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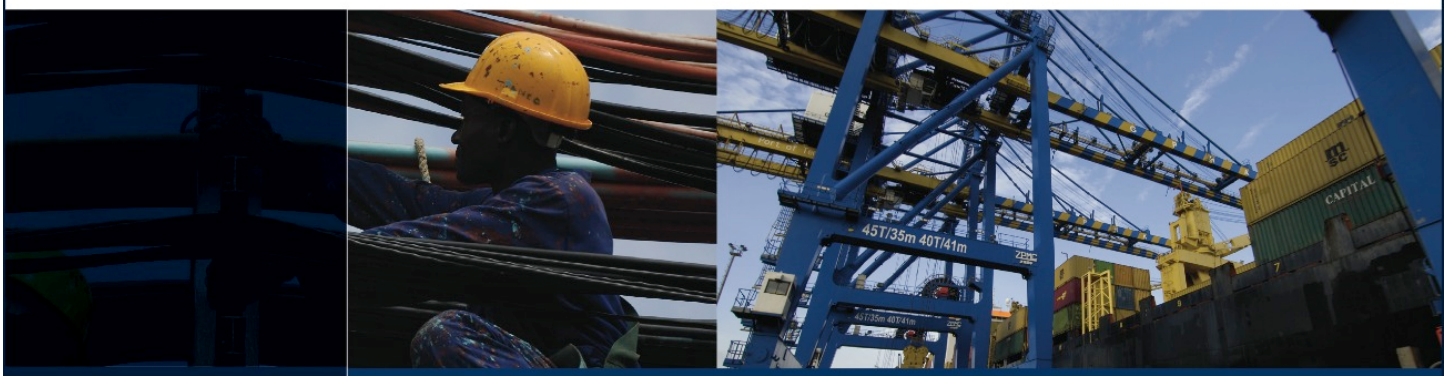

Education, skill, and earnings: Further evidence from Ghana

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Abstract

This paper provides evidence on the nature of returns to education in Ghana and confirms the emerging empirical literature on the convexity of returns to education in Ghana. Using a basic Mincerian, model we find that returns to education more than triples from primary to secondary level or higher—an indication of a rather strong convex relationship. The results point to the importance of higher education in productivity. Nonetheless educational policies should not only be directed at increasing enrolment and quality of education at the secondary and higher educational levels but also at improving the quality of basic education.

Keywords: Education, earnings, convexity, Ghana
JEL classification: J24, J31, O15

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1 Introduction

Since the seminal works by Becker (1962, 1964) and Mincer (1974) it has been accepted that human capital is vital for firm productivity and is accumulated in two ways: through experience and education. Therefore educated and experienced workers should earn more (see for example Becker 1964; Mincer 1974) as compared to non-educated workers. Thus returns to education are observable from higher earnings. Evidence from empirical studies using the Mincerian equation (after Mincer 1974) suggests that the relationship between education and earnings for most countries was concave and with the implication that low levels of education have higher returns (Psacharopoulos 1994; Psacharopoulos and Patrinos 2004). In recent times much of the empirical evidence from developing countries, however, shows that returns to primary education may be lower than that of post-primary education, suggesting that the earnings–education profile is, in fact, convex.

Studies document a rising returns to education; Appleton et al. (1999) show this for Uganda, from 1992 to 1999, Canagarajah and Thomas (1997) also show that returns to education increased in Ghana from 1987 to 1991. Similar findings are made by Sackey (2008) for Ghana within 1992-99 and by Söderbom et al. (2006) for Tanzania in the 1990s. These results have consequences for educational policies and skills development in developing countries particularly in Africa, and Ghana is no exception. This makes it imperative to examine returns to education empirically to gain further understanding on returns to skill and also to help guide policy with empirical findings. This paper re-examines the effect of education on earnings in Ghana using the most recent household survey data. We analyse returns to education across occupational groupings and geographical locations to take into account their effect in influencing earnings.

Ghana has had a chequered educational history alongside its political path with policies implemented by various political regimes to boost educational attainment. By the 1990s most educational policies had been revamped and focussed at attaining some of the key tenets of the Millennium Development Goals. In this regard focus on increasing primary school enrolment became key on the agenda with policies such as the free compulsory basic education and capitation grant alongside others. The educational reforms appeared to have yielded some positive gains as the country currently has about 85 per cent completion rate in primary education and about 65 per cent in junior secondary school. Gross enrolment increased to 94 per cent in primary school and 77 per cent in junior secondary schools by 2006. Whilst these gains are commendable, Ghana has not enjoyed commensurate skills development levels. Earlier empirical studies on Ghana also point to the possibility of convexity in the educations earnings curve. Clearly there is need for further empirical studies in the earnings education literature.

The rest of the paper is organized as follows: the next section discusses an overview of the empirical literature. Section 3 discusses the empirical analysis and results and conclusions are drawn in section 4.

2 Overview of empirical literature

It has been documented in the literature that earnings might not solely depend on worker's ability. Other individual characteristics, such as experience or gender, are often also found to be correlated with wages. In that regard, the empirical literature shows evidence of a link between firm characteristics and worker wages (e.g., Krueger and Summers 1988; Blanchflower et al. 1996; Abowd et al. 1999; Söderbom et al. 2004). There is also evidence on job sorting (Benhassine et al. 2006), as well as the role of unions in wage-setting and rent-sharing (Teal 1996; Azam and Ris 2001; Söderbom and Teal 2001; Manda et al. 2001; Alby 2007).

The literature on returns to education in Africa in particular has been changing over time in terms of direction of evidence. Returns to education appear to have fallen for some countries; Moll (1996) shows that returns to primary education in South Africa declined from 1960 to 1975, Appleton et al. (1999) also report similar declines in returns to education between 1978–95 in Kenya's urban labour markets for workers with secondary education and below. Söderbom et al. (2006) use data from 1993 to 2001 and reconfirm the finding of Appleton et al. (1999) for Kenya. Yet other studies document a rising returns to education; Appleton et al. (1999) show this for Uganda, from 1992 to 1999, Canagarajah and Thomas (1997) also find that returns to education increased in Ghana from 1987 to 1991. Similar findings are made by Sackey (2008) for Ghana within 1992-99 and by Söderbom et al. (2006) for Tanzania in the 1990s.

Other studies like Söderbom et al. (2006) and Fox and Oviedo (2008) also find increasing returns to age. Rankin et al. (2010) investigate labour market outcomes of urban workers and find that the returns to education are higher and linear in the large firm sector with evidence of convexity in the returns to education for the self-employed and small firms in Ghana and Tanzania. Similarly to Fox and Oviedo (2008), they also find a steep age-earnings profile in Ghana.

Indeed though there appears to be ample literature on returns to education, still not much is known about how labour markets reward education in developing countries. Furthermore as shown by Teal (2011) little is known about the emergence of the service-based self-employed sector for the higher educated as well as the rise in employment in small-scale enterprises for highly educated workers (Nsowah-Nuamah et al. 2010). It is clear that a lot remains unresolved in the research on the directions and trends in returns to education, particularly in Africa.

3 Empirical methods

We estimate the basic Mincerian equation of returns to education using household survey data from the GLSS V. We augment the basic model with locational dummies and also estimate the model over occupational sub-samples for robustness.

$$\ln w = \alpha + \beta_0 E + \beta_1 A + u \tag{1}$$

$\ln w =$ log real monthly wage

$E =$ educational attainment; this is decomposed further into four (4) groups; none representing persons who have not completed primary school, primary representing those with primary school completion, junior secondary indicates persons who have completed three (3) additional post primary years of junior level secondary school and secondary includes those who have completed secondary school or higher (includes all tertiary education)

$A =$ a vector of other explanatory variables including, experience, gender, unskilled workers, and locational dummies.

Tables 1-3 show relevant descriptive statistics on earnings and education in Ghana. Education is categorized as persons who have no basic school qualification (none); persons with primary education, junior secondary and those with secondary and tertiary level qualifications. This decomposition also allows us to ascertain the incremental difference, if any, between primary and junior secondary school, as well as junior secondary and senior secondary school (secondary). Average schooling age in Ghana is nine years; which is education up to junior secondary school and is indicative of the generally low levels of educational attainment. About 70 per cent of Ghanaians with education have only up to the junior secondary level with just 24 per cent of

Ghanaians with secondary school or higher education. Indeed efforts at increasing educational attainment have tended to concentrate on the basic education and perhaps much less efforts at secondary and higher education. This educational trend could have implications for skills development in the country if higher level of education is correlated with higher skills level. In this case earnings are likely to be an increasing function of educational attainment.

Table 1: Mean difference between earnings across educational levels

	Mean log difference	T stat
None-primary	-0.0286	-0.33
None-junior secondary	-0.4715	-5.76
None-secondary or higher	-1.2126	-14.11
Primary-junior secondary	-0.4428	-8.15
Primary-secondary or higher	-1.1839	-18.37
Junior secondary-secondary or higher	-0.7410	-14.56

Source: Computed by authors from GLSSV.

Average real monthly wage is cedi 238,799 (equivalent to US$88).[1] When viewed according to the educational levels, there appears to be an increasing trend in real wages as one climbs up the educational ladder. From a test of differences in log of real wages we see no significant difference (0.02) in real monthly earnings between persons with no education and those with primary education. However, as one moves up the ladder, significant differences emerge. Of particular notice is the incremental difference between log real wages of persons with no education to those with junior secondary (0.471). Therefore three more years of post-primary school adds a significant increase of (0.45). The trend in difference in earnings as one moves up is also indicative of a convex shape in the earnings education curve. Returns to education are marginal at the primary education, increase slowly as one progresses along the lower educational level and are steep at the higher levels of education. This shows evidence of increasing returns to education in Ghana.

Table 2: Educational levels and earnings across regions

	Real mean monthly wage (cedi)	Log (real wage)	Years of schooling
Western	205,997	11.55	8.843
Central	217,773.9	11.34	8.29
Gt. Accra	432,671.1	11.94	11.15
Volta	124,953.4	11.15	8.05
Eastern	204,169.7	11.46	8.69
Ashanti	232,199.5	11.68	9.17
Brong Ahafo	214,841	11.48	8.85
Northern	226,354.6	11.10	8.37
Upper East	102,838.2	10.56	7.83
Upper West	140,843.5	11.04	10.91
National	238,799.9	11.46	9.23

Source: Computed by authors from GLSSV.

1 Using 1999 constant prices and exchange rate of cedi 2709.879 to US$1.

On geographical basis, Greater Accra (the most developed region, which also houses the capital), has the highest real earnings (cedi 432,671) and also records the highest schooling years (11 years). The three northern regions; Northern Region, Upper East and Upper West (the least developed of the 10 regions) record the lowest real earnings, with the national lowest earnings in the Upper East region (which incidentally is also the poorest region) and with average school of only seven years. Interestingly the Upper West has the second highest educational attainment with average school years of 10.9. Its earnings, however, are not commensurate with the educational attainment. In terms of occupational sectors, the public sector attracts the highest earnings (cedi 602,621), which is almost three times the national average, and has the highest educational level as well (14.8 years of schooling). Farmers, however, who constitute close to half of the population earn the least. Females, on average, also earn slightly less than their male counterparts.

Table 3: Educational levels and earnings across occupational sectors

	Real mean monthly wage (cedi)	Log (real wage)	Years of schooling
Public	602,621.3	12.68	14.88
Private formal	299,703.6	12.16	11.76
Private informal	174,677	11.64	9.31
Non-farm small enterprises (SE)	270,269.1	11.65	8.26
Farmers	138,100.8	10.83	7.57

Source: Computed by authors from GLSSV.

3.1 Regression results

We first estimate a base regression of only educational variables as the explanatory variables of earnings. Results (Table 4) show that returns to education are generally positive and significant. The magnitude of the coefficient on education increases progressively with educational levels. Compared to persons with no education, those with primary education attract 16 per cent higher wages. Again completing junior secondary raises real wages by 56 per cent, whilst workers with secondary or higher education attract much higher wage (130 per cent increase). Clearly there is an increasing trend in returns to education. Column 2 (General) reports the Mincerian equation with experience and augmented by gender, skill[2] and geographical dummies. Here we observe that primary education does not yield significant earnings. Persons with junior secondary earn 38 per cent higher wages than those with no education or with primary education. The earnings increase by an 80 per cent margin for persons with secondary or higher education. Again we observe the convexity in returns to education. This result corroborates that of Söderbom et al. (2006) and Fox and Oviedo (2008).

Experience adds a 2 per cent increase in real earnings but has a non -linear effect (squared term is negative). Female workers earn 7 per cent less than their male counterparts. Manual (unskilled) workers earn 62 per cent less than their skilled counterparts. Urban workers earn 42 per cent more in real wages than rural workers. This is representative of the concentration of the high earning jobs (especially in the public sector) in the urban areas. In regional terms, workers are likely to earn less if located in another region other than Greater Accra. The difference in wages here varies from 26 per cent lower earnings for workers in the Central Region to a mammoth 73 per cent lower if located in the Upper East region.

2 Manual refers to unskilled labour.

Table 4: Regression results

	Base	General	Public sector	Private formal	Private informal	Non-farm SE	Farmers
Primary	0.1162	0.0780	-0.3779	-0.1957	0.2702	0.0935	0.0025
	(2.27)	(1.48)	(-1.21)	(-0.88)	(2.05)	(1.20)	(0.03)
Junior sec	0.5591	0.3760	0.0045	-0.0690	0.4482	0.3261	0.3046
	(14.76)	(9.23)	(0.03)	(-0.39)	(4.55)	(5.27)	(4.39)
Secondary or higher	1.3001	0.7954	0.39177	0.3462	0.6076	0.6858	0.5427
	(28.95)	(15.10)	(2.36)	(1.97)	(5.19)	(7.59)	(3.24)
Experience		0.0217	0.03009	0.0174	0.0336	0.0592	0.0274
		(6.89)	(2.36)	(1.09)	(4.28)	(7.16)	(5.03)
Experience sq		-0.0003	-0.0005	0.0003	-0.0004	-0.0013	-0.0003
		(-4.68)	(-1.38)	(0.73)	(-2.47)	(-5.17)	(-3.02)
Female		-0.0721	0.1327	-0.1158	-0.0514	-0.1268	-0.1319
		(-2.44)	(1.88)	(-1.48)	(-0.68)	(-2.60)	(-2.39)
Manual		-0.6170	-0.4164	-0.0748	-0.3191	-0.2264	-0.6855
		(-13.12)	(-4.27)	(-0.88)	(-2.07)	(-1.42)	(-2.07)
Urban		0.4155	0.18348	0.0591	0.0809	0.2097	-0.0032
		(12.29)	(2.33)	(0.43)	(0.96)	(3.89)	(-0.04)
Locational dummies-reference is Gt Accra region							
Western		0.0290	0.1244	-0.0972	-0.2283	0.1429	0.2506
		(0.49)	(0.89)	(-0.71)	(-2.18)	(1.65)	(1.15)
Central		-0.2691	0.0250	-0.5905	-0.3134	-0.0229	-0.1716
		(-4.02)	(0.18)	(-1.96)	(-2.03)	(-0.21)	(-0.81)
Volta		-0.307	-0.1716	-0.4903	-0.5259	-0.0660	-0.0723
		(-5.41)	(-1.43)	(-2.78)	(-2.93)	(-0.69)	(-0.37)
Eastern		-0.0211	-0.0574	-0.1027	-0.3038	0.0961	0.2530
		(-0.39)	(-0.43)	(-0.70)	(-2.11)	(1.10)	(1.25)
Ashanti		0.0085	0.1876	-0.0016	-0.1195	0.3012	0.0875
		(0.19)	(1.67)	(-0.01)	(-1.40)	(4.30)	(0.45)
Brong Ahafo		-0.0989	-0.0731	-0.2290	-0.3028	0.3925	0.0680
		(-1.57)	(-0.69)	(-1.37)	(-2.10)	(3.55)	(0.32)
Northern		-0.1708	-0.2108	-0.0967	-0.0548	-0.1643	0.1279
		(-2.71)	(-1.10)	(-0.43)	(-0.32)	(-1.58)	(0.64)
Upper East		-0.7335	-.07913	-.7206	-.5345	-.0893	-.7422
		(-8.45)	(-0.41)	(-7.50)	(-1.18)	(-0.65)	(-3.48)
Upper West		-0.4046	-0.2853	0.01897	-0.5094	-0.4913	-0.4179
		(-3.77)	(-1.78)	(0.03)	(-1.98)	(-2.01)	(-1.64)
Constant	11.029	11.535	12.081	11.987	11.527	11.204	11.143
	375.14	151.82	59.24	53.43	52.86	61.65	30.67
Observations	6726	6726	571	385	830	2366	2333
R-squared	0.13	0.20	0.20	0.16	0.14	0.11	0.07
F stat	311	108	8.8	9.18	6.58	16.32	10.8

Note: Figures in parenthesis are t-statistics.

Source: Computed by authors from GLSSV.

To control for occupational sector biases, we estimate the model by various sector groupings and notice interesting results. In the public sector, the only significant educational variable in relation to real earnings is the secondary and higher education level. Hence whilst wages may be high in the public sector, these higher wages are only attained with secondary or higher education levels. Persons with lower education do not attract higher wages in the public sector. Also interesting is the fact that regional returns to earnings change in the public sector; persons in Ashanti Region (one of the richest regions in terms of mineral resource) earn 19 per cent higher wages than

those in the Greater Accra Region. Females also earn 13 per cent higher monthly wages in the public sector; a clear indication that the public sector is likely to have proportionately more educated female workers and hence the higher earnings power. In the case of the private formal sector, not much change is seen in the results. Experience is not significant in attracting earnings. Another interesting twist in the regional patterns is observed in the non-farm small enterprise subsample, where workers in Western, Ashanti and Brong Ahafo Regions earn 14 per cent, 30, and 39 per cent higher wages, respectively, as compared to workers located in Greater Accra. These three regions together host the export crop and mineral resources of Ghana and appear to be a hub for burgeoning small enterprises, thus explaining the higher earnings power. We do not notice much change in the results on the farming subsector.

As a further robustness check we also estimate the Mincerian model replacing educational variables with average years of schooling.[3] Generally the results do not differ much. Additional schooling yields a 7 per cent increase in earnings for public and private sectors and dips to 5.6 per cent for farming enterprises and 5.4 per cent for non-farm enterprises.

4 Conclusion

Education plays a vital role in harnessing human capital for development and growth. A more educated worker increases the productivity gain of a firm compared to a worker with no education. Hence the educated worker would earn significantly higher than the non-educated worker and returns to education would be higher at primary levels than at higher education levels. This phenomenon has resulted in policy initiatives at increasing education in developing countries where productivity is generally low. A puzzling issue, however, has been the emerging empirical literature in the developing world which shows returns to education being marginal at the primary level and higher at higher levels of education. This paper provides evidence on the nature of returns to education in Ghana and confirms the emerging empirical literature on the convexity of returns to education in Ghana. We find that returns to education more than triple from primary to secondary level or higher—an indication of a rather strong convex relationship.

What might explain these convexity trends? Colclough et al. (2009) offer explanations that point to demand (falling demand for low skilled workers in the developing world), supply (increased supply of primary school completers in the developing world) and possible weakening in the quality of primary school systems in developing countries. In the case of Ghana, these factors may all have been at work. There certainly is demand for more skilled workers as the production patterns become more biased towards skilled and technology-based production. The energized efforts at increasing educational attainment especially at the primary school level coupled with the free compulsory basic education and capitation policy[4] may have increased the supply of primary school completers. There is also some evidence of a declining quality; the national education assessment scores for 2005 show that the mean competency scores for P3 English (38.1 per cent) and mathematics (36.6 per cent) were just above the minimum of 35 per cent for competency; these further declined to 37.6 per cent and 35 per cent, respectively, in 2007. The scores are only slightly better for P6 English and mathematics. With the exception of P6 competency in English, just about 40-50 per cent of students on average achieved minimum

3 Results are not shown but are available on request.

4 Where a school receives about US$3.1 for every child enrolled in basic school; part of this was used to defray school levies and to provide food for pupils.

competencies (Ghana Education Service 2008). This is certainly indicative of low cognitive skills in lower education.

Policies would have to be directed at improving the quality of basic education rather than focusing on increasing enrolment rates. Infrastructure developments, provision of learning materials and supply of well qualified teachers are important for enhancing the quality of education. This will help increase returns to education at lower levels of education. Indeed policies must also support secondary and higher education to increase enrolment as well as assure quality standards. In cases where the cost of education may be too high for lower income earners, the government will have to intervene with more appropriate and effective scholarship systems so as not to end up being abused as previous schemes have been. In all of these efforts, it is important to note the educational and earnings differentials amongst geographical locations and regions in the country and to steer policies towards strategically bridging these gaps.

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