



The Asymmetric Impact of Growth Fluctuation on Human Development:

Evidence from Correlates of Growth Decelerations and Accelerations

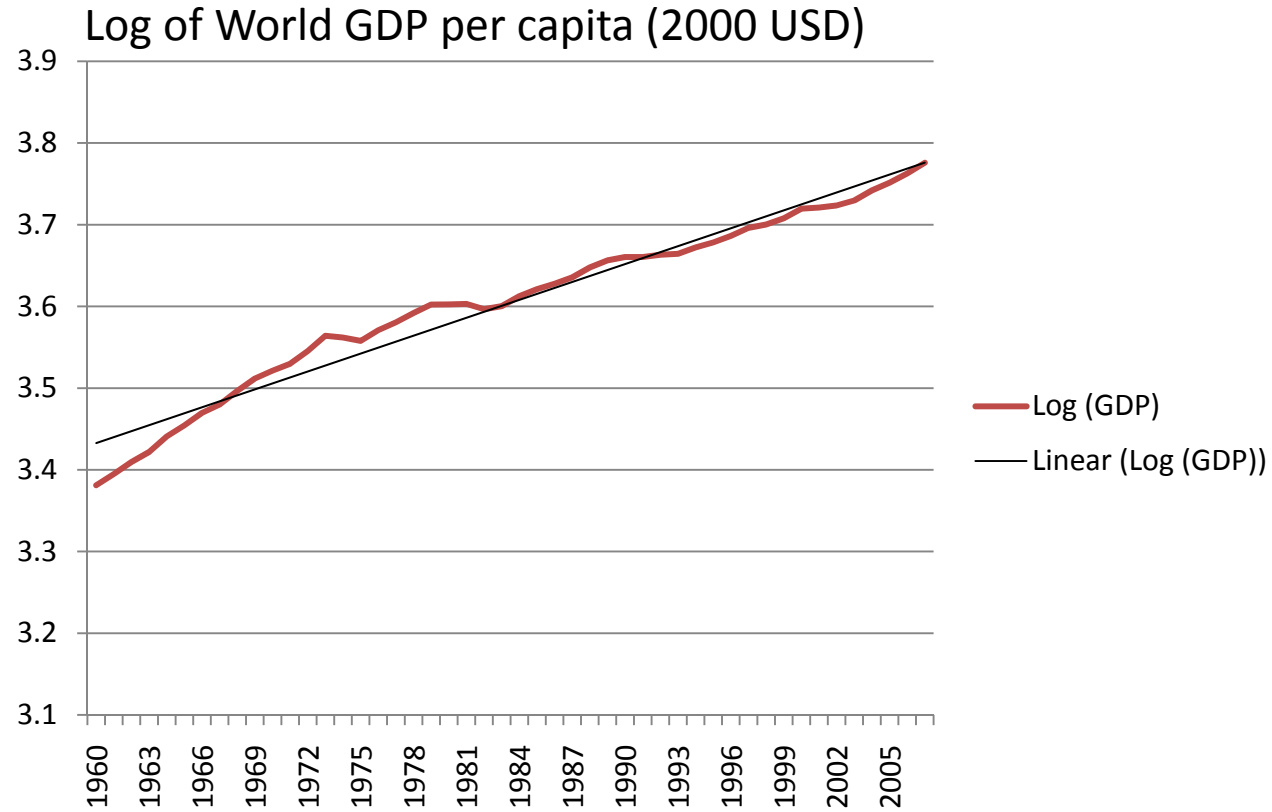
Pedro Conceição and Namsuk Kim
UNDP, New York

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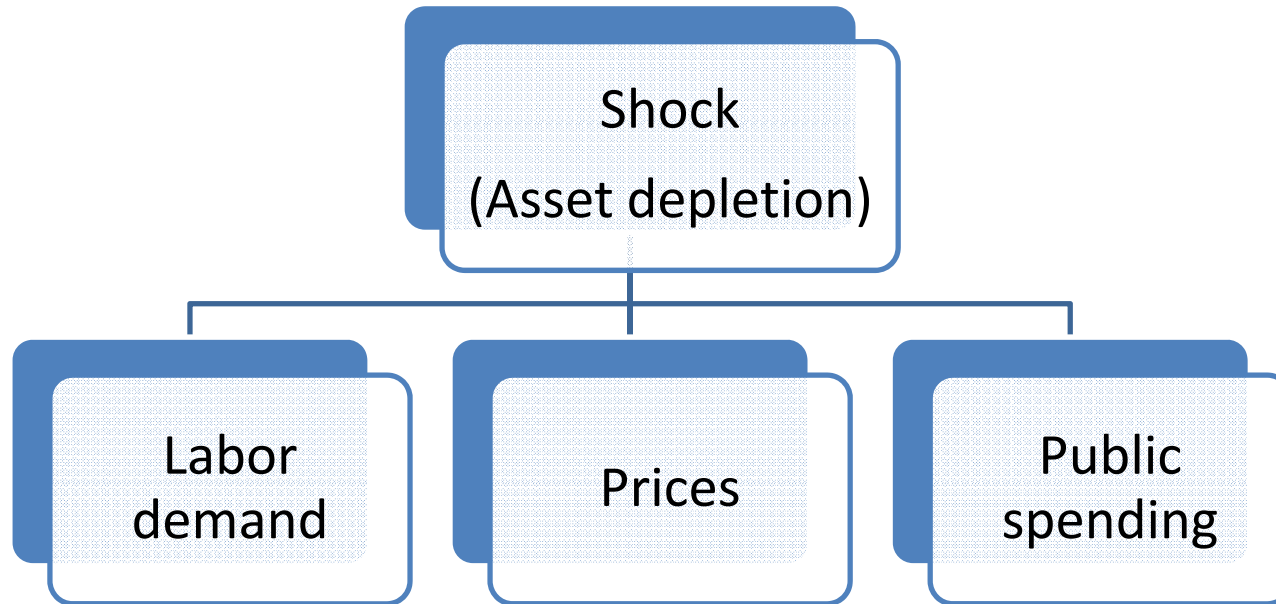


Trend and Fluctuation



Source: World Bank (2009)

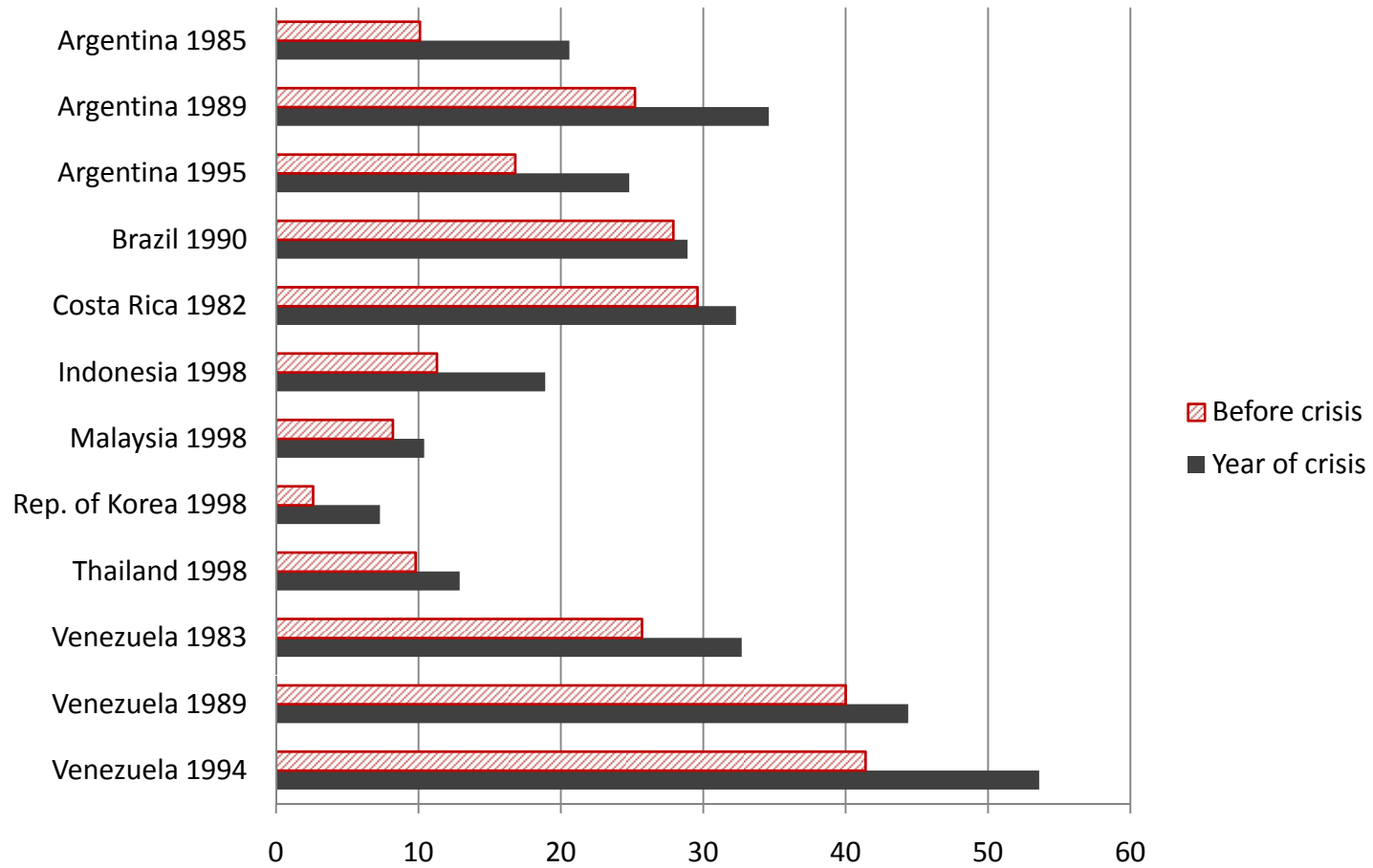
Channels



Source: Lustig and Walton (1999)

Poverty and Crises

Crises and Poverty Headcount Ratios

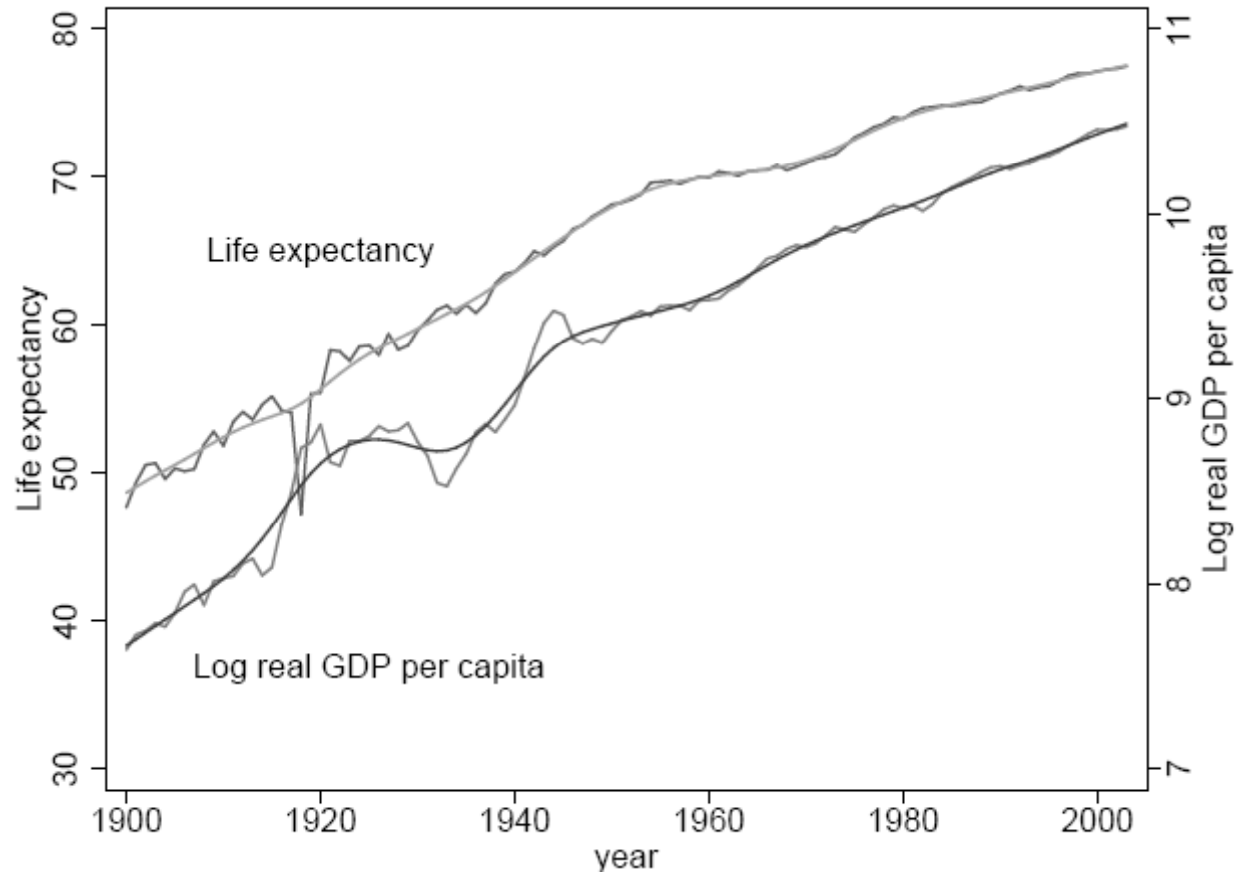


Lustig, Fishlow and Bourguignon (2000, p.4), Skoufias (2003, p.1088).



Health and Nutrition I

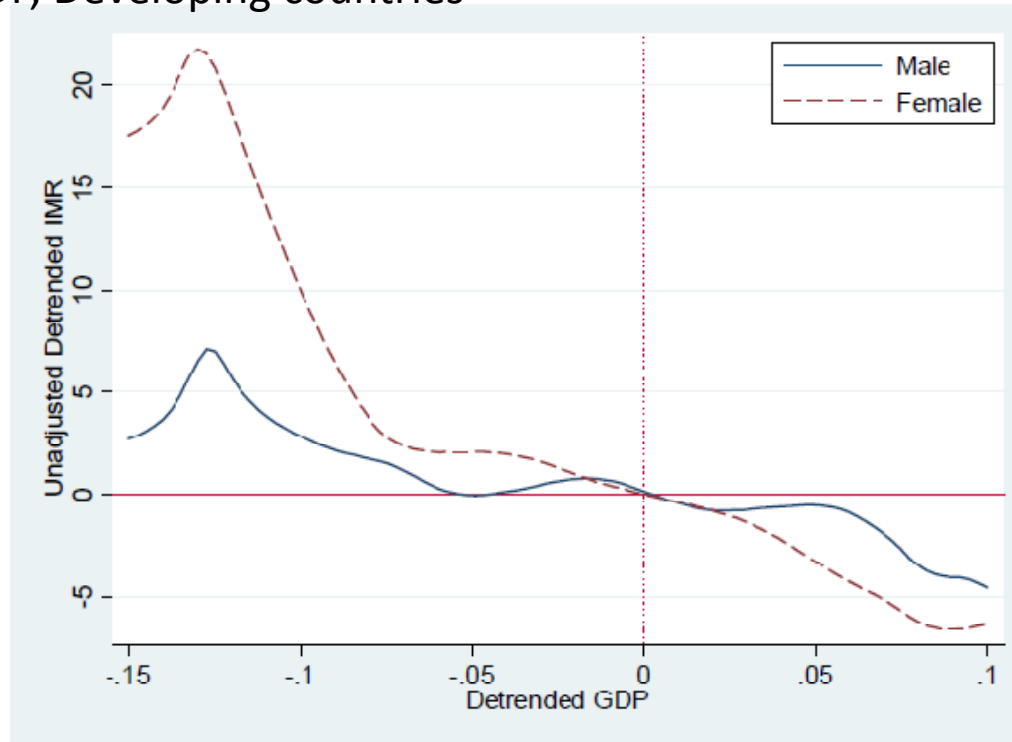
Trends in log life expectancy, and log real income per capita in the U.S. since 1900



Source: Edwards (2009)

Health and Nutrition II

Relationship between Infant Mortality Rate and Detrended GDP, Developing countries



Note: Estimated with locally weighted least squares. GDP is measured in year 2000 international (PPP) dollars

Source: Baird, Friedman, and Schady (2007)



Education I

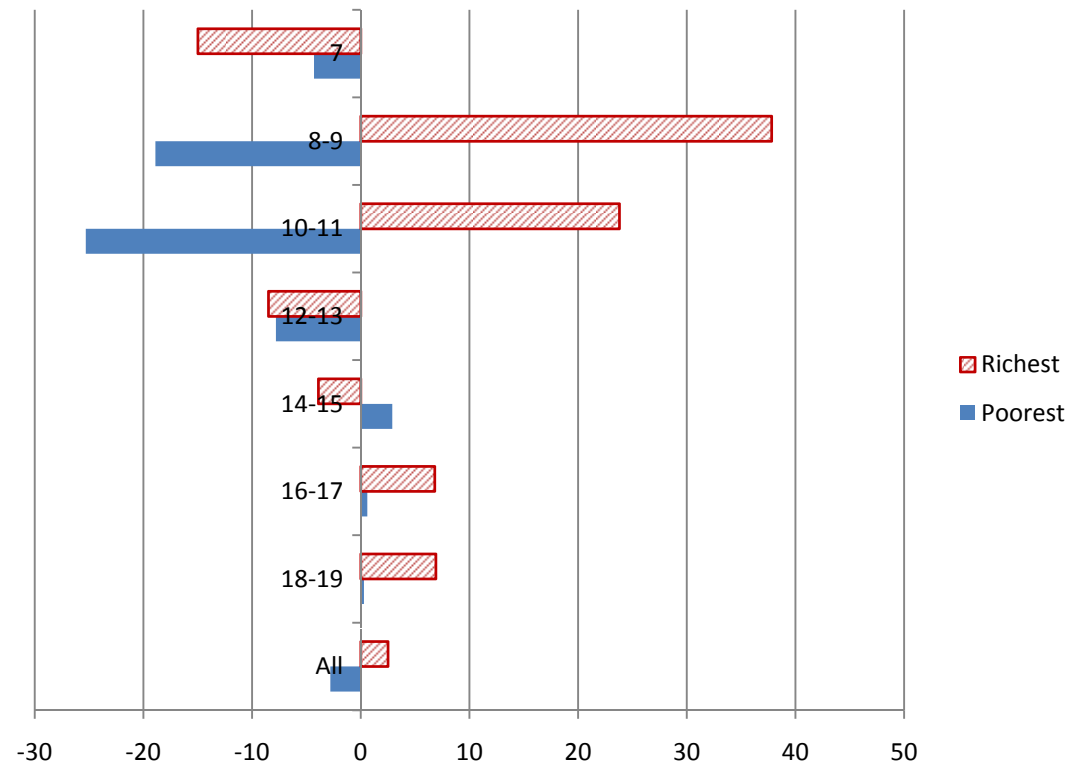
Effect of a Negative Aggregate Economic Shock on Child Education Outcomes

Rich countries	Positive impact <ul style="list-style-type: none">• United States
Middle-income countries	Ambiguous impact Examples of positive impact <ul style="list-style-type: none">• Mexico• Brazil• Peru• Nicaragua Examples of negative impact <ul style="list-style-type: none">• Costa Rica
Poor countries	Negative impact <ul style="list-style-type: none">• Indonesia• Cote d'Ivoire• Malawi• (Nicaragua)

Note: Parentheses indicate the reverse effect, for countries that deviate from the theoretical predictions.
Source: Ferreira and Schady (2008, p.50).

Education II

School enrollment rates by age and income quartile, changes between 1997 and 1998, Indonesia



Source: Thomas et al (2004, p.64, Table 2b)

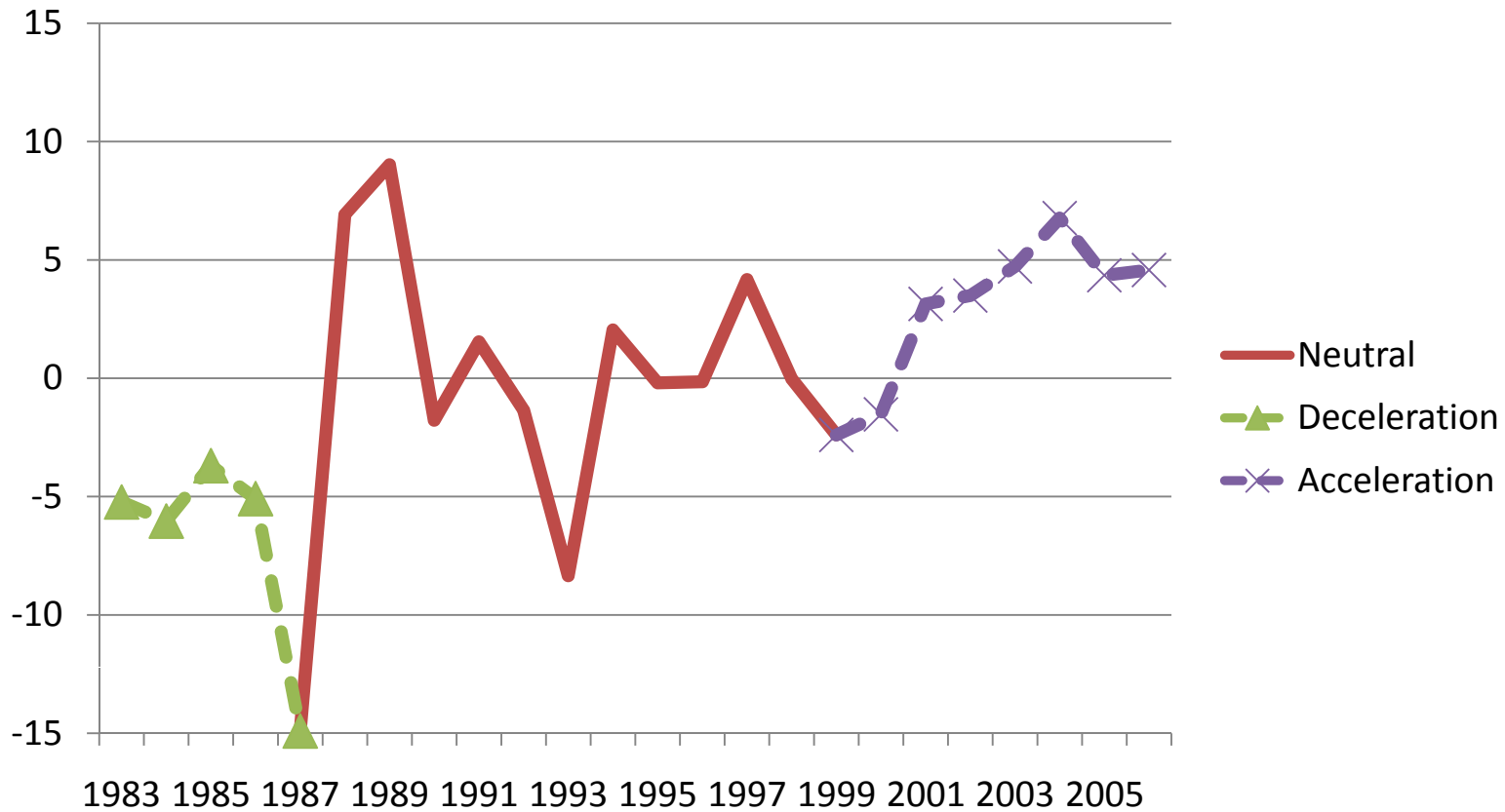


Identification of Growth Acceleration and Deceleration

- A growth acceleration is a period that satisfies the following four conditions:
 - Condition 1 – The forward four-year moving average growth minus the backward four-year moving average growth > 0 for a given year; i.e., the forward moving average window ($t, t+1, t+2, t+3$) must be higher than the backward window ($t, t-1, t-2, t-3$) and above 0;
 - Condition 2 – The forward four-year moving average growth exceeds the country's average growth, meaning that the pace of growth during acceleration is higher than the country's trend;
 - Condition 3 – The forward four-year moving average GDP per capita exceeds the backward four-year moving average;
 - Condition 4 – A growth acceleration episode requires at least three years in a row satisfying conditions 1-3. An episode includes the three subsequent years after the last year that satisfies conditions 1-3.



Example: Surinam - GDP per capita growth rate (minus the 1980-2006 average)



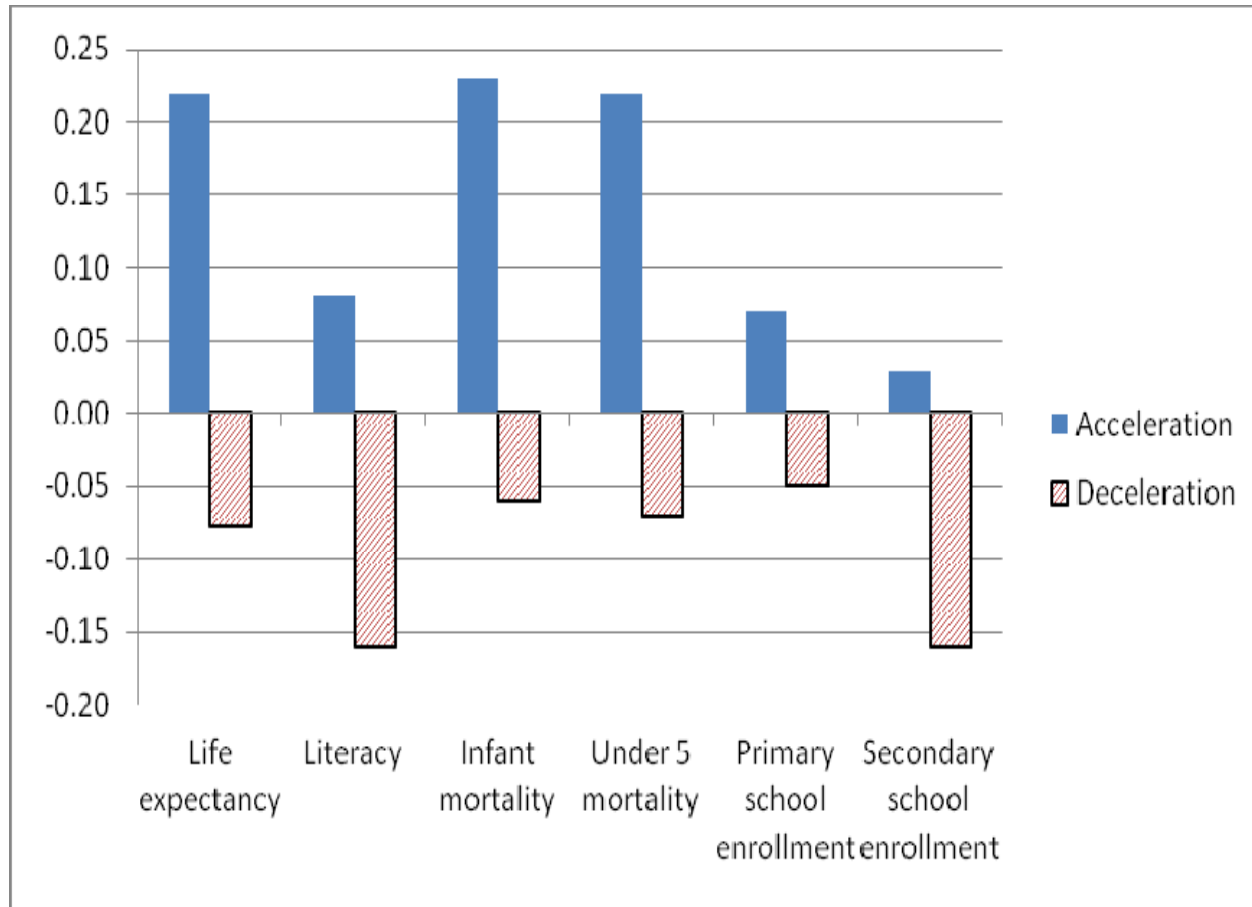


Difference between Sample Means, Global Average, 1983-2006

	<i>Growth Acceleration</i>		<i>Growth Deceleration</i>	
	During A	Otherwise A	During D	Otherwise D
All countries				
Life expectancy (years)	69.4** (0.26)	63.5 (0.2)	62.3** (.54)	65.3 (.17)
Infant mortality (per 1,000 live birth)	27.5** (1.12)	51.9 (1.12)	55.6** (3.1)	43.9 (.92)
Under 5 mortality (per 1,000)	43.6** (2.13)	83.9 (2.05)	94.6** (5.84)	70.8 (1.7)
Literacy (% of adult)	78.4 (1.81)	74.6 (2.12)	66.7** (4.6)	77.9 (1.4)
Primary school enrollment (net, %)	100** (0.57)	98.2 (.79)	96.3* (2.3)	99.9 (.48)
Secondary school enrollment (net, %)	71.8 (1.08)	69.6 (1.3)	52.4** (3.04)	72.2 (.86)
Developing countries				
Life expectancy	65.0** (.35)	58.4 (.24)	59.9 (.58)	60.1 (.22)
Infant mortality	45.1** (1.7)	80.5 (1.5)	71.6 (3.5)	70.2 (1.4)
Under 5 mortality	69.5** (3.1)	127.9 (2.7)	113.3 (6.3)	111.9 (2.4)
Literacy	76.5 (2.01)	70.9 (2.5)	65.6* (4.7)	75.2 (1.67)
Primary school enrollment	100** (.7)	96.1 (1.1)	96.1 (2.4)	98.9 (.65)
Secondary school enrollment	63.6** (1.2)	54.9 (1.4)	50.7** (3.1)	60.8 (.94)
Developed countries				
Life expectancy	76.1** (.16)	72.2 (.16)	72.2 (.41)	73.3 (.14)
Infant mortality	7.6** (.45)	17.7 (.58)	14.2 (1.2)	14.9 (.47)
Under 5 mortality	9.8** (.96)	23.2 (1.07)	19.3 (2.6)	19.6 (.87)
Literacy	92.5 (1.6)	88.9 (1.5)	99.7 (N.A.) [†]	89.8 (1.2)
Primary school enrollment	102.7 (.65)	102.2 (.63)	102.1 (2.8)	102.4 (.46)
Secondary school enrollment	99.3 (1.6)	97.2 (1.1)	84.8 (4.6)	98.3 (.92)



Improvement in Human Development Indicators (correlation coefficient) in Periods of Growth Acceleration and Deceleration





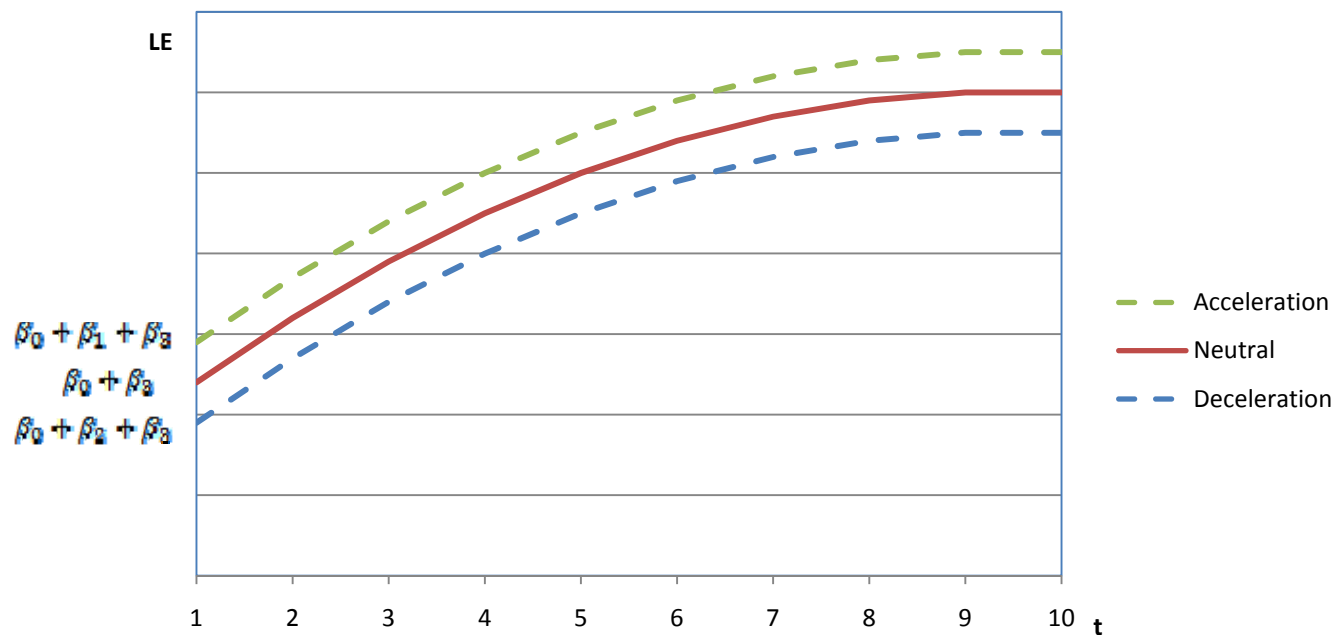
Frequency of Growth Acceleration and Deceleration Episodes and Average Growth Rates by Decade

	Overall period	Growth acceleration		Growth deceleration	
	Annual Average GDP growth rate	Frequency (country-years)	Annual Average Growth rate	Frequency (country-years)	Annual Average Growth rate
1983-1989	1.30	0.22	3.87	0.19	-2.42
1990-1999	1.07	0.36	3.70	0.13	-4.96
2000-2006	3.00	0.49	4.44	0.04	-2.76
1983-2006	1.72	0.36	4.03	0.12	-3.58



Specification: HD and Growth Acceleration/Deceleration

$$HD_{i,t} = \beta_0 + \beta_1 ACC_{i,t} + \beta_2 DEC_{i,t} + \beta_3 TIME_t + \varepsilon_{i,t}$$





Pooled OLS Regression of Human Development Indicators, 1983-2006

	Life expectancy	Infant mortality	Under-5-mortality	Primary school enrollment	Secondary school enrollment	Literacy
All countries						
ACC	1.653 (3.88)**	-8.193 (3.74)**	-12.077 (2.94)**	1.984 (2.01)*	-1.680 (0.99)	1.133 (0.38)
DEC	-4.679 (7.73)**	19.239 (5.84)**	36.916 (5.99)**	-0.450 (0.23)	-16.549 (4.90)**	-10.529 (2.29)*
Constant	65.538 (248.16)**	41.438 (29.00)**	65.901 (25.00)**	102.689 (2.61)**	156.399 (2.52)*	84.646 (4.65)**
Observations	4394	2870	2466	1465	1418	250
R-squared	0.14	0.13	0.13	0.02	0.04	0.03
Number of country	200	199	199	188	188	138
Developing countries						
ACC	2.033 (3.82)**	-9.174 (3.28)**	-14.402 (2.84)**	3.565 (2.58)**	4.782 (2.40)*	
DEC	-3.090 (4.33)**	11.668 (2.95)**	21.631 (3.03)**	4.038 (1.71)	-0.807 (0.22)	
Constant	61.834 (36.92)**	66.300 (8.54)**	107.703 (7.17)**	110.060 (2.02)*	92.269 (1.31)	
Observations	1581	925	817	1021	899	
R-squared	0.04	0.06	0.06	0.03	0.04	
Number of country	138	131	131	125	108	
Least Developed Countries (LDCs)						
ACC	-0.295 (0.37)	3.930 (0.92)	7.630 (0.96)	2.287 (0.72)	-1.204 (0.51)	
DEC	-3.277 (3.39)**	16.003 (2.86)**	33.542 (3.24)**	9.683 (1.91)	0.049 (0.01)	
Constant	49.528 (19.46)**	115.894 (9.40)**	186.028 (8.18)**	68.237 (0.54)	5.163 (0.06)	
Observations	479	276	276	341	277	
R-squared	0.07	0.14	0.13	0.08	0.08	
Number of country	48	46	46	41	34	



Fixed Effect Regression of Human Development Indicators, 1983-2006

	Life expectancy	Infant mortality	Under-5-mortality	Primary school enrollment	Secondary school enrollment	Literacy
ACC	2.84	-14.72	-25.26	-.15	-.55	1.36
	7.77)**	(-7.62)**	(-6.67)**	(-.38)	(-4.56)	(.78)
DEC	-1.86	11.88	24.01	2.93	2.36	-17.37
	(-4.07)**	(4.75)**	(5.06)**	(2.31)*	(1.77)	(-5.91)*
Constant	64.37	45.62	72.45	111.83	60.52	79.71
	(348.69)**	(43.3)**	(36.58)**	(22.77)**	(14.24)**	(24.77)
Observations	4394	2870	2466	1465	1418	250
R-squared	0.67	0.68	0.68	0.98	0.99	0.86
Number of countries	200	199	199	188	188	138



Conclusion

- ❑ Growth acceleration episodes are associated with improvement in human development
- ❑ Growth deceleration episodes are associated with deterioration in human development
- ❑ Asymmetry between the acceleration and deceleration: Positive impact of growth acceleration is smaller than the negative impact of growth deceleration on health related human development indicators, especially in poor developing countries
- ❑ Low income countries do not benefit much from the boom, but do pay highest price for the recession in terms of human development.