BETTER POLICIES FOR BETTER LIVES

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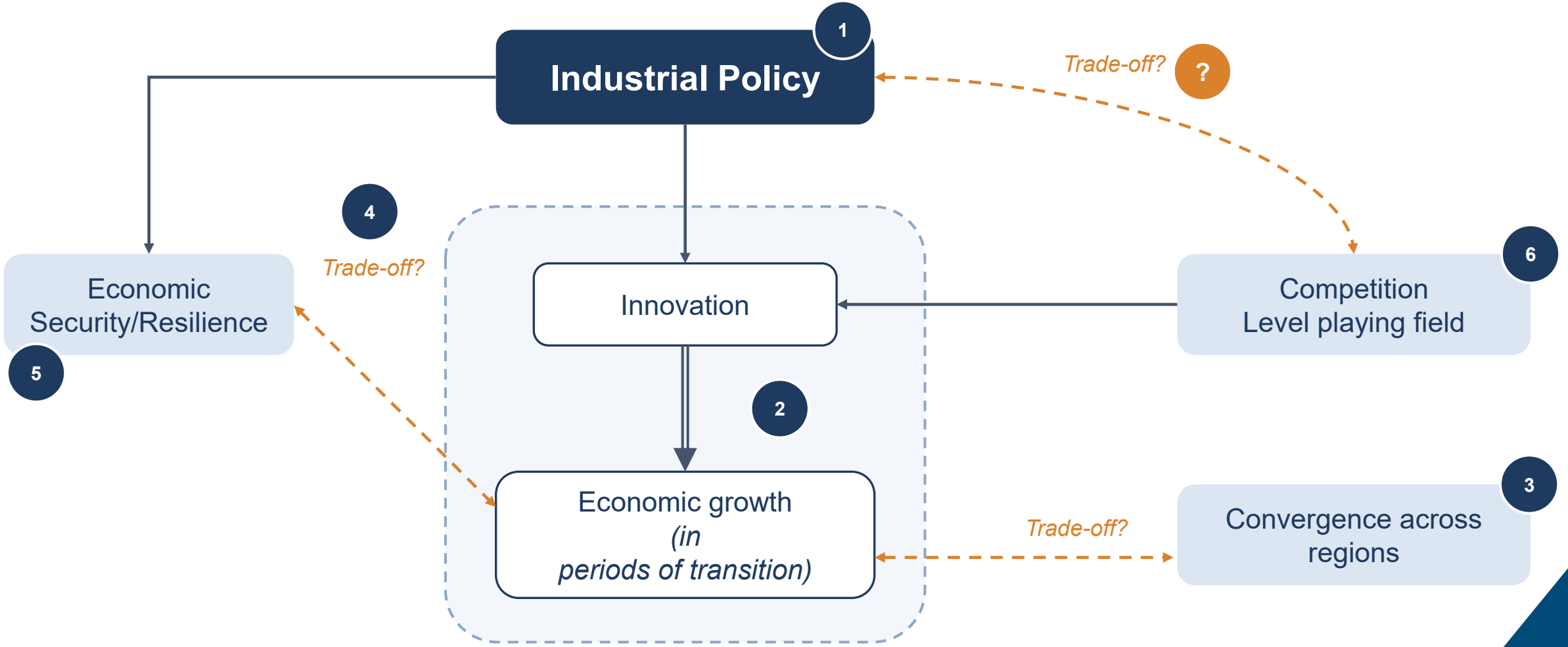
Building evaluation into industrial policy: Measurement, learning and new strategic priorities

Chiara Criscuolo, Head of Division
Productivity, Innovation and Entrepreneurship

SNS, 4 November 2026

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Structure



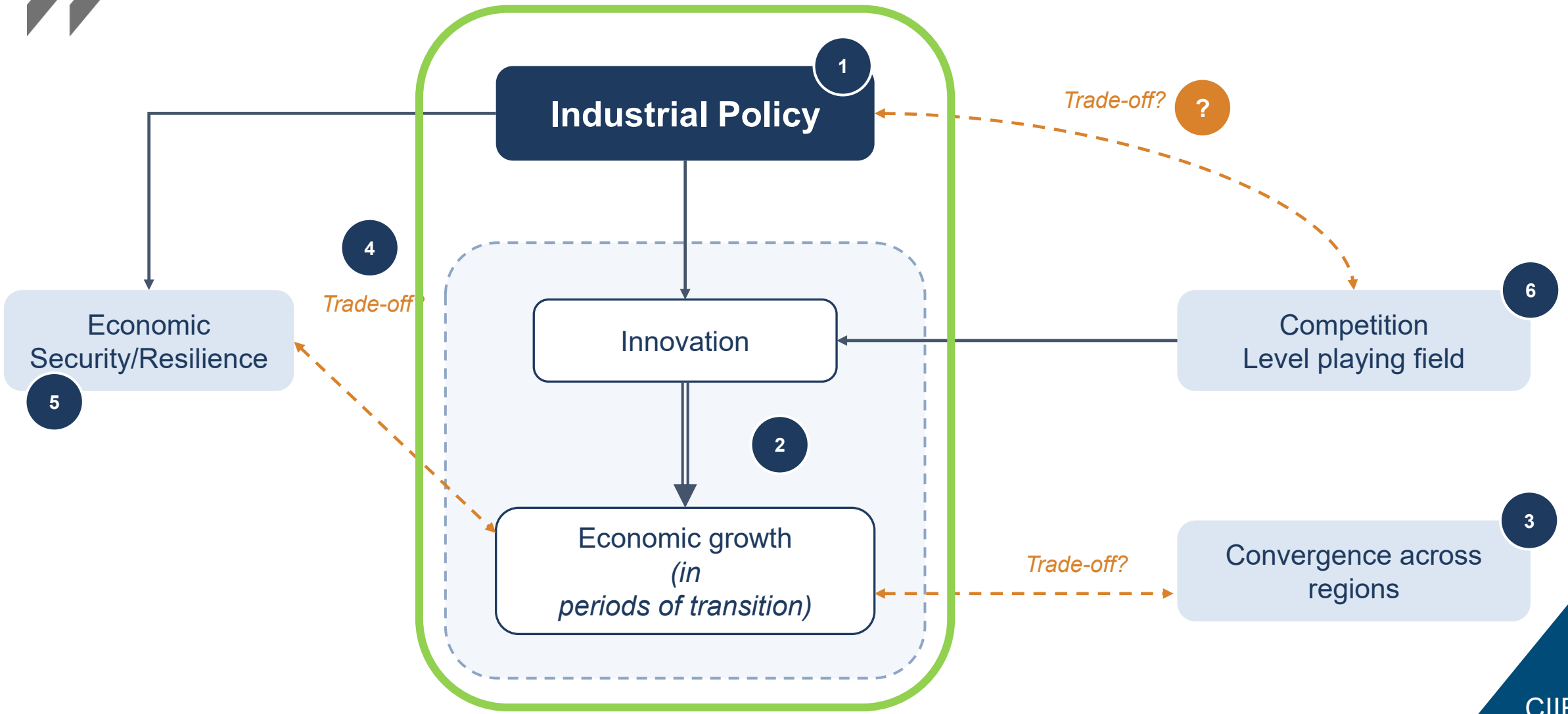
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MEASUREMENT, EVALUATION AND DESIGN FOR LEARNING

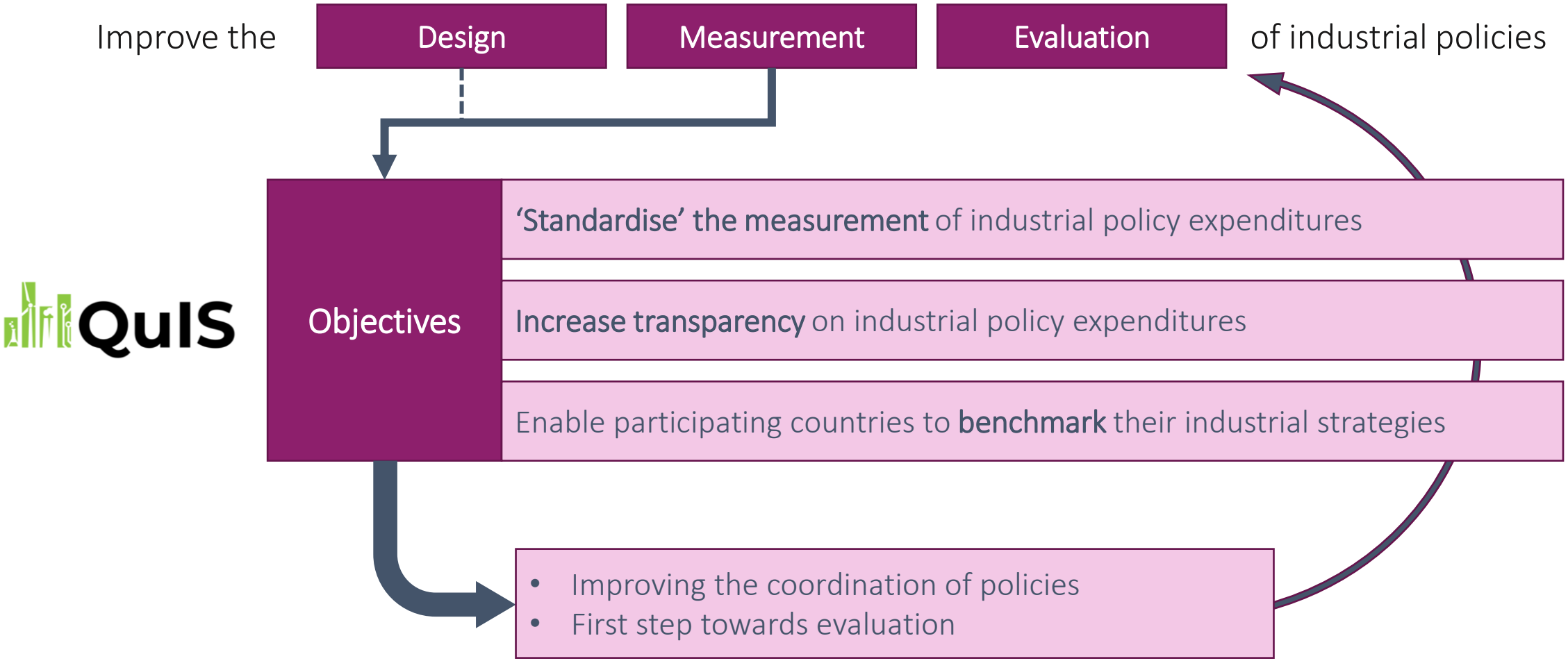
Structure

Definition: Interventions intended to improve structurally the performance of the domestic business sector (OECD, 2022)



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Objectives



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The QuIS database

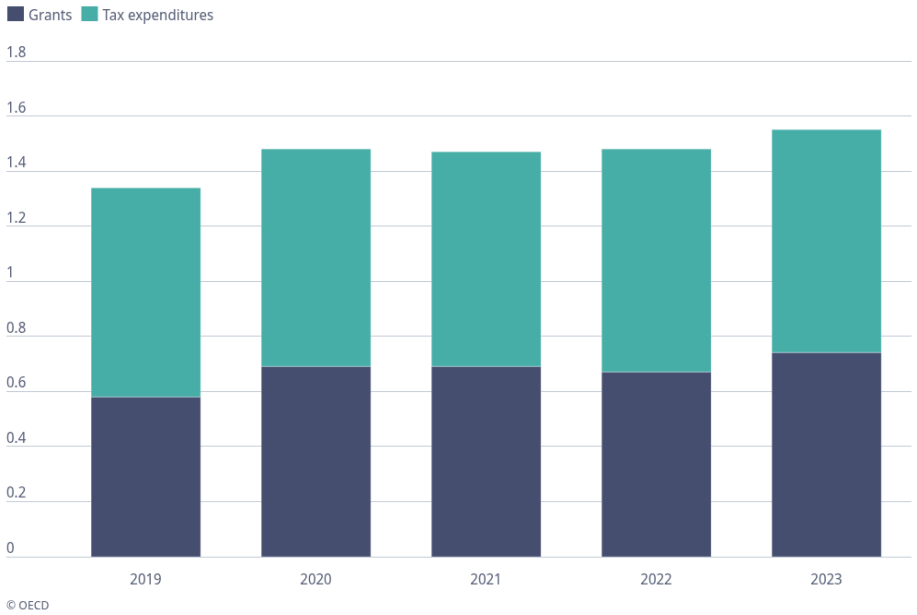
- **2 092 policy instruments (2019 – 2023)**
  - Collected from publicly available sources (> 0.002% of GDP) from budgetary documents, reports of government agencies, governmental websites…
  - Quality checks with complementary sources and validation by CIIE delegates

- **Revised classification of policy targets:**
  - Targeted firm population (e.g. firms operating in particular sectors or developing specific technologies, SMEs)
  - Activity or costs being supported among the target population (e.g. investment in physical capital or R&D, labour or energy costs)

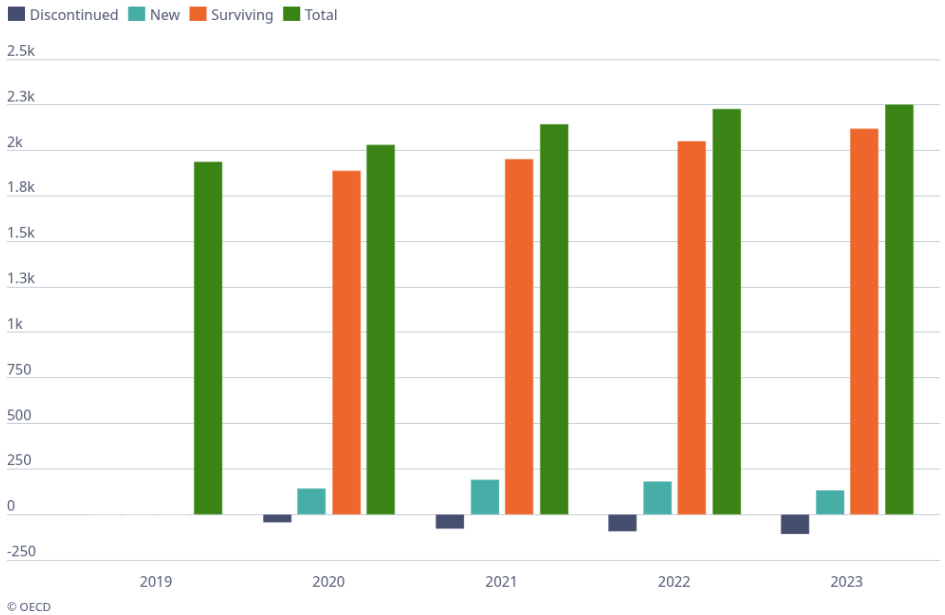
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IP spending is modestly growing, instruments persistent

1.34% of GDP in 2019 to 1.55% in 2023, +16%



76% of the instruments in 2023 existed in 2019



- In a given year, an existing instrument only has a **3.9%** probability of being discontinued
- Half of industrial policy instruments currently in place will still exist **18 years** from now!
- Evaluation is key

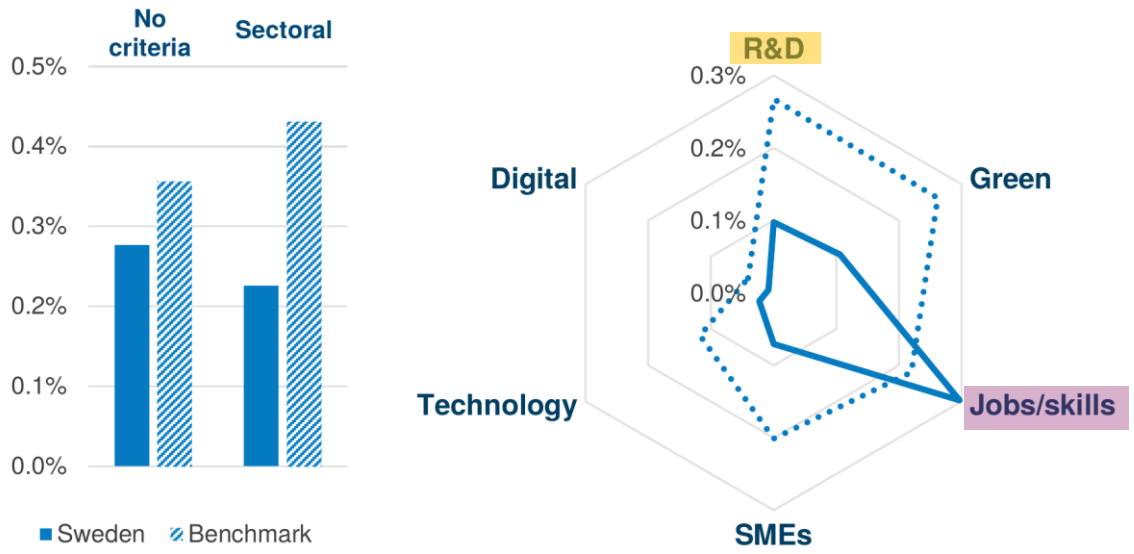
OECD (2026), "Quantifying industrial strategies across 20 OECD countries: Trends and priorities, 2019-2023", *OECD Science, Technology and Industry Policy Papers*, No. 192, OECD Publishing, Paris, https://doi.org/10.1787/0e3ab6dd-en.

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Sweden: support focuses on jobs and skills, less on R&D

Targets of industrial policy spending, 2021

Grants and tax expenditures, % of GDP; Sweden solid, benchmark dotted



Note: structural policies, excluding COVID-19 support; categories are not mutually exclusive. Benchmark: Canada, Denmark, France, Ireland, Israel, Italy, the Netherlands and the United Kingdom. Source: OECD, Sweden: Quantifying Industrial Strategy (QuIS country note), based on the QuIS database.

0.04% of GDP for R&D in 2021

(below the benchmark) through reduced employer contributions (payroll taxes) for R&D staff;

0.3% of GDP on jobs and skills in 2021

(compared to 0.22% benchmark average), includes payroll tax reduction for employing older and younger workers and a grant scheme to hire workers who have not worked before or in a long time

What types of instruments are used?

Fewer grants and tax expenditures than the benchmark, more spending on financial instruments (but this is mainly comprised of export finance (1.9% of GDP in Sweden vs 0.8% benchmark, 2021)

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Getting industrial policy “right”

Rationale	Scope	Shape	Selection	Evaluation
How is the market failure best addressed? By new, or ongoing policies?	Which companies are targeted, excluded? Wide or narrow? Is it additional? Can non-firms apply?	Shape of the aid? (e.g., grants, financial instruments) How large? Total budget?	How are the projects chosen? Non-discretionary vs. selective Define cost-effectiveness? Selection process friendly to SMEs?	Is there demand? Are projects implemented? Is the market failure tackled? Additionality?

OECD (2026), *Industrial Policy Handbook: From Strategy Design to Implementation*, OECD Publishing, Paris, https://doi.org/10.1787/ff099713-en.

Evaluate, adapt and plan for exit

Instruments rarely end and are rarely evaluated: only 3.9% are discontinued in a given year, and public evaluations remain rare



Redesign: Canada, SR&ED tax credit
2011 review: lower rates, more direct grants, simpler rules

Correct course: Netherlands, Top Sectors
2016 and 2020 evaluations: ICT added across sectors, then missions

Stop: Australia, automotive assistance
2014 Productivity Commission inquiry: support withdrawn

Plan data and evaluation

Evaluation is only possible if data access is built in from the start.

OECD microBeRD *links R&D surveys with tax relief records in 23 OECD countries, without moving confidential data.*

Wait for uptake

A review that comes too early judges an instrument before firms use it.

*Uptake of R&D tax relief is **5 to 10 percentage points lower** in the first four years after an incentive is introduced (microBeRD).*

Set a known date

Frequent changes undermine credibility.

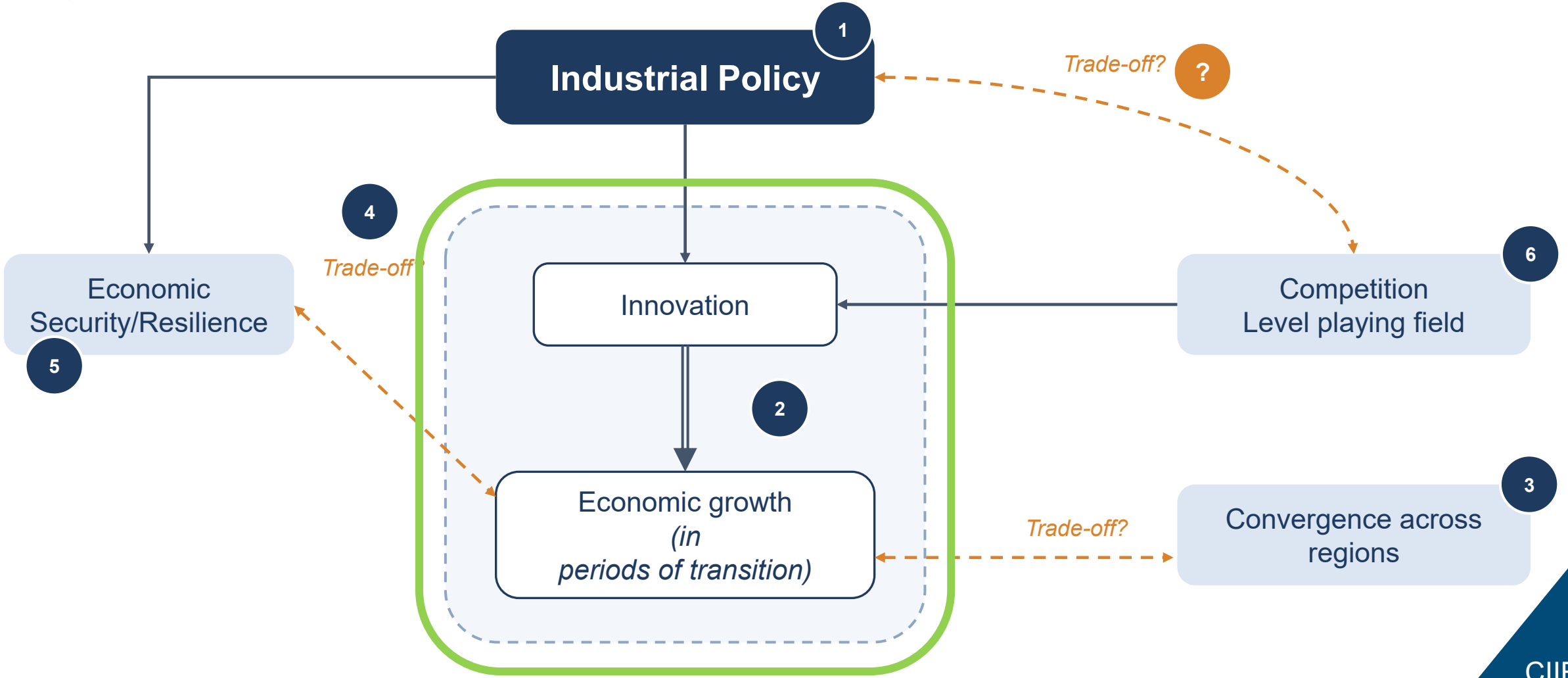
A known timetable helps, as with **Ireland's two-year review cycle.**

Sources: OECD (2026), Industrial Policy Handbook: From Strategy Design to Implementation; OECD (2026), "Quantifying industrial strategies across 20 OECD countries: Trends and priorities, 2019-2023", OECD STI Policy Papers, No. 192; OECD microBeRD project (uptake of R&D tax relief by years since introduction).

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R&D TAX CREDITS

Role of R&D tax credit in innovation policy toolbox: Tax incentives vs. Direct support

Why governments support business R&D

- **Firms do most R&D:** over two-thirds of R&D in OECD countries is performed by private firms
- **Knowledge spillovers:** on their own, firms invest less in R&D than is socially optimal
- **Credit constraints:** information asymmetries between firms and investors

R&D grants	Tax incentives
Discretionary	Non-discretionary
Administrative costs	Cheaper to administer
Allow targeting projects with high social returns	More suitable for R&D closer to market

Limited evidence on their:

- **Relative effectiveness**
  - Larger additionality for tax credits but support different types of projects (Haegeland and Moen, 2007)
  - Grants more suitable for young, financially constrained firms (Busom et al, 2014)

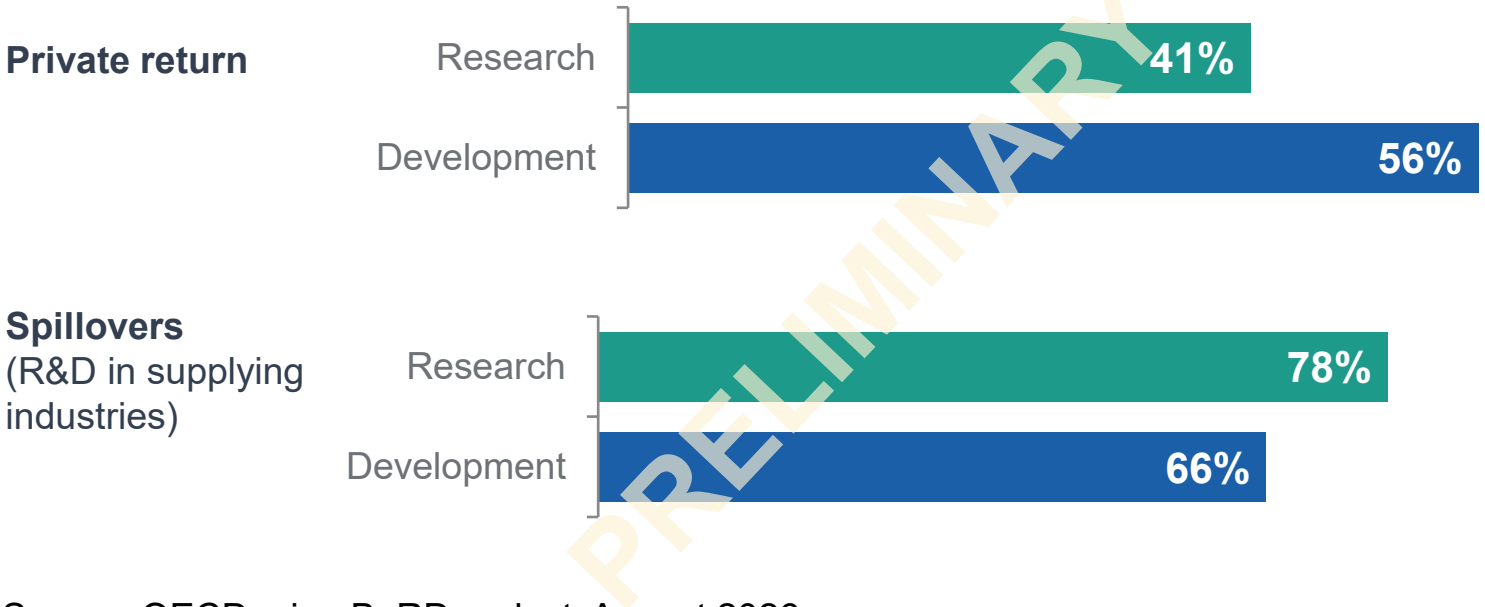
- **Interaction**
  - Substitutes – Dumont (2015), Montmartin and Herrera (2015)
  - Complements – Haegeland and Moen (2007), Falk (2009)

New findings from the OECD microBeRD project

Rates of return to R&D are substantial and spillovers larger for research

Estimated rates of return to R&D, by type of R&D

Average effects across countries, industries, size classes, years



Source: OECD microBeRD project, August 2026.

What is new in this round?

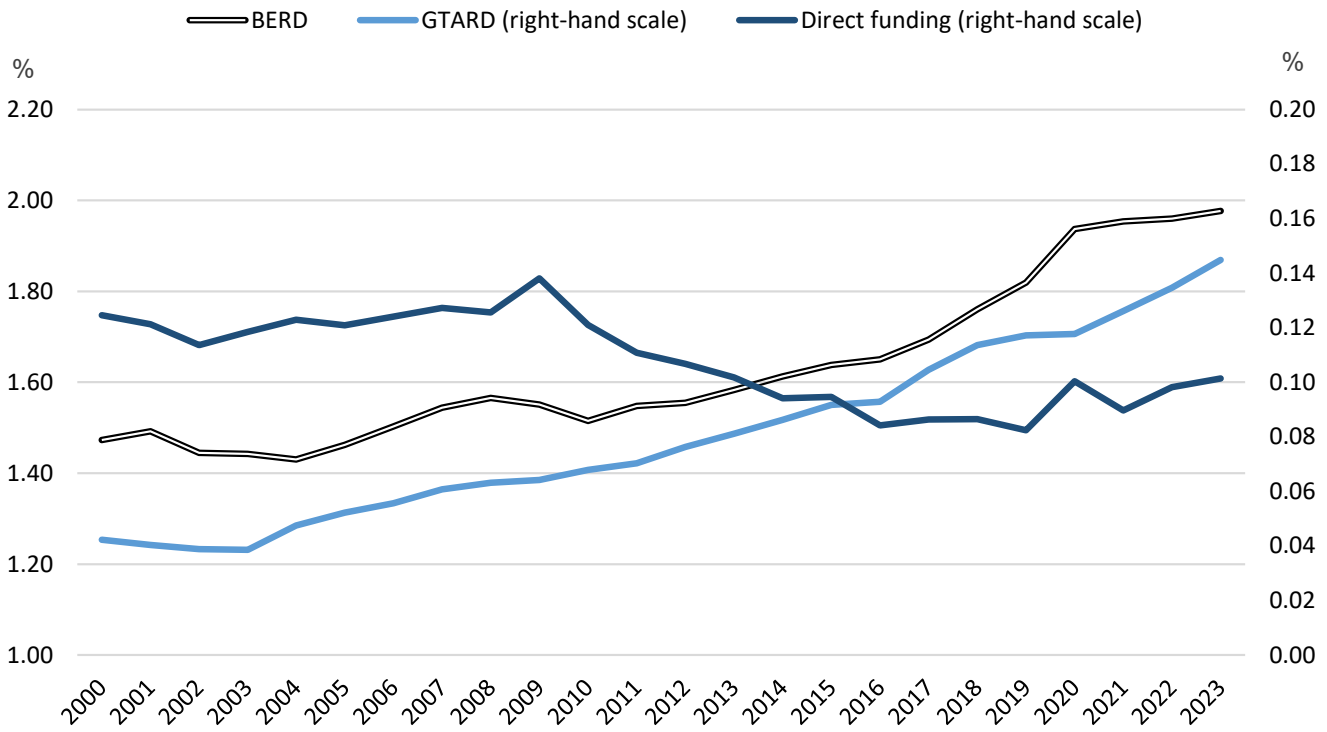
- Rates of return estimated for larger group of OECD countries (microBeRD + MultiProd data)
- **Returns to R&D are substantial:** private returns to own R&D of ~50% and to R&D in supplying industries (i.e. spillovers) of ~70%
- **Estimates by type of R&D:** private returns are larger for development, while spillovers are larger for research (-> market failure)

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Tax incentives are now the main government support for business R&D

Tax support overtook direct funding around 2015

% of GDP, OECD weighted averages, 2000–2023. BERD: business R&D; GTARD: government tax relief for R&D



60% **of government support**

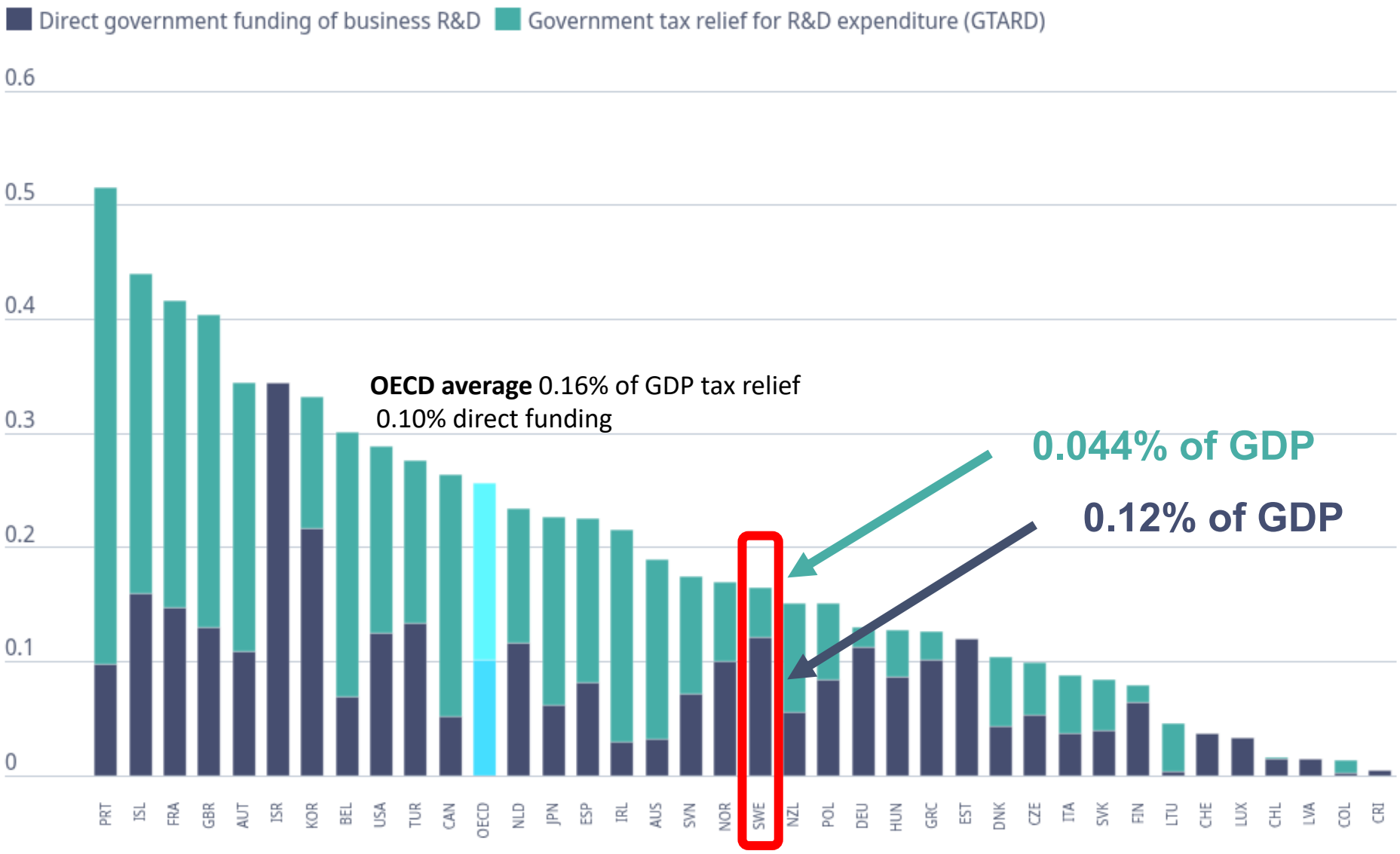
for business R&D across the OECD now comes through tax incentives, up from 28% in 2004

Sources: OECD R&D Tax Incentives Database, https://oe.cd/rdtax, June 2026 (chart); OECD (2026), "Government support for business R&D approaches record highs as R&D tax incentives expand across the OECD", statistical release, June 2026 (60% and 28%); OECD (2023).

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Government direct funding and tax support for business R&D, 2024

As a percentage of GDP



Source: OECD R&D Tax Incentives Database, June 2026.

© OECD

Factors affecting the effectiveness of R&D tax incentives

- Studies agree that R&D tax incentives boost R&D, but they disagree on how much.
- Consider a firm that gets 20 cents back for every dollar of R&D. An elasticity of -0.5 (macro estimates), each dollar of tax revenue forgone brings about 60 cents of extra R&D. An estimated elasticity of -2 brings 1.70 dollars, and at -4 about 2.50 dollars (micro/firm-level estimates) .

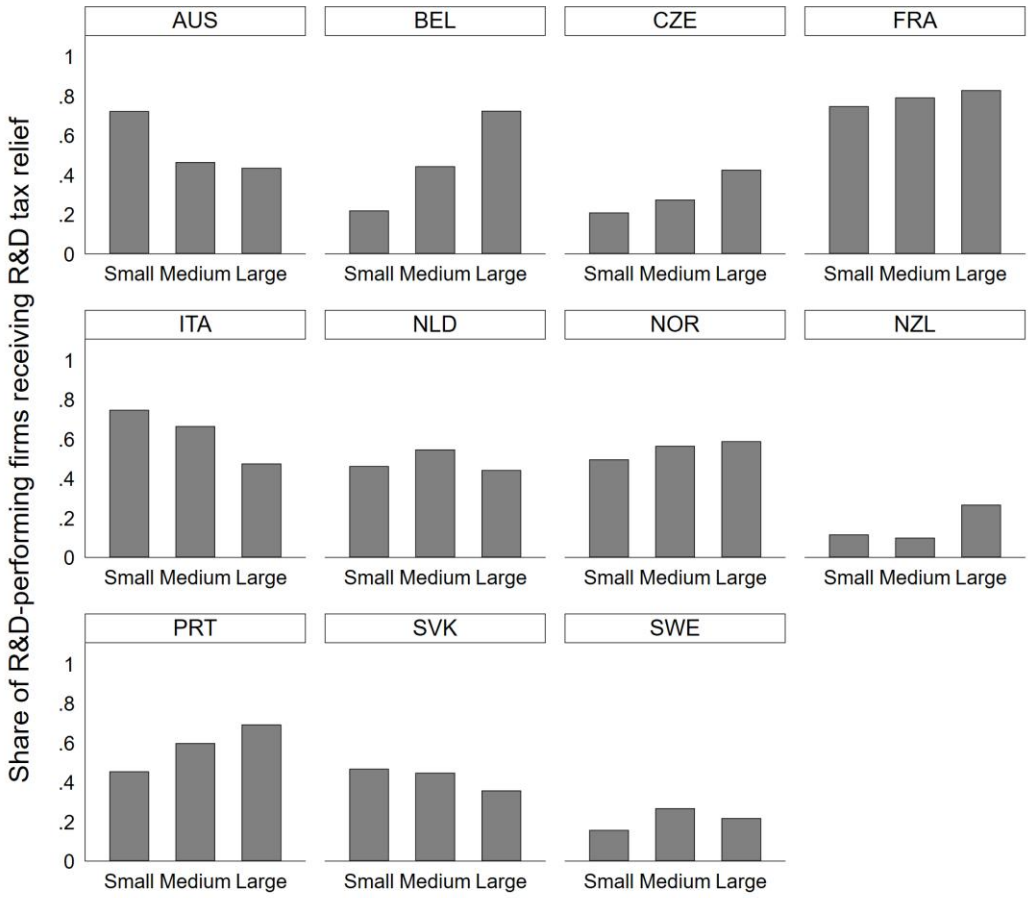
That's a big difference for policy!

1. Incomplete uptake

2. Weak effects for large and R&D-intensive firms

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Incomplete uptake



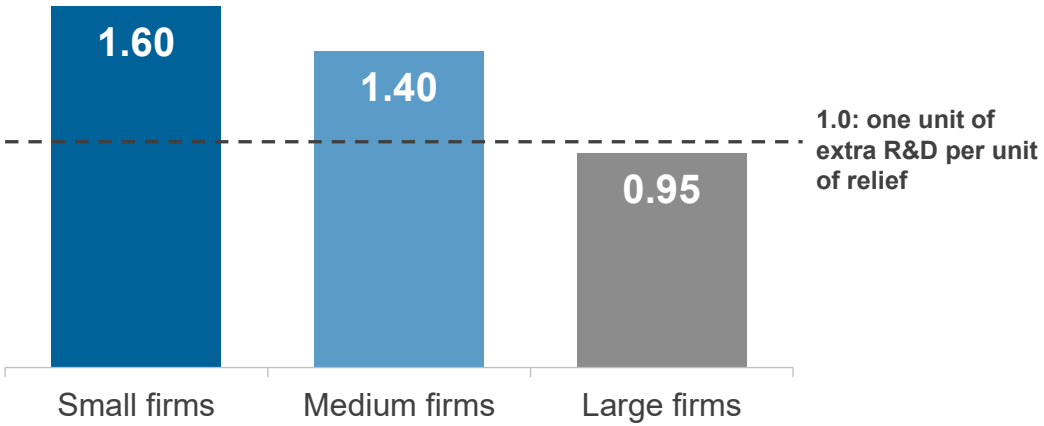
- Less than half of eligible firms used R&D tax relief, with large differences across countries
- **No consistent pattern by firm size across countries**: **Uptake builds slowly**: around 20% in a scheme's first year, levelling off at around 45% after three to four years
- **Firms claim when the benefit outweighs the cost of claiming**: uptake is higher where subsidy rates are more generous and where innovation agencies, rather than tax authorities alone, run the scheme
- **Ignoring incomplete uptake makes aggregate studies underestimate the effect of R&D tax incentives by about 40%**

Firm size: additionality is highest for small firms and lowest for large firms

Large firms receive half of all R&D tax relief, where each unit of relief adds the least R&D

Extra R&D per unit of tax relief, by firm size

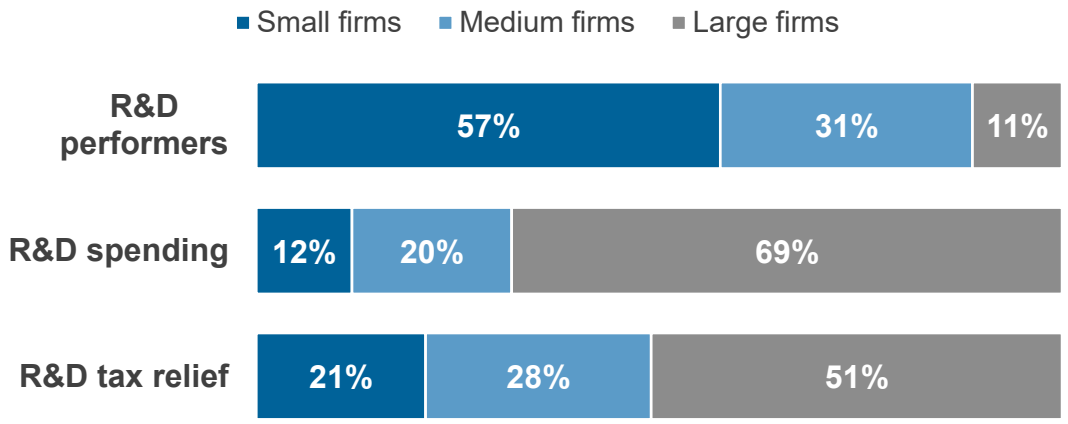
Gross incrementality ratio, preliminary estimates



Direct funding shows the same advantage for small firms (1.70)

Where R&D tax relief goes, by firm size

Share of R&D-performing firms, R&D spending and R&D tax relief, 2019



Shares may not sum to 100% because of rounding

For policy: design that tilts relief towards smaller firms, such as ceilings or refundability, gets more R&D per unit of relief

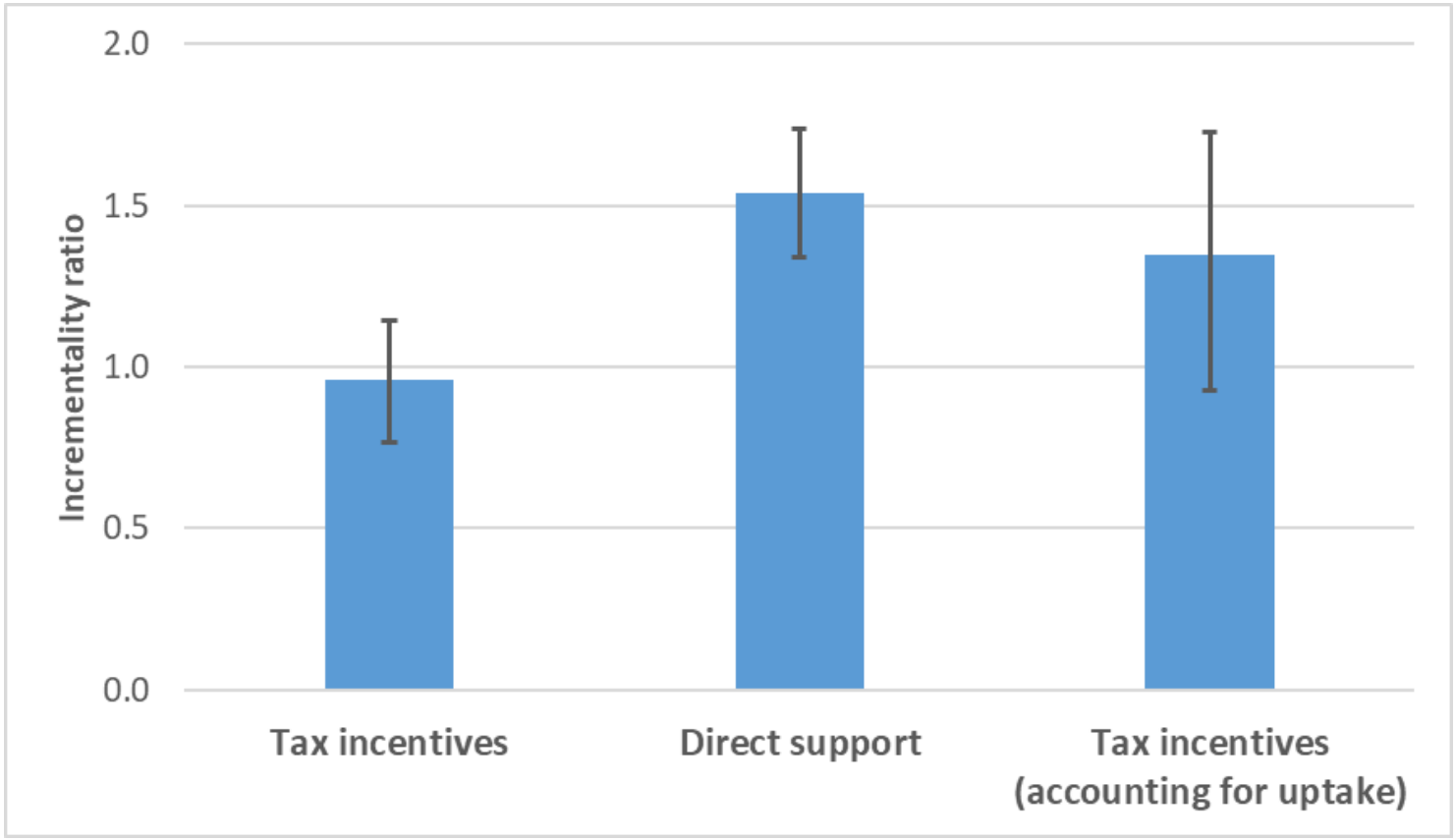
Sources: OECD microBeRD project (preliminary estimates, August 2026; average effects across countries, industries, size classes and years; tax incentives); shares of firms, R&D and tax relief by size class from OECD microBeRD, 2019 (averages across participating countries).

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SUBSTITUTABILITY OR COMPLEMENTARITY?

Role of tax incentives in policy mix

Tax and direct support: main effects

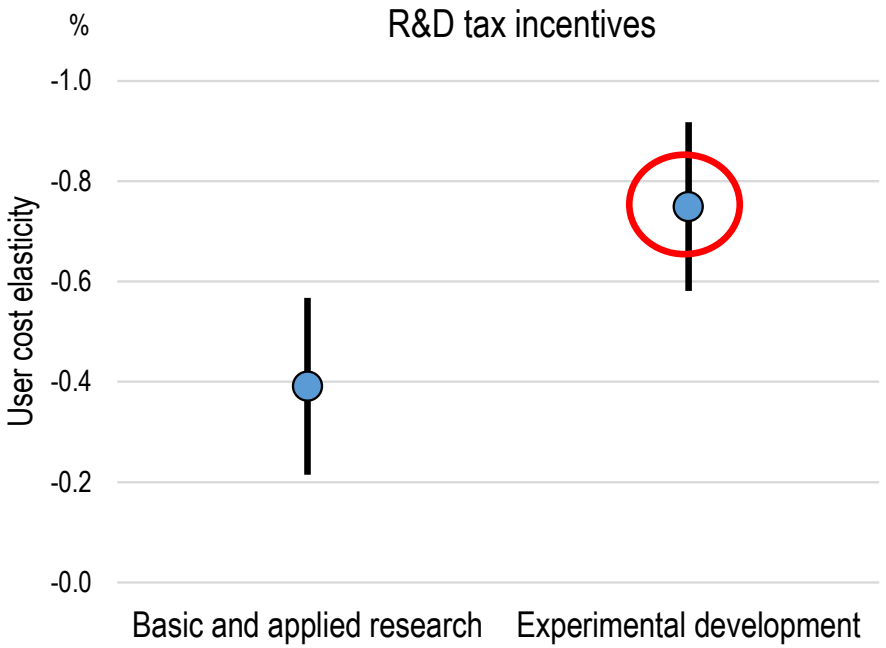


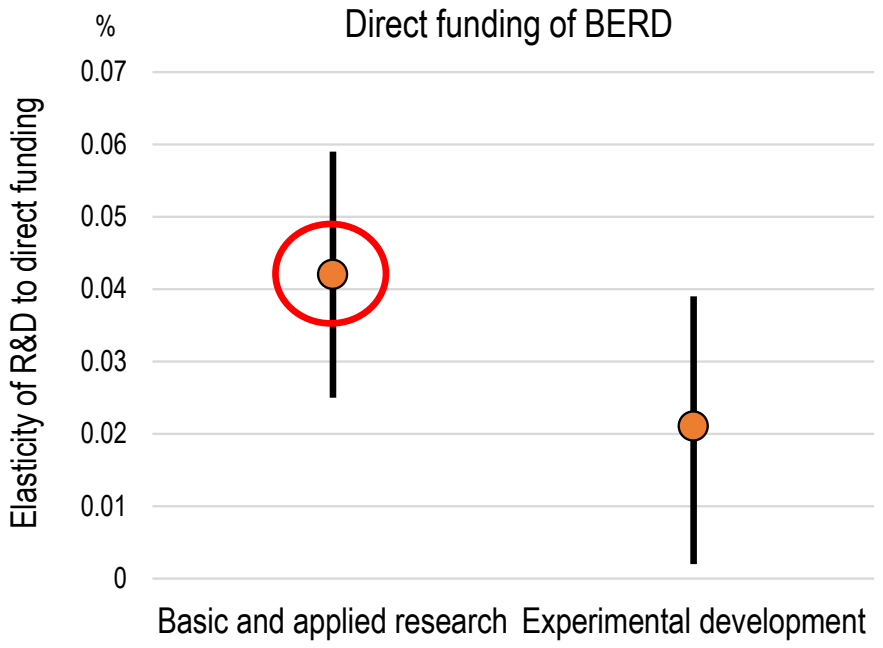
Complementarities: interaction effect, difference in the orientation of R&D induced by each policy tool (research vs. development)

R&D support policies exhibit different strengths

Responsiveness of research and development by type of policy instrument

Elasticity of R&D to the user cost of R&D and direct funding





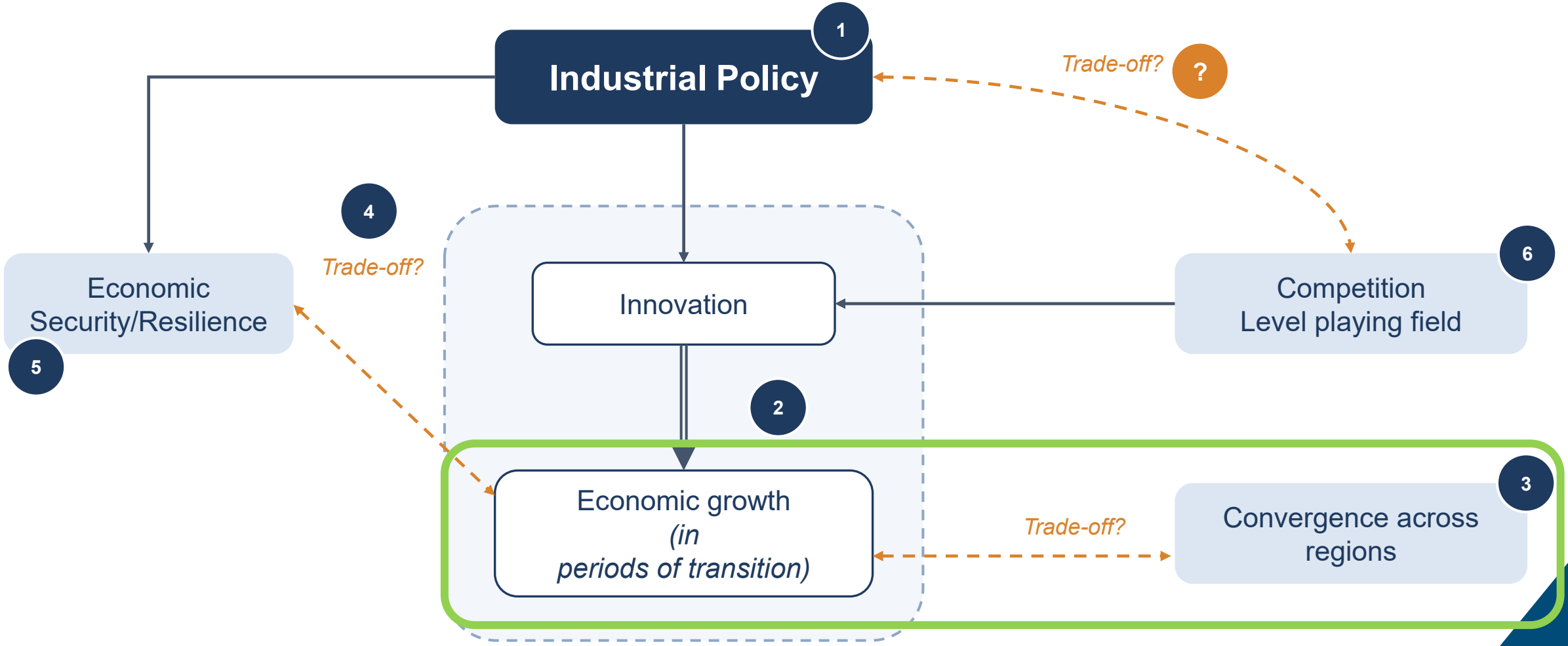
R&D tax incentives and direct funding are **both effective** in stimulating business R&D but have **different strengths** and complement each other

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REGIONAL CONVERGENCE

Structure



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Trade-offs in Place-based Policies

Evidence from Regional Selective Assistance (RSA) in the UK, Criscuolo et al., 2019

What the policy achieved

Employment: Positive causal effect on jobs in eligible areas and employment in treated firms.

Who benefits: Effects are concentrated among smaller firms; effectively zero for larger firms.

Local labour markets: Unemployment falls and manufacturing employment rises, mainly through expansion of existing firms.

Productivity: No effect on firm-level total factor productivity.

The aggregate productivity trade-off

Place-based objective

Support or creates and reduces unemployment jobs in deprived areas .

Aggregate productivity

Supported firms are, on average, less productive, so shifting resources toward them lowers measured aggregate productivity through misallocation.

But the relevant welfare counterfactual matters

To the extent that these workers would otherwise be unemployed rather than employed by more productive firms, the welfare cost of lower productivity may be modest.

Targeting distressed places improved employment outcomes but it did not maximise aggregate productivity.

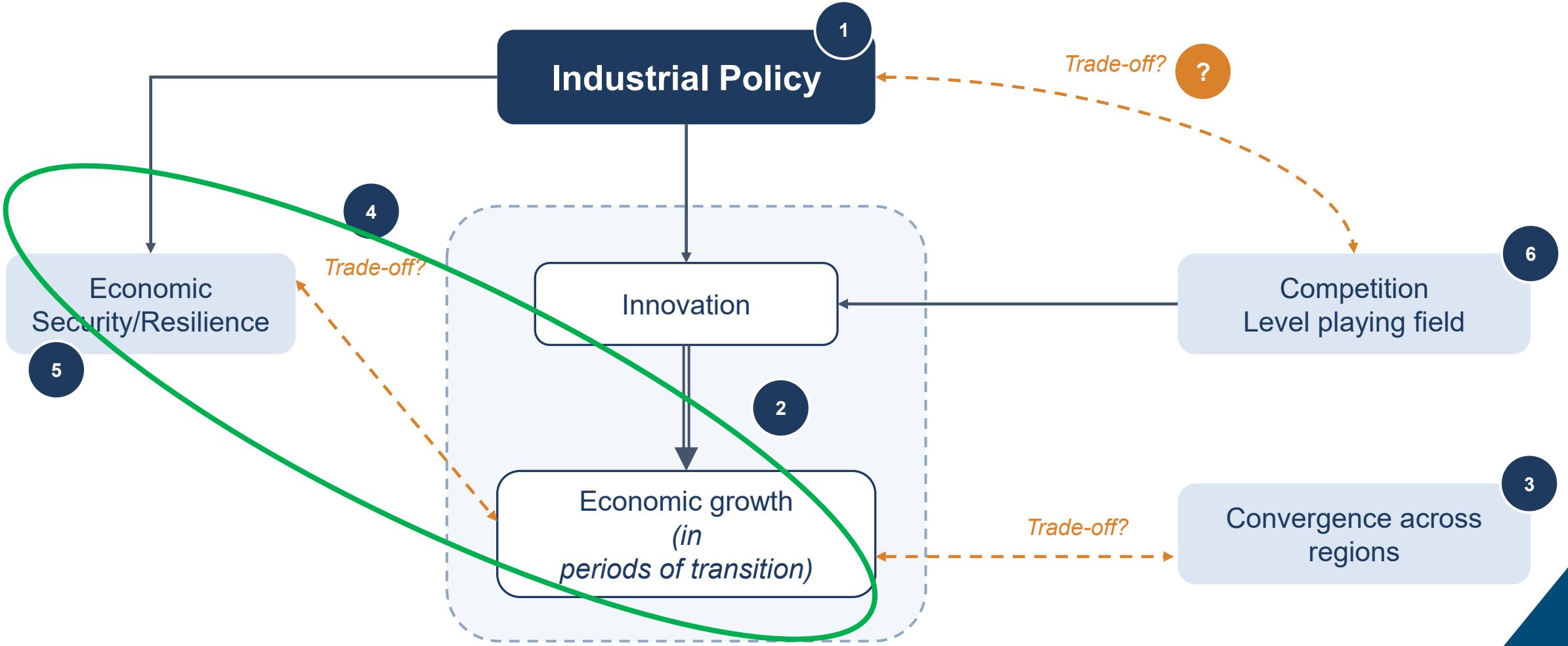
Source: Criscuolo, Martin, Overman and Van Reenen (2019), "Some Causal Effects of an Industrial Policy", *American Economic Re*view, 109(1), 48–85.

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NEW STRATEGIC POLICY PRIORITIES

Structure



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Efficiency and resilience require different targeting metrics

The sectors offering the largest gains in normal times need not be those that matter most under extreme shocks

NORMAL TIMES / MARGINAL CHANGES

Cost-based Domar

Where would productivity improvements matter most?

Focus: pure technology / productivity channel.

Ranks sectors by their cost-based importance throughout the production network.

Objective: raise aggregate performance.

Distortion centrality

Where would reducing distortions matter most?

Focus: allocative-efficiency / misallocation channel.

Ranks sectors by the economy-wide gains from correcting wedges.

Objective: improve efficiency of resource allocation.

EXTREME EVENTS / LARGE SHOCKS

Dew-Becker (2023),
Criscuolo, Luzzati & Panigrahi, forthcoming

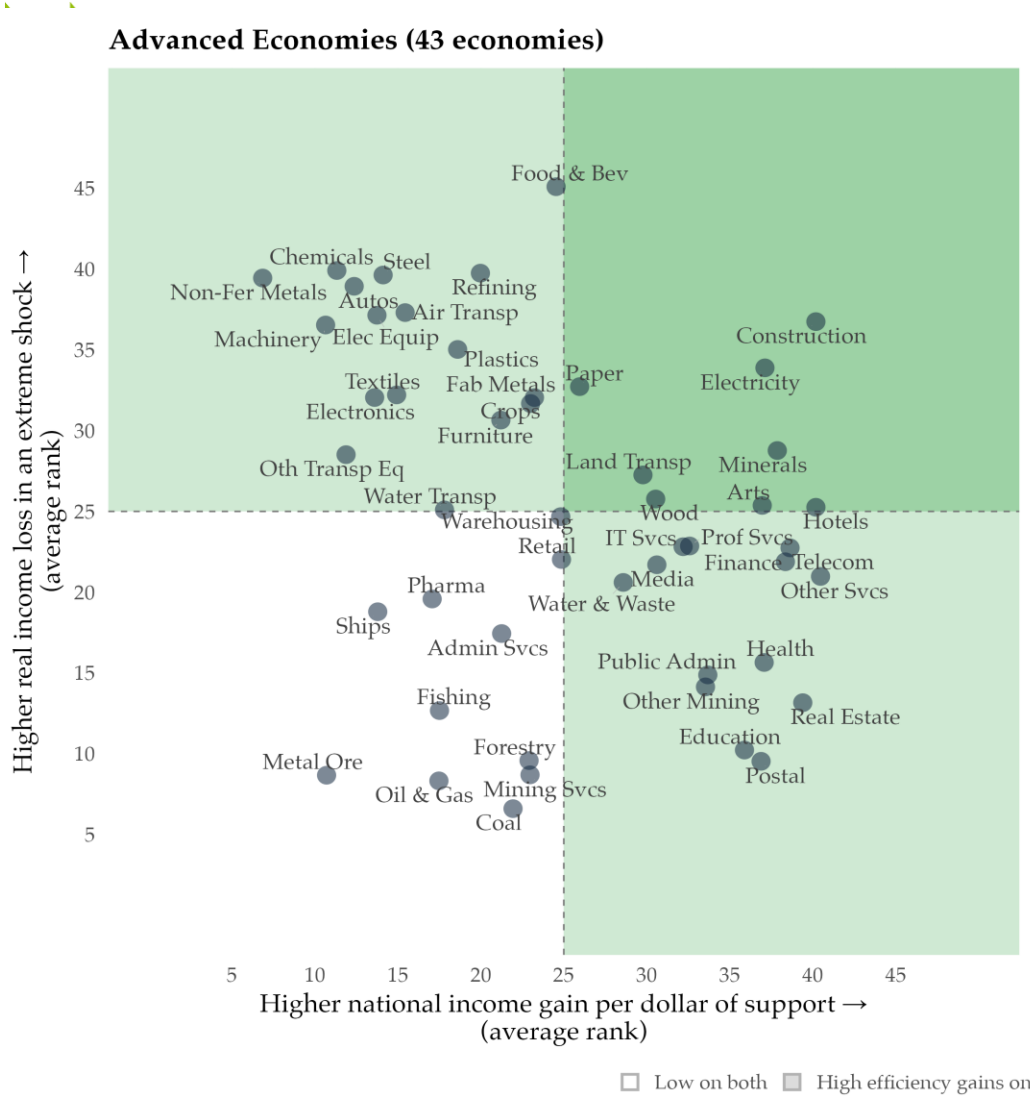
Tail centrality

How much can a large negative shock to a sector reduce GDP?

- Captures systemic importance in bad states.
- A sector with modest importance in normal times can become a binding bottleneck under stress.
- **TARGET**: sectors whose disruption generates disproportionate aggregate losses.

There is no single "most important" sector: targeting depends on the policy objective.

Which sectors matter most depends on the policy objective



Growth and resilience priorities do not always coincide
High resilience risks, lower efficiency gains: e.g.chemicals, refining are critical bottlenecks under extreme shocks, but offer relatively lower national income gains per dollar of support.

Potential double dividend: Construction and electricity rank highly on both dimensions, suggesting opportunities to combine efficiency and resilience objectives.

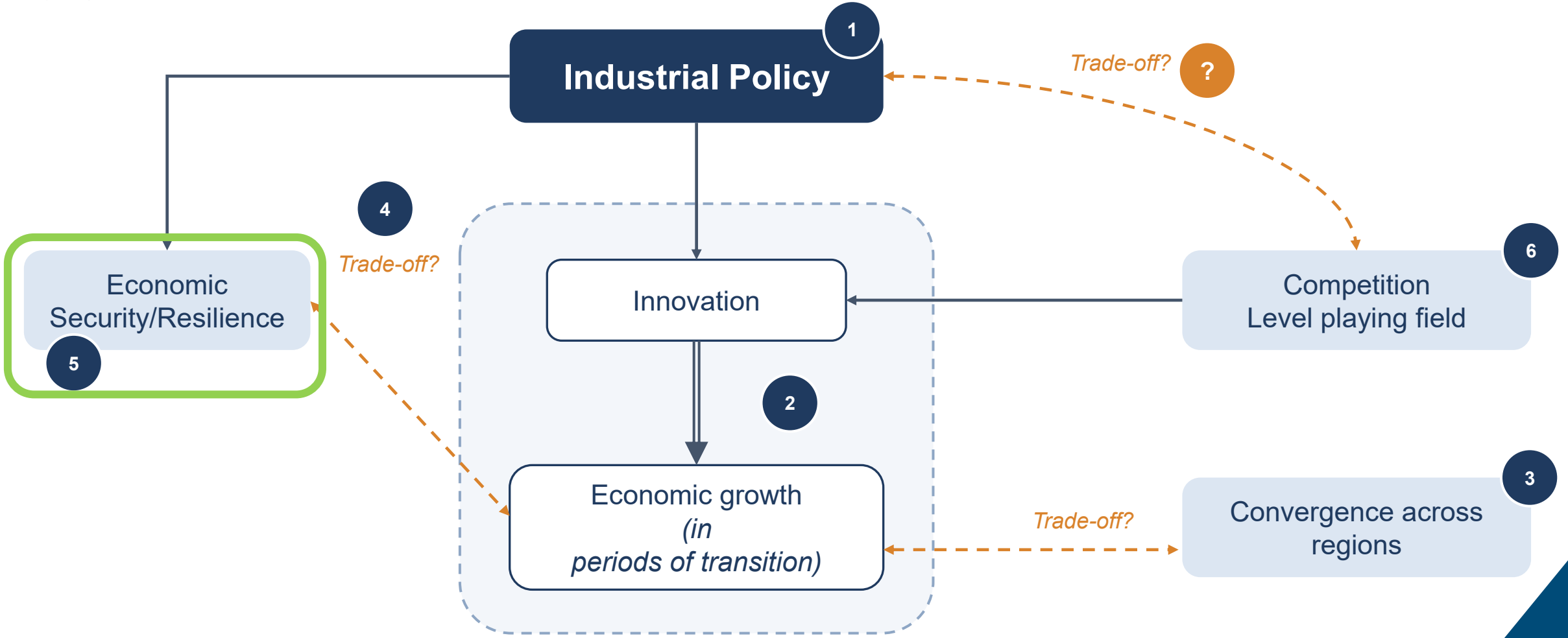
High efficiency gains, lower downside risks: Several services offer relatively high economic returns but rank lower in terms of losses from extreme shocks.

→ Industrial policy needs objective-specific diagnostics: sectors that matter most for growth are not necessarily those that matter most for resilience

Source: WBG Report on Investing for Growth & Resilience in Connected Economies: A Production Network Lens, *forthcoming* based on OECD Inter-Country Input-Output tables and WorldScope.

Note: Each point represents a sector. The figure compares distortion centrality with tail centrality, a measure of the aggregate losses associated with large negative shocks to a sector. Low correlations indicate that growth priorities and resilience priorities often differ. Quadrants indicate whether sectors rank above or below the midpoint on each measure, so sectors in the upper-left area are resilience-critical despite lower growth centrality, while those in the lower-right area are growth-relevant but less exposed to tail risk.

Structure



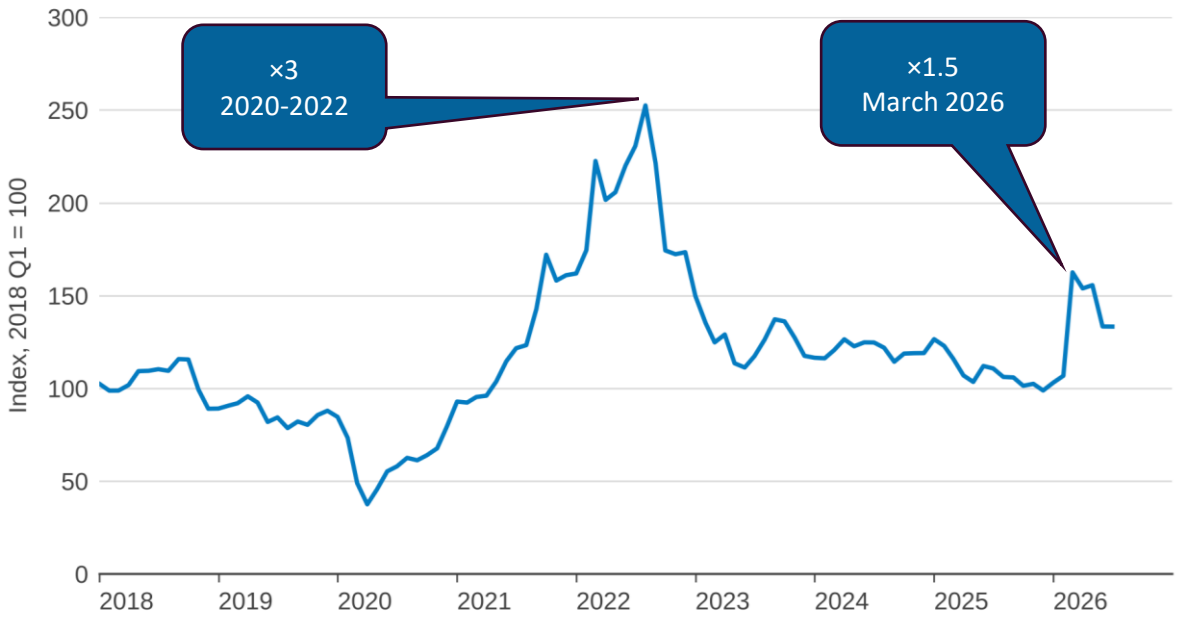
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What are the strategic priorities?

1 Green transition **2** Critical raw materials and value chains **3** Strategies to ensure resilience and energy security

The energy price shock turned energy into a security issue

Global energy price index, 2018 Q1 = 100



+57% energy cost support to firms

between 2021 and 2023, on average across QuIS countries: grants and tax expenditures rose from 0.14% to 0.22% of GDP, **mostly through horizontal schemes and support to manufacturing**

30% less energy per unit of capital

in highly digital sectors in 2019 relative to 2006, against about 20% elsewhere.

But data centres add electricity demand and chips need critical materials

Sources: IMF Global price of Energy index (FRED), rebased to 2018 Q1 = 100; OECD Quantifying Industrial Strategies (QuIS) database (energy cost support through grants and tax expenditures); OECD twin transition analysis (CIIE, 2024), energy end use per net capital stock, selected manufacturing sectors, 15 OECD countries.

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Improving energy efficiency can cut industrial energy needs

20× **gap in energy productivity**

between the 90th and 10th percentile firm in the same industry (5× for labour productivity)

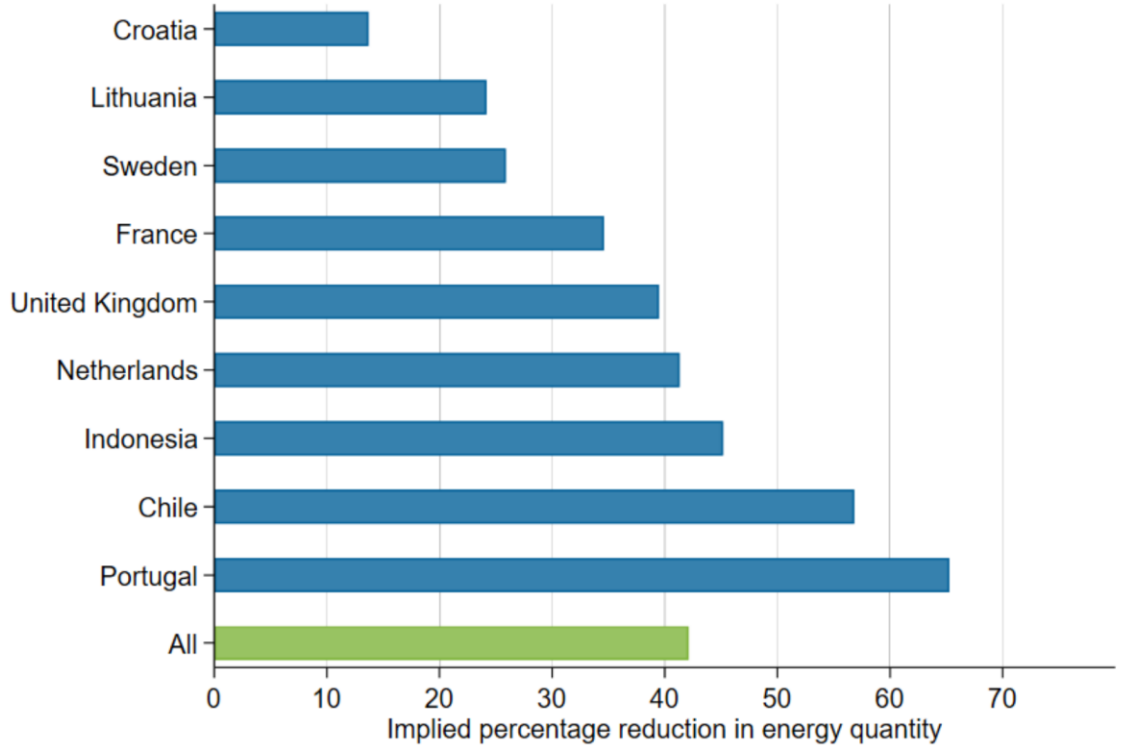
42% **less energy**

for the same output if the least efficient firms reached the level of energy efficiency that 3 out of 4 firms in the industry already have. **No sign that the gap is closing.**

Policy levers

1. **Accelerate diffusion** of existing technologies, e.g. by supporting investment
2. **Make energy pricing reward efficiency** rather than size: today, inefficient users pay lower prices
3. **Harness synergies** between economic and energy productivity: competition, dynamism and finance improve both

Implied reduction in energy use for the same output (%)



Note: least energy-productive firms raised to the 25th percentile of their 4-digit industry; manufacturing firms with 20+ employees, latest year up to 2019. Source: De Lyon and Dechezleprêtre (2025), The great dispersion in energy productivity between firms, OECD STI Working Paper 2025/24, Figure 5.1.

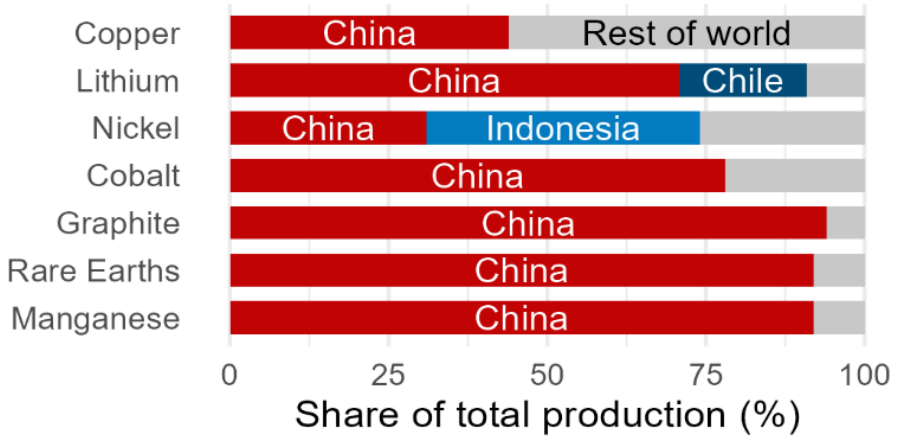
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From fossil fuel dependence to material dependence

- The energy transition replaces dependence on fuels with dependence on materials: batteries, grids, wind turbines and electric motors need lithium, graphite, nickel, copper and rare earths
- Refining is highly concentrated and export restrictions are multiplying, **creating single points of failure for downstream industry**

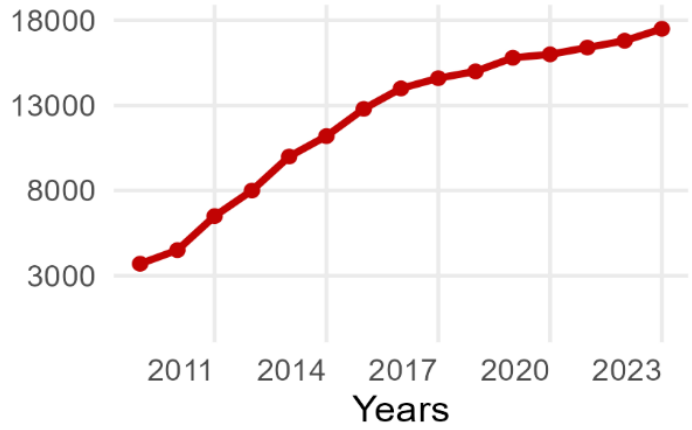
Refining is concentrated in one country for most key minerals

Share of refined production, 2025



Export restrictions on industrial raw materials have risen fivefold since 2009

Number of measures in place



Sources: OECD Inventory on Export Restrictions on Industrial Raw Materials (all measures across all CRMs and implementing countries); IEA (2025).

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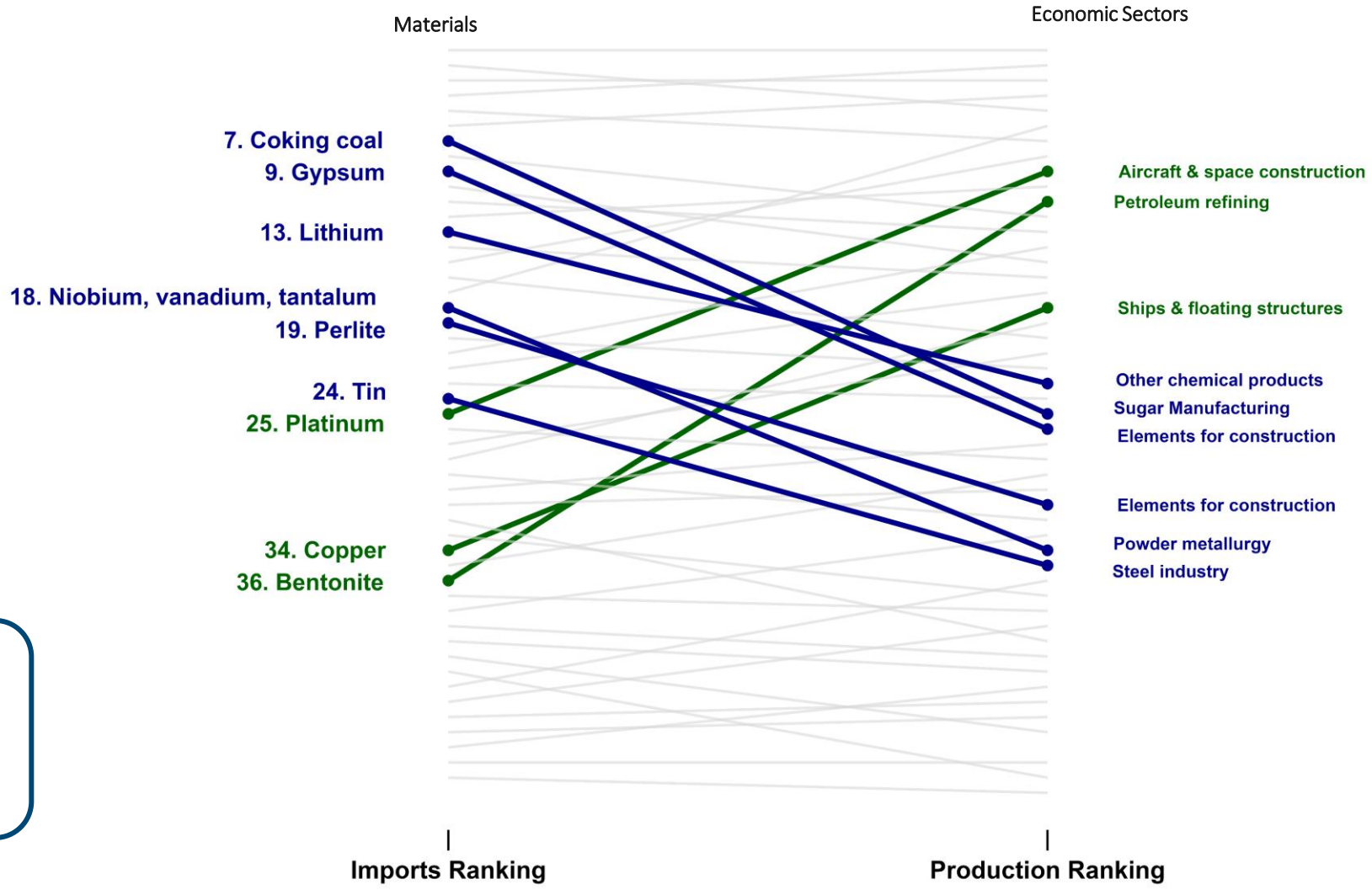
Import rankings hide what matters for production

The border vs. the factory floor:

Many highly imported CRMs lose importance once linked to production, while **others are linked to large output in strategic sectors**

Policy recommendation: base resilience policy for CRMs on production at stake rather than import value

Trade rankings vs. production at risk, by raw material



Strategies to ensure resilience: diversification vs innovation

Diversification changes where we source an input; innovation can change whether, or how much, we need it

The shock spread beyond exposed firms

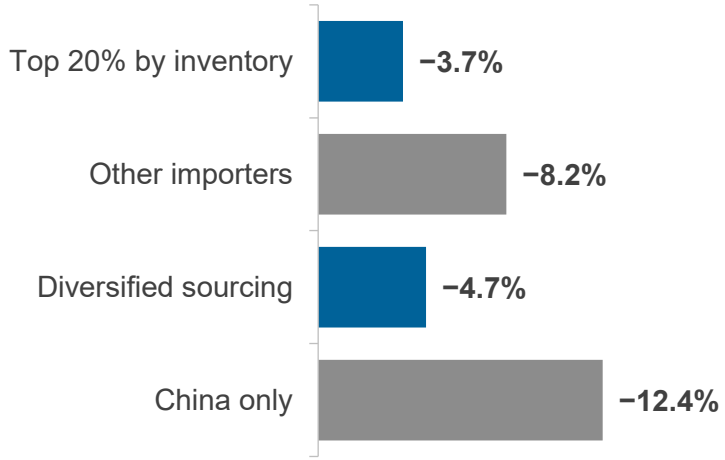
Fall in domestic sales after the 2020 China lockdowns



Buyers and suppliers had no direct exposure to China

Inventories and diversification cushioned it

Fall in domestic sales of China importers



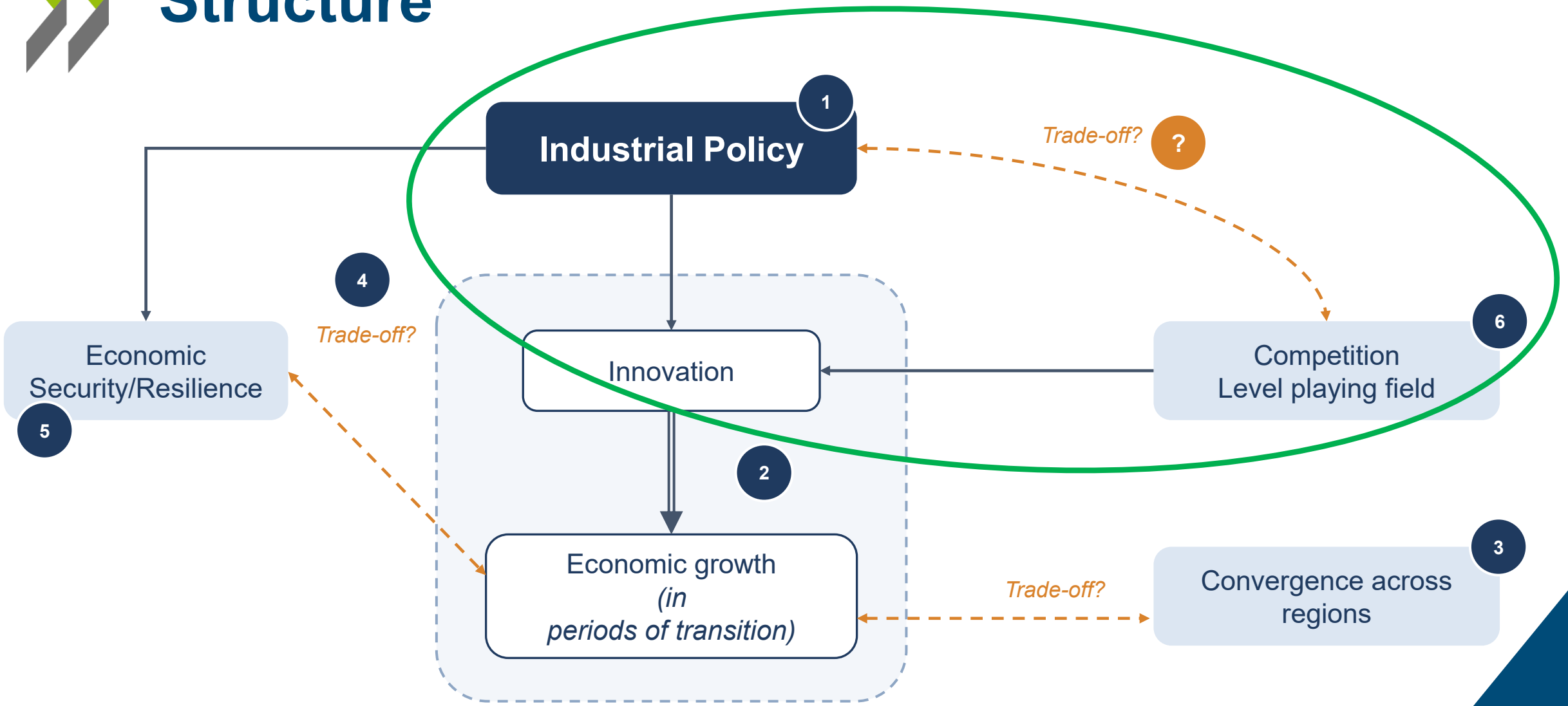
Innovation

- **Changes the dependency itself:** using a material more efficiently, recycling it, or substituting it or the technology that needs it
- **Can break the trade-off:** after China's 2010 rare-earth restrictions, innovation abroad raised rare-earth efficiency and expanded rare-earth-intensive industries outside China
- **Starts from the vulnerability:** for Lithuania, phosphate rock and potash, not lithium and cobalt

Sources: Green, Guillouët and Lalanne (2025), "The transmission of foreign shocks to the Estonian production network", OECD STI Working Papers (falls in domestic sales, Feb-Jun 2020 vs Sep 2019-Jan 2020, relative to comparable firms); Alfaro, Fadinger, Schymik and Virananda (2025), NBER Working Paper 33877; OECD work on critical raw material exposure in Lithuania.

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Structure



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Industrial policy can support competition if

- Embeds competition principles: do not discriminate against entrants and potential entrants; facilitate exit of inefficient firms
- Use competition assessments
- Involve competition authorities
- Ensure transparency, monitoring, and evaluation
- Sets up joint task forces between industrial and competition agencies

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DARPA: A pro-competition way of doing industrial policy

Industrial policy does not have to mean picking national champions: the DARPA model funds a mission, not firms, lets newcomers compete, backs rival ideas and cuts what does not work

Recommended in the Draghi report (2024); the European Innovation Council aims to become more DARPA-like; Germany (SPRIND) and the UK (ARIA) have agencies partly modelled on it

Challenges

1. **Financing** the move to market, especially without a public customer
2. **Autonomy** versus accountability
3. **Evaluation:** transformational outcomes are rare and take decades, so short-term metrics can mislead

What makes the ARPA model work

1. **Organisational flexibility**
   Independence, a flat structure and fixed-term programme managers
2. **Programme managers in charge**
   They design programmes, select projects and manage them actively, cancelling those that miss milestones
3. **The right problems**
   Mission-oriented problems on nascent technologies, where ideas struggle to reach the market (energy, defence)

Source: Azoulay, Fuchs, Goldstein and Kearney (2019), "Funding Breakthrough Research: Promises and Challenges of the ARPA Model", Innovation Policy and the Economy 19.

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Thank you!

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