Language and Fertility Transition in Uganda

< Fertility of English-speaking Couple in Multilingual Uganda>

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Abstract

While a set of values about development and the relationships between development and family structures and behavior such as later age at marriage, postponing childbearing, gender equality and greater autonomy for youth have been widely promoted by international organizations, NGOs and local government in Sub-Saharan African countries after International Conference on Population and Development in Cairo, 1994, overall total fertility rate (TFR) of Sub-Saharan African countries are still high (Bongaarts & Casterline, 2012; ThorntonArland, PierottiRachael, Young-DeMarcoLinda, WatkinsSusan, 2014). Among several slow pace African countries, TFR of Uganda is around 6 and has experienced slower pace of decline compare to neighbor countries. Therefore, in this paper, I conducted second data analysis with 2,479 couples in USAID DHS data Uganda to understand high TFR in Uganda with an idea of role of linguistics homogeneity. Each unit includes demographic information of women and men such as education level, language of interview, wealth, urban residence, religion and region. According to the analysis, when woman speaks either Luganda or English, the couple may have about 11 % less children withholding other control variables in constant including level of education, wealth and urban residence. However, only English-speaking case does not show statistically significant effect. Therefore, I tested the model with Kenya data which has bigger sample size, but local language, Swahili, is dominant in the society compare to Luganda in Uganda. In Kenya case, when woman speaks either Swahili or English, the couple may have 4%

less children and the coefficient is statistically significant in 90% confidence interval. This coefficient increased in the case of English-speaking woman to 6.6%. Although the results refer ambiguous effect in Uganda and Kenya, the key point is that language effect is statistically significant for women, not for men. It would be interesting point that language may have heterogeneous effect on different gender. This paper would be meaningful for social scientist to consider a language factor for understanding fertility transition in Africa.

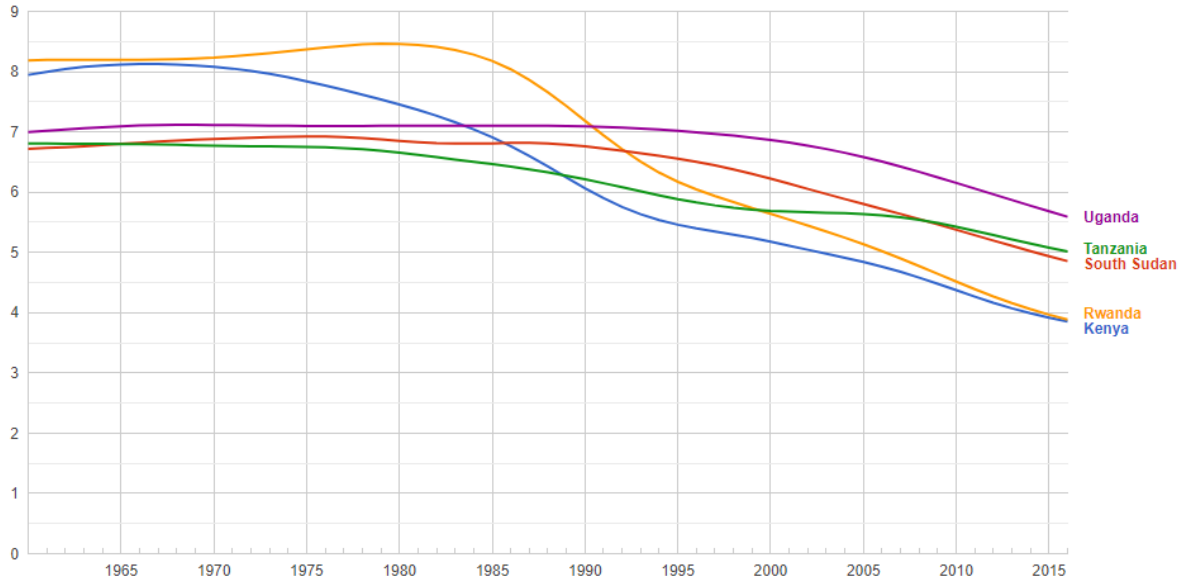
Key words: Fertility Transition, Diffusion of Innovation, Linguistic Homogeneity, Uganda

Back ground

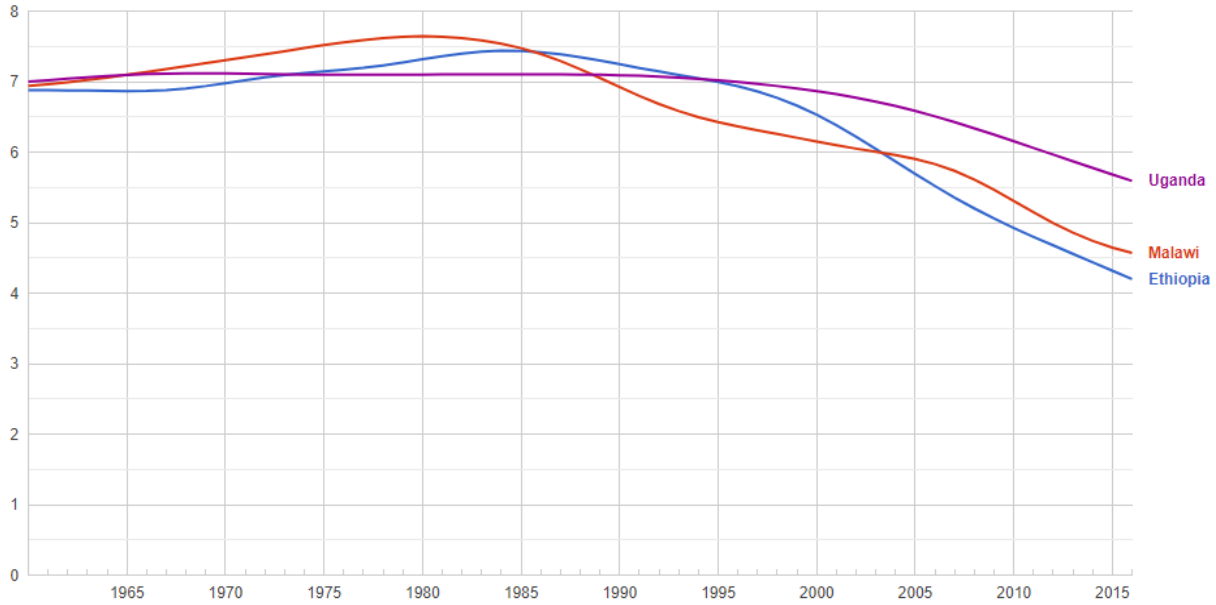
In September 1994, a comprehensive 20-year plan for stabilizing world population and promoting socioeconomic development was developed at the International Conference on Population and Development in Cairo. This plan asked each government to provide 'universal access to a full range of safe and reliable family planning methods and to related reproductive health services by the year 2015' (Kirk, 1996). While not explicitly stated, accomplishing this goal would result in benefits for individuals, families and countries. We might call this "developmental idealism", a set of beliefs and values about development and the relationships between development and family structures and behavior (Thornton, Pierotti, Young-DeMarco, & Watkins, 2014). This idea considers that aspects such as later age at marriage, postponing childbearing, gender equality and greater autonomy for youth are modern and good (Thornton, Pierotti, Young-DeMarco, & Watkins, 2014), and it has been widely promoted by international organizations, NGOs and local government in Sub-Saharan African countries. However, overall total fertility rate (TFR) of Sub-Saharan African countries are still high compare to other regions (Bongaarts & Casterline, 2012).

While John Caldwell and his colleges claimed “African exceptionalism”, which is pronatalist features of African societies and a new type of transition, other study shows different evidence that changes in age-specific fertility rates in Africa does not differ from the other regions but the recent pace of fertility decline in Africa is slower than the pace of decline in other regions (Bongaarts & Casterline, 2012). More than that, several African countries have experienced a stalled fertility transition with a TFR near 5 (Bongaarts & Casterline, 2012).

[Total Fertility Rate trend in East Africa Region from 1960 – 2015]



[Total Fertility Rate trend among UPE implemented countries from 1960 – 2015]



<Figure 1 & 2 from Google Trend, Data from World Bank>

Among several slower pace African countries, TFR of Uganda is around 6 and has experienced even slower pace of decline compare to neighbor countries in Eastern Africa region. Uganda has high fertility rate compare to Malawi and Ethiopia, where not only have low GDP than Uganda but also adopted Universal Primary Education (UPE) policy same as Uganda, which eliminated school fees at all levels of primary school in 1990s. Furthermore, Uganda government actively has utilized mass media for disseminating of reproductive health information and education from 1990 to solve AIDS epidemic and it was first country in Africa where success to reduce AIDS rate, which can infer a prevalence of global level health message in Uganda. Nevertheless, Uganda's total fertility rate is higher than neighboring countries and has various difficulties of conducting sex education and dealing with reproductive health issues such as unintended pregnancy, contraceptive usage, and cultural perception about sexual topic in Uganda (Kibombo, Neema, Moore, & Ahmed, 2008). In that sense, education and socioeconomic development would not enough to explain this difference. Therefore, in this

paper, I brought an idea of role of linguistics homogeneity to understand this slower pace and high fertility rate in Uganda.

Literature review

Among various factors for fertility decline, female education has been discussed as a key factor for fertility decline. There are three major causal relationships based on neo classical economic model: 1) Female education increases female labor participation and the participation increases opportunity cost of raising children. 2) Female education defers first birth due to longer schooling and it lowers chance to additional birth. 3) Female education gives more information of their body and they use the information to their advantage. Other schooling effects are about ideational change such as exposure to new gender & family norm and new idea through textbooks, mass media and peer groups. Regardless of which discipline the papers based on, most studies related schooling and fertility show a negative association between schooling and fertility, but causal relationship between schooling and fertility is not clearly understood (Behrman, 2015). Furthermore, in recent, most demographers reluctant to choose one single exclusive explanation either socioeconomic development or ideational change for fertility decline.

However, considering educational stratification based on socio economic status (SES), we can expect that the ideational change may happen differently upon education level. One of expected consequence from stratified education is that linguistical heterogeneity across social class within multilingual society. For example, Uganda is multilingual country that Ethnologue lists 41 languages (UNICEF, 2016), but the medium of instruction is local languages in only Grades 1 to 3 and English is used as language of instruction from Grade 4 onwards (UNICEF, 2016). In this situation, highly educated people can speak English fluently than people who

stopped their education. This gap may hinder spreading of new idea for family norm, fertility decision, contraceptive method, and preferred family size by requiring additional effort to access information and to communicate with other groups.

Linguistical homogeneity is not a new idea in fertility transition. In the book, "The decline of Belgian fertility, 1800-1970", Lesthaeghe linked the timing of fertility decline to language rather than levels of socioeconomic modernization in Belgium by showing the difference of fertility transition between Flemish and French-speaking village (Lesthaeghe, 1977). Thereafter, Watkins showed that the countries where large proportions of the population did not speak the same language were demographically most diverse than others where population spoke the same language in the nineteenth century of Western Europe (Watkins, 1990). Basu and Amin inferred that language identity has encouraged the diffusion of ideas between the elites and the larger population within each region in Bengal area (Basu & Amin, 2000). These cases share similar line of the classic view of diffusion theory in which new idea would be spread rapidly in socially and linguistically homogenous system rather than diverse society (Cleland, 2001). In that sense, Uganda's slower pace of fertility decline could be due to the lack of linguistic homogeneity.

Data description / Descriptive statistics

In this study, I used USAID DHS data Uganda 2016 and 2,479 couples are analyzed. Each unit includes demographic information of women and men such as education level, language of interview, wealth, residence in urban area, religion and region of origin.

	Ever used anything or tried to delay or avoid getting pregnant		
Highest education level	No	Yes	Total
No education	1140 55.05%	931 44.95%	2071 100%
Primary	4902 45.00%	5991 55.00%	10893 100%
Secondary	1751 41.56%	2462 58.44%	4213 100%
Higher	413 31.08%	916 68.92%	1329 100%
Total	8206 44.34%	10300 55.66%	18506 100%

<Table1, USAID Demographic Health Survey, 2016, Uganda>

	language of interview				
Highest education level	English	Luganda	Luo	other	total
no education	163 7.20%	238 5.74%	317 11.39%	1353 14.53%	2071 11.20%
primary	972 42.91%	1993 48.06%	2057 73.91%	5871 63.05%	10893 58.86%
secondary	686 30.29%	1496 36.07%	305 10.96%	1726 18.54%	4213 22.77%
higher	444 19.60%	420 10.13%	104 3.74%	361 3.88%	1329 7.18%
Total	2265 100%	4147 100%	2783 100%	9311 100%	18506 100%

<Table2, USAID Demographic Health Survey, 2016, Uganda>

Before conducting regression analysis, descriptive statistics show that a possible correlation between education level and fertility decision, and education level and language of interview. In Tabel1, people who have higher education more likely to ever use contraceptive method in their life time. However, not only does education but also language could be important role for receiving developmental idealism and diffusion of the idea.

According to the Table2, we can easily find that English and higher levels of education are correlated as would be expected. In particularly, English is regarded as a spoken language of high educated group and Luganda is general spoken language in capital area and suburban area. In addition to Luganda and English, other local languages such as Luo, Runyoro, Lusoga, Ateso, Runyankole and etc are spoken in each region and people who have regional background.

DHS Uganda 2016: language of interview (women)	Freq.	Percent	Cum.
luganda	482	19.44	19.44
luo	451	18.19	37.63
runyoro/rutoro	307	12.38	50.01
runyankole/rukiga	273	11.01	61.02
english	257	10.37	71.39
lusoga	212	8.55	79.94
other	194	7.83	87.77
ateso	173	6.98	94.75
lugbara	80	3.23	97.98
ngakarimojong	50	2.02	100
Total	2,479	100	

<Table 3>

According to the data, even though Luganda is spoken in capital, each local language has certain proportion and English is ranked in 5th place among the languages. This language usage gap between English and local language, which could shape their view for the messages related to reproductive health, tolerance/openness for other social values, and peer groups. It could be important factor for acceptance and behavior response including initiating conversation, discussion and diffusion of the idea. Furthermore, this language fluency would be differed and reinforced through stratified education. At the end, this expected difference may induce stratified reproduction and fertility decline may happen in slower pace even global level of health message and developmental idea were prevalent.

Regression analysis / result

Hypothesis

H_0: $There\ is\ no\ difference\ whether\ couple\ speak\ English, Luganda\ or\ other\ language.$

H_1: $There\ is\ a\ difference\ whether\ couple\ speak\ English, Luganda\ or\ other\ language.$

Estimating Equation

$$\boldsymbol{Y_i = \beta_0 + \beta_i x_i + \delta_i cotnrols_i + \theta_i (dummy\ out)_i + \epsilon_i}$$

$$\begin{aligned}\boldsymbol{Number\ of\ Children\ born} &= \beta_0 + \beta_1(\boldsymbol{Woman\ who\ speaks\ Luganda\ or\ English}) \\ &+ \beta_2(\boldsymbol{Man\ who\ speaks\ Luganda\ or\ English}) \\ &+ \beta_3(Interaction\ of\ language) + \delta_1 \text{Woman's education level} \\ &+ \delta_2 \text{Man's education level} + \delta_3 Interaction\ of\ education\ level + \delta_4\ Wealth \\ &+\ \delta_5 Urban\ + \theta_1(religion) + \theta_2(region) + error\end{aligned}$$

Model description

The analysis is conducted with multivariate linear regression. I controlled household wealth, residence in urban, education level of each woman and man, interaction of education level between woman and man. In addition, I dummy out the effect of religion and region to limit the unobservable cultural effect. My independent variables are 'language of interview of woman' and 'language of interview of man' as proxy of spoken language of participants. I also put interaction between language of woman and language of man to capture a possible interaction effect of communicating in same language. Finally, I applied regression model into Poisson model because outcome variable, "number of children", is the counted variable and each birth event is independent. For example, having one child will not make another more or less likely, but the probability per unit child of pregnant should be understood as related to covariates such as respondent's education level or household income. In addition, number of children is right skewed distribution due to the biological reason. Considering these features, Poisson model would be reliable to capture accurate coefficient and statistical significance.

Result

VARIABLES	Linear Total number of children	Poisson
Woman who speaks either Luganda or English	-0.481*	-0.112**
	(0.264)	(0.0507)
Men who speaks either Luganda or English	0.141	0.0366
	(0.233)	(0.0437)
Interaction of Luganda or English speaking	0.244	0.0485
	(0.380)	(0.0727)
Reference: No education		
Women's level of education: Primary	-0.966*	-0.195**
	(0.498)	(0.0840)
Women's level of education: Secondary	-2.295***	-0.505***
	(0.828)	(0.160)
Women's level of education: Higher	-1.492	-0.461**
	(1.037)	(0.205)
Reference: No education		
Men's level of education: Primary	0.497	0.0724
	(0.423)	(0.0689)
Men's level of education: Secondary	0.209	0.0155
	(0.575)	(0.0910)
Men's level of education: Higher	-2.123**	-0.460**
	(1.070)	(0.204)
Wealth	0.253***	0.0607***
	(0.0521)	(0.00980)
Urban area	-0.374**	-0.0977***
	(0.168)	(0.0341)
Interaction of education level	O	O
Dummy out: Religion	O	O
Dummy out: Region	O	O
Constant	1.475	0.311
	(1.459)	(0.422)
Observations	2,475	2,475
R-squared	0.148	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

<Table4>

Firstly, I put value of 1 if respondents use either English or Luganda but put 0 in other languages as binary format. With including all the control variables, when woman speaks either English or Luganda, there is a statistically significant effect for having less children across models. According to the Poisson model, it is 11.2% less children when woman speaks either

English or Luganda with holding other variables in constant. While interaction term is not statistically significant, size of coefficient is smaller than women's language effect. When the couple are wealthier, couple may have 6% more children. On the other hands, when the couple live in urban area, they may have 9.7% less children. Female education has statistically significant effect for having less children. Regardless of which education level she in, couple would have less children when woman's education level goes up. However, man's education is only statistically significant effect when he completes higher level of education.

VARIABLES	Linear Total number of children	Poisson
Women who speaks English	-0.00536	0.00210
	(0.253)	(0.0471)
Men who speaks English	0.100	0.0262
	(0.237)	(0.0455)
Interaction of English speaking	-0.312	-0.0991
	(0.403)	(0.0795)
Reference: No education		
Women's level of education: Primary	-0.935*	-0.188**
	(0.499)	(0.0839)
Women's level of education: Secondary	-2.257***	-0.498***
	(0.828)	(0.160)
Women's level of education: Higher	-1.525	-0.467**
	(1.038)	(0.206)
Reference: No education		
Men's level of education: Primary	0.505	0.0740
	(0.424)	(0.0689)
Men's level of education: Secondary	0.213	0.0150
	(0.575)	(0.0910)
Men's level of education: Higher	-2.068*	-0.446**
	(1.071)	(0.204)
Wealth	0.249***	0.0600***
	(0.0522)	(0.00981)
Urban area	-0.398**	-0.104***
	(0.168)	(0.0340)
Interaction of education level	O	O
Dummy out: Religion	O	O
Dummy out: Region	O	O
Constant	1.430	0.296
	(1.450)	(0.420)
Observations	2,475	2,475
R-squared	0.147	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

<Table5>

Thereafter, I put value of 1 only when respondents speak English but put 0 in other languages including Luganda as binary format. With including all control variables, when woman speaks English, there is no statistically significant effect for having less children across models. However, compare to previous case, size of coefficient of interaction term is larger than either woman or man's language effect. Control variables show similar result as previous case. While English speaking did not show statistically significant effect on having less children, it could be due to the small number of English speakers in the data set. On the other hands, it could be that, regardless of which language the major population speak, linguistic homogeneity is important for fertility decline.

Robust Check

DHS Kenya 2014: language of interview (women)	Freq.	Percent	Cum.
swahili	1,851	35.21	35.21
kikuyu	505	9.61	44.82
kalenjin	491	9.34	54.16
english	418	7.95	62.11
luo	346	6.58	68.69
kamba	307	5.84	74.53
kisii	235	4.47	79
somali	185	3.52	82.52
meru	184	3.5	86.02
luhya	129	2.45	88.47
mijikenda	129	2.45	90.92
embu	105	2	92.92
pokot	102	1.94	94.86
borana	84	1.6	96.46
maasai	58	1.1	97.56
turkana	38	0.72	98.28
maragoli	24	0.46	98.74
other	66	1.26	100
Total	5,257	100	

<Table6>

Therefore, I check the same model with Kenya data because, compare to Luganda of Uganda, Swahili is dominant official language in Kenya even though the country is multilingual as well.

VARIABLES	Linear Total number of children	Poisson
Women who speaks either Swahili or English	-0.145	-0.0440*
	(0.104)	(0.0264)
Men who speaks either Swahili or English	-0.0229	-0.00743
	(0.104)	(0.0266)
Interaction of Swahili or English speaking	-0.143	-0.0457
	(0.150)	(0.0383)
Reference: No education		
Women's level of education: Primary	-0.241	-0.0554
	(0.262)	(0.0617)
Women's level of education: Secondary	-0.714	-0.187
	(0.757)	(0.207)
Women's level of education: Higher	-0.907	-0.387**
	(0.717)	(0.189)
Reference: No education		
Men's level of education: Primary	0.190	0.0493
	(0.178)	(0.0405)
Men's level of education: Secondary	0.161	0.0584
	(0.363)	(0.0844)
Men's level of education: Higher	-0.561	-0.133
	(0.713)	(0.185)
Wealth	-0.165***	-0.0481***
	(0.0286)	(0.00744)
Urban area	-0.474***	-0.148***
	(0.0705)	(0.0188)
Interaction of education level	O	O
Dummy out: Religion	O	O
Dummy out: Region	O	O
Constant	4.572***	1.523***
	(0.193)	(0.0476)
Observations	5,263	5,263
R-squared	0.145	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

<Table7>

According to the Poisson model, when woman speaks either Swahili or English, couple may have 4.4% less children. Compare to Uganda case, coefficient of man who speaks either Swahili or English shows negative sign and interaction term also shows negative sign, however, both coefficients are statistically insignificant. Female education has statistically significant

effect for having less children but only at the higher level of education. However, man's education lost its statistically significance. In general, the coefficients of control variables in Kenya case show similar signs of those of Uganda case, but most of them lost the statistical significance. In addition, the coefficient of wealth variable has opposite direction. In Kenya, wealthier couple may have less children with holding other controls in constant.

VARIABLES	Linear Total number of children	Poisson
Women who speaks English	-0.197	-0.0663*
	(0.137)	(0.0380)
Men who speaks English	-0.129	-0.0395
	(0.111)	(0.0305)
Interaction of English speaking	-0.0620	-0.0404
	(0.239)	(0.0690)
Reference: No education		
Women's level of education: Primary	-0.240	-0.0549
	(0.263)	(0.0616)
Women's level of education: Secondary	-0.863	-0.234
	(0.758)	(0.207)
Women's level of education: Higher	-0.910	-0.392**
	(0.717)	(0.189)
Reference: No education		
Men's level of education: Primary	0.192	0.0492
	(0.178)	(0.0404)
Men's level of education: Secondary	0.164	0.0594
	(0.364)	(0.0844)
Men's level of education: Higher	-0.516	-0.113
	(0.714)	(0.185)
Wealth	-0.174***	-0.0507***
	(0.0285)	(0.00741)
Urban area	-0.495***	-0.154***
	(0.0702)	(0.0187)
Interaction of education level	O	O
Dummy out: Religion	O	O
Dummy out: Region	O	O
Constant	4.393***	1.469***
	(0.189)	(0.0465)
Observations	5,263	5,263
R-squared	0.143	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

<Table8>

Interestingly, when I put value of 1 in English and other languages including Swahili in 0, the result shows statistically significant effect for having less children when woman speaks English with including all control variables. Furthermore, compare to previous case, size of coefficient of woman's language is larger than the case of Swahili and English. According to the result, English speaking woman may have around 7% less children compare to other language speaking woman withholding other controls in constant including education, wealth, urban residence, religion and region.

Conclusion

In this paper, I conducted second data analysis to understand high TFR in Uganda with spoken language variable. According to the analysis, when woman speaks either Luganda or English, couple may have about 11 % less children with holding other control variables in constant. While this effect lost statistical significance in the case of only English-speaking, the interaction term indicates some possibility of English effect. Therefore, I tested the model with Kenya data which has bigger sample size, but local language Swahili is dominant in the society compare to Luganda of Uganda. According to the result of Kenya case, when woman speaks either Swahili or English, couple may have about 4 % less children with holding other control variables in constant. In addition to Swahili and English case, when woman speaks English, the couple might have 7% less children and the coefficient is statistically significant in 90% confidence interval.

Based on previous literature, linguistical homogeneity would be important factor for fertility decline. Both cases of Uganda and Kenya, women's major spoken language have statistically significant effect, 1) woman who speaks either Luganda or English 2) woman who speaks either Swahili or English. However, women's language effect of English is not clear in

the analysis. Nevertheless, the key point is that the language effect shows statistically significant for women. Any of the model I ran did not show any statistically significant effect of men's spoken language for having number of children. It would be interesting point that language may have heterogeneous effect on fertility decision. Considering that increased schooling positively affected women's probability of reading a newspaper in Uganda (Behrman, 2015), language could be important mediator between schooling and access to information because major newspaper in Uganda is written in Luganda or English; Bukedde (Luganda), New Vision(English) and Daily Monitor(English).

This analysis doesn't show a mechanism of how language has different effect on fertility and cross-sectional data hardly conveys causal inference. However, this analysis might be meaningful for us to consider a linguistical factor for understanding fertility transition in Uganda. Previous literatures are more focusing on linguistical homogeneity regardless of which language is prevalent in the society. However, according to the analysis, language factor could work differently upon gender. In addition to gender difference, this paper brings question which is more important for fertility decline in Uganda, whether linguistic homogeneity regardless of language major population speak or prevalence of English, which may open more access to Westernized norms.

Further research needs to be studied more about language effect in Africa for fertility decline. For policy implication, not only does stratified education problem for accumulating human capital but also it may impede people to have communicable language for sharing new idea and fostering a policy effectiveness across socioeconomic status. This paper does not suggest language diversity is main reason for stalled fertility decline and slower pace of decline in Uganda. However, language as mediator for ideational change needs to be get more attention

for understanding fertility transition in Uganda and Africa. Finally, more than just linguistical homogeneity within a society, its heterogeneous effect for female population might add value on female literacy and worry for expected stratified reproduction problem due to stratified education.

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