

Reliving the 50s: the Big Push, Poverty Traps, and Takeoffs in Economic Development

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Since the 1950s...

- We have gotten air conditioning, DVDs, CDs, personal computers, the Internet, cell phones, Ipods, life-saving drugs,
- and sex in movies...
- ...but apparently we haven't made any progress in development economics – major development policymakers are talking about the same theories today as we were in the 1950s.

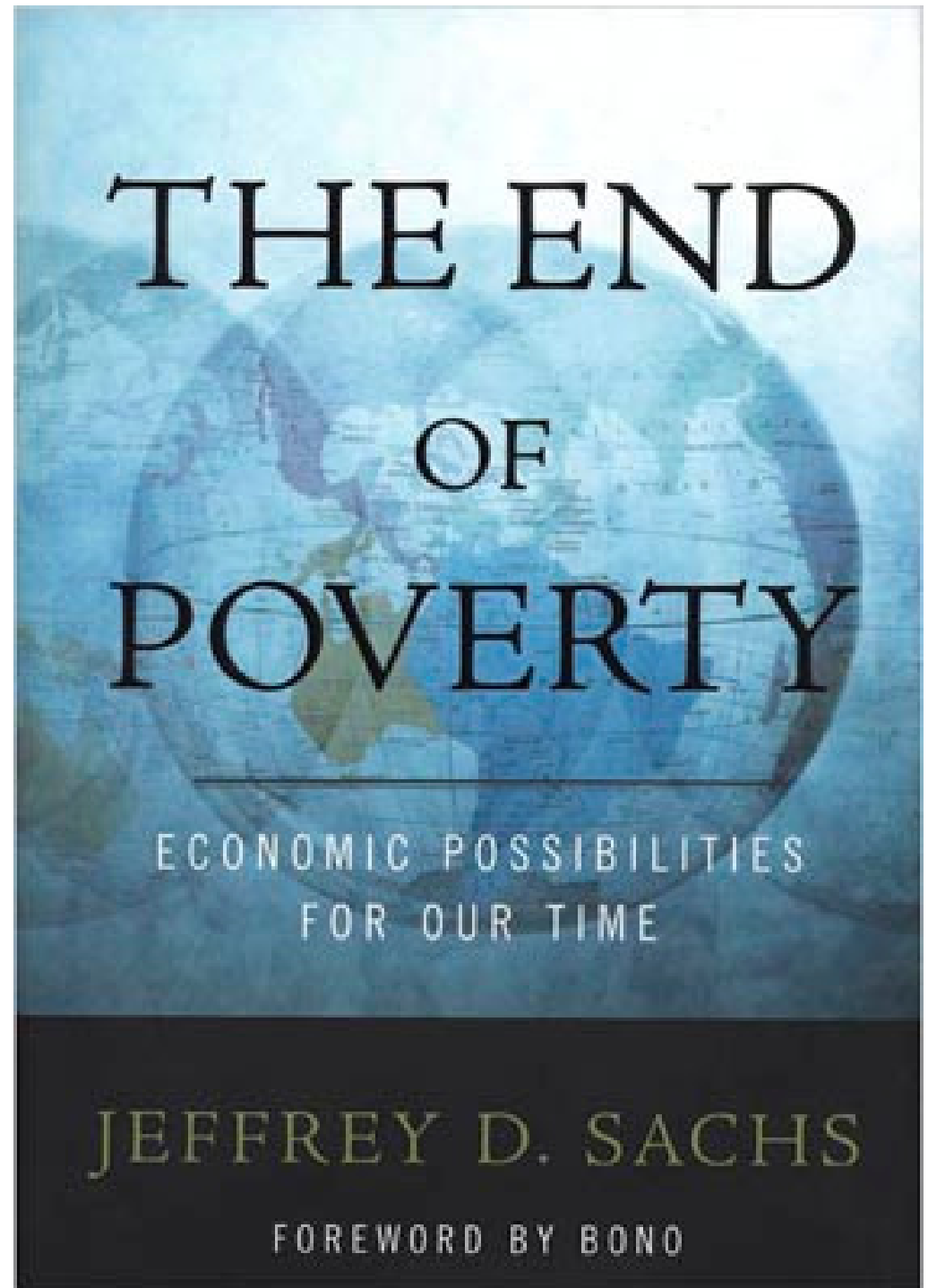
The 1950s: the Classic Development Narrative

- Walt Rostow argued that countries could emerge out of stagnation thanks to an aid-financed increase in investment, after which they would “take off” into self-sustained growth
- Paul Rosenstein-Rodan calls for Big Push: large-scale externally-financed investment program, necessary because of external economies and complementarities between different investments

2005: The Classic Development Narrative makes a comeback in policy circles

- UN Millennium Project recommends in January 2005 “a big push of basic investments between now and 2015”
- “A combination of investments ... can enable African economies to break out of the poverty trap. These interventions need to be applied ... jointly since they strongly reinforce one another.” (Sachs, *The End of Poverty*, March 2005, p. 208)
- “The actions proposed by the Commission constitute a coherent package for Africa. The problems they address are interlocking. They are vicious circles which reinforce one another. They must be tackled together. To do that Africa requires a comprehensive ‘big push’ on many fronts at once.” (Tony Blair Commission for Africa, Spring 2005)

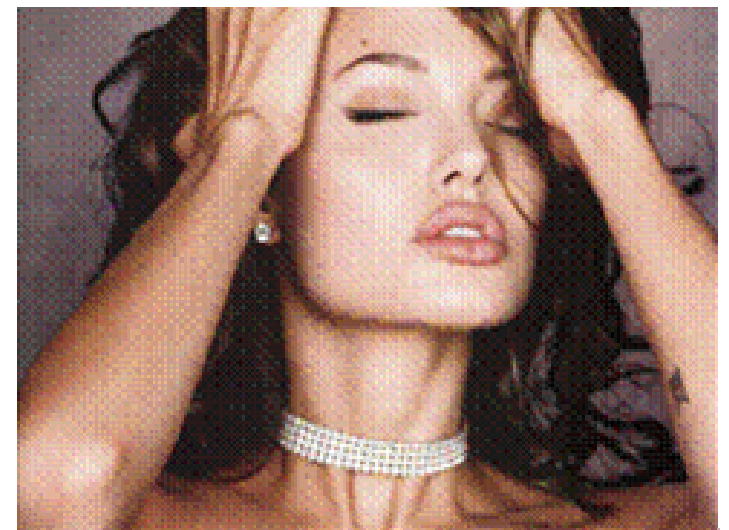
The 2005
statement of
the classic
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narrative



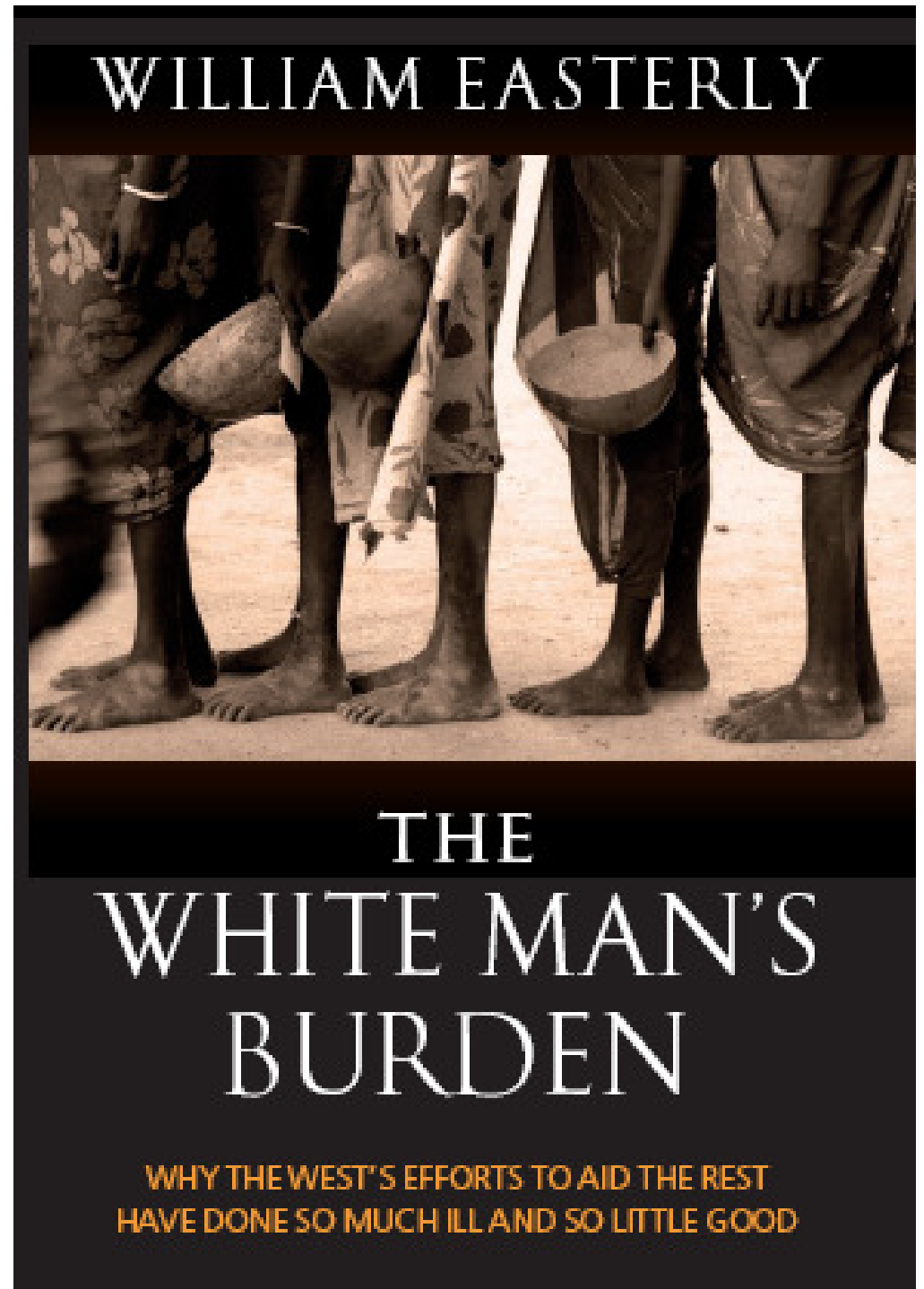
Endorsement of Classic Development Narrative by leading economists

- U2 lead singer Bono: “The plan ...of cutting world poverty by half... is a handbook on how we can finish the job...It’s up to us.”
- Angelina Jolie: “How can we stand by and watch Africa be destroyed?”

Bono and Jolie (2006), “Aid’s effect on growth in dynamic panel estimators with parameter heterogeneity” *Econometrica* XVII: 2, 45-73.



A modest
alternative



Empirical analysis

- Test the Classic Development Narrative: that poor countries are in a “poverty trap”, out of which they need an aid-financed “Big Push”, after which they will “take off” into self-sustained growth
- Test whether poor countries are in a poverty trap and why
- Examine prevalence of “takeoff” pattern for development
- Examine role of foreign aid in poverty traps and takeoffs.
- Note: different parts of the story can be independently true or false, but I test them altogether to see if story as a whole is true.
- Not sure if I pass the Solow “Napoleon” test, but these ideas are taken seriously enough in policy circles to be worth debating and testing.

What paper is not doing

- Not testing whether any possible notion of a poverty trap or multiple equilibrium holds (much good work on theory and empirics of this I am not addressing)
- Not claiming to resolve contentious literature on convergence
- Not claiming to make definitive statement about institutions and growth
- Just testing some sharp predictions implied by classic development narrative

Poverty traps for poor countries

- Poorest countries are too poor to be able to save enough to grow, or population growth is too high.
- Some kind of increasing returns to scale, such as lumpy fixed costs of infrastructure or strong complementarities between investments, creates poverty trap.

Testing the poverty trap for long periods

	<i>1950- 2001</i>	<i>1950-75</i>	<i>1975- 2001</i>	<i>1980- 2001</i>	<i>1985- 2001</i>
<i>Per capita growth for:</i>					
Poorest fifth at beginning of period indicated	1.6%	1.9%	0.8%	0.5%*	0.2%*
All others	1.7%	2.5%**	1.1%	0.9%	1.3%**
Reject stationary income for poorest fifth	Yes	Yes	Yes	Yes	Yes
Fail to reject nonstationary income for poorest fifth	Yes	Yes	Yes	Yes	Yes

**Poorest fifth not statistically distinguishable from zero*

***All others's growth statistically distinguishable from poorest fifth*

Sample: 137 countries. Statistical tests exclude 12 transition economies and Gulf oil states

Testing Absolute Poverty Trap: Per capita growth rates by Quintile of Initial Income in each period

	1950- 2001	1950- 75	1975- 2001	1985- 2001
Quintile measured at beginning of sample period:				
Bottom Quintile	0.016	0.020	0.010	-0.001
t-stat	4.82	8.24	2.13	-0.22
Second from Bottom	0.015	0.024	0.001	0.010
t-stat	4.40	6.00	-0.15	-1.44
Middle	0.009	0.015	0.012	0.007
t-stat	3.98	6.32	2.64	1.69
Second from Top	0.023	0.031	0.015	0.015
t-stat	9.20	10.2	3.94	3.41
Top	0.022	0.029	0.016	0.021
t-stat	11.72	11.92	5.83	9.62
Countries	125	125	125	125

Relationship to aid

- Maybe aid allowed poor countries to escape poverty trap
- However, recent literature fails to find robust positive effects of aid on growth (Easterly, Levine and Roodman 2003, Rajan and Subramanian 2005, Subramanian 2005).
- Divide sample into “low aid” and “high aid”
- First, results on nonstationarity of income in bottom quintile in the previous table are identical in both samples.

Per capita growth rates in bottom quintile of countries in each period depending on whether aid is above or below median

	1950-75	1975-2001	1985-2001	1950-2001
Average growth rate in with countries with aid/GDP below median	0.017	0.014	-0.001	0.015
<i>t-statistic</i>	(5.02)	(1.93)	(-0.17)	(3.07)
Difference in average growth rate between countries with aid/GDP above and below median	0.006	-0.010	0.001	0.001
<i>t-statistic</i>	(1.27)	(-1.11)	(-0.10)	(0.12)
R-squared	0.00	0.01	0.00	0.00
Average Aid/GDP ratios in two groups (data start in 1960):				
<i>Aid/GDP average for below median group for bottom quintile</i>	2.1	6.0	9.7	7.5
<i>Aid/GDP average for above median group for bottom quintile</i>	11.2	17.2	22.5	21.3

Testing Relative Poverty Trap: Relative growth rates by Quintile of Initial Income in Each Period

	1950- 2001	1950- 75	1975- 2001	1985-2001
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Quintile measured at beginning of sample period:

Bottom	-0.005	-0.001	-0.011	-0.020
t-stat	-1.60	-0.60	-2.48	-4.86
Second from Bottom	-0.006	0.003	-0.020	-0.008
t-stat	-1.70	-0.64	-4.19	-1.16
Middle	-0.012	-0.006	-0.009	-0.011
t-stat	-5.18	-2.42	-2.11	-2.68
Second from Top	0.002	0.010	-0.006	-0.004
t-stat	-0.93	3.27	-1.57	-0.86
Top	0.001	0.008	-0.005	0.002
t-stat	-0.51	3.24	-1.74	-0.92
R-squared	0.01	0.01	0.04	0.04

Divergence

- Some evidence of divergence of bottom 3 quintiles above (possibly consistent with Quah's "twin peaks")
- Divergence over the long run (e.g. 1820-2001) as pointed out by Pritchett (1997)
- Even though rich nations in 1820 grew faster over the next two centuries than poor ones, we can reject that predicted growth of poorest countries is zero, failing one of the criteria for absolute poverty traps
- Still it is of interest to see if divergence big time is partial support for relative poverty trap: why is there lower growth of poor countries (as there was in 1985-2001)?

Sharp alternatives: Poverty trap vs. Bad Government

- Jeffrey Sachs says “the claim that Africa’s corruption is the basic source of the problem {the poverty trap} does not withstand practical experience or serious scrutiny”
- Likewise the Millennium Project says “Many reasonably well governed countries are too poor to make the investments to climb the first steps of the ladder.”

Poverty trap versus bad government

- is Divergence changed by conditioning on average institutions?
- My measure of institutions: Polity IV democracy measure either (1) averaged over available years, or (2) restricted to countries independent at least 75 years, or (3) coding colonialism as zero democracy

Instrumental variables for institutions

- Very dicey exercise to satisfy exogeneity and exclusion restrictions
- I bravely use distance from the equator, British legal origin, French legal origin, German legal origin, and Socialist legal origin as instruments for democracy measure

IV Regressions for Per Capita Growth 1820-2001
(t-stats in parentheses)

Regressions	1	2	3
Log initial income	0.00269 <i>1.64</i>	0.00184 <i>1.03</i>	-0.00069 <i>-0.35</i>
Polity IV Democracy Average over whole period	0.00067 <i>2.57</i>	0.00065 <i>3.44</i>	
Polity IV Democracy Average Corrected for Colonies			0.00109 <i>3.74</i>
Constant	-0.00791 <i>-0.77</i>	-0.00142 <i>-0.12</i>	0.01374 <i>1.13</i>
Observations	45	30	45

Divergence in recent data, 1960-2002

- Early growth literature did not find divergence, but poor performance of low and middle income countries over 1985-2002 means we now have divergence in the data for the whole period 1960-2002 relative to initial income in 1960.
- Do we still get divergence conditioning on institutions like “democracy” or “economic freedom”?

IV regressions for growth per capita 1960-2002

	0.0043	-0.0124	-0.0177	-0.0145
Initial income	<i>3.12</i>	<i>-2.13</i>	<i>-2.17</i>	<i>-2.21</i>
Average Polity IV Democracy, 1960-2002		0.0048		
		<i>2.80</i>		
Average Freedom House Political Liberties, 1972- 2002			0.0126	
			<i>2.52</i>	
Average Economic Freedom, 1970- 2002				0.0225
				<i>2.63</i>
Constant	-0.0148	0.0855	0.1918	0.0007
	<i>-1.40</i>	<i>2.42</i>	<i>2.48</i>	<i>0.05</i>
Observations	116	91	93	85

Go back to 1985-2001 period identified as “poverty trap” earlier

- Define measures of “bad government” defined as either/both worst democracy rating and worst corruption rating in 1984.
- Control for both initial income and initial “bad government”
- Bad government is significant predictor of lousy growth 1985-2001, while initial income is no longer significant.

Testing for takeoffs

- Define takeoff as a shift in adjacent periods from “zero per capita growth” to “sustained normal positive per capita growth”
- Certainly some general notion of takeoff would apply to rich countries – but very gradual over centuries
- Classic Development Narrative implies abrupt, rapid, permanent Takeoff -- there is a break such that all prior periods are “zero growth” and all subsequent periods are “normal growth.”
- I first try some heuristic definitions looking for takeoff episodes, then I will apply more formal statistical analysis

Episode analysis

- I will arbitrarily define periods, “zero”, and “normal” and then do some robustness checks
- I arbitrarily define zero per capita growth as growth between -0.5 and 0.5 percent per annum, and “normal” growth as any sustained growth above 1.5 percent.

Rich country takeoffs

- Periods are determined by available dates in Maddison: 1600-1700, 1700-1820, 1820-1870, 1870-1913, 1913-1960, 1960-2001 (note: Maddison has annual data 1950-2001, but I use 1960 because 1950 was unusual for some war-devastated countries)
- Although all rich countries gradually moved out of stagnation into growth...
- ...Out of 20 developed countries with data, only 1 satisfies definition of rapid, abrupt “take-off”:
Japan

Takeoffs in developing regions

<i>Region</i>	<i>1820- 1870</i>	<i>1870- 1913</i>	<i>1913- 1950</i>	<i>1950- 1975</i>	<i>1975- 2001</i>
Africa	0.3%	0.6%	0.9%	1.8%	0.2%
Caribbean countries (24)	-0.3%	1.8%	1.4%	3.2%	1.0%
East Asian countries (16)	-0.1%	0.5%	-0.1%	3.5%	3.4%
East European Countries (7)	0.6%	1.4%	0.6%	3.7%	0.4%
Latin America	0.0%	1.8%	1.4%	2.5%	0.8%
West Asian countries (15)	0.4%	0.9%	1.3%	4.4%	0.2%

Only East Asia satisfies definition for takeoff

Maddison has historical data for 44
developing countries at least as early as
1913

- Only 5 takeoffs: Hong Kong, India, Singapore, South Korea, Thailand
- Others had gradual acceleration of growth, erratic growth, and/or especially failed to sustain “normal” growth
- Robustness check: define zero growth as between -1 and 1 and normal growth as above 2 percent per capita: this adds China, Indonesia, Taiwan, and Vietnam, but drops Hong Kong, India, and Singapore, whose growth had intermediate phase of 1.5 percent.

More formal testing

- Bai and Perron test for structural breaks, determines # of breaks and date of breaks
- Choose parameters so that max of 2 breaks in postwar data, 3 breaks for longer time series.
- Data from Maddison on 139 countries for at least 1950-2001, longer for many countries as early as 1870.

Results

- Although the takeoff hypothesis predicts one break, the procedure found either 0 or 2 or more breaks in 109 countries; none of the 30 countries with one break met the takeoff definition.
- Define takeoffs mechanically as before as moving from $\{-0.5, 0.5\}$ to >1.5 . Gives only one takeoff in 139 countries: Costa Rica (1945)
- Alternatively define takeoff as a consecutive sequence of growth regimes not significantly different than zero, followed by consecutive sequence of regimes with growth significantly greater than zero.
- This procedure finds only 4 takeoffs in 139 countries: Bolivia, Brazil, Cape Verde, and Costa Rica.
- All procedures agree that takeoffs are a small minority of growth experiences

Takeoffs in mechanical procedure and aid, 1960-75

Country Name	Foreign aid as a percent of Gross National Income, 1960-75 except where noted
China	0.00
Hong Kong	0.11
India	1.82
Indonesia	3.93
Korea, Rep. (incl 50s)	8.39
Singapore	0.46
Taiwan (incl 50s)	3.75
Thailand	0.90
<i>Median for whole sample</i>	2.78

Relationship to aid

- Aid above median for 3 out of 8 takeoffs in episode analysis: Indonesia, South Korea, Taiwan. Korea seems like strongest case of aid-financed takeoff.
- However, there were other countries with high aid that did not take off.
- Aid/GDP 1960-75 is not a significant predictor of probability of having a takeoff 1950-75 (earlier data not available, except for Korea and Taiwan)

Investment to GDP ratios in Takeoff Countries

	Investment to GDP 1950-75	Percentile ranking of investment to GDP 1950- 75
China**	12.8	38%
Hong Kong*	30.8	86%
India*	11.0	31%
Indonesia**	9.2	26%
Singapore*	43.0	100%
South Korea*	19.0	59%
Taiwan**	14.0	46%
Thailand*	23.6	71%

Relationship of investment to takeoffs

- There are some high investment takeoffs, especially Singapore (not aid-financed)
- However, 4 of the 8 takeoffs (according to either definition) have investment below the median for sample
- Only one takeoff that had both above median aid and above median investment – South Korea
- In a probit regression, investment/GDP 1950-75 is not a significant predictor of who will take off, i.e. there were too many other high investment countries that did not takeoff.

Bottom line on takeoffs

- In mechanical episode analysis, including rich countries, historical data, and modern data, I considered 127 countries and found 9 takeoffs.
- 71 countries made the transition in historical or modern period from below \$2000 per capita income (arbitrary breakpoint for “low income”) to above it, and only 8 did so by means of takeoffs (1 takeoff is still below \$2000).
- Formal statistical procedure finds 1 takeoff out of 139 countries with Maddison historical data
- All procedures agree that takeoffs are not the typical development experience
- Takeoffs not related to aid or investment

Conclusion

- Development experience contradicts traditional narrative of a poverty trap followed by aid-induced Big Push, followed by Takeoff.
- Evidence does not support poverty traps at low income based on saving behavior or technology
- Evidence suggests takeoffs are an atypical development experience, and they are not related to aid or investment.
- No reason from historical experience to advocate Aid-Financed Big Push From the Top as a means to achieve economic development