Access to Learning in Six West African Countries:
Combining PASEC and DHS Data to Create a Composite Indicator

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Rationale

❑ Shift in focus from quantity of education (access) to quality of education (learning)
- In research
- In MDGs vs SDGs

❑ Most studies look at either quantity or quality, but not both
- This can lead to biased conclusions

Education data can lead to biased conclusions

❑ Data on quantity (access)
- Overestimates educational success because it ignores performance within the schooling system (or lack thereof)

e.g. 90% of children are in grade 5 but only 50% can read or do math

Education data can lead to biased conclusions

❑ Data on quantity (access)
   ▪ Overestimates educational success because it ignores performance within the schooling system (or lack thereof)

❑ Data on quality (learning)
   ▪ Overestimates educational success because it ignores the out-of-school population (which is likely to be less educated than the in-school-population)

e.g. 90% of grade 5s can read and do math but only 50% of children are in school

Education data can lead to biased conclusions

- ❑ Data on quantity (access)
  - ▪ Overestimates educational success because it ignores performance within the schooling system (or lack thereof)

- ❑ Data on quality (learning)
  - ▪ Overestimates educational success because it ignores the out-of-school population (which is likely to be less educated than the in-school-population)

- ❑ Data on quality, looked at over time
  - ▪ Underestimates improvement because it ignores increases in access over the period (which is likely to decrease the average performance of students)

e.g. fewer children in grade 5 can read and do math but more children are in school

The Solution

❑ Combine data on quantity (access rates) and quality (test scores)

❑ Outcome: an estimate of the proportion of the population (in and out of school) that are achieving certain learning levels

❑ Very few studies have done this
- Michaelowa (2001)
- Filmer et al. (2006)
- Pritchett (2013)
- Hanushek & Woessmann (2008)
- Spaull & Taylor (2015)
- Taylor & Spaull (2015)

❑ No studies have done this in Francophone Africa

Why is this useful?

❑ Gain a realistic picture of what the education landscape looks like

❑ Understand how education changes over time

❑ Use this information to inform development goals (national and international)

Why is this useful: SDGs

❑ MDGs/SDGs prescribe(d) single end-points for all countries

❑ Some countries (most in Africa) did not reach the MDG because they were in no starting place to do so – the MDG was impossible

❑ These goals are not useful for countries which simply cannot attain them in the time span given

❑ This work highlights that there is an education crisis in Francophone Africa. The SDGs are not attainable

❑ Solution:
  ▪ Have different goals for the most struggling countries, OR
  ▪ Set goals in proportional rather than absolute terms.

The Countries

Senegal
Burkina Faso
Ivory Coast
Togo
Benin
DRC
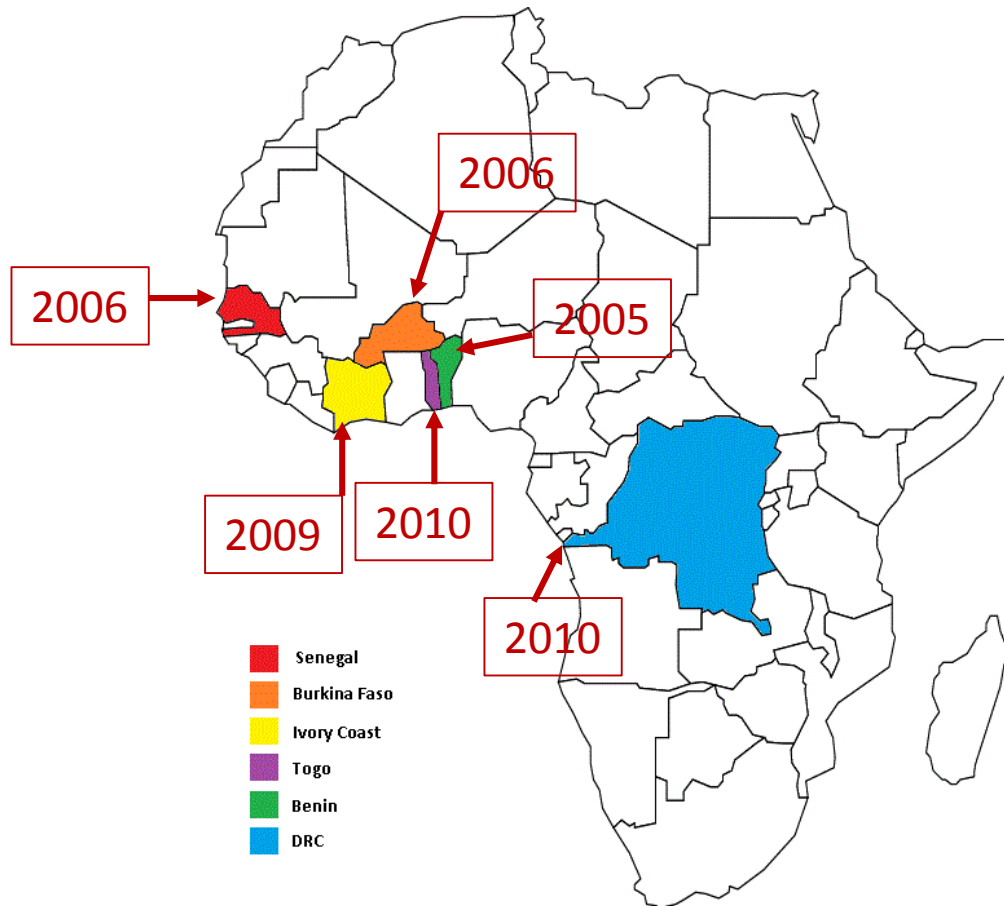
The Countries

All six countries achieved their independence in 1960. The 2014 Human Development Report ranked 187 countries according the their Human Development Index – a composite statistic of the state of education, life expectancy, and per capita income in a country. All six countries ranked in the lowest 15%.

Research Questions

❑ What are the rates of access, learning, and access to learning for each country?

❑ How do these rates differ by socioeconomic status?

❑ How do these rates differ by gender?

Methodology (1/3)

❑ Measure of education access
- Source: DHS data
- Indicator: Grade completion

❑ Measure of education quality
- Source: PASEC
- Indicator: Test scores
- PASEC measures proficiency in French (literacy measure) and Mathematics (numeracy measure)
- 40% correct answers = basic proficiency

Methodology (2/3)

❑ Creating the indicator

▪ Multiply proportion getting access by proportion acquiring proficiency

▪ Assume the out-of-school population have not acquired basic literacy and numeracy

▪ Use an older cohort

❑ Disaggregate access to literacy and access to numeracy by:

▪ Gender

▪ Socioeconomic status

• Account for the underrepresentation of poorer individuals in the schooling system

Methodology (3/3): Accounting for the underrepresentation of poorer individuals in the schooling system

❑ PASEC:

- Richer students are more likely to attend school than poorer students
- Richer students are therefore disproportionately represented in PASEC

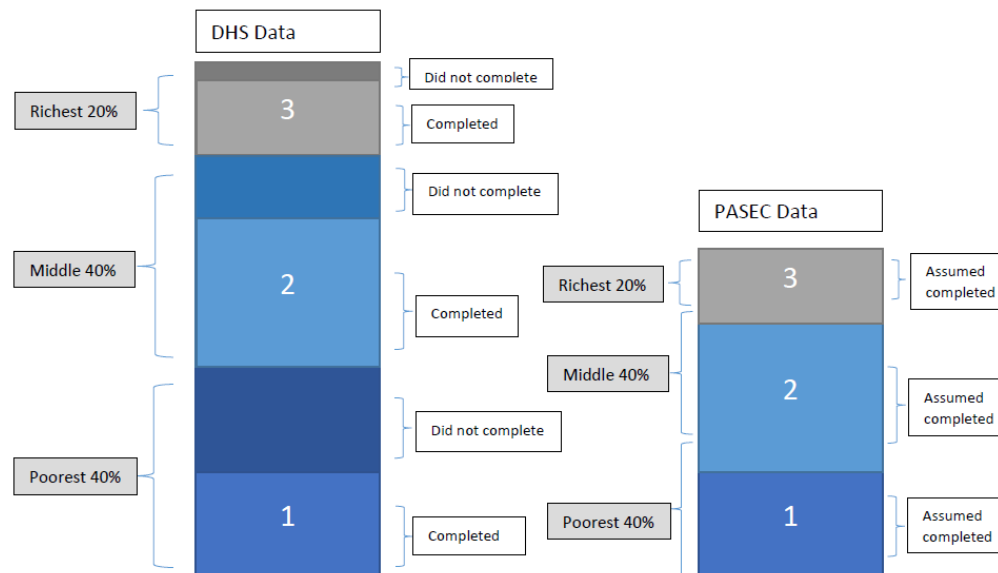# Methodology (3/3): Accounting for the underrepresentation of poorer individuals in the schooling system

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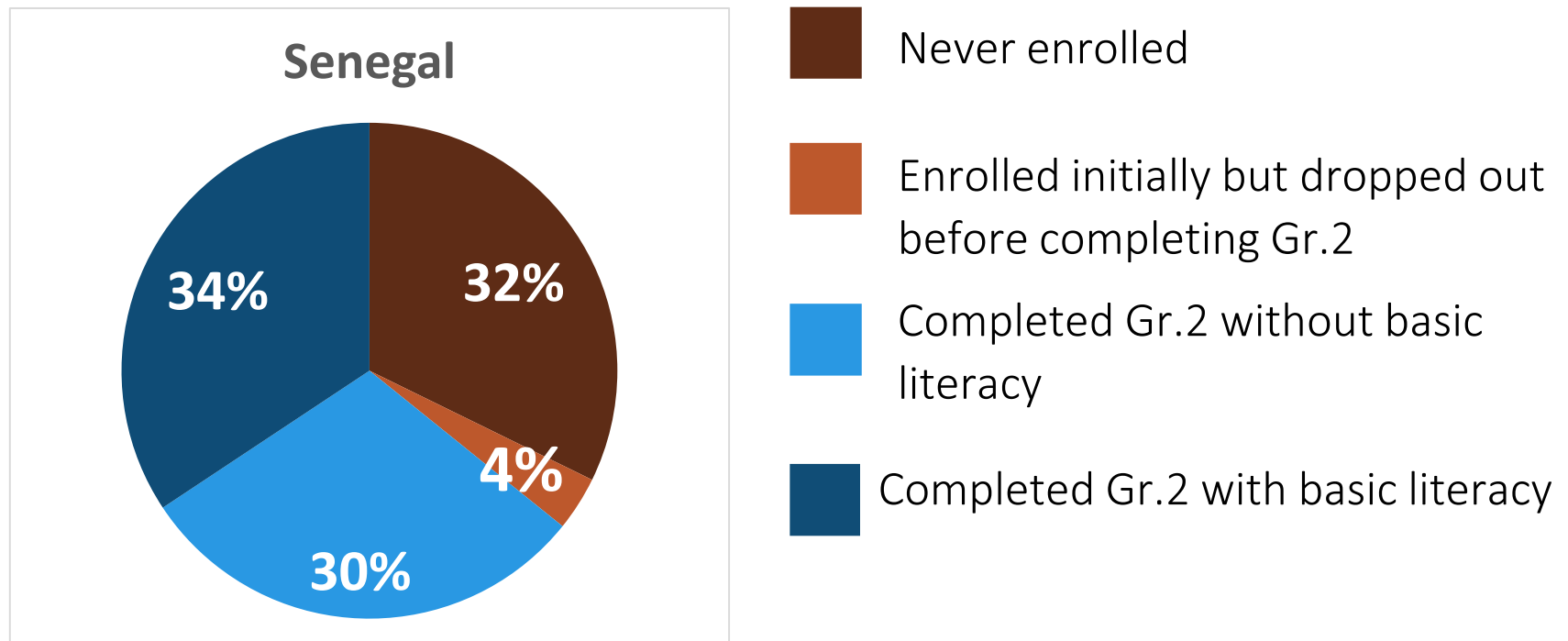

Use DHS completion rates to create wealth quintiles in the PASEC data

Results

❑ Major findings:

▪ Access and learning are both extremely low in all countries

▪ Huge socioeconomic inequalities in access to learning exist

▪ Females are at a disadvantage in access in some countries, but not all

Results (1/6): Access and learning in grade 2

Senegal

- Never enrolled — 32%
- Enrolled initially but dropped out before completing Gr.2 — 4%
- Completed Gr.2 without basic literacy — 30%
- Completed Gr.2 with basic literacy — 34%

Results (1/6): Access and learning in grade 2

Senegal

- Never enrolled
- Enrolled initially but dropped out before completing Gr.2
- Completed Gr.2 without basic literacy
- Completed Gr.2 with basic literacy

32%
4%
30%
34%

Results (1/6): Access and learning in grade 2

Senegal

Pie chart with segments:
- 32% — Never enrolled
- 4% — Enrolled initially but dropped out before completing Gr.2
- 30% — Completed Gr.2 without basic literacy
- 34% — Completed Gr.2 with basic literacy

Legend:
- Never enrolled
- Enrolled initially but dropped out before completing Gr.2
- Completed Gr.2 without basic literacy
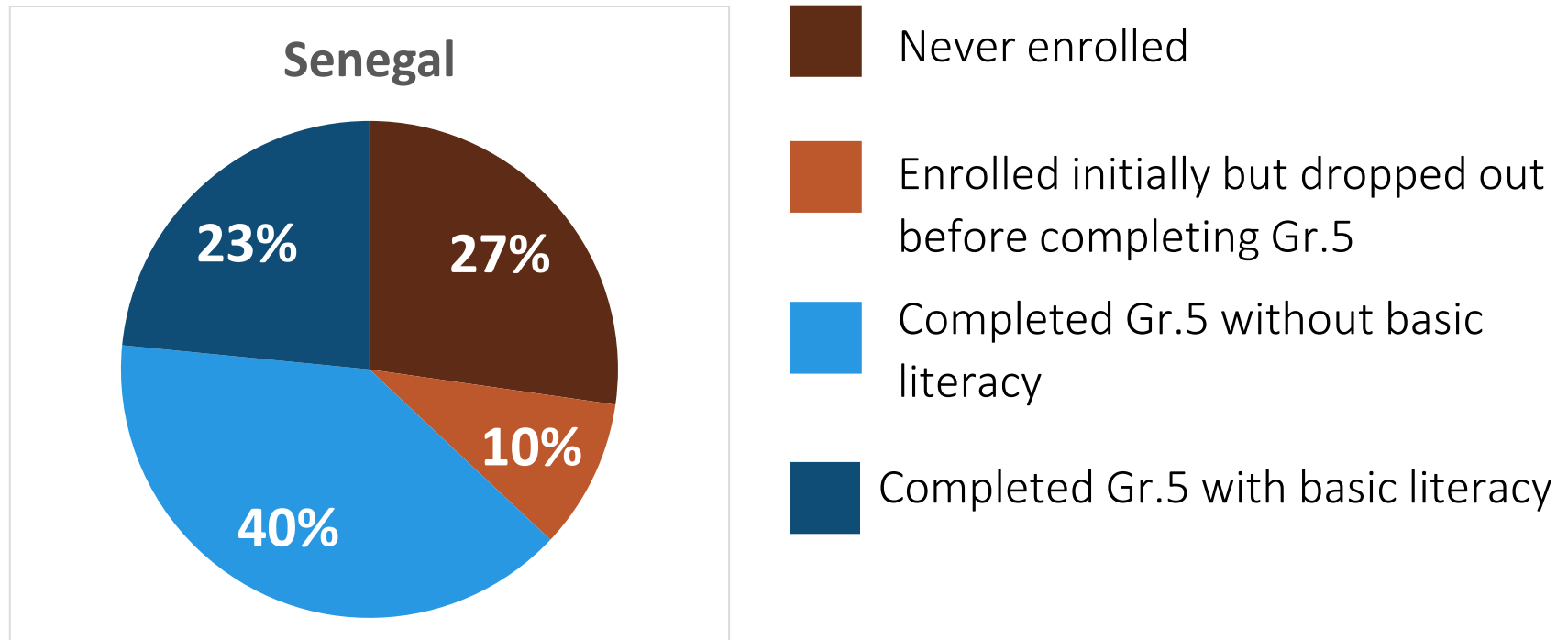- Completed Gr.2 with basic literacy

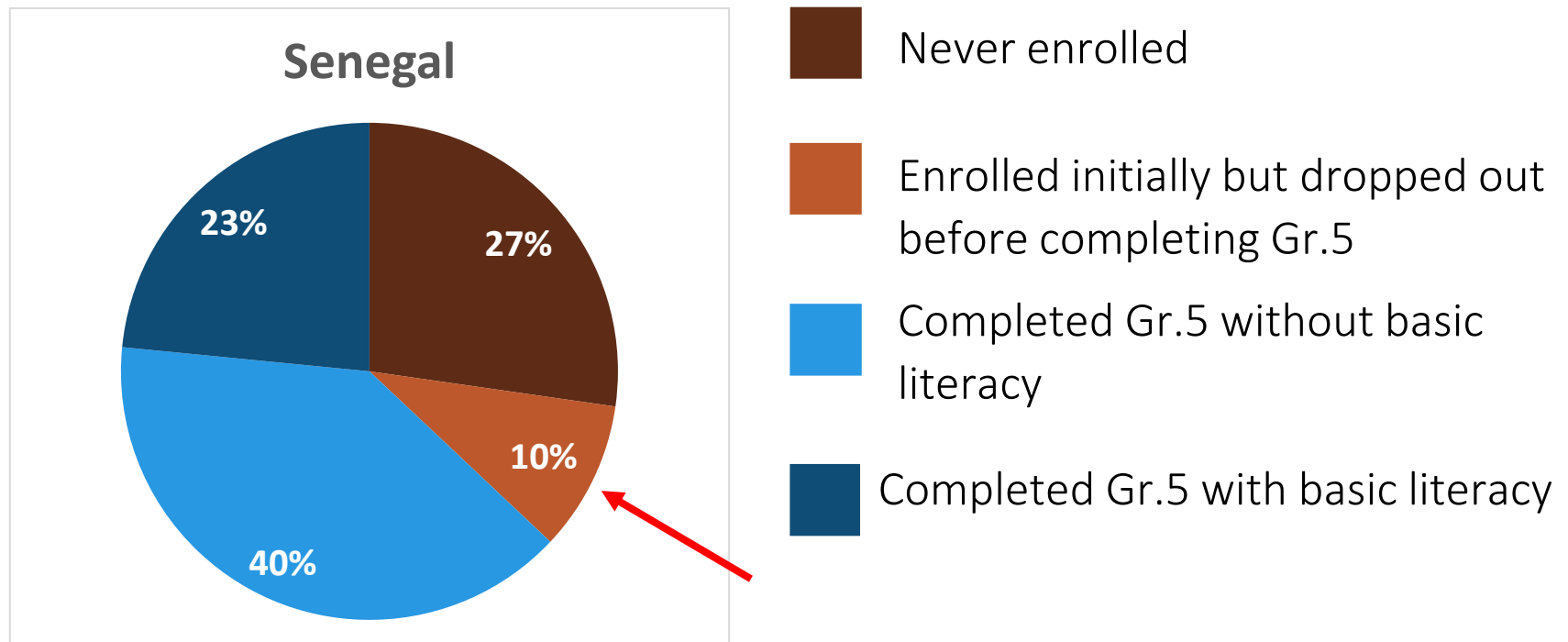# Results (1/6): Access and learning in grade 2

❑ This not unique to Senegal

- ▪ Benin, Burkina Faso, and the Ivory Coast have non-enrolment rates of between than 15% and 40%

- ▪ All other countries, besides the DRC, have less than half of those in school acquiring basic skills

Results (2/6): Access and learning in grade 5

Senegal

- 27% Never enrolled
- 10% Enrolled initially but dropped out before completing Gr.5
- 40% Completed Gr.5 without basic literacy
- 23% Completed Gr.5 with basic literacy

Results (2/6): Access and learning in grade 5

Senegal

- Never enrolled
- Enrolled initially but dropped out before completing Gr.5
- Completed Gr.5 without basic literacy
- Completed Gr.5 with basic literacy

Results (2/6): Access and learning in grade 5

Senegal

- 27% — Never enrolled
- 10% — Enrolled initially but dropped out before completing Gr.5
- 40% — Completed Gr.5 without basic literacy
- 23% — Completed Gr.5 with basic literacy

Table 3F. PASEC Grade 5 Access to Literacy, with Standard Errors (%)

Country	National	SE	Males	SE	Females	SE	Poor40	SE	Mid40	SE	Rich20	SE
Benin[a]	13.89	-	15.31	-	12.04	-	5.99	-	16.70	-	22.65	-
Burkina Faso	13.10	3.0	14.28	3.4	11.69	3.5	5.75	3.6	10.22	3.9	30.45	4.8
DRC	43.83	3.2	42.64	3.7	30.75	3.6	30.13	4.7	36.85	4.1	45.08	6.0
Ivory Coast	19.06	3.3	20.64	3.9	17.62	4.6	6.42	5.3	17.20	4.0	43.24	5.3
Senegal	23.44	4.1	23.25	4.7	23.51	5.0	8.61	5.4	21.72	4.8	53.95	5.0
Togo	18.06	2.7	19.42	2.9	16.45	3.6	5.66	4.0	17.22	2.9	43.34	4.3
	Poor40M	SE	Poor40F	SE	Mid40M	SE	Mid40F	SE	Rich20M	SE	Rich20F	SE
Benin[a]	8.68	-	2.46	-	17.04	-	16.82	-	24.99	-	18.63	-
Burkina Faso	5.94	4.5	4.72	4.6	12.38	4.7	8.20	5.0	37.26	5.4	25.84	5.7
DRC	38.82	5.1	23.35	5.2	41.56	4.9	32.67	4.5	50.15	6.5	38.52	6.5
Ivory Coast	8.96	6.6	4.15	7.0	18.40	5.4	15.66	5.7	43.77	5.8	40.38	7.2
Senegal	9.89	6.5	7.07	6.4	22.48	6.0	21.52	6.5	50.66	7.7	55.56	6.1
Togo	6.65	4.0	3.23	6.2	17.05	3.1	16.83	4.5	50.08	5.4	38.96	5.9

Note: Poor40 refers to the poorest 40% of individuals in the country, Mid40 the middle 40%, and Rich20 the richest 20%. 'SE' is the standard error. An 'M' or 'F' after the wealth bracket refers to 'Males' or 'Females', respectively. Values shown are percentages. [a]Estimates of literacy rates were run on the unweighted sample.

**Table 3F.** PASEC Grade 5 Access to Literacy, with Standard Errors (%)

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Results (2/6): Access and learning in grade 5

❑ Again, this is not unique to Senegal
- All drop out rates are around 10%
- More than half of those in school do not acquire basic skills in all countries

❑ In the DRC, only 1 out of 3 students are achieving basic literacy

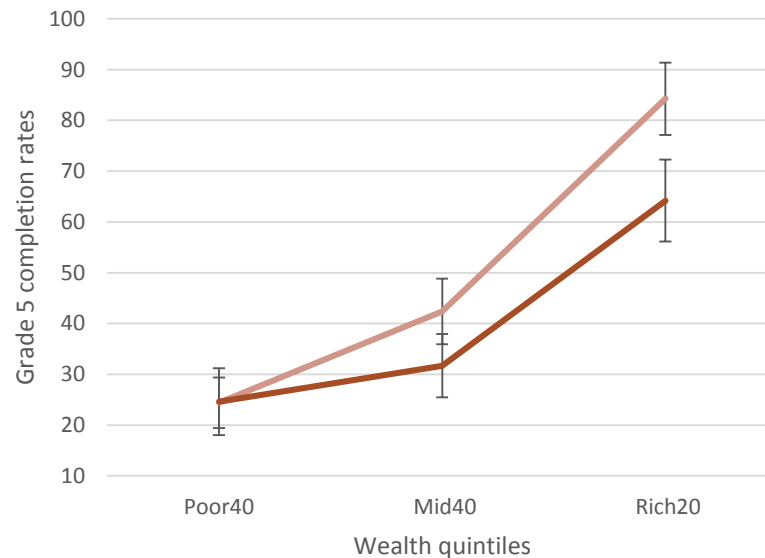❑ In the Ivory Coast, only 1 out of 10 students are achieving basic numeracy
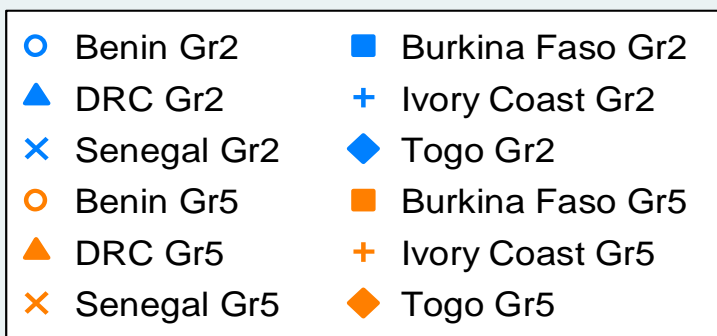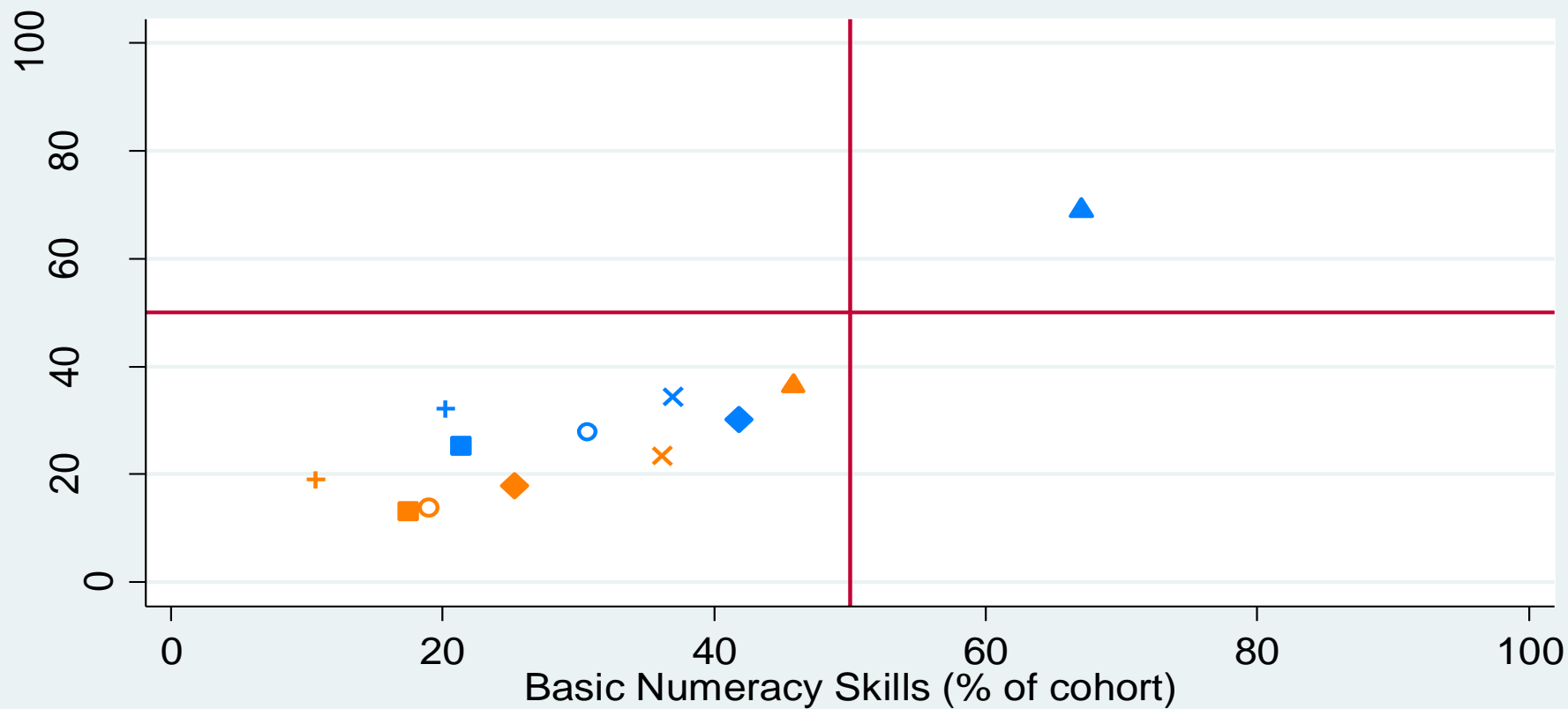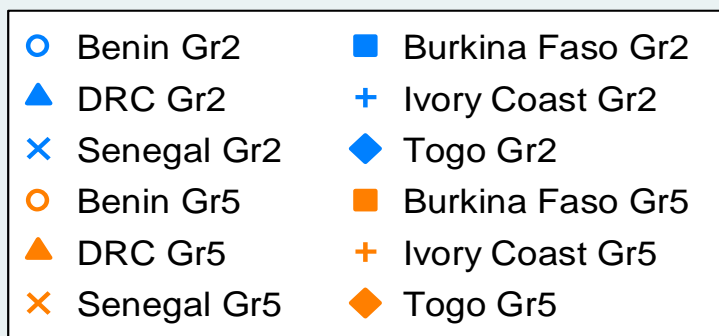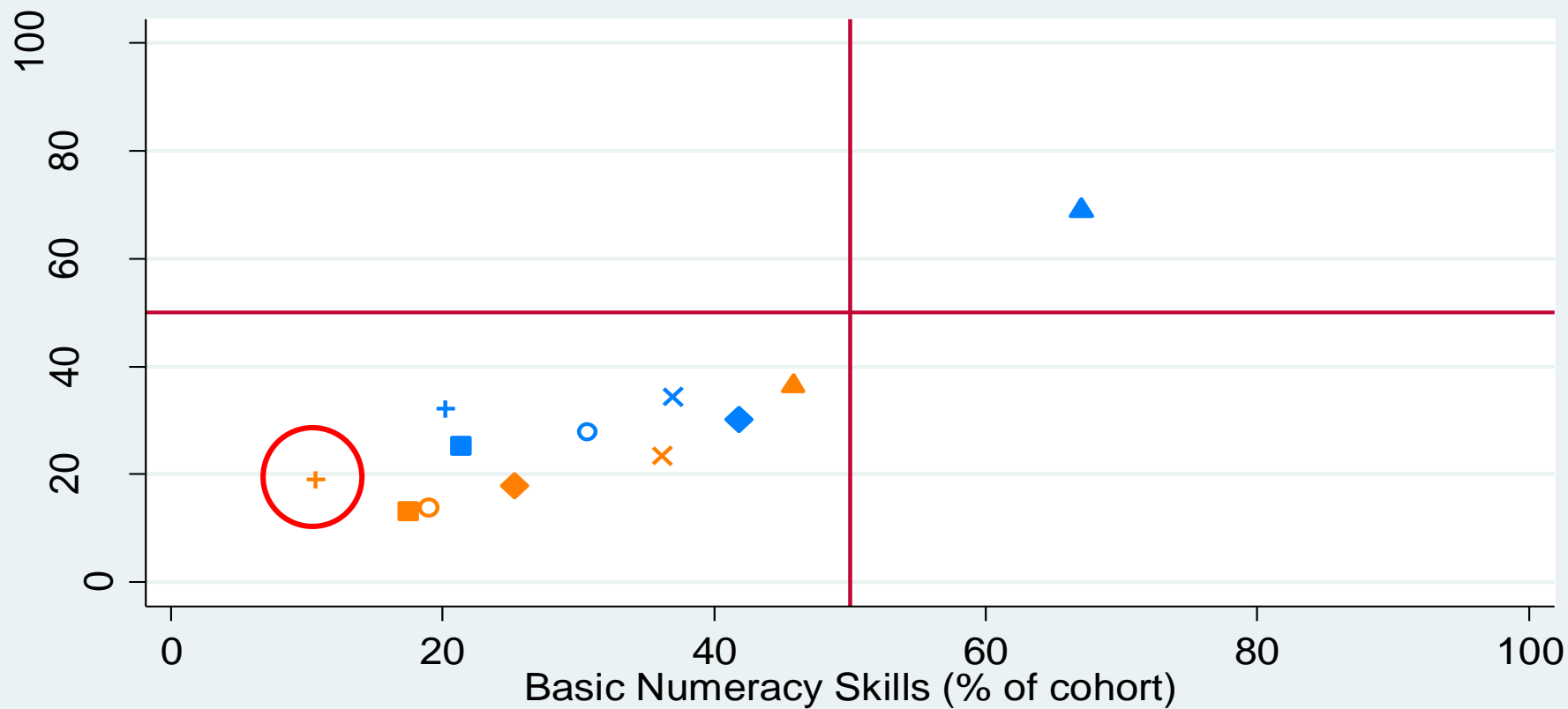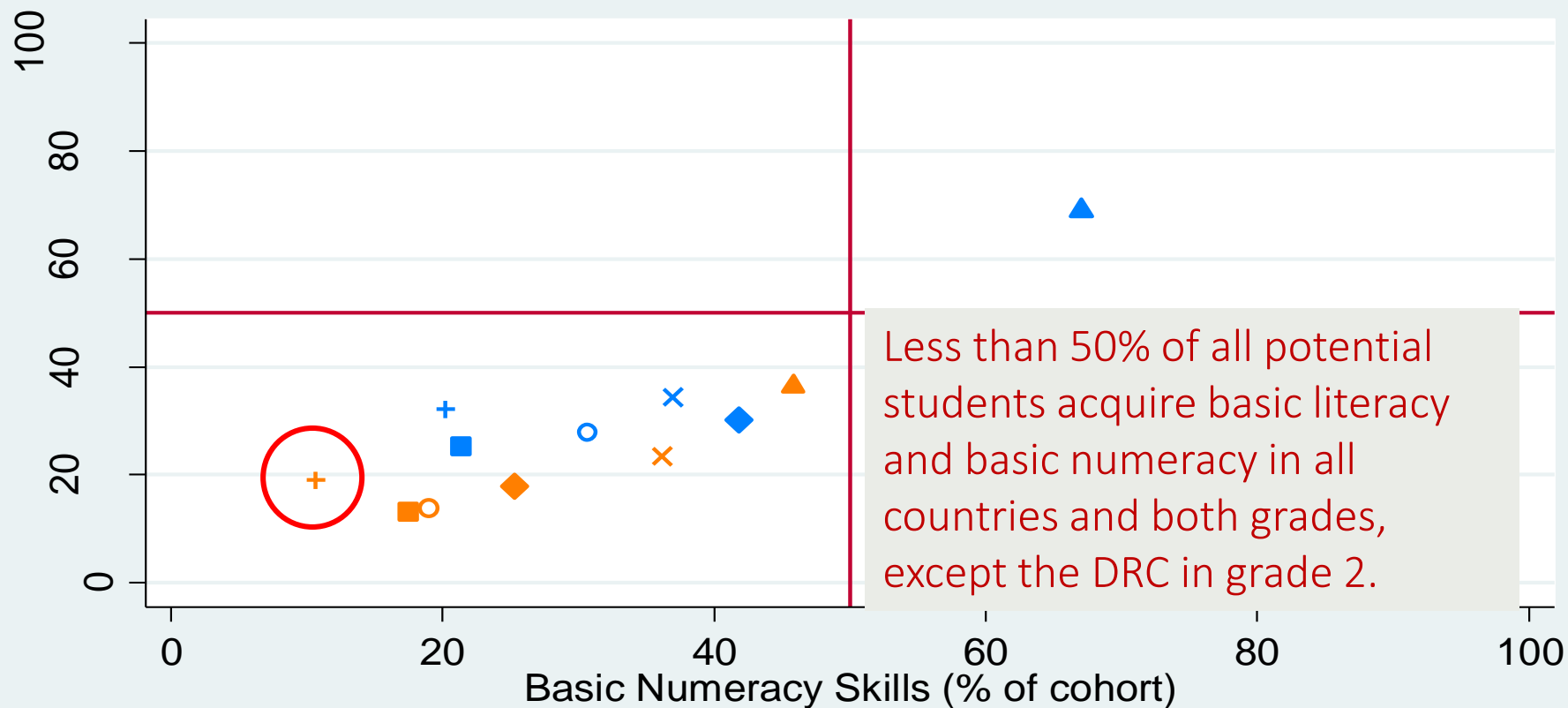
Legend:
- Benin Gr2
- Burkina Faso Gr2
- DRC Gr2
- Ivory Coast Gr2
- Senegal Gr2
- Togo Gr2
- Benin Gr5
- Burkina Faso Gr5
- DRC Gr5
- Ivory Coast Gr5
- Senegal Gr5
- Togo Gr5

Basic Numeracy Skills (% of cohort)

Less than 50% of all potential students acquire basic literacy and basic numeracy in all countries and both grades, except the DRC in grade 2.

Legend:
- Benin Gr2
- Burkina Faso Gr2
- DRC Gr2
- Ivory Coast Gr2
- Senegal Gr2
- Togo Gr2
- Benin Gr5
- Burkina Faso Gr5
- DRC Gr5
- Ivory Coast Gr5
- Senegal Gr5
- Togo Gr5

Basic Numeracy Skills (% of cohort)
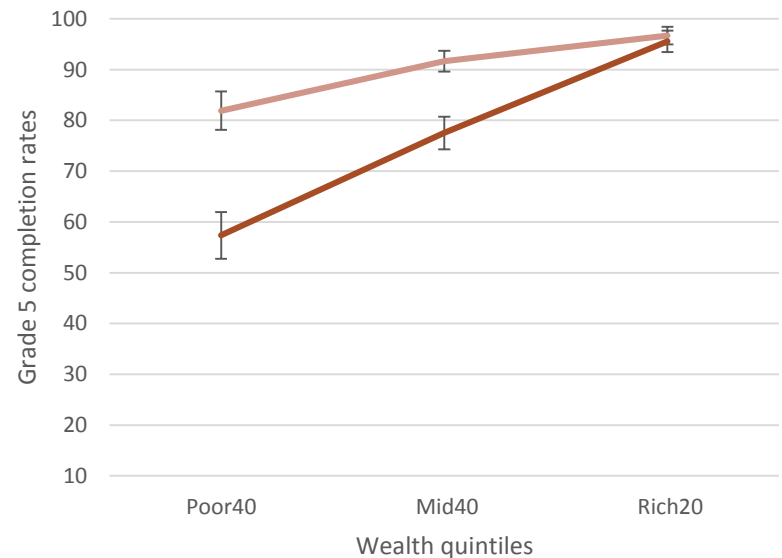
Results (3/6): Access to literacy and access to numeracy

❑ Access to literacy and access to numeracy are extremely low in all countries

❑ These are likely to be lower where inequalities exist
- For low wealth levels
- For females

Results (4/6): Gender and socioeconomic inequalities in access
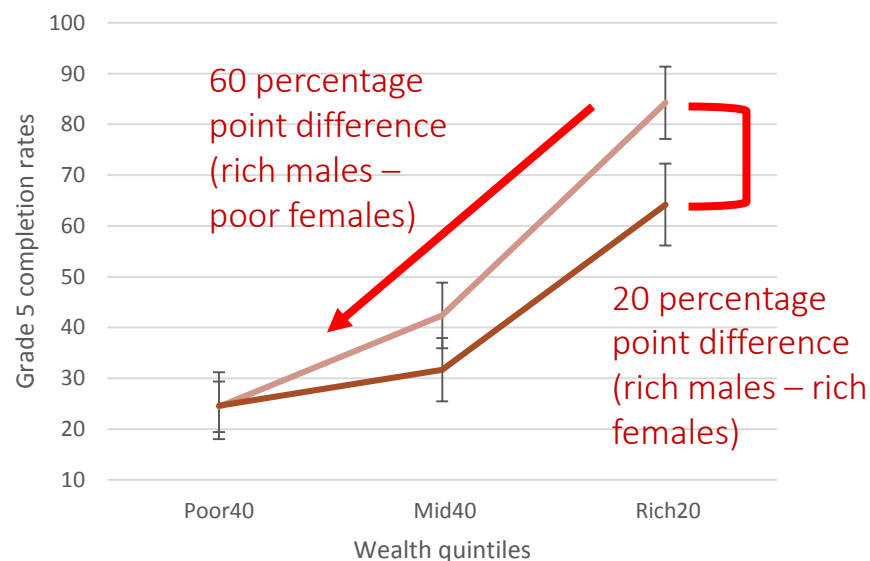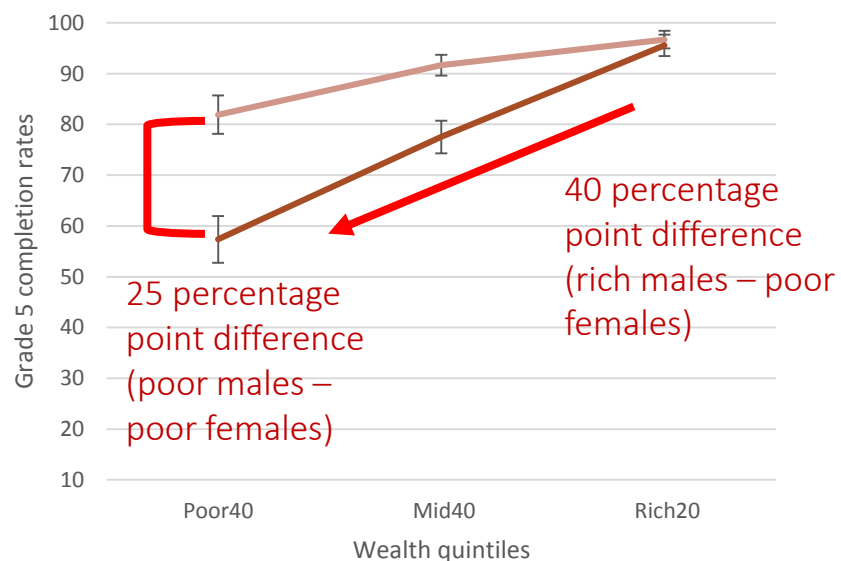

Burkina Faso, Grade 5

DRC, Grade 5

Males   Females

Results (4/6): Gender and socioeconomic inequalities in access

Burkina Faso, Grade 5

DRC, Grade 5

60 percentage point difference (rich males – poor females)

20 percentage point difference (rich males – rich females)

25 percentage point difference (poor males – poor females)

40 percentage point difference (rich males – poor females)

Males   Females
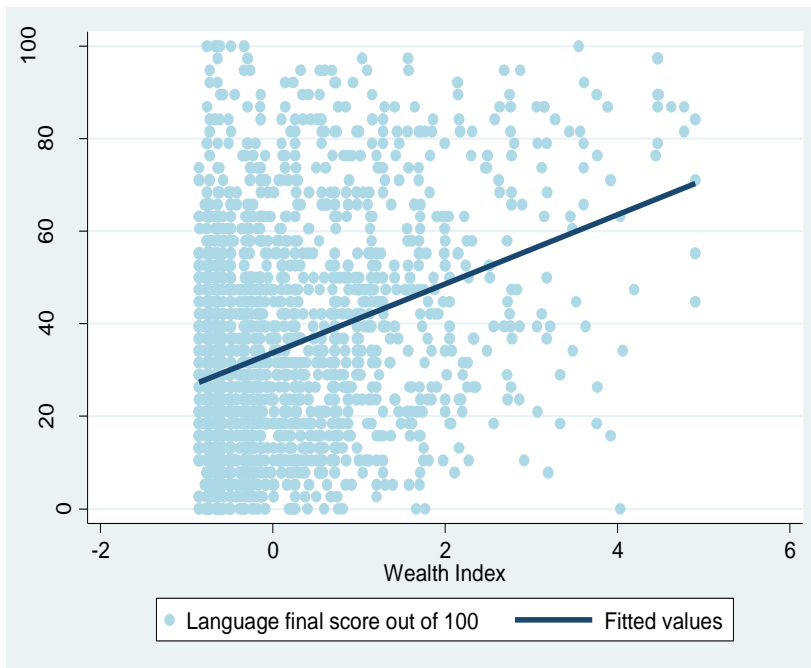
Results (4/6): Gender and socioeconomic inequalities in access

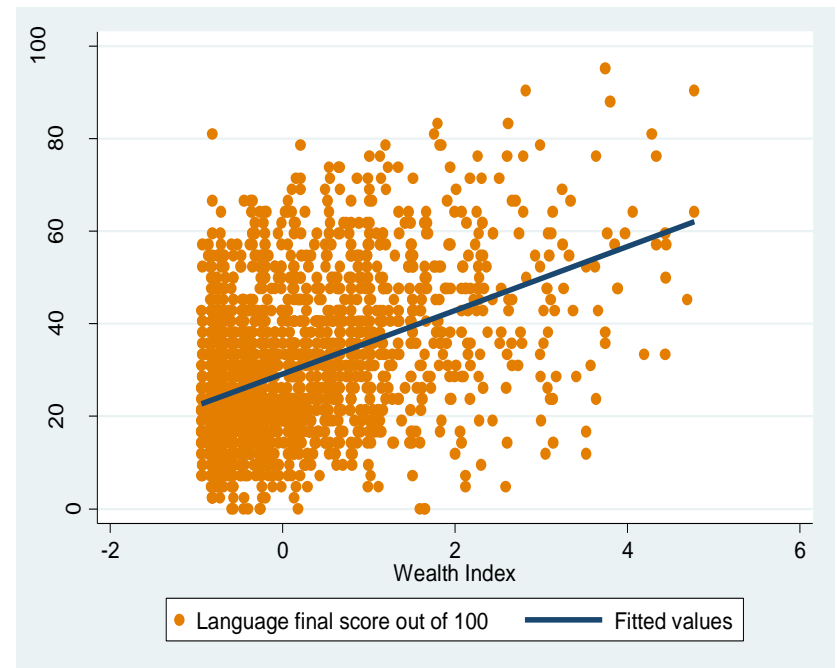❑Socioeconomic inequalities in access
  ▪ Substantial in all countries

❑ Gender inequalities in access
  ▪ Substantial in 4/6 countries (Not detected in Senegal and Togo)

❑ These results clearly highlight issues of equity

Results (5/6): Socioeconomic inequalities in quality

Togo, Grade 2

Togo, Grade 5

Results (5/6): Socioeconomic inequalities in quality
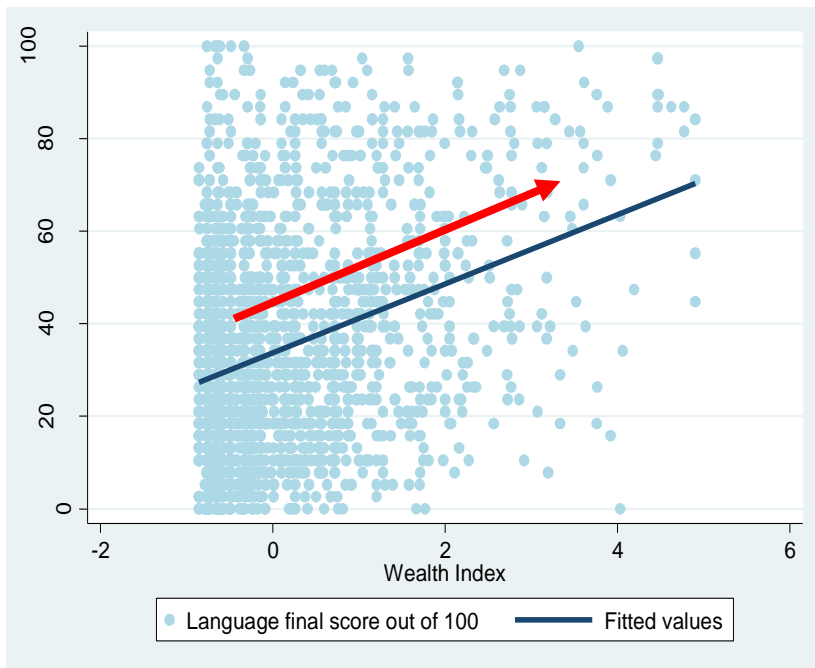
Togo, Grade 2

Togo, Grade 5
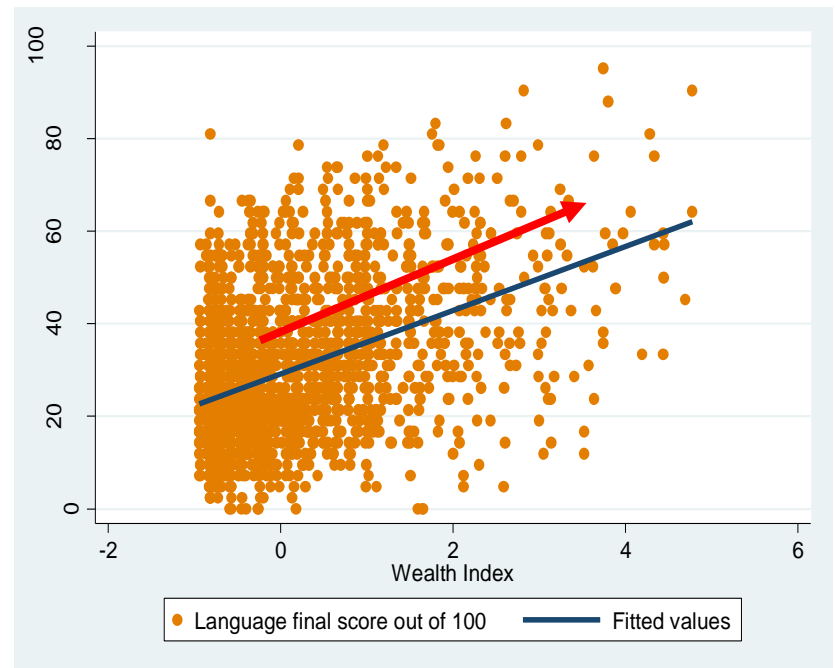
Results (5/6): Socioeconomic inequalities in quality

❑ Socioeconomic inequalities in quality
  - Substantial in 4/6 countries (not detected in Benin and the DRC)
  - Up to 20% of the variation in test scores can be explained by SES

❑ Gender inequalities in quality
  - Not detected

❑ Again, this clearly highlights issues of equity, especially for the poor

❑ In Benin, Burkina Faso, the Ivory Coast, and Togo, it is estimated that less than 5% of the poorest girls learn to read at a basic grade 5 level

❑ Due to error in estimating these figures, we cannot be sure that these rates are not zero

❑ Even in the DRC, less than 1/5 of the poorest girls learn to read

❑ Numeracy rates are slightly better but still extremely low

Conclusion

❑ Dismal performances in most countries

1. Generally, countries display problems related to both access and quality
   - 2 in 10 children in Ivory Coast will never attend school
   - 4 in 10 children in Ivory Coast are illiterate, despite attending school
   - 3 in 10 children in Ivory Coast are literate by the end of grade 5

2. All countries have vast socioeconomic inequality in both access and quality
   - In Togo, among wealthy children, **40%** acquire basic literacy skills by the end of grade 5, whereas only **6%** of poor children do so
   - Among rich children in Burkina Faso, **70%** complete grade 5, while only **25%** of poor children do so

3. Gender inequalities are not always present but can also be large (in access), especially at low income levels

❑ Overall: There is both an access crisis and a learning crisis in these countries
   - These countries should be differentiated from others when prescribing development goals and/or indicators, OR
   - Goals/indicators should be proportional

Mozambique
14%, 7%, 34%, 12%, 33%

Malawi
7%, 1%, 39%, 23%, 30%

Zambia
7%, 5%, 36%, 33%, 19%

Uganda
5%, 10%, 45%, 14%, 26%

Lesotho
5%, 8%, 53%, 17%, 17%

South Africa
1%, 1%, 25%, 44%, 26%

Tanzania
15%, 45%, 26%, 3%, 11%

Namibia
6%, 17%, 57%, 11%, 9%

Zimbabwe
1%, 26%, 52%, 17%, 4%

Kenya
5%, 34%, 46%, 7%, 8%

Swaziland
2%, 33%, 53%, 1%, 11%

Legend:
- Never enrolled
- Drop out before Gr6
- Completed Gr6 but functionally illiterate (Level 1-2)
- Completed Gr6 and acquired basic reading skills (Level 3-5)
- Completed Gr6 and acquired higher-order reading skills (Level 6-8)
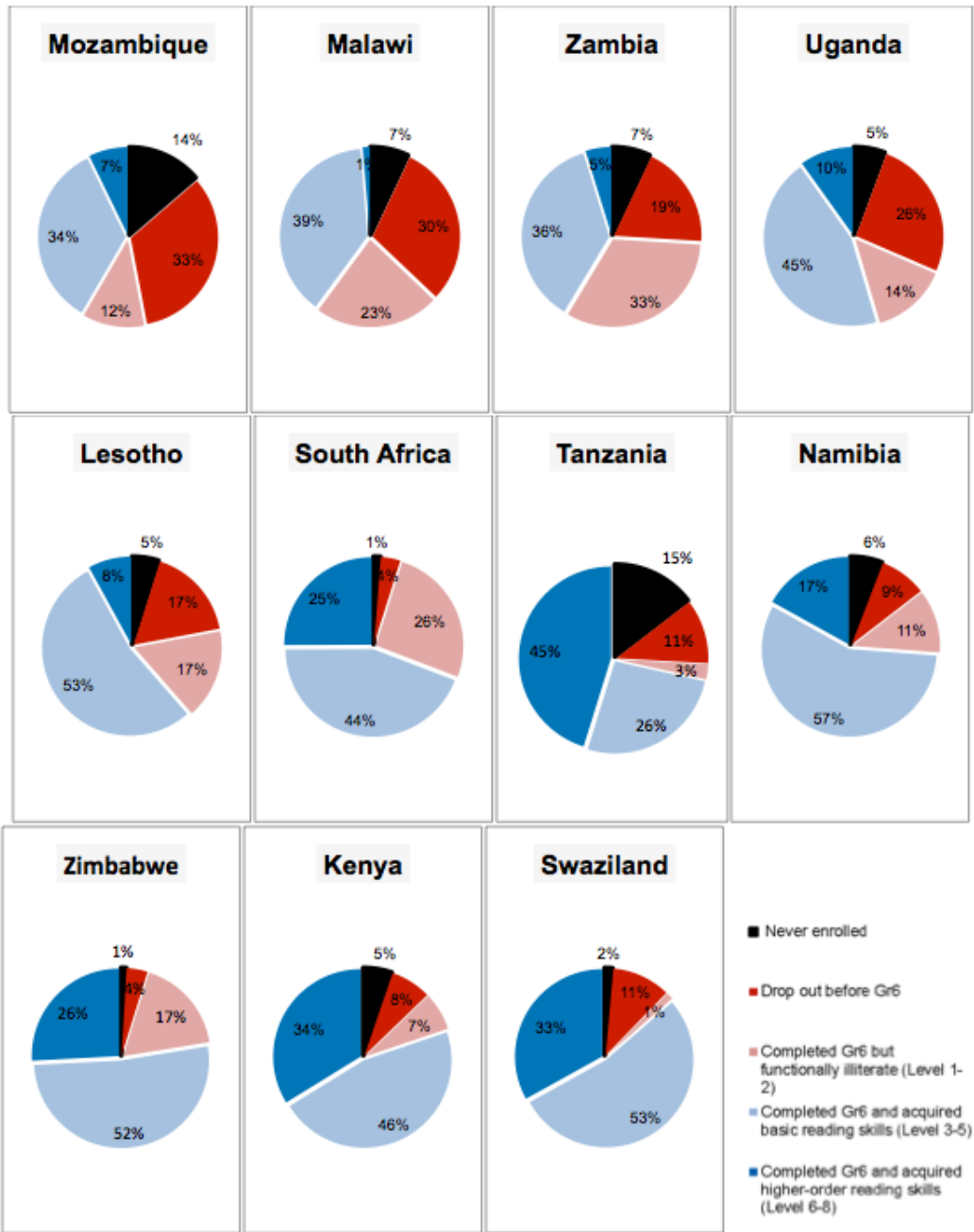
- **Chapter 4**: Access to what? Creating a composite indicator of educational access and educational quality for 11 African countries

Take Mozambique circa 2007:

Gr6 comp rate (DHS):   53%
Gr6 literacy rate (SACMEQ):
      79%

Access-to-literacy rate: 42%

Do this for gender and wealth groups
→ Boys, Girls
→ Poorest 40%, Middle 40%, Wealthiest 20%
→ Poorest 40% Girls, Poorest 40% Boys
→ Etc..

Points for Discussion

- **Comparability issues**
    - Level 3 in SACMEQ = ?? in PASEC==?? In TERCE
    - Equating with common items (SACMEQ 2013 & PASEC 2012)
    - Equating using non-linear techniques and bridging countries? (Hanushek & Woessman, 2008? Gustafsson 2013?
    - Broader issue of PISA vs TIMSS vs SACMEQ?
- **Differentiated goals for SDGs**
    - Loss of simplicity vs being more realistic

- **Future directions of this research agenda**
    - Looking at developing countries that take part in PISA
    - Looking at Latin America (SERCE/TERCE)
    - Looking at Pacific Islands (PILNA)
    - Updating measures using latest household-surveys and cross-national assessments (new PASEC data, new SACMEQ data)

- Are **HH→tests** or are **tests→ HH?**
    - Are assessments moving towards household-level administration (PISA-D) or are Household surveys incorporating EGMA/EGRA/ACER-type assessments (as in MICS 2018?)

- **Benefits of participating in BOTH PISA and IEA (TIMSS/PIRLS)?**
    - PISA obligation for OECD countries, TIMSS/PIRLS optional?
    - Currently PISA doesn't assess primary-school students?
- Scaling issues in developing countries
    - Extreme floor-effects in many developing countries
    - Politics of assessment . Countries refusing to participate in 'dumbed-down' tests despite needing to from a psychometric perspective
    - All Vietnamese students scoring 100% on the PASEC test?
    - PISA and PISA-D, creating meaningful items that can genuinely discriminate at the bottom-end

- **Questions of curriculum and assessment**
    - Is foreign-assessment (PISA/TIMSS) driving local-curriculum?
    - Are we seeing a convergence of curriculum as a result of participation in ILSA?
    - Taking part in ILSAs can be hugely beneficial to local assessment capacity. Explicit aim of SACMEQ for example.
- **Lack of studies that focus on what is and isn't happening in the classroom / instruction.**
    - Useful insight from Lucia Tramonte (UBC) regarding South Africa – looking at more outcome measures is far less useful than classroom-based studies.

Thank you

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Nic Spaull – nicholasspaull@gmail.com

(Research forthcoming in IBE UNESCO Book chapter 2016)

Access and learning in grade 2

Benin
- 16%
- 4%
- 52%
- 28%

Burkina Faso
- 25%
- 37%
- 6%
- 32%

DRC
- 4%
- 3%
- 24%
- 69%

Ivory Coast
- 19%
- 5%
- 44%
- 32%

Senegal
- 32%
- 4%
- 30%
- 34%

Togo
- 5%
- 5%
- 60%
- 30%

Never enrolled

Enrolled initially but dropped out before completing Gr.2

Completed Gr.2 without basic literacy

Completed Gr.2 with basic literacy
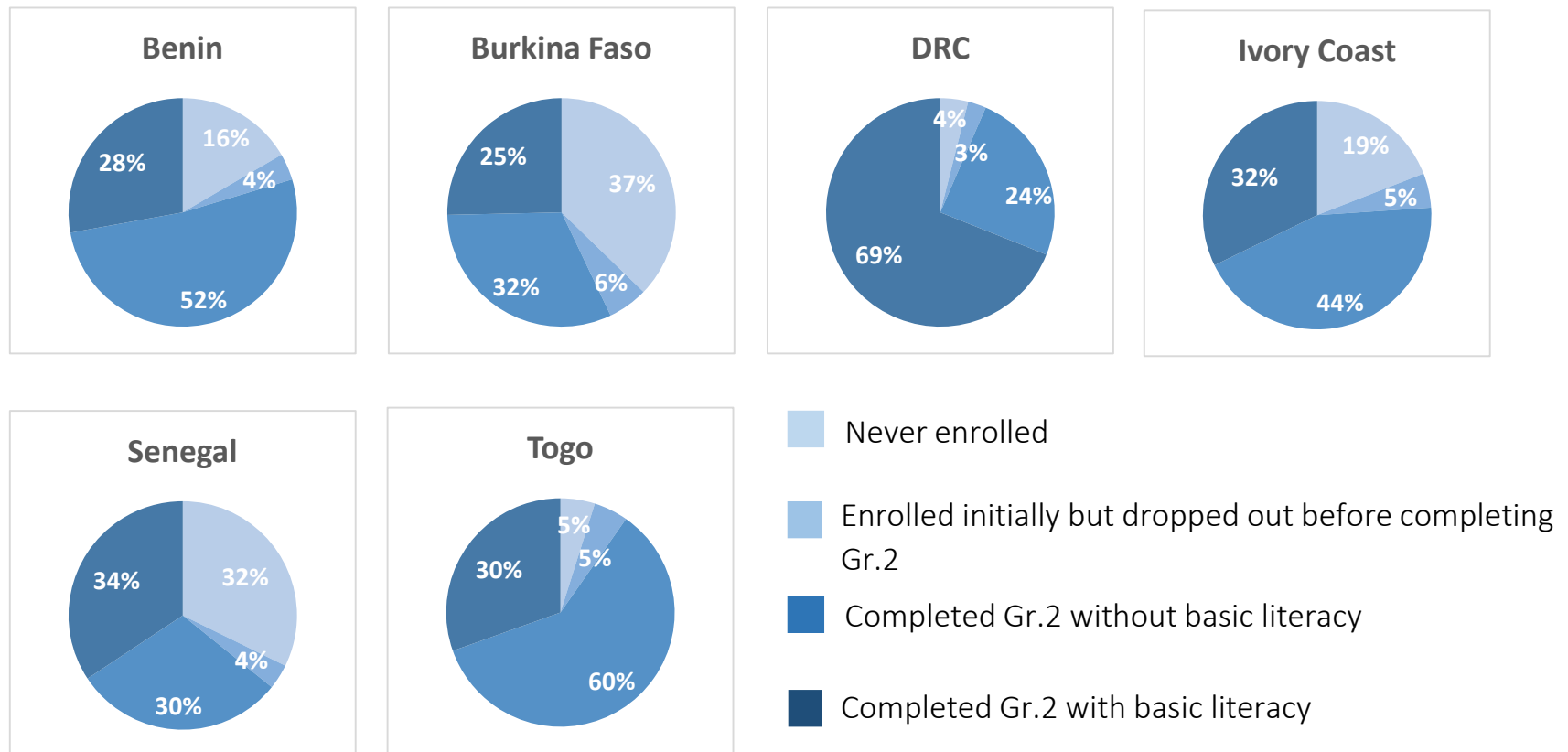
Access and learning in grade 5
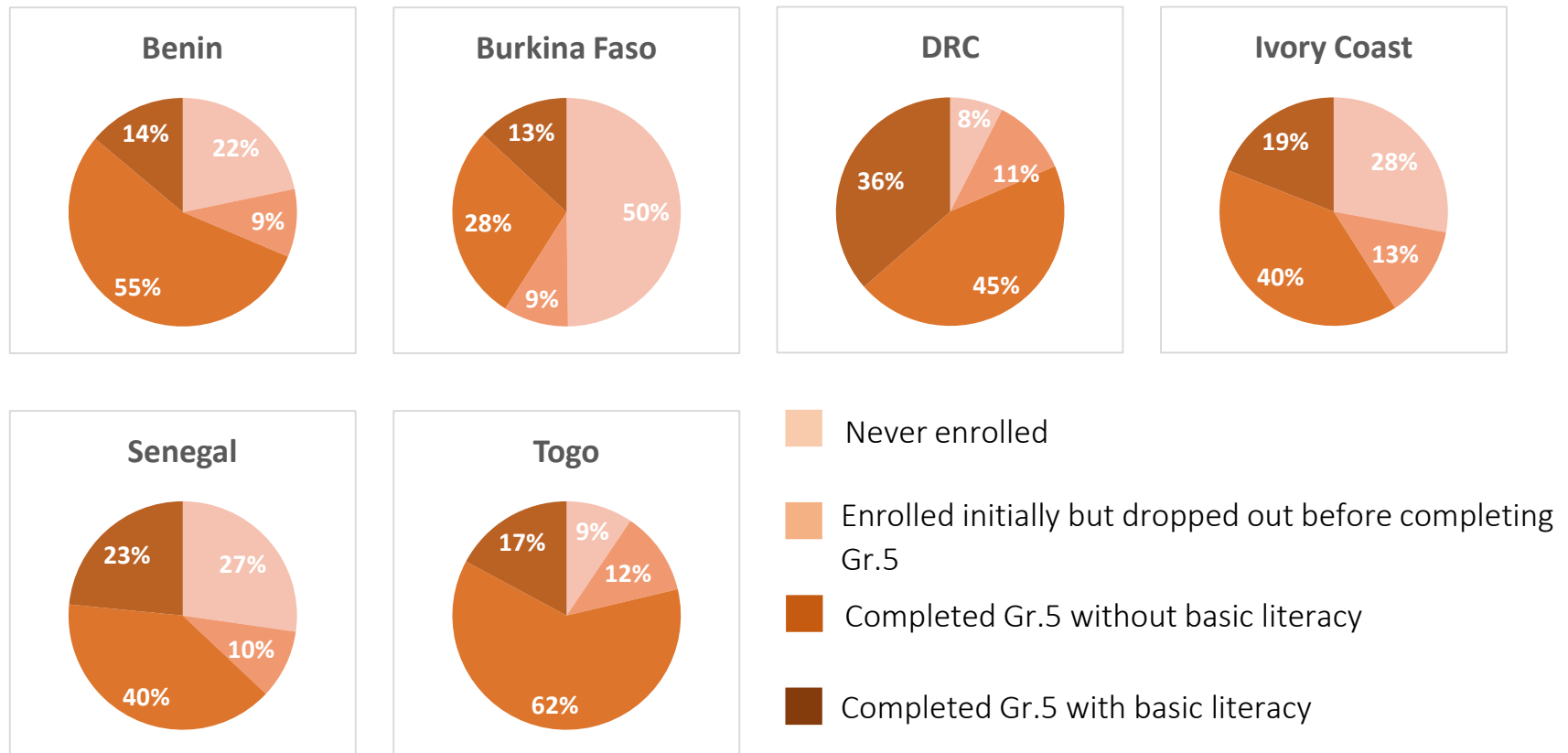
Socioeconomic inequalities in quality

Proportion of Variance in Test Scores that can be Explained by Differences in Socioeconomic Status

	Grade 2		Grade 5	
Country	Language	Math	Language	Math
Benin	3.09	2.22	3.27	0.92
Burkina Faso	9.19	7.12	10.30	3.75
DRC	0.00	1.11	0.06	0.00
Ivory Coast	9.12	7.53	13.98	5.57
Senegal	9.61	6.93	10.18	7.53
Togo	11.00	6.06	21.18	8.34

Note: Figures shown are adjusted R^2 values.

Rates of access to learning for the poorest males and females

Access to Literacy and Access to Numeracy for the Poorest 40% of Individuals - Grade 2

Literacy

Countries	National	SE	Males	SE	Females	SE
Benin	27.85	-	14.45	-	9.39	-
Burkina Faso	25.35	3.2	17.28	4.9	12.99	5.5
DRC	68.97	2.6	70.01	4.2	60.32	4.2
Ivory Coast	32.23	3.0	24.84	4.2	15.01	5.7
Senegal	34.31	4.1	18.31	8.3	23.65	8.3
Togo	30.14	1.8	22.11	3.2	16.39	4.2

Numeracy

Countries	National	SE	Males	SE	Females	SE
Benin	30.69	-	24.41	-	16.58	-
Burkina Faso	21.35	3.0	15.44	4.3	10.97	4.8
DRC	67.05	2.5	65.55	4.2	54.67	4.3
Ivory Coast	20.19	2.7	16.94	4.0	8.41	5.2
Senegal	36.91	4.2	22.32	8.4	25.79	7.6
Togo	41.84	1.9	36.58	3.6	25.74	4.6

Note: 'SE' is the standard error. Values shown are percentages.

Less than 20% of potential grade 2s have access to literacy/numeracy ↑

Access to Literacy and Access to Numeracy for the Poorest 40% of Individuals - Grade 5

Literacy

Countries	National	SE	Males	SE	Females	SE
Benin	13.89	-	8.68	-	2.46	-
Burkina Faso	13.10	3.0	5.94	4.5	4.72	4.6
DRC	43.83	3.2	38.82	5.1	23.35	5.2
Ivory Coast	19.06	3.3	8.96	6.6	4.15	7.0
Senegal	23.44	4.1	9.89	6.5	7.07	6.3
Togo	18.06	2.6	6.65	4.0	3.23	6.2

Numeracy

Countries	National	SE	Males	SE	Females	SE
Benin	18.98	-	14.04	-	6.37	-
Burkina Faso	17.47	3.2	10.44	5.1	8.01	5.9
DRC	55.13	3.2	48.18	5.1	31.89	5.5
Ivory Coast	10.60	2.8	7.01	6.4	2.01	6.5
Senegal	36.13	4.4	19.85	6.4	17.54	6.4
Togo	25.34	2.8	15.19	4.5	10.94	6.7

Note: 'SE' is the standard error. Values shown are percentages.

Less than 10% of potential grade 5s have access to literacy/numeracy ↑