Political Economy, Global Development and Sustainability

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April 2024

A. Introduction

- **The field of political economy started only since 1980s, as a result of joint effort by economists and political scientists**
- **Various issues of interest include:**
  - **legislature (one congress or two-tiers) and voting:**
    - **voting system (French 2-stage voting, US electro)**
    - **majority rule (1/2 or super-majority)**
    - **impeachment procedure**
  - **the number and the breakup of nations (including trading blocs formation):**
    - **breakups: Soviet Union, Northern Ireland, Brexit, debates of Quebec in Canada**
    - **reunification: Germany, formation of new trading blocs (RCEP, CPTPP)**
  - **protectionism and lobbying:**
    - **incumbents want to lobby to block new entrants (domestic or foreign)**
    - **lobbyists want to influence industrial and trade policies**
  - **political reforms and economic growth:**
    - **pro-elite or pro-citizen**
    - **democracy vs nondemocracy**
    - **pre-/post-reform and economic performance**

- **Early contributors include:**
  ○ **Tabellini (1991), Piketty (1995): Redistributive Politics**
  ○ **Alesina-Spolaore (1997): the Number and Size of Nations**
  ○ **Bolton-Roland (1997): the breakup of nations**
  ○ **Grossman-Helpman (1998): lobby**
  ○ **Drazen (2000): graduate-level textbook on political economy**
- **New development:**
  ○ **Acemoglu-Robinson (2012), Why Nations Fail**
  ○ **Acemoglu-Egorov-Sonin (2015): political economy in a changing world**
  ○ *Acemoglu-Restrepo-Robinson* **(2019), democracy and growth**
  ○ *Easterly* **(2019 & forthcoming): political reforms and growth**
  ○ **Coibion-Gorodnichenko-Weber (2020): political polarization**
  ○ *Baldwin* **(forthcoming): the role of service trade in global development**
  ○ *Rodrik* **(forthcoming): failure of hyperglobalization**
  ○ *Rossi-Hansberg* **(forthcoming): climate changes and global development**

B.   Institutions and Growth: Acemoglu-Naidu-Restrepo-Robinson (2017)

- **Simple cross-country regressions show the absence of a robust relationship between democracy and growth**

- **This paper uses a consolidated dichotomous measure of democracy and controls for country fixed effects and the rich dynamics of GDP (long lagged dependent)**
- **A country is called democratic in a given year if Freedom House codes it as free or partially free and if Polity IV assigns a positive score to it; with missing data, it is called democratic if either Cheibub-Gandhi-Vreeland (2010) or Boix-Miller-Rosato (2012) codes it as democratic**

	NONDEMOCRACIES			DEMOCRACIES		
	Obs.	Mean	Std. dev.	Obs.	Mean	Std. dev
GDP per Capita	3,376	$2,074.46	$3,838.65	3,558	$8,149.97	$9,334.83
Investment Share of GDP	3,225	0.2182	0.1023	3,340	0.2328	0.0741
TFP	1,863	1.0676	0.4056	2,744	0.9345	0.1646
Trade Share of GDP	3,175	0.7162	0.5106	3,485	0.7715	0.4104
Primary Enrollment Rate	2,861	90.29	29.51	2,823	101.60	15.86
Secondary Enrollment Rate	2,424	45.76	31.77	2,538	75.40	29.78
Tax Revenue Share of GDP	3,122	0.1587	0.0948	2,564	0.2075	0.0955
Child Mortality Per 1000 births	4,142	77.29	49.64	3,615	33.26	32.65
Unrest Dummy	3,739	0.2870	0.4524	3,610	0.2191	0.4137
Market Reforms Index (0-100)	3476	21.89	23.26	2,829	52.11	24.75

- **weak linkage between democracy and TFP**
- **trade viewed as crucial to democracies & nondemocracies (except N. Korea)**
- **higher tax share in democracies (but accompanied by better infrastructures and welfare)**

- **Empirical findings**

COVARIATES INCLUDED:	(1)	GDP in 1960 quintiles × year effects (2)	Soviet dummies (3)	Lags of unrest (4)	Lags of trade (5)	Lags of financial flows (6)	Lags of demographic structure (7)	Region × regime × year effects (8)
				Panel A: Within estimates.				
Democracy	0.787	0.718	0.911	0.705	0.595	0.926	0.650	0.834
	(0.226)	(0.249)	(0.251)	(0.224)	(0.264)	(0.244)	(0.230)	(0.264)
Long-run effect of democracy	21.240	22.173	24.860	17.000	14.593	23.870	14.153	16.651
	(7.215)	(8.702)	(7.783)	(5.980)	(7.122)	(8.211)	(5.419)	(5.546)
Effect of democracy after 25 years	16.895	16.261	19.587	13.567	11.500	18.149	12.251	14.532
	(5.297)	(5.982)	(5.724)	(4.644)	(5.336)	(5.435)	(4.552)	(4.726)
Persistence of GDP process	0.963	0.968	0.963	0.959	0.959	0.961	0.954	0.950
	(0.005)	(0.005)	(0.005)	(0.004)	(0.006)	(0.006)	(0.005)	(0.005)
Observations	6,336	5,523	6,336	5,643	5,750	4,950	6,262	6,336
Countries in sample	175	149	175	171	172	171	172	175
				Panel B: Arellano and Bond estimates.				
Democracy	0.875	0.730	1.073	0.693	1.034	1.017	0.756	1.217
	(0.374)	(0.387)	(0.403)	(0.396)	(0.469)	(0.373)	(0.370)	(0.420)
Long-run effect of democracy	16.448	14.865	20.006	9.871	17.926	18.607	12.152	18.209
	(8.436)	(8.998)	(8.981)	(6.479)	(9.021)	(7.842)	(6.639)	(6.746)
Effect of democracy after 25 years	14.713	12.759	17.874	9.159	15.659	15.903	11.334	16.861
	(7.128)	(7.350)	(7.564)	(5.768)	(7.593)	(6.327)	(6.004)	(6.050)
Persistence of GDP process	0.947	0.951	0.946	0.930	0.942	0.945	0.938	0.933
	(0.009)	(0.008)	(0.009)	(0.012)	(0.009)	(0.007)	(0.010)	(0.010)
AR2 test p-value	[0.51]	[0.90]	[0.28]	[0.62]	[0.72]	[0.34]	[0.58]	[0.70]
Observations	6,161	5,374	6,161	5,467	5,570	4,779	6,090	6,161
Countries in sample	175	149	175	171	172	171	172	175

  - **democracy always has a significantly positive effect on output growth**
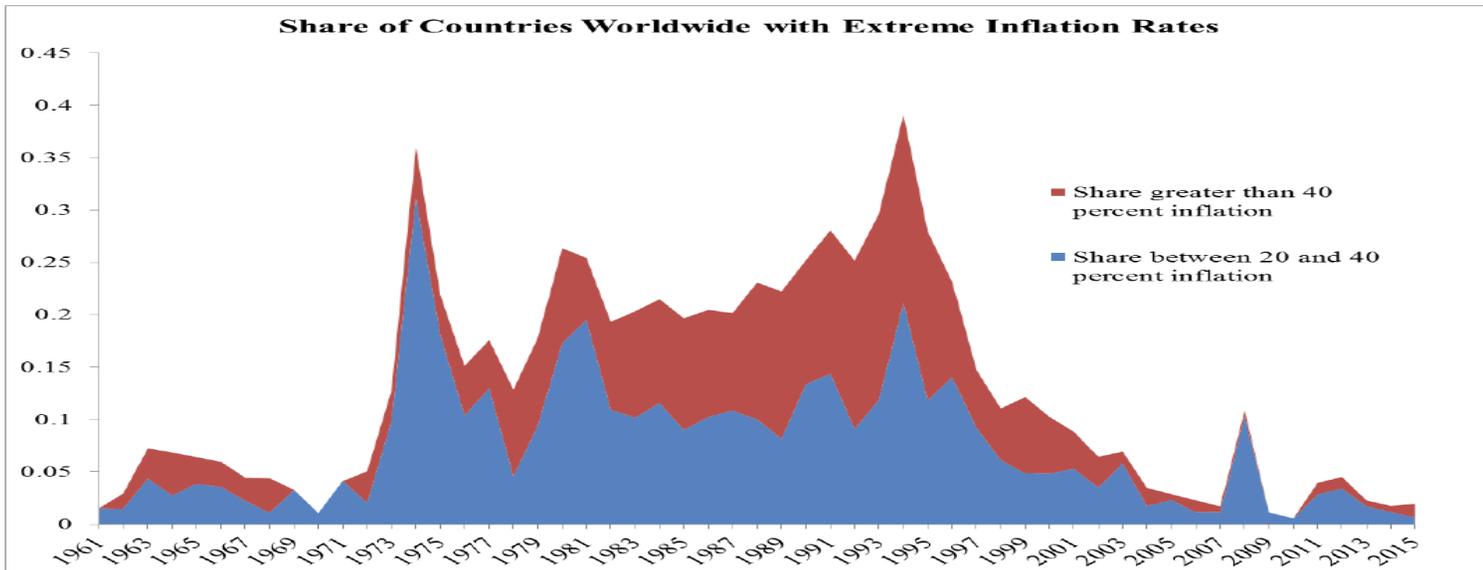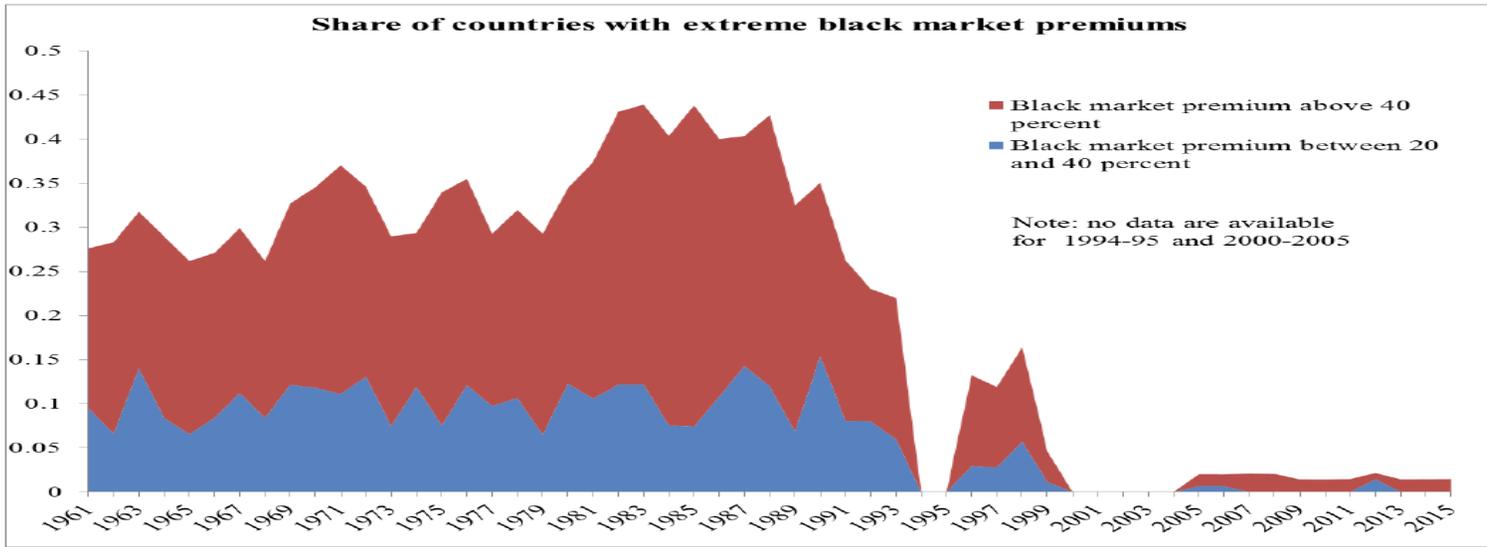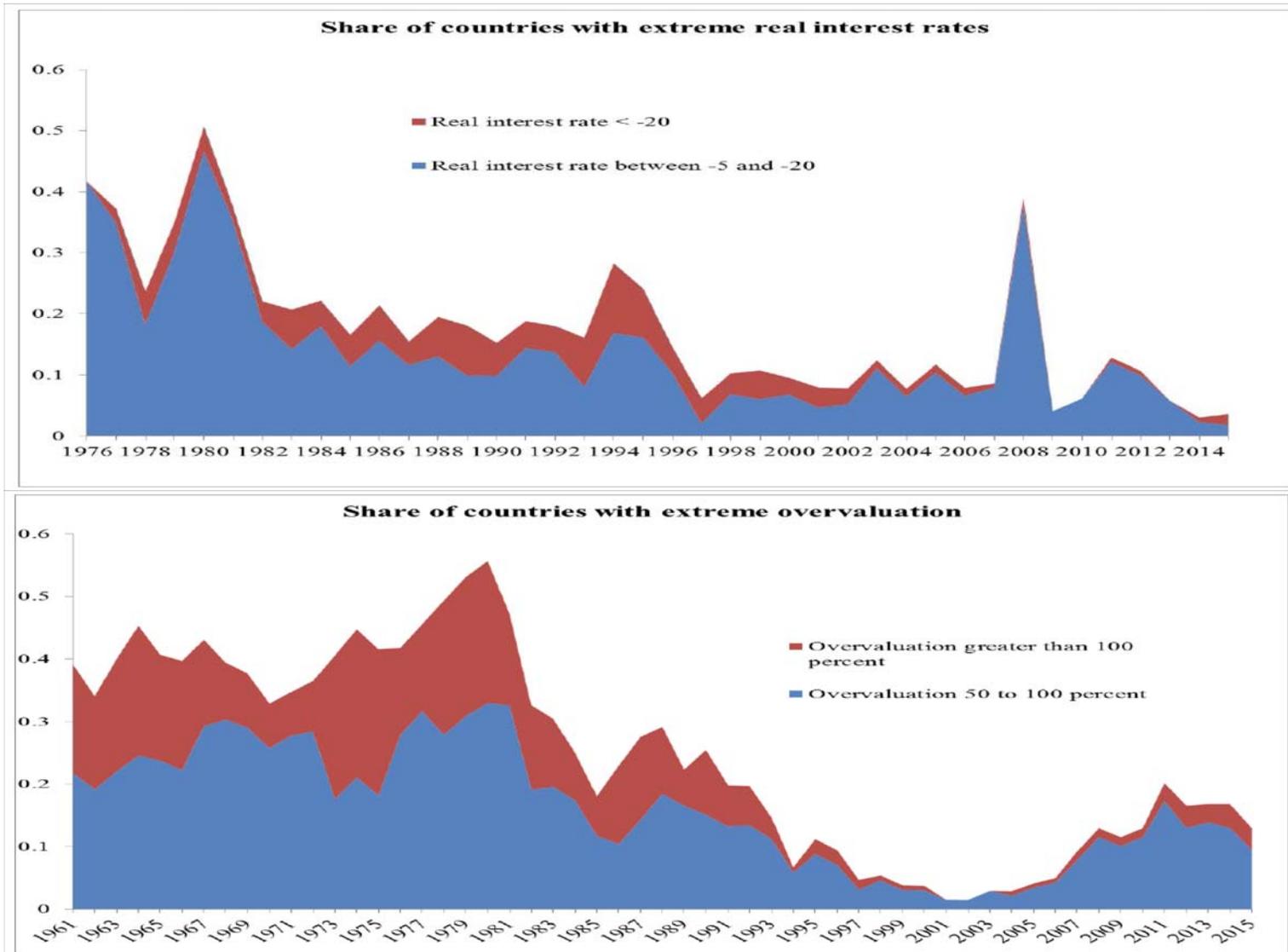
- **Potential channels**

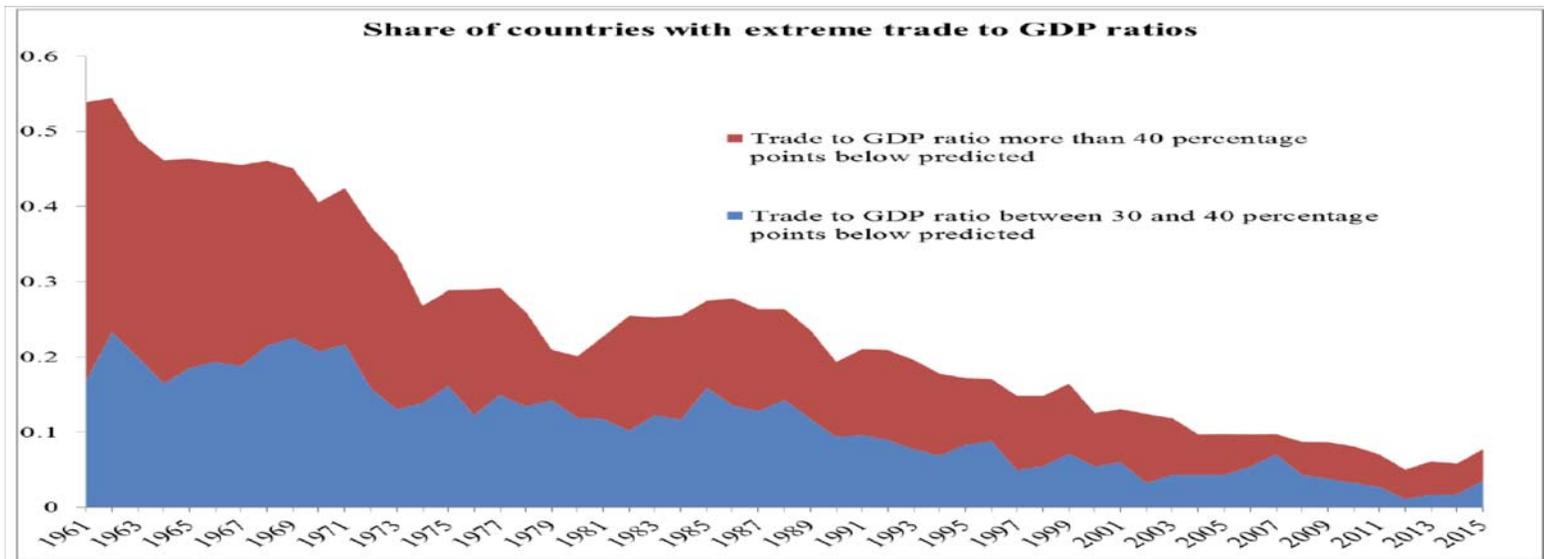| DEPENDENT VARIABLE:	Log of investment share in GDP	Log of TFP	Index of economic reforms	Log of trade share in GDP	log of tax share in GDP	Log of primary enrollment	Log of secondary enrollment	log of child mortality	Dummy for unrest
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Within estimates.									
Democracy	2.391	-0.205	0.687	0.689	3.311	1.042	1.345	-0.253	-7.832
	(1.114)	(0.276)	(0.348)	(0.676)	(1.409)	(0.338)	(0.610)	(0.063)	(2.185)
Long-run effect of democracy	9.112	-2.883	5.580	5.445	16.062	21.908	18.960	-34.264	-11.944
	(4.255)	(3.858)	(2.883)	(5.253)	(6.650)	(7.624)	(8.622)	(10.747)	(3.329)
Effect of democracy after 25 years	9.089	-2.738	5.359	5.303	15.864	18.892	18.057	-21.400	-11.944
	(4.245)	(3.648)	(2.753)	(5.126)	(6.574)	(6.321)	(8.146)	(5.124)	(3.329)
Persistence of outcome process	0.738	0.929	0.877	0.873	0.794	0.952	0.929	0.993	0.344
	(0.020)	(0.012)	(0.012)	(0.011)	(0.016)	(0.008)	(0.013)	(0.001)	(0.030)
Observations	5,665	3,879	4,692	5,738	4,511	3,714	2,883	6,084	5,646
Countries in sample	169	107	150	172	131	166	158	173	171
Panel B: 2SLS estimates.									
Democracy	2.211	-0.941	3.224	5.512	8.088	1.757	4.116	-0.715	-5.569
	(2.852)	(0.667)	(0.863)	(2.005)	(3.021)	(0.721)	(1.626)	(0.164)	(5.682)
Long-run effect of democracy	8.440	-12.738	23.775	40.589	38.609	36.693	57.072	-95.728	-8.471
	(10.705)	(8.854)	(6.215)	(13.580)	(14.330)	(15.505)	(21.698)	(26.347)	(8.577)
Effect of democracy after 25 years	8.419	-12.167	23.156	39.817	38.159	31.611	54.252	-58.625	-8.471
	(10.681)	(8.380)	(6.039)	(13.375)	(14.121)	(12.863)	(20.267)	(13.123)	(8.577)
Persistence of outcome process	0.738	0.926	0.864	0.864	0.791	0.952	0.928	0.993	0.343
	(0.020)	(0.012)	(0.012)	(0.012)	(0.017)	(0.008)	(0.013)	(0.001)	(0.030)
Exc. instruments F-stat.	21.7	27.7	43.7	21.5	31.8	12.1	10.4	26.3	28.6
Hansen p-value	[0.29]	[0.06]	[0.22]	[0.09]	[0.69]	[0.09]	[0.12]	[0.02]	[0.84]
Observations	5,640	3,871	4,670	5,714	4,489	3,710	2,879	6,057	5,619
Countries in sample	168	107	149	171	130	164	156	172	170

  - **significant channels: democracy promotes physical, knowledge and health capital accumulation and leads to less unrestness**
  - **unrestness may not be as important since the rise of populism**

C. Can Policy Reforms Promote Growth: Easterly (2019, forthcoming)

- **Three new styplized facts:**
  - policy outcomes worldwide have improved a lot since the 1990s,
  - improvements in policy outcomes and improvements in growth across countries are correlated with each other
  - growth has been good after reform in Africa and Latin America, in contrast to the "lost decades" of the 80s and 90s
- **Stylize Fact 1: based on bad (blue) and extremely bad (red) policy indicators**
  - black market preimum (bad: **20-40%**, extreme: **> 40%**)
  - inflation (bad: **20-40%**, extreme: **> 40%**)
  - real interest rate (bad: **-20 to -5%**, extreme: **< -20%**)
  - exchange rate overvaluation (bad: **50-100%**, extreme: **> 100%**)
  - residual trade share (bad: **-30 to -40%** below predicted, extreme: **-40%** below predicted)
 - large improvements from 1980-1998 to 1999-2015

Share of countries with extreme black market premiums

Black market premium above 40 percent

Black market premium between 20 and 40 percent

Note: no data are available for 1994-95 and 2000-2005

Share of Countries Worldwide with Extreme Inflation Rates

Share greater than 40 percent inflation

Share between 20 and 40 percent inflation

Share of countries with extreme real interest rates

- Real interest rate < -20
- Real interest rate between -5 and -20

Share of countries with extreme overvaluation

- Overvaluation greater than 100 percent
- Overvaluation 50 to 100 percent

Share of countries with extreme trade to GDP ratios

■ Trade to GDP ratio more than 40 percentage
points below predicted

■ Trade to GDP ratio between 30 and 40 percentage
points below predicted

- **Stylize Fact 2: policy improvements correlated with growth enhancement**

	Countries that had any extreme policy 1980-1998		Countries with no extreme policies 1980-1998	
	1980-1998	1999-2015	1980-1998	1999-2015
Per Capita Growth	**0.7%**	**2.1%**	**2.3%**	**1.7%**
Frequency of Policy Outcomes:				
Black Market Premium Over 40	33.3%	6.0%	0.0%	0.0%
Inflation Over 40	16.7%	2.0%	0.0%	0.0%
Real Interest Rate Below -20	8.0%	1.5%	0.0%	0.2%
Overvaluation Over 100 Percent	10.9%	1.7%	0.0%	0.0%
Residual Trade Share -40 Below Predicted	19.0%	7.4%	0.0%	3.9%
Number of observations on per capita growth	1603	1541	928	878
Number of countries	92	92	52	52

- **Stylized Fact 3: reversal of lost decades in Africa and Latin America**
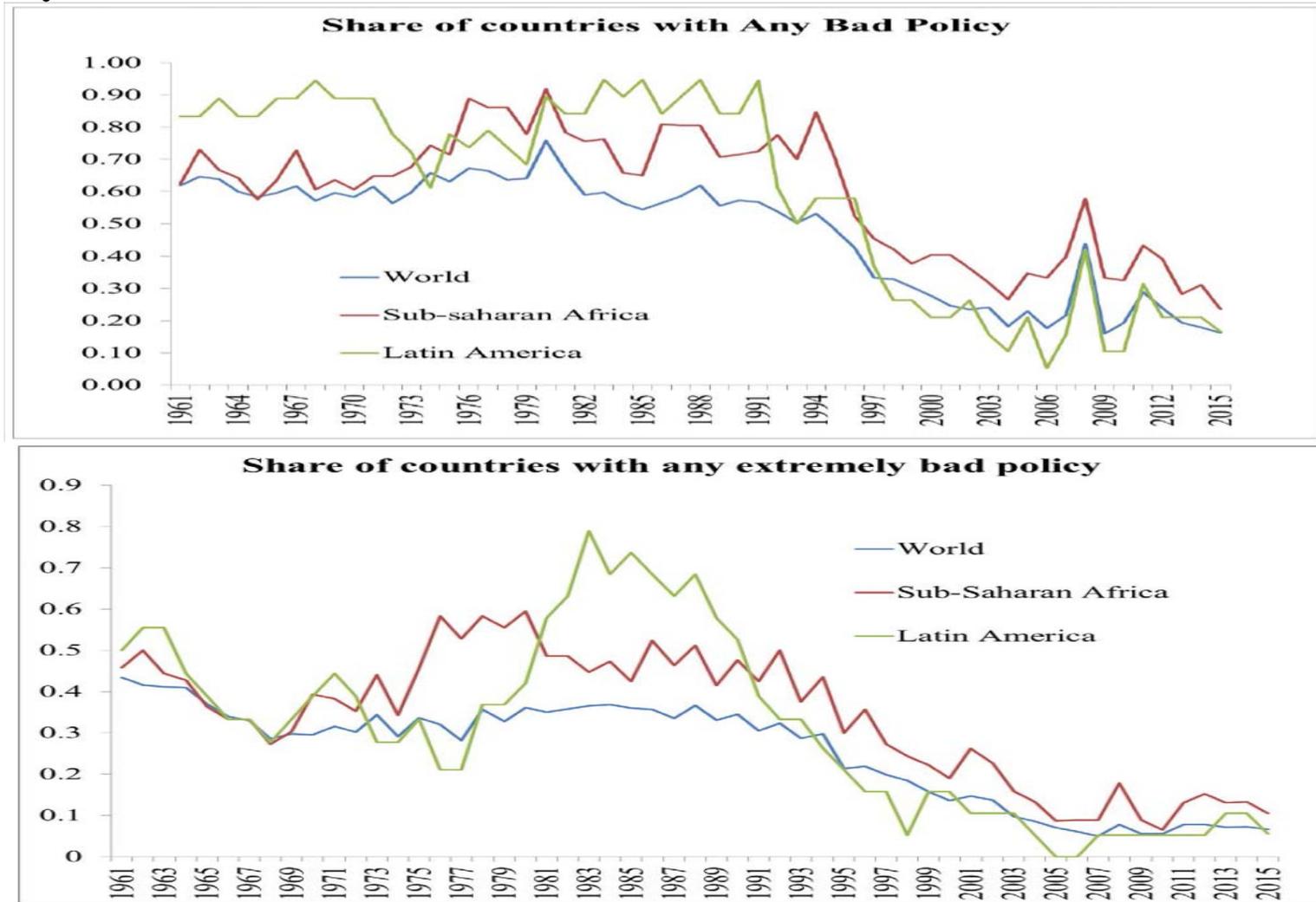
	Africa 1980-98	Africa 1999-2015	Actual Africa growth change	Predicted Africa growth change
Per Capita Growth	0.1%	1.8%	1.76%	1.27%
Frequency of Policy Outcomes:				
Black Market Premium Over 40	27.5%	3.7%		0.22%
Black Market Premium 20 to 40	10.8%	0.7%		0.04%
Inflation Over 40	14.6%	3.0%		0.31%
Inflation 20 to 40	15.3%	4.9%		0.13%
Real Interest Rate Below -20	9.2%	2.2%		0.05%
Real Interest Rate -20 to -5	20.1%	8.9%		-0.02%
Overvaluation Over 100 percent	15.0%	4.1%		0.17%
Overvaluation 50 to 100 percent	20.2%	10.1%		0.03%
Residual Trade Share -40 Below Predicted	19.0%	8.1%		0.25%
Residual Trade Share -40 to -30 Below Predicted	15.0%	6.5%		0.10%

	Latin America 1980-98	Latin America 1999-2015	Actual Latin America growth change	Predicted Latin America growth change
Per Capita Growth	0.4%	2.1%	1.67%	1.74%
Frequency of Policy Outcomes:				
Black Market Premium Over 40	24.9%	7.4%		0.16%
Black Market Premium 20 to 40	15.9%	1.6%		0.06%
Inflation Over 40	27.5%	2.2%		0.67%
Inflation 20 to 40	24.9%	4.1%		0.25%
Real Interest Rate Below -20	10.9%	2.3%		0.06%
Real Interest Rate -20 to -5	13.5%	9.6%		-0.01%
Overvaluation Over 100 percent	4.8%	0.7%		0.06%
Overvaluation 50 to 100 percent	8.3%	4.1%		0.01%
Residual Trade Share -40 Below Predicted	17.7%	2.5%		0.34%
Residual Trade Share -40 to -30 Below Predicted	14.9%	3.8%		0.13%

- ○ **successful reforms constitute of:**
  - - **pro-market institutions (low black market premium)**
  - - **stable fiscal and monetary policy (low inflation)**
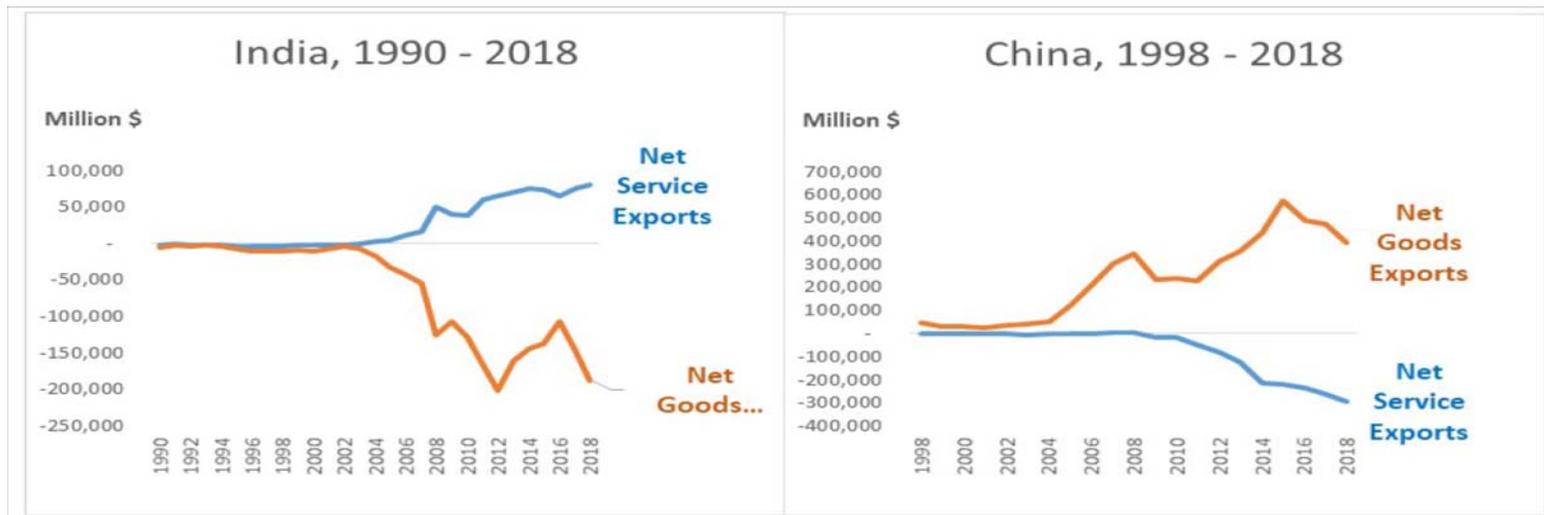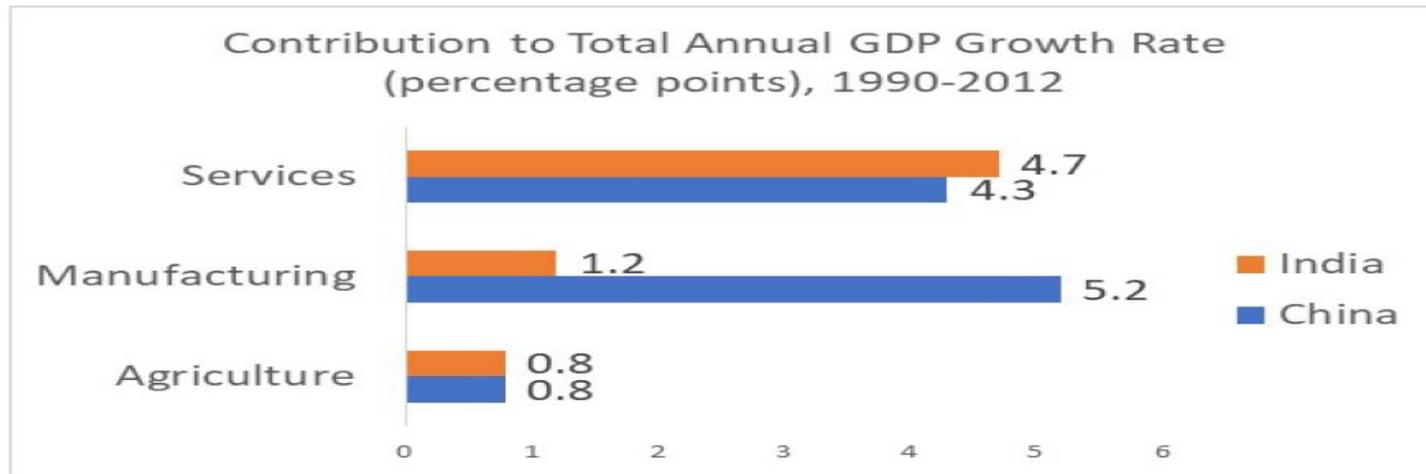 - - **open policy (high trade share)**

D. Failure of Hyperglobalization: Rodrik (forthcoming)

- **The recent rise of populism, long dragging pandemic that caused broken global supply chain and tensions of trade & chip wars have all led to deglobalization**
- **Rodrik (forthcoming) argues that this is foreseeable long before the recent development because an international order lacks a global enforcer where "global institutions are, by their very nature, weak, and have no enforcement power"**
- **The past trend of globalization:**
  - **the first era of globalization in the modern period: Gold Standard**
  - **the second major global economic order: Bretton Woods regime where the state played a key role in macro-prudent policy as well as in the creation of social insurance and a welfare state and in restructuring the economy, which, in the field of international relations (IR), is referred to as an era of embedded liberalism**
  - **the third era after the 1990s: hyper-globalization era where the global economic system entailed deeper integration in goods/service trade and in financial markets and where, as a by-product, democracy was strengthened globally that also ensured lessen conflict, which in IR is referred to as *liberal internationalism***

- **Problems underlying such development:**
  - **Developing countries such as China rose quickly, threatening the leaders**
  - **When the fast comers turn out to be non-democratic, there would be national security concerns as well**
  - **Major powers in turn became obsessed with geopolitical competition, best illustrated by the US-China case, leading to zero-sum geopolitical games**
- **These problems worsened with populism. pandemic isolation and broken global supply chain, thereby causing decoupling and deglobaling with trade and chip wars that further damaging the global supply chain**
- **A million dollar question: Does hyper-globalization come to an end?**

E. The Role of Service Trade in Global Development Baldwin (forthcoming)

- **A bright angle to deglobalization is an stylized fact suggesting that services, rather than goods, may have played more important roles in development of some major economies, as stressed by Baldwin (forthcoming)**
- **For example, in contrast with China where most trade were in manufactured goods, India's export boom came from the service sector**
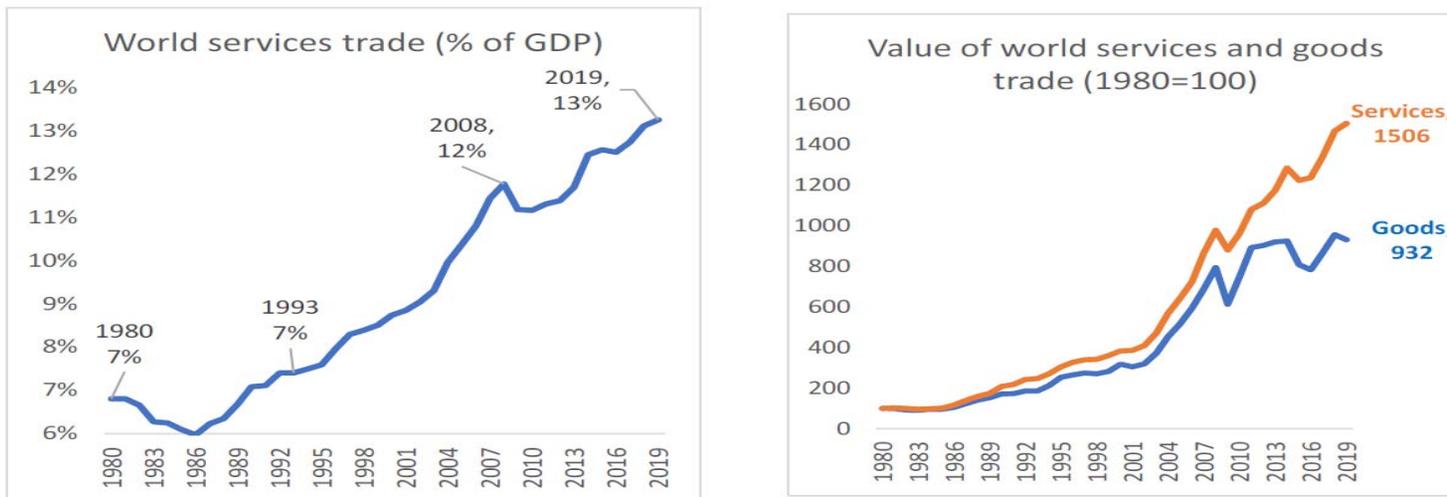
Contribution to Total Annual GDP Growth Rate (percentage points), 1990-2012

India, 1990 - 2018

China, 1998 - 2018

- **More importantly, in the world, goods trade intensity has peaked, but services trade intensity has not**

○ **world goods exports to GDP ratios:**
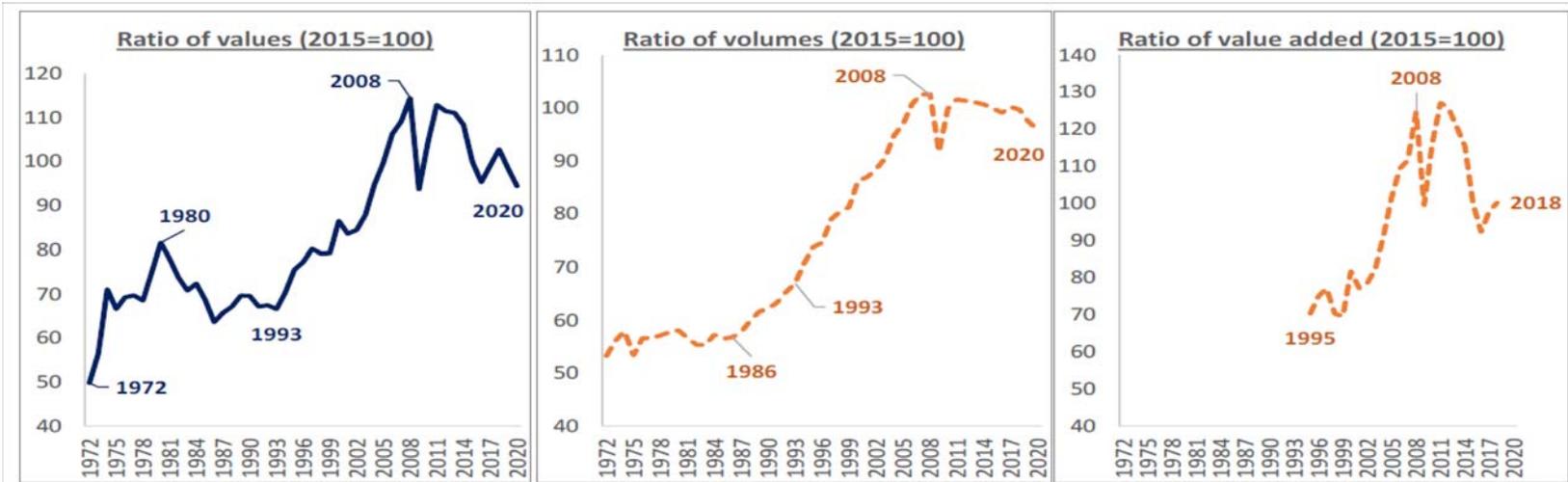
○ **world services exports to GDP ratios**

- **While the global trend is obvious, the China path seems to be non-viable**
- **Could the non-viable path be responsible for inducing the conflict and tension as seen?**
- **If so, deglobalization and disturbance to global order may be limited to a smaller group of countries, rather than the entire world economy,**
- **This is particularly relevant because services trade is less vulnerable to global supply chain issues and less subject to tariff or export controls**

F. **Global Supply Chain Uncertainty and Geopolitics – Glopalorization of the Semiconductor Industry: Lee-Wang-Wang (2024)**
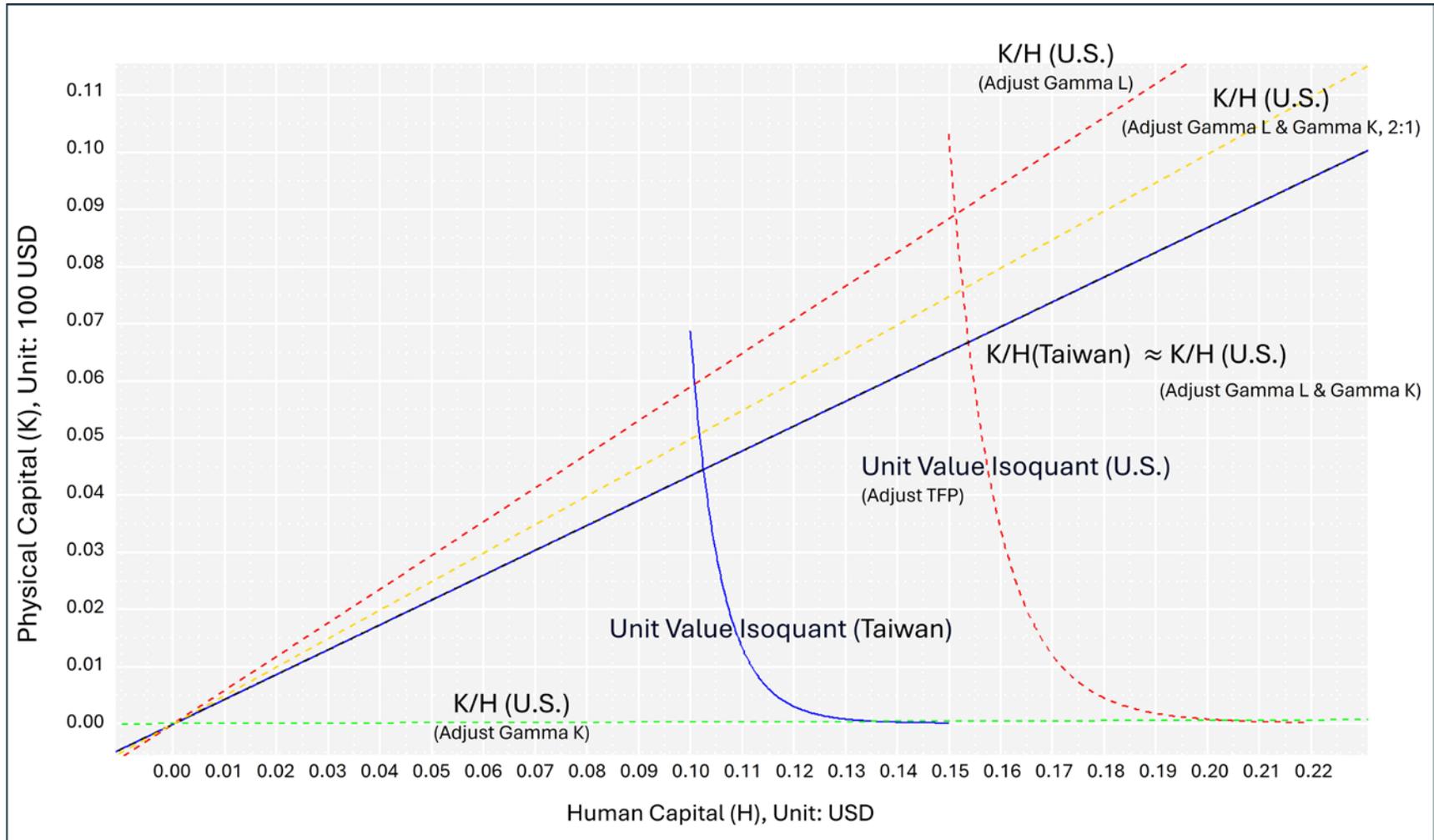
- **Rise of the Semiconductor Industry**
  - **Rapid industrialization and digitalization => strong demand for chips**
  - **Continual technical progress, expansion of scales economics, modularization (component sourcing without upfront payment of fixed costs) and improvements in organization capital => continual reduction in unit cost of chips making**
  - **Cost reduction further induces more demands => vicious cycle**

○ **Trend reversal since trade wars, the pandemic and the rapid rise of China**
- **In the name of national security**
- **Glopolarization with intertwined global power configurations beyond multi-polarization (with separated powers)**
- **Systematic economic tradeoff not yet carefully computed (counterfactual exercises)**

● **Global supply chain development**
○ **Modern supply chains are intricate and global, fueled by tech, communication, and transport progress**
○ **Firms procure globally for lower costs**
- **yielding savings and market access**
- **yet intensifying exposure to risks like disruptions, trade tensions, and regulations**
○ **In the semiconductor industry, better lithography equipment by ASML => TSMC can make smaller and more powerful chips => more profitable for NVIDIA and AMD to design even better chips**

- **Human capital, human capital, human capital**
  - **Within high-tech skilled labor, one must have**
    - **Firm-specific skills**
    - **Fit with firm-specific organization capital & culture**
    - **Loyalty to maintain business secrets**
  - **This makes labor associated with high adjustment costs, much higher than capital that is known to be more flexible nowadays in the IT industry**
  - **New plants in a location with stronger union and less government incentive provision (public infrastructure, utility, among others) will lead to**
    - **Reconfiguration**
    - **Overinvestment in capital to compensate misfit in human capital/business culture**
    - **Lower productivity, especially measured by the average product of capital (labor productivity would be biased due to overinvestment in capital)**

A diagrammatic illustration of assimilation in semiconductor foundry industry: US subsidiaries vs. TSMC headquarter (Lee-P. Wang-S. Wang 2024)

- **Geopolitics and national security**
  - ○ **Economic security**
    - **Main players in the semiconductor industry such as TSMC have been pure-play foundry manufacturers**
    - **Compared with other integrated device manufacturers (IDMs), foundry manufacturers have advantages on the order acceptance and process evolution**
    - **Less worry about Trade Secret Theft**
  - ○ **Global slowdown is expected when reverting the trend of modularization**
    - **The US's 1930 Smoot-Hawley tariff is believed to induce tariff wars and defensive trade blocs and later political and military alliance, eventually as a trigger of WWII (Kindleberger 1989)**
    - **Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed (Josh Lerner 2012): VC subsidy after the Great Recession failed**
    - **After 25 years of operation, TSMC-Camas still incurred 50% higher cost in its production of legacy chips (Morris Chang)**
    - **Protection and misaligned subsidy policy such as Export Control and Chips Act (including the US $52 billion subsidy) may not ensure national security while leading to misallocation and harming economic security**

- **TSMC will faces major adjustments in response to Chip War with large reconfiguration cost, particularly huge labor adjustment costs and relatively moderate capital adjustment costs**
    - **Large manpower gaps in the U.S. as well as other international fabs is the chief concern**
    - **Increasingly sophisticated semiconductor manufacturing harder to re-establish in economies with deindustrialization**
    - **Shortage of high skilled semiconductor labor as most international universities have not offer comprehensive courses**
    - **Shortage of peripheral manpower (construction/operational jobs)**
    - **Possible shortage and misalignment in government incentive and infrastructure provision**
    - **Possible "downgrade" from skill intensity to capital intensity**
- **Mark Liu (TSMC CEO) and Matt Pottinger (former top Asia official on National Security Council) both dismissed the idea that Taiwan's Silicon Shield would deter China; Stimson Centre study of Taiwan's Silicon Shield (2022) suggested that the U.S. could lift some sanctions and export bans against China in return for a commitment from Beijing to adopt a less threatening posture.**
- **Summing up, the current semiconductor policy is likely a lose-lose strategy**

**G.   The New Economics of Industrial Policy: Juhász-Lane-Rodrik (2023)**

- **Institutional factors and government policies are underlying drivers of the distortionary wedges in Hsieh-Klenow (2009), among which industrial policy is of particular relevance**
- **However, more recent empirical work offers a more positive take on industrial policy, upon paying close attention to measurement, causal inference, and underlying economic structure**
- **This is particularly so in East Asian economies where industrial policy is being reshaped by a new understanding of governance, a richer set of policy instruments beyond subsidies, and the reality of deindustrialization**
- **To illustrate the challenge of evaluating industrial policy, consider that an economy's macroeconomic performance g is a function of macroeconomic fundamentals A subject to market failure whose degree of severity is measured by θ: $g(\theta) = (1 - \theta)A$, which may be referred to as a "growth equation"**
- **Let government intervention be summarized by a subsidy be at the rate s that comes with an agency or fiscal cost of $\varphi\alpha(s)$ where the cost is increasing and convex ($\alpha' > 0$ and $\alpha'' > 0$)**
- **Thus, the growth equation is modified as: $g(s, \theta, \varphi) = (1 - \theta(1 - s))A - \varphi\alpha(s)$ and the growth-maximizing subsidy policy satisfies $g_s(s, \theta, \varphi) = \theta A - \varphi'\alpha(s) = 0$**

- **The government, however, may be rent seekers or have different agenda, which can be generally referred to as political benefit $\pi(s)$ with $\pi' > 0$ and $\pi'' < 0$, measured in the same unit as g**
  - **government objective:** $\max\limits_{s} u(s; \theta, \varphi) = \lambda g(s, \theta, \varphi) + \pi(s)$
  - **the government solution of intervention satisfies**
    $\lambda g_s(s, \theta, \varphi) + \pi'(s) = \lambda[\theta A - \varphi \alpha'(s)] + \pi'(s) = 0$
  - **thus, with $\pi' > 0$, it must be true that $\theta A - \varphi \alpha'(s) < 0$**
  - **this implies over-subsidy or excessive interventions**
- **This simple structure entails different positions on industrial policy:**
  - **the "developmentalist" view: governments can successfully identify and support growth/efficiency-enhancing firms/industries ($\lambda \to \infty$)**
  - **the "inefficacy" view: governments seek growth/efficiency but do a poor job of supporting appropriate activities ($\lambda < 1$)**
  - **the "rent-seeking" view: governments are beholden to special interests and do not seek desirable economic outcomes ($\lambda \to 0$)**

- **Traditional and new industrial policies**

	Traditional industrial policy	New industrial policy
Market failures targeted	R&D, innovation, learning externalities; coordination failures in investment	Traditional markets failures, plus good-job externalities, direction of innovation, and missing public inputs
Sectors	Manufacturing, tradable sectors	Services in addition to manufacturing
Firms	Large, globally competitive firms	All sizes of firms, including SMEs
Assumptions about the government	Governments can identify market failures ex ante and is sufficiently insulated from capture	Knowledge about location and magnitude of market failures is widely dispersed; government faces substantial uncertainty; state capacity is endogenous
Types of incentives	Tax, credit subsidies	A portfolio of business services, including marketing, management & tech assistance, customized training, infrastructure, seed capital/loans for directed technologies
Application of incentives	Fixed schedule of incentives, except for incentive packages for large firms which may be negotiated	Customized to firms' needs and adapted to context
Selection criteria	Pre-specified	Voluntary buy-in and participation
Conditionality	Hard; rigid ex-ante criteria	Soft; provisional, open-ended and evolving
Relationship with recipients	Arms'-length	Collaborative, iterative; active project management

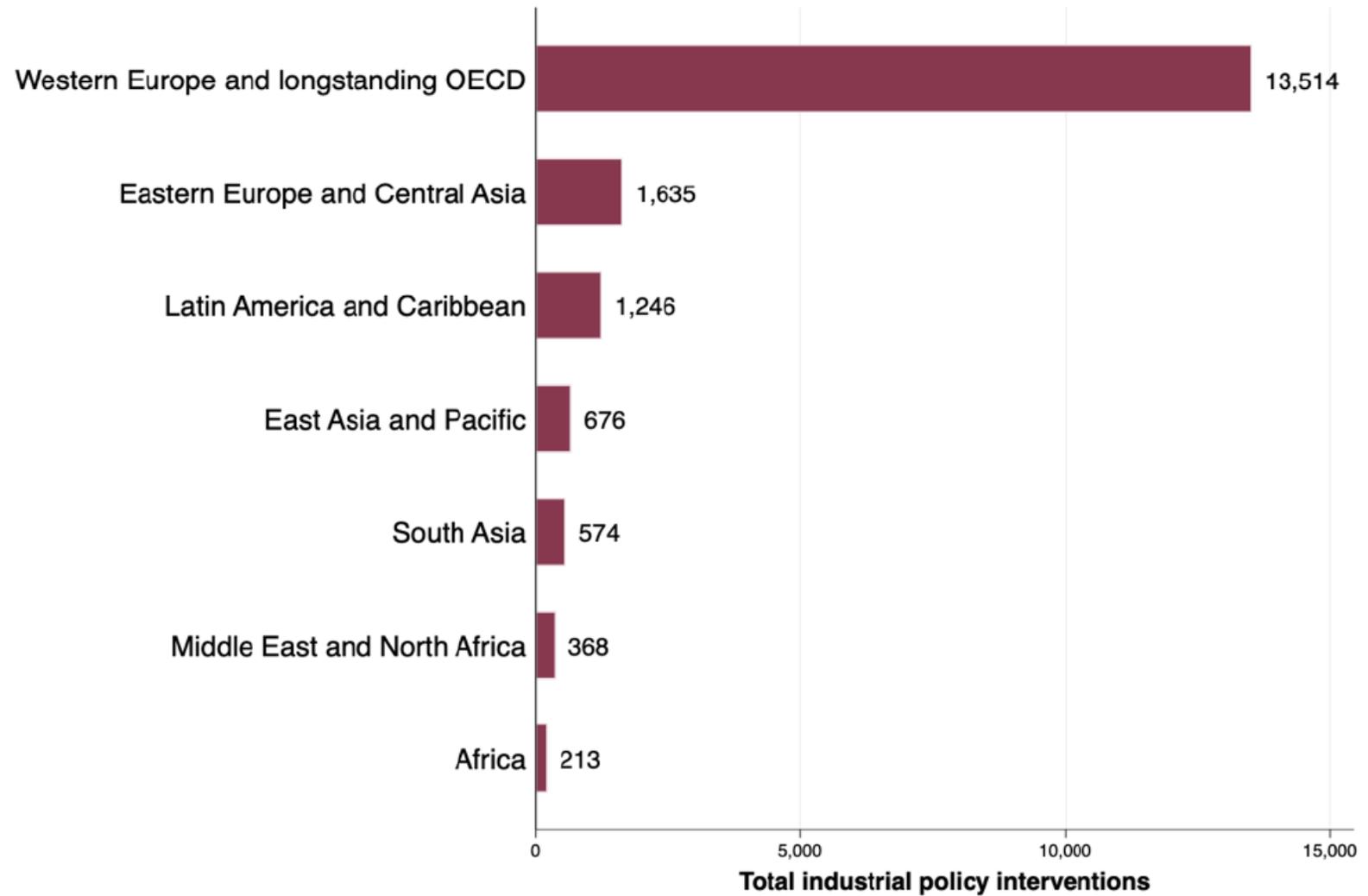- **Trend of industrial policy**
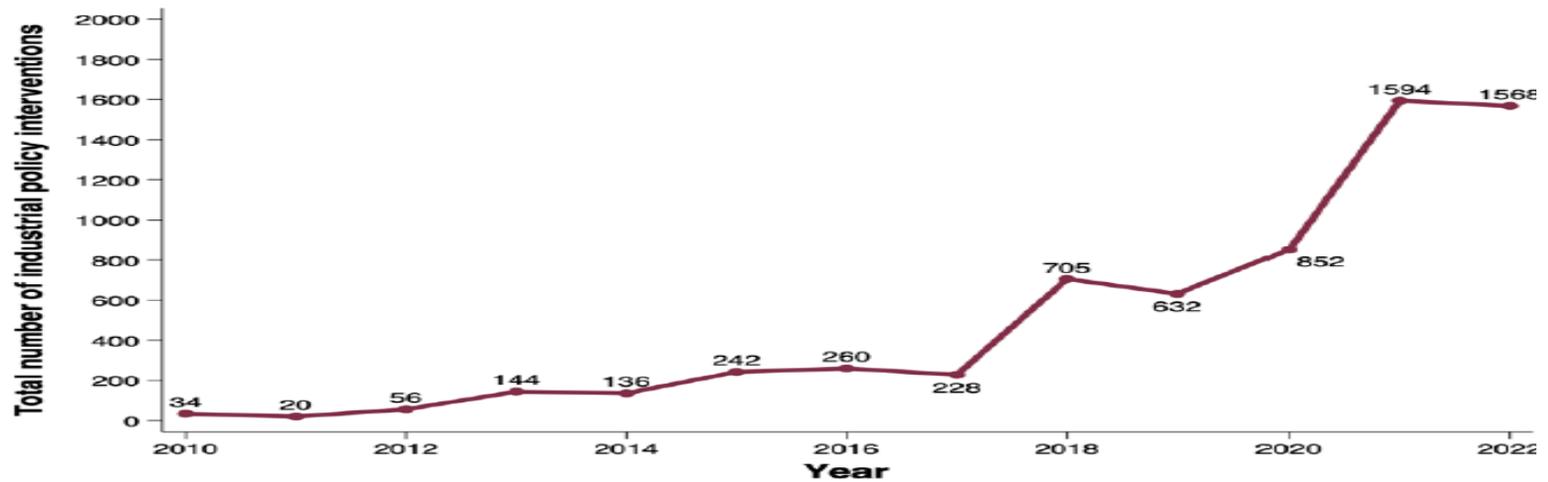
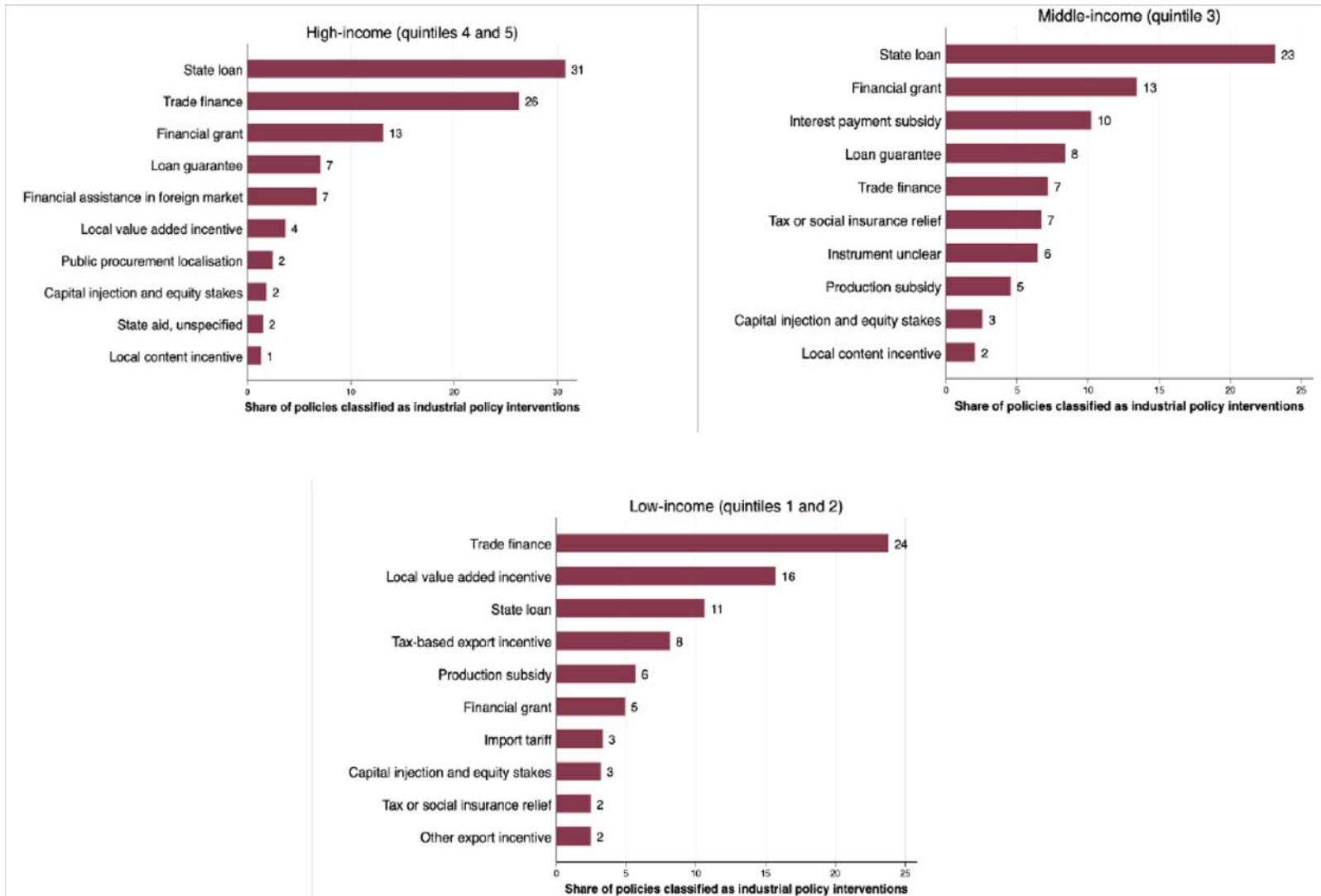Panel A: Total number of industrial policy interventions

Panel B: Share of all interventions classified as industrial policy
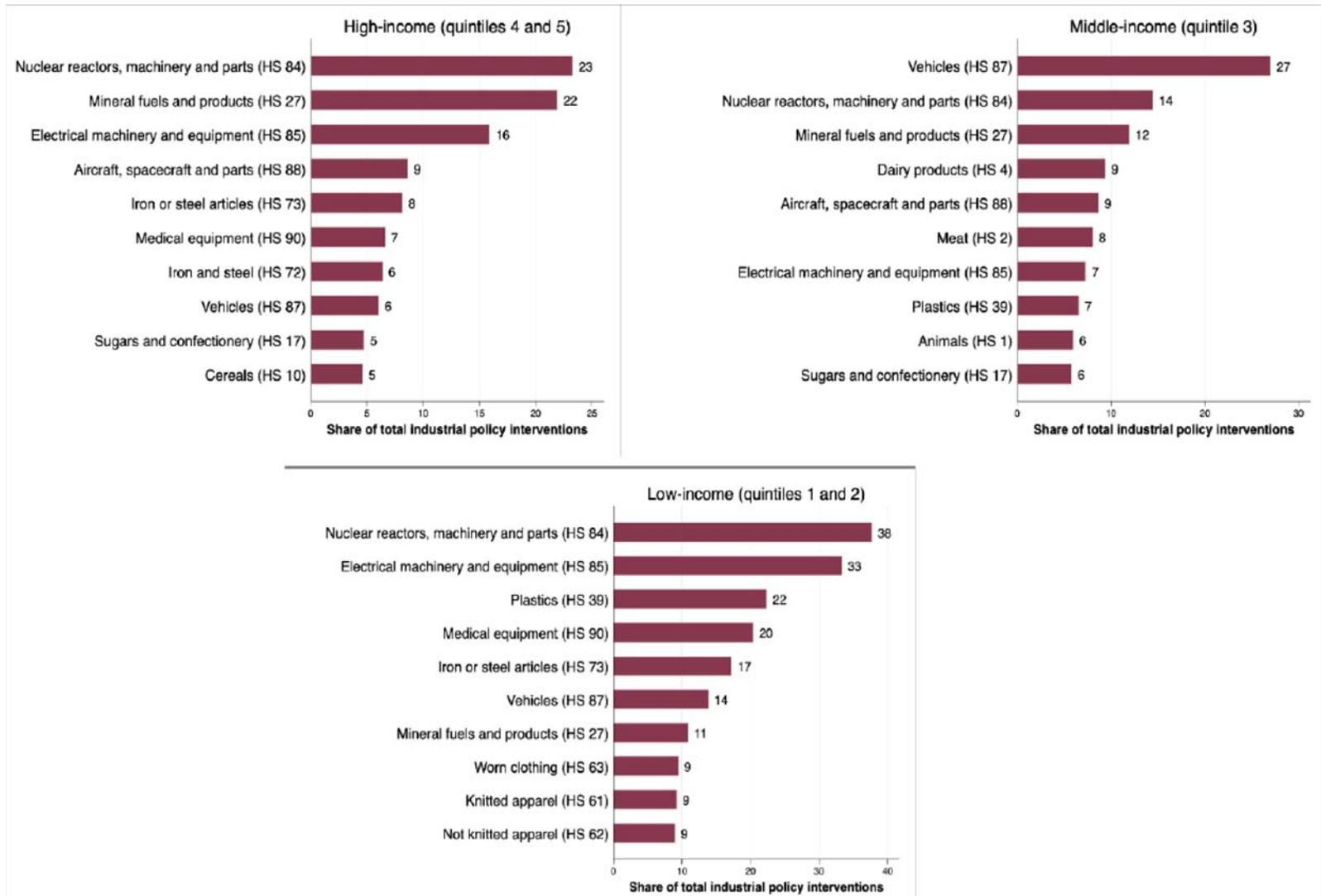
● **Industry policy interventions by country income quintile:**

- **Industrial policies by types**

High-income (quintiles 4 and 5)

Type	Share
State loan	31
Trade finance	26
Financial grant	13
Loan guarantee	7
Financial assistance in foreign market	7
Local value added incentive	4
Public procurement localisation	2
Capital injection and equity stakes	2
State aid, unspecified	2
Local content incentive	1

Share of policies classified as industrial policy interventions

Middle-income (quintile 3)

Type	Share
State loan	23
Financial grant	13
Interest payment subsidy	10
Loan guarantee	8
Trade finance	7
Tax or social insurance relief	7
Instrument unclear	6
Production subsidy	5
Capital injection and equity stakes	3
Local content incentive	2

Share of policies classified as industrial policy interventions

Low-income (quintiles 1 and 2)

Type	Share
Trade finance	24
Local value added incentive	16
State loan	11
Tax-based export incentive	8
Production subsidy	6
Financial grant	5
Import tariff	3
Capital injection and equity stakes	3
Tax or social insurance relief	2
Other export incentive	2

Share of policies classified as industrial policy interventions

- **Industrial policies by sectors**

**H.   Climate Changes and Global Development: Rossi-Hansberg (forthcoming)**

- Beyond conventional macroeconomic considerations, severe climate changes have led to deep concern about the earth and the act of Net-Zero Emissions by 2050 and its enforcement using tax policies have been foreseen to yield significant macroeconomic implications (e.g., EU)
- Scientists have long realized the damage of human activities on the earth, inclusive drastic climate changes such as global warming
- The Intergovernmental Panel on Climate Change (IPCC) report released in October 2018 indicated that carbon dioxide were over 400 parts per million (ppm), causing global warming of 3°C above the late 19th century benchmark
- To hold it below 2°C needs to cut emissions by around 40% absolutely in the next two decades, with much bigger cuts required for 1.5°C.

- **Global land-ocean temperature index from late 19 century to 2020:**

Global Land-ocean Temperature Index
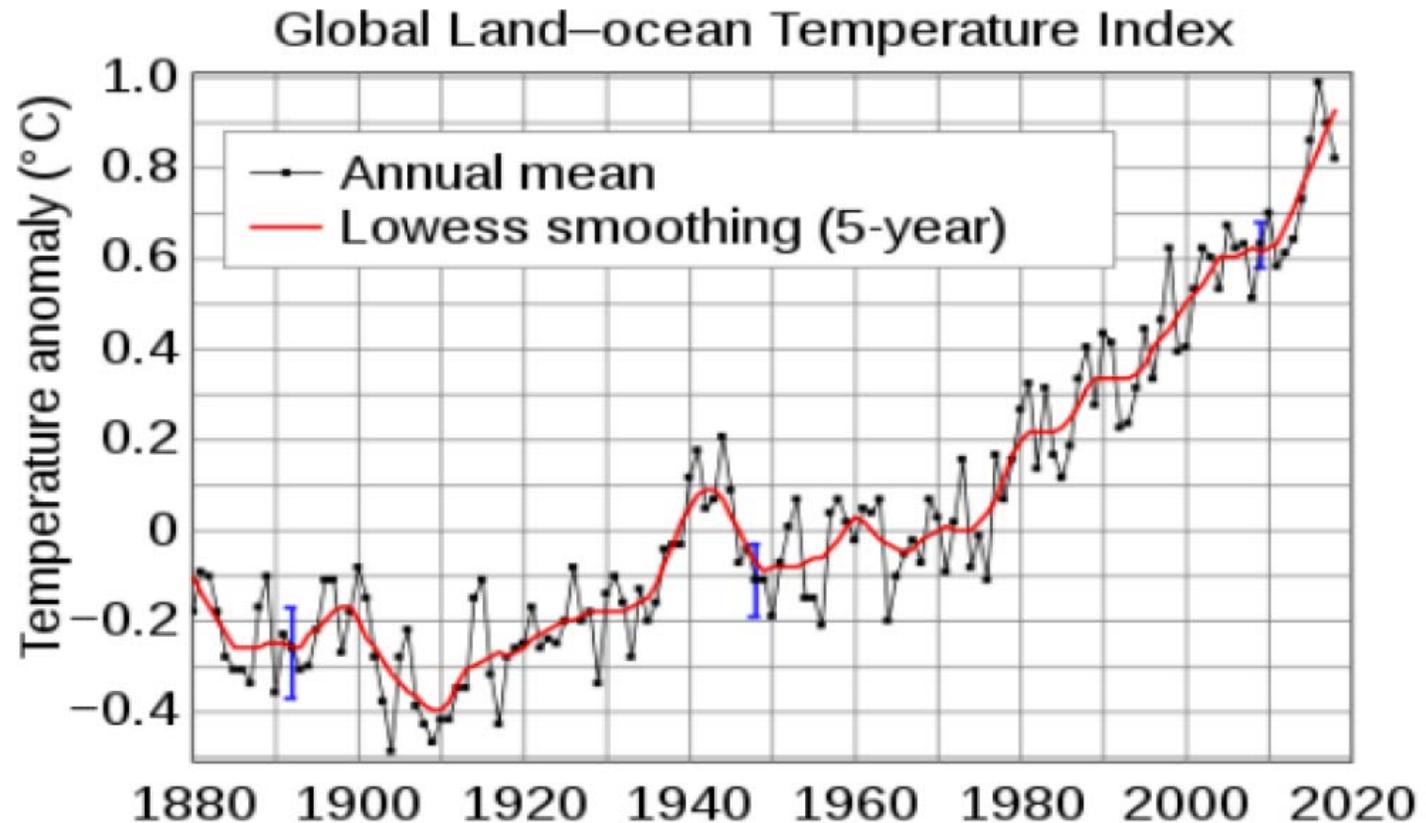
- one can see a much steeper trend during the post-WWII period, especially since 1975

- **Rossi-Hansberg (forthcoming) and his coauthored work Rossi-Hansberg and Cruz (2021, 2022) provide thorough model-based quantitative analysis.**
  - **Based on a spatial integrated assessment models, one may analyze the local social cost of carbon at a detailed spatial resolution.**
  - **Because of significant heterogeneity of gains/losses from climate change across countries/locations, some places experience negative local social costs of carbon, while others with positive costs.**
  - **This leads to the conflicts inherent in responding to climate change.**
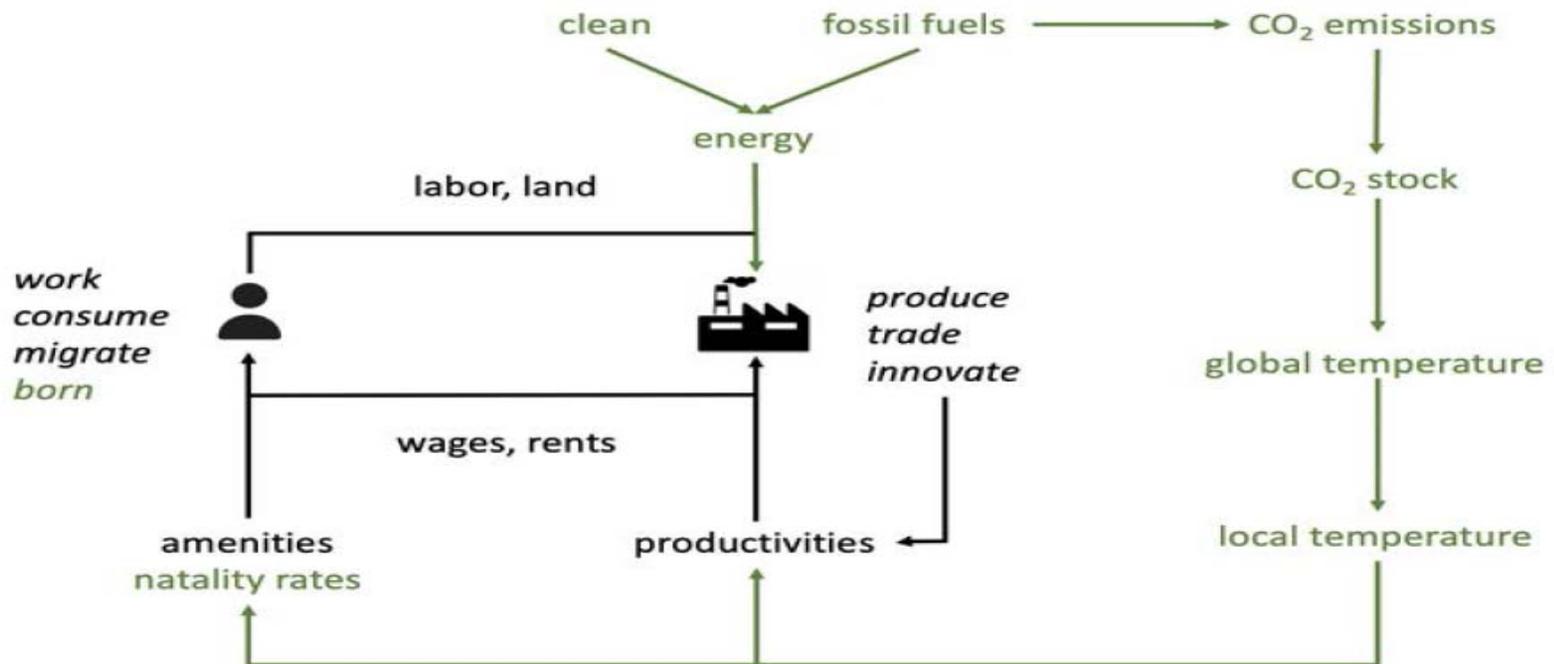
- **Climate change thus leads to heterogeneous impact on welfare across countries/locations**

FIGURE 1   SPATIAL IMPACT ON WELFARE OF CLIMATE CHANGE
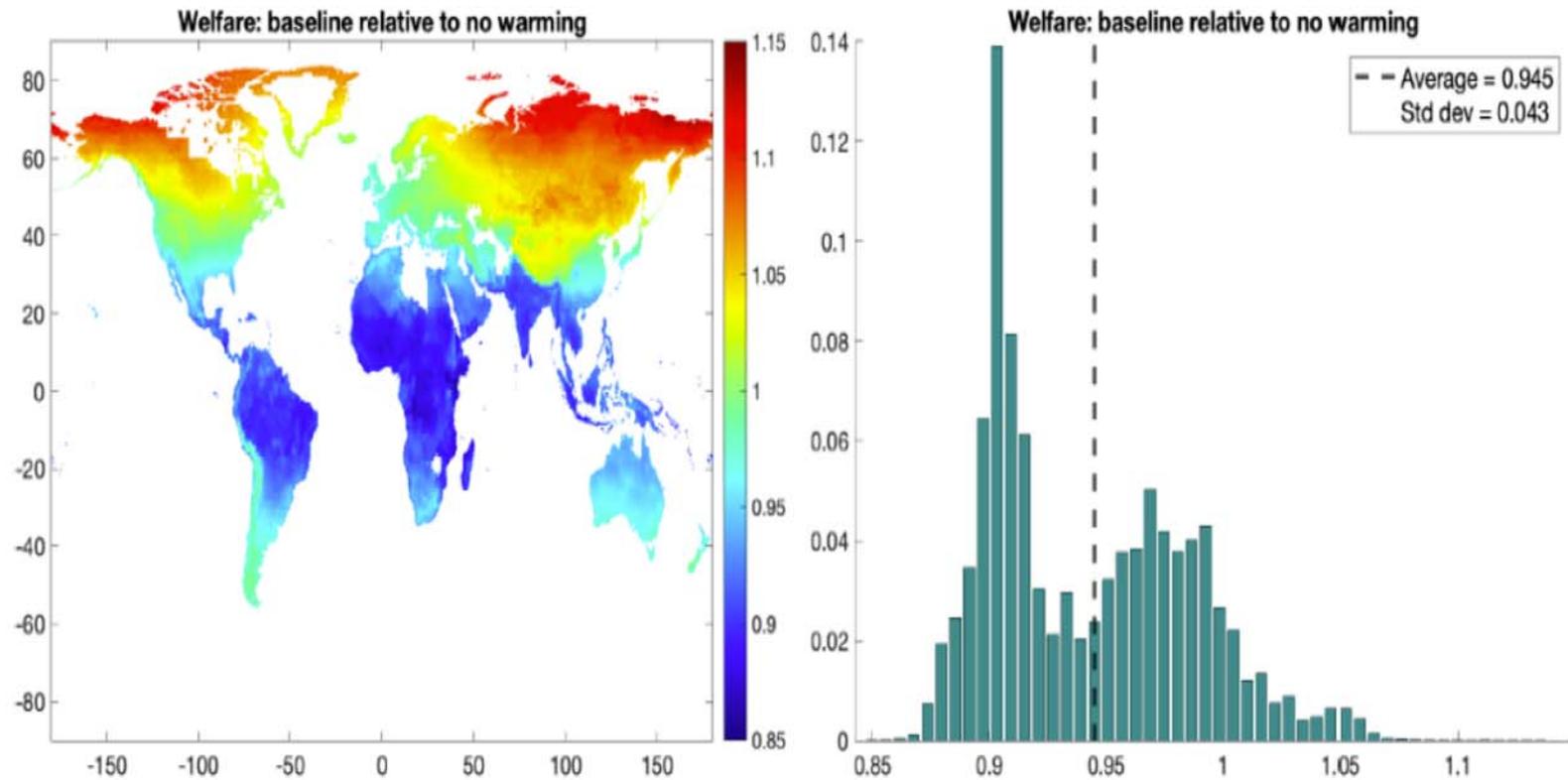
- **The big policy question: Is the single global agreement – the Paris Agreement – adequate for addressing the environmental issues?**
  - ○ **The answer is, unfortunately and not surprisingly, no**
  - ○ **The agreement's stated goal is to limit temperature increases to $1.5°C$ by 2100.**
  - ○ **The average global carbon tax recommended by the Paris Agreement is at $12 per ton of CO2**
  - ○ **This falls way short of achieving the goal: The necessary global carbon tax turns out to be unfeasibly large – at $500 per ton of CO2**
  - ○ **This suggests a strong desire for alternative policies that remain unexplored.**