Fertility estimates from full birth

Outline

Data and methods

Data and methods

104 countries, 424 surveys, 10 HDSS

- World Fertility Surveys (WFS)
- Standard Demographic and Health Surveys (DHS)
- Aids Indicators Surveys (AIS), Malaria Indicators Surveys (MIS), Interim DHS surveys, Special DHS surveys
- Multiple Indicators Cluster Surveys (MICS)
- Reproductive Health Surveys (RHS)
- PAPFAM and PAPCHILD
- Selected HDSS data (Senegal, Burkina Faso, Ethiopia, Malawi, Bangladesh) ς more will be included

Surveys by program

	297	261	Not needed
	30	27	Not needed
	11	5	Variable names
	27	12	Variable names, file structure
	43	35	Variable names, file structure, all-women factors
	49	37	Variable names, file structure
	32	23	Variable names, all-women factors
	41	24	Variable names, file structure, date imputations

Methods

Data harmonization, computation of all-women factors if necessary, imputation of dates if necessary

Computation of births and exposure by age and year (or period), fertility rates, and standard errors

Under-15 fertility : DHS « Lexis approach » (Pullum et al. 2018)

> ¦ ăŜ ₹ŦÓ·ŏűŽℕă *f* that will inflate the observed exposure *e* according to the geometry of the [ŜĖλăέ ó(Pullum et al., 2018, p.10)

Several *Stata* commands developed

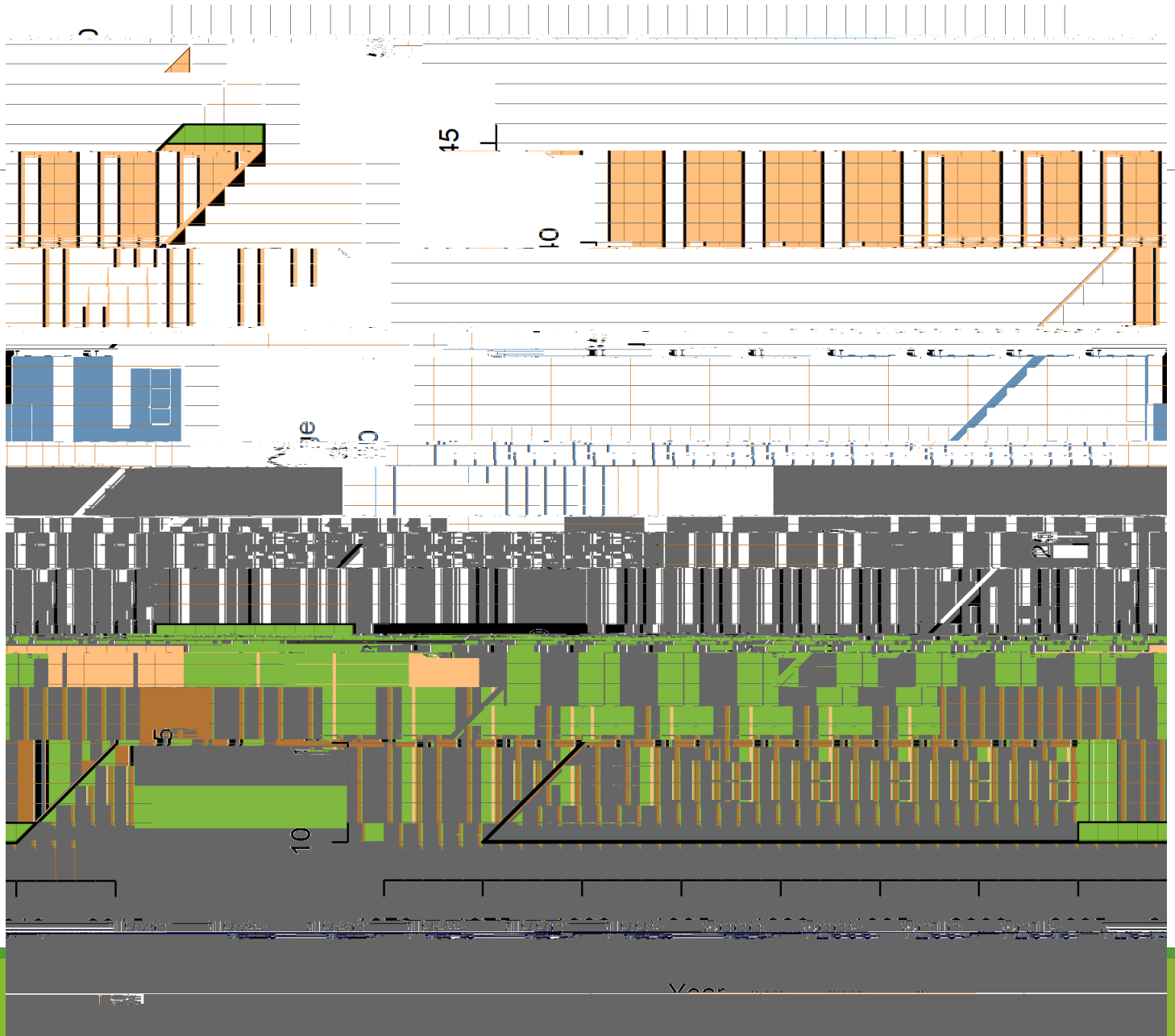
- adof11 : computation of under-15 fertility from birth histories
- singa11: computation of single year ASFR from birth histories
- tfr2 and itfr : computation of ASFR and TFRs from surveys and HDSS

Two-stage sample design taken into account

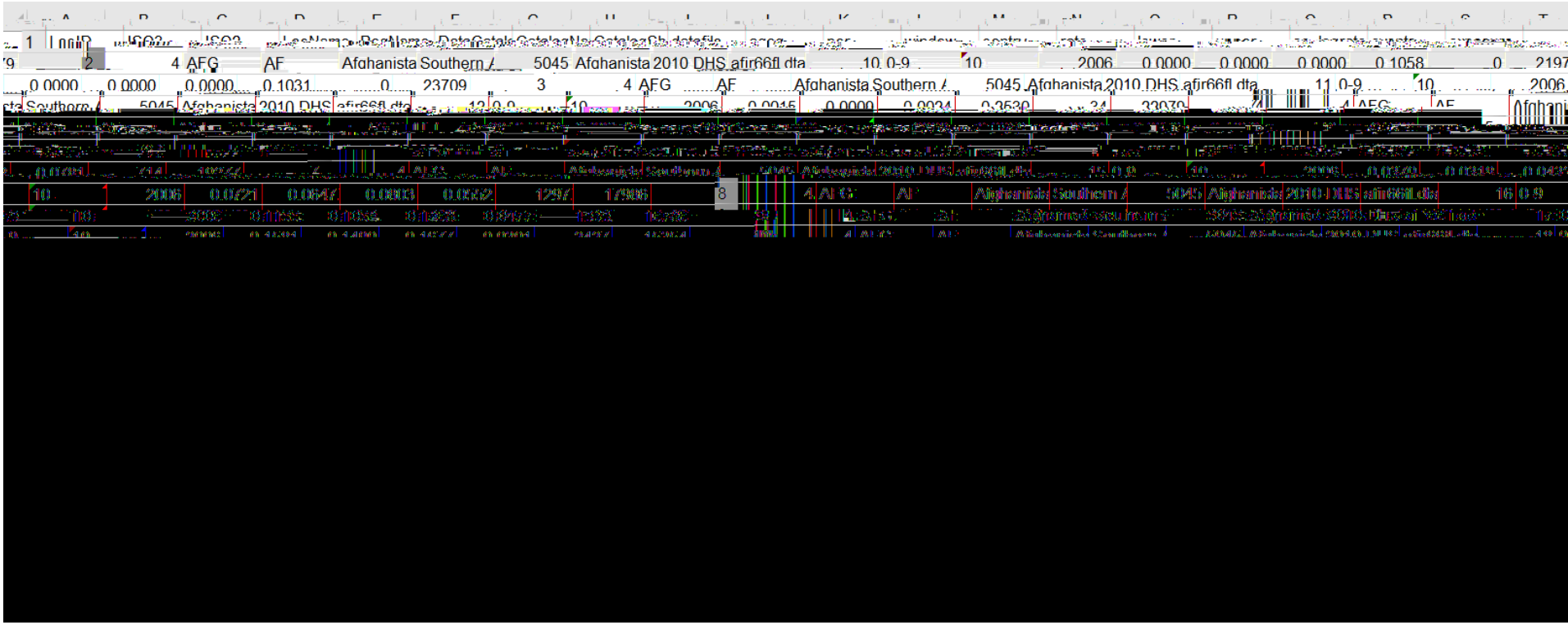
Single year ASFRs

FROM SURVEY DATA

Single year ASFRs ς 10 years preceding the survey



Database


4 AFG AF Afghanista Southern A 5045 Afghanista 2010 DHS afir66fl.dta
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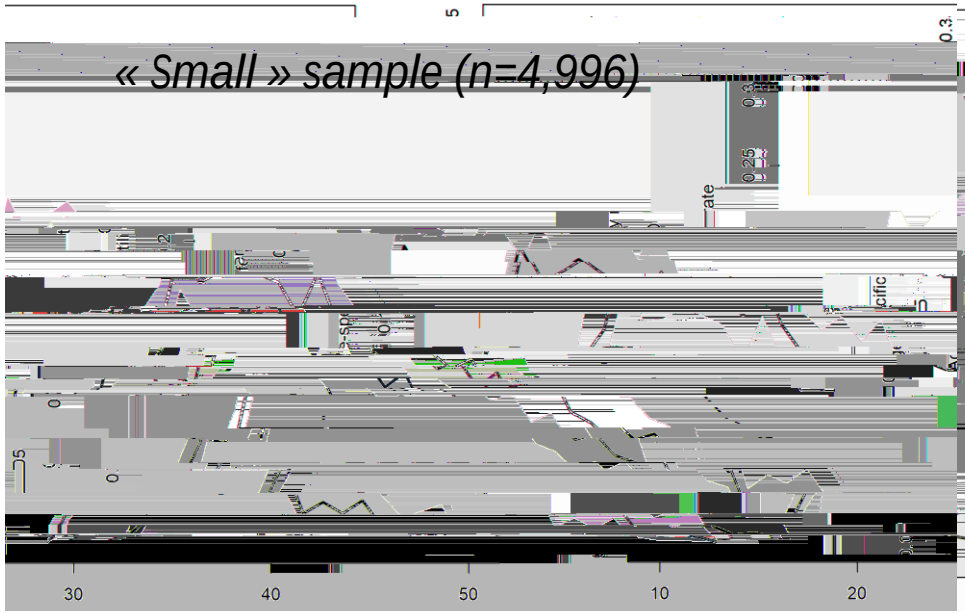
Sampling errors

95% CONFIDENCE INTERVALS

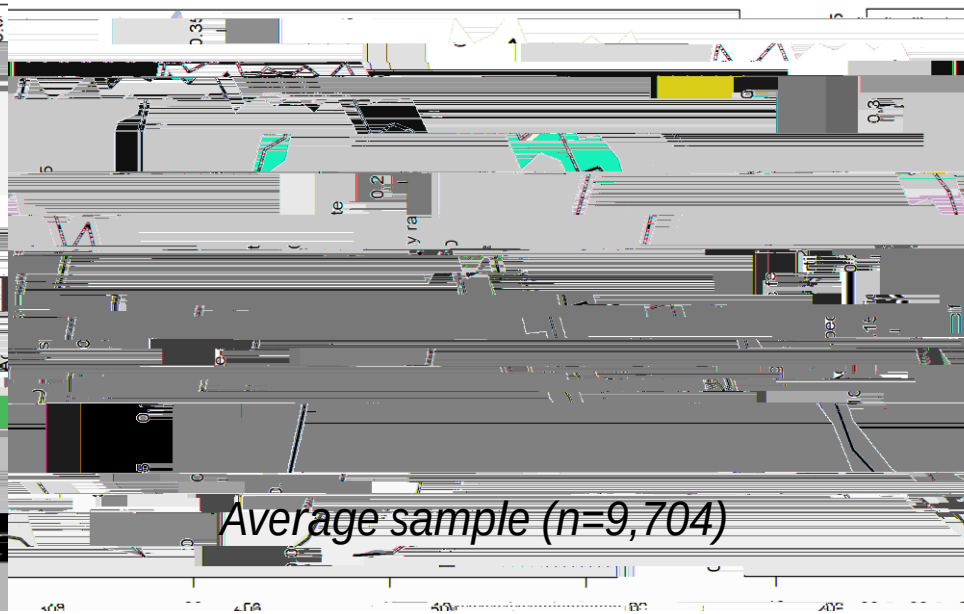
10-YEAR ESTIMATES

Guyana 2005

« Small » sample (n=4,996)

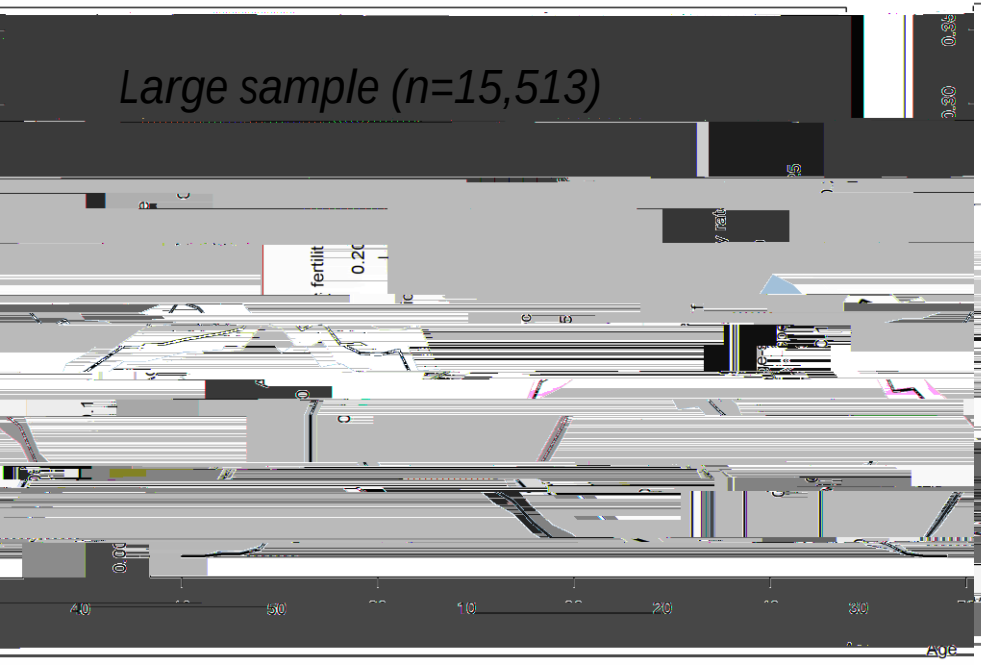


Average sample (n=9,704)

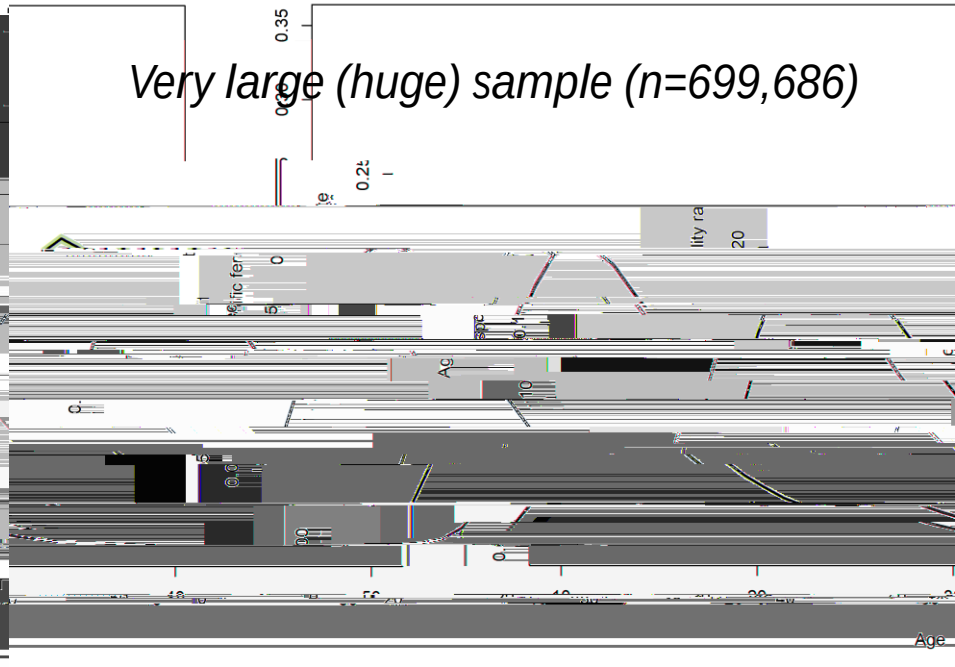


India 2015-2016

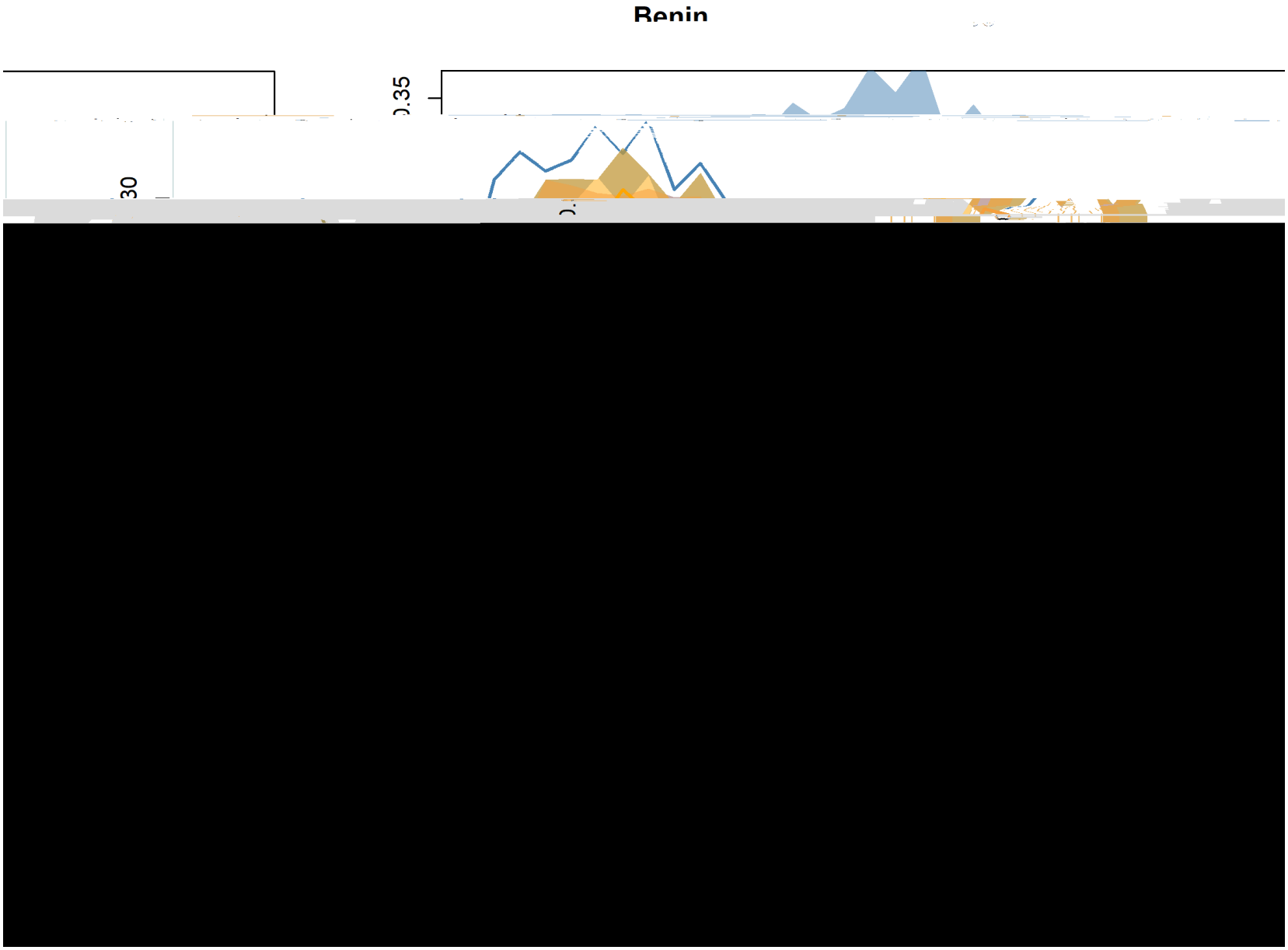
Large sample (n=15,513)

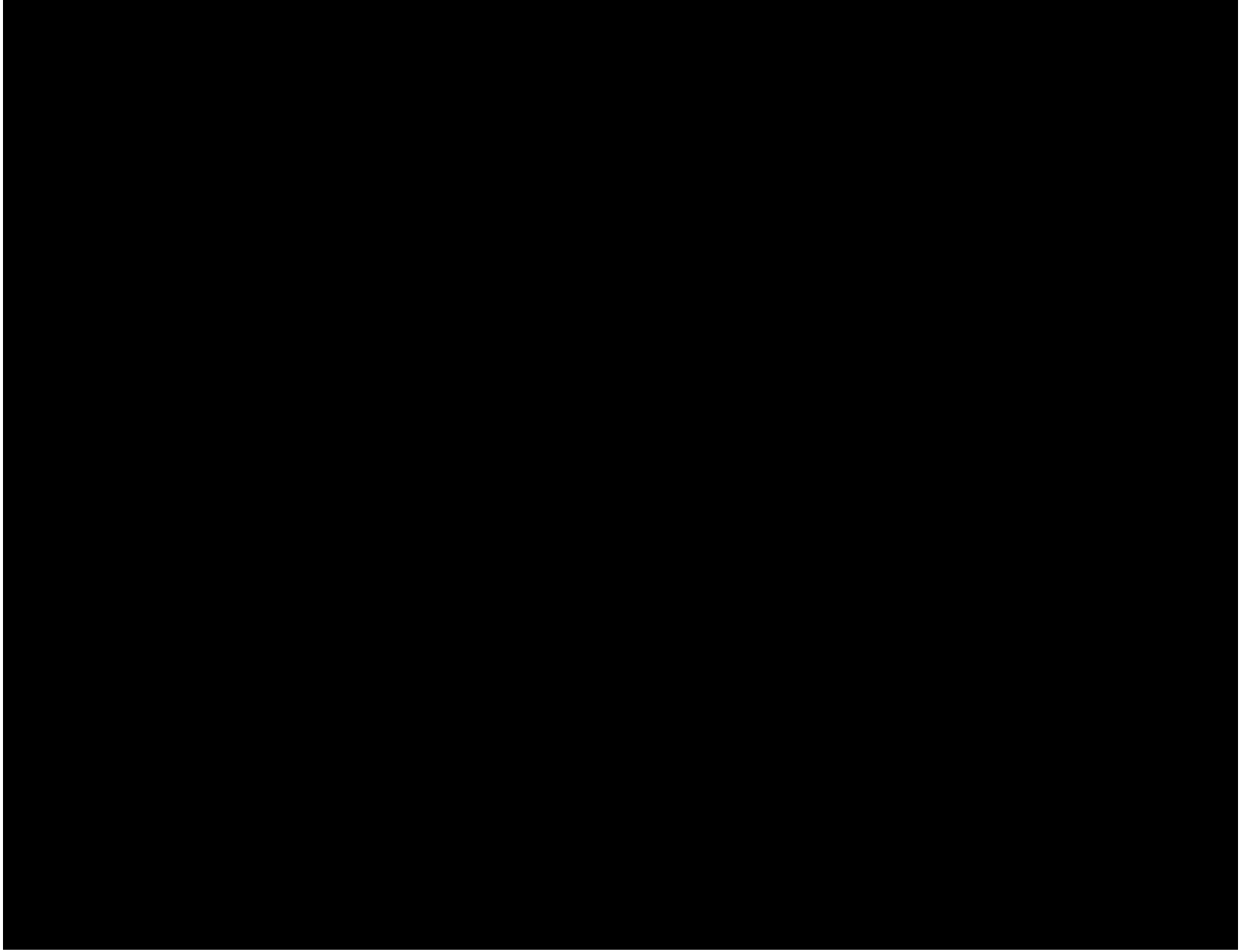


Very large (huge) sample (n=699,686)



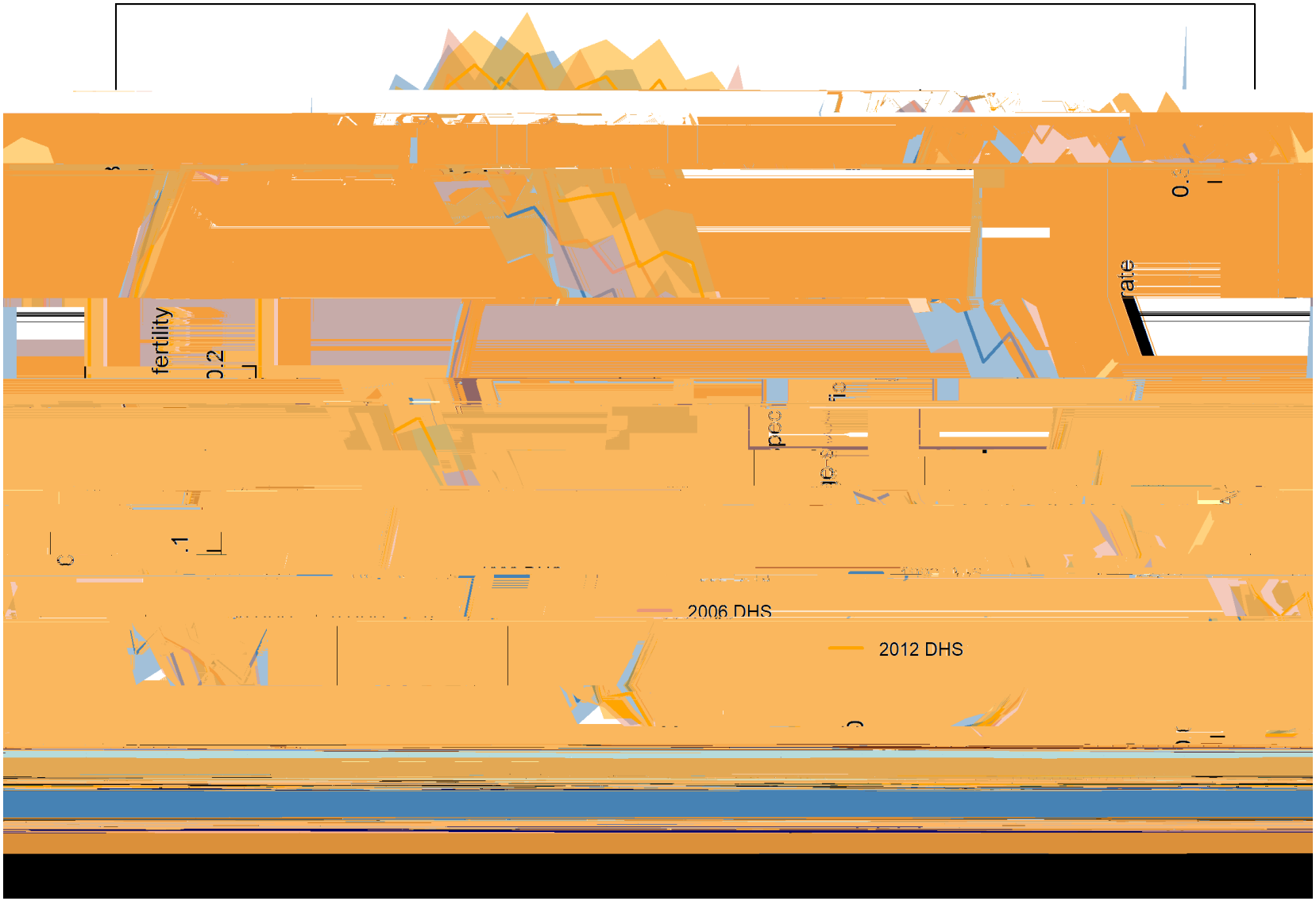
Consistency of age patterns within countries

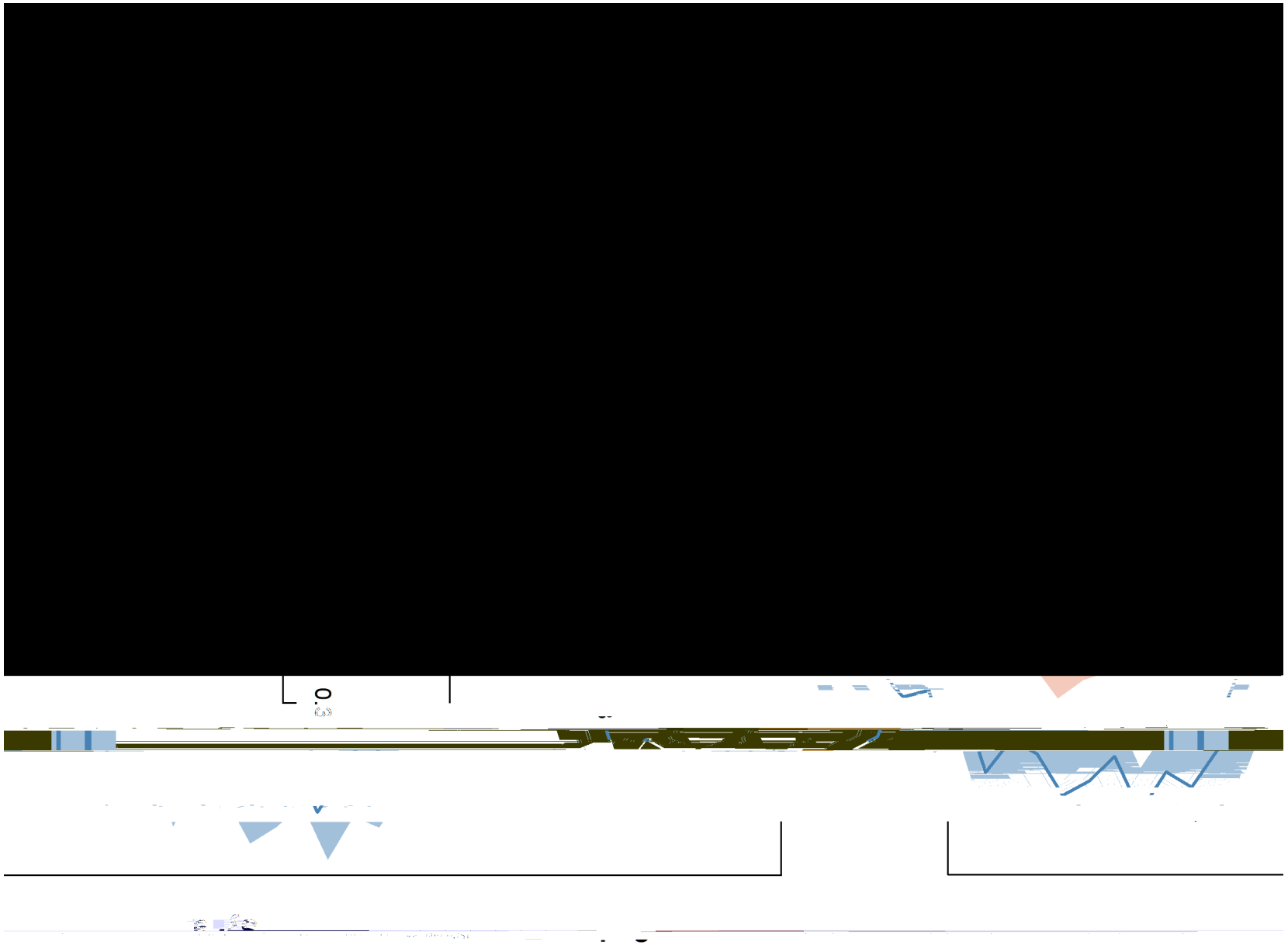

Benin
0.35
30



Iraq
0.35
0.30
0.20
2011 MICS
0.000
10
20
30
40
50
Age

Niger



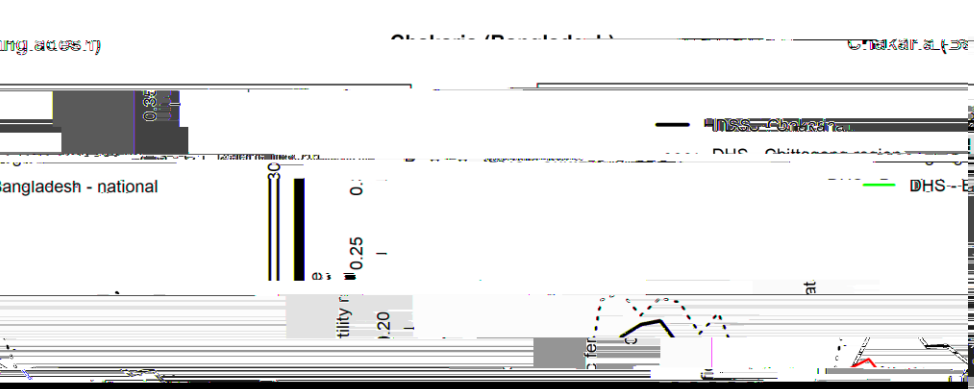


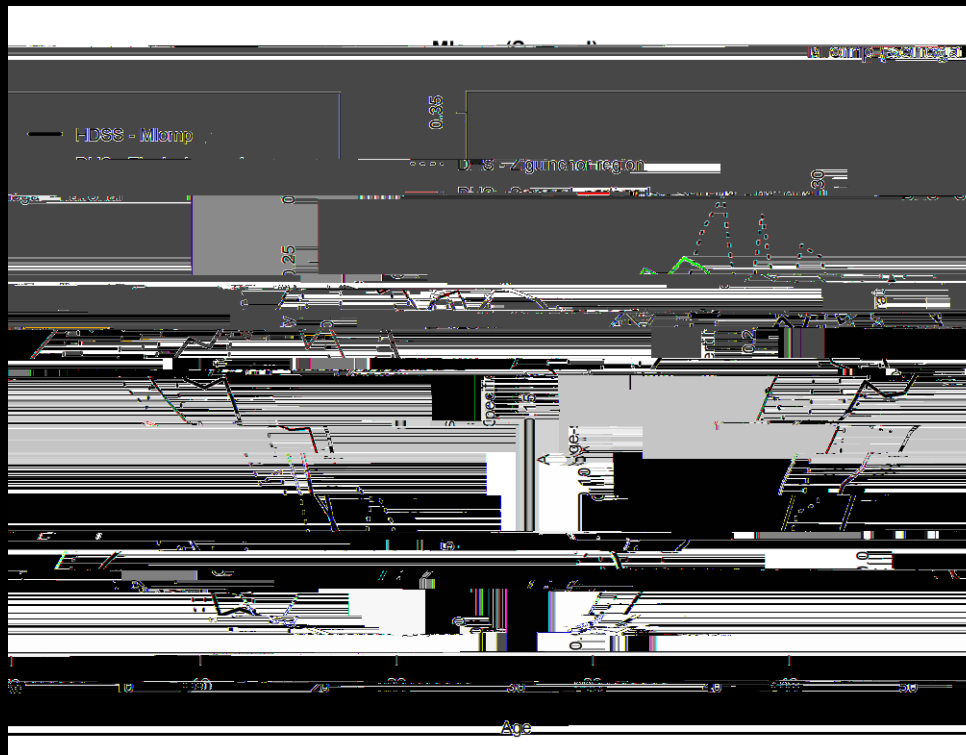
Single year ASFRs

FROM SELECTED HDSS

Comparisons HDSS ς DHS

IN SELECTED HDSS, DHS REGION AND DHS COUNTRY


Bangladesh - national
0.35
0.25
0.20

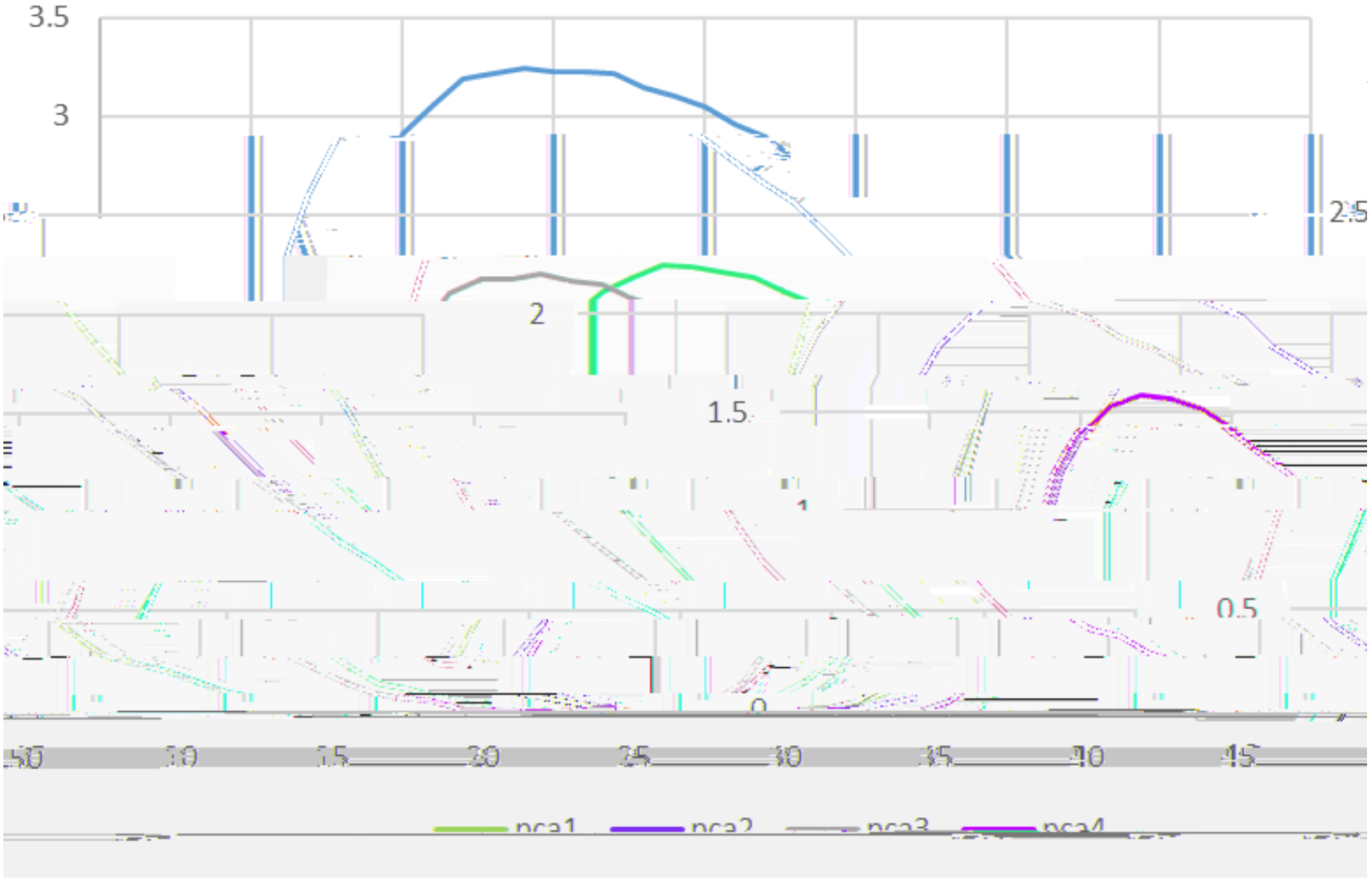

HDSS - Mlomp
0.35
0.25
Age

Modelling and smoothing

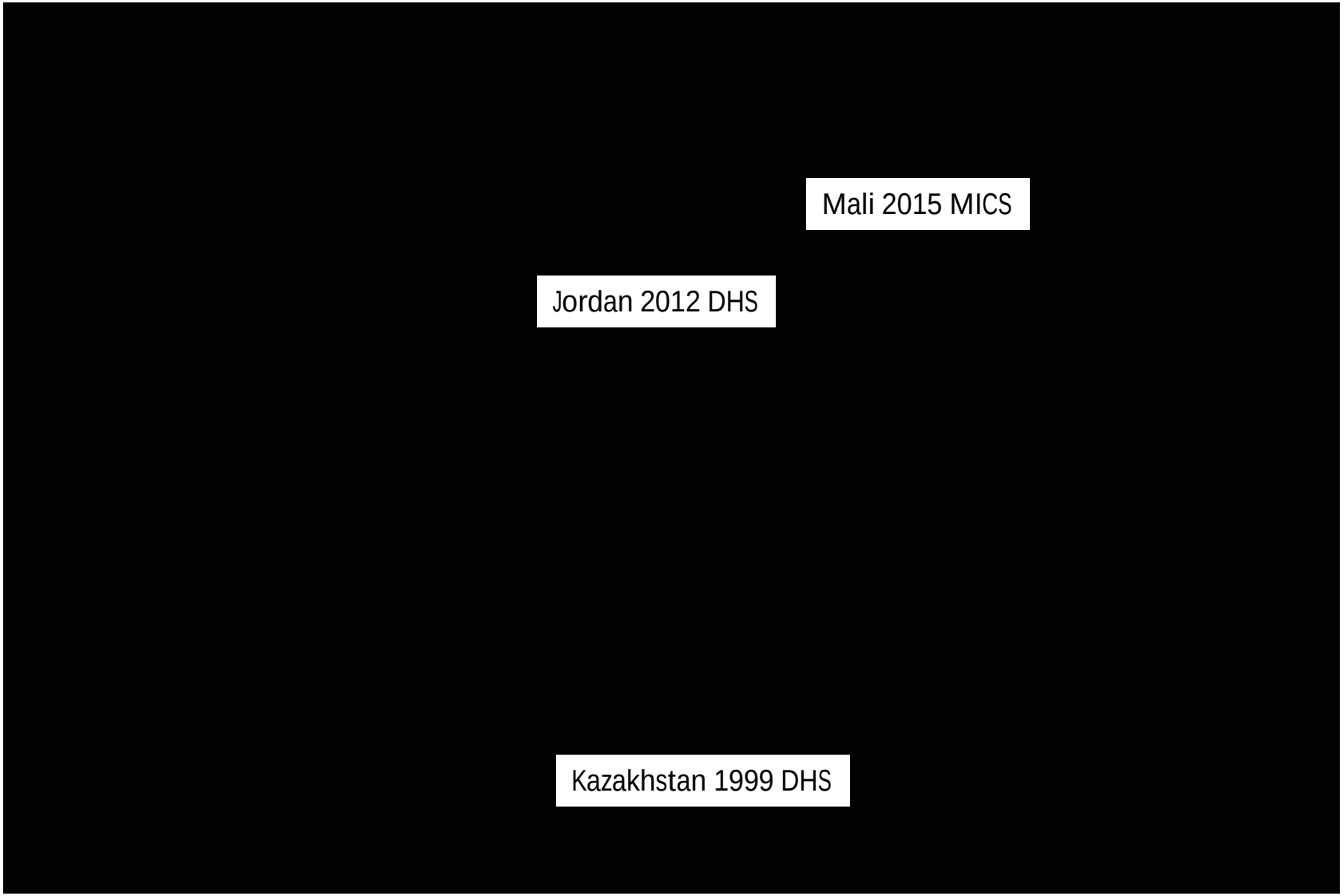
Principal component analysis of fertility rates

- Work very much in progress ς inspired by Pantazis and Clark (2018)
- Around 400 series of single year age fertility rates
- 4 components represent 99% of the variance
- For each survey, weights for each of the 4 components
- Smoothed rates obtained as the linear combination of the 4 components and survey-specific weights

4 components (rotated)



Observed and PCA smoothed



Key results

- A lot of trustworthy information on single year ASFRS in developing countries
- Age patterns are highly

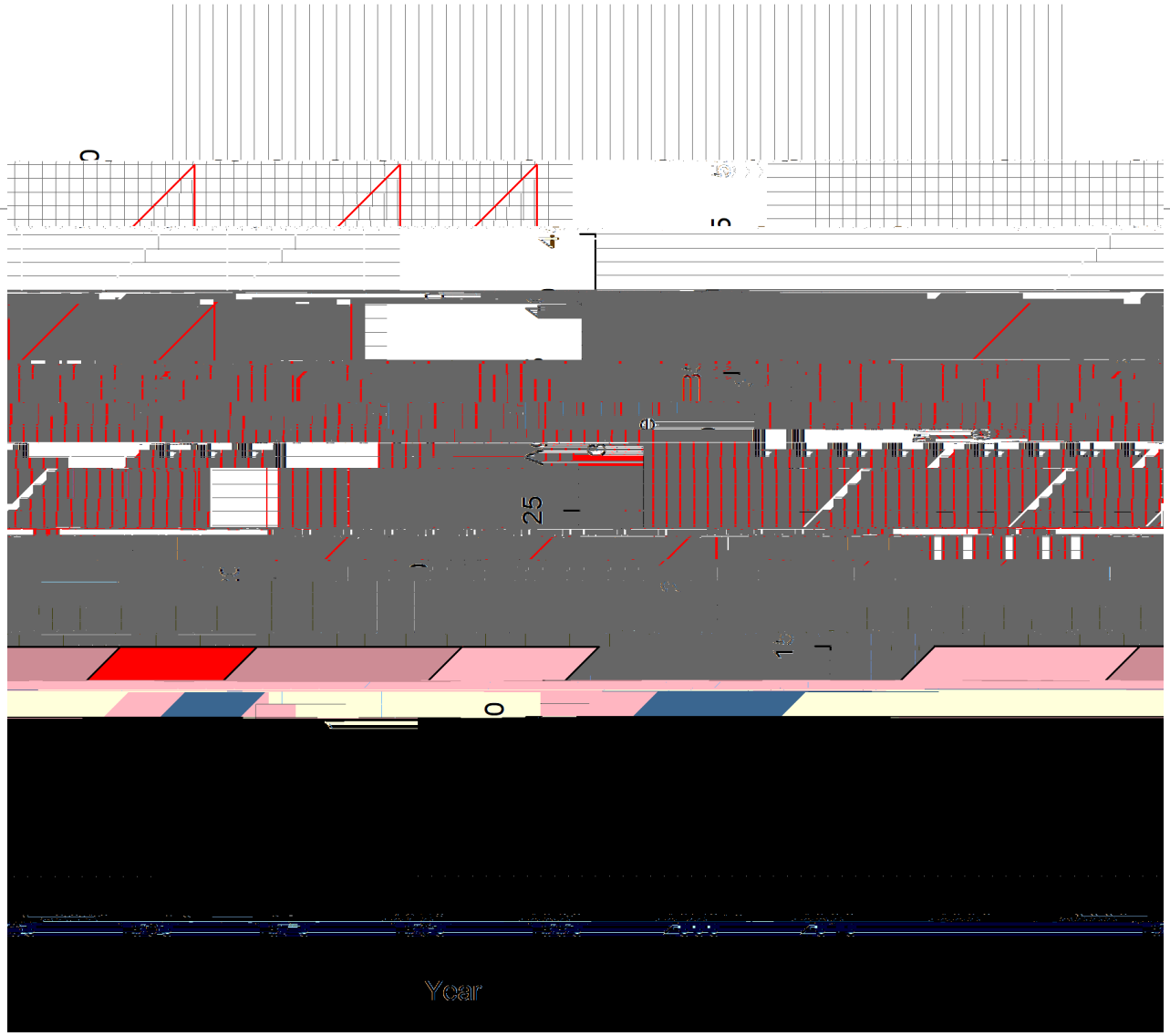
Trends in under-15 fertility

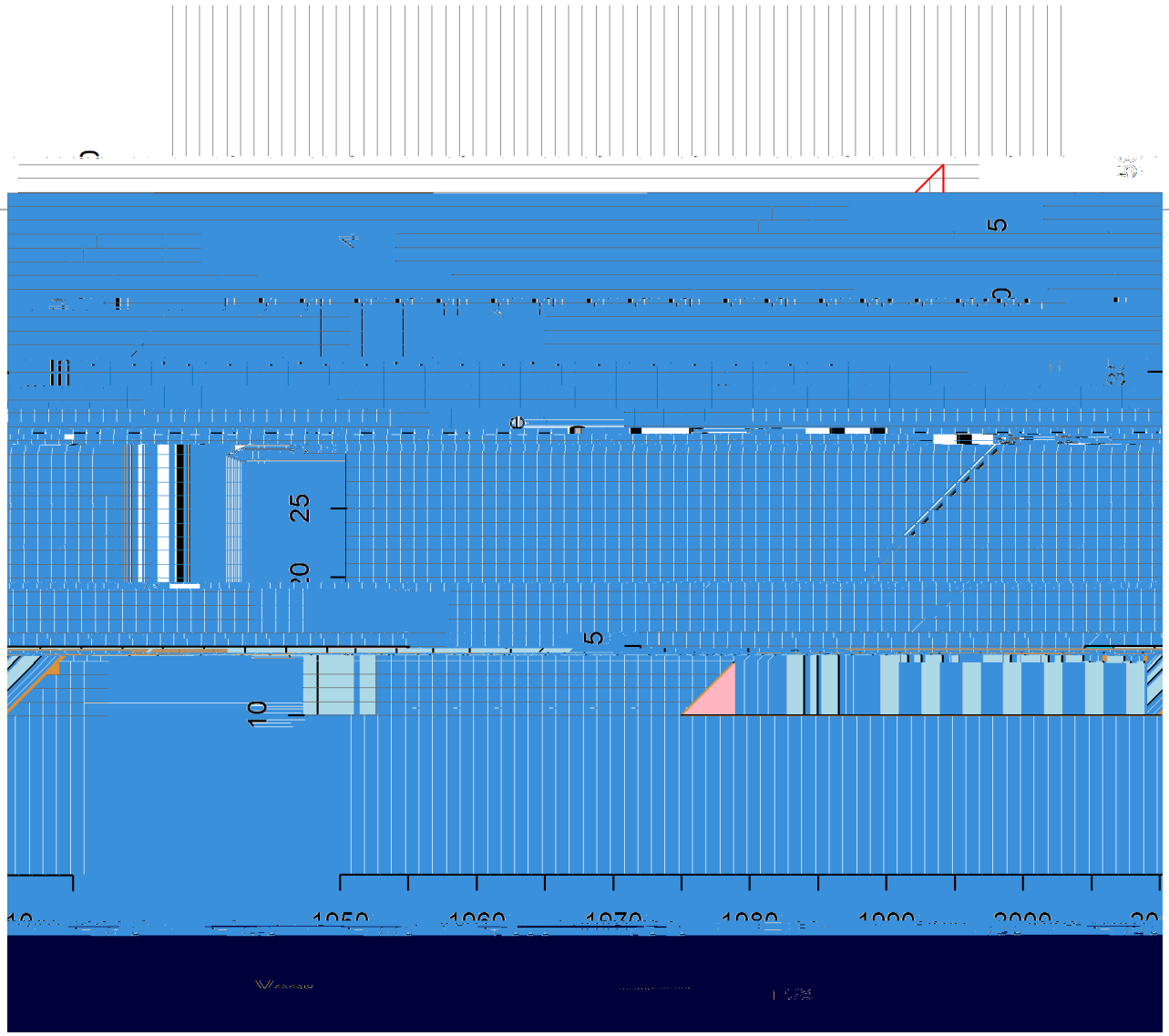
FROM SURVEYS

Available estimates of 10-14 fertility rates - developing countries

- Demographic and Health Surveys (DHS) Reports and StatCompiler
  - Estimates for the 3 years preceding the survey
    - Recent addition to StatCompiler : recent estimates from all the DHS
- United Nations Demographic Yearbooks, Human fertility database (HFD) and Human fertility collection (HFC)
  - Rates often not available (only numbers of births) and age-groups not well defined
  - Limited data in developing countries
- Global Burden of Disease (GBD) (2018)
  - ά¢Ƨ ƨdzŊ ⌊ƴƨǿfŜŘƎŜΣ ƨdzŊ I·ƴ⅂·fѐăλă LJŊƨǾλŘŜă ΰKŜ *first annual time series of fertility rates* in these age groups. [10-14 and 15-мфϐέ
    - Largely relies on modelling

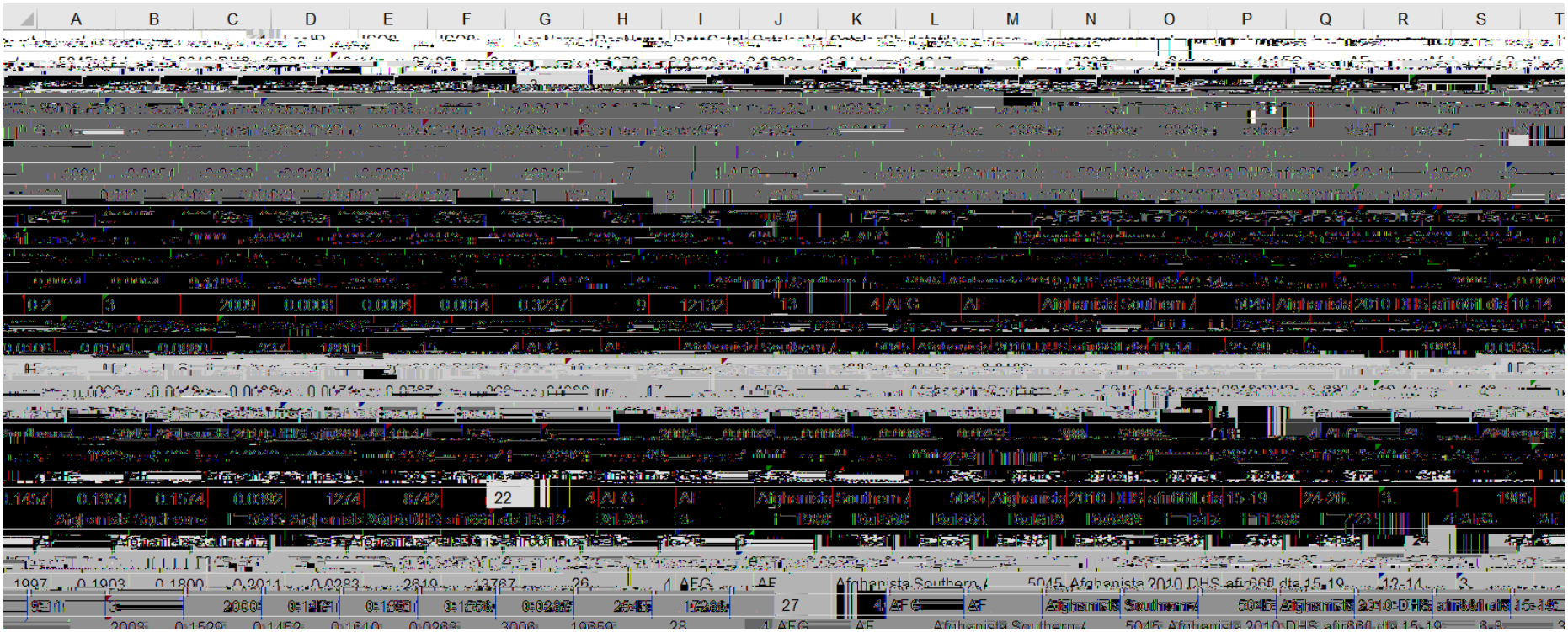
40
35
25
20
10

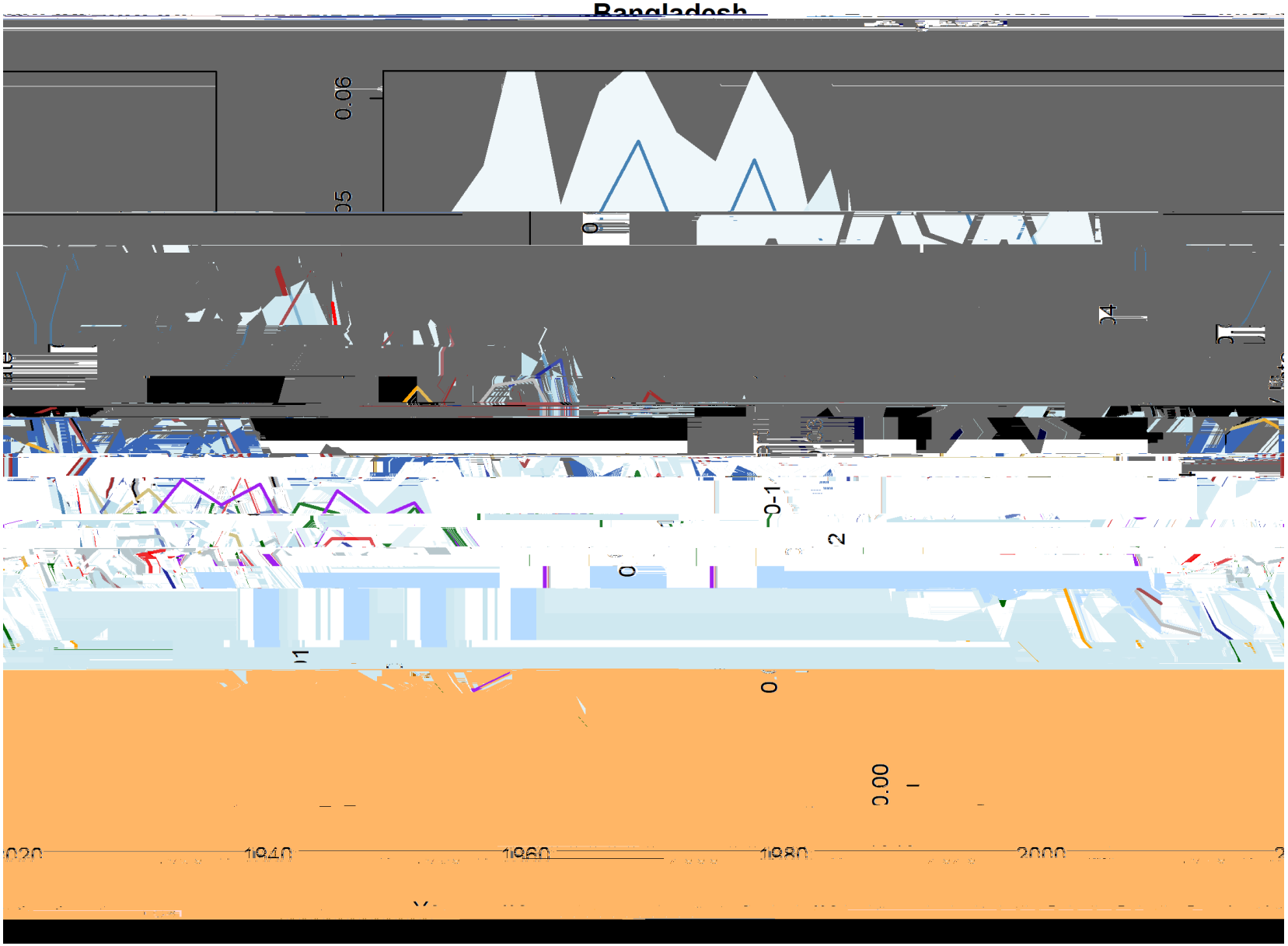

Year

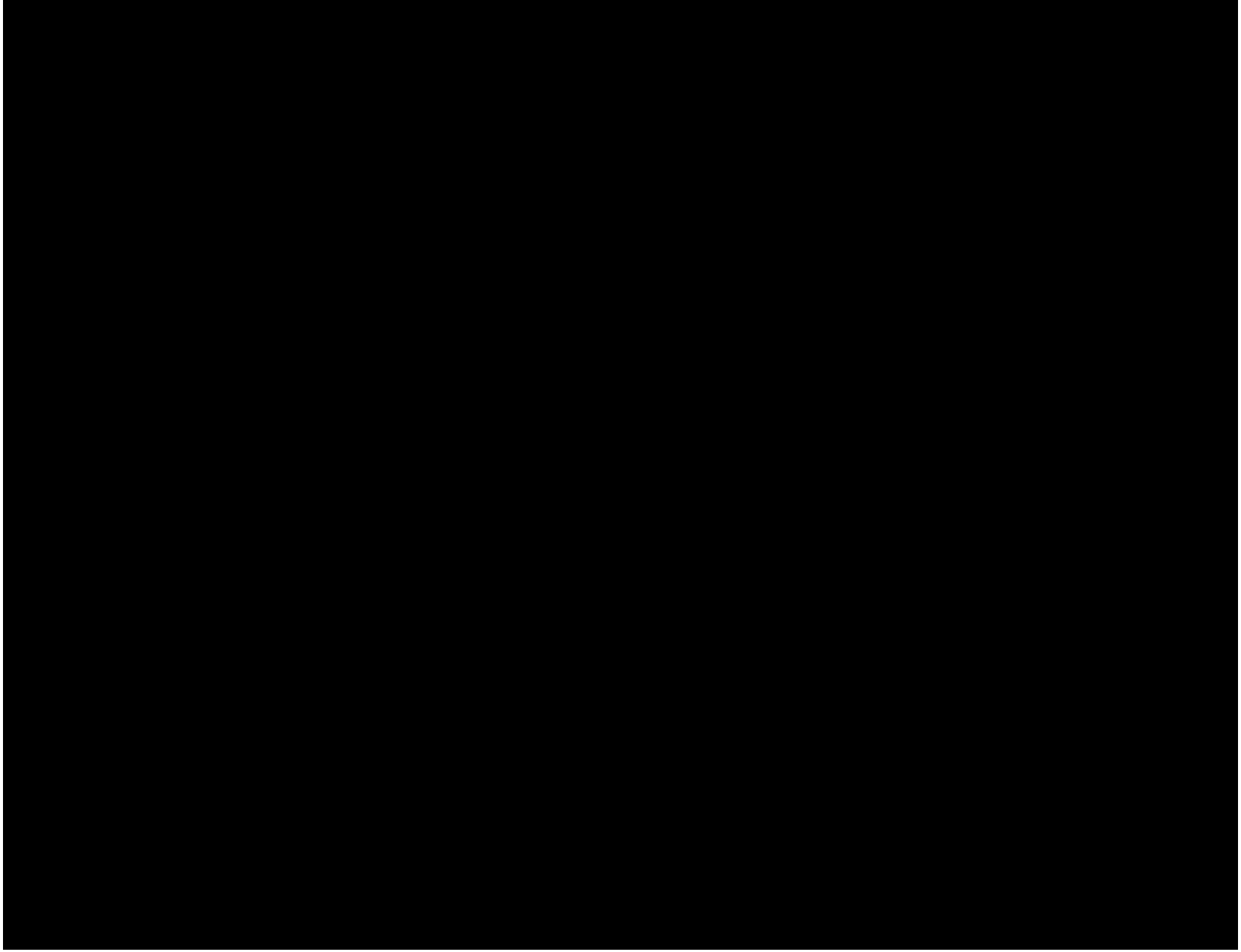

5
25
30
5
10

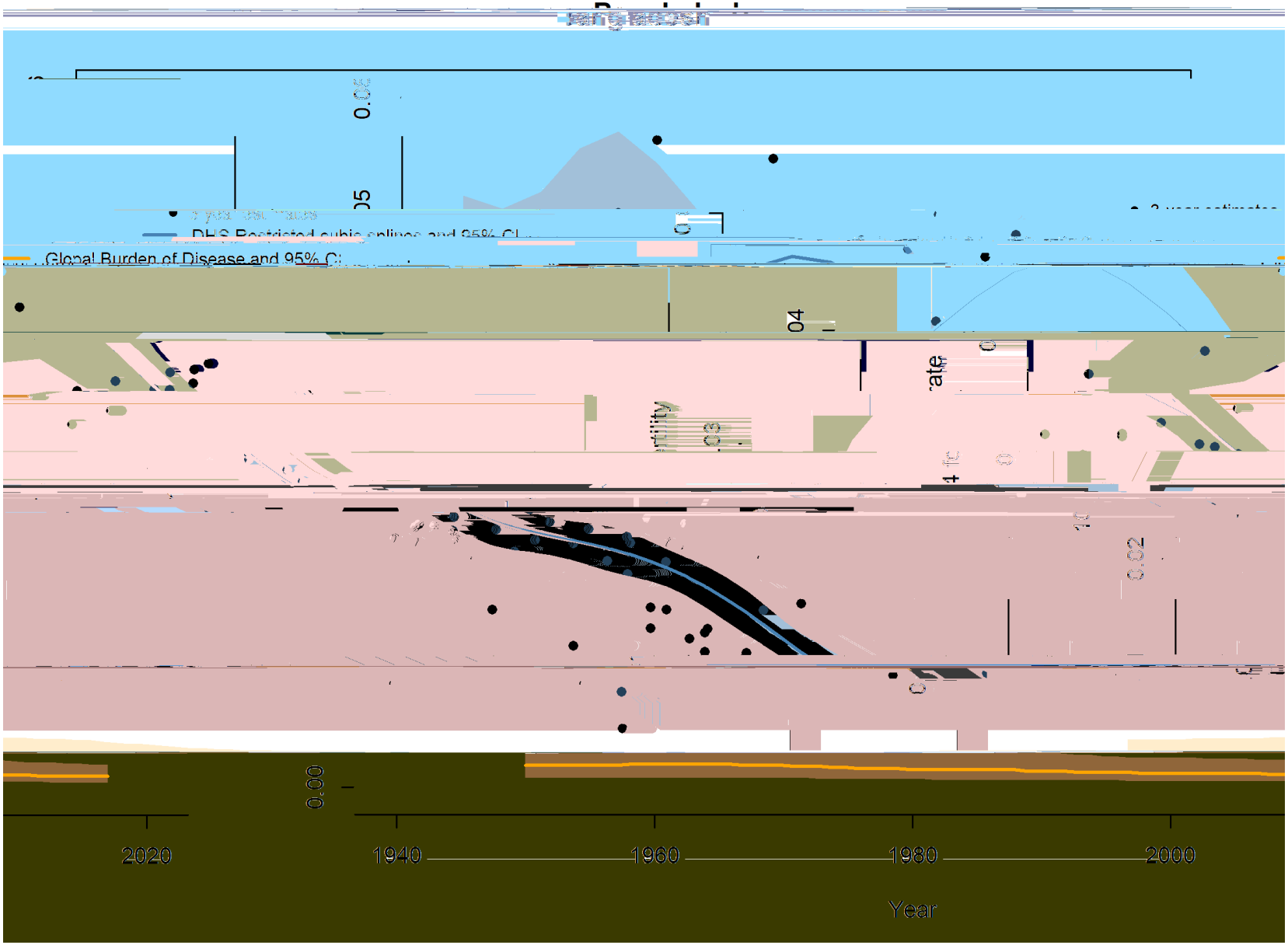
Main

Database

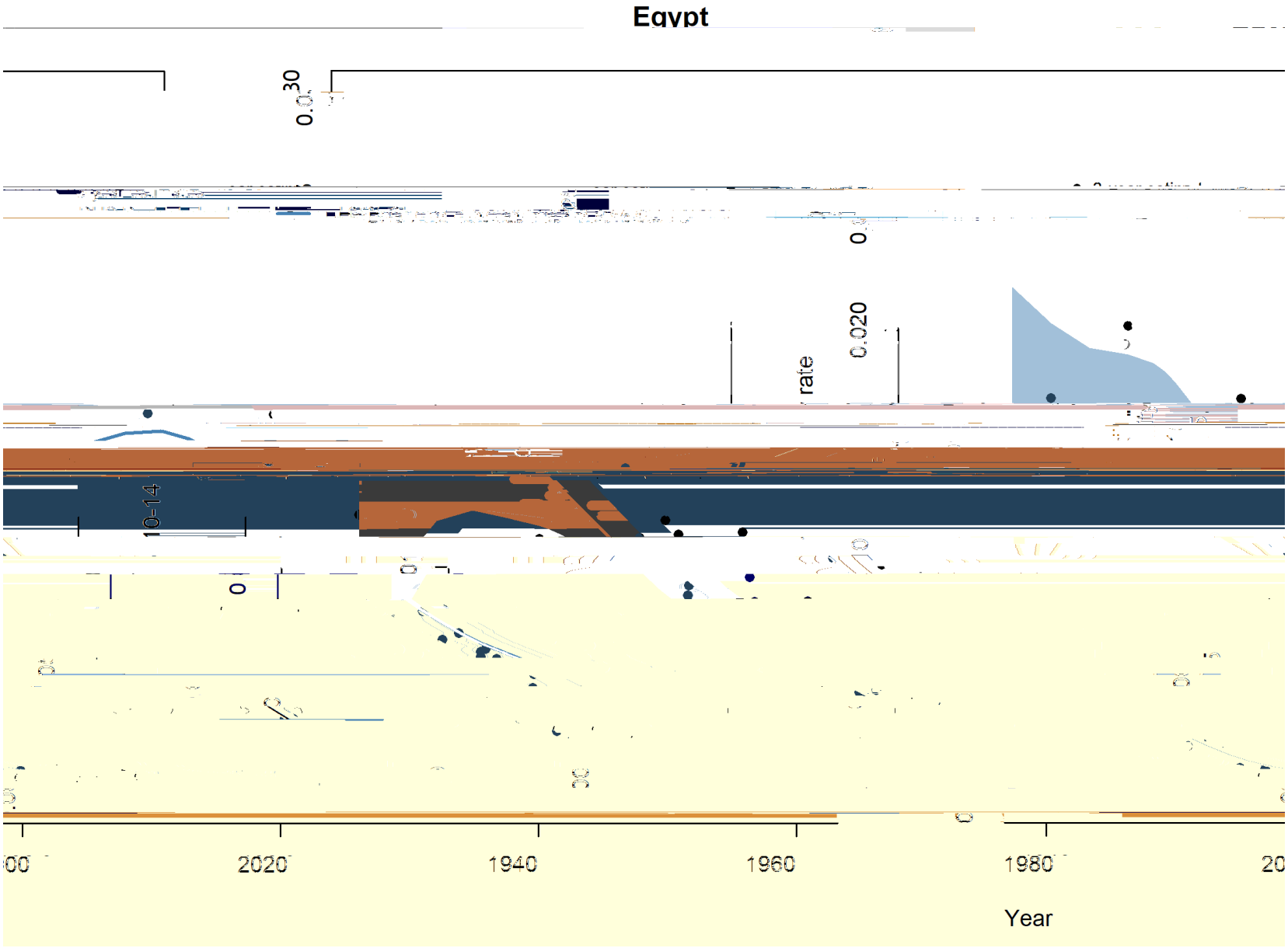



Bangladesh

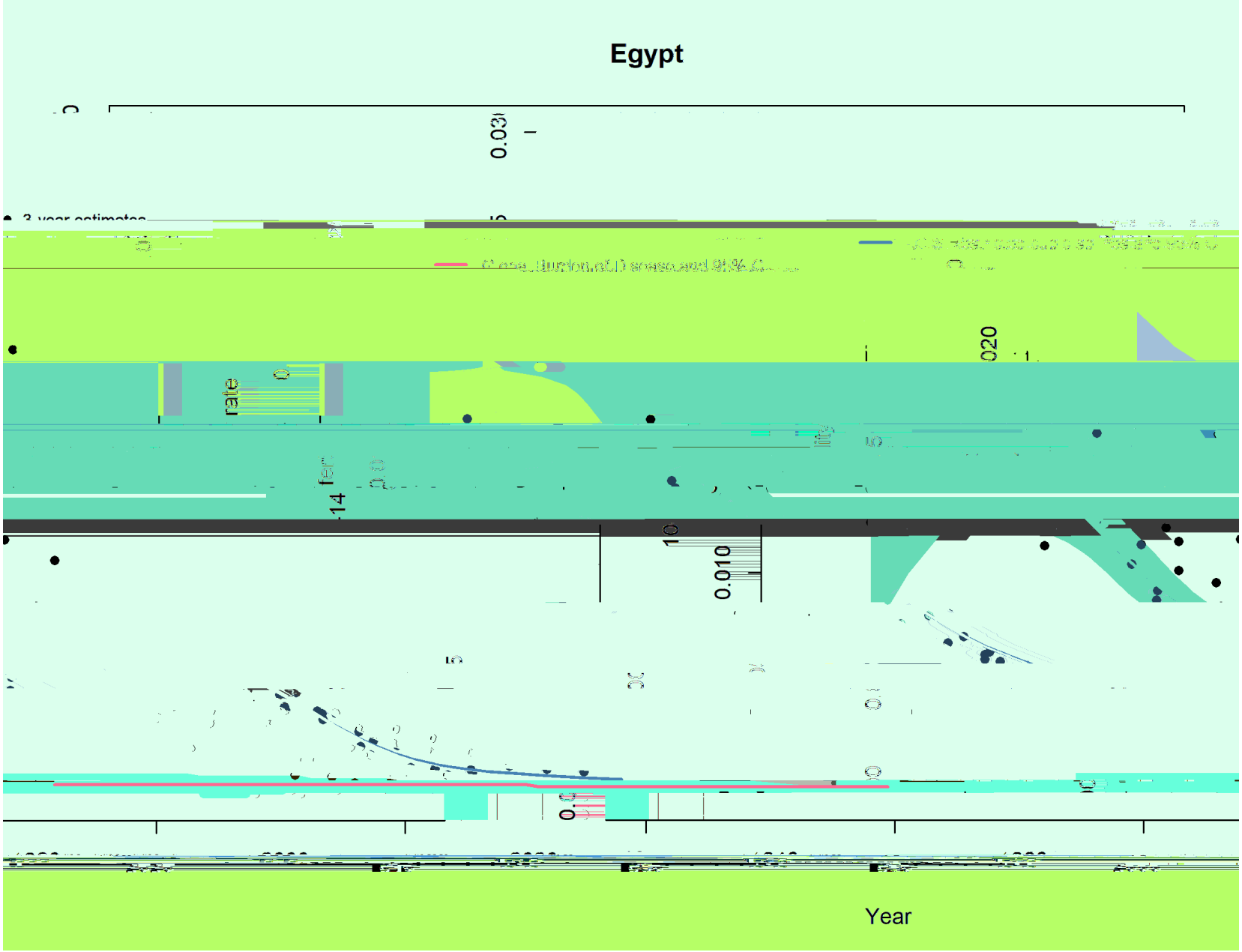


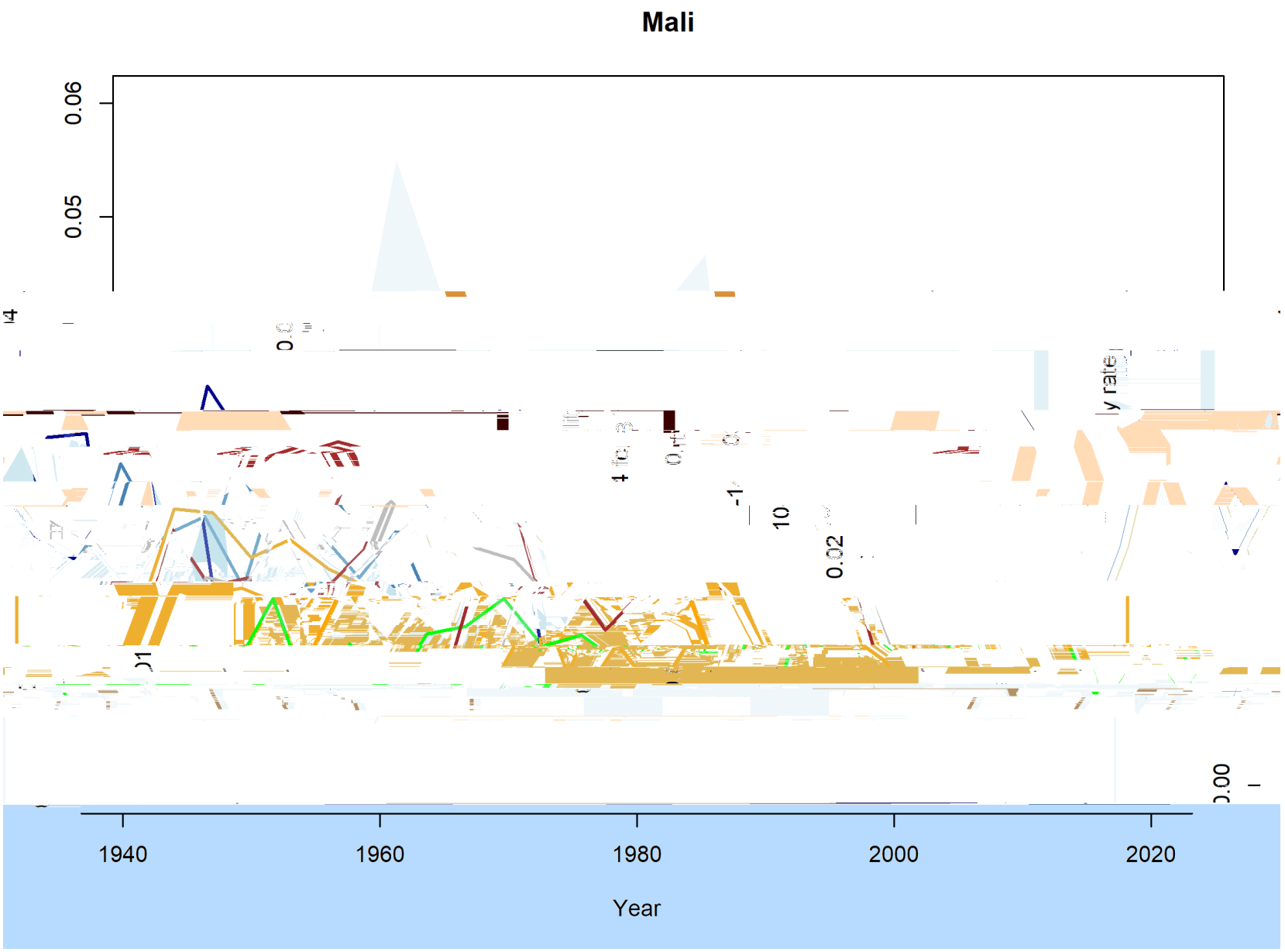

0.03
0.02
0.00
2020
1940
1960
1980
2000
Year

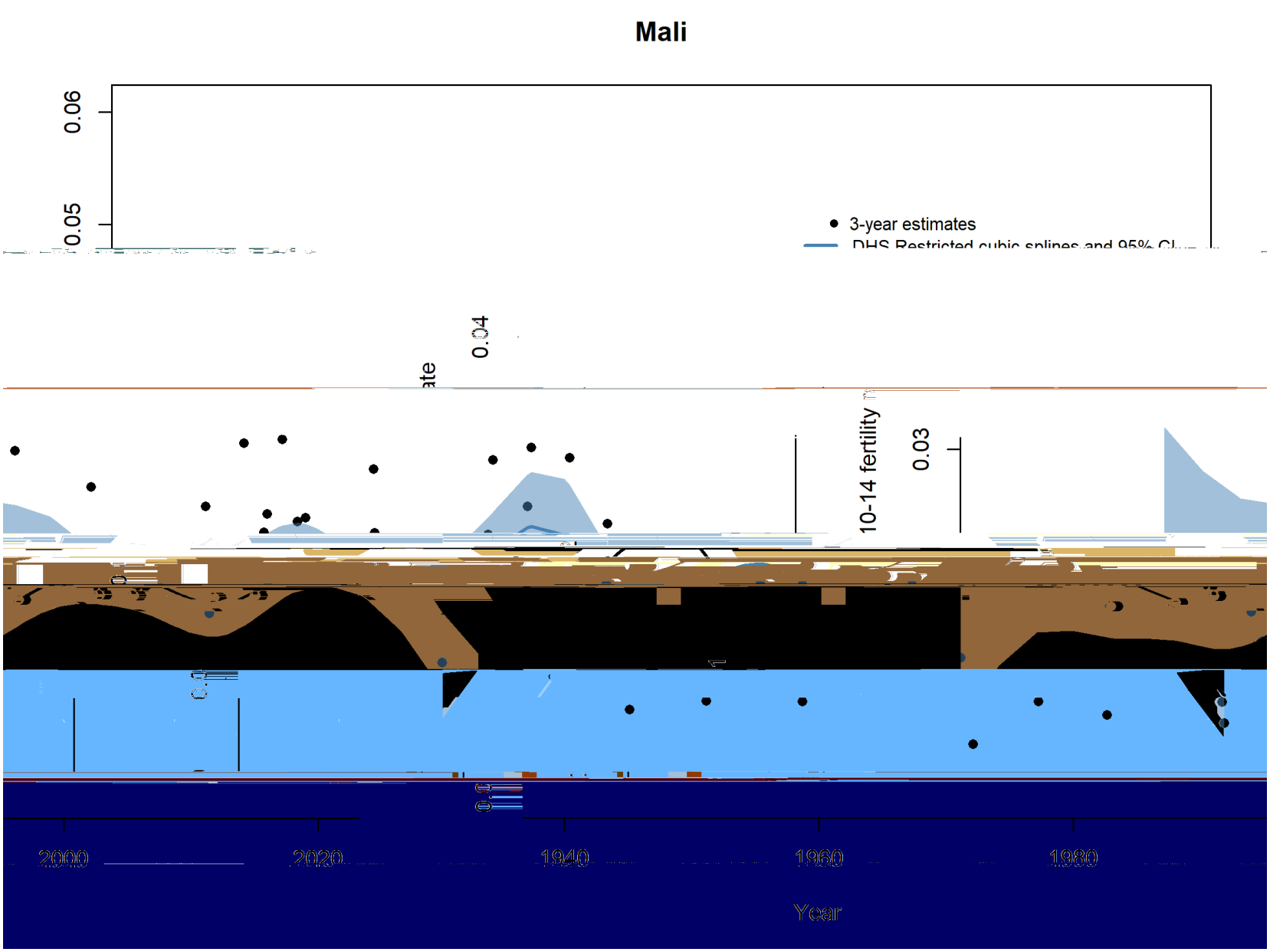
10 surveys in Egypt, covering close to 70 years.



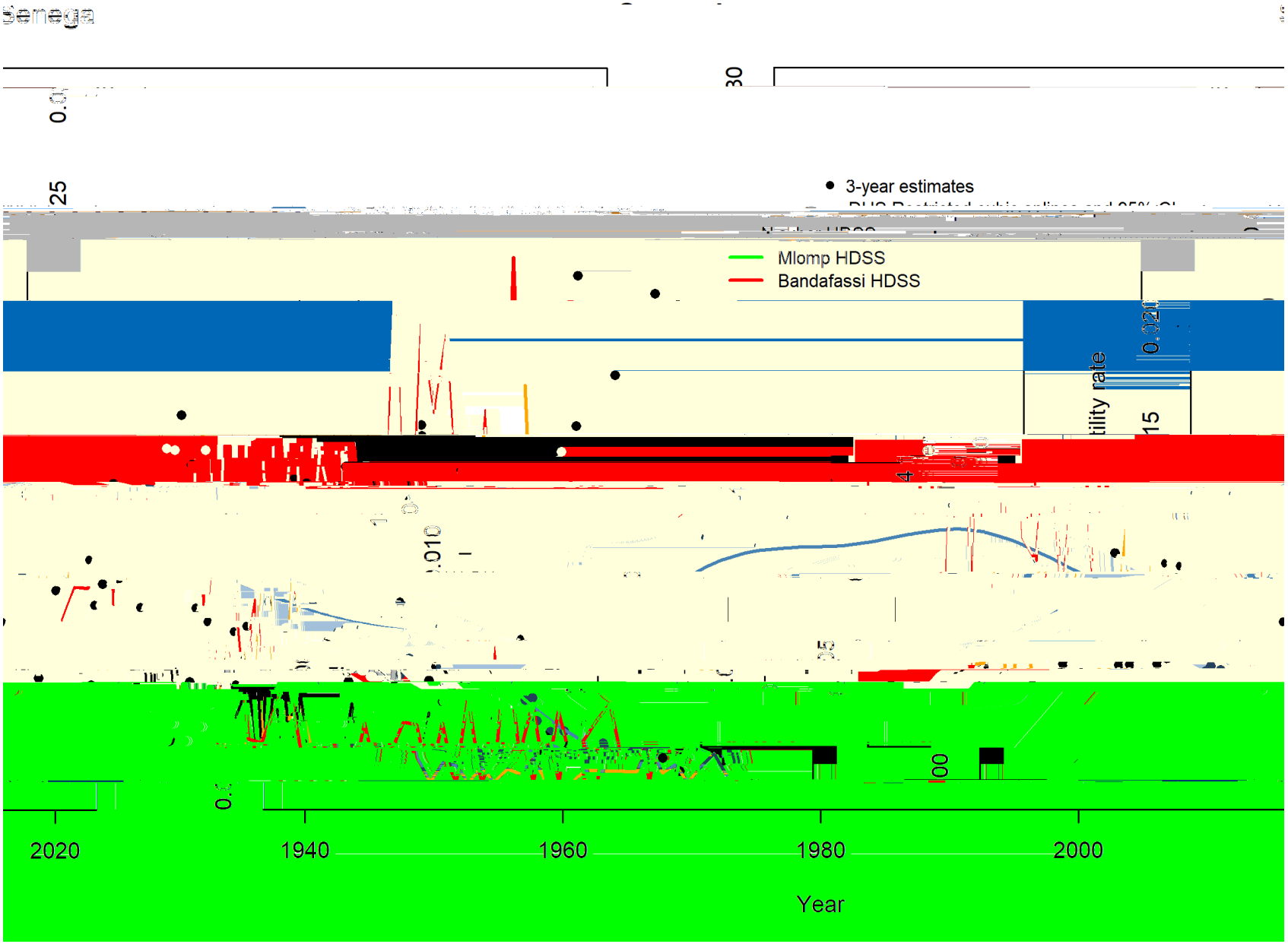
Pooled surveys (events and exposure). Negative binomial regression with restricted cubic splines (knots spaced by 10 years)


Egypt
0.030
0.020
0.010
Year


Mali
0.06
0.05
0.02
1940
1960
1980
2000
2020
Year


Mali
0.06
0.05
3-year estimates
0.04
10-14 fertility
0.03
2000
2020
1940
1960
1980
Year

Mali


Senega
3-year estimates
Mlomp HDSS
Bandafassi HDSS
2020
1940
1960
1980
2000
Year

Key results

- Possible to estimate long-term trends in under-15 fertility
  - Data on young adolescents fertility widely available and largely untapped
  - Fairly consistent estimates across surveys
  - Reasonable confidence intervals
  - Seems consistent with HDSS, but more comparisons needed
- Compared to existing estimates
  - Longer trends than published DHS
  - Much larger set of countries than in Human Fertility Collection
  - Much more realistic estimates than GBD estimates
- Very limited impact on TFR (usually << 1%)

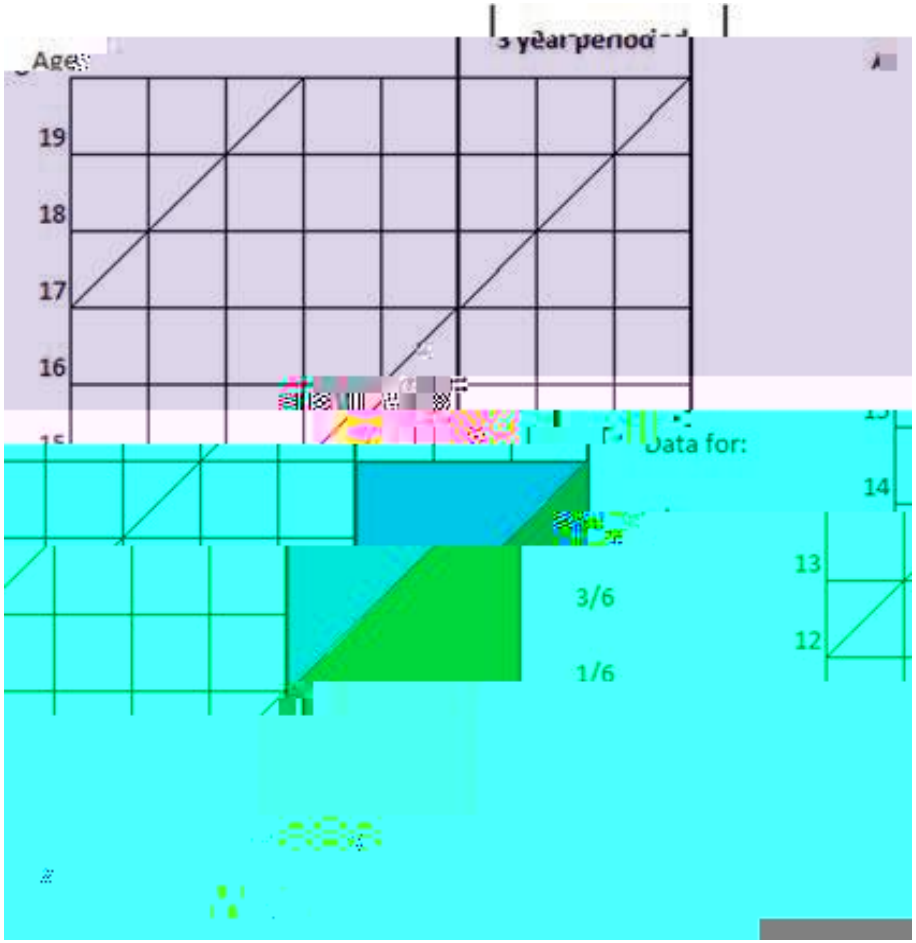
Thank you

Appendix

Recent estimates : truncated data

Source : Pullum, Thomas W., Trevor Croft, and Kerry L. D. MacQuarrie. 2018. Methods

The Lexis Approach



$$12 = \frac{\frac{6}{1}}{\quad} \; 12$$

$$13 = \frac{\frac{6}{3}}{\quad} \; 13$$

$$14 = \frac{\frac{6}{5}}{\quad} \; 14$$