

Multivariate Analysis of Parity
Progression-Based Measures
of the Total Fertility Rate and Its
Components Using Individual-
level Data

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Aims

- New methodology for multivariate analysis of TFR and each of its components
- New methodology for multivariate analysis of the *trend* in TFR and each of its components
- Apply the methodology to three DHS surveys in the Philippines, to illustrate the methods
- Future work
 - Apply to census or household survey data, using reconstructed birth histories

TFR_{ppr} and its components

- PPRs (parity progression ratios)
- TFR (based on PPRs)
- TMFR (based on PPRs)
- Mean and median ages at first marriage
- Mean and median closed birth intervals, by birth order

PPRs considered in this study

- p_B Woman's own birth to first marriage (B-M)
- p_M First marriage to first birth (M-1)
- p_1 First birth to second birth (1-2)
- p_2 Second birth to third birth (2-3)
- p_3 Third birth to fourth birth (3-4)
- p_4 Fourth to fifth birth (4-5)
- p_5 Fifth to sixth birth (5-6)
- p_{6+} Fourth or higher-order birth to next higher-order birth (4+ to 5+)

Logic of methodology

- Use a **discrete-time survival model** (multivariate) to model parity progression
 - **Complementary log-log model (CLL model)**
 - Separate data set and a separate model for each parity transition
- CLL model is equivalent to a **multivariate life table** for a particular parity transition
 - Life table time dimension is duration in parity
 - E.g., life tables of parity progression for urban and rural, holding education constant
 - PPR is calculated as proportion of women who have a next birth by the time they reach the end of the life table
- PPRs are aggregated to a TFR in same way as in China presentation
 - E.g., TFRs for urban and rural, holding education constant

Methodology is applicable to both period data and cohort data

- Only difference is in how the data set is constructed
- Period application is more innovative and shown here
- Philippines DHS surveys in 1993, 1998, and 2003
 - Periods are 5-year period before each survey
 - 1988-92, 1993-97, 1998-2002

Adjusted values of p_3 and mean and median closed birth interval by education, holding residence constant (period case)

		1988-92	1993-97	1998-03
	PPR	0.81	0.74	0.73
Low	Mean CBI	3.08	3.15	3.46
	Median CBI	2.61	2.62	2.81
	PPR	0.72	0.67	0.64
Medium	Mean CBI	3.27	3.01	3.47
	Median CBI	2.62	2.51	2.76
	PPR	0.65	0.56	0.54
High	Mean CBI	3.39	3.56	3.76
	Median CBI	2.72	2.79	2.86

Note: Separate CLL model for each of the three time periods.

Unadjusted and adjusted values of the period TFR by education

		1988-92	1993-97	1998-03
Low	Unadj.	4.64	4.00	3.89
	Adjusted	4.49	3.68	3.69
Medium	Unadj.	3.59	3.17	3.07
	Adjusted	3.59	3.13	3.04
High	Unadj.	2.42	2.55	2.28
	Adjusted	2.45	2.60	2.32

Urban-rural residence is held constant in the adjusted estimates.
Results based on a separate analysis for each survey

Trend analysis

- Merge three surveys (pooled data for the 5-year period before each survey)
- Create two dummy variables to represent three 5-year time periods
 - PERIOD2 and PERIOD3
 - Add these variables to the set of predictor variables
- Calculate the trend in TFR with and without controls for residence and education

Multivariate analysis of trend in TFR and TMFR (pooled data analysis)

	Period analysis		
Measure	1988-92	1993-97	1998-02
TFR			
Unadjusted	3.64	3.26	2.94
Adjusted	3.39	3.14	2.88
TMFR			
Unadjusted	4.21	3.69	3.17
Adjusted	4.03	3.60	3.13

Residence and education explain 27% of the unadjusted decline in the period TFR between the 1st and 3rd periods. and 28% of the unadjusted decline in the cohort TFR. In the case of TMFR, this percentage is 13%.

Extension to census and household survey data

- The methodology requires birth histories
- We can compute reconstructed birth histories from census and household survey data
 - **To do so, a question on children ever born must be asked, preferably of women up to age 65**

U. S. case

- CEB last asked in 1990 census
- Not yet asked in the American Community Survey (replaced census long form)
- Would be good to ask CEB every five years