Economic development beyond the orthodoxy:

Industrial policy and structural transformation in post-Keynesian and heterodox development theory

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Introduction

Orthodox development economics

1. What characterises orthodox development economics?
2. What are we missing?

Economic development beyond the orthodoxy: structural change, industrial policy, demand-growth

1. Why does structural change matter for sustaining high living standards?
2. Why does structural change need to be supported by industrial policy?
3. How to make industrial policy work?
    a) Navigating Global Value Chains
    b) Navigating conflicts of interest
    c) Navigating demand constraints

Pro-industrialisation theories

Classical Development Economics: Rosenstein-Rodan (1943), Kalecki (1954), Lewis (1954), Myrdal (1957), Hirschman (1958), Kaldor (1966)

Structuralism, dependency, post-Marxism: Prebisch (1950), Singer (1950), Frank (1967), Wallerstein (1974), Cardoso and Faletto (1979)

Neoclassical economics of scale

New Growth Theory: Romer (1986), Lucas (1988)

New Trade Theory: Krugman (1990)

1940s-1970s

1960s-1970s

1980-1990s

1990s

Neoclassical development economics

Old Growth Theory: Solow (1957)

Human Capital Theory: Becker (1964)

Rational Peasant: Schultz (1964)

Neoclassical economics of institutions and market imperfections

Market Failure Economics: credit rationing, externalities

New Institutional Economics: North (1990), Acemoglu, Johnson and Robinson (2001)

Heterodox development economics

- *Meaning and measurement of well-being* (Basic needs approach, Sen's capability approach)
- *Developmental States* (Amsden 1989, Wade 1990, Evans 1995), industrial policy (Chang and Andreoni 2020), political settlements (Khan 2013)
- *Demand constrained growth*: Balance of payments constrained growth (Thirlwall 1979, 1986), Brazilian New Developmentalism
- *Financialisation and financial subordination*

Import-Substituting Industrialisation

Washington Consensus

Post-Washington Consensus

Development Economics – The State of Affairs

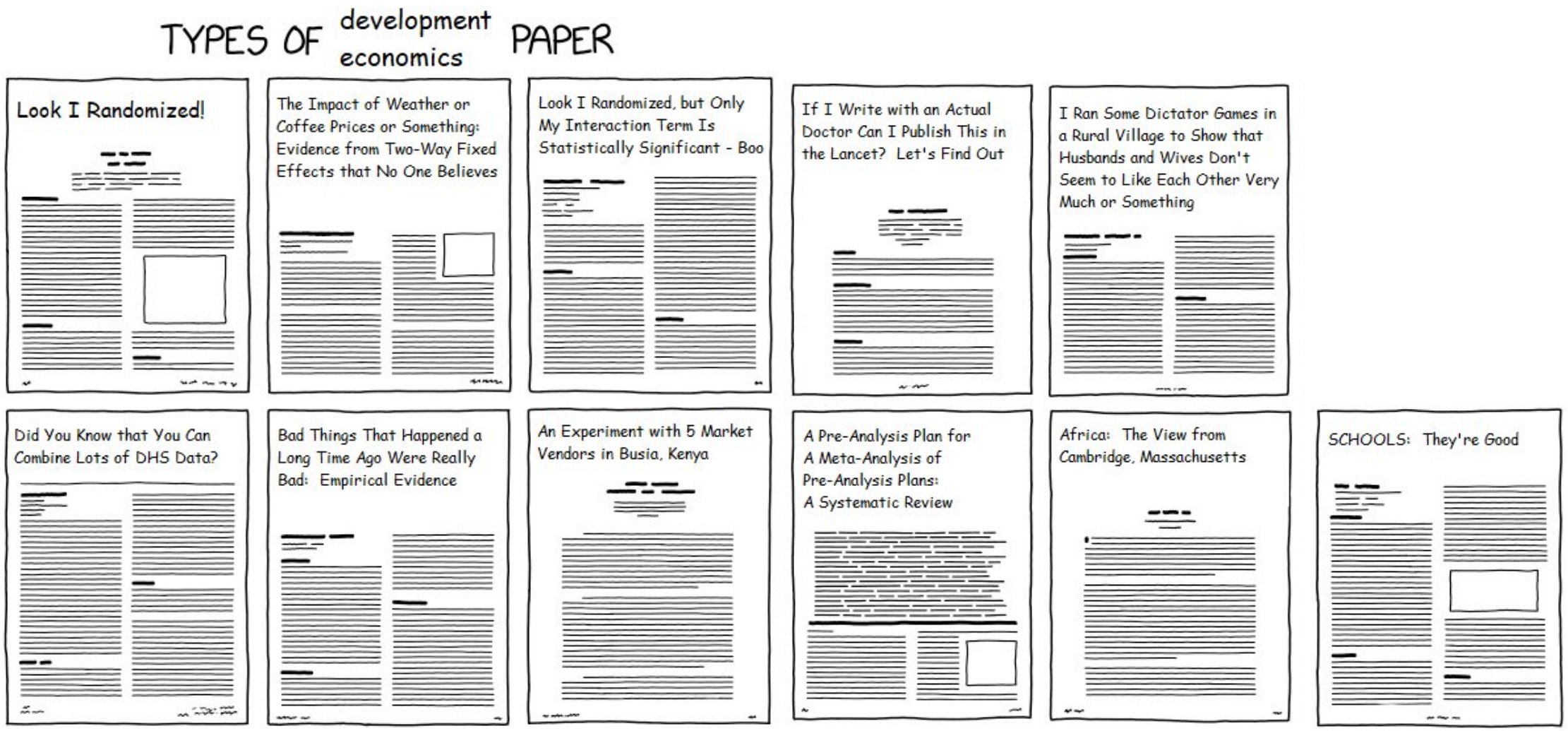
Theoretical level: relaxation of some core neoclassical assumptions

- Neoclassical economics of *scale*: New Growth Theory, New Trade Theory
- *Market imperfections*: Externalities ('Self-discovery', Hausman and Rodrik 2003), Information Asymmetries (e.g. credit markets, Hoff and Stiglitz 1993)
- *Institutions*: weak enforcement of property rights (New Institutional Economics, North 1990)

Policy level: From letting markets work to making markets work

- State intervention might be justified to correct market failures (BUT: market vs. government failure)
- Anti-corruption/ 'good governance' agenda
- Piecemeal interventions to correct specific market failures (make individual markets work)
- Overlap between WC and PWC (especially macro): Both highly conservative in fiscal and monetary policy, support 'free' trade, privatisation, liberalisation, wage moderation and (labour market) deregulation

Development Economics – The State of Affairs



What are we missing?

1. Current mainstream based on ahistorical models without room for historical, systemic or structural specificities
   - Bias towards domestic reforms (correcting specific market failures in piecemeal way) while shying away from global or structural reforms

2. Supply-side determined framework – no role for demand
   - Supply-side determined growth models (OGT and NGT)

3. Models based on representative agents - no conflicts of interest
   - No reflection on why vested interest exist, what sustains them and why certain groups (the poor) have no effective voice
   - Which markets do we ‘enable’ – and is that a value neutral decision?

Industrial policy and structural transformation in post-Keynesian and heterodox development theory

Heterodox development economics

- *Meaning and measurement of well-being* (Basic needs approach, Sen's capability approach)
- *Theories of structural change:* Developmental States (Amsden 1989, Wade 1990, Evans 1995), industrial policy (Chang and Andreoni 2020), political settlements (Khan 2013)
- *Demand constrained growth*: Balance of payments constrained growth (Thirlwall 1979, 1986), Brazilian New Developmentalism
- *Financialisation and financial subordination* (Bonizzi et al., 2019; Powell, 2013)

1. Sustained improvements in living standards are contingent on the evolution of the economy's production structure
2. Industrial policy is a necessary condition for facilitating sustained structural transformation
3. Industrial policy can fail: heterodox institutionalist explanations, demand-led structural transformation

Structure of production matters: sustaining improvements in living standards

Manufacturing as engine of growth

High living standards closely linked to development of technological capabilities in manufacturing

1. Driver of productivity growth

- Primary commodity booms often short lived and replaced by technological innovations
  - BASF's synthetic fertilizer replace natural fertilizer like guano and saltpetre
  - BASF's synthetic dyes destroy natural dye industries in India and Guatemala

Kaldor's growth laws

1. GDP growth is strongly linked to the growth of the manufacturing sector.
2. Verdoorn's Law: Circular cumulative causation between output and productivity growth
3. Overall productivity growth rises with employment growth in manufacturing.

Peruvian Guano Boom

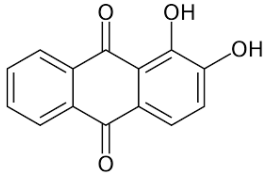
Chilean Saltpetre Boom

BASF Synthetic fertilizer

Guatemalan cochineal beetle

Indigo plantation

BASF Synthetic dye



Further reading: Chang, H.-J. (2022) Edible Economics, Allen Lane. Chapter Anchovy
Szirmai, A. (2012). Industrialisation as an Engine of Growth in Developing Countries, 1950-2005. Structural Change and Economic Dynamics, 23(4), 406–420.
Thirlwall, A. P. (1983). A plain man's guide to Kaldor's growth laws. Journal of Post Keynesian Economics, 5(3), 345.

Structure of production matters: sustaining improvements in living standards

- Increasing returns to scale
- Spillover effects to other sectors
- Manufacturing main source of technological innovation (even in high income economies)
- Assembly manufacturing vs. high-end manufacturing (e.g. machinery, precision equipment, industrial chemicals)

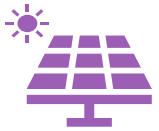
2. Services dependent on manufacturing core
   - High-end services (finance, transport, management consulting, engineering, design) cannot exist without manufacturing

11% of US GDP

35% Productivity Growth

20% Capital Stock

70% R&D

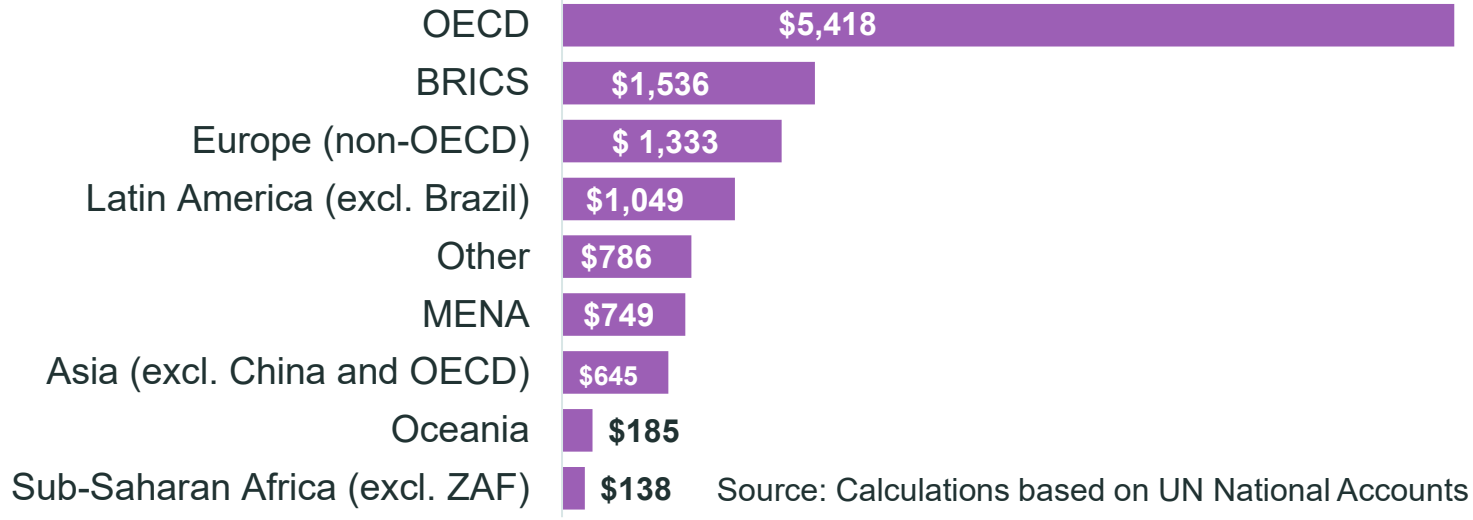


https://www.weforum.org/agenda/2022/01/inclusive-economic-growth-manufacturing/

Knowledge Intensive Industries (KII)

1. High-tech manufacturing (semi-conductors, pharmaceuticals…)
2. Medium high-tech manufacturing (motor vehicles)
3. Knowledge intensive services

Manufacturing Value Added per Capita (2019)



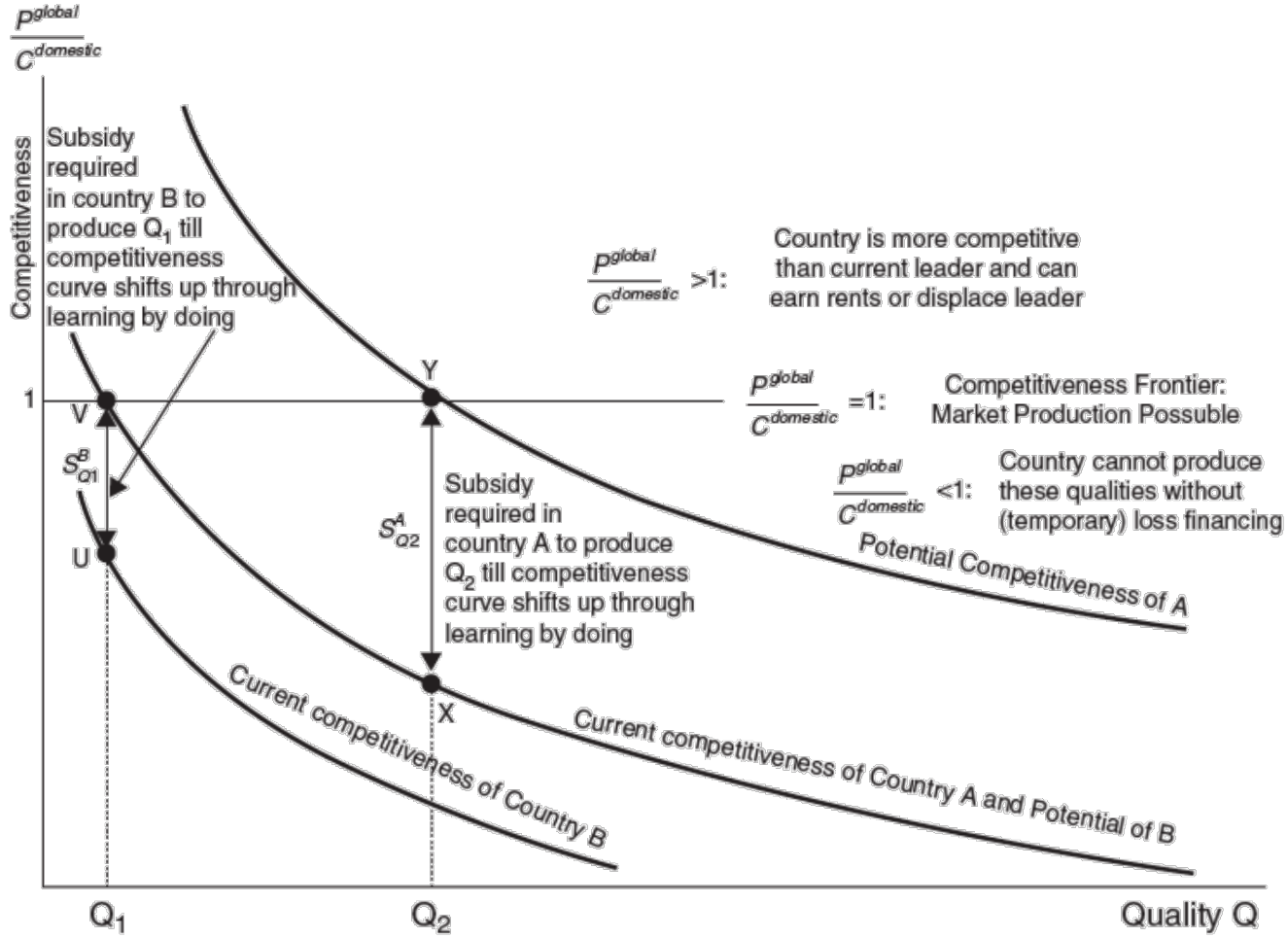
Source: Calculations based on UN National Accounts

Sustained structural transformation requires industrial policy

- Productive capabilities not static
  - Developing economies can ‘skip’ various steps of technological innovations by assimilating foreign technology
- Assimilation of (foreign) technology relies on
  - Investment: upskilling of workers, machines, technological research…
  - Tacit knowledge: operating machines effectively, organising production processes…
- Development of productive capabilities takes time and requires nurturing
- Economic development similar to child development: Infant Industry Protection (Alexander Hamilton)

Sustained structural transformation requires industrial policy

- Without protection, immature producers in new industries will be outcompeted by established foreign producers
- Technological capabilities can only be acquired through the production process itself (learning by doing)
- Instruments like subsidies, credit direction, or tariff protection are needed to ensure production can take place *before* competitiveness is reached
- Economic history: most high-income countries used infant industry protection for substantial period of time



Source: Khan, M.H. (2013) 'Technology Policies and Learning with Imperfect Governance', in J.Y. Lin and J.E. Stiglitz (eds) The Industrial Policy Revolution I. The Role of Government Beyond Ideology, pp. 79–115. London: Palgrave Macmillan.

Sustained structural transformation requires industrial policy

- Alexander Hamilton (first Secretary of US Treasury): strategy for promoting American manufacturing to catch-up with Britain and promote military using tariffs and other forms of infant industry
- Emerging Agro-industrial block
- Emerging engineering block (military-industrial complex)
- After WWII Network Building Industrial Policy for civilian applications of military research:
  - National Institutes of Health (NIH)
  - Defense Advanced Research Projects Agency (DARPA),
  - Advanced Research Projects Agency-Energy (ARPA-E),
  - Small Business Innovation Research Programme (SBIR)

Average tariffs on manufactured products

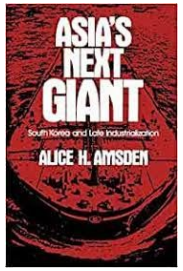
	1820[2]	1875[2]	1913	1925	1931	1950
Austria[3]	R	15–20	18	16	24	18
Belgium[4]	6–8	9–10	9	15	14	11
Denmark	25–35	15–20	14	10	n.a.	3
France	R	12–15	20	21	30	18
Germany[5]	8–12	4–6	13	20	21	26
Italy	n.a.	8–10	18	22	46	25
Japan[6]	R	5	30	n.a.	n.a.	n.a.
Netherlands[4]	6–8	3–5	4	6	n.a.	11
Russia	R	15–20	84	R	R	R
Spain	R	15–20	41	41	63	n.a.
Sweden	R	3–5	20	16	21	9
Switzerland	8–12	4–6	9	14	19	n.a.
United Kingdom	45–55	0	0	5	n.a.	23
United States	35–45	40–50	44	37	48	14

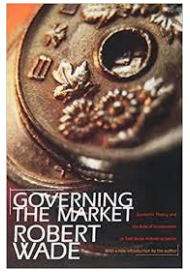
Source: Ha-Joon Chang (2002) Kicking Away the Ladder

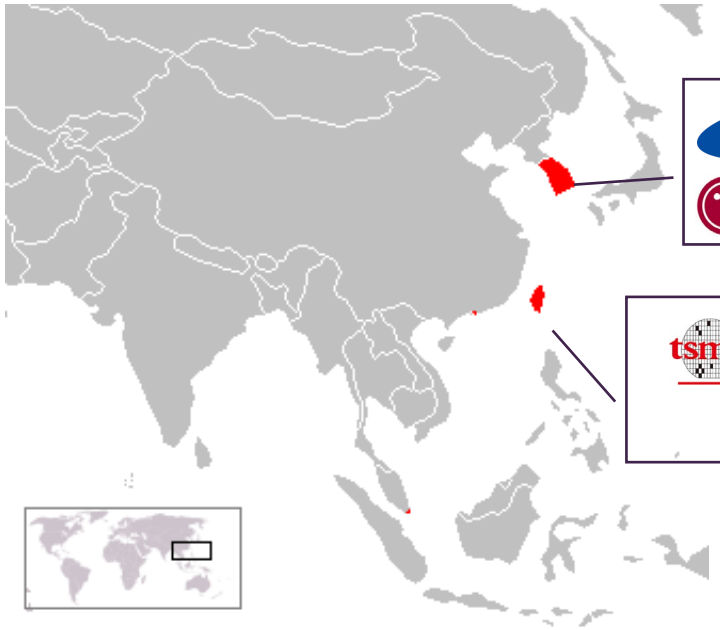
For further reading on US Industrial Policy: Wade, R.H. (2014) 'The Paradox of US Industrial Policy: The Developmental State in Disguise', in J.M. Salazar-Xirinachs et al. (eds) *Transforming Economies - Making Industrial Policy Work for Growth, Jobs and Development*, pp. 379–400. Geneva: International Labour Office.

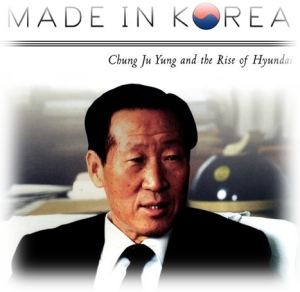
Sustained structural transformation requires industrial policy

- East Asian ‘miracles’ based on industrial upgrading from silk, textiles, basic food processing to automotive, consumer electronics, ship building, iron, steel and more recently semi-conductors
  - ‘Governing the market’ (Wade) and ‘Getting prices wrong’ (Amsden)
  - Tax reductions, tariff exemptions, import financing, export subsidies, subsidised credit, foreign currency loans, direct subsidies, trade restrictions

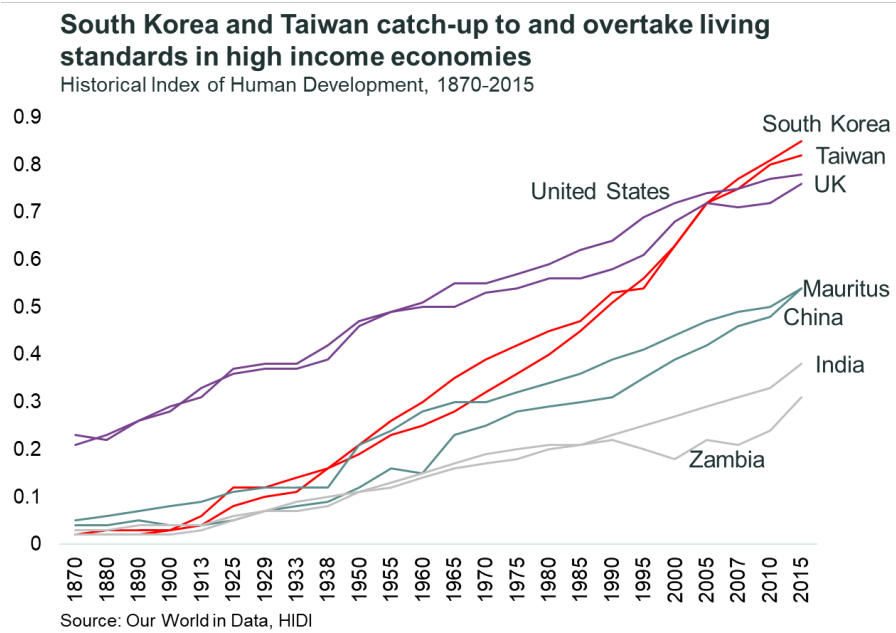






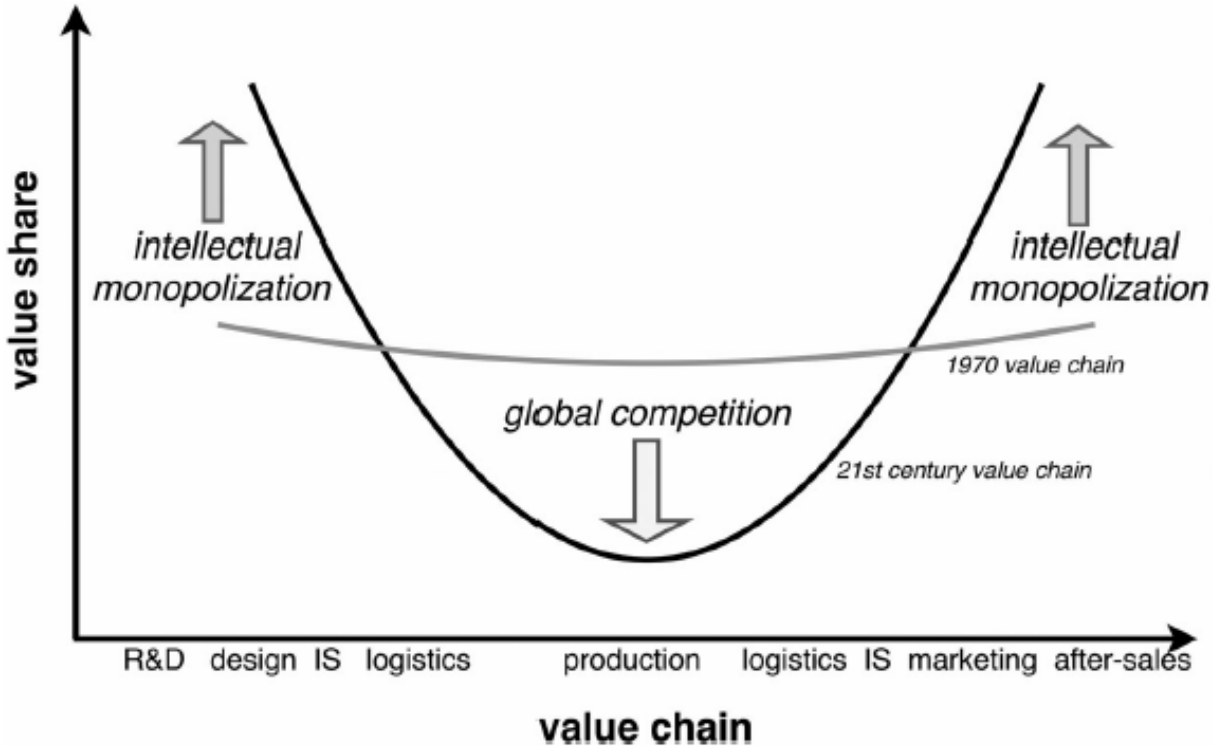


Chung Ju-yung - Hyundai



Making industrial policy work: navigating the smile curve

Distribution of value-added share in GVCs follows a 'smile curve'



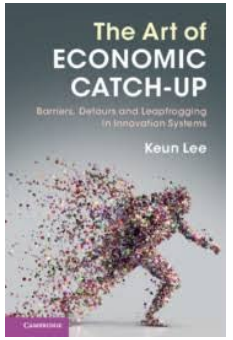
Source: Durand and Milberg 2020: 409

1. Tightening of IPRs
2. Natural monopoly forces
3. Increasing returns to intangible assets
4. Innovation advantages from control over value chain

Keun Lee's In-Out-In Again pattern

Dynamic development of technological capabilities relies on proprietary control of core technologies

1. In: Integrate into global markets through foreign technology and investment.
2. Out: Develop their own capabilities and begin to "exit" reliance on foreign technologies
3. In Again: Re-engage with global markets as competitive players, exporting their own innovations and technologies



Lee, K. (2019). *The Art of Economic Catch-Up: Barriers, Detours and Leapfrogging in Innovation Systems* (1st ed.). Cambridge University Press.

Making industrial policy work: navigating conflicts of interest

Heterodox institutionalist theory: The political settlements approach

From Khan (2010)		HORIZONTAL DISTRIBUTION OF POWER: EXCLUDED ELITES →	
		WEAK	STRONG
VERTICAL DISTRIBUTION OF POWER: LOWER LEVEL FACTIONS	WEAK ↓	POTENTIALLY DEVELOPMENTAL DOMINANT COALITION RWANDA Longer-term horizons Implementation capabilities high	VULNERABLE AUTHORITARIAN COALITION
	STRONG	WEAK DOMINANT PARTY UGANDA, CAMBODIA Implementation capabilities weakened by multiple demands and 'blockers'	COMPETITIVE CLIENTELIST BANGLADESH, GHANA Shorter-term horizons: threat of powerful excluded elites Implementation capabilities weakened

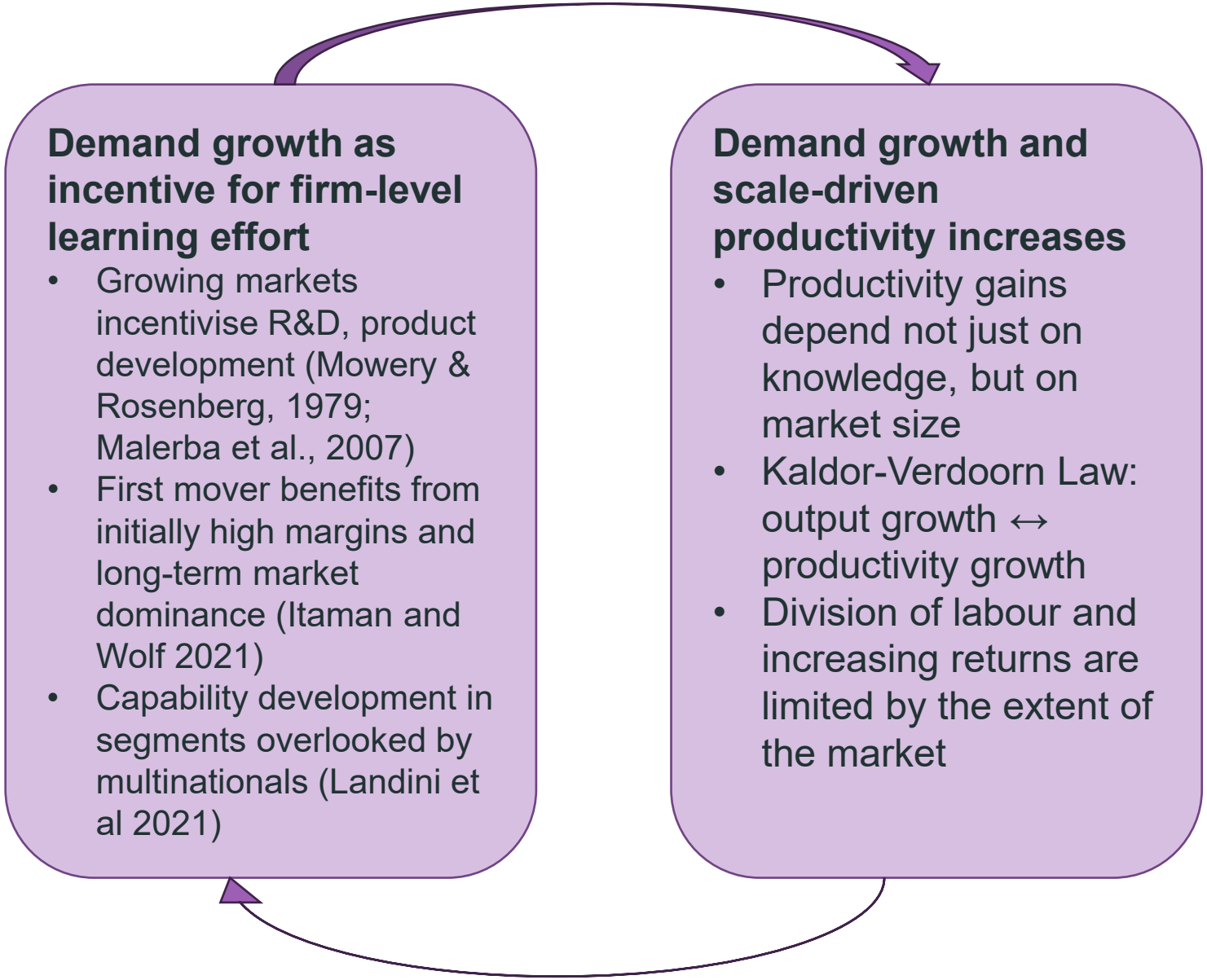
Khan's political settlements approach

Learning depends on the active effort of firms, which can be difficult to enforce. IP instruments have to match the distribution of power in society.

Khan, M.H. (2013) 'Technology Policies and Learning with Imperfect Governance', in J.Y. Lin and J.E. Stiglitz (eds) *The Industrial Policy Revolution I. The Role of Government Beyond Ideology*, pp. 79–115. London: Palgrave Macmillan.

Khan, M.H. (2019) 'Knowledge, Skills and Organizational Capabilities for Structural Transformation', *Structural Change and Economic Dynamics* 48: 42–52.

Making industrial policy work: navigating demand constraints



Which policies can support demand growth?

Making industrial policy work: navigating demand constraints

- All demand-led theories agree: Demand growth = driver of cumulative causation
- But: Theories diverge on *how* demand increases and which *policies* can generate it

Kaldorian tradition
demand problems emerging when vertically linked industries grow at different paces

- Build supply capacity in sectors with high export potential and undervalued exchange rate *[Thirlwall 1997, 2013; Bresser Pereira and Rugitsky 2018, Oreiro et al 2020, Gabriel et al 2020]*
- Caution against domestic demand-led policies (leak into imports → trigger balance-of-payments crises)

- Endogenous drivers of demand growth: government spending *[Nomaler et al 2021; Strom 2020]* and income distribution *[Kalecki 1954]*
- Flag limits of export-led growth and caution against wage repression and austerity

Keynesian/ Kaleckian tradition
purchasing power created in production process is withheld from consumption or investment

Making industrial policy work: navigating demand constraints

Kaldorian tradition
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- Kaldor: Industrial demand growth depends on autonomous demand from outside industry
- Expenditures derived from production process itself cannot exceed costs → not a source of profit
- Two key sources of autonomous demand: Agriculture and exports
- Outcome: Growth becomes balance-of-payments constrained (BOCG)

Thirlwall's Balance of Payments Constrained Growth Model

As no country can permanently run a trade deficit, the pace of structural change is constrained by world market demand for current domestic production, which constrains an economy's ability to pay for the (capital goods) imports necessary for (ongoing) production processes

Thirlwall's law

$$y_{i,bop} = \frac{\hat{\varepsilon} \cdot y_{world}}{\hat{\pi}}$$

Income elasticity of demand for exports

Income elasticity of demand for imports

Thirlwall, A.P. (1986) 'A General Model of Growth and Development on Kaldorian Lines', *Oxford Economic Papers* 38(2): 199–219.
Thirlwall, A.P. (1997) 'Reflections on the Concept of Balance-of-Payments-Constrained Growth', *Journal of Post Keynesian Economics* 19(3): 377–85.

Making industrial policy work: navigating demand constraints

- Emphasis on endogenous drivers of demand
  - Arise when purchasing power created in production is withheld from spending.
  - Caused by weak expectations (Keynes) or income inequality and class power (Kalecki).
- Limits to export-led strategy, especially if based on wage repression and austerity amplifies deflationary pressures by
  - undercutting vital sources of domestic purchasing power
  - limiting export earnings in race to the bottom
- Instead: support domestic demand growth through public investment programmes and procurement, pro-poor redistributive policies

- endogenous drivers of demand growth: government spending *[Nomaler et al 2021; Strom 2020]* and income distribution *[Kalecki 1954]*
- Caution against wage repression and austerity

Keynesian/ Kaleckian tradition
purchasing power created in production process is withheld from consumption or investment

Kalecki (1954): Domestic markets in developing economies are not too small, but constrained by monopolistic market structures + power of rentiers
"(…) increased profits will not be spent at all,or will be spent on luxuries." (pg. 29)

Kalecki, Michal. 1954. 'The Problem of Financing Economic Development'. In *Collected Works of Michal Kalecki*, edited by Jerzy Osiatynski, Volume V Developing Economies:21–44. Oxford: Oxford University Press

Making industrial policy work: navigating demand constraints

An attempt at reconciling the traditions

- 1992 Dutt Thirlwall debate on the nature of the demand-problem
  - The Kaldorian-Thirlwallian demand-constraint stems from differences in productivity growth across sectors but there is no independent investment function, and all savings are reinvested
  - Keyensian-Kaleckian demand-constraint: Purchasing power created in the production process withheld from consumption and investment (Dutt 1992)
- The two traditions are not mutually exclusive: highlight complementary dimensions of demand constraints
  - Support growth of demand in sectors targeted by industrial policy. This can take different forms depending on the sector
  - Adress BoP constraints: reducing-import dependence of sectors targeted by industrial policy, encourage export growth

Further reading:
Dutt, A.K. (1992) 'A Kaldorian Model of Growth and Development Revisited: A Comment on Thirlwall', *Oxford Economic Papers* 44(1): 156–68
Thirlwall, A.P. (1992) 'A Kaldorian Model of Growth and Development Revisited: A Rejoinder to Dutt', *Oxford Economic Papers*, New Series 44(1): 169–72
Wolf, Christina. 2023. Demand-growth in support of structural change: Evidence from Nigeria's formal manufacturing sector. *Structural Change and Economic Dynamics*, *67*, 347–358.

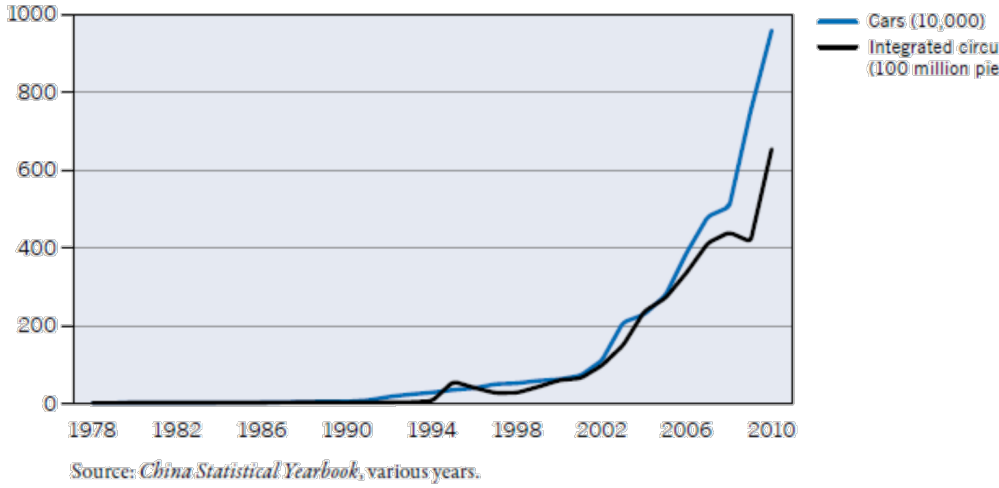
Making industrial policy work: navigating demand constraints

- A history-friendly approach: Demand windows in the development of several Chinese industries
  - Renewable energy: wind, biomass, hydropower
    - Renewable energy law (2005) creates expanding markets (e.g. mandatory purchasing of wind energy by utilities, generous feed in tariffs for renewable power plants)
  - Car industry
    - JVs with major car producers (VW, Citroen, Peugot) but only takes off following large scale infrastructure investment programme after East Asian financial crisis
  - Battery production

Demand-led catch-up: a history-friendly model of latecomer development in the global green economy

Fabio Landini ✉, Rasmus Lema, Franco Malerba

Figure 11.4 Output of cars and integrated circuits, 1978–2010



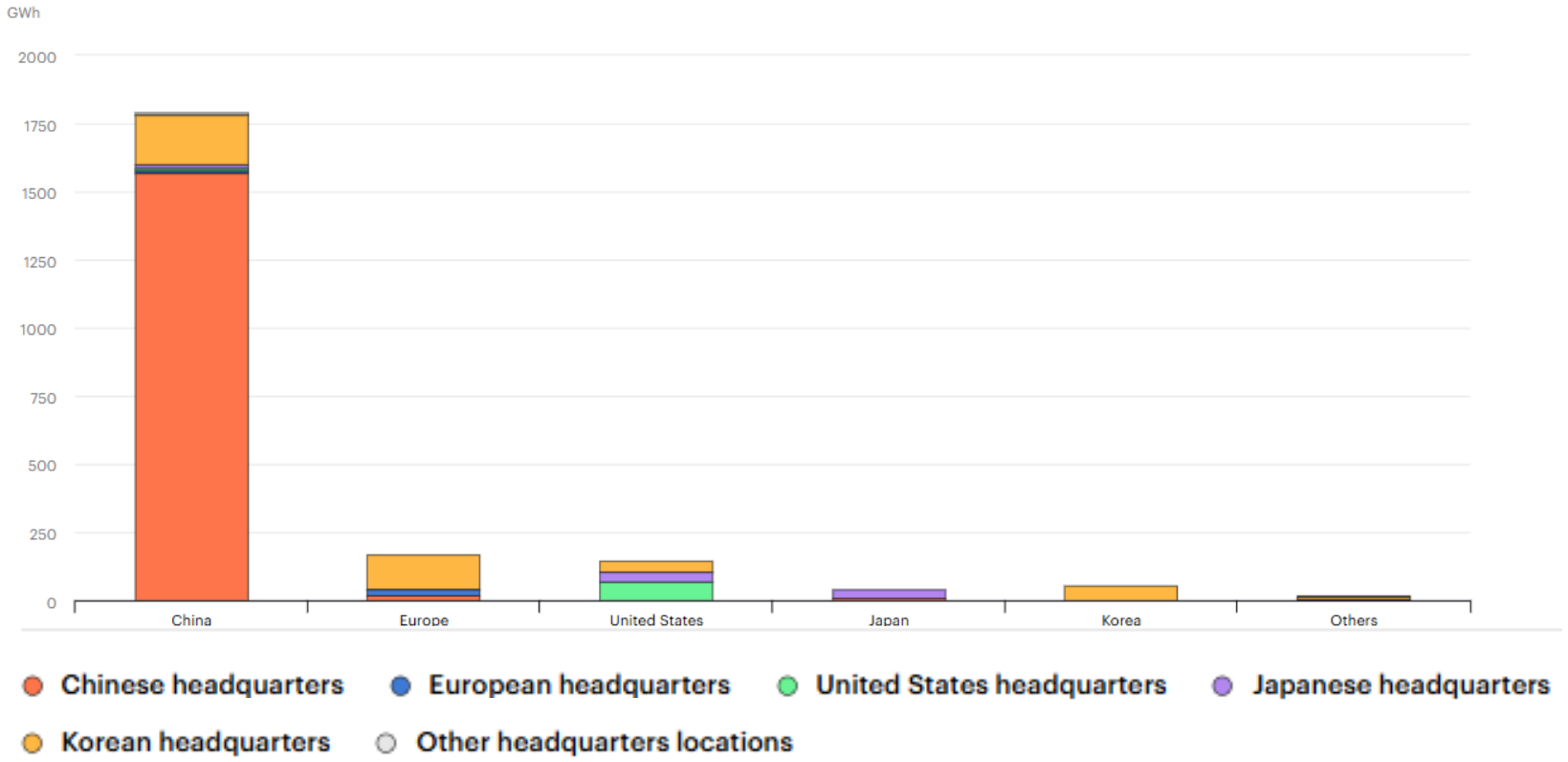
Source: *China Statistical Yearbook*, various years.

Source: Lo, D. and M. Wu (2014) 'The State and Industrial Policy in Chinese Economic Development', in J.M. Salazar-Xirinachs et al. (eds) *Transforming Economies - Making Industrial Policy Work for Growth, Jobs and Development*, pp. 307–26. Geneva: International Labour Office.

Making industrial policy work: navigating demand constraints

Production and innovation capacity is dominated by Chinese and South Korean firms

Regional EV lithium-ion battery manufacturing capacity by manufacturer headquarters, 2023



How Europe's battery champion descended into crisis

Insiders say Northvolt, Europe's best-funded start-up, has been beset by problems from the start

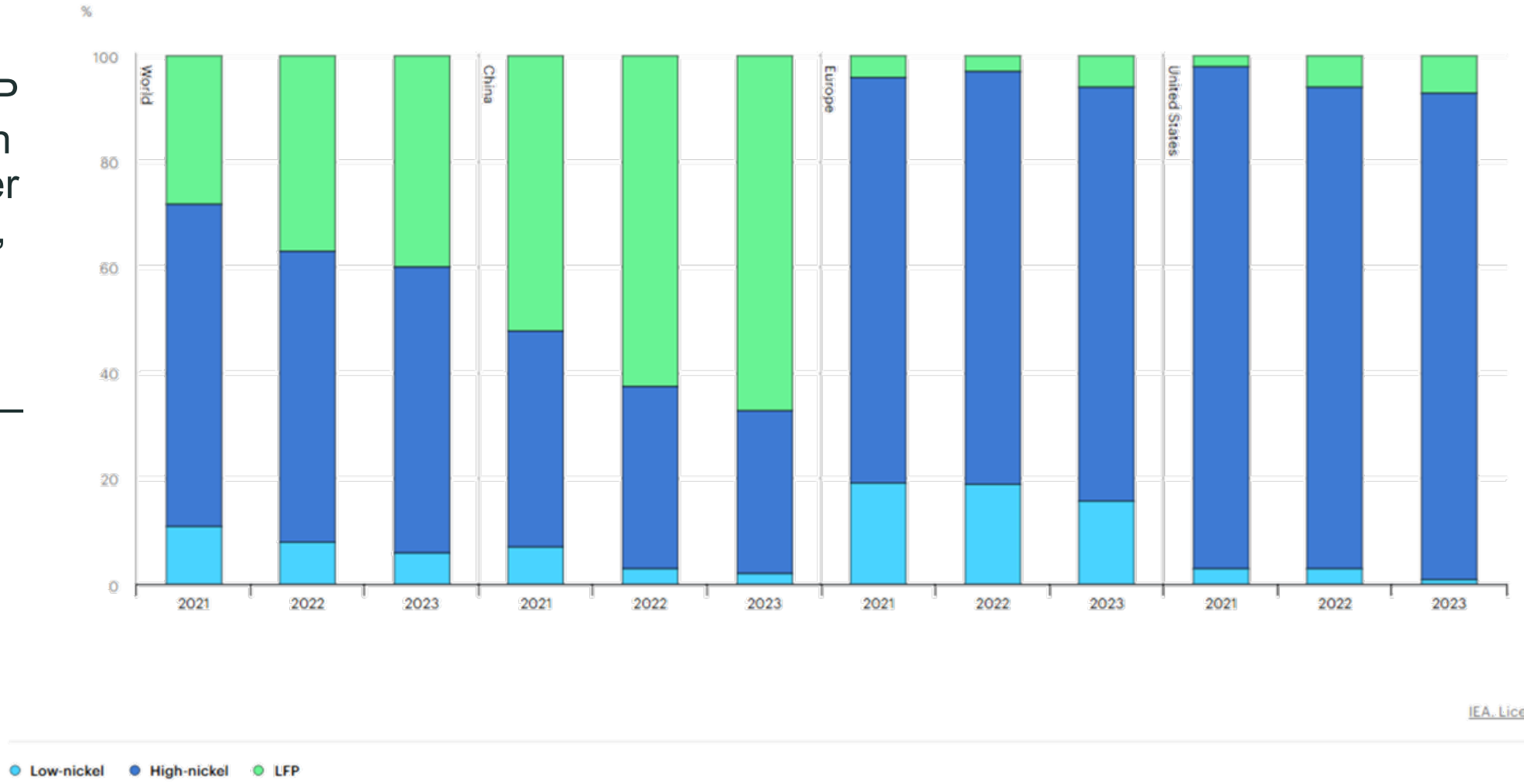
Britishvolt owed up to £160mn to creditors when it collapsed

Battery start-up had just £1.8mn and no IP when it went into administration in January

Source: IEA (2024), Regional EV lithium-ion battery manufacturing capacity by manufacturer headquarters, 2023, IEA, Paris https://www.iea.org/data-and-statistics/charts/regional-ev-lithium-ion-battery-manufacturing-capacity-by-manufacturer-headquarters-2023, Licence: CC BY 4.0

Making industrial policy work: navigating demand constraints

- Recent technological advances include LFP batteries (Lithium Iron Phosphate) with lower cost, longer cycle life, and improved safety compared to traditional lithium-ion batteries (e.g., NMC—Nickel Manganese Cobalt)
- LFP batteries held a 40% market share in 2023, with China leading production capacity.



IEA (2024), Share of battery capacity of electric vehicle sales by chemistry and region, 2021-2023, IEA, Paris https://www.iea.org/data-and-statistics/charts/share-of-battery-capacity-of-electric-vehicle-sales-by-chemistry-and-region-2021-2023, Licence: CC BY 4.0

Making industrial policy work: navigating demand constraints

- Main challenge lies in defect rates, not labour or raw material costs.
- This requires tacit knowledge: efficient material use transitioning from laboratory scale to pilot scale and commercial scale while maintaining low defect rates
- Chinese producers CATL and BYD lead in cost-effective battery production, leveraging 30 years of experience for large-scale output and low defect rates
  - Growth driven by assured market demand and industrial policy support: Required municipalities to electrify vehicle fleets (e.g., city buses) → created stable demand conditions
  - (regional) industrial policy incentives: land concessions, tax rebates, and recruitment assistance

Further reading: Gong, H., Yu, Z., Binz, C., & Truffer, B. (2024). Beating the Casino: Conceptualizing an Anchoring-based Third Route to Regional Development. *Economic Geography*, *100*(2), 107–137.

Conclusions

- **Heterodox approaches** to development economics emphasise
  - the historically specific, systemic and structural nature of uneven development
  - conflicts of interest, power imbalances, and institutional constraints that are overlooked in orthodox frameworks.
- **Structural transformation** - especially the upgrading of an economy's productive structure - is essential for sustained improvements in living standards.
  - The composition of production matters: productivity, innovation, and value capture are concentrated in manufacturing and knowledge-intensive sectors.
- **Industrial policy** is a necessary condition for structural transformation, but it must be designed to address:
  - Structural power asymmetries in global value chains (GVCs)
  - Domestic political settlements and rentier interests
  - Demand-side constraints that limit market size and firm-level learning (though debates persist among PK how to support demand growth!)

Key Reading

Hauge, J., & Chang, H.-J. (2019). The role of manufacturing versus services in economic development. In P. Bianchi, C. R. Durán, & S. Labory (Eds.), *Transforming Industrial Policy for the Digital Age*. Edward Elgar Publishing. https://doi.org/10.4337/9781788976152.00007

Khan, M. H. (2013). Technology Policies and Learning with Imperfect Governance. In J. Y. Lin & J. E. Stiglitz (Eds.), *The Industrial Policy Revolution I. The Role of Government Beyond Ideology* (pp. 79–115). Palgrave Macmillan.

Landini, F., Lema, R., & Malerba, F. (2021). Demand-led catch-up: A history-friendly model of latecomer development in the global green economy. *Industrial and Corporate Change*, *29*(5), 1297–1318. https://doi.org/10.1093/icc/dtaa038

Thank you

University of Hertfordshire UH