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Spatial Inequality for Manufacturing Wages in Five African Countries

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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 wages than 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 foreign owned). Any location effect identified is therefore additional to appropriate control variables. There are two main findings. First, we find evidence of a 'pure capital city premium' equivalent to between 12 per cent and 28 per cent of nominal average earnings in the five countries. In some countries this location premium exceeds plausible consumer price differentials, between the capital and other urban areas. This does suggest that real (purchasing power) manufacturing wages are higher in the capital city (although this real premium is no more than ten per cent). Second, we find that skilled workers earn a higher wage premium in the capital city than those less skilled. However,.../…

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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.

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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 (in purchasing power terms) if employed by firms located in the capital city than if employed by firms located elsewhere. Available evidence suggests 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 the countries we consider. 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, and 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 World Bank and the bilateral donor-sponsored Regional Programme on Enterprise Development (RPED), which 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. A particular advantage of the RPED data is that there are two datasets, 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 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 2002; Söderbom and Teal 2001a,b), 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 (2002) and Mazumdar (1995), using the same cross-country dataset 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 of the 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 were unavailable, requiring us to make a judgement on the likely magnitude of price differentials.

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 per cent of the national population were below the upper poverty line; this figure was almost 90 per cent in rural areas but 47 per cent 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 urbanized 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. However, as poverty and inequality are similar in the urbanized provinces, there is no reason to assume large price differentials between the capital city and other urban areas (where firms are likely to be located).

Coulombe and McKay (2001) compare poverty and inequality in Ghana between 1991-92 and 1998-99. Overall inequality increased, especially in rural areas, while inequality in Accra fell. Thus, urban-rural inequality rose. Almost 20 per cent 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 per cent higher than in other urban areas. The corresponding differential may be even higher in Kenya. 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 per cent lower (Republic of Kenya, 1995) which does not give comparable price data).

We would expect to find that wages are higher in the capital city, if only because the cost of living is higher than in other urban areas. While there is no evidence that such a differential exists in Zambia, the differential is in the range 10-20 per cent for Ghana and Kenya. 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. We present estimates of a ‘raw’ and a ‘pure’ premium. The raw premium is the difference in the wage paid to similar workers, in terms of educational qualification or skill level. The pure premium adjusts this to control for the possibility that the types of firms that pay higher wages, such as larger or foreign-owned firms, are more likely to locate in the capital city.

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 the issue 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 whether the location premium benefits specific types of workers. 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 may give better quality teaching, or the workers may have 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 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). The firm characteristics that are known to be associated with higher earnings 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 (2002), amongst others. Similarly, te Velde and Morrissey (2001) identify a 'foreign premium' as foreign-owned firms pay higher wages 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. This accounts for differences in the raw and pure premium in earnings 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, firms 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. 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, otherwise worker migration and/or firm location would erode the differential.

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 unionization, 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 in capital cities for otherwise similar workers is that capital cities 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 the long run. Urban economies may lead to greater production efficiency as they exhibit increasing returns to scale associated with three types of agglomeration economies (Wheaton and Lewis 2002). Urbanization economies could arise if larger cities provide more direct support services and industrial linkages. Localization economies may arise from knowledge transferred between firms in the same industry, through direct contact or spatial proximity, and could enhance skill accumulation and productivity. There may also be localization scale economies if agglomeration improves labour market search and matching, which in turn enhances specialization 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.

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[1] This study 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) location 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:

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

Y_{it} is a measure of the wage of individual i=1,…,N at time t=1,…,T. S_{ij} is a binary 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 binary dummy $LOCC_i$ =1 if the firm in which individual i is employed in the capital city, and zero otherwise:

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

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—what we term the raw premium. 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).

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

We then estimate (4) to assess whether the raw premium (= φ_k 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:

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

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.

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

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.

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

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 dataset we use (that available on the CSAE website) there are three years (waves) of data for most of the five countries,

[3] Strobl and Thornton (2002) 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.

covering firms in four manufacturing sectors: food, timber, 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 datasets, 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.

We use monthly earnings data (wages and benefits) in current domestic prices as the 'wage' variable, the measure commonly applied in studies using this data. 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 variables. 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 1 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 to higher earnings in the capital city (the raw premium). Summary data on the sample classified according to location, ownership and firm size is provided in the Appendix Table 2. This relates to a total of 2824 firms (the regressions are based on employees linked to firms, hence the sample is much larger), 58 per cent are located in the capital city and 42 per cent are not. The sample is fairly evenly spread over the countries, largely reflecting their relative sizes: 25 per cent of firms are from Cameroon; 23 per cent from Kenya; 20 per cent from Zimbabwe; 18 per cent from Ghana; and 14 per cent from Zambia. Zambia is the only country for which fewer firms are located in the capital city (probably reflecting the importance of the copperbelt provinces), while the proportions are fairly even in Ghana. Considering all countries together, about 20 per cent of firms are owned by foreigners and such firms are more likely to be located in the capital city than are local firms (for all countries except Zambia).

There is a general tendency for larger firms to be located in the capital city, especially 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 they 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

Country	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)
	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 heteroscedasticity-consistent *t*-statistics in parenthesis; * indicates significance at least at the 5% level. Dependent variable = 1 if LOCC, 0 otherwise.

Source: Authors' computations.

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 estimating equations (1) to (6) for manufacturing in five African countries.[4] The first row of Table 2 presents estimates of (2), the raw premium. 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 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 pure 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 education primary secondary	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.

Source: Authors' computations.

4.1 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

[4] 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 report here only the main results.

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 other sectors when they are located in the capital city.[5]

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 per cent 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).

Source: Authors' computations.

We then estimate specification (5) and present the results in the 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).

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

Table 4 presents results of estimating (6) using interaction terms between *LOCC* and occupation (skilled and less-skilled) rather than *LOCC* and education. 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 per cent) when they are employed by firms located in the capital city.
- Workers in less skilled occupations earn a significant capital premium (of some 20 per cent) 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.

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	0.05	0.19	0.21	0.04	-0.03
SKILLED	(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 H_0: 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 per cent 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).

Source: Authors' computations.

We now consider if the location wage premium varies by skill level after taking into account that *LOCC* tend to be larger firms, and the employer size premium varies by skill level (Strobl and Thornton 2002), 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 foreign-owned, or does a capital city wage premium remain after accounting for these factors? The results are in Table 5. 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—spatial inequality is not associated with skilled–unskilled wage differentials.[6] 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 uses 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. Similar workers employed by firms located in the capital city do earn higher wages; the raw premium is in the range 13-32 per cent. Controlling for firm characteristics, the pure capital city premium is significant: 12-15 per cent in Cameroon, Zambia and Zimbabwe; 26-28 per cent in Ghana and Kenya. 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, for example the number of years of formal education is higher for workers in the capital city. Note, however, that observed worker characteristics are accounted for and do not contribute to the premium. 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. The tendency of the types of firms that pay higher wages to locate in the capital accounts for about five percentage points of the raw premium in all countries except Zambia. Finally, workers in capital cities earn higher wages than similar workers employed by similar firms located outside the capital city, the pure premium estimated.

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

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) *	0.10	0.11	0.07	0.07	0.11
UNSKILLED	(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 H_0: coefficients LOCC*SK = LOCC*UNSK	P=0.470	P=0.55	P=0.577	P=0.451	P=0.848
Test H_0: coefficients FOR*SK = FOR*UNSK	P=0.014	P=0.000	P=0.029	P=0.015	P=0.712
Test H_0: 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.

Source: Authors' computations.

We do not have adequate data on spatial price variations to assess if the pure location premium corresponds to a premium on real earnings (purchasing power) differentials. In the case of Ghana and Kenya, where prices in the capital appear to have been 10-20 per cent higher than in other urban areas, the pure location premium could account for no more than a ten per cent increase in real purchasing power. In Zambia, where evidence suggests little spatial variation in urban prices, the real premium also is no more than ten per cent. In general, we do not find strong evidence that the earnings premium from being employed in the capital city contributes to spatial inequality to any appreciable degree. A potential real premium of ten per cent could be accounted for by unobserved worker (and firm) characteristics and statistical confidence intervals. Migration and 'new economic geography' (agglomeration) theories would predict that, in equilibrium, real earnings are equalized across locations. In this sense our findings support such theories.

We can, however, be confident that a pure location premium exists, probably even in real purchasing power terms. The data available do not allow us to distinguish between the various explanations for a pure (real) location premium: unobserved characteristics, agglomeration economies (increasing productivity) or greater bargaining power of workers in cities. The new economic geography (NEG) approach of Fujita *et al.* (1999) cannot be directly tested, but we can make two observations. First, it is not evident that real earnings are equalized across urban locations, suggesting that there is a capital city agglomeration effect. In all likelihood, this is a combination of productivity and bargaining effects, both of which are unobservable characteristics in the data (hence, part of the pure premium). Second, and perhaps more conclusive, there is evidence for a firm location effect (the five percentage point difference between the raw and pure premiums in most countries). There is a tendency for larger and/or foreign-owned firms to agglomerate in the capital city. This is an effect that the NEG approach could explore further; market and supply-side explanations are equally likely.

The finding that wage inequality *within* manufacturing is unlikely to be a significant source of spatial inequality (i.e. relative to the significant rural–urban income differentials observed) does not imply that wage inequality is irrelevant. There are sources of wage inequality, and these tend to be interrelated (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 (spatially), which tends to be associated with larger firms and foreign investment, is a source of increased earnings. This may reduce spatial inequality, if workers are drawn out of low wage agriculture into higher wage (rural) manufacturing, but at the expense of increasing wage inequality (the skilled–unskilled differential). Wider opportunities for education and acquiring skills enhances the potential for all workers to benefit from manufacturing employment, and is more likely to attract investment in manufacturing. Manufacturing employment may be part of the solution to, rather than part of the problem of, spatial inequality.

Appendix Table A1: Earnings and years of 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

Source: Authors' summary of the data.

Appendix Table A2: Cross tabulations by ownership, location and firm size

numbers

F/ size	Location (1 = capital city, 0 otherwise)											
	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

F/ size	Location (1 = capital city, 0 otherwise)											
	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).

Source: Authors' computations.

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