.1)	(1.2)	(0.9)
Secondary education	0.57	0.47	0.32	0.32	0.31
completed (SECC)	(8.2) *	(6.4) *	(4.3) *	(4.4) *	(3.9) *
University completed	1.40	1.39	1.18	1.19	1.44
(UNIVC)	(12.7) *	(10.7) *	(9.4) *	(9.3) *	(10.7) *
Constant	5.1	5.2	5.3	5.3	5.3
	(27.1) *	(26.3) *	(27.5) *	(27.3) *	(27.2) *
Log (employment)			0.15	0.16	0.15
			(9.1) *	(9.0) *	(9.1) *
Foreign ownership		0.37	0.22		
(FOF)		(12.4) *	(6.6) *		
State ownership			0.03	0.03	0.03
			(0.7)	(0.6)	(0.7)
Located in capital			0.26	0.27	0.26
city			(7.2) *	(7.2) *	(7.2) *
Time Dummies	Yes	Yes	Yes	Yes	Yes
Sector Dummies			Yes	Yes	Yes
FOR*Sector				Yes	
Dummies					
FOR*Educ Dummies					Yes
N	2557	2257	2257	2257	2257
R-squared	0.45	0.47	0.50	0.51	0.51
Test				P=0.43	P=0.00

Notes: As for Table A2.

Table A4 Wage Equations for Kenya

	(1)	(2)	(3)	(4)	(5)
Male	0.06	0.05	0.08	0.08	0.08
	(1.9)	(1.6)	(2.6) *	(2.7) *	(2.4) *
Age	0.06	0.05	0.04	0.04	0.04
	(5.4) *	(5.4) *	(3.5) *	(3.5) *	(3.5) *
Age-squared	-0.0005	-0.0005	-0.0003	-0.0003	-0.0003
	(-3.5) *	(-3.0) *	(-2.0) *	(-2.0) *	(-1.9)
Tenure	0.04	0.006	0.0001	0.0001	0.0002
	(0.8)	(1.1)	(0.0)	(0.0)	(0.0)
Tenure-squared	0.0001	-0.0001	0.0001	0.0001	0.0001
	(0.3)	(-0.3)	(0.5)	(0.6)	(0.5)
Primary education	0.21	0.21	0.16	0.16	0.14
completed (PRIMC)	(7.6) *	(7.5) *	(6.1) *	(6.0) *	(4.8) *
Secondary education	0.58	0.55	0.43	0.42	0.35
completed (SECC)	(18.3) *	(17.1) *	(13.8) *	(13.7) *	(10.6) *
University completed	1.71	1.61	1.42	1.42	1.28
(UNIVC)	(15.8) *	(15.2) *	(13.0) *	(13.4) *	(10.3) *
Constant	6.2	6.2	6.1	6.1	6.2
	(32.4) *	(32.2) *	(34.2) *	(33.9) *	(34.7) *
Log (employment)			0.09	0.09	0.09
			(10.4) *	(10.4) *	(10.7) *
Foreign ownership		0.24	0.17		
(FOR)		(8.7) *	(6.0) *		
State ownership			-0.07	0.06	-0.12
			(-0.6)	(0.5)	(-1.1)
Located in capital city			0.28	0.27	0.28
			(13.8) *	(12.2) *	(13.5) *
Time Dummies	Yes	Yes	Yes	Yes	Yes
Sector Dummies			Yes	Yes	Yes
FOR*Sector Dummies				Yes	
FOR*Educ Dummies					Yes
N	3143	3045	3035	3035	3035
R-squared	0.29	0.29	0.38	0.39	0.39
Test				P=0.00	P=0.00

Notes: As for Table A2.

Table A5 Wage Equations for Zambia

	(1)	(2)	(3)	(4)	(5)
Male	0.01	-0.00	-0.01	-0.02	-0.01
	(0.3)	(-0.0)	(-0.2)	(-0.0)	(-0.2)
Age	0.08	0.06	0.05	0.05	0.05
	(6.0) *	(6.0) *	(4.3) *	(4.0) *	(4.3) *
Age-squared	-0.0008	-0.0006	-0.0005	-0.0005	-0.0005
	(-4.5) *	(-3.6) *	(-2.8) *	(-2.6) *	(-4.5) *
Tenure	0.04	0.04	0.03	0.03	0.03
	(5.2) *	(4.1) *	(3.6) *	(3.5) *	(3.7) *
Tenure-squared	-0.001	-0.001	-0.001	-0.001	-0.001
	(-3.9) *	(-3.3) *	(-2.9) *	(-2.8) *	(-2.9) *
Primary education	0.36	0.36	0.34	0.34	0.37
completed (PRIMC)	(5.6) *	(6.3) *	(5.9) *	(5.7) *	(5.9) *
Secondary education	1.01	0.99	0.84	0.84	0.81
completed (SECC)	(14.4) *	(15.4) *	(12.3) *	(12.1) *	(11.2) *
University completed	2.13	2.06	1.88	1.87	1.82
(UNIVC)	(20.8) *	(19.9) *	(16.3) *	(16.0) *	(20.8) *
Constant	8.0	8.2	7.9	7.9	7.9
	(37.3) *	(39.4) *	(36.4) *	(36.1) *	(35.9) *
Log (employment)			0.10	0.11	0.11
			(5.9) *	(6.3) *	(6.1) *
Foreign ownership		0.37	0.23		
(FOR)		(8.4) *	(4.7) *		
State ownership			0.24	0.24	0.25
			(3.8) *	(3.6) *	(3.9) *
Located in capital city			0.15	0.17	0.16
			(4.0) *	(4.4) *	(4.2) *
Time Dummies	Yes	Yes	Yes	Yes	Yes
Sector Dummies			Yes	Yes	Yes
FOR*Sector Dummies				Yes	
FOF*Educ Dummies					Yes
N	2471	1763	1593	1593	1593
R-squared	0.39	0.44	0.47	0.48	0.48
Test				P=0.02	P=0.16

Notes: As for Table A2.

Table A6 Wage Equations for Zimbabwe

	(1)	(2)	(3)	(4)	(5)
Male	0.21	0.18	0.11	0.10	0.12
	(5.1) *	(4.3) *	(3.0) *	(2.6) *	(3.0) *
Age	0.16	0.15	0.13	0.13	0.13
	(12.9) *	(12.6) *	(11.0) *	(10.9) *	(10.9) *
Age-squared	-0.002	-0.002	-0.001	-0.001	-0.001
	(-11.6) *	(-11.3) *	(-9.8) *	(-9.6) *	(-9.6) *
Tenure	0.01	0.03	-0.01	-0.01	-0.01
	(2.3) *	(0.5)	(-1.8)	(-2.0) *	(-1.5)
Tenure-squared	-0.0004	0.0002	0.0005	0.0005	0.0004
	(-0.2)	(1.0)	(2.6) *	(2.6) *	(2.4) *
Primary education completed (PRIMC)	0.15	0.15	0.14	0.16	0.12
	(3.5) *	(3.4) *	(3.5) *	(3.9) *	(2.5) *
Secondary education completed (SECC)	0.77	0.73	0.58	0.58	0.53
	(13.0) *	(12.1) *	(10.2) *	(10.3) *	(8.4) *
University completed (UNIVC)	1.79	1.64	1.27	1.28	1.73
	(10.5) *	(9.3) *	(6.8) *	(7.2) *	(20.5) *
Constant	2.6	2.7	2.6	2.6	2.7
	(11.3) *	(11.8) *	(11.7) *	(11.8) *	(12.1) *
Log (employment)			0.14	0.15	0.14
			(12.2) *	(8.7) *	(11.9) *
Foreign ownership (FOR)		0.30	0.13		
		(8.3) *	(3.3) *		
State ownership			0.06	0.05	0.05
			(0.8)	(0.7)	(0.6)
Located in capital city			0.12	0.08	0.12
			(4.1) *	(2.8) *	(4.0)
TimeDummies	Yes	Yes	Yes	Yes	Yes
Sector Dummies			Yes	Yes	Yes
FOR*Sector Dummies				Yes	
FOR*Educ Dummies					Yes
N	1960	1866	1866	1866	1866
R-squared	0.29	0.30	0.38	0.39	0.39
Test				P=0.00	P=0.004

Notes: As for Table A2.

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Norman Gemmell – growth and public sector issues
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