

Asia: Challenges of Stability and Growth
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Growth Slowdowns and the Middle-Income Trap*

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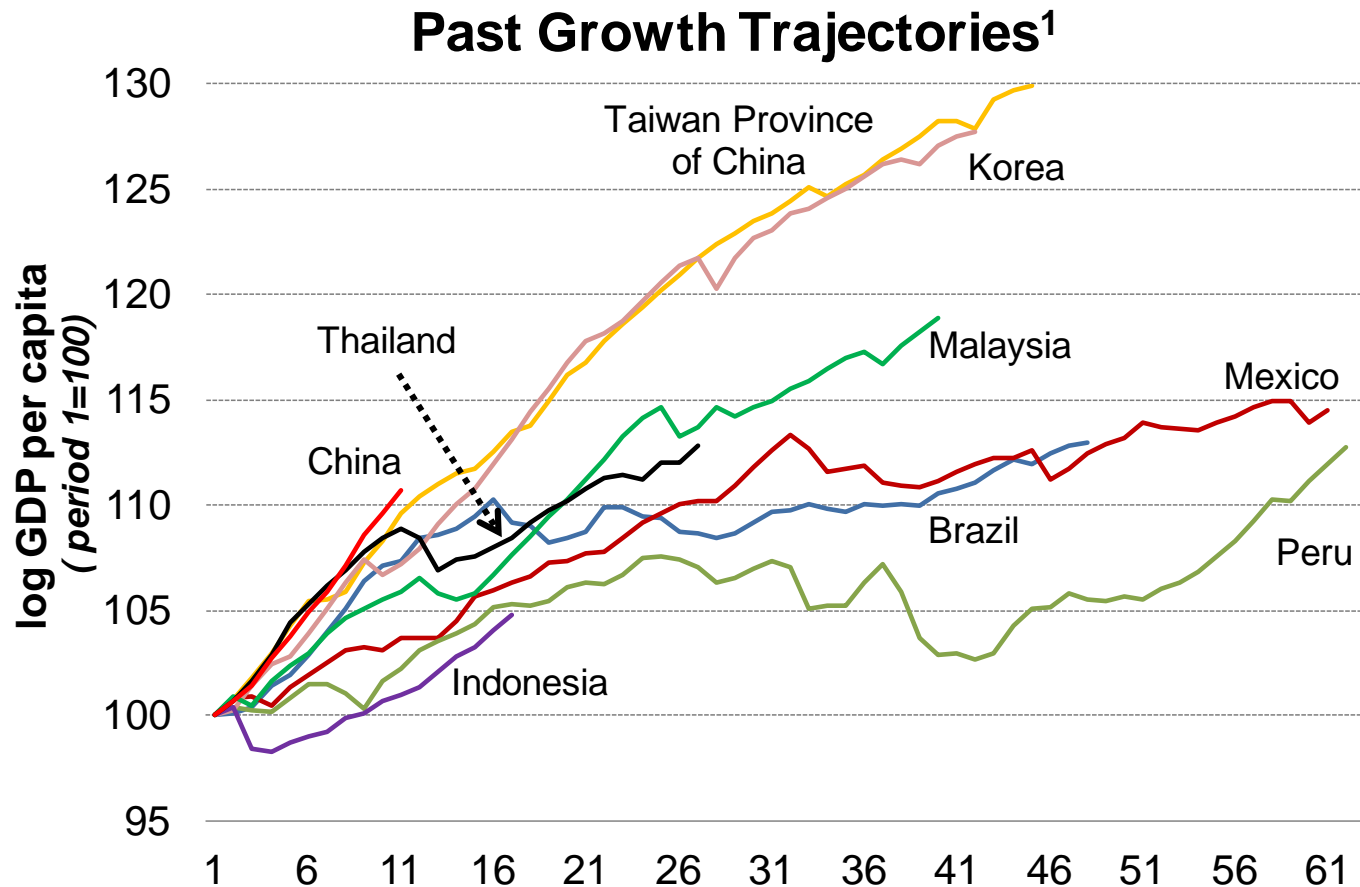
* Based on Aiyar, Duval, Puy, Wu and Zhang (2013), "Growth slowdowns and the middle-income trap", IMF Working Paper No. 13/71.

Introduction

- “Hills, plateaus, mountains and plains” of growth
 - Growth very unstable even at low frequencies
 - Small empirical literature on growth turning points
- An “endless plain” at middle-income level?
 - Acute anxiety in MIEs but lessons from past mixed *a priori*

Introduction

- Many Asian economies have reached a stage when some others in the past experienced a substantial *growth slowdown*

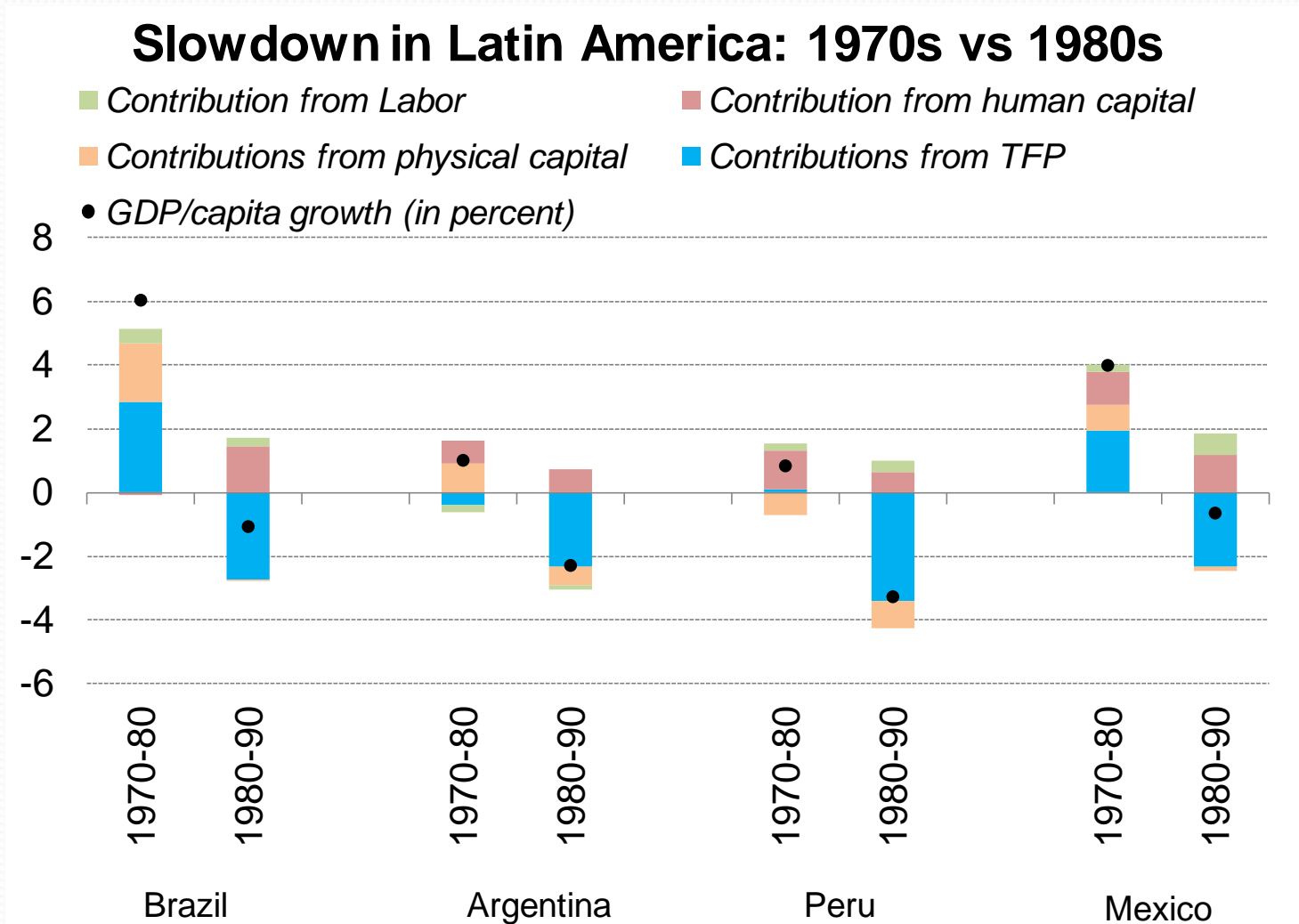


Sources: Heston and others (2012) and authors calculations.

¹ GDP per capita is in 2005 PPP adjusted terms. The slope of each series reflects the growth rate. Period = 1 defined as the year when GDP per capita for the country considered reached US\$ 3000 in PPP terms.

Introduction

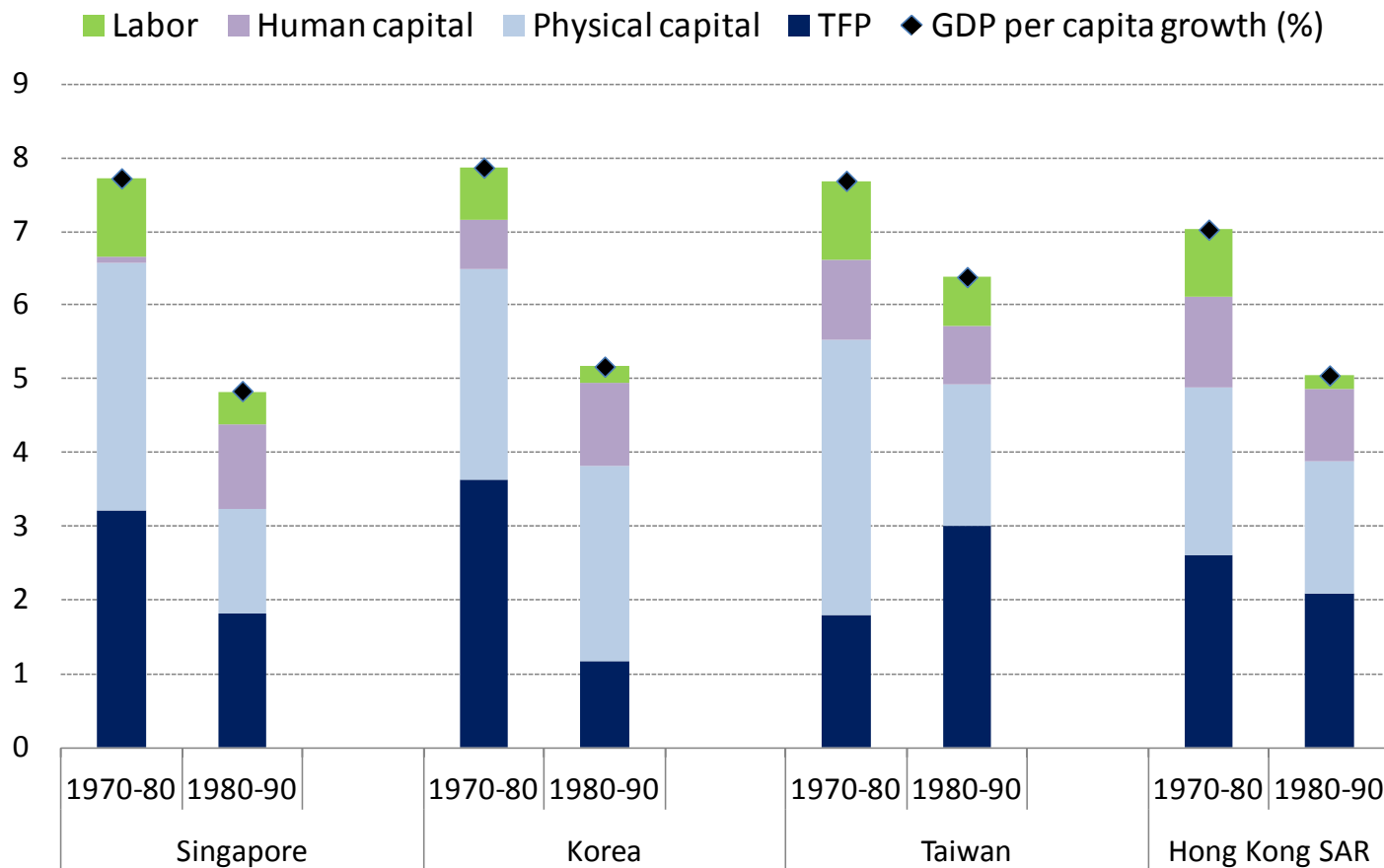
- Slowdowns in growth rates have typically been attributable to steep falls in TFP growth



Introduction

- The Asian “Tigers” were spared: TFP growth slowdown gradual without sustained collapses

Slowdown in the Four Asian "Tigers": 1970s vs. 1980s



Introduction

- “Hills, plateaus, mountains and plains” of growth
 - Growth very unstable even at low frequencies
 - Small empirical literature on growth turning points
- An “endless plain” at middle-income level?
 - Acute anxiety in MIEs but lessons from past mixed *a priori*
 - No clear theoretical foundations for a middle-income trap...
 - ...and just 1 empirical paper (Eichengreen, Park, Shin, 2013)
- This paper: middle-income trap as special case of (sustained) growth slowdowns, with focus on TFP
 - Are slowdowns more frequent at middle-income level?
 - What are the drivers, and do they differ for MIEs?
 - Policy implications for MIEs in Asia

Identifying Growth Slowdowns

- An approach grounded in standard growth theory: use predictions from a conditional convergence framework to identify slowdowns as “substantial” and “sustained” deviations from the predicted growth path.
- Predicted path \sim Mankiw-Romer-Weil (1992): Per capita GDP growth regressed on the lagged income level and standard measures of physical and human capital.
- Data:
 - Annual data from PWT used to compute a five year panel of GDP per capita growth rates. Sample covers 138 countries over 12 periods (1955-2009).
 - Mincerian coefficients method used to calculate H (\sim Hall and Jones 1999, Duval and Maisonrouve 2010).

Identifying Growth Slowdowns

- Deviation from predicted path = residuals = res = actual rate of growth minus predicted rate of growth.
- Country i experiences a growth slowdown in period t if the *two* following conditions hold:

$$res_t^i - res_{t-1}^i < p(0.20) \quad (1)$$

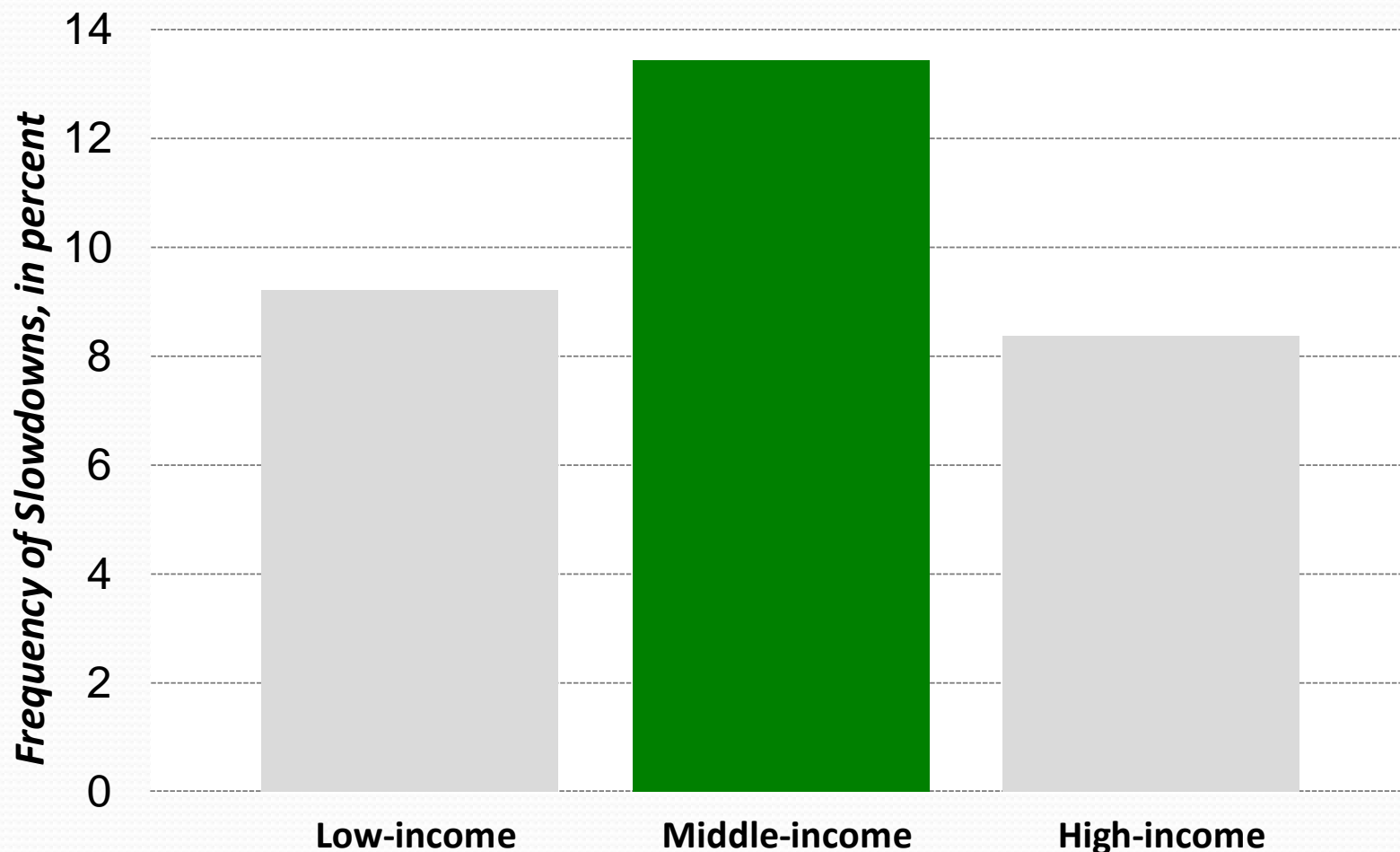
$$res_{t+1}^i - res_{t-1}^i < p(0.20) \quad (2)$$

where $p(0.20)$ denotes the 20th percentile of the empirical distribution of *differences* in residuals from one (5-year) period to another.

- ➔ Slowdown occurs if fall in growth path sustained for at least a decade

There seems to be a “middle income trap”

Higher frequency of sustained slowdowns for MIEs¹



¹ The figure considers a low income threshold of US\$2,000 and a high income threshold of US\$15,000 in PPP terms, but is robust to a range of alternative thresholds.

Determinants of Growth Slowdowns

- Multiple potential causes of slowdowns → consider as broad a range of factors as possible, based on growth literature.
- Set of regressors (lagged one period) comprises 50+ variables (both in levels and differences), grouped into 7 categories:
 1. Institutions;
 2. Demography;
 3. Infrastructure;
 4. Macroeconomic Environment and Policies;
 5. Economic Structure;
 6. Trade structure;
 7. Other.
- Run Probit specifications to identify factors increasing or decreasing the probability of a slowdown.

Determinants of Growth Slowdowns

- The inclusion of a wide set of regressors has 2 drawbacks:
 - Model uncertainty
 - Data availability
- To address model uncertainty we use Bayesian Model Averaging techniques after every probit estimation:
 - WALs methodology: Magnus et al (J. Econometrics 2010).
 - BMA popularized by Sala-i-Martin et al (AER 2004).
- To address data overlap problems, we:
 - group variables into 7 categories and examine each category *separately* (larger sample sizes *within* each category).
 - perform the full exercise (WALS only) as robustness check

Econometric results: institutions

I Final Probit Specification

Variable	Levels		Differences	
	Coef.	P>z	Coef.	P>z
Strong rule of Law	-0.089	0.005		
Small government			-0.173	0.009
Regulation			-0.210	0.003
Pseudo R2	0.07			
Obs.	599			

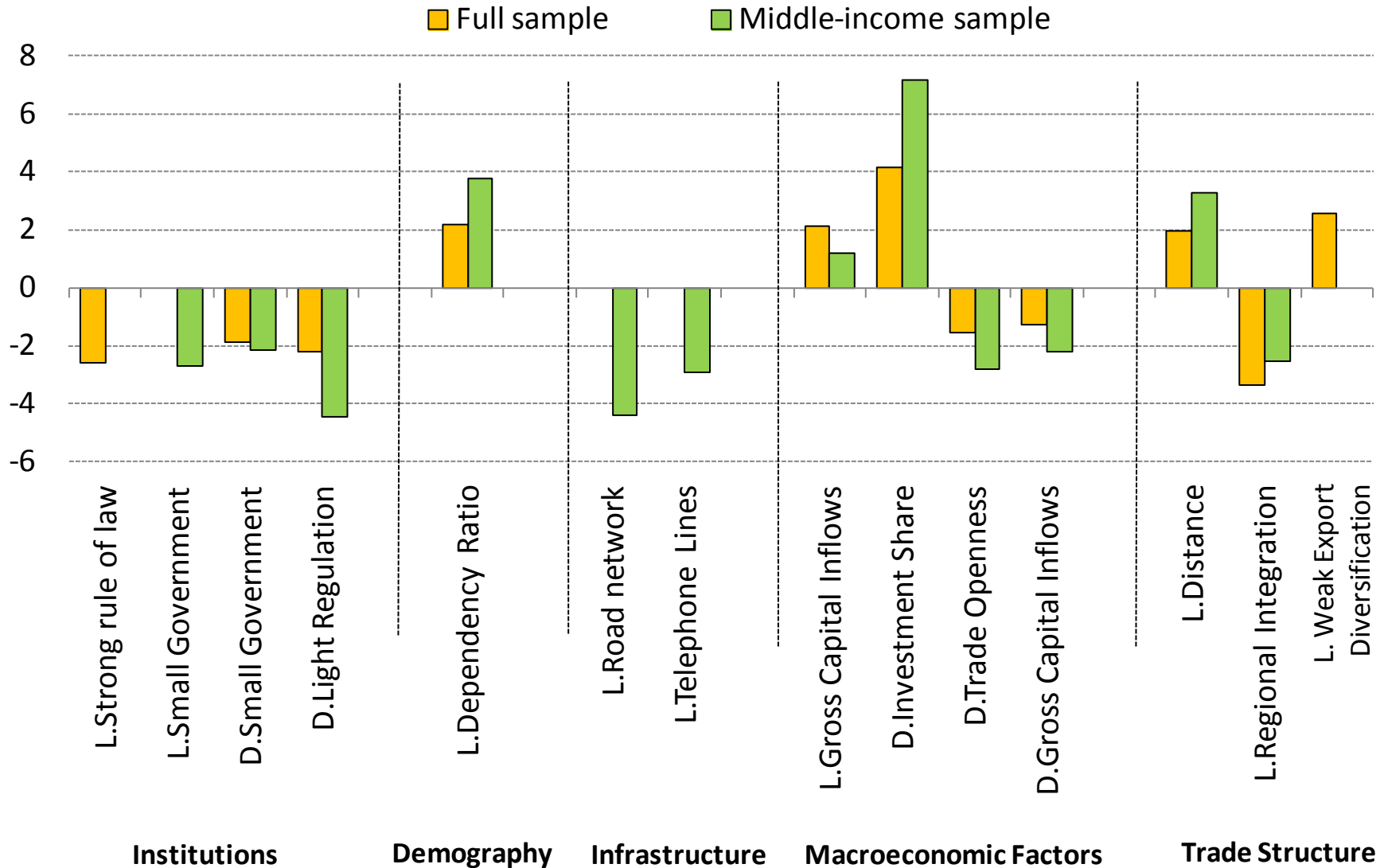
II Bayesian Averaging Robustness Tests

Institutions	Levels		Differences	
	WALS t	BMA PIP	WALS t	BMA PIP
Small government	0.67	0.06	-2.43	0.84
Strong rule of law	-1.12	0.50	-1.16	0.14
Freedom to trade	-0.16	0.08	-1.15	0.09
Light regulation	-0.78	0.08	-2.34	0.91
Financial openness	0.78	0.05	-0.86	0.09

Key robust findings

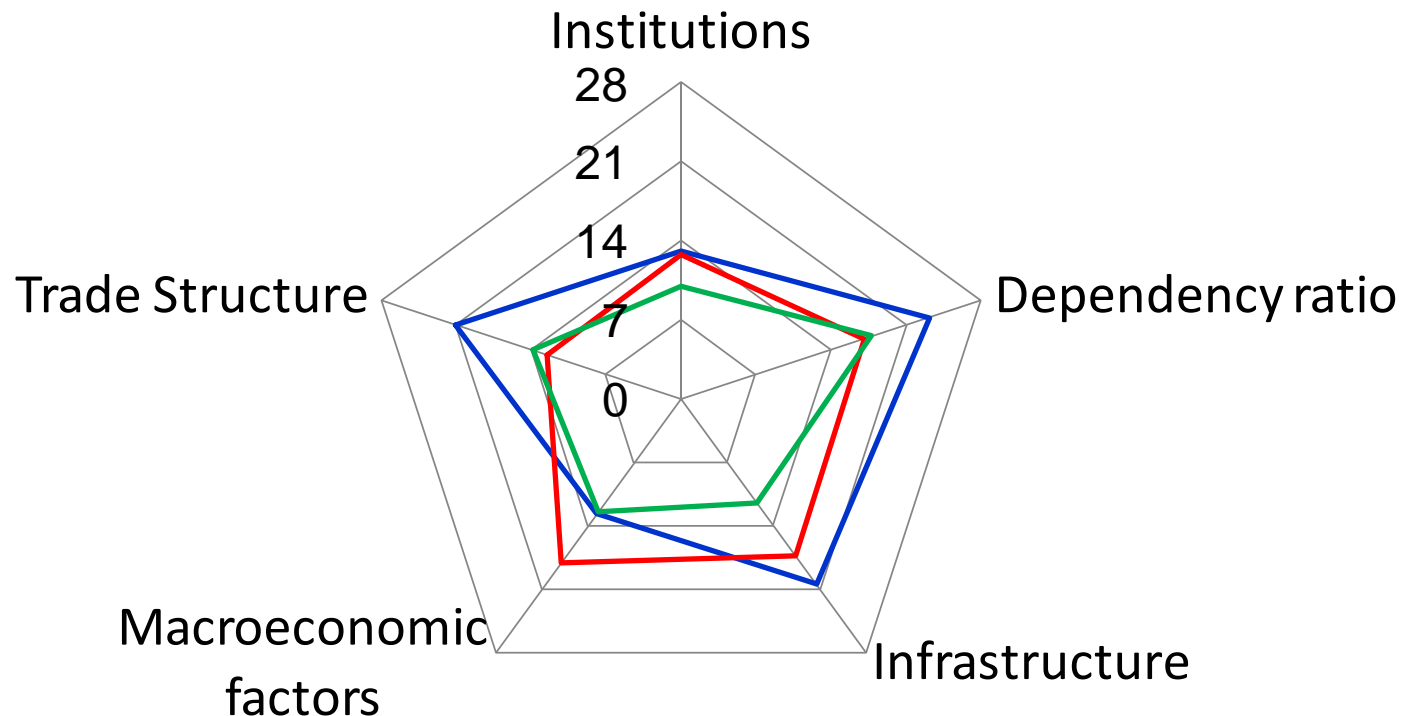
The Impact of Changes in Fundamentals on the Probability of a Sustained Slowdown

(In percent; shift from median to 75th percentile of distribution of explanatory variable)



Strengths and weaknesses of Emerging Asia vs. Latin America and MENA

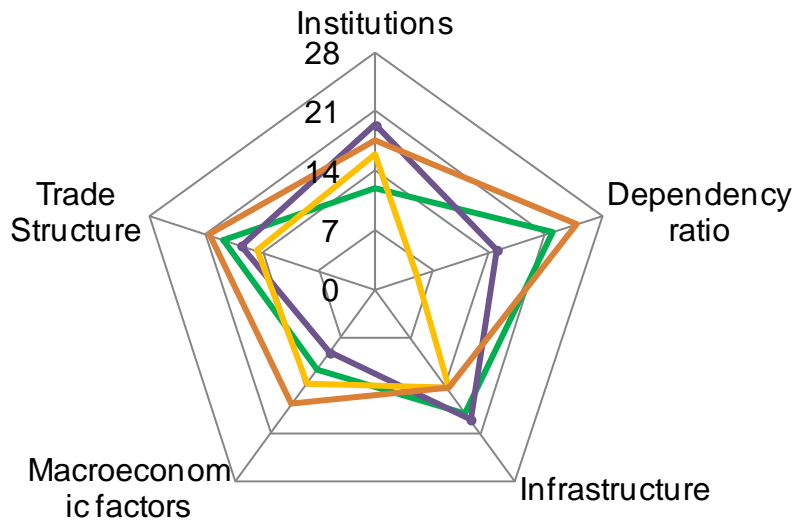
— Emerging Asia — Latin America — Middle East & North Africa



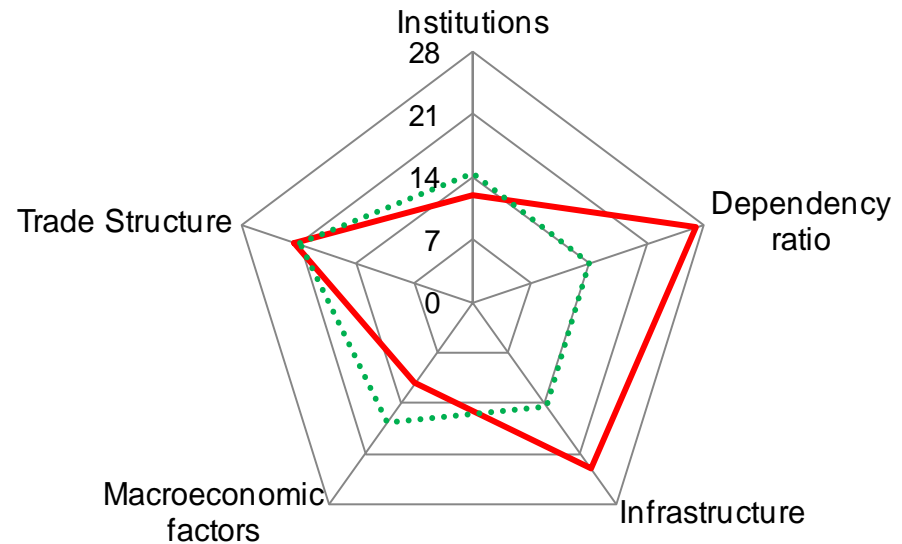
Note: Latest available observations for each individual variable, with the exception of dependency ratios which are projected 2020 values. See Aiyar and others (2013) for details. *Institutions* includes small government involvement in the economy, strong rule of law and light regulation; *Infrastructure* includes telephone lines and road networks; *Macroeconomic factors* includes low gross capital inflows, the change over 2008-2012 in capital inflows and trade openness, and the (negative of the) change in the investment-to-GDP ratio; *Trade structure* includes strong regional integration and low GDP-weighted distance. Numbers in the panels represent a simple average of the rankings along each individual variable.

Strengths and weaknesses of various Asian Middle-income economies

Indonesia Malaysia Philippines Thailand



China India





THANK YOU!

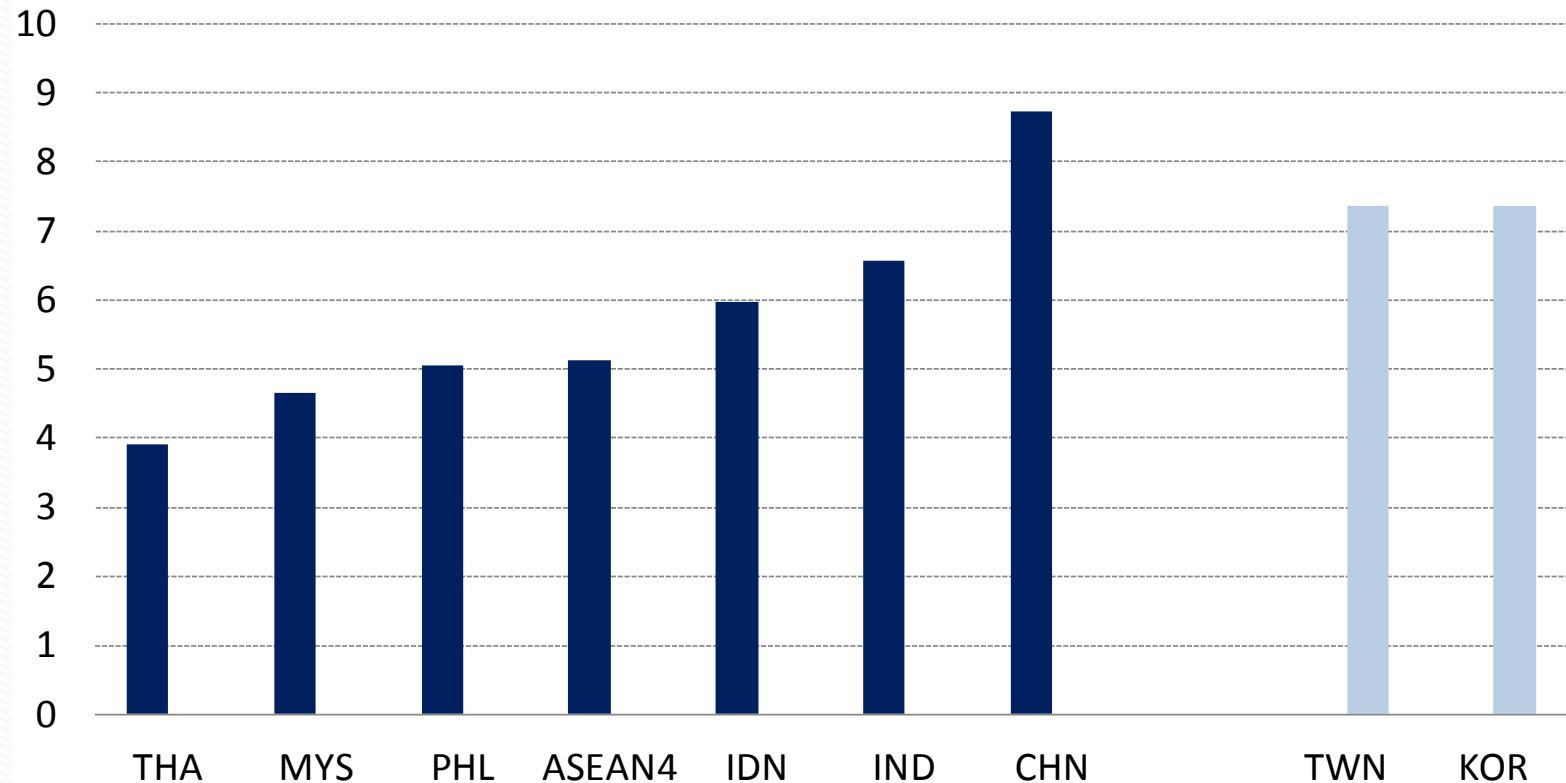


BACKGROUND SLIDES

Introduction

- Today's middle-income Asia: less stellar than often thought...

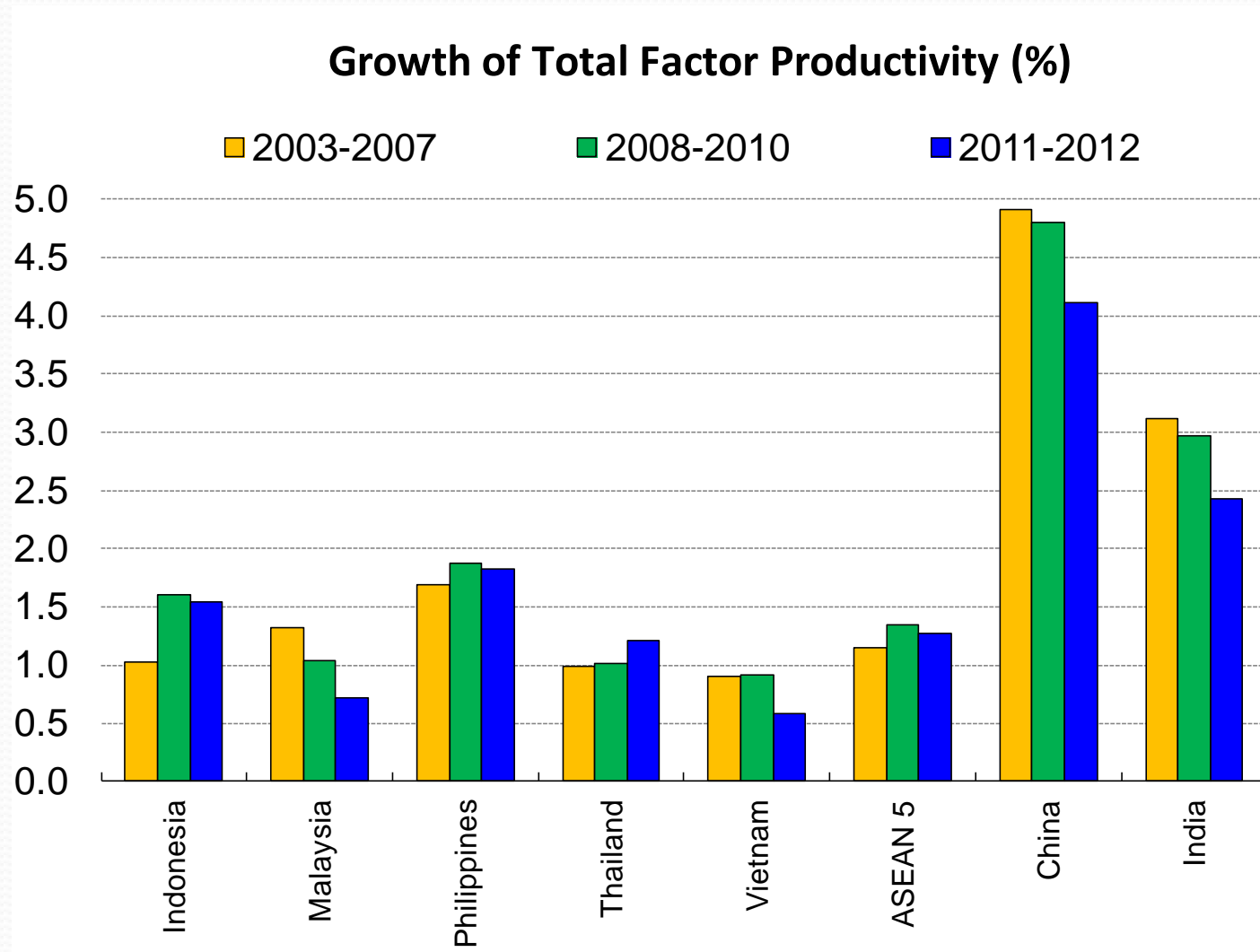
Trend Growth: today's fast-growing Asian middle-income economies vs past Asian success stories (%)



Note: The figure compares 2011-2012 estimated potential growth for China, India, Indonesia, Malaysia, the Philippines, Thailand, and the ASEAN4 with the 5-year average trend growth of Korea and Taiwan POC back when their income per capita relative to the US was the same as the maximum of ASEAN4's income per capita relative to the US today.

Introduction

- ...and TFP growth in middle-income Asia is either slowing down or low to begin with



Stylized Fact 1: frequency of slowdowns higher in Latin America and MENA

Table 1: Distribution of Slowdown Episodes by Region

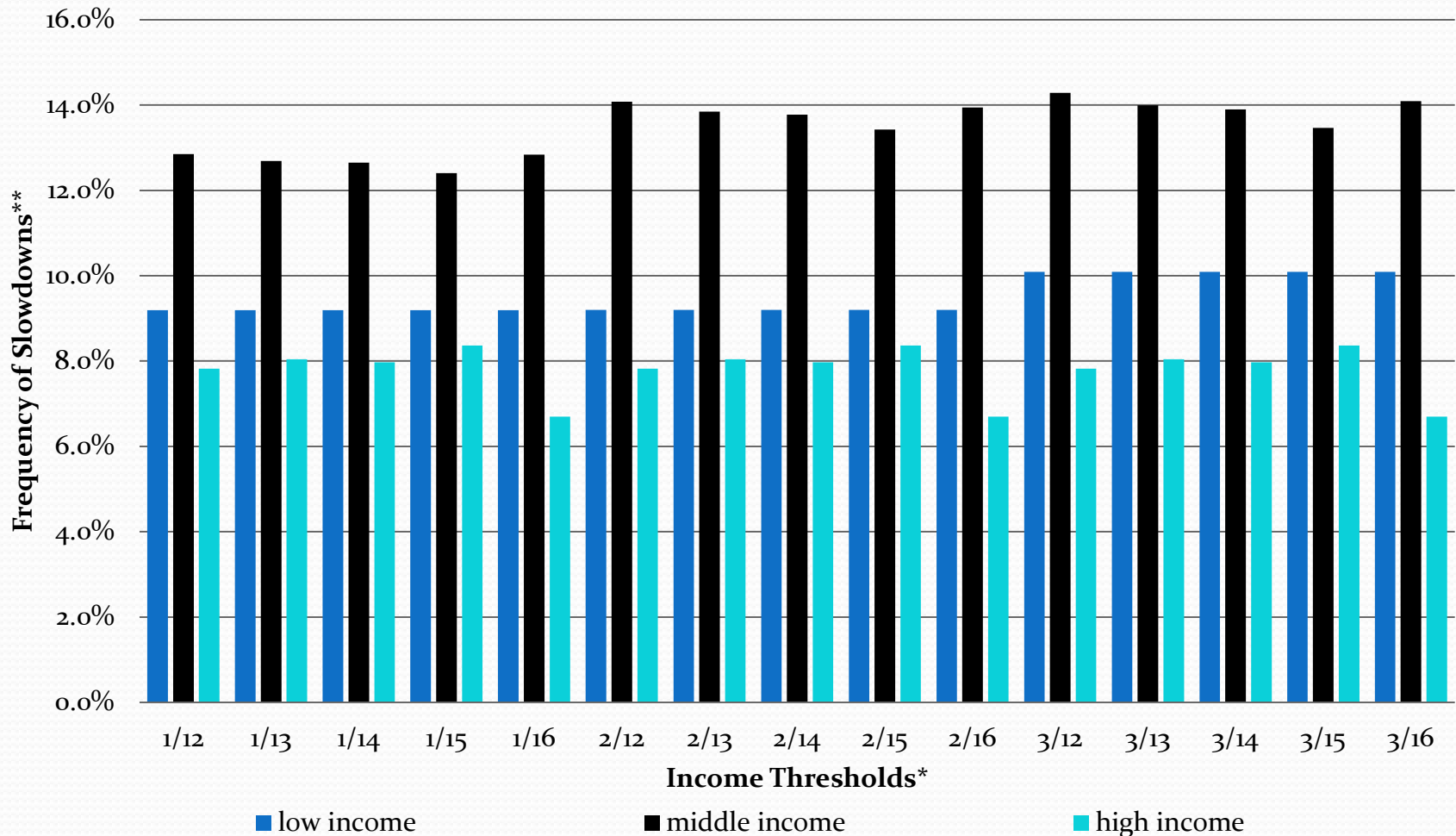
	Advanced	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa	Total
0 = no slowdown	205	130	79	181	107	58	242	1,002
1 = slowdown	10	17	4	33	22	3	34	123
Total	215	147	83	214	129	61	276	1125
Slowdown Frequency	5%	13%	5%	18%	21%	5%	14%	11%

Stylized Fact 2: frequency of slowdowns higher in late 1970s – early 1980s

Table 2: Distribution of Slowdown Episodes by Time Period

	1960-1965	1965-1970	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000	2000-2005	Total
0 = no slowdown	97	114	106	98	90	122	125	125	125	1002
1 = slowdown	2	6	14	22	30	10	13	13	13	123
Total	99	120	120	120	120	132	138	138	138	1125
Slowdown frequency	2%	5%	12%	18%	25%	8%	9%	9%	9%	11%

Stylized Fact 3: There seems to be a “middle income trap”



* 1/12 refers to a low income threshold of 1000\$ and a high income threshold of 12000\$.

** frequencies are calculated as the ratio of slowdown episodes to the total number of observations per income class

Econometric results: institutions

I Final Probit Specification

Variable	Levels		Differences	
	Coef.	P>z	Coef.	P>z
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Full sample results: summary Table (1/2)

Summary Table				
Regressor	Probit Coeff.	Average Marginal Effects	Change in slowdown probability from...	
			<i>p(50)-p(25)</i>	<i>p(75)-p(50)</i>
Institutions				
L.Rule of Law	-0.089***	-1.7%	-3.1%	-2.6%
D.Small Size of Government	-0.173***	-3.2%	-1.8%	-1.9%
D.Light Regulation	-0.210***	-3.9%	-2.3%	-2.2%
Demography				
L.Dependency Ratio	0.008***	0.1%	2.7%	2.2%
D.Sex (males/females) ratio	0.075***	1.4%	0.6%	0.6%
Macro Environment and Policies				
L.Gross Capital Inflows	0.028***	0.5%	1.4%	2.1%
D.Investment Share	0.059***	1.1%	3.4%	4.2%
D.Trade Openness	-0.013***	-0.2%	-1.3%	-1.5%
D.Gross Capital Inflows	-0.016**	-0.3%	-1.1%	-1.3%

Full sample results: summary Table (2/2)

Summary Table				
Regressor	Probit Coeff.	Average Marginal Effects	Change in slowdown probability from...	
			<i>p</i> (50)- <i>p</i> (25)	<i>p</i> (75)- <i>p</i> (50)
Economic Structure				
L.Agriculture Share	-0.012**	-0.2%	-2.1%	-3.4%
L.Services Share	-0.015**	-0.3%	-3.0%	-2.4%
D.Agriculture Share	-0.039**	-0.7%	-1.6%	-0.7%
D.Services Share	-0.035**	-0.7%	-2.0%	-1.6%
L.Lack of Output Diversification	0.034**	0.5%	2.3%	8.2%
Trade				
L.Distance	0.116***	2.4%	2.9%	1.9%
L.Regional Integration	-0.008***	-0.2%	-2.5%	-3.4%
L.Lack of Export Diversification	0.133***	2.7%	2.5%	2.5%
Others				
Tropics	0.264**	5.0%	3.0%	1.9%
War and Civil conflicts	0.476***	9.0%		

Are middle income countries different?

- We repeat the empirical analysis restricting the sample to MICs
→ Most of the results hold.
- But we note the following differences:
 - Institutions:
 - *Government Size* replaces the *Rule of Law* as the most significant institution variable in levels.
 - The coefficient on *Regulation* in differences is twice as large for MICs than for the full sample of countries. Could reflect distance-to-frontier effects (Aghion et al (2005)).
 - Infrastructure:
 - Both *Power* generating capacity and *Telephone Lines* per head emerge as potential bottlenecks to growth.
 - Economic structure:
 - *Trade (and output) diversification* yields no marginal benefit for MICs, possibly because gains from diversification occur at lower-income levels.

Summary Table: Full Sample vs MICs (1/2)

Summary Table		
Regressor	Coeff Full Sample	Coeff Middle income
Institutions		
L.Rule of Law	-0.089***	-0.150**
L.Small Size of Government		
D.Small Size of Government	-0.173***	-0.185*
D.Light Regulation	-0.210***	-0.422***
Demography		
L.Dependency ratio	0.008***	0.011***
D.Sex (males/females) ratio	0.075***	0.146**
Infrastructure		
L.Road network		-0.126**
L.Telephone Lines		-0.168**
Macro Environment and Policies		
L.gross_capital_inflows	0.028***	0.030*
D.investment_share	0.059***	0.106***
D.Trade_openness	-0.013***	-0.022**
D.gross_capital_inflows	-0.016**	-0.040***
D.TOT		-0.008*

Summary Table: Full Sample vs MICs (2/2)

Summary Table		
Regressor	Coeff Full Sample	Coeff Middle income
Economic Structure		
L.Agriculture share	-0.012**	
L.Services share	-0.015**	
D.Agriculture share	-0.039**	-0.040*
D.Services share	-0.035**	-0.038**
L.Lack of Output Diversification	0.034**	
Trade		
L.Distance	0.116***	0.115*
L.Regional Integration	-0.008***	-0.011*
L.Lack of Export Diversification	0.133***	
Others		
Tropics	0.264**	
War and Civil conflicts	0.476***	0.544***

Policy Implications

- Much heterogeneity across variables in how amenable they are to policy, and over what time horizon
- “Short / Medium Run”
 - Prudential regulation to limit build-up of excessive capital inflows (and cushion impact of a sudden stop)
 - Measures to enhance regional trade integration
 - Public investment in infrastructure projects / PPPs
 - Ease overly stringent product and labor market regulations
- “Medium / Long Run”
 - Rule of law
 - Demography (fertility incentives, raise female participation...)
- Policy invariant: Geography (distance), climate...etc.

Identifying Vulnerabilities: the “Trap Map” for 7 middle-income Asian countries

(NB: based on above econometric results, so not necessarily on current levels of variables)

A “Trap Map” for Asian Middle-Income Countries

Country					Output	Macroeconomic		
	Institutions	Demography	Communication	Road	composition	Facors	Trade	
China	3	6	7	4	6	5	3	3
India	4	3	1	7	4	3	1	1
Indonesia	5	5	4	1	3	6	2	2
Malaysia	1	4	5	2	7	1	4	4
Philippines	2	1	2	6	5	2	5	5
Thailand	6	7	3	3	1	7	6	6
Vietnam	7	2	6	5	2	4	7	7

“Trap Map” Extension: Middle income countries in Asia, Latin America and Mena

(NB: based on above econometric results, so not necessarily on current levels of variables)

A “Trap Map” for Middle-Income Countries

Country	Institutions	Demography	Communication	Road	Output composition	Macroeconomic Facors	Trade
Developing Asia	17.4	21.7	17.9	23.0	22.3	15.6	21.9
Latam	10.8	15.7	21.5	13.7	17.4	12.5	4.5
MENA	12.7	19.8	16.5	7.3	4.2	14.1	18.3

Developing Asia	3	3	2	3	3	3	3
Latam	1	1	3	2	2	1	1
MENA	2	2	1	1	1	2	2