The gender dimensions of birth registration in Sub-Saharan Africa: What can the data tell us?

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1. Introduction

Constraints to birth registration, and gender issues

Birth registration is one of the most important channels to establishing proof of identity, which affects access to schooling, public services, as well as inheritance and legal rights. Even in contexts where other government-issued IDs provide access to benefits, applying for these alternate forms of identification often requires a birth certificate. Despite the benefits, however, registration rates continue to lag across many regions, including Africa. In particular, Demographic and Health Survey (DHS) data collected from Sub-Saharan Africa between 2008-2014 show that only about 54 percent of urban children aged five and younger have a birth certificate, and just 37 percent in rural areas. These shares are even lower (46 percent and 28 percent, respectively) for children in their first year.[1]

The implications of low birth registration rates for women and girls are significant. Although average birth registration rates for boys and girls are similar across many countries (UNICEF, 2005, 2013), this may not necessarily hold across different socioeconomic and cultural groups. And in Africa as well as other parts of the developing world, different marriage and social customs surrounding polygamy, inheritance rights, and widowhood, directly affect mothers' time and mobility and hence the ease with which they can register their children — beyond other broader constraints such as complicated registration requirements, administrative deadlines (some countries have rules that children need to be registered within 15 days of birth,

[1] Source: Waves 5 and 6 of the DHS. Table 1 presents these shares in more detail across countries.

for example) and limited access to registration facilities. In many countries, a child cannot even be registered unless the mother has a marriage certificate, pointing to other gaps in CRVS systems related to marriage and divorce registration, and how customary marriage practices would be integrated within CRVS.

Using the most recent survey rounds of the DHS surveys in Africa, as well as the Multiple Indicator Cluster Surveys (MICS), we take a first step in understanding how gaps in birth registration interact with gender. As we discuss below, all of the countries surveyed were from Sub-Saharan Africa, so our analysis is limited to this region. In particular, we examine a range of different socioeconomic and demographic characteristics that are associated with registration rates for girls and boys, and try to interpet some of the differences. The analysis complements work by Knowles (2016) for countries in the Asia-Pacific region, as part of a broader initiative to better understand and address gender data gaps in birth registration.

The need for more nuanced data

Importantly, **we also discuss the need for additional survey data** in understanding the low levels of birth registration for girls and boys, and how policy can be better targeted through an improved understanding of the constraints that parents face in registering their children. As mentioned earlier, complex bureaucracy and administrative procedures for registration, along with limited registration facilities, explain a large part of why birth registration rates are so low in Africa. Using additional data from the most recent rounds of the Multiple Indicator Cluster Surveys (MICS) in Africa, we examine mothers' reported reasons why children are not registered, including access and not understanding the registration process, as well as whether these reasons differ across girls and boys. We discuss the value of including this information across all surveys collecting data on birth registration, to better design policies that target non-registered groups.

Similarly, in designing a countrywide birth registration effort, understanding exactly where rates of non-registration are the highest, and where gender disparities are more prevalent, is directly useful to policymakers in addressing access issues. We use geospatial coordinates of communities in the DHS surveys to examine the geographic distribution of non-registered girls and boys within countries, and whether gender disparities are more concentrated in particular areas. The value of geospatial data is magnified by recent mobile registration programs in Sub-Saharan Africa (GSMA, 2013), as well as efforts to link different institutions (healthcare facilities, national and regional statistical offices) to improve the collection of registration data.

2. Data and measurement issues – where should we go?

Trends in birth registration for girls and boys

The DHS as well as MICS both surveyed birth registration outcomes for children aged 5 and below. As mentioned earlier, the MICS also asked about reasons for not registering. We use waves 5 and 6 from the DHS for Africa, covering 26 countries between 2008-2014 (all were from Sub-Saharan Africa). The most recent waves of the MICS (waves 4 and 5) covered 12 countries between 2010-2014, and all but one (Tunisia) were also from Sub-Saharan Africa. As a result, our findings apply primarily to this region. Five countries overlapped between the MICS and the DHS, so in total 33 countries are covered in the analysis.

In both the DHS and MICS surveys, the question on registration asked mothers, for each child in the reference age group, whether the child had a birth certificate (separate responses coded for (a) whether the child had a birth certificate, (b) whether the child was registered but may/may not have a birth certificate, and (c) whether the respondent didn't know. Missing responses were also recorded. One issue with the DHS question is that the date of registration is not recorded. As discussed below, this

creates some difficulties when trying to assess the effect of registration on outcomes. To address the lack of information on timing, therefore, we also examine birth registration trends for children aged one year and less, to better understand the extent to which registration occurs in the first year as opposed to later on.

Table 1 examines the share of boys and girls with a birth certificate in the DHS (aged 0-1 years, as well as the full sample of children) across urban and rural areas. Table A2 in the Appendix presents the same information for whether children are registered (but may or may not have a birth certificate). Statistically significant differences between boys and girls are marked with asterisks.

Looking at Table 1, the share of children who have a birth certificate varies widely across countries. In the Zambia 2014 survey, for example, an average of only 6-7 percent of children in urban areas have a birth certificate, and only 2 percent of children in rural areas. In the Gabon 2012 survey, on the other hand, about 75 percent of the full sample of children in both urban and rural areas have a birth certificate. Overall, across countries, the share of children in rural areas are much less likely to have a birth certificate compared to urban areas, and while most children with a birth certificate receive it in their first year, a large share of children get one after they are one year old (comparing the younger and overall samples). Similar patterns emerge for registration with or without a birth certificate (Appendix Table A2).

Consistent with previous studies (UNICEF, 2005, 2013), most countries do not exhibit significant differences overall for the share of boys and girls with a birth certificate. There are still a handful of countries, howver, where girls' registration rates lag significantly behind those for boys, particularly among older children (for example, the 2009 Kenya Survey, Mozambique 2011, Benin 2011, Cameroon 2011 and Gambia 2013; the Benin survey also shows a higher share of boys aged 0-1 with a birth certificate compared to girls). Interestingly, all of these samples, with the exception of Cameroon

2011, are in urban areas. As children get older in these areas, therefore, boys who were not registered in their first year are more likely to be registered later on as compared to girls. Fewer statistically significant differences across boys and girls also emerge for countries with the highest poverty headcounts. We revisit this issue in more detail in the next section, where we examine socioeconomic and demographic correlates of girls' versus boys' registration.

Table 1. Demographic and Health Surveys (DHS):
Share of children (≤ 1yrs and ≤ 5yrs) who have a birth certificate, urban and rural areas

	Poverty headcount ratio	Urban				Rural			
		Children ≤ 1yr		All children ≤ 5yrs		Children ≤ 1yr		All children ≤ 5yrs	
		Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Madagascar 2009	75.3	77	78	81	80	39	44	54	76
Zimbabwe 2011	72.3	27	31	46	49	10	9	23	23
Burundi 2010	66.9	67	66	75	74	47	52	54	54
Liberia 2013	63.8	25	20	29	29	18	16	20	20
DRC 2014	63.6	17	20	18	19	7	6	9	9
Zambia 2014	60.5	6	5	7	7	2	2	2	2
Lesotho 2009	57.1	11	14	24	19	8	9	15	14
Guinea 2012	55.2	56	66	61	64	25	25	30	29
Mozambique 2011	54.7	23	23	**38****	**34****	18	15	24	24
Sierra Leone 2013	52.9	49	45	46	42	**29*****	**37*****	**31*****	**37*****
Gambia 2013	48.4	41	35	**58****	**52****	31	33	52	53
Burkina Faso 2010	46.7	61	64	80	77	36	34	51	49
Senegal 2014	46.7	66	66	74	74	40	40	47	45
Nigeria 2013 [3]	46	-	-	-	-	-	-	-	-
Kenya 2009	45.9	31	32	**43****	**36****	16	18	21	21
Rwanda 2010	44.9	3	6	9	7	7	7	8	7
Comoros 2012	44.8	77	79	82	82	66	70	76	74
Mali 2013	43.6	80	81	90	90	65	64	72	72
Cote d'Ivoire 2011	42.7	57	61	71	70	18	19	31	29
Cameroon 2011	39.9	53	53	70	67	26	24	**37*****	**32*****
Benin 2011	36.2	**66*****	**59*****	**69****	**66****	50	52	55	56
Gabon 2012	32.7	**61****	**68****	75	75	61	60	73	74
Namibia 2013	28.7	66	64	78	76	35	34	50	48
Tanzania 2010	28.2	19	23	38	37	8	6	**13***	**11***
Ghana 2008	24.2	**67***	**56***	73	72	36	32	47	44
Uganda 2011	19.5	36	25	37	35	2	3	22	22
Average across countries	**47.7**	**45.7**	**45.6**	**54.9**	**53.3**	**28.0**	**28.4**	**36.7**	**37.0**

Notes:
(1) Source: Waves 5 and 6 data from the DHS surveys.
(2) Statistically significant differences between registration rates for boys and girls are represented in asterisks; *** p<0.01, ** p< 0.05, * p<0.10. For simplicity the T-statistics are suppressed in the table.
(3) Figure A1 in the Appendix provides a visual representation of the data above.
(4) For the Nigeria 2013 survey, registration was not broken out by whether the certificate was seen or not.

For countries in the DHS sample that had also conducted an earlier survey (from wave 4), we also looked at the change in registration overall — not just whether they actually had a certificate, to increase the sample size — for girls and boys aged 0-1, across urban and rural areas. Figure 1 presents these results. We find interesting trends in both directions. Interestingly, while in many countries there have been substantial increases in registration (20-40 percent), increases in girls' registration rates have often lagged behind boys', particularly in urban areas. Benin, Sierra Leone, Liberia, Namibia, Senegal and Cameroon are some examples, although within some of these countries (Sierra Leone and Namibia, for example), trends were reversed in rural areas. On the other hand, a handful of countries (Kenya and Burkina Faso among the earlier surveys, as well as the more recent survey from Guinea), show greater increases in girls' registration.

Measurement issues and the need for more nuanced data on birth registration

As discussed earlier, policymakers face difficulties in understanding who is actually registered (including verifying that children have birth certificates/related documents), as well as constraints to registration. Going forward, surveys need to capture these dimensions more precisely.

Currently, for example, survey data such as the MICS and DHS are the main nationally-representative household surveys that have information on birth registration across countries. However, discrepancies in reported birth registration rates are apparent across the two surveys for some countries, although as a caveat the survey years are not the same for each country (see MICS registration summary statistics for Sub-Saharan Africa in Appendix Table A3). Understanding the reasons for these differences better (is it due to different sampling approaches, or the way questions are administered, for example?) will help in addressing measurement issues. This points to a larger data collection issue, regardless of the type of survey, that also needs to be addressed in addition to policy responses to improve registration.

Understanding why households don't register their children is also important. Very few country surveys in the DHS have this information, although as mentioned earlier, the MICS does ask this question. Table 2 presents data from the MICS on reasons for not registering — for children that were not registered, the primary reason given by mothers was that they did not know how to register their child (often more than 50-60 percent of this group across countries). Rural respondents were also much more likely to report not knowing the registration process. Cost and being too far away were also main reasons for not registering, with rural areas more likely to report distance as a factor. However, a large share of respondents also reported other (unspecified) reasons, reflecting a wide and also unknown variance in potential constraints affecting registration.

Table 3. Multiple Indicator Cluster Surveys (MICS): Reasons for not registering children < 5 years

	Reasons for not registering									
	Doesn't know how to register		Cost		Distance		Did not know it is required/ doesn't want to pay a fine		Other	
	U	R	U	R	U	R	U	R	U	R
CAR 2010	20.7***	25.7***	27.9	29.1	1.2***	10.7***	1.3	1.1	28.5***	24.2***
Chad 2010	63.8***	71.6***	8.1	8.1	2.7***	6.6***	3.6***	1.4***	13.9***	7.3***
DRC 2010	76.4***	83.0***	4.6**	3.5**	1.4**	2.3**	2.2**	1.5**	11.6***	6.9***
Ghana 2011	16.1***	35.6***	17.7***	7.9***	30.1	27.5	2.9	1.8	32.1***	54.4***
Malawi 2013	72.5	73.3	-	-	-	-	-	-	-	-
Nigeria 2011	54.3***	77.1***	3.1***	1.8***	4.4***	7.6***	33.5***	47.6***	17.6***	7.1***
Sierra Leone 2010	55.6***	62.9***	-	-	-	-	-	-	-	-
South Sudan 2010	60.5***	71.5***	2.2**	1.4**	2.9	2.3	1.1**	2.1**	2.0***	1.0***
Sudan 2010	52.6***	73.0***	19.8***	10.4***	1.3***	4.9***	1.4	1.5	8.0**	5.6**
Togo 2010	28.0***	45.6***	6.1***	17.9***	1.5***	7.8***	1.5	2.8	21.2*	14.8*
Tunisia 2012	0***	37.0***	-	-	-	-	-	-	-	-
Zimbabwe 2014	11.7***	20.2***	-	-	-	-	-	-	-	-

Notes:
(1) MICS Wave 5 and Wave 4 surveys that were publicly available.
(2) Statistically significant differences between registration rates are represented in asterisks; *** p<0.01, ** p< 0.05, * p<0.10. For simplicity the T-statistics are suppressed in the table.

In recent survey waves, the DHS has also included GPS locations of communities across several surveys to be able to visualize outcomes from the household questionnaire. This can help us visualize trends in birth registration at a much more refined level, beyond basic urban/rural distinctions which tend to mask important local factors affecting registration, including different social/cultural community norms, as well as the role of local government. Figure 2 presents, for a few countries, the geographic distribution (by administrative state/province) of the percentage point difference in the share of girls minus the share of boys who are unregistered. We used GPS data of communities that is available in selected DHS country surveys, and Figure 2 presents this information for Cameroon, Liberia, and Nigeria, which as seen earlier have varying levels and growth in

birth registration by age and gender. Greater differences (i.e. where the share of unregistered girls is much higher than the share of unregistered boys) are indicated by darker shading in the figure. We see that greater gender disparities are often concentrated in specific geographic areas of countries, for example in the northern part of Cameroon and the southern part of Liberia, as well as many southern and a few northern provinces in Nigeria. In Cameroon, the difference in the share of unregistered girls-boys is as high as 24 percentage points in some areas, and about 6 percentage points in Liberia and Nigeria. There are many areas, therefore, that require better targeting of registration efforts. At the same time, there are also other areas in the same countries (particularly Liberia and Nigeria) where the share of boys that are unregistered outnumber that for girls. Averaging out these differences across provinces can therefore mask priority areas for addressing gender disparities.

The discussion in this section therefore motivates our analysis below – that an aggregate analysis of average registration for boys and girls by country is not sufficient to understand whether there are gender differences, and even by urban/rural areas. A more detailed analysis by age, specific geographic community, and other socioeconomic and demographic characteristics is needed to target gender-focused policy in the right areas.

Figure 1. Change in birth registration* for children aged 0-1, DHS surveys from Sub-Saharan Africa

Figure 1a. Urban areas

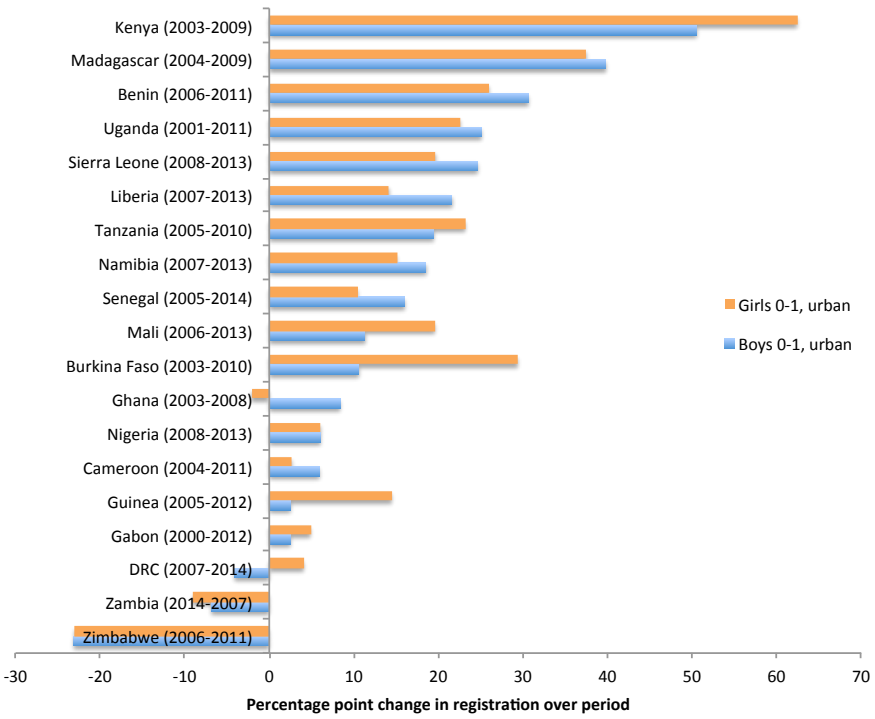
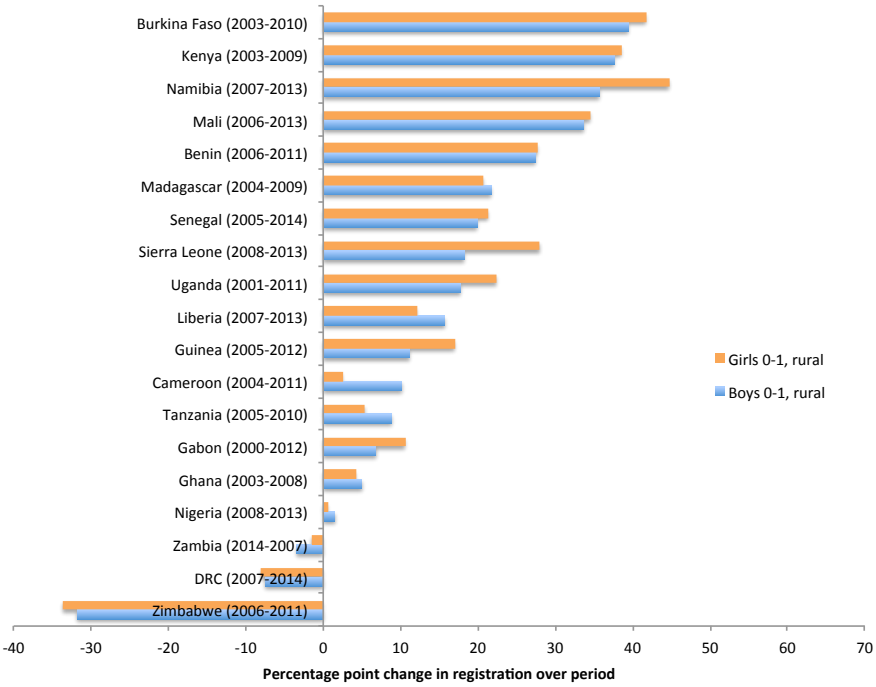


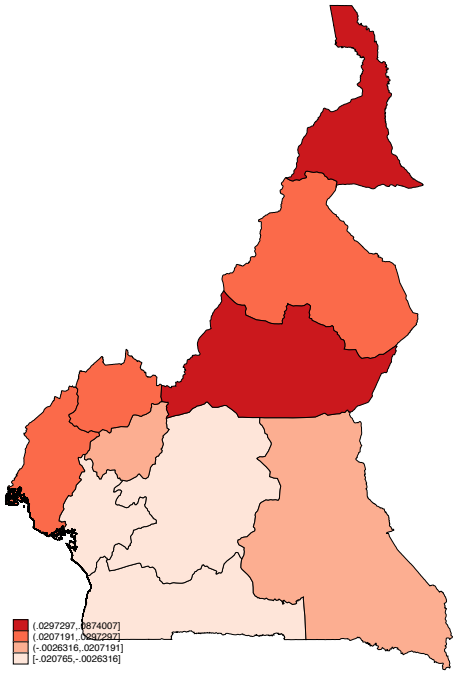
Figure 1b. Rural areas



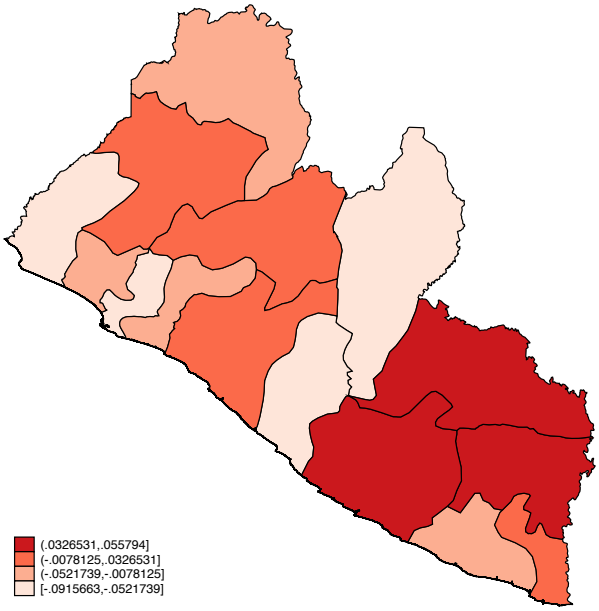
Notes:
(1) Only countries were included that had a wave 5/6 survey as well as a previous DHS survey.
* Whether or not the child actually had a birth certificate.

Figure 2. Percentage point difference in the (share of girls)-(share of boys) who are not registered, selected DHS countries

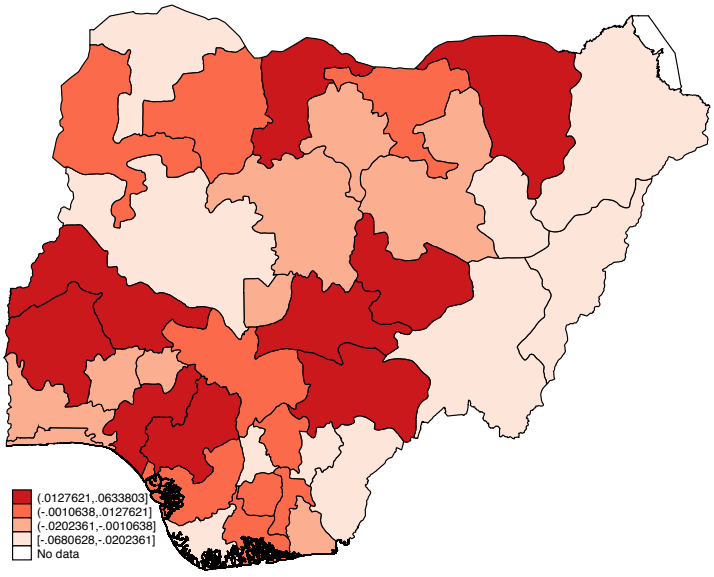
Cameroon 2011



Liberia 2013



Nigeria 2013



Notes:

Source: GPS and household suvey data from the DHS.

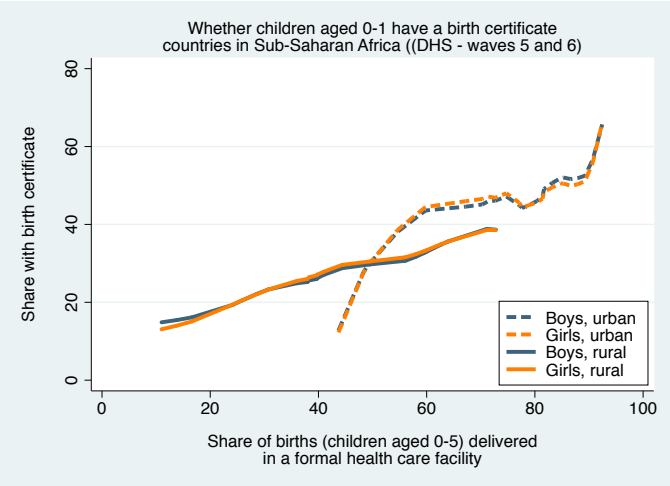
3. What are important correlates of boys' and girl's registration?

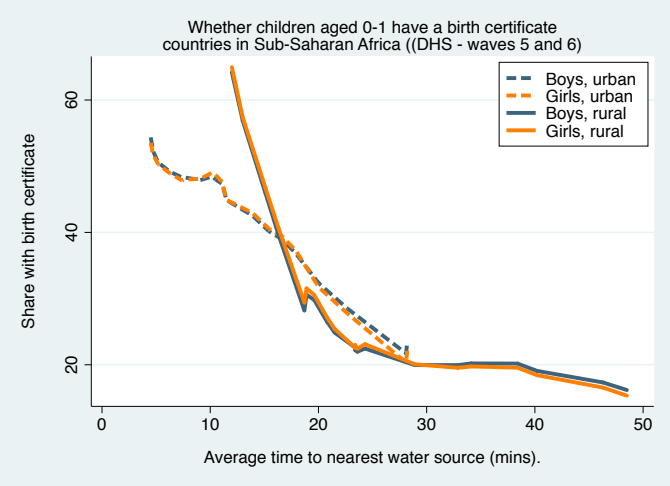
The role of access to healthcare facilities and resources – few gender differences

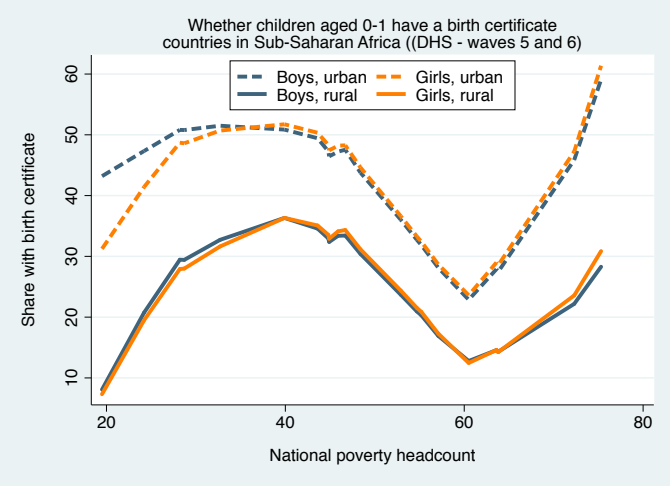
As discussed earlier, access to facilities and resources can affect registration rates. Using the 26 DHS surveys from Sub-Saharan Africa, Figure 3 presents locally weighted regressions of the share of boys and girls aged 0-1 in urban and rural areas of each country that have a birth certificate, against (a) average access to formal healthcare at birth, as measured by the share of births for children aged 0-5 delivered in a formal healthcare facility; (b) average time to the nearest water source (as a measure of access to other resources and poor women's time burdens); and (c) the national poverty headcount.

Figure 3 that access to formal healthcare facilities, as measured by the share of births is an important correlate – the share of children with a birth certificate broadly rises with the average share of births that are delivered in a hospital. Time to the nearest water is also highly negatively correlated with registration rates, although in rural areas the trend flattens out in areas with more difficult access (likely reflecting very few available points of registration in these areas). Poverty also seems to associated with lower registration, when focusing on the middle part of the distribution (between 40-60 percent of the population under the national poverty line). Interestingly, however, there are no differences in these patterns across girls and boys. As we see in the regression analysis below, demographic and other cultural factors – including types of marriage – play a much stronger role in gender differences in registration as compared to economic factors.

Figure 3. Cross-country trends in birth registration by poverty, access to formal health care and infrastructure constraints (access to water)







Notes:
Cross-country locally weighted regressions, DHS wave 5 and 6 surveys from Sub-Saharan Africa

Regression analysis

To better understand what variables are associated with birth registration, we used the DHS surveys to estimate OLS regressions (at the child level) for whether each child had a birth certificate, conditional on a range of individual and household characteristics. These regressions are meant only to understand, controlling for other factors, what characteristics tend to be most associated with birth registration for both boys and girls, and whether gender disparities in registration tend to arise within specific socioeconomic and/or demographic groups.

Table 4 presents the right-hand side variables in the regressions in more detail. At the household level, locality (urban/rural), religion (whether household practices Islam), access to piped water and health care, as well as wealth quintile were included. Among parents' characteristics, mother's age when she was married, years of schooling, and whether she is in a polygamous marriage were also included. In separate regressions, father's education was also controlled for, but as discussed below mother's schooling had the predominant effect. We also included children's birth order and age. In addition to a dummy variable for whether the child is a girl, interactions of gender with other characteristics were also included to see whether registration varies by gender through other channels.

Table 4. Explanatory variables used in OLS regressions across countries

Explanatory variables (outcome: child has a birth certificate, Y=1 N=0)	**Interaction included with whether child is a girl:**
Child is a girl (Y=1 N=0)	
HH in a rural area (Y=1 N=0)	
Female headed household (Y=1 N=0)	
HH religion: Islam (Y=1 N=0)	Yes
Age of mother when she married: 15-19 years [(a)]	Yes
Age of mother when she married: 30+ years [(a)]	Yes

Child birth order: 2 or higher (Y=1 N=0) [(b)]	Yes
Age of child: 0-1 years (Y=1 N=0) [(c)]	Yes
Age of child: 1-3 years (Y=1 N=0) [(c)]	Yes
Father lives at home (Y=1 N=0)	
Mother's years of schooling, and years of schooling squared	Yes
Mother is in polygamous marriage (Y=1 N=0)	Yes
HH has piped water connection (Y=1 N=0)	
HH faces constraints to accessing health care (Y=1 N=0)	
HH wealth quintile: poorest	Yes
HH wealth quintile: second poorest	Yes
HH wealth quintile: middle	Yes
HH wealth quintile: second highest	Yes
HH wealth quintile: highest	Yes

Notes:
(a) Reference/excluded category was mothers who were married between ages 20-30.
(b) Reference/excluded category was children who were firstborn.
(c) Reference/excluded category was children aged 3-5.

Results: factors correlated with birth registration overall

Tables 5a-5b present a summary of results, for the most commonly significant variables across countries. Table 5b, in particular, presents significant interactions of gender with other socioeconomic variables. The results were also robust to adding/removing different variables and interaction terms.

Looking first at Table 5a, among parents' characteristics, mother's education has a strong positive association with children's registration across nearly all countries (in some countries only squared schooling was significant). The father being in the home also had a very strong positive association. The mother being married as an adolescent, as well as being in a polygamous marriage, was typically associated with poorer registration outcomes. Among other demographic household characteristics, being in a female headed household was positively correlated with registration.

Household socioeconomic characteristics also had a strong role in registration – households in the bottom two wealth quintiles were significantly less likely to have

registered their children, and households in the top two quintiles were significantly more likely (only positive/negative correlation reported). Households facing constraints to accessing health care also had lower registration rates.

What factors are associated with gender differences in birth registration?

Looking at Table 5b, In four surveys (Gambia 2013, Burkina Faso 2010, Nigeria 2013, and Cameroon 2011), being a girl significantly lowered the chance of having a birth certificate, controlling for other variables. Children across most countries were also significantly less likely to be registered in their first year.

The most prevalent gender differences in children's registration arise in polygamous households, where girls are significantly less likely than boys to be registered (Burundi 2010, Guinea 2012, Kenya 2009, Rwanda 2010, and Namibia 2013). Girls in households practicing Islam are also less likely to be registered in three countries (Liberia 2013, Kenya 2009, Mali 2013). Girls who were born at a higher birth order (Cote d'Ivoire, Benin, and Uganda) were also less likely to be registered.

Interestingly, interactions with household economic or resource-related variables, such as wealth quintile or (in separate regressions) access to health care, had no significant correlation and are therefore not reported in the table. The results therefore point to stronger gender differences arising from cultural and demographic factors.

How does birth registration affect outcomes?

Understanding how birth registration relates to specific outcomes for children is also important, including whether there are differences between boys and girls As discussed earlier, however, a main shortcoming of how birth registration questions are asked in household surveys is that timing of when the child was registered is not elicited. As a result, understanding how registration in turn actually affects outcomes (such as education) becomes more complex. If one could look at outcomes for very young

children (aged one year or less, for example) and see how they were linked to birth registration, that might present some interesting conclusions. The DHS does have anthropometric data for children aged 5 and younger, and so for very young children, one could potentially understand how these health outcomes vary with whether they were registered. Table 6 presents the results, which show that in all countries (with the exception of the Tanzania 2010 survey), birth registration is associated broadly with positive anthropometric outcomes for children aged 0-1 years. Interestingly, a greater number of positive associations are for countries with lower poverty rates. One reason may be the link between better health outcomes and birth registration to access to formal healthcare facilities. Countries on the poorer end of the distribution, such as Sierra Leone and the DRC, exhibit positive correlations between registration and anthropometric (weight-for-height) outcomes only for boys, but overall differences across girls and boys are not immediately apparent across countries. We do see, however, that within specific countries, positive associations tend to be observed for either one group or the other. Further investigation is needed on this topic, including looking at additional outcomes for young children.

Table 5a. Most common statistically significant correlations across countries, on whether children ≤ 5yrs have a birth certificate

	Statistically significant correlations of following variables on registration:									
	Child characteristics		Parents' characteristics				Other HH demographic/economic characteristics			
	Child is girl	Child aged 0-1	Mother got married between ages 15-19	Mother's schooling	Mother in polygamous marriage	Child's father in home	Female headed HH	HH faces constraints in seeking healthcare	Lowest 2 wealth quintiles (+/ -effect)	Highest 2 wealth quintiles (+/ - effect)
Madagascar 2009		-0.06***	-0.08***	0.05***		0.05***			(-)	
Zimbabwe 2011				0.02*		0.04**		-0.04**	(-)	(+)
Burundi 2010		-0.15***	-0.20**	0.01*	-0.08*	0.11***	0.09**		(-)	(+)
Liberia 2013									(-)	
DRC 2014		-0.05***			-0.07***				(-)	(+)
Zambia 2014				+ Effect on sq. schooling					(-)	(+)
Lesotho 2009		-0.17***	-0.12*	+ Effect on sq. schooling		0.07**				
Guinea 2012						0.06**			(-)	(+)
Mozambique 2011		-0.27***	-0.08***	+ Effect on sq. schooling		0.07***	0.05***		(-)	(+)
Sierra Leone 2013	0.08**			0.01*	-0.07***			-0.07***	(+)	
Gambia 2013	-0.09**	-0.19***				0.05**			(-)	
Burkina Faso 2010	-0.04*		-0.11*	0.02***		0.07***			(-)	(+)
Senegal 2014			-0.13***	0.04***	-0.05**		0.06**		(-)	(+)
Nigeria 2013	-0.04*	-0.05***	-0.04**	0.02***		0.03***		-0.02**	(-)	(+)
Kenya 2009	0.09*	-0.05**								
Rwanda 2010		-0.3***				0.09***		-0.05***		
Comoros 2012				0.02***				-0.06***	(-)	(+)
Mali 2013										
Cote d'Ivoire 2011		-0.08***	-0.10*	0.01*			0.07*	-0.04*	(-)	(+)
Cameroon 2011	-0.14***	-0.08***	-0.10**	0.04***					(-)	(+)
Benin 2011				0.01*	-0.06***		0.07***		(-)	(+)
Gabon 2012				0.01**			0.03*		(-)	(+)
Namibia 2013		-0.19***	-0.13**	0.020*			0.05*			
Tanzania 2010			-011***	+ Effect on sq. schooling				-0.08***	(-)	(+)
Ghana 2008		-0.07**		0.01*					(-)	
Uganda 2011		-0.12***								

Notes:
(1) Only statistically significant correlations are represented in asterisks; *** p<0.01, ** p< 0.05, * p<0.10. For simplicity the T-statistics are suppressed in the table. Standard errors corrected for clustering at the community level.

Table 5b. Most common statistically significant correlations on interaction of girl with other individual and household characteristics

	Statistically significant interactions with whether child is a girl:			
	Child 2nd or higher birth order	**Child aged 0-1**	**Mother's schooling**	**Mother in polygamous marriage**
Madagascar 2009				
Zimbabwe 2011				
Burundi 2010				-0.13**
Liberia 2013				
DRC 2014				
Zambia 2014				
Lesotho 2009				
Guinea 2012				-0.31**
Mozambique 2011				
Sierra Leone 2013				
Gambia 2013				
Burkina Faso 2010				
Senegal 2014				
Nigeria 2013	0.035**			
Kenya 2009		0.064*	+ Effect on sq. schooling	-0.067*
Rwanda 2010				-0.107*
Comoros 2012				
Mali 2013				
Cote d'Ivoire 2011	-0.095**			
Cameroon 2011		0.060*		
Benin 2011	-0.037*	-0.041**		
Gabon 2012				
Namibia 2013				-0.109*
Tanzania 2010				
Ghana 2008				
Uganda 2011	-0.113*			

Notes:
(1) Only statistically significant correlations are represented in asterisks; *** p<0.01, ** p< 0.05, * p<0.10. For simplicity the T-statistics are suppressed in the table. Standard errors corrected for clustering at the community level.

Table 6. Correlations between having a birth certificate and children's anthropometric outcomes: whether child is 50th percentile or above in the weight-for-height and height-for-age distribution

		Whether child is in 50th percentile or above:			
		Children aged 0-1			
		Girls		Boys	
	Poverty headcount (most recent)	Weight for height	Height for age	Weight for height	Height for age
Madagascar 2009	75.3				
Zimbabwe 2011	72.3				
Burundi 2010	66.9				
Liberia 2013	63.8				
DRC 2014	63.6			0.102***	
Zambia 2014	60.5				
Lesotho 2009	57.1				
Guinea 2012	55.2				
Mozambique 2011	54.7				
Sierra Leone 2013	52.9			0.075*	
Gambia 2013	48.4				
Burkina Faso 2010	46.7		0.099**		
Senegal 2014	46.7				0.102***
Nigeria 2013	46				
Kenya 2009	45.9				0.077**
Rwanda 2010	44.9		0.105**		
Comoros 2012	44.8		0.132*		
Mali 2013	43.6				
Cote d'Ivoire 2011	42.7				
Cameroon 2011	39.9				
Benin 2011	36.2	0.050*			
Gabon 2012	32.7				0.146**
Namibia 2013	28.7				
Tanzania 2010	28.2	-0.112***		-0.126***	
Ghana 2008	24.2				
Uganda 2011	19.5				

Notes:
(1) Only statistically significant ecorrelations are represented in asterisks; *** p<0.01, ** p< 0.05, * p<0.10. For simplicity the T-statistics are suppressed in the table.

4. What is the incidence of (and factors correlated with) missing responses?

Table 7 below presents the share of children (nationally as well as for urban and rural areas) whose mothers provided missing or "don't know" responses to the question on birth registration. Countries are ordered from highest share of missing responses (Comoros 2012, with 8 percent of responses coded as missing/don't know) to the lowest (Tanzania, 2010, with 1.2 percent). The incidence of missing responses is not very high, but again the DHS does distinguish between households that actually present a birth certificate as opposed to households that just make the claim that their children are registered, so perhaps further investigation is needed in this area.

For countries with a large enough sample of missing observations (marked with an asterisk), the same regressions above were run to determine what factors were associated with higher/lower rates of missing or uncertain responses. However, from a policy perspective we are more interested in understanding which factors are more associated with this type of response, as opposed to the actual magnitude of the coefficients. As a result for simplicity Table 7 presents just the sign (positive/negative) of significant correlations to understand the patterns.

Table 7 shows, as expected, that many of the variables that were strongly associated with higher registration are negatively associated with missing responses (gender of household head, mother's education, father being in the home, religion, and household wealth/access to resources). In four countries, the mother being married at an older age (30 or above) actually raised the chance of missing responses, which needs to be examined more carefully.

Table 7. Incidence of missing/"don't know" responses to birth registration, as well as most common correlates

	Share of children ≤ 5yrs with missing/"don't know" response to birth registration question			Significant correlations (positive/negative) on whether respondent provided missing/"don't know" response						
	Total	Urban	Rural	Female HH head	Father in home	Mother's education	Mother married at age 30+	HH faces constraints in seeking healthcare	HH is in poorest quintile	HH religion: Islam
Comoros 2012*	8	7	8.5							
Sierra Leone 2013*	7.9	8.1	7.9	(-)						(-)
Lesotho 2009*	7.1	8.3	6.8							
Gabon 2012*	6	6.4	5.4	(-)						
Guinea 2012*	5.4	6	5.2	(-)	(-)					
Madagascar 2009*	5.3	5	5.3	(-)	(-)	(-)	(+)			(-)
Namibia 2013*	5.1	5.4	4.9							
Nigeria 2013*	5	4.7	5.2	(-)	(-)				(+)	
Ghana 2008*	4.9	4.6	5					(+)		
Zambia 2014*	4.7	5.3	4.3		(-)			(+)		
Cameroon 2011*	4.6	4.7	4.5	(-)		(-)	(+)			
Rwanda 2010*	4.2	7	3.8							
Kenya 2009*	3.4	3.1	3.5							
Benin 2011*	3.1	3.2	3	(-)	(-)		(+)		(+)	
Mozambique 2011*	3	3.4	2.9		(-)					(+)
DRC 2014*	2.9	4.6	2.2	(-)	(-)	(-)			(+)	
Liberia 2013*	2.9	2.7	3	(-)	(-)					(-)
Uganda 2011*	2.5	2.7	2.4			(-)				
Gambia 2013	2.4	3.1	2.1							
Senegal 2014*	2.3	2.3	2.3		(-)	(-)				
Mali 2013*	2.1	1.5	2.3			(-)	(+)		(+)	(-)
Zimbabwe 2011*	2.1	2	2.1		(-)			(+)		
Burkina Faso 2010	1.5	1.2	1.6							
Cote d'Ivoire 2011	1.5	2	1.3							
Burundi 2010	1.3	1.2	1.3							
Tanzania 2010	1.2	1.8	1.1							

Notes:
(1) Only statistically significant correlations are represented in the table; for simplicity of understanding patterns in missing responses, the signs of these correlations were presented. Standard errors corrected for clustering at the community level.

5. Conclusions

Birth registration is key to accessing a range of public services as well as legal rights. However, registration rates lag considerably across developing countries. The gender dimensions are significant — women in particular bear a large part of the burden for getting their children registered, and lack of access to formal healthcare facilities and other points of registration, as well as complex administrative requirements are often to blame for low registration.

In this study, we examine, within Sub-Saharan Africa, whether certain socioeconomic and demographic characteristics are more likely to be associated with gender disparities in registration. Previous work has found few differences in average registration for boys and girls across countries, but in this study we argue that an aggregate analysis of average registration for boys and girls by country is not sufficient to understand whether there are gender differences, and even by urban/rural areas. A more detailed analysis by age, specific geographic community, and other socioeconomic and demographic characteristics is needed to target gender-focused policy in the right areas.

Specifically, using the most recent survey rounds of the DHS surveys in Africa, as well as the Multiple Indicator Cluster Surveys (MICS), we take a first step in understanding how gaps in birth registration interact with gender. In particular, we examine a range of different socioeconomic and demographic characteristics that are associated with registration rates for girls and boys, and try to interpet some of the differences. Out results show that a small group of countries exhibit overall gender differences in birth registration, and these differences are typically concentrated in either rural or urban areas. Across all countries more broadly, there are many significant gender-related determinants of registration (mother's education, mother's age at marriage, polygamy), some of which (polygamy in particular for some countries) has a stronger association with girls' likelihood of registration as compared to boys. Economic factors, on the

other hand, do not appear to affect the likelihood of girls' registration differently from boys' registration. A closer look at how cultural factors interact with access to resources and health facilities is the next step of the analysis.

Appendix

Table A1. List of DHS country surveys, along with additional country indicators (WDI)

	Year	Wave	Poverty headcount ratio at national poverty lines (most recent available)	GNI per capita (2011, current US $)	Adolescent fertility rate, births per 1000 women aged 15-19 (2012)
Madagascar	2009	5	75.3	519	123
Zimbabwe	2011	6	72.3	690	113
Burundi	2010	6	66.9	220	30
Liberia	2013	6	63.8	320	117
DRC	2014	6	63.6	310	124
Zambia	2014	6	60.5	1400	103
Lesotho	2009	5	57.1	1370	90
Guinea	2012	6	55.2	400	146
Mozambique	2011	6	54.7	480	154
Sierra Leone	2013	6	52.9	519	125
Gambia	2013	6	48.4	510	116
Burkina Faso	2010	6	46.7	519	115
Senegal	2014	6	46.7	1030	87
Nigeria	2013	6	46	1720	117
Kenya	2009	5	45.9	1040	94
Rwanda	2010	6	44.9	590	30
Comoros	2012	6	44.8	790	75
Mali	2013	6	43.6	620	179
Cote d'Ivoire	2011	6	42.7	1150	136
Cameroon	2011	6	39.9	1210	119
Benin	2011	6	36.2	720	90
Gabon	2012	6	32.7	8740	111
Namibia	2013	6	28.7	4970	80
Tanzania	2010	5	28.2	720	123
Ghana	2008	5	24.2	1376	70
Uganda	2011	6	19.5	519	127

Table A2. Demographic and Health Surveys (DHS):
Share of children (≤ 1yrs and ≤ 5yrs) who have been registered*, urban and rural areas

	Poverty headcount ratio	Urban				Rural			
		Children ≤ 1yr		All children		Children ≤ 1yr		All children	
		Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Madagascar 2009	75.3	92	90	91	88	70	71	77	77
Zimbabwe 2011	72.3	59	53	67	65	29	32	42	43
Burundi 2010	66.9	82	77	87	87	64	67	75	75
Liberia 2013	63.8	25	20	29	29	18	16	20	20
DRC 2014	63.6	27	31	27	29	14	15	19	20
Zambia 2014	60.5	16	15	16	17	5	6	6	6
Lesotho 2009	57.1	26	40	**51***	**40***	36	36	45	45
Guinea 2012	55.2	77	84	78	79	44	43	47	45
Mozambique 2011	54.7	29	30	**52****	**48****	28	25	44	45
Sierra Leone 2013	52.9	84	82	81	80	**72*****	**83*****	**72*****	**79*****
Gambia 2013	48.4	61	58	**74***	**69***	63	60	75	73
Burkina Faso 2010	46.7	**83***	**89***	91	92	73	73	76	74
Senegal 2014	46.7	81	78	85	83	59	57	**62***	**59***
Nigeria 2013	46	46	48	52	51	18	17	**21***	**20***
Kenya 2009	45.9	75	75	**79****	**74****	52	55	56	55
Rwanda 2010	44.9	38	36	60	57	42	40	64	63
Comoros 2012	44.8	90	89	90	90	84	85	87	85
Mali 2013	43.6	92	92	94	94	81	80	81	80
Cote d'Ivoire 2011	42.7	72	80	82	84	51	48	57	56
Cameroon 2011	39.9	73	75	81	81	47	42	**51*****	**46*****
Benin 2011	36.2	**85****	**81****	85	84	75	73	76	76
Gabon 2012	32.7	90	88	**92****	**89****	88	90	90	90
Namibia 2013	28.7	68	64	79	77	35	34	51	50
Tanzania 2010	28.2	48	48	56	56	21	18	21	20
Ghana 2008	24.2	**82***	**72***	**85***	**81***	59	60	65	65
Uganda 2011	19.5	37	33	39	41	22	24	29	29

Notes:
* Whether or not they have a birth certificate
(1) Statistically significant differences between registration rates for boys and girls are represented in asterisks; *** p<0.01, ** p< 0.05, * p<0.10. For simplicity the T-statistics are suppressed in the table.
(2) Figure A1 in the Appendix provides a visual representation of the data above.

Table A3. Multiple Indicator Cluster Surveys (MICS): Share of children < 5yrs who have been registered, urban and rural areas

	Share of children 0-5 whose births are registered (certificate seen)				Share of children 0-5 whose births are registered (certificate not seen)				Share of children 0-5 with "don't know"/missing responses for registration			
	Urban		Rural		Urban		Rural		Urban		Rural	
	B	G	B	G	B	G	B	G	B	G	B	G
Countries overlapping with DHS												
DRC 2010	3.4	3.3	4.2	4.7	20.6	19.3	20.9	21.1	3.3	2.5	2.7	2.9
Ghana 2011	39.8	42.3	27.1	25.8	32.8	34.0	27.1	27.5	2.1	2.0	2.4	2.5
Nigeria 2011	23.1	22.0	8.7	9.2	37.5	35.8	21.5	20.5	3.4	3.3	4.3	4.2
Sierra Leone 2010	20.2	22.3	23.3	24.6	56.6	55.0	52.8	53.3	4.3**	2.8**	3.6**	2.6**
Zimbabwe 2014	32.1	33.5	12.7	12.1	23.5	20.6	10.6	9.9	4.1	5.0	4.2	4.0
Other countries												
Central African Republic 2010	20.0	19.0	11.5	10.9	53.8*	56.8*	40.9*	43.0*	5.1	4.5	4.5	4.2
Chad 2010	7.4	7.7	0.1	0.1	22.6	21.3	7.5	7.4	5.5	5.7	5.1	4.7
Malawi 2013	2.3	2.4	1.9	1.9	53.9	53.7	63.2	64.3	2.3	2.8	2.0	2.0
South Sudan 2010	6.8	7.5	3.7	4.0	28.5	28.0	22.6	22.1	21.2	21.7	16.3*	17.9*
Sudan 2010	31.8	30.3	14.6***	12.7***	51.7	50.7	36.1	35.1	3.2	3.6	3.3	3.3
Togo 2010	36.7	34.6	35.6	35.2	54.3	52.6	32.4	33.8	4.6	5.6	4.0	4.2
Tunisia 2012	47.6	50.2	47.9	45.3	49.7	47.8	49.3	53.1	3.1	1.8	1.3	1.3

Notes:
(1) MICS Wave 5 and Wave 4 surveys that were publicly available.
(2) Statistically significant differences between registration rates for boys and girls are represented in asterisks; *** p<0.01, ** p< 0.05, * p<0.10. For simplicity the T-statistics are suppressed in the table.