META ANALYSIS FOR GROWTH VELOCITY AND DIARRHOEA

ARTHUR HUNG

UNIVERSITY OF TECHNOLOGY SYDNEY

ACEMS POSTDOC RETREAT MARCH 2017

ACKNOWLEDGEMENTS

This work was carried out in collaboration with

Louise Ryan (UTS)

Craig Anderson (UTS)

Funding was provided by

BILL & MELINDA GATES foundation

ACEMS

TALK OUTLINE

- Research Question
- Data
- Method
- Preliminary Meta-analysis Results
- Using SES data for Covariate – An Challenge (e.g. BngD Data)
- Using SES data For Covariate – A Factor Analysis (FA) Approach
- FA – Correlation Matrix
- FA – Scree Plot
- FA – Rotation and Loadings

TALK OUTLINE

- Summary
- Additional Analyses

RESEARCH QUESTION

Is Growth Velocity associated with Percentage of having Diarrhoea both in first year?

DATA

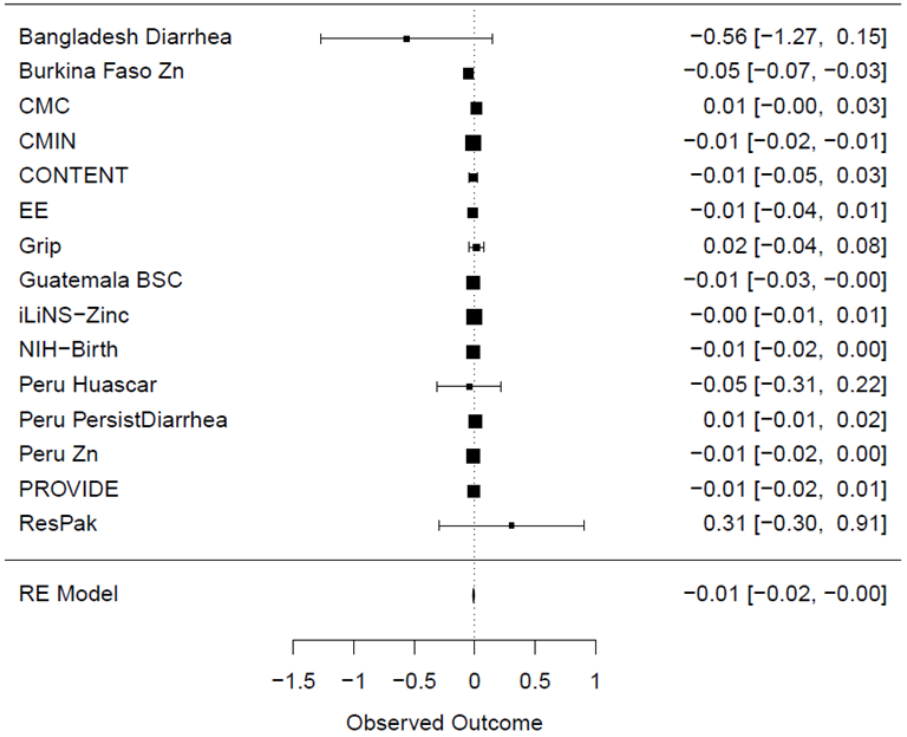
- We have included 15 datasets for our analysis
- Growth velocity in the first year
- Percentage of having diarrhoea in first year
- Demographic data

METHOD

Multiple Regression

Meta-Analysis

META ANALYSIS RESULT - FOREST PLOT



We showed that Growth velocity is significantly (p=0.01) associated with Percentage of having Diarrhoea.

USING SES DATA FOR COVARIATE – A CHALLENGE (E.G. BANGLADESH DIARRHEA DATA)

- We consider using SES variables as covariates
- We used Bangladesh Diarrhea dataset because it has many SES variables as shown below:
- Its SES variables are either continuous or categorical.
- We expect they are correlated

variable	label	Short Label
nperson	Number of persons in house	Person (n)
educcrgv	Highest education of caregiver	Caregiver Edu
inctot	Total family income	Income
lvstock	Livestock ownership	Livestock
educhh	Highest education head of household	Head Edu
homesz	Home size	Home Sze
homeval	Home value (local currency)	Home Val
occup	Occupation (primary)	Job 1
occup2	Secondary occupation	Job 2

USING SES DATA FOR COVARIATE – A FACTOR ANALYSIS (FA) APPROACH

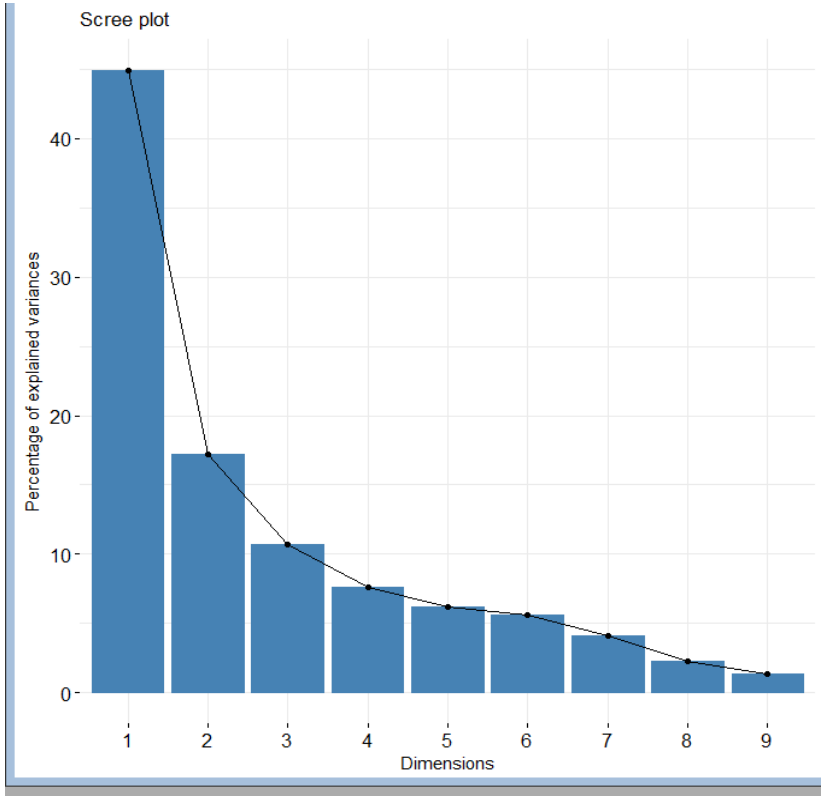
- We Covert Continuous variable to ordered factor
- We calculate polychoric correlation for a pair of variables that that both of them are ordinal variables. Otherwise, cramers V is calculated.
- We used the correlation matrix as an input to Factor Analysis

FA - CORRELATION MATRIX

SES Variables	Caregiver	Head Edu	Job 1	Job 2	Person (n)	Income	Livestock	Home Val	Home Sze
Caregiver Edu	1.000	0.709	0.217	0.398	0.097	0.218	0.036	0.466	0.484
Head Edu	0.709	1.000	0.317	0.338	0.075	0.170	0.205	0.478	0.476
Job 1	0.217	0.317	1.000	0.422	0.348	0.291	0.491	0.330	0.356
Job 2	0.398	0.338	0.422	1.000	0.269	0.306	0.324	0.300	0.316
Person (n)	0.097	0.075	0.348	0.269	1.000	0.463	0.490	0.294	0.381
Income	0.218	0.170	0.291	0.306	0.463	1.000	0.560	0.429	0.448
Livestock	0.036	0.205	0.491	0.324	0.490	0.560	1.000	0.520	0.511
Home Val	0.466	0.478	0.330	0.300	0.294	0.429	0.520	1.000	0.869
Home Sze	0.484	0.476	0.356	0.316	0.381	0.448	0.511	0.869	1.000

Note: values highlighted in Green denote >= 0.3

FA - SCREE PLOT



WE extract two components.

FA – ROTATION AND LOADINGS

SES Short Label	Comp 1	Comp 2
Caregiver Edu	0	0.897
Head Edu	0	0.871
Job 1	0.572	0.284
Job 2	0.382	0.452
Person (n)	0.757	0.155
Income	0.735	0.103
Livestock	0.855	0.64
Home Val	0.52	0.635
Home Sze	0.556	

From the "varimax" Result, the 2 Factors can be interpreted as “Finance” and “Education”.

SUMMARY

- We would like to answer if growth velocity associated with percentage of diarrhoea
- Without including covariates in our regression, meta-analysis showed significant relationship
- Using SES variables as covariate could be a challenge
- We proposed to use Factor analysis to analyse SES variables

ADDITIONAL ANALYSES

Include some covariates in our regression

Perform the meta-analysis on the revised coefficient estimates and standard errors from each studies