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No. 02/18

Spatial Inequality for Manufacturing Wages in 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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The Authors
Dirk Willem te Velde is a Research Fellow in the Overseas Development Institute (dw.tevelde@odi.org.uk.). Oliver Morrissey is Director of CREDIT, ODI Research Fellow and Reader in Development Economics, University of Nottingham.

Acknowledgements
This paper was prepared for the *WIDER Conference on Spatial Inequality*, LSE, 27-29 June 2002. We are grateful to DFID for funding under grant R8003. We are grateful to CSAE for making available the manufacturing survey data used, and to Simon Appleton, Andrew McKay and Neil McCulloch for providing advice on data on inequality. Views and opinions expressed are those of the authors alone.

September 2002

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Abstract
This paper uses data on individual earnings in manufacturing industry for five African countries in the early 1990s to test whether firms located in the capital city pay higher earnings than do firms located elsewhere, and whether such benefits accrue to all or only certain types of workers. Earnings equations are estimated that take into account worker characteristics (education and tenure) and relevant firm characteristics (notably size and whether owned by a foreigner). Any location effect identified is therefore additional to appropriate control variables. There are two main findings. First, we find evidence of a 'capital city premium' that varies between 12% and 28% in the five countries. This location premium does not always exceed plausible consumer price differentials, between the capital and other areas, and therefore does not demonstrate that real (purchasing power) manufacturing wages are higher in the capital city. This suggests that spatial inequality in real earnings is unlikely to be significant for manufacturing employees. Secondly, while we find that skilled workers earn a higher wage premium in the capital city than less skilled workers, this is not because of location effects on earnings *per se*, but rather because of other firm characteristics of firms located in the capital city such as size and foreign ownership. This suggests that spatial inequality in itself does not directly contribute to skilled/less-skilled wage differentials in manufacturing.

Outline
1. Introduction
2. Factors Influencing Spatial Inequality in Manufacturing Wages
3. Location and the Earnings Function
4. Data Description and Results
5. Conclusions and Policy Implications

1. INTRODUCTION

Within the broad context of spatial inequality, this paper examines the issue of inequality in manufacturing wages. Specifically, we ask if workers with similar characteristics are paid higher wages if employed by firms located in the capital city than if employed by firms located elsewhere. It is well established that poverty is higher, and average incomes lower, in some regions of a country than in others, and typically incomes are highest in and around the capital city (or the major city if it is not the administrative capital). For example, in Uganda poverty is lowest in the central region around Kampala and highest in the insecure northern region. To a large extent, spatial inequalities reflect rural-urban divides in earning opportunities associated with the sector composition of employment – higher paid jobs in manufacturing and services are concentrated in urban areas, whereas low paid agriculture sector jobs are in rural areas. However, it may be the case that even within the manufacturing sector there are spatial inequalities in wages, such that real earnings are higher for workers employed in the capital city as compared with other urban locations. This is the issue we investigate.

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 Regional Programme on Enterprise Development (RPED), through which the World Bank and bilateral donors 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 (earnings 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 size, location and whether there is foreign ownership). We examine if firms located in the capital city pay higher earnings for equivalent workers when compared with firms located elsewhere, controlling for relevant firm characteristics.

A number of recent studies analyse these surveys (e.g. Bigsten *et al*. 1997, 1999, 2000; Strobl and Thornton, 2001; 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. Bigsten *et al.* (2000) examine rates of return on physical and human capital whereas Strobl and Thornton (2001) and Mazumdar (1995), using the same cross-country data set that we use, are more concerned with the effect of firm size. Te Velde and Morrissey (2001) use the same data to study the effect of foreign ownership on earnings. This paper follows the same general approach and includes control variables identified as important in the previous studies, but with a focus on the effect of location on earnings and earnings differentials.

We do not present measures of spatial inequality, but rather present some evidence on location differences in manufacturing earnings. Although we do not know where firms not located in the capital city were actually based, the presumption is that most such firms were located in other urban areas rather than in rural areas. Unfortunately, most of the information on spatial differences in inequality and poverty refers to rural-urban and/or regional differences. We review some evidence on Ghana and Zambia to give an indication of the magnitudes. As we in effect identify the wage premium of being employed in the capital city, to evaluate the significance of this we would like data on price or cost of living differences between the capital city and other urban areas. Such data is difficult to find, a point we return to in the concluding section. Thus, where we identify a 'location premium' (for being in the capital city) we will have to make a judgement as to whether the size of the differential is greater than could be expected to account for plausible price differentials between the capital and other urban areas.

McCulloch *et al* (2000) show that there were significant rural-urban and regional differences in poverty and inequality in Zambia in 1991. Mean per adult equivalent real consumption in urban areas was some three times the level of that in rural areas. They estimate, again for 1991, that some 70% of the national population were below the upper poverty line; this figure was almost 90% in rural areas but 47% in urban areas (although there was a dramatic increase in urban poverty during the 1990s). Rural inequality was at the national level with a Gini of 0.56, compared to 0.45 in urban areas. The three most urbanised provinces (Copperbelt, Central and Lusaka) had Ginis ranging from 0.47 to 0.52, whereas in rural provinces Ginis were mostly about 0.6. The general perception that poverty and inequality are higher in rural areas is confirmed for Zambia.

Unfortunately, there is no data to allow a comparison of prices or real incomes in different urban areas.

Coulombe and McKay (2001) compare poverty and inequality in Ghana between 1991/2 and 1998/9. Overall inequality increased, especially in rural areas, while inequality in Accra fell. Thus, urban-rural inequality rose. Almost 20% of overall inequality was due to inequality between locations. They note that inequality fell for formal sector employees. Of greater relevance for our purposes, they report data on cost of living indices that suggest that the cost of living in Accra is about 12% higher than in other urban areas.

What the available studies show is that incomes tend to be higher, and poverty and inequality lower, in urban as compared with rural areas (or in more urbanised as compared with less urbanised regions). One reason for this, confirmed for Ghanaian data, is that earnings tend to be higher, and inequality lower, in formal sector employment (especially manufacturing) than in the informal sector (urban) or agriculture (rural). Furthermore, manufacturing employment tends to be concentrated in urban areas, especially the capital city. If spatial inequality in manufacturing earnings is relatively low, this may contribute to lower observed inequality in urban areas. This is the issue we address. As discussed below, most literature on wage inequality concentrates on educational or skill differentials. We also discuss these, and whether they appear to be affected by location.

We would expect to find that wages are higher in the capital city, if only because the cost of living is higher. Our aim is to see if the capital city premium is at least what would be explained by price differences, and to elicit some of the other factors that may explain higher capital city wages. The structure of the paper is as follows. Section 2 presents some issues in the literature relating to wage inequality, identifying reasons why wages may be higher in the capital. This is brief as the literature has not specifically addressed this type of spatial inequality. Section 3 then presents the wage determination model, essentially a Mincerian framework. Section 4 discusses the data and presents our results, assessing the size of and factors influencing the location premium. Conclusions are presented in Section 5 with a discussion of the significance of the location premium estimated.

2. FACTORS INFLUENCING SPATIAL INEQUALITY IN MANUFACTURING WAGES

There are at least three general reasons why workers employed by firms located in the capital city may earn higher wages than workers employed by firms located elsewhere. First, the *distribution of worker characteristics* may be skewed towards a particular location. While we can control for observed characteristics, such as educational attainment (level of schooling reached) or experience (measured as tenure), and therefore compare 'similar workers' (i.e. those with similar characteristics), there may be important unobserved factors. For example, workers in the capital city may be more motivated or better educated (e.g. urban schools have a better quality of education, or the workers had higher exam marks), and are therefore paid more. Such unobserved characteristics will be part of any observed differences in earnings for apparently similar workers.

Second, the *distribution of firm characteristics* may be skewed towards a particular location and such features of firms can be associated with higher wages. Much of the literature on wage inequality is concerned with the effects of size and foreign ownership, especially foreign direct investment (FDI) by multinationals. Two issues arise – do foreign (or larger) firms pay higher wages than local firms to similar workers and do foreign firms or larger firms contribute to increasing wage inequality between skilled and unskilled workers. We will consider some of these issues indirectly, insofar as we account for size and ownership in the wage equations.

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, face lower capital costs and hence can pay more. But there are also other reasons for a wage differential, see Te Velde and Morrissey (2001). Foreign firms may be more profitable than local firms and, as Blanchflower *et al.* (1996) argue, earnings can be positively correlated to profits, which is shown empirically in the case of Ghana (Söderbom and Teal, 2001a).

These firm characteristics are known to be associated with higher earnings and may be correlated with location in the capital city. In particular, workers in larger firms (measured by employment) have higher earnings - the 'size premium' identified by Te Velde and Morrissey (2001) and Strobl and Thornton (2001), amongst others. Similarly, Te Velde and Morrissey (2001) identify a 'foreign premium' as foreign-owned firms pay higher earnings to equivalent workers. We will test for the possibility that firms with such characteristics, larger and/or foreign-owned, are more likely to locate in capital cities. Note that if such correlations are present this does not reduce the spatial inequality but rather offers explanations for why earnings are higher for those employed in capital cities.

Third, *workers in capital cities may earn higher wages than similar workers employed by similar firms located outside the capital city*. This could simply be to compensate for a higher cost of living. Higher wages in the presence of a higher cost of living will help to maintain the balance between centrifugal and centripetal forces, see Krugman and Livas (1996) and Fujita *et al.* (1999). If wages are too high compared to consumer prices, firm may locate elsewhere. Similarly, if wages are too low compared to consumer prices, workers may choose to work elsewhere. Consumer prices may be higher in the capital city than elsewhere, therefore earnings have to be higher to maintain purchasing power. For example, the average monthly basic minimum wage in Nairobi was 1706 Kenyan Shillings in 1992, whereas that in other (small, rural) towns was 1343, some 20% lower (Kenyan *Economic Survey 1995*, which does not give comparable price data). While we use a measure of real earnings, this is constructed from an aggregate country deflator and therefore does not capture regional price variations. We do not have information on regional price variability that is compatible with our wage data, and cannot account for this directly. We will consider if any estimated location premium (higher earnings in the capital city) is consistent with plausible magnitudes of regional price variations. Significant long-run variations in real earnings across space is only possible when labour markets are sufficiently segmented spatially.

However, keeping a balance between centrifugal and centriputal forces does not explain the existence of a spatial wage differential in the first place. There are two different

explanations for such wage differential and to distinguish between these explanations would require information on the effects of location on earnings as well as productivity.[1]

One possible reason is that unionisation, or bargaining power more generally, is greater in the capital city. In other words, there are location reasons why wages (not productivity) in the capital city may be higher for similar workers. This may apply to a larger extent to skilled workers who would otherwise be poached by other firms. Firms would not be able to afford paying higher wages over the long-run unless compensated for this in the form of lower costs for other inputs or in the form of higher production efficiency.

Another possible reason for higher wages for workers in capital cities is that externalities associated with location in the capital may enhance the productivity of firms and workers within firms. Hence, firms in capital cities can afford to pay more to their workers than firms located elsewhere, in the short as well as long-run. Urban economies may lead to greater production efficiency as they exhibit increasing returns to scale associated with three types of agglomeration economies (see e.g. Wheaton and Lewis, 2002). *Urbanisation economies* could be present as large cities can provide more direct support services and industrial linkages. *Localisation economies arising from knowledge* transferred between firms in the same industry through direct contact or spatial proximity could also enhance skill accumulation productivity. *Localisation economies arising from scale* whereby scale improves labour market search and matching, which in turn enhances specialisation and productivity.[2] Agglomeration economies may lead to static or dynamic improvements in productivity, which can then lead to higher wages. It could be that skilled workers are able to capture more of such productivity gains through their ability to learn more from contacts than less-skilled workers, in which case skilled workers could benefit more from being employed by firms in the capital city.

1 This paper concentrates on the effects of location on earnings and hence may not be able to distinguish between both explanations appropriately.

2 Glaeser and Mare (1994) distinguish between two types of (dynamic) locational economies. They find that faster urban wage growth can be explained by faster skill accumulation not by improved labour market outcomes in cities.

3. LOCATION AND THE EARNINGS FUNCTION

We use and extend the framework of Mincer (1974) to examine the effects of location on earnings of individuals. This basic framework has been applied by Bigsten *et al*. (2000) and Te Velde and Morrissey (2001) 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 allow for non-linear effects. The substance of this paper is to include location in (1) in a number of ways to assess the effect on earnings.

The first extension is to include a 0/1 dummy $LOCC_i$ =1 if the firm in which individual i is employed in the capital city, and zero otherwise:

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

The coefficient φ is the percentage increase in earnings enjoyed by individual i because s/he is employed in a firm located in the capital. The coefficient φ may overstate the true effects if location is correlated with control variables (Z_k, the firm characteristics such as size, foreign ownership, sector, etc.) that are positively correlated with the dependent variable. For example, it may be the case that larger firms locate in the capital city and it is established that there is a size-premium in earnings. Thus, the coefficient on *LOCC* may be in part or wholly due to the fact that large firms locate in the capital city. A similar argument applies in the case of foreign-owned firms. Equation (3) therefore includes firm-level control variables (k=1,…,K).

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

We then estimate (4) to assess whether the location mark-up in earnings (=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:

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

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

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

Finally, (6) repeats (5) but replaces levels of education with types of occupation (*SKILLOCCUP*= skilled occupations such as managers, supervisors, sales workers and administrators, while other occupations are defined as less-skilled) to assess whether foreign ownership affects individuals equally regardless of the type of occupation. Given possible explanations discussed earlier, φ_j in (6) could be higher with more complex and skilled occupations if skilled workers in capital cities are better at skill accumulation or better at wage bargaining than less-skilled workers in capital cities.

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

When using the interaction terms between location and occupation/education we assume that observable worker and firm characteristics are the only determinants of worker

earnings. If this is not so, for instance if unobservable worker or firm characteristics affect earnings, the φ_j coefficients will be biased if location is correlated with the unobservables. One could 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]

4. DATA DESCRIPTION AND RESULTS

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 (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 earnings. 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. Our core variable of interest is firms located in the capital city (*LOCC* = 1, otherwise 0). Other control variables are included. For example, the variable *FOR* is a 0/1 dummy to define if a firm is foreign-owned.

There are different types of earnings data. We use monthly earnings data (wages and benefits) in current domestic prices. The dependent variable in the regression analysis is in logs. An important part of the analysis in this paper relates to the education and

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.

occupation data. The data distinguish between five different levels of education: no education, some primary education, primary education completed, secondary education completed and university. The data also distinguish occupation categories, which we allocate as skilled or unskilled (see Te Velde and Morrissey, 2001).

Appendix Table A1 compares the mean of the log of earnings of workers in the capital city and elsewhere. It shows that average wages are higher in the capital city for all countries. As hypothesised previously, part of the explanation is in the *distribution of worker characteristics* across space: in all five countries the average number of years of formal schooling is higher for workers in the capital city than for workers elsewhere.

The distribution of firm characteristics across space is also likely to contribute higher earnings in the capital city. Summary data on the sample classified according to location, ownership and firm size is provided in the Appendix Table A2. This relates to a total of 2824 firms (the regressions are based on employees linked to firms, hence the sample is much larger), 58% are located in the capital city and 42% are not. The sample is fairly evenly spread over the countries, largely reflecting their relative sizes: 25% of firms are from Cameroon, 23% from Kenya, 20% from Zimbabwe, 18% from Ghana and 14% from Zambia. Zambia is the only country for which fewer firms are located in the capital city, while the proportions are fairly even in Ghana. Considering all countries together, about 20% of firms are owned by foreigners and such firms are more likely to be located in the capital city than are local firms. While the proportion of foreign owned firms varies by country, the tendency for them to be more likely to be located in the capital city is true for all countries except Zambia.

There is a general tendency for larger firms to be more likely to be located in the capital city, especially for foreign owned firms. This is not true for the largest size category (firms with more than 500 employees) overall, but is true if we define larger firms as those with more than 50 employees. Only in Zimbabwe are the largest firms more likely to be in the capital city; in Cameroon they are clearly less likely to be in the capital city, while for the other countries the number of firms in this category is very small. In all countries the smallest firms (10 or fewer employees) are almost all locally owned. In Cameroon and Kenya the are more likely to be in the capital city, in Ghana and Zimbabwe they are less likely, while numbers are evenly split in Zambia.

Table 1 Influences on Likelihood of Location in Capital

Dependent variable = 1 if LOCC, 0 otherwise

	Logit regression
Ghana	-0.20
	(-1.0)*
Kenya	0.14
	(0.8)
Zambia	-0.71
	(-3.6)*
Zimbabwe	-0.64
	(-3.2)*
Foreign owned firm	0.15
	(1.2)
Wood and furniture sector	0.14
	(1.1)
Textile sector	0.06
	(0.4)
Metal sector	0.26
	(2.3)*
Log (employment)	0.21
	(6.3) *
Share of non-production workers	0.48
	(1.6)
Constant	-0.4
	(-1.8)
N	2060
Maximum Likelihood	-1354.02

Notes: Cameroon is the omitted country, Food the omitted sector. White (1980) 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 location in the pooled sample (i.e. pooling all five countries). Allowing for country and sector effects, we find that in our sample larger firms tend to locate in the capital city but there is no significant tendency for foreign-owned firms to locate in the capital. As compared to Cameroon, firms are less likely to be located in the capital in Zambia and Zimbabwe and, to a lesser extent, Ghana. Firms in the metal sector appear most likely to locate in the capital.

Table 2 summarises the results of estimation of equations (1) to (6) 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). The results were the same except for minor differences, such as values of *t*-statistics, which may be due to the use of a different statistical package. Most coefficients are well determined and consistent with expectations. Details are available on request – we here report only the main results.

The first row of Table 2 presents estimates of (2). The effects of location are positive, substantial and significant in all regressions. Earnings for individuals in firms located in the capital city are 34 per cent higher in Kenya, 32 per cent in Ghana, 19 per cent higher in Cameroon, 16 per cent in Zimbabwe and 13 per cent Zambia. The second row of table Table 2 presents estimates of specification (3), confirming that the effects of *LOCC* on earnings are reduced when taking firm-specific control variables into account. Nevertheless, the location premium remains quite large at 12 per cent in Zimbabwe, 15 per cent in Cameroon and Zambia, 26 per cent in Ghana and 28 per cent in Kenya. The location premium applies to all workers in Ghana and Kenya, but to skilled workers only in the other countries. There are no consistent patterns by sector of firm or education of workers.

Table 2 Summary of Main Results from Wage Equations

	Cameroon	Ghana	Kenya	Zambia	Zimbabwe
LOCC premium					
No controls	0.19	0.32	0.34	0.13	0.16
Firm controls	0.15	0.26	0.28	0.15	0.12
Which workers?					
Sectors	Ns	Wood Food	Wood Metal Textiles Food	Ns	Metal Food
Education	Ns	Ns	No edu Prim Sec	Ns	Ns
Occupation	Skilled	Skilled Less-skilled	Skilled Less-skilled	Skilled	Skilled

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

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

	Cameroon	Ghana	Kenya	Zambia	Zimbabwe
PRIMC	0.09	-0.03	0.14	0.36	0.20
	(1.1) *	(-0.3)	(3.4) *	(5.4) *	(3.6) *
SECC	0.49	0.14	0.35	0.92	0.60
	(5.2) *	(1.3) *	(7.8) *	(11.6) *	(8.3) *
UNIVC	1.14	1.18	1.79	1.99	1.68
	(9.1) *	(5.5) *	(10.9) *	(15.2) *	(5.7) *
Foreign Ownership	0.08	0.21	0.17	0.22	0.12
	(2.5) *	(6.5) *	(5.9) *	(4.55) *	(3.1)
Log (employment)	0.13	0.15	0.09	0.10	0.15
	(8.8) *	(9.1) *	(10.4) *	(6.0) *	(12.3) *
LOCC * NONE	0.04	0.01	0.23	0.26	0.20
	(0.5)	(0.1)	(5.6)*	(2.6) *	(3.2) *
LOCC * PRIMC	0.13	0.27	0.27	0.23	0.08
	(2.5) *	(6.4) *	(9.3)*	(4.6) *	(2.2) *
LOCC * SECC	0.17	0.36	0.35	0.05	0.14
	(2.6) *	(4.1) *	(9.6) *	(0.9) *	(2.5) *
LOCC * UNIVC	0.33	0.13	-0.24	-0.07	-0.36
	(2.8) *	(0.6)	(-1.2)	(-0.3)	(-1.0)
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=0.24	P=0.14	P=0.01	P=0.08	P=0.20

Notes: Dependent variable is log of monthly earnings in current domestic currency. White (1980) heteroscedasticity-consistent *t*-statistics in parenthesis; * indicates significance at least at the 5% level. Equation as specified in the text. Standard worker controls (age, tenure, male, state ownership foreign ownership etc.) included in the regressions but not reported here (available upon request).

Table 4 Earnings Equations with Occupations, specification (6)

	Cameroon	Ghana	Kenya	Zambia	Zimbabwe
PRIMC	0.13	0.06	0.09	0.34	0.11
	(2.9) *	(0.9)	(3.0) *	(5.8) *	(2.7) *
SECC	0.49	0.24	0.24	0.79	0.49
	(10.3) *	(3.2) *	(6.8) *	(11.7) *	(9.0) *
UNIVC	1.26	1.00	1.22	1.83	1.04
	(17.8) *	(7.7) *	(9.8) *	(15.6) *	(5.3) *
Foreign Ownership	0.09	0.21	0.20	0.23	0.10
	(2.8) *	(6.5) *	(5.7) *	(4.71) *	(2.6) *
Log (employment)	0.12	0.15	0.09	0.10	0.14
	(8.4) *	(8.8) *	(8.6) *	(5.8) *	(12.2) *
LOCC * SKILLED	0.34	0.51	0.60	0.29	0.52
	(8.0) *	(11.5) *	(13.6)*	(5.5) *	(12.1) *
LOCC * LESS SKILLED	0.05	0.19	0.21	0.04	-0.03
	(1.1) *	(5.0) *	(8.1)*	(0.9) *	(-1.2) *
Time Dummies	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes
N	1534	2257	3035	1593	1866
R-squared	0.54	0.51	0.43	0.48	0.44
Test H0: coefficients LOCC*SK = LOCC*UNSK	P=0.00	P=0.00	P=0.00	P=0.00	P=0.00

Notes: Dependent variable is log of monthly earnings in current domestic currency. White (1980) heteroscedasticity-consistent *t*-statistics in parenthesis; * indicates significance at least at the 5% level. Equation as specified in the text. Standard worker controls (age, tenure, male, state ownership foreign ownership etc.) included in the regressions but not reported here (available upon request).

What type of worker benefits from spatial inequality?

To assess if the earnings 'premium' from location applies equally to different types of worker, we first estimate (4). The results, in row 4 of table 2, suggest that the earnings premium does differ by sector for Ghana, Kenya and Zimbabwe. The P-values (for F-tests) are smaller than 5 per cent, implying that the null hypothesis of equal coefficients (on sector***LOCC*) can be rejected for these three countries. There are significant sector effects in Ghana (Wood and Food sectors), Kenya (all sectors) and Zimbabwe (Metal

and Food), and hence workers in some sectors benefit more than workers in others when they are located in the capital city.[4]

We then estimate specification (5) and present the results in Table 3. There are some patterns, but they are not very clear. The first three rows confirm that wages increase with education (as compared to no education); this is least for Ghana and most pronounced for Zambia. The size and foreign-ownership premiums are also evident. A capital city premium applies for those with primary or secondary education in all countries, is considerable for those with no education in Kenya, Zambia and Zimbabwe but does not accrue to those with university education (except in Cameroon). In Zambia the location premium decreases with education whereas in Cameroon it increases (the other countries are more variable).

Table 4 presents the results for the estimation of (6) using interaction terms between *LOCC* and occupation (skilled and less-skilled) rather than *LOCC* and education interactions. The interpretation appears much clearer. For all countries, there is a clear difference in capital city premia between skilled and less-skilled occupations (indeed the premium for less skilled is negative in Zimbabwe). There are a number of general results:

- Workers in skilled occupations earn a premium (of 30-60%) when they are employed by firms located in the capital city.
- Workers in less skilled occupations earn a significant capital premium (of some 20%) in Ghana and Kenya.
- Less-skilled workers do not earn a significant capital-city premium in Cameroon and Zambia, while their premium is negative in Zimbabwe.

We now consider if the location wage premium varies by skill level after taking into account that *LOCC* tend to be large firms, and the employer-size premium varies by skill level (Strobl and Thornton, 2001), and that the foreign-ownership premium also varies by skill level (Te Velde and Morrissey, 2001). Are senior and more skilled workers paid more in firms located in the capital city simply because such firms tend to be larger or

4 This compares well with evidence in Hanson (1997, table 3) for Mexico. Wage differentials between Mexico city and other regions vary substantially by sector.

foreign-owned, or does a capital city wage premium remains after accounting for these factors? The results are in Table 5:

Table 5 Who benefits from Location in the Capital?

	Cameroon	Ghana	Kenya	Zambia	Zimbabwe
Male	0.13	0.09	0.16	0.08	0.16
	(3.6) *	(1.8)	(4.5) *	(1.8)	(4.7) *
Age	0.08	0.18	0.04	0.05	0.10
	(4.8) *	(17.1) *	(3.6) *	(3.8) *	(9.2) *
Age-squared	-0.0007	-0.002	-0.0004	-0.0004	-0.001
	(-3.0) *	(-14.6) *	(-2.9) *	(-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) *	(5.0) *	(2.4) *
SECC	0.49	0.18	0.20	0.67	0.43
	(10.2) *	(2.4) *	(5.5) *	(9.9) *	(8.0) *
UNIVC	1.24	0.88	1.19	1.61	0.86
	(17.5) *	(7.1) *	(9.7) *	(14.0) *	(4.3) *
Constant	8.1	5.6	6.6	8.1	3.3
	(27.1) *	(29.3) *	(34.6) *	(38.4) *	(16.0) *
State ownership	-0.03	0.01	-0.37	0.27	0.01
	(-0.5)	(0.2)	(-3.3) *	(4.2) *	(0.2)
LOCC * SKIL	0.18	0.24	0.32	0.12	0.13
	(3.2) *	(4.5) *	(5.8) *	(2.0) *	(2.3) *
LOCC * UNSKILLED	0.13	0.28	0.29	0.17	0.12
	(3.0) *	(6.6) *	(11.1) *	(4.0)	(3.9) *
Log(emp) * SKIL	0.15	0.23	0.15	0.15	0.22
	(8.7) *	(11.9) *	(10.2) *	(8.0) *	(16.0) *
Log(emp) * UNSKILLED	0.10	0.11	0.07	0.07	0.11
	(6.1) *	(6.5) *	(7.0) *	(4.4) *	(9.5) *
FOR* SKIL	0.18	0.03	0.34	0.33	0.07
	(3.7) *	(0.6)	(4.4) *	(4.8) *	(1.2)
FOR* UNSKILLED	0.03	0.28	0.16	0.11	0.10
	(0.8)	(7.5) *	(4.2) *	(2.0) *	(2.4) *
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 LOCC*SK = LOCC*UNSK	P=0.470	P=0.55	P=0.577	P=0.451	P=0.848
Test H0: coefficients FOR*SK = FOR*UNSK	P=0.014	P=0.000	P=0.029	P=0.015	P=0.712
Test H0: coefficients LEMP*SK = LEMP*UNSK	P=0.003	P=0.000	P=0.000	P=0.000	P=0.000

Notes: As for Table 3. Dependent variable is log of monthly earnings in current domestic currency.

Tests indicate that we cannot reject, for all countries, the hypothesis that the coefficients on *LOCC*SK* and *LOCC*UNSK* are equal. Thus, in general, the location premium applies equally to all workers in each country, i.e. spatial inequality is not associated with skilled-unskilled wage differentials.[5] However, the size premium is significantly greater for skilled workers in all countries, as can be seen from the log(emp) interaction terms. This suggests that skilled workers were able to obtain a higher earnings premium in the capital city, compared to less-skilled workers, mainly because larger firms tend to locate in the capital city and such firms pay a premium to skilled workers. The foreign premium also favours skilled workers in Cameroon, Kenya and Zambia, and this may contribute to a higher skill premium for workers located in the capital. In Ghana, the foreign premium favours unskilled workers.

5. Conclusions and Policy Implications

This paper used data on individual earnings in the manufacturing industry of five African countries (Cameroon, Ghana, Kenya, Zambia and Zimbabwe) in the early 1990s to test whether location is associated with higher earnings for all education and occupation groups. Controlling for firm characteristics, the capital city premium is significant, varying from 12-15% in Cameroon, Zambia and Zimbabwe to 26-28% in Ghana and Kenya. Similar workers employed by firms located in the capital city do earn higher wages. This location premium seems to apply to all types of workers, whether classified by education or skill level. While we found that skilled workers earn a higher wage premium in the capital city than less skilled workers, this was not because of location effects *per se*, but rather because of firm characteristics associated with firms located in the capital city such as size and foreign ownership. This suggests that spatial inequality in itself does not directly contribute to skilled/less-skilled wage differentials.

We find some evidence for all three sources of spatial wage inequality identified in Section 2. First, the distribution of *worker characteristics* is skewed towards the capital city: the number of years of formal education is higher for workers in the capital city. Secondly, *firm characteristics* are also important: larger and/or foreign-owned firms tend to pay a significant wage premium, generally favouring more skilled workers, and are more likely to locate in the capital city. Finally, *workers in capital cities earn higher*

5 This compares well with similar evidence for Thailand (Matsuoka, 2001). Controlling for other factors such as size and industry dummies, firms located in Bangkok and vicinity pay 39 per cent more to non-production

wages than similar workers employed by similar firms located outside the capital city. This paper was not able to distinguish between the various explanations for this - agglomeration economies or greater bargaining power in cities.

We do not yet have adequate data on spatial price variations to assess if these location premia translate into real earnings (purchasing power) differentials. In the case of Kenya, the location premium of 28% is greater than the 20% variation in minimum wages between Nairobi and provincial towns reported in Section 2. The location premium of 26% (with controls) in Ghana is more than twice the price differential between Accra and other urban areas of 12% reported in Section 2. For the other three countries, for which we have no data on price variations, the premium of 12-15% is unlikely to represent a significant difference in real purchasing power. In general, we do not find any evidence that the earnings premium from being employed in the capital city contribute to spatial inequality to any appreciable degree, the exception being Ghana (and Kenya to a lesser extent). In other words, observed spatial inequality is unlikely to be due to earnings differentials in manufacturing. A more likely explanation is that the manufacturing share in employment is greater in urban areas, and that non-manufacturing (informal and agriculture) earnings are lower. The sector composition of employment is a more likely determinant of spatial inequality than spatial wage inequality. This may not be a novel conclusion, although at least we can offer some evidence.

The conclusion that wage inequality *within* manufacturing is unlikely to be a significant source of spatial inequality does not imply that wage inequality is irrelevant. There are sources of wage inequality, and these tend to be inter-related (albeit with country variations). Larger firms tend to pay higher wages, as do foreign-owned firms (and these are not always one and the same firms), and such premia tend to favour more skilled and/or educated workers. Expanding manufacturing employment, if achieved through larger firms and foreign investment, may well increase wage inequality (the skilled/unskilled differential). If manufacturing is spatially concentrated, it is likely to contribute to spatial inequality. Wider opportunities for education and acquiring skills enhances the potential for workers to benefit from manufacturing employment, and is more likely to attract investment in manufacturing. Regionally diversified manufacturing

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workers and 36 per cent more to production workers than similar workers elsewhere.

employment may be part of the solution to, rather than part of the problem of, spatial inequality.

REFERENCES

Biggs, T., M. Shah and P. Srivatava (1995), "Technological Capabilities and Learning in African Enterprises", *World Bank Technical Paper Number 2888,* Africa Technical Department Series.

Bigsten, A., P. Collier and others (1999), 'Investment of Africa's Manufacturing Sector: a Four Country Panel Data Analysis', *Oxford Bulletin of Economics and Statistics*, 61, pp. 489-512.

Bigsten, A., A. Isakson and others (2000), "Rates of Return on Physical and Human Capital in Africa's Manufacturing Sector", *Economic Development and Cultural Change*, 48, pp. 801-827.

Blanchflower, D.G., A.J. Oswald and P. Sanfey (1996), "Wages, profits and rent-sharing", *Quarterly Journal of Economics*, 111, pp. 227-251.

Coulombe, H. and A. McKay (2001), 'The Evolution of Poverty and Inequality in Ghana over the 1990s', The World Bank, mimeo.

Dunning, J. (1993). *Multinational enterprises and the global economy*, Addison-Wesley Publishing Company.

Fujita, M., P. Krugman and A.J. Venables (1999), *The Spatial Economy*, The MIT Press, Cambridge Massachusetts.

Glaeser, E. and D. Mare, "Cities and Skills", *NBER working paper 4728*.

Hanson, G.H. (1997), "Increasing returns, trade and the regional structure of wages", *The Economic Journal*, 107, pp. 113-133.

Krugman, P. and R. E. Livas (1996), "Trade policy and Third World metropolis", *Journal of Development Economics*, 49, pp. 137-150.

McCulloch, N., B. Baulch, M. Cherel-Robson (2000), 'Poverty, Inequality and Growth in Zambia during the 1990s', IDS, Sussex, *IDS WP 114*.

Matsuoka, A. (2001), "Wage Differentials among Local Plants and Foreign Multinationals by Foreign Ownership Share and Nationality in Thai Manufacturing", *ICSEAD working paper series 2001-15.*

Mazumdar, D. (1995), "Wage differences by size of enterprise in African manufacturing", *RPED Discussion Paper*, August 1995, World Bank.

Mincer, J. (1974), *Schooling, Experience and Earnings*, NBER, New York.

Polachek, S.W. and W.S. Siebert (1993), *The Economics of Earnings*, Cambridge University Press, Cambridge.

Söderbom, M. and F. Teal (2001a), "Firm size and human capital as determinants of productivity and earnings", Oxford University: *CSAE Working Paper WPS/2001-09*

Söderbom, M. and F. Teal (2001b), "Are African Manufacturing Firms Really Inefficient? Evidence from Firm-Level Panel Data", Oxford University: *CSAE Working Paper WPS/2001-14*

Strobl, E. and B. Thornton (2001), "Do Large Employers Pay More? A Study of Five African Countries", paper presented at the *DESG Conference 2001*, University of Nottingham, 5-7 April.

Velde, D. W. te and O. Morrissey (2001), "Foreign Ownership and Wages: Evidence from five African Countries, *CREDIT Discussion Paper 01/19*, downloadable from www.nottingham.ac.uk/economics/research/credit.

Wheaton, W.C. and M.J. Lewis (2002), "Urban Wages and Labor Market Agglomeration", *Journal of Urban Economies*, 51, pp. 542-562.

White, H. (1980), "A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity", *Econometrica* , 48, pp. 817-838.

Appendix Table A1: **Earnings and worker education by country and location**
(first wave)

	Location Capital city=1	**Log of monthly earnings in current domestic prices**	**Mean of formal years of worker education**
Cameroon	0	11.06	9.83
	1	11.37	10.26
Ghana	0	9.40	9.79
	1	10.16	11.20
Kenya	0	7.69	8.62
	1	8.11	8.93
Zambia	0	10.51	10.10
	1	10.52	10.31
Zimbabwe	0	6.43	8.35
	1	6.61	8.79

Appendix Table A2: Cross tabulations by Ownership, Location and Firm Size

Numbers

	Location (1 = capital city, 0 otherwise)											
F/ size	ALL		Cameroon		Ghana		Kenya		Zambia		Zimbabwe	
	0	1	0	1	0	1	0	1	0	1	0	1
F=0												
1	380	411	62	113	99	64	108	136	60	64	51	34
2	313	403	55	103	92	102	53	90	64	57	49	51
3	183	345	7	38	16	51	35	105	51	30	74	121
4	117	65	89	13	1	0	4	12	5	6	18	34
All	993	1224	213	267	208	217	200	343	180	157	192	240
F=1												
1	23	28	11	10	3	9	3	5	0	1	6	3
2	48	91	15	46	6	26	14	12	7	7	6	0
3	76	234	15	86	6	34	7	51	18	13	30	50
4	51	56	28	20	3	0	5	3	3	2	12	31
All	198	409	69	162	18	69	29	71	28	23	54	84
Total	1191	1633	282	429	226	286	229	414	208	180	246	324

Percentage

	Location (1 = capital city, 0 otherwise)											
F/ size	ALL (100 %)		Cameroon (100 %)		Ghana (100 %)		Kenya (100 %)		Zambia (100 %)		Zimbabwe (100 %)	
	0	1	0	1	0	1	0	1	0	1	0	1
	42%	58%	40%	60%	44%	56%	36%	64%	54%	46%	43%	57%
F=0												
1	13%	15%	9%	16%	19%	13%	17%	21%	15%	16%	9%	6%
2	11%	14%	8%	14%	18%	20%	8%	14%	16%	15%	9%	9%
3	6%	12%	1%	5%	3%	10%	5%	16%	13%	8%	13%	21%
4	4%	2%	13%	2%	0%	0%	1%	2%	1%	2%	3%	6%
All	35%	43%	30%	38%	41%	42%	31%	53%	46%	40%	34%	42%
F=1												
1	1%	1%	2%	1%	1%	2%	0%	1%	0%	0%	1%	1%
2	2%	3%	2%	6%	1%	5%	2%	2%	2%	2%	1%	0%
3	3%	8%	2%	12%	1%	7%	1%	8%	5%	3%	5%	9%
4	2%	2%	4%	3%	1%	0%	1%	0%	1%	1%	2%	5%
All	7%	14%	10%	23%	4%	13%	5%	11%	7%	6%	9%	15%
Total	1191	1633	282	429	226	286	229	414	208	180	246	324

Notes: *F*=1 indicates owned by a foreigner (individual or firm), otherwise locally owned. The size categories are 0-10 employees (1), 11-50 employees (2), 51-500 employees (3) and more than 500 employees (4).

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Adam Blake – CGE models of low-income countries
Mike Bleaney - growth, international macroeconomics
Indraneel Dasgupta – development theory, household bargaining
Norman Gemmell – growth and public sector issues
Ken Ingersent - agricultural trade
Tim Lloyd – agricultural commodity markets
Andrew McKay - poverty, peasant households, agriculture
Chris Milner - trade and development
Wyn Morgan - futures markets, commodity markets
Christophe Muller – poverty, household panel econometrics
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