

Comparative Data for the Manufacturing Sector of Five Sub-Saharan African Countries: Cameroon, Ghana, Kenya, Zambia and Zimbabwe.

The data made available here is the data which underlies the paper:

Rates of Return on Physical and Human Capital in Africa's Manufacturing Sector.

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Abstract of the paper

In this paper two sets of issues are addressed using panel data from the manufacturing sector of five African countries. First, how high are the returns to human relative to physical capital. Second, what is the relative importance of technology and endowments of human and physical capital in determining differences in productivity and earnings across the countries. Estimates from individual based earnings functions, which only include human capital variables, shows that the returns to education are on average 10 per cent and rise with the level of education. Mincerian returns are 5 per cent for those with six years of education, 10 per cent for those with ten years and 14 per cent for those with fourteen years. Evidence is presented showing that the average return is reduced to 7 per cent once firm fixed effects are included. The rates of return on human capital from a production function are lower, ranging from 3 to 5 per cent. Rates of return on physical capital exceed 20 per cent and greatly exceed the return on human capital. Data is available on the stocks of human and physical capital across the countries. Productivity and earnings differentials are shown to be large between the Cameroon and Ghana. These differences are due almost entirely to differences in firm characteristics and physical, not human, capital endowments.

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An Overview of the Data.

The paper presents standard earnings and production functions for the manufacturing sector of five African countries, Cameroon, Ghana, Kenya, Zambia and Zimbabwe. The data set is unusual in having measures of both physical and human capital. To understand how these variables are created it is necessary to understand something of the design of the underlying questionnaire.

An example of the questionnaires can be found under the CSAE web site page on data sets. The three waves of the Ghana RPED data are available. The other questionnaires were similarly designed.

The questionnaire collected data at the level of the firm - called firm level data in the exposition that follows and also data at the worker level - called individual level data below. At the firm level data on the outputs, costs and the details of the labour force of the firm were collected. Within each firm up to 10 workers were then interviewed and information collected on their educational background, their training and earnings. It is therefore possible to run standard earnings functions on the individual level data and standard production functions on the firm level data. The two basic data files which enable this to be done are:

EARN5ILD (Earnings for 5 Countries at the individual level).

This file contains the basic individual level data for the 5 countries. Table 1 is the list of variables in this data file.

To obtain the basic summary statistics and to run the earnings function which are reported in Tables 1, 3, 5 and the first column of Table 7 you can run “earnall5release” which is a simple sas programme taking the individual level data in EARN5ILD as input.

HC13COMF (Human capital combined with firm data)

If you run the sas program “program to run hc13comf” you will obtain the results reported in Tables 9, 10, 11 and 12 of the EDCC paper. The programme uses the data file HC13COMF as input. A list of variables in the data file can be seen in Table 2. It needs to be noted that these tables use the lagged value of the capital stock series so if you wish to obtain the data that underlies these runs you will need to use more basic data.

To create HC13COMF you need the following data files and sas programs:

RPED5C (Firm level data for the five countries)

This file contains the basic firm level data for the five countries. Table 3 is a list of variables in this data file.

OCCST (Firm level data for occupational breakdown of the five countries)

This file contains the number of workers by occupation within each firm. The occupational categories used are linked to the occupational variables in EARN5ILD. Table 4 is a list of variables in this file.

And the following sas programme: “humancapital release”. This programme creates two other files as well as HC13COMF. They are:

PRODED15: See Table 5 for a list of the variables in this file.

HCBASE: See Table 6 for a list of variables in this file.

Both files contain firm level data for both physical and human capital. PRODED15 is the more general file. HCBASE has deletion of outliers in particular all firms with Value-added to capital greater than 50 or less than .01 have been deleted. If you do not wish to make this deletion then you should use the more general file PRODED15.

To obtain the results reported in Table 7 equations (2) and (3) which link firm effects to the individual data you will need to run the sas programme "EDCCfirm level runs".

Two other sas programmes that run regressions reported in the paper are:

"Cobb-Douglas tests"

"Pooling tests"

The first reproduces the test for the Cob-douglas that were run for the paper. The second reproduces the pooling tests reported in Table 12 of the paper.

Table 1 EARN5ILD				
Variable	Label	Mean	N	
WAVE	Round Dummy	1.8633312	12512	
FIRM	Firm Identification Number	2337.44	12512	
WID	Worker Identification Number	5.4876119	12512	
AGE	Age of the worker	33.4057705	12512	
TENURE	Years Worked in Current Firm	7.1828348	12471	
HOURS	Weekly Hours Worked	44.8426311	12512	
WAVE2	Dummy for Second Round	0.3136189	12512	
WAVE3	Dummy for Third Round	0.2748561	12512	
MALE	Dummy if Worker is Male	0.8284047	12512	
AGESQ	Age of the worker Squared	1205.99	12512	
EDUC	Formal Years of Education	9.838441	12367	
NONE	No Education	0.0217391	12512	
SOMPRIM	Some Primary Education	0.0850384	12512	
PRIMCOM	Primary Education Completed	0.5183824	12512	
SECCOM	Secondary Education Completed	0.3320812	12512	
UNIV	University education Completed	0.0310102	12512	
PEXP	Potential experience (age-years in school-6)	17.5313334	12367	
PEXPSQ	Potential experience squared	421.507237	12367	
MGMT	Dummy if worker Management	0.0537084	12512	
ADMIN	Dummy if worker Administration	0.0658568	12512	
SALES	Dummy if worker Sales staff	0.101023	12512	
SUPER	Dummy if worker a Supervisor	0.0966272	12512	
TECH	Dummy if worker a technician	0.1042199	12512	
APPREN	Dummy if worker an Apprentice	0.1009221	7917	
MASTER	Dummy if worker a Master	0.0268447	6817	
MANEDU	Years of education if worker=management	13.2636364	660	
ADMINEDU	Years of education if worker=administration	12.6177559	811	
SALEDU	Years of education if worker=sales	11.6203336	1259	
SUPEDU	Years of education if worker=supervisor	9.9556114	1194	
TECHEDU	Years of education if worker=technician	9.3833593	1286	
PROSEDU	Years of education if worker=production	8.63494	5747	
MASTEDU	Years of education if worker=master	8.6120219	183	
APPREDU	Years of education if worker=apprentice	10.0614035	798	
MANPEX	Potential experience if worker=management	19.6469697	660	
ADMINPEX	Potential experience if worker=administration	14.9420469	811	
SALPEX	Potential experience if worker=sales	15.5631454	1259	
SUPPEX	Potential experience if worker=supervisor	22.9798995	1194	
TECHPEX	Potential experience if worker=technician	18.6423017	1286	
PROSPEX	Potential experience if worker=production	18.4825126	5747	
MASTPEX	Potential experience if worker=master	16.273224	183	
APPRPEX	Potential experience if worker=apprentice	7.8947368	38	
MANYRS	Imputed education if worker=management	15.0133929	672	
ADMINYRS	Imputed education if worker=administration	14.1492718	824	
Variable	Label	Mean	N	

SALYRS	Imputed education if worker=sales	13.2689873	1264
SUPYRS	Imputed education if worker=supervisor	12.4408602	1209
TECHYRS	Imputed education if worker=technician	12.142638	1304
PROSYRS	Imputed education if worker=production	10.6901529	5819
MASTYRS	Imputed education if worker=master	9.557377	183
APPRYRS	Imputed education if worker=apprentice	10.1777222	799
MANAGE	Age if worker=management	39.0401786	672
ADMINAGE	Age if worker=administration	33.5206311	824
SALAGE	Age if worker=sales	33.221519	1264
SUPAGE	Age if worker=supervisor	38.9222498	1209
TECHAGE	Age if worker=technician	34.0575153	1304
PROSAGE	Age if worker=production or support	33.1481354	5819
MASTAGE	Age if worker=master	30.8852459	183
APPRAGE	Age if worker=apprentice	21.4092616	799
MANTEN	Tenure in job if worker=management	8.1442786	670
ADMINTEN	Tenure in job if worker=administration	6.3567296	821
SALTEN	Tenure in job if worker=sales	6.73194	1262
SUPTEN	Tenure in job if worker=supervisor	11.7900774	1206
TECHTEN	Tenure in job if worker=technician	7.0010328	1299
PROSTEN	Tenure in job if worker=production	7.1964189	5799
MASTTEN	Tenure in job if worker=master	6.5554029	182
APPRTEN	Tenure in job if worker=apprentice	1.8399079	796
YEARSC	Imputed Years of Schooling	10.8152174	12512
EDUCSQ	Formal Years of Education Squared	110.312121	12367
TENSQ	Years Worked in Current Firm Squared	100.7609693	12471
EARNM	Monthly Earnings in Local Currency	43278.81	11954
PROS	Dummy if a production or support worker	0.3570662	2795
CAMER	Country Dummy for Cameroon	0.1574488	12512
KENYA	Country Dummy for Kenya	0.2607097	12512
GHANA	Country Dummy for Ghana	0.2233855	12512
ZIMBA	Country dummy for Zimbabwe	0.1604859	12512
ZAMBI	Country Dummy for Zambia	0.1979699	12512
EARNMUSD	Monthly Earnings in US \$	127.9161332	11954
EARNMPPP	Monthly Earnings in US (PPP) \$	285.4559681	11954
PEXPYRS	Potential Experience in Years	16.5911925	12512
LAEARNCP	Log of annual earnings in constant price	10.560645	11954
LMEARNPP	Log of Monthly Earnings in US\$ PPP	5.1707039	11954
EARNMCDP	Monthly Earnings in constant prices	19051.59	11954
LMEARNCP	Log of Monthly Earnings in constant prices	8.0757384	11954

Table 2 HC13COMF			
Variable	Label	Mean	N
FIRM	Firm Identification Number	8641.04	958
WAVE	Round Dummy	1.9906054	958
VADCAPC	Value-added/Capital	2.340612	958
EARNMPPC	Monthly earnings in US\$ ppp	300.33772	660
LNEARNPC	Log of monthly earnings in US\$ppp	5.3539352	660
LCAPPPEC	Log capital/employee in US PPP\$ lagged	8.3369285	958
LVADPPEC	Log of Value-added/employee in US\$ ppp	8.5002532	958
LEDUWGTC	Log of weighted years of education in fi	2.1323097	958
LAGEWGTC	Log of weighted age of workers in firm	3.3770937	958
LTENWGTC	Log of weighted tenure of workers in fir	1.6380266	958
LVADPPC	Log of value-added in US\$ ppp	12.01583	958
LCAPPPC	Log capital in US PPP\$ lagged	11.871842	958
LEMPC	Log employment	3.5155766	958
LEDUTOTC	Log of total years of Education lagged	5.6672235	958
LAGETOTC	Log of total age of workers in firm	6.9120075	958
LTENTOTC	Log of total years of tenure lagged	5.1729403	958
EMPC	Employment	126.55386	958
LEMPCL	Log employment lagged one period	3.5349138	958
UNIVC	University completed lagged	0.0209715	830
SECCOMC	Secondary completed lagged	0.3040907	830
PRIMCOMC	Primary completed lagged	0.5456178	830
NONEC	No education lagged	0.0198053	830
EDUWGTC	Weighted av. of education per firm lagged	8.7085096	958
AGEWGTC	Weighted av. of age per firm lagged	30.153399	958
TENWGTC	Weighted av. of tenure per firm lagged	6.6153923	958
CAPPEMPC	Capital in US\$ppp/Employee lagged	16189.11	958
VADPEMPC	Value-added in UIS\$pp/Employee	13116.14	958
HCETPCC	Human capital=Education+tenure	15.323902	958
LCAPPECC	Log of capital in US\$ppp/employee	8.3673835	958
LNERNPLC	Log of monthly earnings lagged	5.4914472	789
WAVED	Dummy for round	0.4989562	958
CAPCITY	Dummy=1 for firm in capital city	0.5709812	958
WOOD1	Dummy =1 for wood sector	0.177453	958
TEXTILE1	Dummy=1 for textile an clothing sector	0.1127349	958
METAL1	dummy=1 for metal and machines sector	0.2505219	958
ANYFOR	Any foreign ownership	0.2066806	958
ANYSTAT	Any state ownership	0.0407098	958
GHANA	Country dummy for Ghana	0.2400835	958
KENYA	Country dummy for Kenya	0.2077244	958
ZIMBA	Dummy if firm in Zimbabwe	0.2724426	958
CAMER	Country dummy for Cameroon	0.177453	958
ZAMBI	Country dummy for Zambia	0.1022965	958
LVADPEC	Log value-added/employee in US PPP \$	8.5002532	958
EDUWSQ	Squared weighted education in years	79.993102	958
Variable	Label	Mean	N

AGEWSQ	Squared weighted age in years	956.75761	958
TENWSQ	Squared weighted tenure	62.753368	958
EARNPC	Monthly earnings in US\$ ppp	300.33772	660
LEANRMPT	Log earnings+log employment	8.768156	660
VADPEC	Value-added/employee in US\$ppp	13116.14	958
CAPPPEC	Capital in US\$ppp/employee	16189.11	958
VADCAPP	Value-added in US\$ppp/Capital in US\$ppp	7.5840243	958
LHC	Log of human capital (education+tenure)	10.840164	958
HCPC	Human capital=Education+tenure	15.323902	958
HCPCSQ	Squared human capital	255.733	958
LHCPC	Log of human capital	3.7703363	958

Variable	Label	Mean	N
FIRM	Firm Identification Number	3096.68	3223
WAVE	Round Dummy	1.9900714	3223
EMP	Number of employees in firm (employment)	126.73036	2760
VAD	Value-added in domestic prices	209107496	2521
CAPCITY	Dummy if firm in the capital city	0.579561	2916
WOOD1	Dummy if firm in wood or furniture sector	0.1836595	2913
TEXTILE1	Dummy if firm in textile or clothing sec	0.1167182	2913
METAL1	Dummy if firm in metal sector	0.2519739	2913
LVAD	Log of value-added in domestic prices	15.689859	2378
LEMP	Log of employment	3.3430121	2760
LKPER	Log of replacement value of the capital	16.042569	2533
VADCAP	value-added/capital	4.8953534	1926
CAPVAD	capital/value-added	7.450845	2331
ANYFOR	Dummy if firm has any foreign ownership	0.2153846	2860
ANYSTAT	Dummy if firm has any state ownership	0.0514166	2859
GHANA	Dummy if firm in Ghana	0.182749	3223
KENYA	Dummy if firm in Kenya	0.2041576	3223
ZIMBA	Dummy if firm in Zimbabwe	0.1889544	3223
KPER	Replacement value of the capital stock	387479901	400
CAMER	Dummy if firm in Cameroon	0.2224635	3223
ZAMBI	Dummy if firm in Zambia	0.2016755	3223

Variable	Label	Mean	N
FIRM	Firm Identification Number	2886.54	3029
MGMT	Management workers	3.5560314	2802
ADMIN	Administration workers	5.2239468	2706
SALES	Sales staff	8.0368189	2716
SUPER	Supervisors	4.9683355	2337
TECH	Technicians	5.2087674	2304
PROD	Production or support workers	88.092883	2810
APPREN	Apprentices	2.3539537	1859
WAVE	Round Dummy	1.9792011	3029
MASTER	Masters	1.0942211	796
WAVE1	Dummy for First Round	0.3393859	3029
WAVE2	Dummy for Second Round	0.3420271	3029
WAVE3	Dummy for Third Round	0.318587	3029
CAMER	Dummy if firm in Cameroon	0.197755	3029
KENYA	Dummy if firm in Kenya	0.2172334	3029
GHANA	Dummy if firm in Ghana	0.2129416	3029
ZIMBA	Dummy if firm in Zimbabwe	0.2010565	3029
ZAMBI	Dummy if firm in Zambia	0.1710135	3029

Variable	Label	Mean	N
FIRM	Firm Identification Number	3057.79	3291
WAVE	Round Dummy	1.9939228	3291
UNIV	University education Completed	0.0284651	2312
SECCOM	Secondary Education Completed	0.3147686	2312
PRIMCOM	Primary Education Completed	0.5362554	2312
NONE	No Education	0.0242291	2312
EMP	Number of employees in firm (employment)	126.73036	2760
VAD	Value-added in domestic prices	224679483	2378
CAPCITY	Dummy if firm in the capital city	0.579561	2916
WOOD1	Dummy if firm in wood or furniture sector	0.1836595	2913
TEXTILE1	Dummy if firm in textile or clothing sec	0.1167182	2913
METAL1	Dummy if firm in metal sector	0.2519739	2913
LEMP	Log of employment	3.3430121	2760
VADCAP	value-added/capital	7.436947	2196
CAPVAD	capital/value-added	9.8506751	2196
ANYFOR	Dummy if firm has any foreign ownership	0.2153846	2860
ANYSTAT	Dummy if firm has any state ownership	0.0514166	2859
GHANA	Dummy if firm in Ghana	0.1967063	3279
KENYA	Dummy if firm in Kenya	0.2006709	3279
ZIMBA	Dummy if firm in Zimbabwe	0.1857274	3279
KPER	Replacement value of the capital stock	436373070	2533
CAMER	Dummy if firm in Cameroon	0.2186642	3279
ZAMBI	Dummy if firm in Zambia	0.1982312	3279
EDUWGT	Weighted years of education in firm	7.4478574	3088
AGEWGT	Weighted age of workers in firm	25.082455	3088
TENWGT	Weighted tenure in firm	5.2160935	3088
PEXWGT	Weighted potential experience in firm	13.551998	3088
VADPPP	value-added in US\$ PPP	2364847.7	2378
CAPPPP	Capital stock in US\$ PPP	3662228.2	2533
EARNMUSD	Monthly earnings in US\$	162.95158	2220
EARNMPPP	Monthly earnings in US\$ PPP	321.79167	2220
LVADPPP	Log of value-added in US\$ PPP	11.798599	2378
LCAPPPP	Log of capital stock in US\$ PPP	11.772326	2533

Table 6 HCBASE		Mean	N
Variable	Label		
FIRM	Firm Identification Number	9228.55	2130
WAVE	Round Dummy	1.9741784	2130
UNIV	University education Completed	0.0257448	1652
SECCOM	Secondary Education Completed	0.3164264	1652
PRIMCOM	Primary Education Completed	0.5379326	1652
NONE	No Education	0.0238953	1652
EMP	Number of employees in firm (employment)	125.39027	2128
CAPCITY	Dummy if firm in the capital city	0.586385	2130
WOOD1	Dummy if firm in wood or furniture sector	0.1798122	2130
TEXTILE1	Dummy if firm in textile or clothing sec	0.1244131	2130
METAL1	Dummy if firm in metal sector	0.2544601	2130
LEMP	Log of employment	3.4116867	2128
VADCAP	value-added/capital	2.5805938	2130
CAPVAD	capital/value-added	4.0381217	2130
ANYFOR	Dummy if firm has any foreign ownership	0.2102713	2064
ANYSTAT	Dummy if firm has any state ownership	0.0470189	2063
GHANA	Dummy if firm in Ghana	0.2042254	2130
KENYA	Dummy if firm in Kenya	0.2253521	2130
ZIMBA	Dummy if firm in Zimbabwe	0.2169014	2130
CAMER	Dummy if firm in Cameroon	0.1779343	2130
ZAMBI	Dummy if firm in Zambia	0.1755869	2130
EDUWGT	Weighted years of education in firm	8.6220689	1994
AGEWGT	Weighted age of workers in firm	29.056196	1994
TENWGT	Weighted tenure in firm	6.0990952	1994
VADPPP	value-added in US\$ PPP	2363816.8	2130
CAPPPP	Capital stock in US\$ PPP	3486194.4	2130
EARNMUSD	Monthly earnings in US\$	163.37135	1589
EARNMPPP	Monthly earnings in US\$ PPP	335.81485	1589
LVADPPP	Log of value-added in US\$ PPP	11.893354	2130
LCAPPPP	Log of capital stock in US\$ PPP	11.80272	2130
EDUTOT	Total years of education in firm	1022.12	1992
AGETOT	Total age of workers in firm	3724.84	1992
TENTOT	Total tenure of workers in firm	960.61773	1992
LEDUTOT	Log of total years of education in firm	5.4981222	1938
LAGETOT	Log of total age of workers in firm	6.7116117	1942
LTENTOT	Log of total tenure of workers in firm	4.9608969	1941
LEDUWGT	Log of weighted years of education in fi	2.1510372	1939
LAGEWGT	Log of weighted age of workers in firm	3.3674277	1943
LTENWGT	Log of weighted tenure of workers in fir	1.6148722	1942
LVADPPE	Log of Value-added/employee in US\$ ppp	8.4804744	2128
LCAPPPE	Log of Capital/employee in US\$ ppp	8.3911566	2128
CAPPEMP	Capital/employee in US\$ ppp	16412.17	2128
VADPEMP	Value-added/employee in US\$ ppp	12763.51	2128