

Does Akan Literacy Influence Household's Income?

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Abstract

Amponsah and Koga (2019) demonstrated that there is a strong correlation between Akan literacy and income of both Akan and non-Akan Ghanaians. The empirical work in this article addresses the hypothesis that Akan literacy influences household income. Using Ordinary Least Square (OLS) and quantile regression models, we find that literacy in Akan is associated with higher household income. Moreover, even after accounting for ethnicity, we also find that returns to biliteracy in Akan and English is higher than returns to mono-literacy in English or Akan. When we consider our main results together with the results of the interaction terms for ethnicity and biliteracy, our results indicate that the higher returns to Akan create a larger income differentials within Akan households (income gap of about 133% for the 10th quantile) than between Akan and non-Akan households (income gap of about 35%).

Keywords: biliteracy, human capital, indigenous language, income, ethnicity

1. Introduction

Akan is the most dominant spoken language in Ghana. 'Akan' belongs to the Kwa sub-family of Niger-Congo and is spoken in the south-central part of the Republic of Ghana (Williamson and Blench 2000).¹ Various rounds of the Ghana Living Standards Survey

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¹According to Williamson and Blench (2000), Nzema and Ahanta are not included to Akan. But in this study, we follow the definition of GLSS to classify Nzema as Akan.

(GLSS) suggest that it is also the most learned indigenous language. For example, the GLSS 7 indicates that about 47% of the population are Akans with about 26% of household heads being literate in Akan (Table 1). The current regional demarcations in Ghana indicate that the Akans occupy eight out of the sixteen regions of Ghana, namely; Ahafo, Ashanti, Bono, Bono East, Central, Oti, Western and Western North regions, with the language spoken as a first language in these regions.

Language shift has been featured as a popular topic in sociolinguistic analysis. As indicated in Pendakur and Pendakur (2002), Bodomo et al. (2009) and Agyekum (2009), studies on shifts in language have focused on use between majority languages and shifts from minority to majority languages. In the case of Ghana, Bodomo et al. (2009) and Agyekum (2009) discuss two categories of language shift namely, intra-national language shift and international language shift. According to Agyekum (2009), intra-national language involves the situation where one indigenous language in a geographic area or region in a country assumes a lingua franca status and other languages thus shift to this language, while international language shift is the situation where the people shift to an entirely foreign language that is not one of the indigenous languages of their country. Examples of the former type of language shift in West Africa are languages that are considered as trade languages, which include Hausa, Igbo and Yoruba in Nigeria, Akan in Ghana and Hausa in the Northern parts of Ghana. While examples of the latter type of language shift are English and French which both became the official languages of the anglophone and francophone countries in West Africa. In Ghana, English is not only used as an official language, but it is also the language of education and of mass communication vis--vis the indigenous Ghanaian languages.

Not only is Akan the most dominant spoken language in Ghana, but it is widely used as lingua franca throughout Ghana. Although English is the de facto official language, Akan is much more understood and used than English. The influence of Akan is such that some argue people are shifting from their mother tongue to Akan (Bodomo et al. 2009 and Agyekum 2009), but in the case of Ghana it is controversial to argue for complete language shift to Akan. Rather, it could be argued that some individuals from other ethnic groups use Akan along with their mother tongue because of its significant importance for

trade and other activities. However, the economic impact of the Akan literacy and for that matter other indigenous languages in Ghana are less studied. Studies on language, earnings and the labor market have been largely concentrated on the effects of official languages acquisition (Chiswick 1991; Chiswick and Miller 1995; Dustmann and Soest 2001; Leslie and Lindley 2001; Chiswick and Miller 2002; Chiswick 2009 and Bleakley and Chin 2010).

In this paper, our aims and objectives are to contribute to, first, the emerging scholarship on household income differentials associated with Akan literacy by exploring Akan literacy rate among Akans and Non-Akan, second, the ever increasing literature on dominant language worldwide, and, the literature on biliteracy in the international language (English) and the dominant indigenous language (Akan) on household income. Following the literature, we investigate three broad strands of language literacy. First, we examine income differentials associated with literacy considered as the human capital facet of language. Basically, in this case, we are looking at the fact that language literacy is economically functional. Second, we evaluate income differentials associated with literacy from the ethnic facet of language knowledge, thus, the fact that language knowledge is a dimension of ethnic identity (Pendakur and Pendakur (2002)). Finally, we examine income differentials associated with literacy from the biliteracy facet of language knowledge, thus considering the fact that if biliteracy between Akan and English might also be economically functional, for example through the labor market.

The paper is structured as follows. Section 2 provides a brief overview of the literature examining economics of language. Section 4 details our empirical strategy to estimate Akan's effect on household income. Section 4 describes the data used for our analysis and provides summary statistics for the variables used. Section 5 provides a series of Ordinary Least Square (OLS) and quantile regressions results of the effect of Akan on household income and Section 6 concludes.

2. The Literature

In this section, we provide literature review on the three broad areas of economics of language. Gazzola et al. (2016) provides an extensive set of references to several categories of literature in economics of language. Among the literature provided by these authors,

three areas are of much interest to our studies. In the sub-sections that follows, we provide literature review in the areas that are of interest to us. We start with papers that consider language skills as human capital, then follow it up with those that examine language skills and economic returns, and end with studies that investigate the economic returns of language and ethnicity.

2.1. Language as Human Capital

Language and language skills have been referred to as valuable and marketable asset or human capital (Holborow 2018). Economic benefits of international language ability have been studied. In a study conducted in Canada, English-French bilinguals earn more than those who speak one of the two widely spoken language in Canada (Shapiro and Stelcner 1997; Christofides and Swidinsky 2010). A number of studies have also focused on English ability for both immigrants and non-immigrants (McManus et al. 1983; Angrist and Lavy 1997; Azam et al. 2013). Using a non-parametric method based on propensity score with controls for cognitive ability and panel data method, Saiz and Zoido (2005) suggested a wage premium of 2% to 3% for college graduates who can speak English as a second language.

Empirically, the economic benefits of language skills have been found to outweigh the cost and people make early investment in such ventures (Doyle et al. 2009). The cost may include individuals time, money and efforts that may have been invested in the areas while benefits come in the form of additional earnings. In the US, English language deficiency has been found to be costly but the cost is ethnically and occupationally specific (Kossoudji1988). Academic success has also been linked to English language proficiency. In support of this argument, a study conducted by Garrouste (2008) on the economic returns to language knowledge/skills in eight different countries in an International Adult Literacy Survey concluded that second language skills are estimated to be a major compelling factor affecting wage opportunities.

Countries with both majority and minority languages should have a different pattern of economic returns to these languages. It is expected that the economic returns to majority language speakers are greater than those of the minority language speakers. It is important to note mother tongues are an important instrument in identifying the economic returns

to the possession of language skills. Pendakur and Pendakur (2002) distinguished between languages that are learnt not by choice (mother tongue) and those that were learnt after childhood and interpreted the productive returns to the latter as the pure return to language skills. Thus, fluency in a majority languages should be associated with a higher productive return for those who possess it as a mother tongue than those who learn the languages later on. To further examine the issues of local mother tongue, this study analyses the return to a local majority languages and other minority languages with different sizes of linguistic communities.

2.2. Language skills and Economic Returns

Economic incentives, exposure and efficiency of acquiring a language has been some of the major factors determining peoples language proficiency (Christofides and Swidinsky 2008). Most of the studies focussed on English proficiency with the exception of a few turning their attention to other country-specific languages such as German, Norwegian and Hebrew (Dustmann 1994; Chiswick 1998; Hayfron 2001). Limited studies have also focussed on economic returns to English language skills in countries whose major and official language is not English (Lang and Siniver 2009; Grin 2001). Studies into the economic returns of language skills mostly have the hypothesis that higher language competence brings a higher wage and it is important to note here that mixed results have been produced. Gwartney and Long (1978) analyses the earnings of eight ethnic minorities in the US urban labor force and found that English language proficiency was not statistically significant in affecting wages. Reimers (1983), also argued that Spanish speakers with English ability from Mexico, Puerto Rico and Cuba received a wage of 5%, 15% and 20% respectively less than their white counterparts in the USA.

Nevertheless, other researches conducted in the USA found a positive effect of English ability on earnings (Tainer 1986; Rivera-Batiz 1990). Christofides and Swidinsky (2010) and Christofides and Swidinsky (2008), found similar results in Canada where the returns to bilingualism in English and French increased significantly in twenty years (1971 and 1991) compared to the returns of monolingual anglophone. Grin (1999) also confirms a significant positive effect of English ability on earnings in a study conducted in Switzerland.

As mentioned earlier, the official language for Ghana is English while it has seventy-nine (79) local spoken languages but only nine (9) of which are studied in schools. Knowledge in the majority local language, i.e., Akan, spoken by over 51% of the population is expected to have higher economic returns hence possess an economic incentive to learn as a second local language for non-Akan speakers. In this study, we hypothesize higher earnings for knowledge in Akan and associate lower earnings to the minority languages.

2.3. Language and Ethnicity

Different labour market opportunities available to both majority and minority groups could be attributed to different human capital. In an Economics of Higher Education Research conducted in Australia revealed that full-time graduates receive a higher wage premium over non-graduates; they receive about an average of 65% more than their counterparts without a university degree (Borland et al. 2000). This reflect the impact of investment in higher education on productivity. In spite of this, the investment made in human capital becomes useful when it is in high demand in a specific labour market. Therefore, the difference in wage premium in a country-specific labour market favours the natives with dominant languages than those with minorities and immigrants (Kalter and Kogan 2006). The ability to speak the dominant country specific language influences the wage and opportunities available to non-native speakers or immigrants.

To further validate the importance of investment in education and the advantages that comes with the ability to be fluent in a country-specific language, Lindemann (2009) in a study conducted in Estonia revealed that both ethnicity and Estonian language skill have a significant effect on the occupational first job and that Estonian language proficient non-Estonian are less successful labour market entrants compared to ethnic Estonian. It therefore appears that ethnicity plays important role in returns from education in a specific-country labour market. With the changing influence of ethnicity and language skill in the labour market an inequality gap is created (Pendakur and Pendakur 2002; Lindemann (2009)). The ethnic labour market enclave offers a degree of job security and comfort with the possession of the language skill (Light 1984). Brenton's 1974 institutional completeness concept explains some of the advantages of being part of an ethnic and cultural enclave. He argues that

such belongingness offers a wide job opportunities and services that are mostly enjoyed by members of an enclave that is institutionally complete. Therefore, it is expected that besides investment in education, workers in and institutionally complete large ethnic enclave earns more than a smaller enclave worker.

The afore-mentioned narrative seamlessly constructs a major link between language skills, human capital, economic returns and ethnicity. In the subsequent pages, several related dimensions will be outlined within the context of the above theories. Attempts will be made to address the Ghana's language situation as well as the prospective data sources that may be adopted for this policy research. Specifically, as mentioned in the introductory section, the study will analyse the effect of Akan literacy on household income differentials.

3. Estimation Methodology

The main objective of this empirical analysis is to test the hypothesis that Akan literacy is positively associated with household income. To do this, we specify the following linear regression model:

$$y_i = x_i^{\rho}\beta + \epsilon_i, \quad (1)$$

where y_i is the dependent variable for the i household, β represents the vector of parameters to be estimated, x_i^{ρ} denotes a vector of independent variables, and ϵ_i represents the error term. As discussed in Cromley et al. (2012), Furno (2014) and others, the quantile regression model provides a robust estimates of the coefficients and does not require distributional assumptions. The objective function could be formulated as:

$$F(\theta) = \sum_i w_i |\epsilon_i(\theta)| = \sum_{y_i > x_i^{\rho}\beta} \theta |y_i - x_i^{\rho}\beta| + \sum_{y_i < x_i^{\rho}\beta} (1 - \theta) |y_i - x_i^{\rho}\beta|, \quad (2)$$

where the weighting system w_i is equal to θ for positive errors and to $1 - \theta$ for negative ϵ_i . When $\theta = 0.5$, the quantile regression is simply the median regression and the objective function becomes $F(0.5) = \sum_i \theta |y_i - x_i^{\rho}\beta|$. The reason for using the quantile regression analysis is that our dependent variable (i.e., household income) is skewed, which means it does not have a normal distribution. The literature on quantile regression analysis show that

its coefficients are not sensitive to outliers (Cromley et al. 2012; Hung et al. 2010). This means that compared to an OLS, the results from quantile analysis will be more appropriate. Moreover, a quantile regression approach makes it possible to examine the estimated equation at different points of the wage distribution, it also helps to detect discrepancies and specific behaviours of the regressors including patterns of the estimated coefficients across quantiles and within a specific subset – that is not possible to detect in the case of OLS (Furno, 2014).

4. Data and sample

In this paper, we use data from the GLSS7 to estimate the effect of Akan at the household level. The GLSS is based on the World Bank’s Living Standard Measurement Survey, as a multi-module household survey, it covers a range of issues including demographic characteristics, education, household income, consumption and expenditure, health, employment, prices of consumer goods, and time use. The main objective of the GLSSs in Ghana is to collate data on households for the estimation of indicators of poverty, and to enable government in the drawing up of policies for poverty reduction and national planning. Like the previous round of the GLSSs, the seventh round also provides national and regional level indicators. The survey studied about 15,000 households in 1,000 Enumeration Areas (EAs), consisting of 561 (56.1%) rural EAs and 439 (43.9%) urban EAs. However, the sample size for our study is 12,153 households. These were the number of households that we had complete information on the head’s language literacy.

The GLSS asks a number of question on literacy in English/French and Ghanaian local languages. A question on foreign languages asks whether respondents are able to read a phrase/sentence in either English or French, or both. Another question asks whether respondents are able to write a sentence in either English or French, or both. For Ghanaian languages, respondents are asked to answer questions on the Ghanaian language they can read or write a phrase/sentence. To overcome the problem of self-reported literacy, which is considered a poor measure, enumerators tested respondents literacy by asking them to read or write sentences in the foreign and local languages in which they are literate. A question on mother tongue is not solicited in the questionnaire, for that reason, we used parent’s ethnicity to identify mother tongue.

4.1. Language Literacy in Ghana

We present in Table 1 summary statistics for literacy in Ghana to allow the reader to put into context the germaneness of the income and language relations discussed in this paper. The Ghanaian language variable is divided into five categories: not literate in any Ghanaian Language (None), partially literate in Akan (PAL), literate in Akan (AL), partially literate in other Ghanaian language (POL), and literate in other Ghanaian language (OL). None means the respondent indicated that she/he is not able to read or write any language, PAL means the respondent indicated that she/he is able to read Akan but cannot write, while AL means the respondent indicated that she/he is able to read and write in Akan. Similarly, POL means the respondent indicated that she/he is able to read a Ghanaian language other than Akan but cannot write and OL means the respondent indicated that she/he is able to read and write in a Ghanaian language other than Akan.

Table 1: Summary Statistics on Language Literacy (Mean and SD), by Sex

	Female mean/sd	Male mean/sd	Total mean/sd
<i>Panel A: Ghanaian Language Literacy</i>			
None	0.683 (0.465)	0.532 (0.499)	0.578 (0.494)
PAL	0.043 (0.203)	0.048 (0.214)	0.046 (0.211)
AL	0.193 (0.395)	0.286 (0.452)	0.257 (0.437)
POL	0.014 (0.117)	0.018 (0.131)	0.016 (0.127)
OL	0.067 (0.251)	0.117 (0.321)	0.102 (0.302)
<i>Panel B: Biliteracy</i>			
None (GLENG 1)	0.570 (0.495)	0.380 (0.485)	0.438 (0.496)
English only (GLENG 2)	0.088 (0.284)	0.133 (0.339)	0.119 (0.324)
Akan only (GLENG 3)	0.171 (0.377)	0.274 (0.446)	0.242 (0.428)
Akan and English (GLENG 4)	0.056 (0.230)	0.103 (0.304)	0.088 (0.284)
Other Ghanaian Language only (GLENG 5)	0.070 (0.254)	0.054 (0.227)	0.059 (0.236)
Other Ghanaian Language and English (GLENG 6)	0.045 (0.208)	0.057 (0.231)	0.053 (0.224)
Observations	12153		

Standard deviation in parentheses. None means not literate in any Ghanaian Language, PAL means partially literate in Akan, AL means literate in Akan, POL means partially literate in other Ghanaian language, and OL means literate in other Ghanaian language
 Authors own calculation using data from GLSS 7

In addition to information on Ghanaian language literacy, we also present information on biliteracy in English and Akan. Moreover, included in Table 1 are information on biliteracy in English and other indigenous Ghanaian languages. Biliteracy is divided into six categories: not literate in either English or Ghanaian language (none), mono-literate in English (GLENG 2), mono-literate in Akan (GLENG 3), biliterate in English and Akan (GLENG 4), mono-literate in other Ghanaian language (GLENG 5), and biliterate in English and other Ghanaian language (GLENG 6). According to panel B of Table 1, about 57% of heads are not literate in either English or any of the indigenous Ghanaian languages. Specifically, only about 6% of heads in the sample are biliterate in Akan and English, and about 5% are biliterate in English and some other Ghanaian language.

Table 1 shows that household heads are more literate in Akan than any other indigenous Ghanaian language. In general, Akan literacy is almost the same for both male and female household heads. The figures in Table 1 also reveals that the majority of the sample is not literate in any indigenous Ghanaian language, but, depending on gender, 10-29% are literate in Akan or some other Ghanaian language. Interestingly, we find that 1-5% of the sample are partially literate in either Akan or some other Ghanaian languages. Partially literate means that the individual reported being able to read or write but not able to do both.

Table 2 reports the descriptive statistics for the other variables used in the statistical analysis, while Figure 1 shows variations in the distribution of earnings by Akan literacy and other Ghanaian language literacy. It is important to emphasize that our sample is representative of household heads in Ghana. The GLSS is a national representative survey, using the sample weight provided in the data, one is able to produce results that are nationally representative. We used the sampling weight to compute the statistics provided in both Table 1 and 2.

According to the figures presented in Table 2, female household heads are on average mature than male household heads. The average age is 48 for female household heads and 46 for male household heads. It seems that the difference in age between female and male household heads has a bearing on the household size, which is 4.6 for female headed households and 6.1 for male headed households. Female household heads are more likely to have no education or more likely to be a primary school grandaunt, but less likely to

Table 2: Summary Statistics of Selected Data Mean and SD, by Sex

	Female mean/sd	Male mean/sd	Total mean/sd
Age in completed years	48.37 (15.35)	46.52 (13.76)	47.09 (14.29)
Household size	4.57 (2.43)	6.06 (3.58)	5.60 (3.35)
Per capita gross income (GHs)	7.50 (1.62)	7.67 (1.61)	7.62 (1.61)
No school	0.277 (0.447)	0.209 (0.407)	0.230 (0.421)
Primary school	0.341 (0.474)	0.222 (0.416)	0.259 (0.438)
Junior Secondary School	0.260 (0.439)	0.348 (0.476)	0.321 (0.467)
Secondary High School	0.043 (0.204)	0.090 (0.287)	0.076 (0.265)
Tertiary	0.079 (0.270)	0.131 (0.337)	0.115 (0.319)
<i>Employment status</i>			
Public Employee	0.037 (0.189)	0.082 (0.274)	0.069 (0.253)
Private Employee	0.085 (0.279)	0.217 (0.412)	0.179 (0.3847)
Self-employed (non-agric)	0.423 (0.494)	0.177 (0.382)	0.248 (0.432)
Self-employed (agric)	0.236 (0.425)	0.383 (0.486)	0.341 (0.474)
Unemployed	0.085 (0.279)	0.064 (0.244)	0.070 (0.255)
Retired	0.008 (0.092)	0.011 (0.106)	0.011 (0.102)
Other Inactive	0.125 (0.331)	0.066 (0.248)	0.083 (0.275)
<i>Marital Status</i>			
Never married	0.091 (0.287)	0.045 (0.207)	0.0585 (0.234)
Married monogamous	0.246 (0.431)	0.730 (0.444)	0.591 (0.492)
Married polygamous	0.000 (0.000)	0.088 (0.283)	.063 (0.242)
Common law,Living together	0.089 (0.285)	0.102 (0.303)	0.099 (0.298)
Divorced/Separated	0.244 (0.430)	0.023 (0.152)	0.087 (0.282)
Widowed	0.329 (0.470)	0.011 (0.104)	0.102 (0.303)
Observations	13719		

Standard deviation in parentheses

Authors own calculation using data from GLSS 7

have higher than primary education. Majority of female household heads engage in self-employed (non-agriculture) activities, while the major area of employment for male household heads is self-employed (agriculture) followed by private employees and self-employed (non-agriculture). Finally, our summary statistics indicate that relative to male household heads, female household heads are less likely to be married and more likely to be divorced or widowed.

Now turning to the distribution of household income and its relation to Akan literacy, Figure 1 panel (a) indicates that for the full sample, households whose heads are partially literate in Akan or those who are literate in Akan have higher per capita income than those who are not literate in Akan. In Figure 1 panel (b) we created separate graphs for Akan and Non-Akan household heads. These graphs reveal that for Akans, households with heads being literate in Akan or other Ghanaian language have higher per capita income. However, for non-Akans, the households with heads being literate in Akan have the highest per capita income. These interesting observations would be tested empirically in the next section to assess their level of significance.

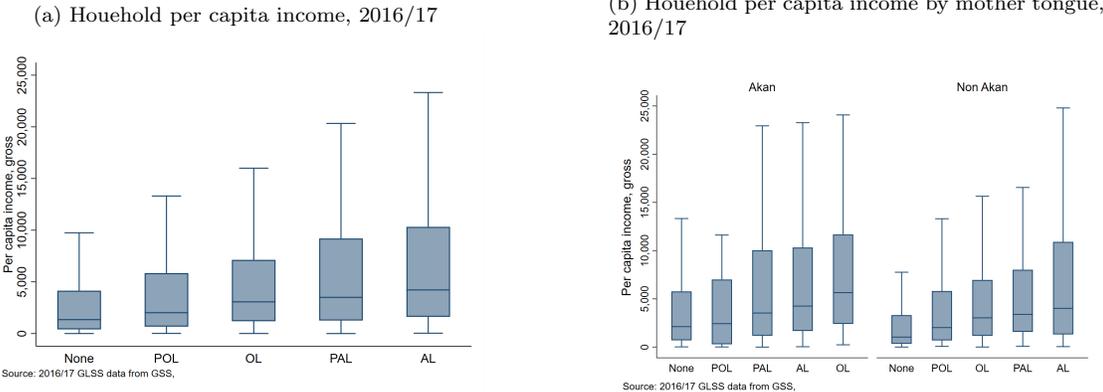


Figure 1: Distribution of household income

5. Empirical Results

The results from estimating equation 1 and equation 2 are presented in Tables 3, 4 and 5. In all the tables, results from the quantile regression are reported at the 10th, 25th, 50th, 75th and 90th quantiles. In addition, the OLS results are also listed for comparative

purposes. In Table 3, our results assess income differentials faced by households associated with Akan and non-Akan literacy. In Table 4, we analyze the effect of mother tongue and Akan literacy, while in Table 5 we look at the effect of biliteracy of the household head on household income. In the subsequent subsections, we discuss the results for each analysis.

5.1. Returns to Ghanaian Language

In this subsection, we consider the results for return to Akan literacy without accounting for mother tongue. As discussed above, the indigenous Ghanaian language variable is divided into five categories, the omitted category is AL; they constitute about 26% of the sample, so the coefficients may be interpreted relative to this category (i.e., these coefficients may be interpreted as percentage difference in per capita income between those households' whose head differ in Akan literacy relative to none or other Ghanaian language literacy). For all the models reported in 2, we account for household's education level, employment status marital status and regional dummies as well as rural and urban locality dummies. For the locality variable, we used the one that accounts for the ecological zones of Ghana in terms of their rural and urban status (.e., Accra, urban coastal, urban forest, rural coastal, rural forest and rural Savannah). We also included in our models, an interaction terms between the indigenous Ghanaian language dummy and employment status. In these tables, we report only the results for our language variables but the full results would be made available for interested readers upon request.

In addition to Table 3, Figure 2 presents a summary of quantile regression results for the Ghanaian language covariates. The plots show the coefficient estimates and the associated 95% pointwise confidence bands for the quantile regression estimates depicted by the shaded gray area. These plots provide information on the coefficient estimates for None, PAL, POL and OL. The dash lines represent the 95% confidence interval for the OLS estimates. The graphs in Figure 2 show that there is considerable variation in the association between income and household head's ability to read and write Ghanaian language.

The value for None is negative for each of the regression models, which indicates that in all the models households whose heads are not Akan literate have less income relative to those whose heads are Akan literate. The disparity between income of households with Akan

Table 3: Returns to Akan Literacy via OLS and Quantile Regression

VARIABLES	OLS	Quantile Regression				
		q10	q25	q50	q75	q90
<i>Akan literacy</i>						
None	-0.5182*** (0.1365)	-0.6346*** (0.2020)	-0.6016*** (0.0624)	-0.4938*** (0.1872)	-0.3878*** (0.1403)	-0.2583 (0.2220)
PAL	-0.1727 (0.2167)	0.0637 (0.3466)	-0.3565 (0.7785)	-0.1591 (0.2035)	-0.1794* (0.0957)	-0.1857 (0.4216)
POL	-0.1840 (0.1891)	-0.3022 (0.7392)	-0.0539 (0.0877)	-0.2631*** (0.0801)	-0.4182 (0.3456)	-0.2573 (0.4545)
OL	-0.1928* (0.1044)	-0.1628 (0.1090)	-0.0292 (0.0808)	-0.2528*** (0.0614)	-0.3421*** (0.0971)	-0.0932 (0.1612)
Constant	7.1925*** (0.2302)	6.9975*** (0.1954)	7.1653*** (0.1992)	7.0301*** (0.2144)	7.4245*** (0.1879)	7.8557*** (0.2931)
Observations	12,153	12,153	12,153	12,153	12,153	12,153
R-squared	0.3508	0.2228	0.2300	0.21146	0.1937	0.1923
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

literate heads and those with Akan illiterate heads are substantial, particularly at the bottom tail of the distribution. At the 10th quantile of the distribution, the difference is roughly 65% that of the Akan literate households. The OLS model indicates a disparity of about 52%, which is close to the median model disparity of about 49%. These results indicate that both the low and top earning households are poorly represented by the conditional mean, the OLS regression. Like for instance, the impact of Akan literacy is much stronger at the 10th than the 90th quantile. The coefficient steadily increased from a low of -0.63 at the 10th quantile to about -0.26 at the 90th quantile. These results provide evidence of heterogeneity in the parameter estimates for these Ghanaian language categories.

Table 3 shows that there is higher returns to Akan relative to PAL, POL and OL. For these categories, while the OLS estimates are mostly not significant, the quantile regression provides significant estimates in some cases. For example, income differentials are large, negative and significant at the 1% level for the median regression in the case of POL and OL. Similar results is found for the OL at the 75th quantile. However, in the case of PAL, all the results are negative but significant at the 10% level for the 75th quantile only.

5.2. Language Human Capital and Mother Tongue

The results discussed in the previous section considered Ghanaian language literacy by ignoring the ethnic background or the mother tongue of the head of the households. The

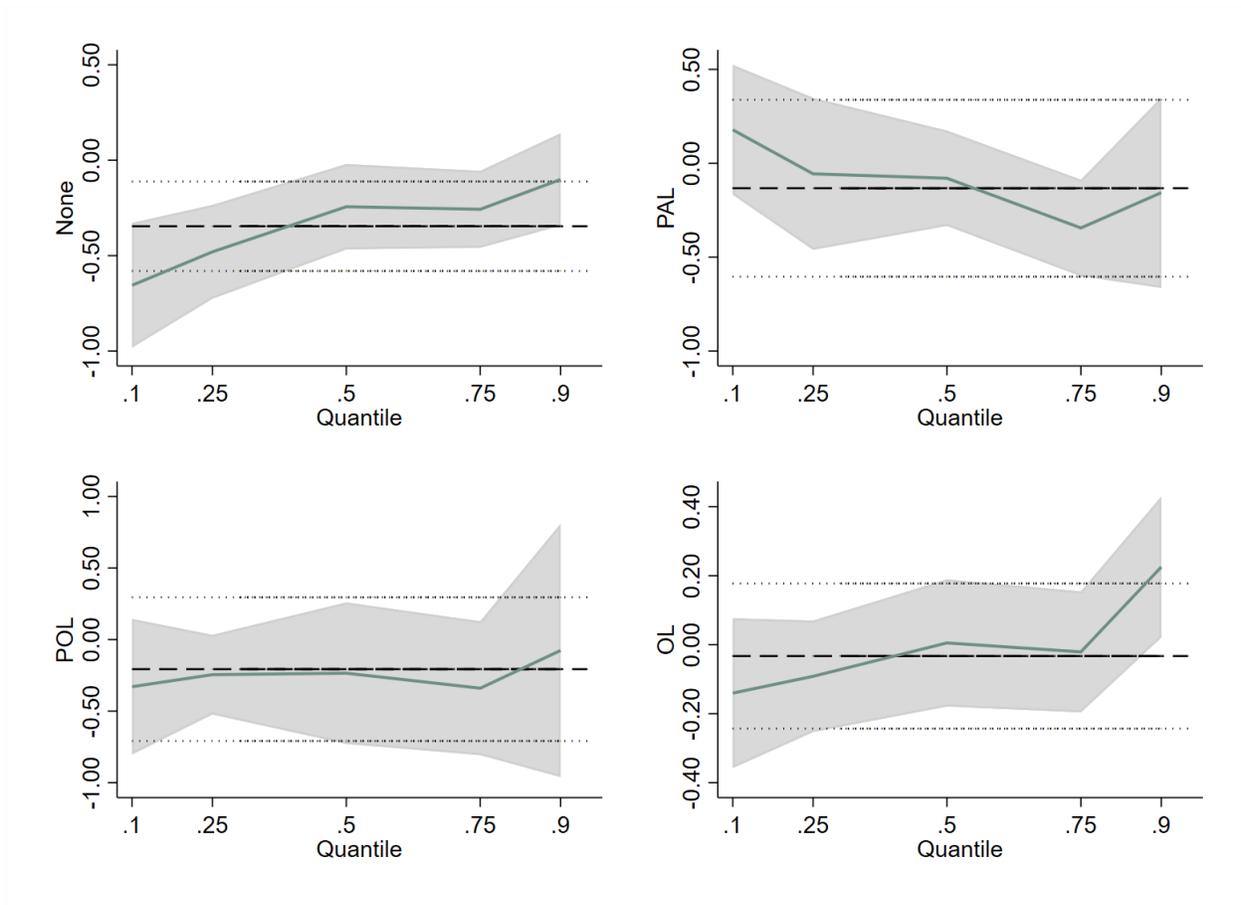


Figure 2: Distribution of household income

literature show that this may be problematic because language can be acquired either in childhood by mother tongue, or later in life (Pendakur and Pendakur 2002). Since our language variable is literacy (i.e., the ability to read and write a particular language), its acquisition can be considered as an active individual choice. Thus, each and every Ghanaian, whether Akan or non-Akan, who is literate in any of the Ghanaian languages, made a decision later in life to invest in that language. We envisage that a person's language acquisition may be influenced by their mother tongue or ethnicity, which if not accounted for may bias our results.

To assess the effect of mother tongue or ethnicity, we estimate a model with ten dummy variables for language literacy based on the household head's ethnicity. The reference dummy is Akan mother tongue and being literate in Akan language. Figure 3 presents results for quantile regressions on the effect of Ghanaian language literacy and

mother tongue on household income. The black dashed line shows the OLS results. The graphs in Figure 3 demonstrate that there is considerable variation in the association between income and Akan literacy based on mother tongue. We also observe similar results of variation for the association between income and literacy in other Ghanaian Languages.

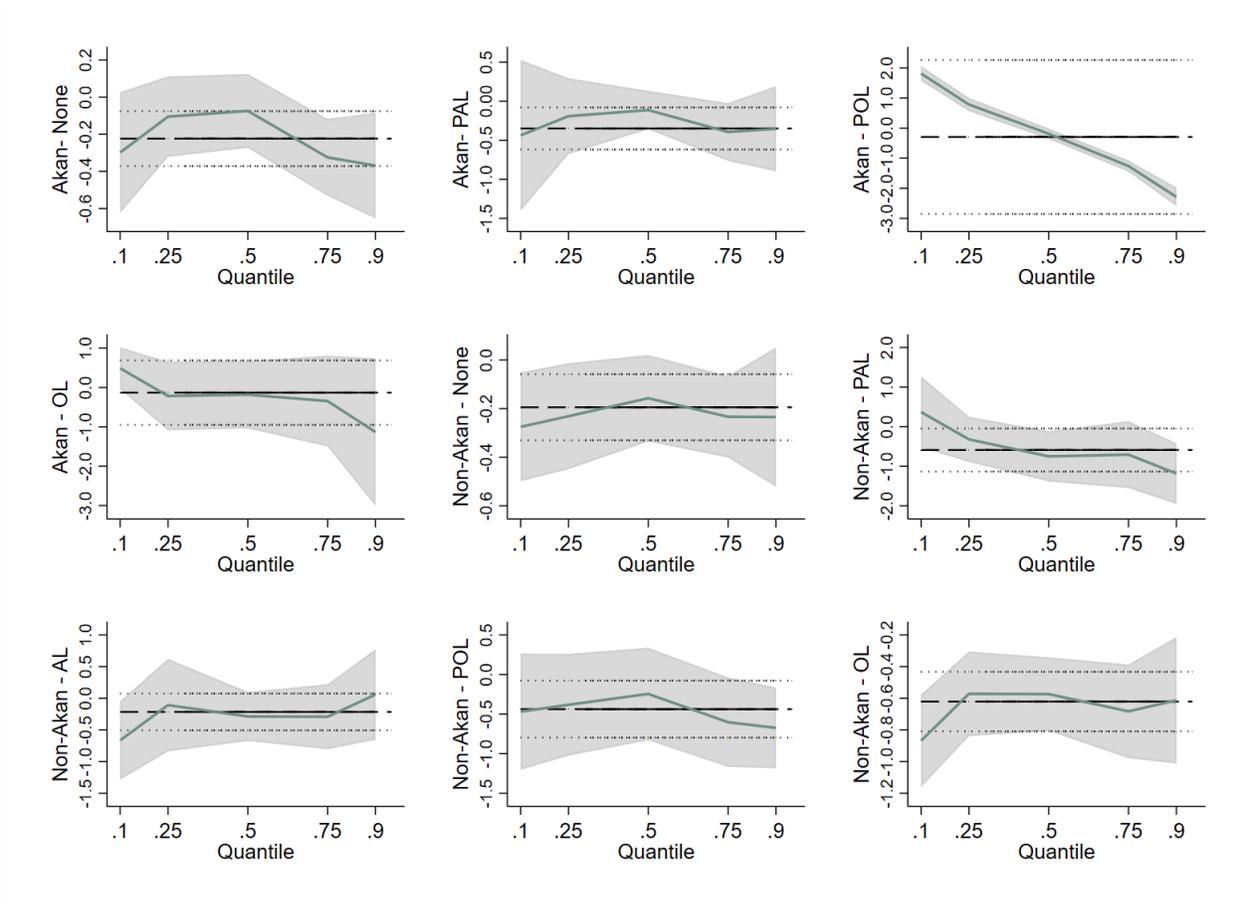


Figure 3: Distribution of household income

Presented in Table 4 are the OLS and the quantile regression estimates at the 10th, 25th, 50th, 75th, and 90th quantiles. Drawing our attention to Akan literacy among Akans, we see that its effects on income are variable, and statistically significant for all the estimated models. The OLS estimated value for the Akan literacy gap of 68% between households with Akan literate heads and those with heads who are not literate in any language is in line with our previous findings (Amponsah and Koga 2019), and about 25% higher. Our quantile regression estimated coefficients do not substantially differ from the OLS. They are mostly within the two standard error confidence interval of the OLS results. Notwithstanding,

Table 4: Akan and Ethnicity on log per capita income via OLS and Quantile Regression

VARIABLES	OLS	Quantile Regression				
		q10	q25	q50	q75	q90
<i>Akan Ethnicity</i>						
None	-0.6817*** (0.1654)	-0.5337*** (0.1214)	-0.6597*** (0.0697)	-0.7889* (0.4347)	-0.6099*** (0.1790)	-0.5178** (0.2131)
PAL	-0.1270 (0.1847)	-0.0929 (0.4114)	0.1368** (0.0569)	-0.0662 (0.2717)	-0.2878 (0.2418)	-0.4671 (0.3368)
POL	-1.0977*** (0.2790)	-0.6373 (7.3716)	-0.8518 (0.9797)	-1.2683 (3.8198)	-1.0248 (0.9405)	-1.6037*** (0.5721)
OL	-0.2159 (0.2076)	0.3927 (0.5017)	0.0961 (0.2046)	-0.2233 (1.0086)	-0.9023*** (0.2678)	-0.3037 (1.5427)
<i>Non-Akan Ethnicity</i>						
None	-0.5288*** (0.1696)	-0.8035*** (0.1300)	-0.5876*** (0.0981)	-0.4374 (0.2744)	-0.3998** (0.1844)	-0.1908 (0.2123)
PAL	-0.3242 (0.4237)	-0.0454 (0.2784)	-0.4445 (3.7771)	-0.1684 (1.6254)	0.0703 (0.2008)	-0.1890 (0.5834)
AL	-0.2365 (0.1639)	-0.6153*** (0.0678)	0.0869 (0.2928)	0.0278 (0.0766)	-0.2542*** (0.0980)	-0.2429 (0.2098)
POL	-0.1587 (0.1935)	0.1090 (0.1269)	-0.0703 (0.0569)	-0.2560 (0.2046)	-0.3752 (0.6312)	-0.3859 (0.2567)
OL	-0.2687** (0.1181)	-0.2847*** (0.0942)	-0.1151 (0.0727)	-0.2805*** (0.0690)	-0.4036** (0.1605)	-0.2875 (0.2940)
Constant	6.9149*** (0.2442)	6.6668*** (0.1749)	6.7447*** (0.2064)	6.7161*** (0.2001)	7.1446*** (0.2418)	7.3084*** (0.3281)
Observations	12,153	12,153	12,153	12,153	12,153	12,153
R-squared	0.3453	0.2330	2330	0.2141	0.1968	0.1955

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

their estimated values at the various are of interest and quite informative. For instance, in the case of Akan, relative to households with Akan literate heads, the income gap is highest at the median and statistically significant at the 10% level for those households with Akan illiterate heads. On the other hand, for non-Akan, relative to Akan literate household heads, the estimated coefficients show a decreasing income gap as the quantile increases for households with Akan illiterate heads. It is plausible that among the Akans, both higher and lower income households receive the same premia because Akan literacy is relevant across board. However, in the case of non-Akans, it seems that Akan literacy is less relevant for higher income households and for that matter, the income gap between households headed by Akan literates and those headed by non-Akan literates reduces significantly.

Table 4 allows us to compare household heads who are Akan and literate in Akan to those who are non-Akan and literate in Akan language. The effect of mother tongue becomes more

clearer when we compare the results of these two groups. The OLS results indicate about 23% income gap between these households, but the coefficient is insignificant. However, we can confirm from Table 4 that the 10th-50th quantile regression coefficients for non-Akans who are literate in Akan (AL) have coefficients outside the OLS confidence intervals, indicating that the OLS provides a poor representation of non-Akans who are Akan literate lower income. For example, the income gap is roughly 62% at the 10th quantile and about 3% at the median, while the coefficients are significant at the 10th and 75th quantiles. In comparison with households with heads not literate in any Ghanaian language, the pattern is different. As opposed to both Akan and non-Akan who are not literate in Akan where the coefficients are negative and more than four are significant, for the non-Akans who are literate in Akan language, four of the coefficients are negative but only two are significant at the 1% level.

5.3. Language as Human Capital: Returns to Biliteracy in Ghana

Table 5 presents the effect of biliteracy on household income. In all the models, in addition to regional dummies, locality dummies and interaction terms between biliteracy and employment status, we included the explanatory variables listed in Table 2. On one hand, the income equation estimated by OLS shows that there are no significant differences between household headed by Akan and English biliterates and those headed by those who are not literate in any Ghanaian language as well as English. On the other hand, the OLS results show that there are significant differences between household headed by an Akan and English biliterates and those headed by English mono-literates. Moreover, the OLS results seem to indicate that Akan literate headed households have higher income than Akan and English biliterates households. Between these two households, the results indicate an income gap of about 18%, which is significant at the 10% level. We do not find significant differences in income between Akan and English biliterate headed households and other Ghanaian language mono-literate headed households, although it seems the latter has higher household income. Similarly, there is no significant differences in income between Akan and English biliterate headed households and other Ghanaian and English biliterate headed households.

The quantile regression coefficients are mostly significant for NONE, GLENG2 and

Table 5: Effect of biliteracy on log per capita income via OLS and Quantile Regression

VARIABLES	OLS	Quantile Regression				
		q10	q25	q50	q75	q90
<i>Akan and English Biliteracy</i>						
NONE	-0.2746 (0.2362)	-0.8248*** (0.3123)	-0.6029*** (0.2083)	-0.3533 (0.5842)	0.2625 (0.2352)	0.6237*** (0.2261)
GLENG2	-0.3874*** (0.1323)	-0.4661*** (0.1194)	-0.5519*** (0.0580)	-0.2167 (0.2235)	-0.1781 (0.1829)	-0.4061** (0.1965)
GLENG3	0.1788* (0.1052)	0.1318 (0.1321)	0.0230 (0.0573)	0.2317*** (0.0882)	0.2822* (0.1454)	0.0860 (0.2027)
GLENG5	0.2487 (0.4886)	-0.5629 (0.7953)	-0.3886 (0.3800)	0.3445* (0.1798)	0.9979*** (0.2789)	1.4589 (3.6905)
GLENG6	0.0558 (0.1538)	0.2106 (0.1438)	0.0145 (0.0612)	0.0817 (0.1432)	0.1623 (0.3680)	0.0983 (0.2463)
Constant	6.8325*** (0.2889)	7.1426*** (0.3464)	6.9025*** (0.2193)	6.8580*** (0.2682)	7.1373*** (0.3151)	7.5327*** (0.3870)
Observations	12,153	12,153	12,153	12,153	12,153	12,153
R-squared	0.3426	0.2230	0.2299	0.2117	0.1940	0.1940

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

GLENG3. As indicated in Table 5, their estimated values at the various quantiles are quite informative. For instance, the income gap is larger for households with heads who are not literate in any Ghanaian language or English relative to those with Akan and English biliterate heads at the lower quantiles. However, at upper quantiles, it is observed that households with heads who are not literate in any Ghanaian language nor English have higher income. We can offer two plausible explanations for these results. First, the large informal sector economy of Ghana means that some higher income household members do not rely on literacy for their income. For example, a large number of Ghanaians engage in artisan mining (galamsey), cocoa production, trading, etc., which are mostly within the informal sector, language literacy requirement is minimal. The second explanation is that, it is plausible that the head of the household is not literate in any language but he or she was been able to provide education for his or her children who are now in position to earn higher income.

We have mentioned the patterns of the estimated coefficients at the different income levels revealed by the quantile regression estimates. The estimates for these subsets revealed that from the lower quantiles to the upper quantiles, English mono-literate headed households have lower income compared to Akan and English biliterate headed households. The results

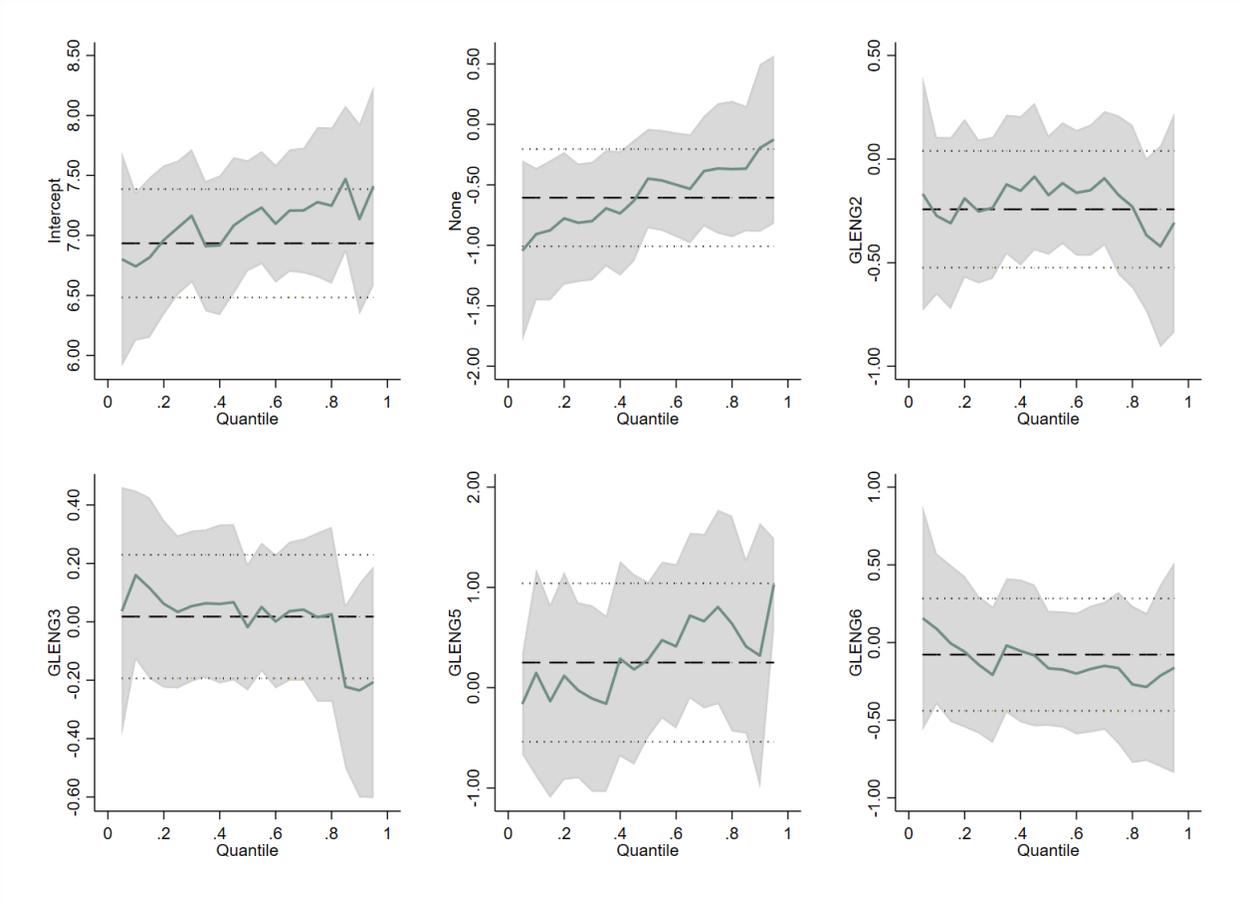


Figure 4: Distribution of household income

are highly significant at the lower quantiles.

Figure 4 summarizes the different behavior of Akan and English biliterate effect relative to the other dummies across the quantiles. In general, NONE and GLENG5 effects increase across quantiles while GLENG2, GLENG3 and GLENG4 effect decrease at the higher quantiles. These results indicate how the OLS provides a poor estimation of the effect of biliteracy on income, especially, for NONE. The dashed lines in the Figure 4 represent the OLS estimated coefficients, which are constant across quantiles.

5.4. Ethnicity and Returns to Biliteracy in Ghana

The biliteracy effect can be clouded by ethnicity differences. To avoid this problem, we estimated separate models that account for ethnicity dummies. Figure 5 and Table 6 report OLS estimates and quantile regression estimates for the 10th, 25th, 50th, 75th and 90th quantiles. The reference dummy for the figures is Akan and English biliteracy and the

figures report the estimates of the coefficients of the language dummy to together with their 95% confidence intervals at the different quantiles. Starting with the effect of biliteracy on income, the graphs in Figure 5 provide patterns similar to those reported in Figure 4 but the estimated coefficient values for the 10th and 90th quantiles of NONE increases slightly.

Table 6: Effect of biliteracy on log per capita income via OLS and Quantile Regression

VARIABLES	OLS	Quantile Regression				
		q10	q25	q50	q75	q90
<i>Akan and English Biliteracy</i>						
NONE	-0.4987 (0.3454)	-1.3250*** (0.4450)	-0.7019** (0.2912)	-0.3376 (0.7145)	0.2344 (0.5417)	0.4092 (0.7176)
GLENG2	-0.6358** (0.2884)	-0.9202*** (0.1777)	-0.6254*** (0.2285)	-0.1770 (0.2550)	-0.2118 (0.5239)	-0.8111 (0.6976)
GLENG3	-0.0915 (0.2663)	-0.4779*** (0.1679)	-0.1471 (0.2248)	0.2365 (0.1456)	0.2919 (0.5161)	-0.2193 (0.6754)
GLENG5	-0.0735 (0.5594)	-1.0899 (0.6937)	-0.4982 (3.7060)	0.2759 (0.2112)	1.0989** (0.5220)	1.0631 (3.9903)
GLENG6	-0.1172 (0.2961)	-0.6934*** (0.2302)	-0.0266 (0.7017)	0.2791 (0.1799)	0.4670 (0.6671)	0.1460 (0.7396)
<i>Ethnicity</i>						
AKAN	-0.3409 (0.2552)	-0.6851*** (0.1701)	-0.2648 (0.2219)	-0.0334 (0.1286)	-0.0503 (0.4978)	-0.4453 (0.6155)
<i>Biliteracy and Ethnicity Interaction terms</i>						
DLENGE1	0.2157 (0.2618)	0.5251*** (0.1785)	0.1613 (0.2335)	-0.0536 (0.1457)	-0.0933 (0.5022)	0.2623 (0.6146)
DLENGE2	0.2615 (0.2793)	0.4898*** (0.1886)	0.0931 (0.2318)	-0.0929 (0.1887)	0.0686 (0.5019)	0.4865 (0.6249)
DLENGE3	0.2067 (0.2771)	0.5744*** (0.1867)	0.1532 (0.2335)	-0.0417 (0.1597)	-0.0721 (0.5010)	0.3769 (0.6222)
DLENGE5	0.3627 (0.3042)	0.5591** (0.2815)	0.2147 (0.3135)	0.0498 (0.2050)	-0.1411 (0.5181)	0.4711 (0.6970)
DLENGE6	0.1034 (0.2903)	0.9491*** (0.2307)	0.0257 (0.3817)	-0.2729 (0.2014)	-0.4166 (0.5247)	-0.0352 (0.6253)
Constant	7.1426*** (0.3790)	7.7780*** (0.2686)	7.1986*** (0.2944)	6.8495*** (0.2797)	7.1717*** (0.5605)	7.6992*** (0.7202)
Observations	12,153	12,153	12,153	12,153	12,153	12,153
R-squared	0.3436					

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6 indicates that after adding the effect of ethnicity into the model the difference between biliteracy in Akan and English and English mono-literacy (GLENG2) maintains its significance for the OLS and also for the quantile regression at the 10th–25th quantiles, while the results for the 50th quantile which was not significant becomes significant, indicating that English mono-literate headed households have less income. Other findings worth mentioning from Table 6 are the estimated effects for mono-literacy in other Ghanaian languages (GLENG5) and biliteracy in other Ghanaian language and English (GLENG6) relative to the reference dummy. In the case of (GLENG5), once again we observe that the OLS estimated coefficient is not significant but the quantile regressions

provide significant results for the 25th and the 75th quantiles, thus, we once again see an indication of a poor performance of the OLS in estimating the effect of biliteracy on household income. It should be emphasized that the estimated coefficient value for the 25th quantile which was not significant in Table 5 becomes significant with slight increase in the magnitude of the coefficient, while the coefficient of the 75th quantile maintains its significant level but observe an increase in magnitude from 0.9979 to 1.0286. These results reveal that apart from the 25th and 75th quantiles, there is no significant difference in household income between Akan and English biliterate headed households and those headed by other Ghanaian language mono-literate households. Likewise, our results provide no evidence of significant difference in income between Akan and English biliterate headed household and other Ghanaian language and English biliterate (GLENG6) headed households.

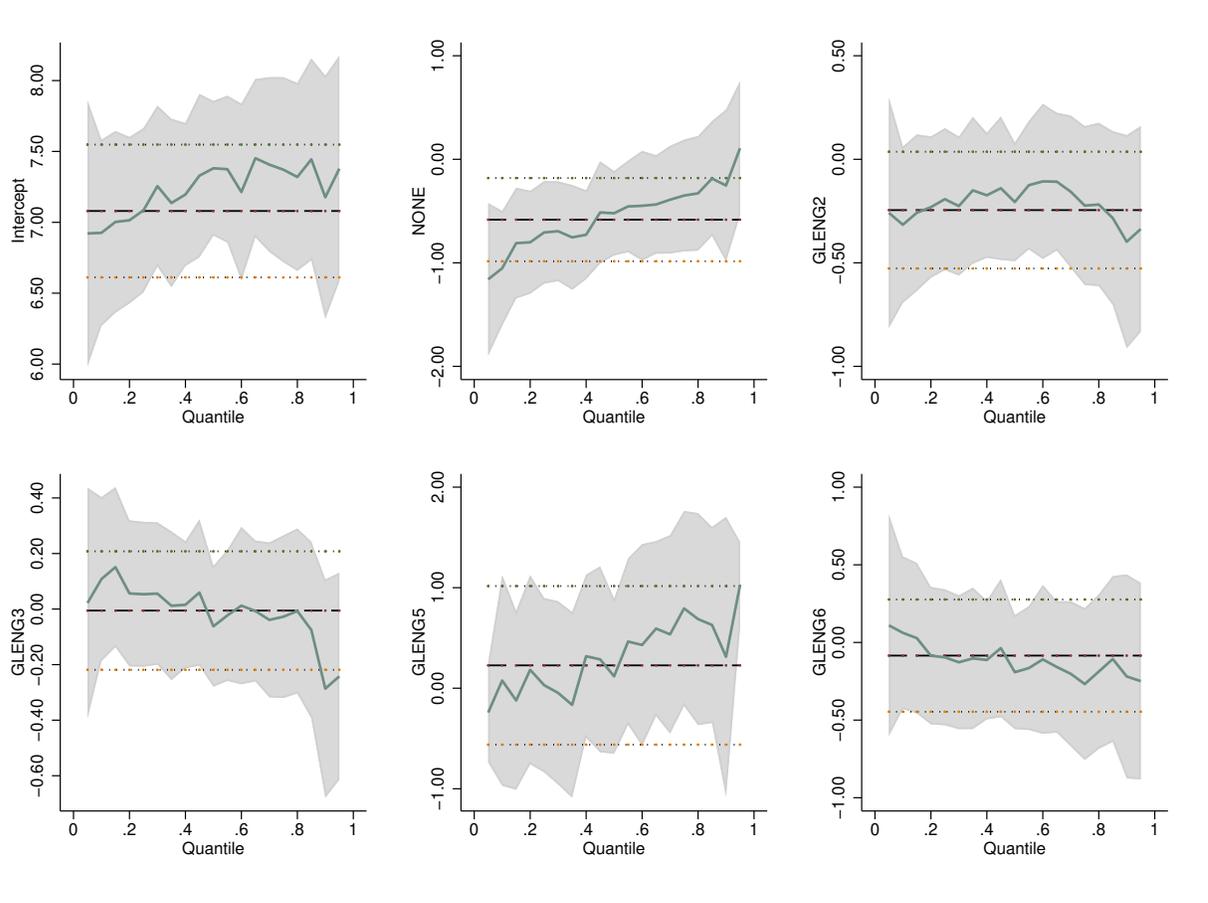


Figure 5: Quantile regression: biliteracy dummies

To examine the effect of ethnicity, we also present OLS and quantile regression results of ethnicity dummy and interaction terms between the ethnicity dummy and biliteracy dummies in Table 6. The graphs in Figure 6 provide more detail for the information reported in the table for the ethnicity dummy and the constant term. The variable AKAN is a dummy that examines the income differentials between Akan and non-Akan headed households. It takes the value of one if the household is headed by non-Akan and zero otherwise.

As for the coefficient of ethnicity, the quantile regressions results illustrated in Figure 6 show different patterns of income profiles across the quantiles: the graph for Akan dummy is inverted U-shaped at the lower quantiles and U-shaped at the upper quantiles. Thus, it indicates large income gaps between Akan and non-Akan headed households at the bottom quantiles (10th–25th) and a closing income gaps at the middle quantiles (50th–75th) and a widening gap at the 90th quantile.

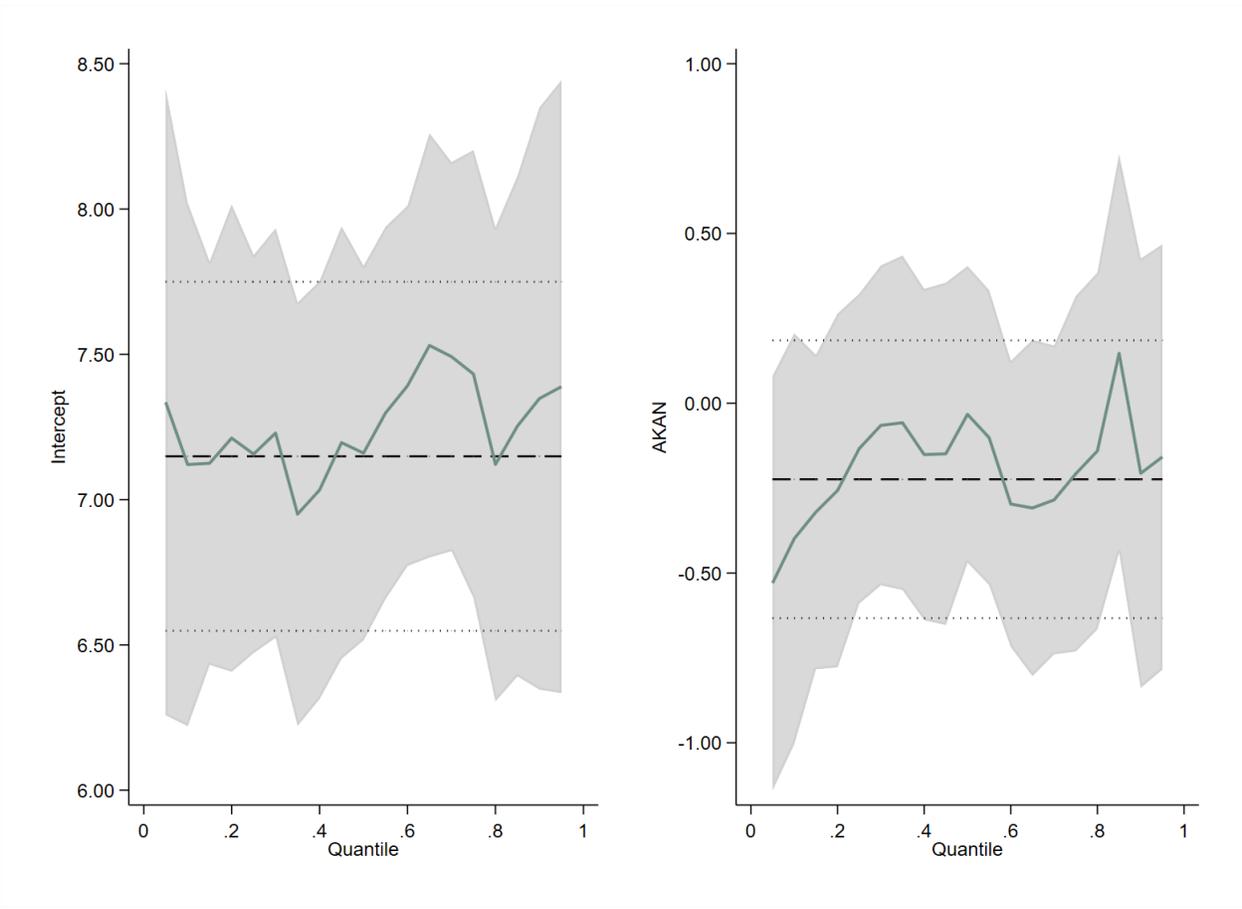


Figure 6: Quantile regression: constant and ethnicity dummy

While these results are informative, to what degree are the reported biliteracy differentials a product of ethnicity (i.e., ethnic background)? To answer this question, we examine the coefficients for the interaction terms for ethnicity and biliteracy dummies together with the main effects. According to Table 6, the coefficients for the interaction terms are positive for the OLS regression, the 10th and the 25th quantile regression models and negative for some of the coefficients in the 50th – the 90th quantile regression models. These interaction terms should be interpreted carefully together with the main effects. As an illustration, let us start with the results for ‘NONE’ in the OLS model. The income gap between the reference group (i.e., Akan heads who are biliterate in Akan and English) and NONE (i.e., those who are not literate in any language) is about 50%, when we consider this results together with the results of the interaction term for ethnicity and biliteracy, the gap between these two groups reduces to about 28% percent ($-0.4987 + 0.2157 = -0.283$), this combined negative effect is further reduced to about 12% if the mean values of NONE from Table 1 is plugged into the equation ($-0.4987 + 0.2157 * 0.438 = -0.124$). Similarly, if the take the results of the quantile regression, we estimate the gap between the reference group and NONE to be about 133%, for the 10th quantile. When the the coefficient of the interaction term is factor in, this gap reduces to about 80% ($-1.3250 + 0.5251 = -0.7999$) and if we include the mean value, this gap reduces to about 35% ($-1.3250 + 0.5251 * 0.438 = -0.35036$). The rest of the results could be interpreted in similar manner.

The positive interaction effects between biliteracy and ethnicity suggest that the the biliteracy income gap between Akan headed households is larger than that between Akan headed and non-Akan headed households. For example, because the ethnicity dummy takes the value of zero if the household head is an Akan and one otherwise, it means the effect of biliteracy for the quantile regression is -1.3250 ($-1.3250 + 0.5251 * 0 = -1.3250$). So for two households, a household with an Akan head who is not literate in English or any other Ghanaian language would be expected to have about 132% less income relative to a household headed by an Akan who is biliterate in Akan and English.

Do biliterates in Akan and English have higher household income than biliterates in other Ghanaian language and English? The answer is mixed, since the coefficients for the interaction involved are not consistent for the different quantile regression and the OLS

models. We observed positive interaction effects between ethnicity and biliteracy for the OLS, the 10th and 25th quantile regressions, while negative effects were observed for the 50th – 90th quantile regressions. Interpreting these interaction terms together with the main effects for biliterates in other Ghanaian language and English; relative to by biliterates in Akan and English, households headed by biliterates in other Ghanaian language and English seem to have lower income at the bottom two quantiles and higher income from the median to the 90th quantiles. The mean regression results also indicate a lower income for households headed by biliterates in other Ghanaian language and English.

6. Conclusion

The main goal of this paper is to examine the extent to which Akan literacy exert influence on household income. Using information on household's language literacy, we have investigated at different quantiles the impact of Akan on household income. Based on our literate review, we investigated this impact through four stages. The first step involved modeling the impact of Akan as human capital, the second step was to examine Akan literacy and ethnicity, while the third was to examine the impact of biliteracy in Akan and English relative to other Ghanaian languages and English, and the fourth was to examine the impact of biliteracy and ethnicity.

On the question of whether Akan literacy influence households' income, the overall results from our models suggest that Akan does exert influence on household income but the results do not hold for all models. In the first set of results for the effect of Akan literacy on household income – relative to Akan literate-headed households, the effect is always negative and significant for Akan illiterate-headed households except for the 90th quantile where it is negative but insignificant. We found similar results for Akan literate-headed households relative to partially Akan literate, partially Other language literate or other language literate headed households.

We also examined the effect of ethnicity to know whether it will have any effect on the Akan literacy results by including in our models ethnicity dummies. The negative and significant results that we found in our first set of models were maintained even for the 90th quantile that was not significant. Our results indicate that Akan literate-headed households

have higher income than other households headed by Akan illiterate, partially Akan literate, partially other language literate and other language literate. Thus, these results do confirm the human capital view of language knowledge as discussed in Pendakur and Pendakur (2002) that those who speak languages with many local speaker earn more than those who speak languages with few local speakers. In this study, we hypothesized that since Akan is the dominant Ghanaian language, individuals who are literate in it should earn more than those who are not literate in it, which we are able to provide evidence to confirm. These findings are similar to those we found in Amponsah and Koga (2019) when we used wage income to examine the return to Akan literacy.

The results of this study suggest that not being literate in Akan and English imposes a real cost on some households (especially, those at the bottom quantiles), by reducing observed incomes. Generally, illiterate and English mono-literate-headed households are more likely to have less income than Akan and English biliterate headed households. When we account for ethnicity in the biliteracy models, we find that the preponderance of non-biliteracy in Akan and English with negative income differentials combine with the effect of ethnicity suggest that the income gap is much larger between Akan and English biliterate headed households and Akan illiterate headed households than between Akan and English biliterate headed households and non-Akan illiterate headed households.

Examining Akan literacy alone clarifies the influence of this skill on households income. Other studies have shown that language ability (especially, English) is often seen as a measure of assimilation in the broadest economic and social sense, and also promote mobility in the labor market (Kossoudji 1988). However, in the case of Ghana, we have shown that Akan and English are most important for economic assimilation. Our results indicate that comprehensive implementation of language programs will eliminate household income gaps and help individuals to full utilize their human capital.

References

- Agyekum, K. (2009). Language shift: A case study of Ghana. *Sociolinguistics Studies* 3(3), 381–403.
- Amponsah, S. and K. Koga (2019). Akan literacy and earnings in Ghana. WEAI Interantional

- Conference. A paper presentation at 15th International Conference of Western Economics Association International, held at Keio University in Tokyo.
- Angrist, J. D. and V. Lavy (1997). The effect of a change in language of instruction on the returns to schooling in Morocco. *Journal of Labor Economics* 15(1, Part 2), S48–S76.
- Azam, M., A. Chin, and N. Prakash (2013). The returns to English-language skills in India. *Economic Development and Cultural Change* 61(2), 335–367.
- Bleakley, H. and A. Chin (2010). Age at arrival, English proficiency, and social assimilation among US immigrants. *American Economic Journal: Applied Economics* 2(1), 165–192.
- Bodomo, A., J. Anderson, and J. Dzahene-Quarshie (2009). A Kente of many colours: multilingualism as a complex ecology of language shift in Ghana. *Sociolinguistic Studies* 3(3), 357.
- Borland, J., J. Borland, P. Dawkins, D. Johnson, and R. Williams (2000). *Returns to investment in higher education*, Volume 1. University of Melbourne.
- Breton, R. (1974). Ethnic stratification viewed from three theoretical perspectives. *Social stratification: Canada*.
- Chiswick, B. R. (1991). Speaking, reading, and earnings among low-skilled immigrants. *Journal of Labor Economics* 9(2), 149–170.
- Chiswick, B. R. (1998). Hebrew language usage: Determinants and effects on earnings among immigrants in Israel. *Journal of Population Economics* 11, 253–271.
- Chiswick, B. R. and P. W. Miller (1995). The endogeneity between language and earnings: international analyses'. *Journal of Labour Economics* 13, 246–88.
- Chiswick, B. R. and P. W. Miller (2002). Immigrant earnings: Language skills, linguistic concentrations and the business cycle. *Journal of Population Economics* 15(1), 31–57.
- Chiswick, B. R. and Miller, P. W. (2009). The international transferability of immigrants' human capital. *Economics of Education Review* 28(2), 162–169.

- Christofides, L. N. and R. Swidinsky (2008). The economic returns to a second official language: English in Quebec and french in the Rest-of-Canada. *Available at SSRN 1150720*.
- Christofides, L. N. and R. Swidinsky (2010). The economic returns to the knowledge and use of a second official language: English in Quebec and French in the Rest-of-Canada. *Canadian Public Policy* 36(2), 137–158.
- Cromley, R. G., D. M. Hanink, and G. C. Bentley (2012). A quantile regression approach to areal interpolation. *Annals of the Association of American Geographers* 102(4), 763–777.
- Doyle, O., C. P. Harmon, J. J. Heckman, and R. E. Tremblay (2009). Investing in early human development: timing and economic efficiency. *Economics & Human Biology* 7(1), 1–6.
- Dustmann, C. (1994). Speaking fluency, writing fluency and earnings of migrants. *Journal of Population Economics* 7(2), 133–156.
- Dustmann, C. and A. v. Soest (2001). Language fluency and earnings: Estimation with misclassified language indicators. *Review of Economics and Statistics* 83(4), 663–674.
- Furno, M. (2014). Returns to education and gender gap. *International Review of Applied Economics* 28(5), 628–649.
- Garrouste, C. (2008). Language skills and economic returns. *Policy Futures in Education* 6(2), 187–202.
- Gazzola, M., F. Grin, and B.-A. Wickstrom (2016). A concise bibliography of language economics. *The economics of language policy*, 53–92.
- Grin, F. (1999). *Competences et recompenses: la valeur des langues en Suisse*, Volume 33. Editions universitaires.
- Grin, F. (2001). English as economic value: Facts and fallacies. *World Englishes* 20(1), 65–78.

- Gwartney, J. D. and J. E. Long (1978). The relative earnings of blacks and other minorities. *ILR Review* 31(3), 336–346.
- Hayfron, J. E. (2001). Language training, language proficiency and earnings of immigrants in Norway. *Applied Economics* 33(15), 1971–1979.
- Holborow, M. (2018). Language skills as human capital? Challenging the neoliberal frame. *Language and Intercultural Communication* 18(5), 520–532.
- Hung, W.-T., J.-K. Shang, and F.-C. Wang (2010). Pricing determinants in the hotel industry: Quantile regression analysis. *International Journal of Hospitality Management* 29(3), 378–384.
- Kalter, F. and I. Kogan (2006). Ethnic inequalities at the transition from school to work in Belgium and Spain: Discrimination or self-exclusion? *Research in Social Stratification and Mobility* 24(3), 259–274.
- Kossoudji, S. A. (1988). English language ability and the labor market opportunities of Hispanic and East Asian immigrant men. *Journal of Labor Economics* 6(2), 205–228.
- Lang, K. and E. Siniver (2009). The return to English in a non-English speaking country: Russian immigrants and native Israelis in Israel. *The BE Journal of Economic Analysis & Policy* 9(1).
- Leslie, D. and J. Lindley (2001). The impact of language ability on employment and earnings of Britain’s ethnic communities. *Economica* 68(272), 587–606.
- Light, I. (1984). Immigrant and ethnic enterprise in North America. *Ethnic and Racial Studies* 7(2), 195–216.
- Lindemann, K. (2009). Ethnic inequalities in labour market entry in estonia: The changing influence of ethnicity and language proficiency on labour market success.
- McManus, W., W. Gould, and F. Welch (1983). Earnings of Hispanic men: The role of English language proficiency. *Journal of Labor Economics* 1(2), 101–130.

- Nahir, M. (2003). Language planning goals: A classification, sociolinguistics: The essential readings. eds. Paulston, Christina Brat and G. Richard Tucker.
- Pendakur, K. and R. Pendakur (2002). Language as both human capital and ethnicity. *International Migration Review* 36(1), 147–177.
- Reimers, C. W. (1983). Labor market discrimination against Hispanic and black men. *The Review of Economics and Statistics*, 570–579.
- Rivera-Batiz, F. L. (1990). English language proficiency and the economic progress of immigrants. *Economics Letters* 34(3), 295–300.
- Romaine, S. (2000). *Language in society: An introduction to sociolinguistics*. Oxford University Press.
- Saiz, A. and E. Zoido (2005). Listening to what the world says: Bilingualism and earnings in the United States. *Review of Economics and Statistics* 87(3), 523–538.
- Shapiro, D. M. and M. Stelcner (1997). Language and earnings in Quebec: trends over twenty years, 1970-1990. *Canadian Public Policy/Analyse de Politiques*, 115–140.
- Tainer, E. M. (1986). English language proficiency and the determination of earnings among foreign-born men. [Unpublished] 1986. Paper presented at the Population Association of America?
- Williamson, K. and R. Blench (2000). *African Languages: An Introduction*, Chapter Niger-Congo, pp. 11–42. Cambridge: Cambridge University Press.