

Demographic Dividend, Human Capital and Poverty Reduction  
(emphasis on Asia)

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# Demographic change in the world

## Population growth is slowing down

1990 to 2015 = 1.5% per year  
2050 to 2100 = 0.3% per year

## Population is ageing

Older population 2015 = 1 billion  
Older population 2100 = 1 billion

## Life expectancy is increasing

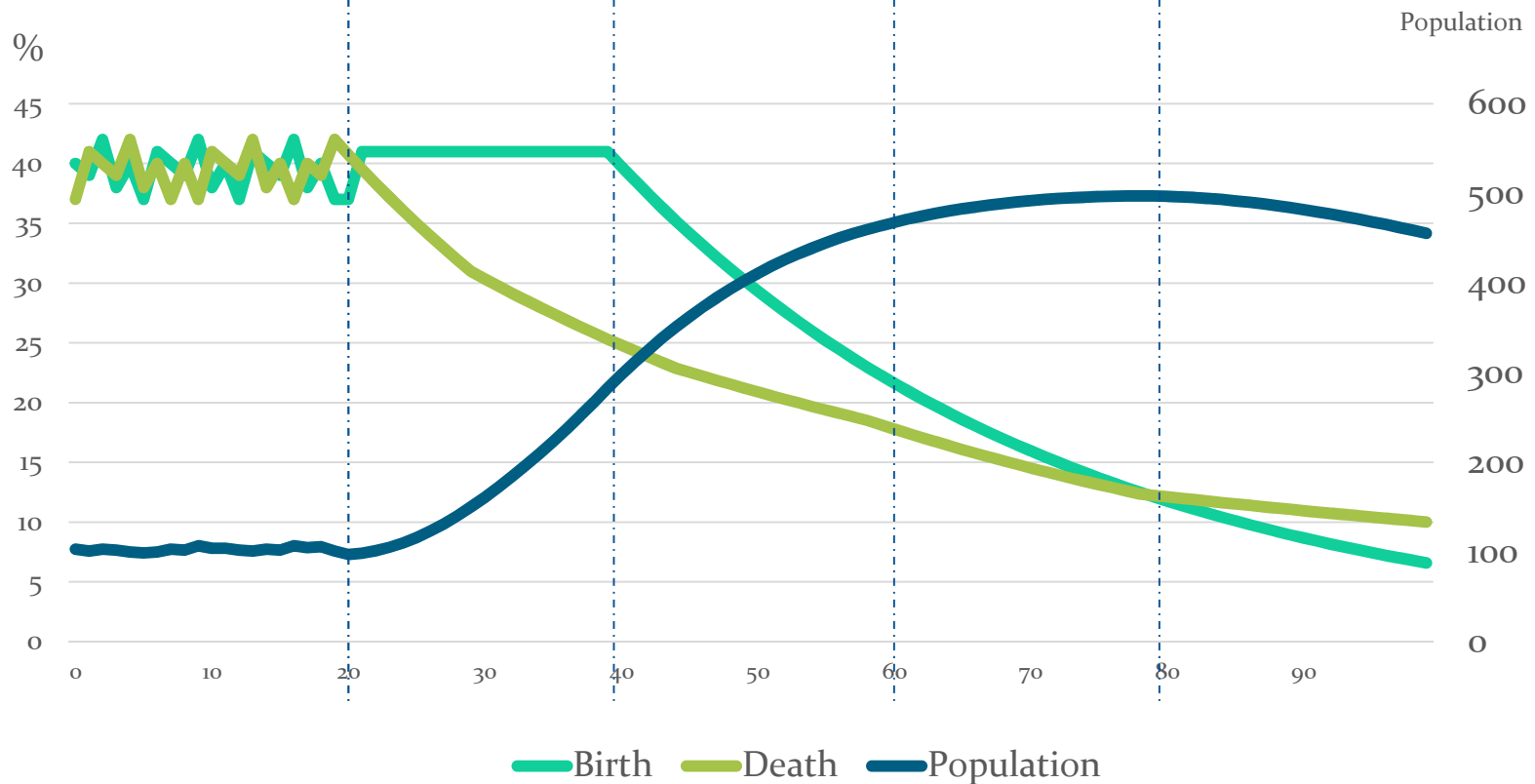
(Below numbers are for 1950 – 2010)

65 to 78 in more developed countries  
42 to 68 in less developed countries

## Most people will be in the less developed countries

4.8 billion people in Asia in 2100  
4.3 billion people in Africa in 2100

# Demographic Transition Model



Source: Author constructed based on Caldwell, John C., Bruce K. Caldwell, Pat Caldwell, Peter F. McDonald, and Thomas Schindlmayr. *Demographic transition theory*. Dordrecht: Springer, 2006.

# Demographic change in the world

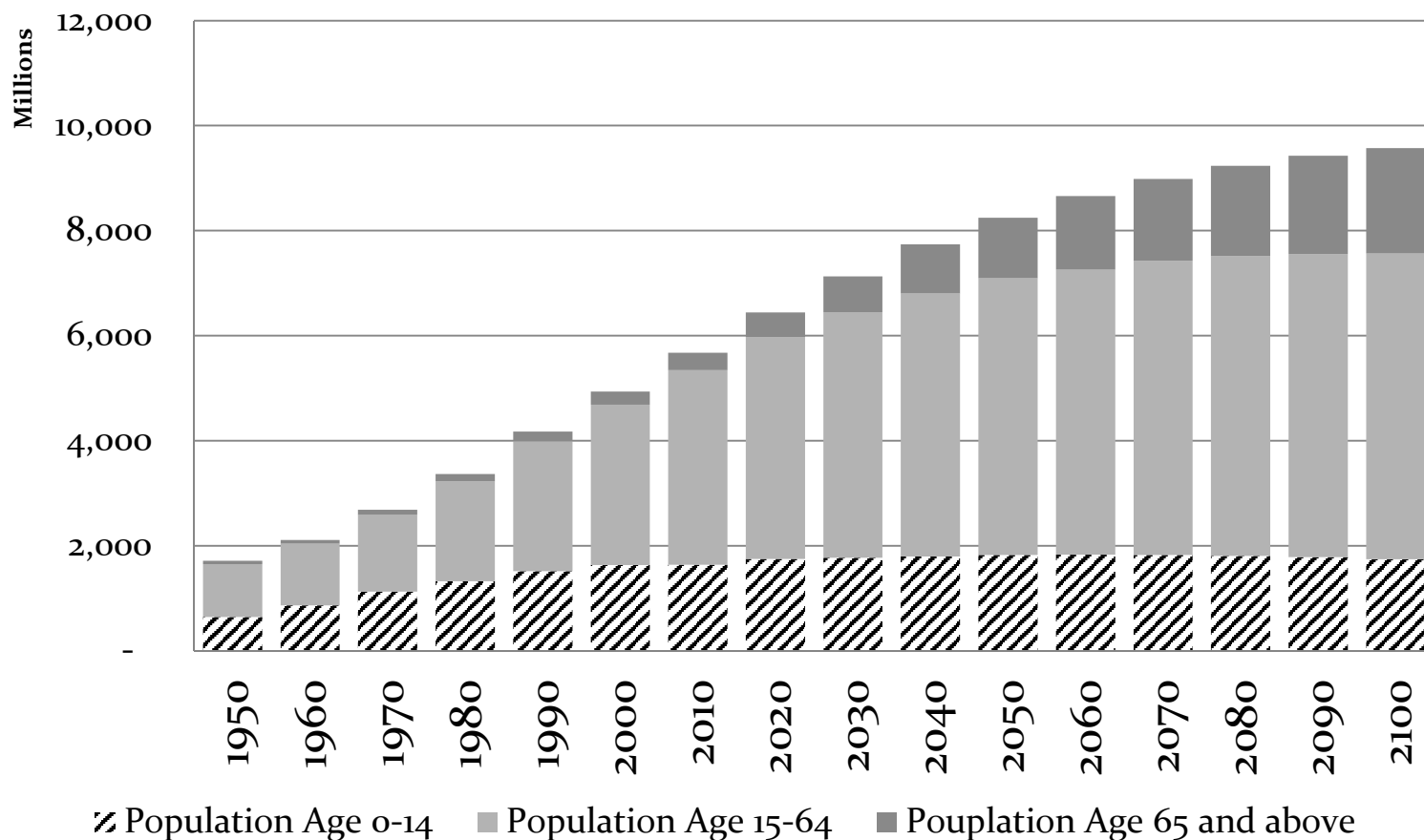
The composition of population by age in **more developed countries** from 1950 to 2100 (projected)



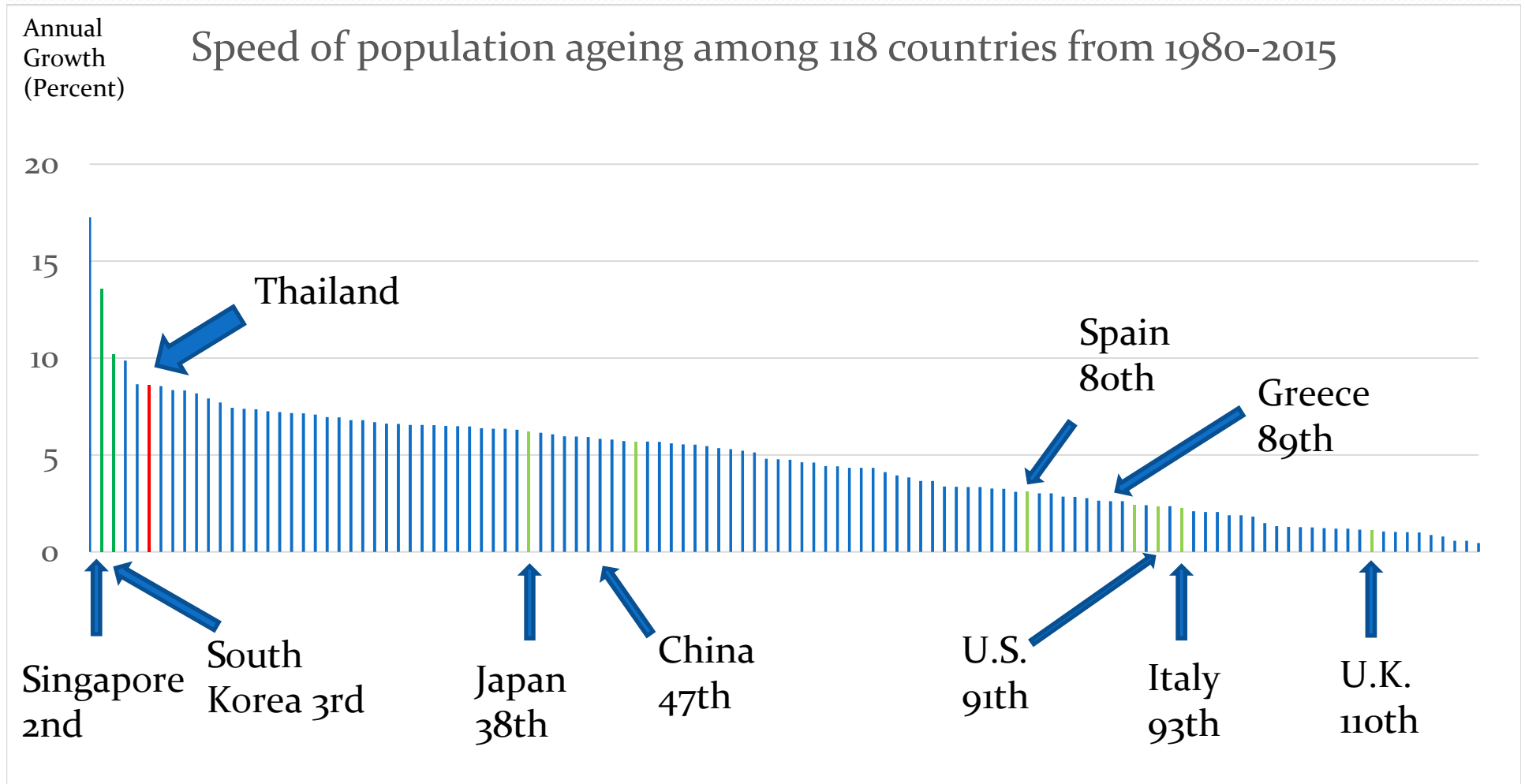


# Demographic change in the world

The composition of population by age in **less developed countries** from 1950 to 2100 (projected)

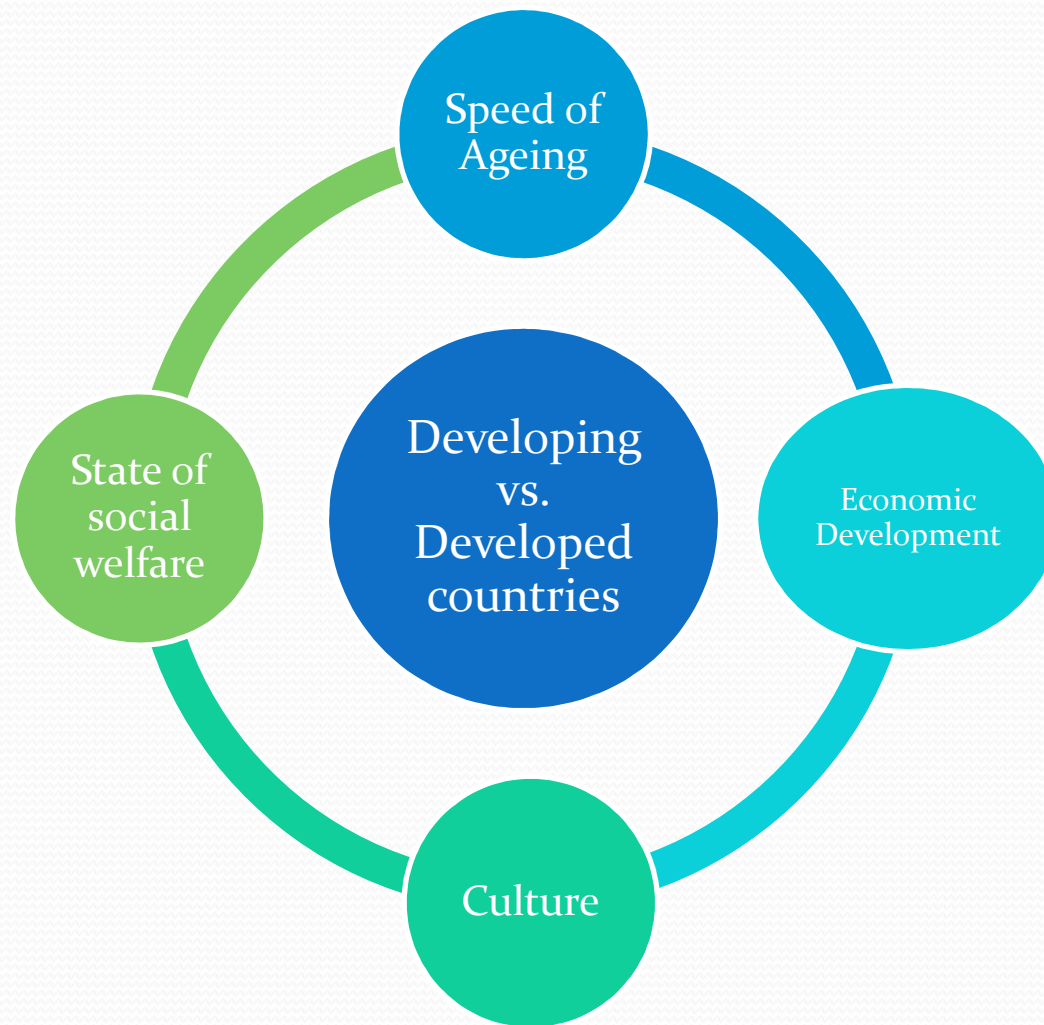


# Speed of population ageing in the world



Source: World Population Prospects: The 2015 Revision

# Demographic Transition: Developing vs. Developed



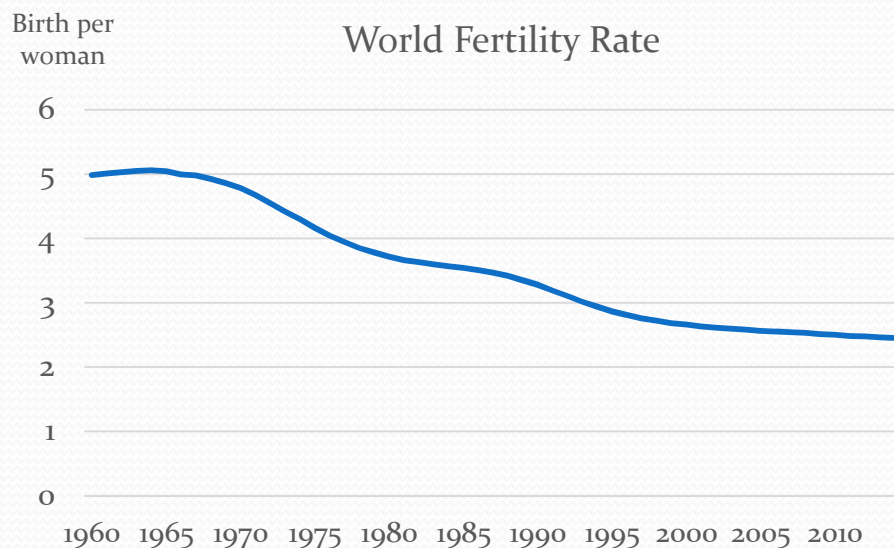


# Key research question?

- Even though demographic transition has been found to be beneficial to the general public in various aspects, there is no guarantee that these benefits will be triggered down to the poor.
- Question: Does the poor benefit from demographic transition (we focus on human capital formation)?



# Benefits of fertility decline on the economy



Source: The World Development Indicators

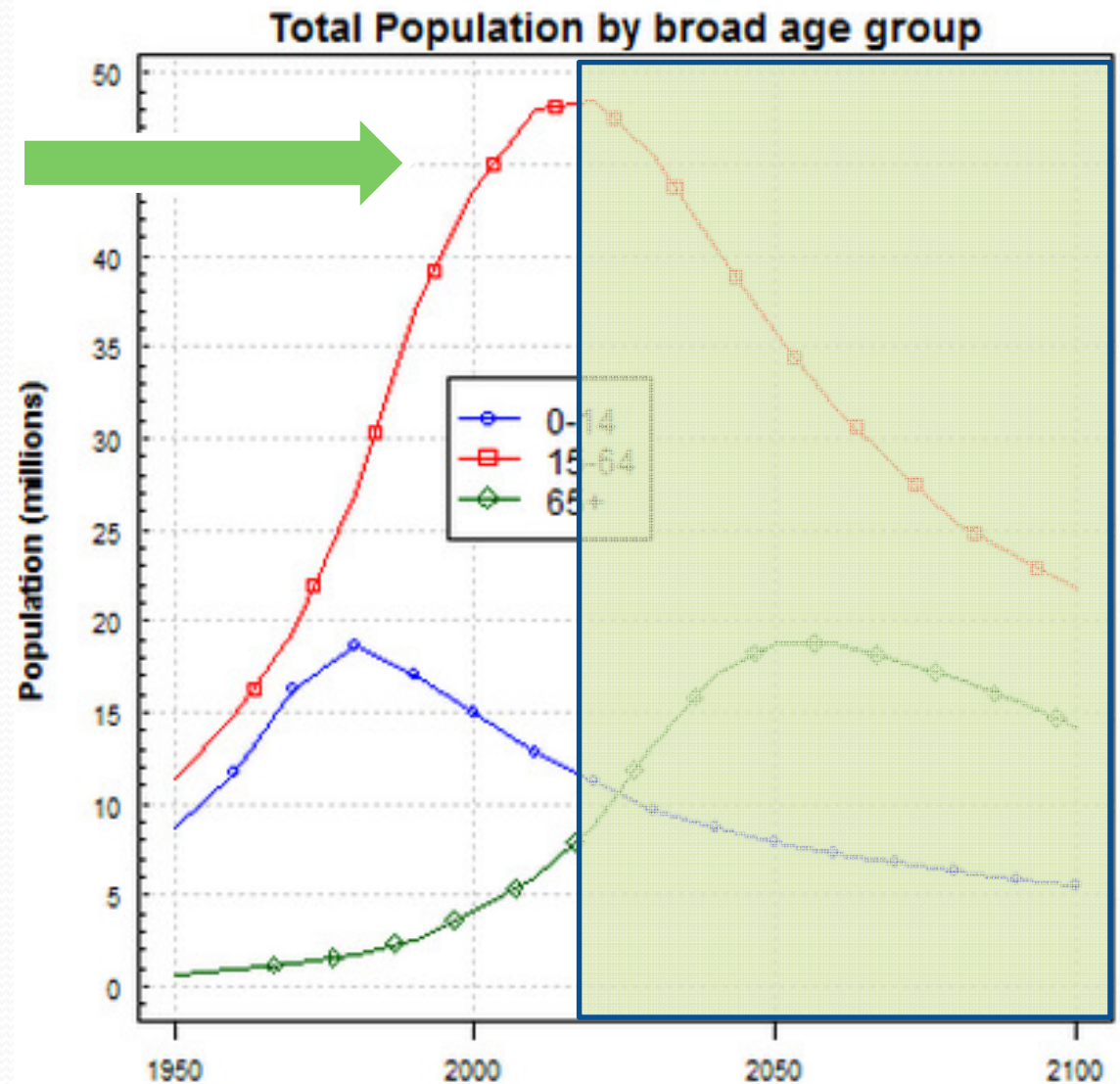
Does people under extreme poverty receive these benefits?

- Lower **population growth** (Barro, 1991; Mankiw, Romer and Weil, 1992)
- Increase the share of **working-age population** and lowers dependency ratios (Brander and Dowrick, 1994; Bloom et al., 2009); see 1<sup>st</sup> demographic dividend
- Increase **saving** (Mason and Lee, 2006) see 2<sup>nd</sup> demographic dividend
- Increase the share of **physical investment** (Brander and Dowrick, 1994)
- Increases **education of woman and children** (Rosenzweig and Zhang (2009)
- Increase **overall education** (Lee and Mason, 2010; Cuaresma, Lutz, and Sanderson, 2014; Cedar et al., 2015)
- Increase **health of woman and children** (Schultz, 2009; Ashraf, Lester and Weil, 2008)

# Demographic dividend

## The 1<sup>st</sup> demographic dividend

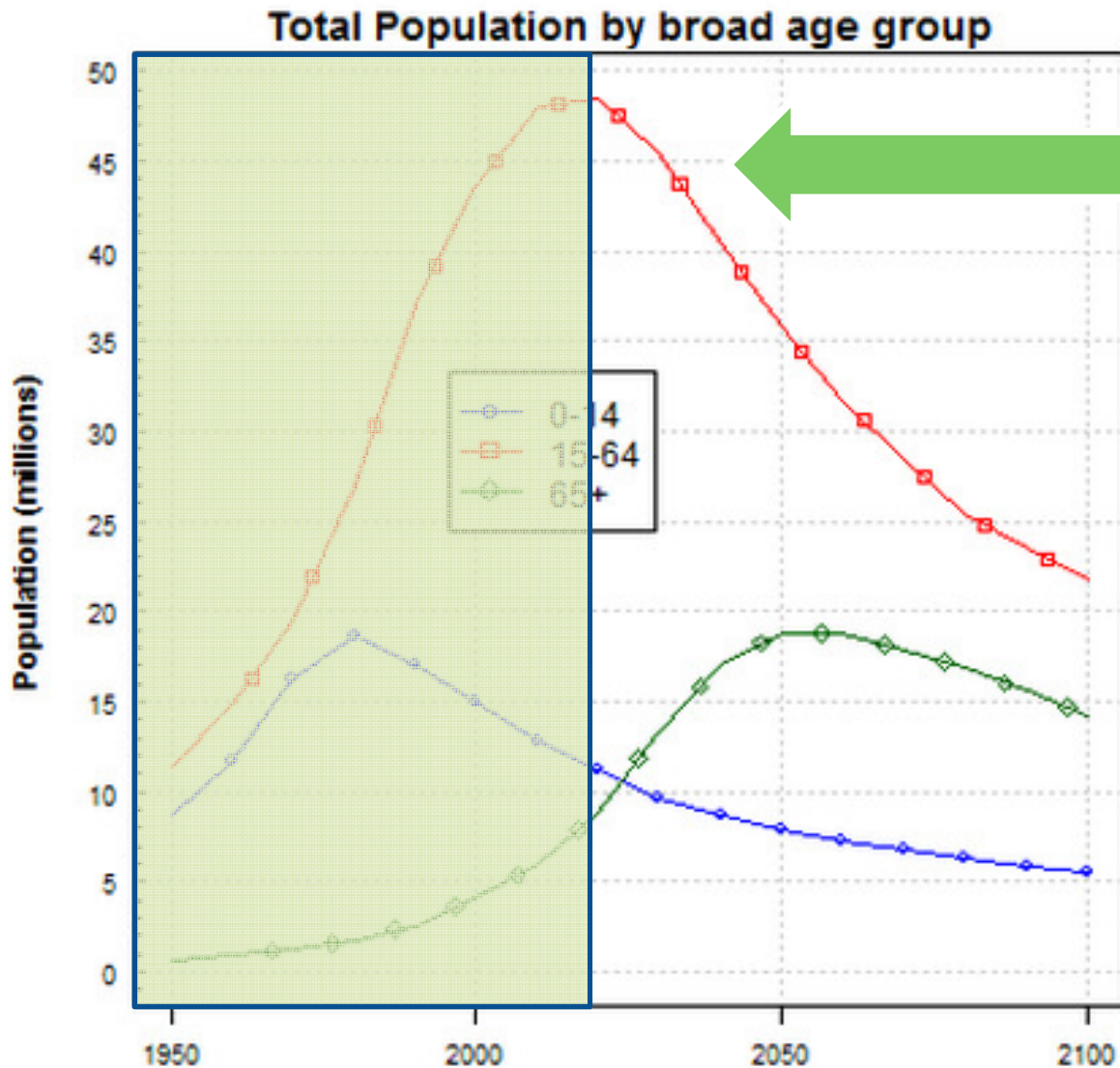
- Rising share of working-age population
- Low old-age dependency ratio
- Should maximize and extend the 1<sup>st</sup> demographic dividend by investing in education, health, and building labor force skills



Source: The World Population Prospects: 2015 Revision (for Thailand)



# Demographic dividend



## The 2<sup>nd</sup> demographic dividend (or tax?)

- Falling share of working-age population
- High old-age dependency ratio
- Need to minimize post-1<sup>st</sup> demographic dividend health burden
- People must accumulate more wealth for their retirement consumption

Source: The World Population Prospects: 2015 Revision (for Thailand)



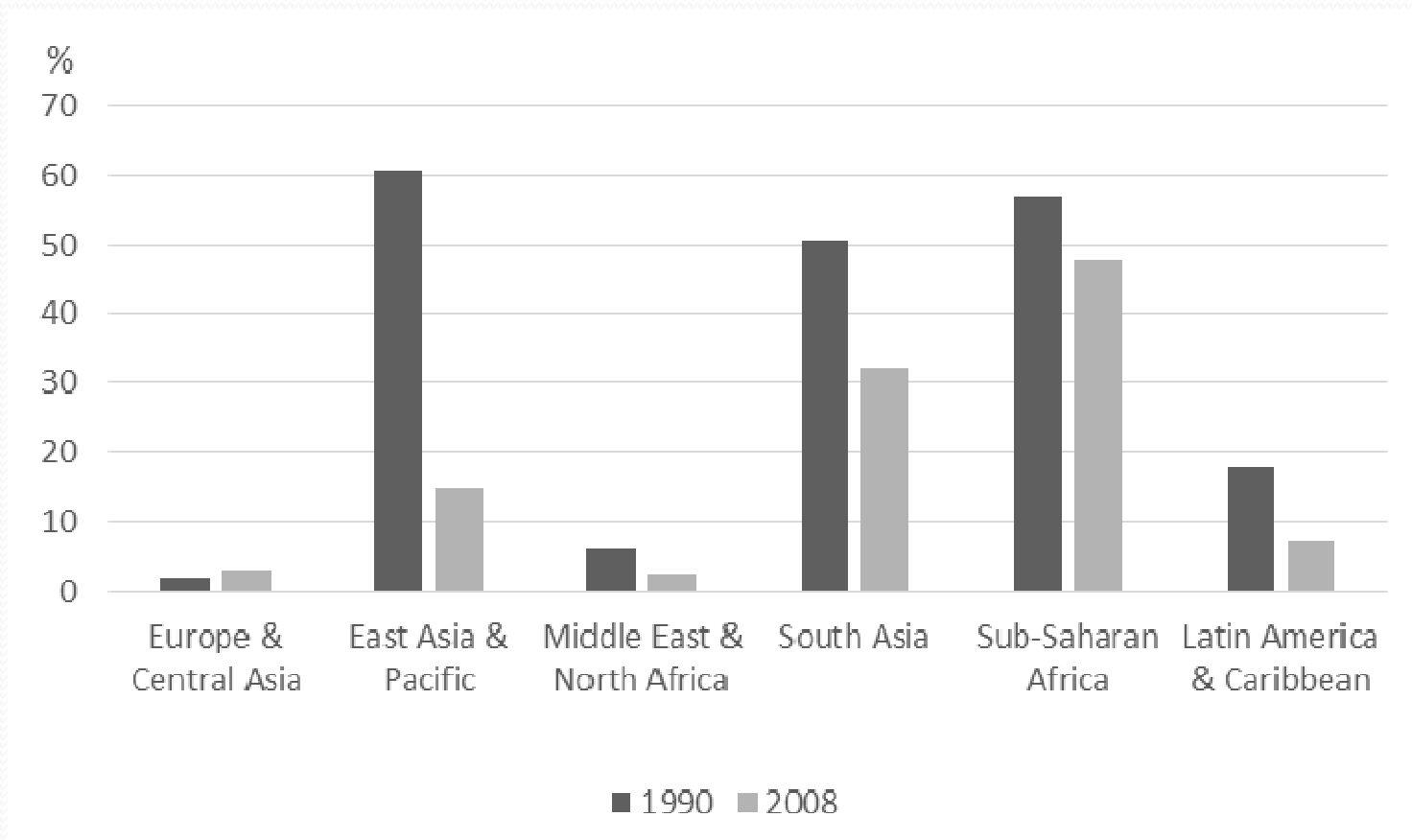
## How to measure poverty?

- There are two approaches in measuring poverty:
  - Indirect approach
    - Rely on income
    - Counting people living below the international poverty line (\$1.90 a day with PPP adjusted)
  - Direct approach (**this is what we used**)
    - Multidimensional Poverty Index (MPI)
    - Developed by the Oxford Poverty and Human Development Initiative (OPHI) and the United Nations
    - Using 10 deprivation indicators (education, health, and standard of living)



# How to measure poverty?

Poverty headcount ratio at \$1.90 a day (2011 PPP) of selected regions (% of population)



Source: Author constructed from the World Development Indicators

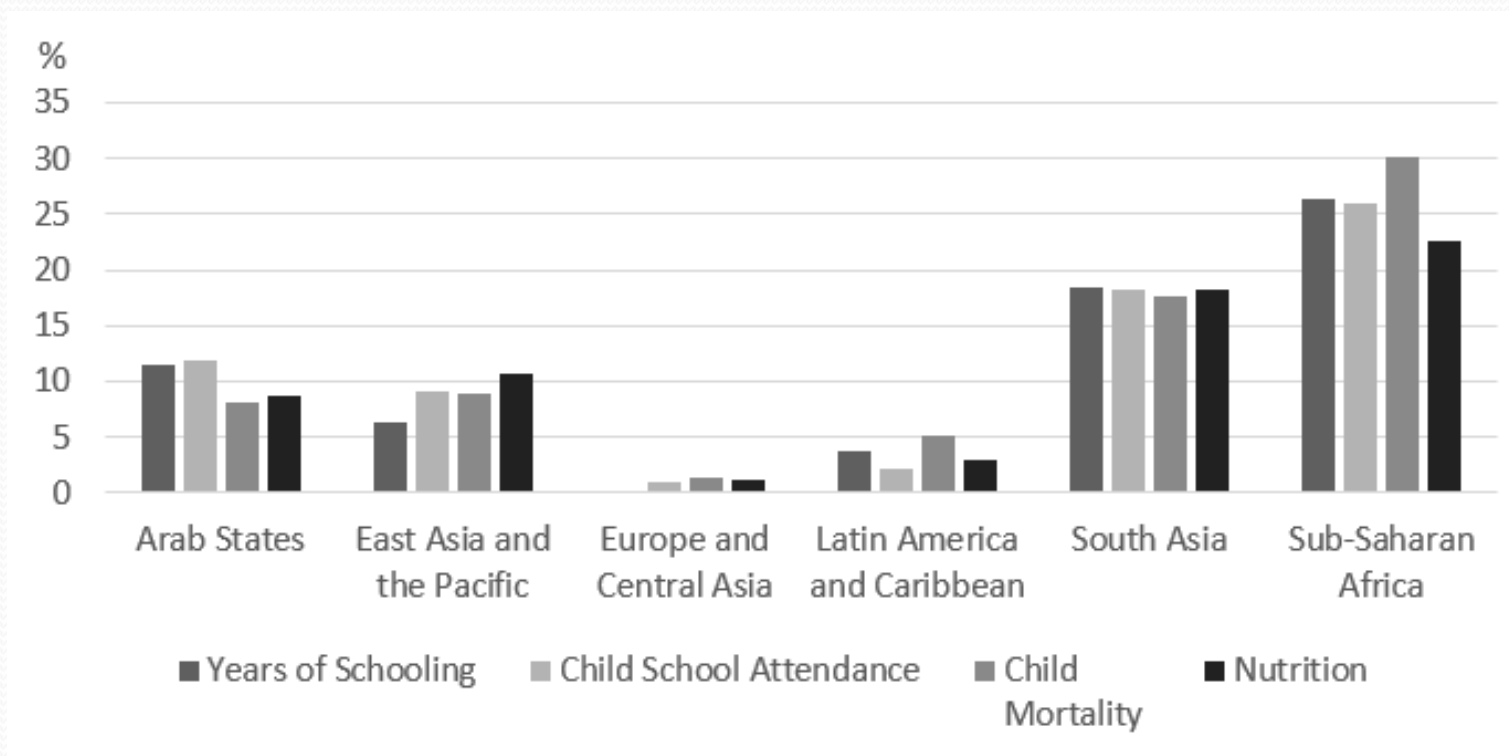


## Education and Health Deprivation Indicators from the Multidimensional Poverty Index (MPI)

- Four deprivation indicators from MPI
  - school attainment (“no household member has completed at least six years of schooling”)
  - school attendance (“a school-age child (up to grade 8) is not attending school”)
  - nutrition (“a household member is malnourished”)
  - child mortality (“a child has died in the household within the five years prior to the survey”)

# How to measure poverty?

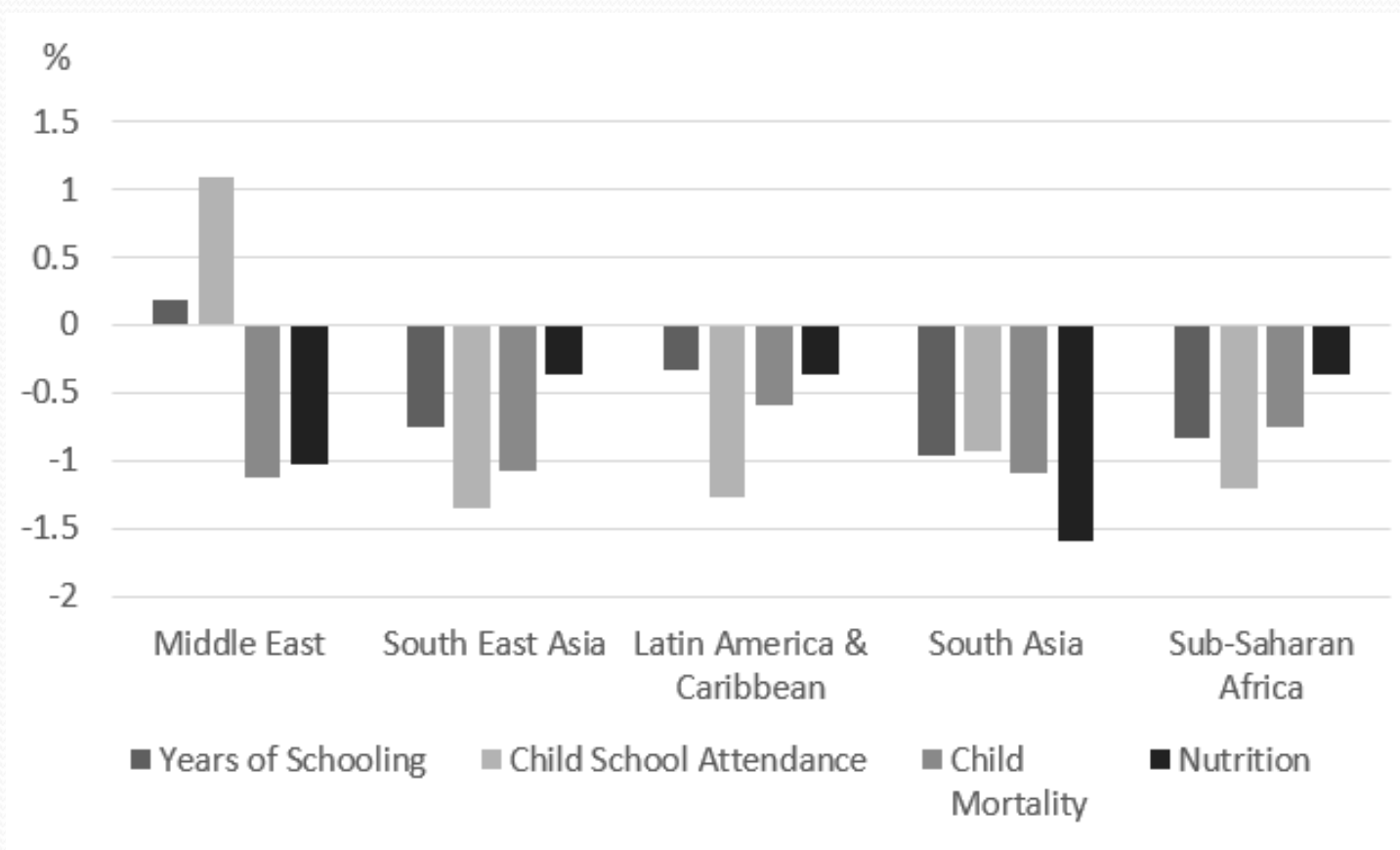
Raw headcounts (in percentage points) of people deprived in education and health components of the Multidimensional Poverty Index of selected regions (MPI 2015 update)



Source: Author constructed from Alkire and Robles (2015)

# How to measure poverty?

Annualized absolute change (in 2000s) in raw headcounts (in percentage points) of people deprived under each four deprivation indicators from MPI



Source: Author constructed from Alkire, Roche and Vaz (2014)



# Econometric Methodology

- Linear regression analysis of the four deprivation indicators from MPI of fertility growth (*GR\_FERT*) and other controls

$$Poverty_i = \alpha + \beta_1 GR\_FERT + \sum_j^J \beta_j X_j + \varepsilon;$$

- Assume no reverse causality
- Controls:
  - the growth rate of real GDP per capita (*GR\_GDP*)
  - the level of MPI
  - the share of government expenditure on education in GDP (*GOVEDU*)
  - the share of private expenditure on health in GDP (*PRIV\_HEALTH*)
  - the share of public expenditure on health in GDP (*PUB\_HEALTH*)

Table 1: OLS regressions on annualized absolute change in raw headcounts (in percentage points) of people deprived in school attainment of MPI (independent variables are measured from 1995 to 2004)

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	<i>School Attainment</i>	<i>School Attainment</i>	<i>School Attainment</i>	<i>School Attainment</i>	<i>School Attainment</i>	<i>School Attainment</i>
<i>GR_FERT</i>	0.76 t = 0.51	2.63** t = 2.00	2.51* t = 1.93	2.00 t = 1.39	2.11 t = 1.48	2.00 t = 1.36
<i>MPI</i>	-	-2.84*** t = -3.91	-2.83*** t = -3.97	-2.81*** t = -3.68	-3.01*** t = -3.88	-2.97*** t = -3.73
<i>GR_GDP</i>	-	-	-0.06 t = -1.44	-0.09 t = -1.79	-0.10** t = -2.02	-0.10** t = -2.01
<i>GOVEDU</i>	-	-	-	-0.004 t = -0.08	0.001 t = 0.03	-0.011 t = -0.18
<i>PRIV_HEALTH</i>	-	-	-	-	0.13 t = 1.19	0.13 t = 1.22
<i>PUB_HEALTH</i>	-	-	-	-	-	0.04 t = 0.39
R-square	0.01	0.33	0.37	0.39	0.42	0.42
Number Observations	34	34	34	31	31	31

Source: Authors constructed. Note: All regressions include an intercept term. \*\*\*, \*\* and \* indicate 99, 95 and 90 percent of confidence level.

Table 2: OLS regressions on annualized absolute change in raw headcounts (in percentage points) of people deprived in school attendance of MPI (independent variables are measured from 1995 to 2004)

Independent variables	(1) <i>School Attendance</i>	(2) <i>School Attendance</i>	(3) <i>School Attendance</i>	(4) <i>School Attendance</i>	(5) <i>School Attendance</i>	(6) <i>School Attendance</i>
<i>GR_FERT</i>	0.82 t = 0.28	2.17 t = 0.69	2.23 t = 0.70	2.00 t = 0.55	2.01 t = 0.54	2.49 t = 0.65
<i>MPI</i>	-	-2.05 t = -1.18	-2.05 t = -1.17	-2.13 t = -1.10	-2.16 t = -1.07	-2.34 t = -1.14
<i>GR_GDP</i>	-	-	0.02 t = 0.27	0.005 t = 0.03	0.002 t = 0.02	0.01 t = 0.08
<i>GOVEDU</i>	-	-	-	-0.03 t = -0.26	-0.03 t = -0.25	0.02 t = 0.15
<i>PRIV_HEALTH</i>	-	-	-	-	0.02 t = 0.07	-0.006 t = -0.02
<i>PUB_HEALTH</i>	-	-	-	-	-	-0.21 t = -0.67
R-square	0.002	0.04	0.04	0.04	0.04	0.06
Number Observations	34	34	34	31	31	31

Source: Authors constructed. Note: All regressions include an intercept term. \*\*\*, \*\* and \* indicate 99, 95 and 90 percent of confidence level.

Table 3: OLS regressions on annualized absolute change in raw headcounts (in percentage points) of people deprived in nutrition of MPI (independent variables are measured from 1995 to 2004)

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	<i>Nutrition</i>	<i>Nutrition</i>	<i>Nutrition</i>	<i>Nutrition</i>	<i>Nutrition</i>	<i>Nutrition</i>
<i>GR_FERT</i>	1.66 t = 0.74	1.91 t = 0.76	1.79 t = 0.70	1.67 t = 0.57	1.70 t = 0.56	1.75 t = 0.56
<i>MPI</i>	-	-0.32 t = -0.23	-0.31 t = -0.23	-0.36 t = -0.24	-0.34 t = -0.22	-0.36 t = -0.22
<i>GR_GDP</i>	-	-	-0.04 t = -0.60	-0.08 t = -0.88	-0.08 t = -0.81	-0.08 t = -0.79
<i>GOVEDU</i>	-	-	-	-0.008 t = -0.08	-0.10 t = -0.09	-0.005 t = -0.04
<i>PRIV_HEALTH</i>	-	-	-	-	-0.02 t = -0.12	-0.03 t = -0.13
<i>PUB_HEALTH</i>	-	-	-	-	-	-0.02 t = -0.09
R-square	0.01	0.02	0.03	0.05	0.05	0.05
Number Observations	30	30	30	27	27	27

Source: Authors constructed. Note: All regressions include an intercept term. \*\*\*, \*\* and \* indicate 99, 95 and 90 percent of confidence level.



Table 4: OLS regressions on annualized absolute change in raw headcounts (in percentage points) of people deprived in child mortality of MPI (independent variables are measured from 1995 to 2004)

Independent variables	(1) <i>Child Mortality</i>	(2) <i>Child Mortality</i>	(3) <i>Child Mortality</i>	(4) <i>Child Mortality</i>	(5) <i>Child Mortality</i>	(6) <i>Child Mortality</i>
<i>GR_FERT</i>	0.61 t = 0.37	1.46 t = 0.83	1.26 t = 0.74	1.24 t = 0.64	1.25 t = 0.63	0.91 t = 0.45
<i>MPI</i>	-	-1.28 t = -1.32	-1.27 t = -1.36	-1.20 t = -1.16	-1.21 t = -1.12	-1.08 t = -0.99
<i>GR_GDP</i>	-	-	-0.10* t = -1.82	-0.09 t = -1.33	-0.09 t = -1.28	-0.10 t = -1.36
<i>GOVEDU</i>	-	-	-	0.0003 t = 0.004	0.0006 t = 0.009	-0.04 t = -0.47
<i>PRIV_HEALTH</i>	-	-	-	-	0.007 t = 0.04	0.02 t = 0.17
<i>PUB_HEALTH</i>	-	-	-	-	-	0.15 t = 0.91
R-square	0.004	0.05	0.15	0.11	0.11	0.14
Number Observations	34	34	34	31	31	31

Source: Authors constructed. Note: All regressions include an intercept term. \*\*\*, \*\* and \* indicate 99, 95 and 90 percent of confidence level.



# Conclusion

- Demographic transition reduces deprivation in school attainment of the poor
- No evidence that demographic transition reduces deprivation in school attendance, nutrition and child mortality of the poor.
- Economic growth reduces deprivation in school attainment and child mortality of the poor.
- No evidence that spending on education and health reduce any of the four deprivation indicators.



## Policy implications (Data and Knowledge limitation)

- Need more data on people under extreme poverty
  - There are very good international statistics by country, sex, and race
  - But no data that captures the same international statistics but allow classification of people below poverty line or deprived people by MPI (the best at the moment is Demographic and Health Survey (DHS) but they classify people by wealth into 5 quantiles which is not extreme poverty)
- Need more research that studies demographic transition and poverty