China’s semiconductor subsidies in comparative perspective

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Much concern about government support but data gaps persist

- Widespread concerns among OECD members about the competitive and trade effects of subsidies and other forms of government support.
  - Not a new issue but one that is resurfacing.

- Aggravated by a chronic lack of comprehensive and comparable data on government support in industrial sectors.
  - Unlike for agriculture, fisheries, or energy.

- The OECD's Trade Committee has been trying to fill in some of the data gaps in the last four years.
  - Aluminium, semiconductors, below-market finance, rolling stock, below-market energy…

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Government support can take many forms

		Statutory or Formal Incidence (to whom and what a transfer is first given)						
		A: Output returns	B: Enterprise income	C: Cost of intermediate inputs	Costs of Value-Adding Factors			
					D: Labour	E: Land and natural resources	F: Capital	G: Knowledge
Transfer Mechanism (how a transfer is created)	1: Direct transfer of funds	Output bounty or deficiency payment	Operating grant	Input-price subsidy	Wage subsidy	Capital grant linked to acquisition of land	Grant tied to the acquisition of assets	Government R&D
	2: Tax revenue foregone	Production tax credit	Reduced rate of income tax	Reduction in excise tax on input	Reduction in social charges (payroll taxes)	Property-tax reduction or exemption	Investment tax credit	Tax credit for private R&D
	3: Other government revenue foregone			Under-pricing of a government good or service		Under-pricing of access to government land or natural resources	Debt forgiveness or restructuring	Government transfer of intellectual property rights
	4: Transfer of risk to government	Government buffer stock	Third-party liability limit for producers		Assumption of occupational health and accident liabilities	Credit guarantee linked to acquisition of land	Credit guarantee, below market equity and DE swap	
	5: Induced transfers	Import tariff or export subsidy	Monopoly concession	Monopsony concession; export restriction	Wage control	Land-use control	Credit control (sector-specific), below market loans	Deviations from standard IPR rules

Some subsidies are necessary but still need to be designed with competition and trade in mind

- There can be good reasons for subsidies: market failures (R&D spillovers, info asymmetries in capital markets), crisis situations (COVID, energy crisis), etc.
- Even then, policy design is critical to ensure that subsidies are proportional, time-limited, targeted, non-discriminatory…
- There are many ways of supporting R&D spending by private firms, some better than others (Boeing and Peters, forthcoming).
- Much support in semiconductors is being provided under the guise of R&D subsidies, including govt. equity injections in China (OECD, 2019).

What makes the semiconductor industry special?

- Strategic
  - Security concerns + tech superiority
- R&D intensive
- Skill intensive
  - Tacit knowledge and HR talent
- Capital intensive
  - Concentration due to high costs of fabs
  - But also costs of design (e.g. floorplanning gets more complex)!

The semiconductor value chain and firms included in the analysis

Amkor
Intel
Micron
Nvidia
Qualcomm
Texas Instruments

Samsung Electronics
SK Hynix

Renesas
Toshiba Memory

Infineon
NXP
STMicro

ASE
TSMC
UMC
Vanguard Semiconductor

Hua Hong
JCET
SMIC
Tsinghua Unigroup

Source: OECD (2019), "Measuring distortions in international markets: The semiconductor value chain", OECD Trade Policy Papers, No. 234, OECD Publishing, Paris, https://doi.org/10.1787/8fe4491d-en.

Graph adapted from Semiconductor Industry Association and Nathan Associates (2016)

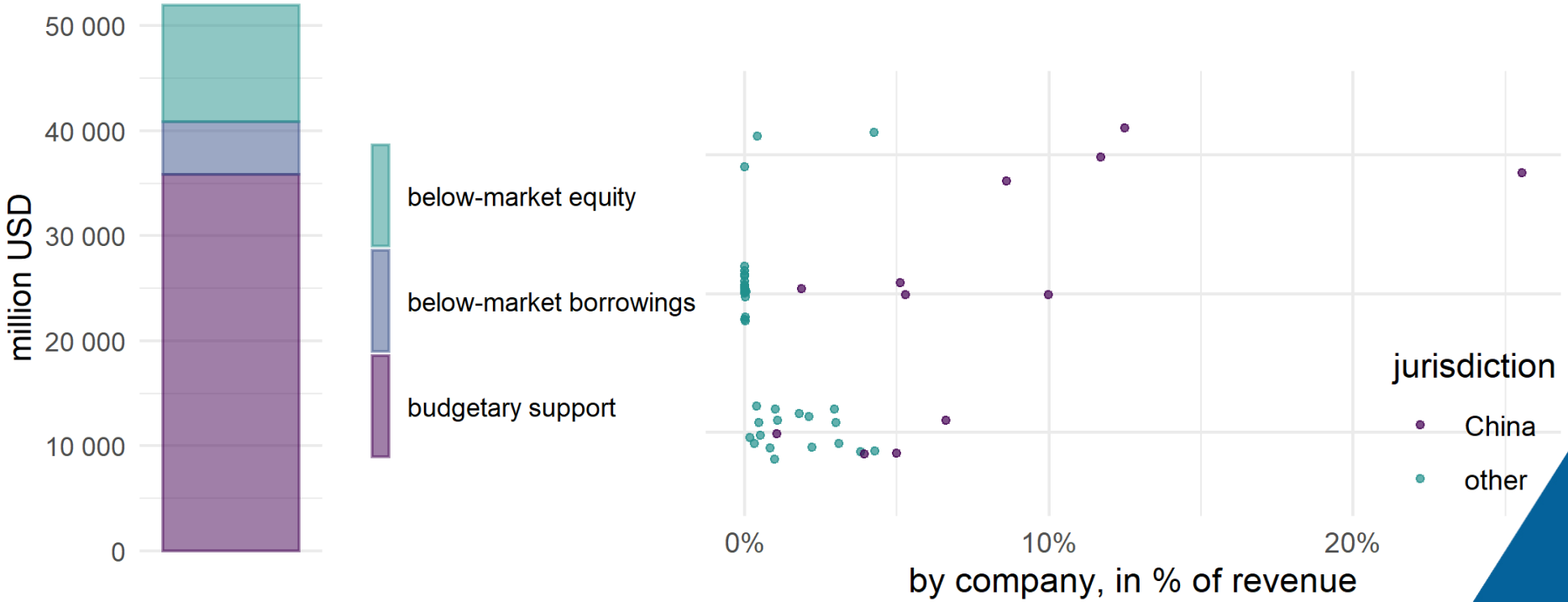
The three main forms of govt. support analysed

- **Budgetary support**
  - Grants, tax breaks, etc.
- **Below-market finance**
  - **Below-market borrowings**
    - Borrowings at better-than-market conditions (e.g. lower interest rates), sometimes government guarantees
  - **Below-market equity (returns)**
    - Govt. invested firms with returns consistently below what private investors would demand

Increasing complexity

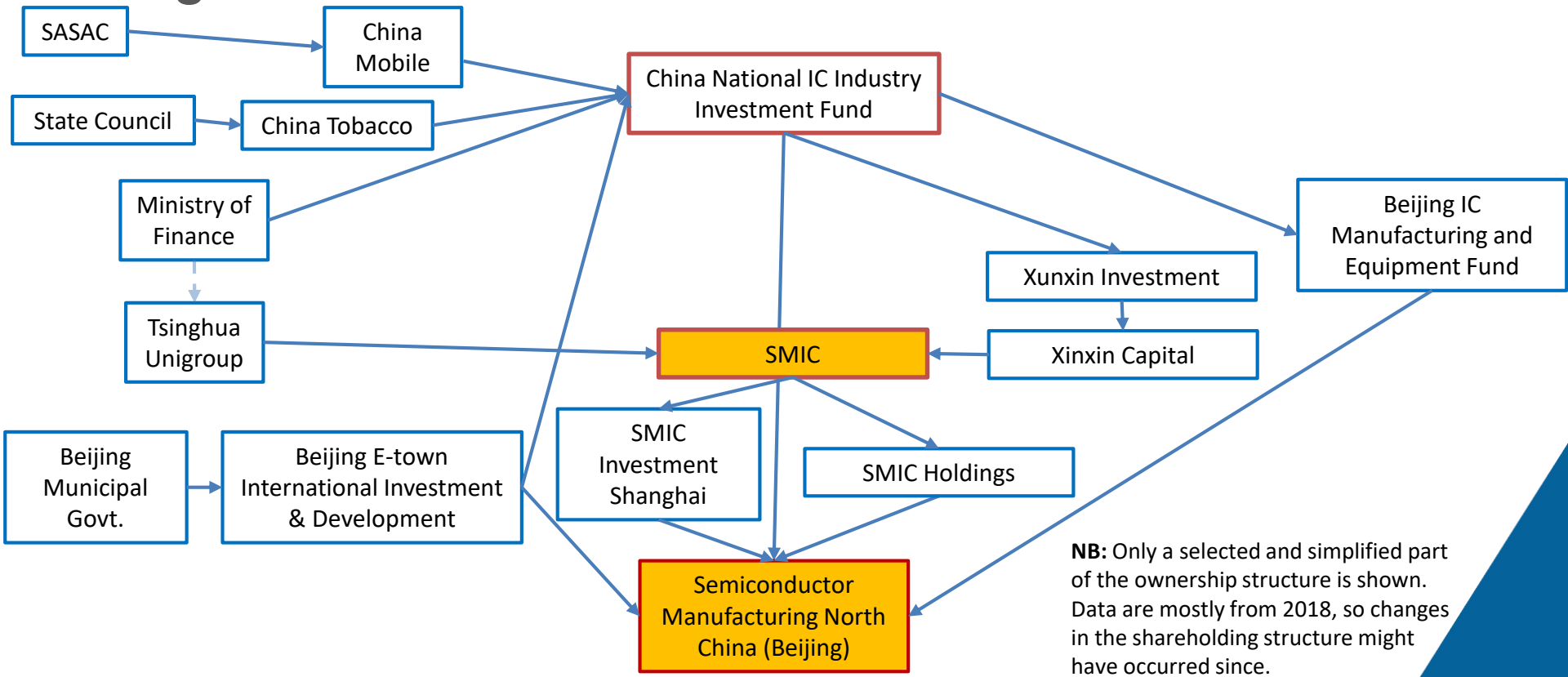
Source: OECD (2019), "Measuring distortions in international markets: The semiconductor value chain", OECD Trade Policy Papers, No. 234, OECD Publishing, Paris, https://doi.org/10.1787/8fe4491d-en.

Below-market finance makes up 1/3 of support to analysed semiconductor companies



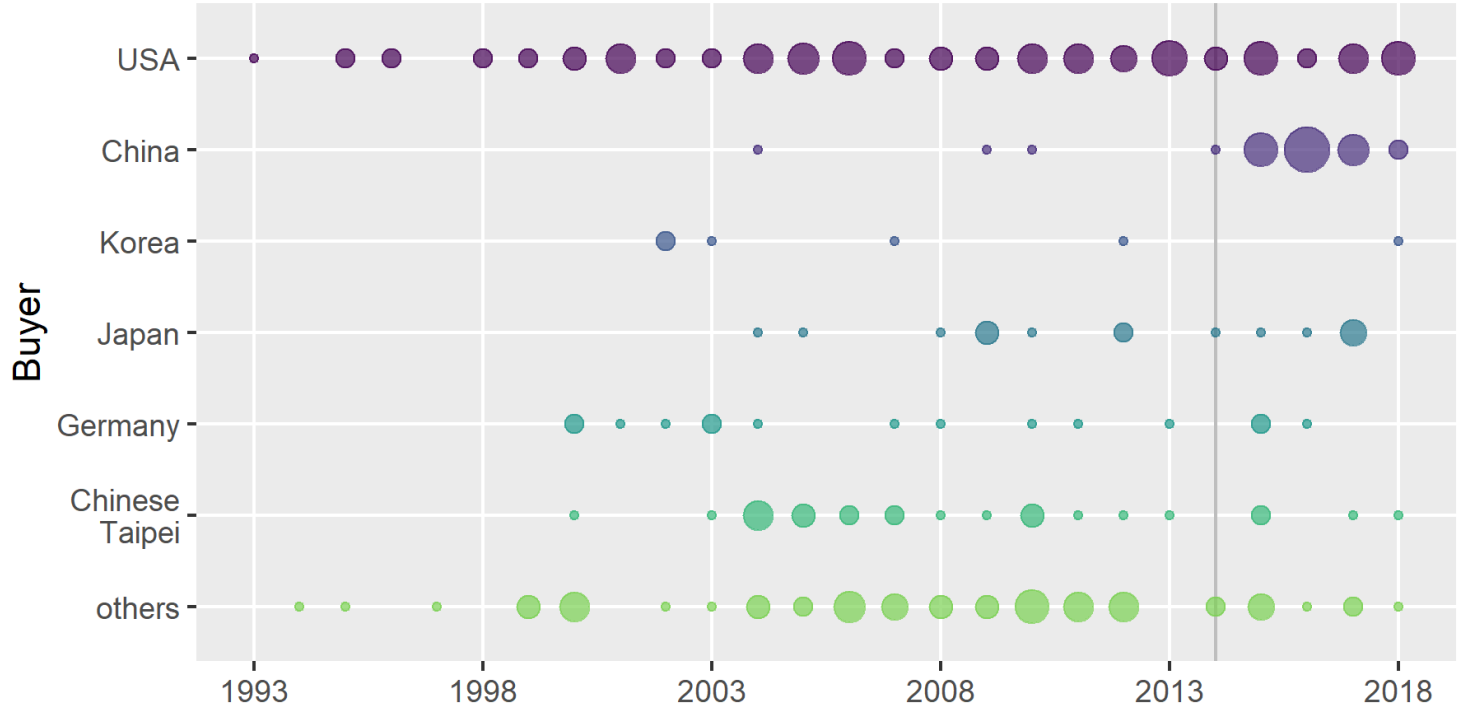
Source: OECD (2019), "Measuring distortions in international markets: The semiconductor value chain", OECD Trade Policy Papers, No. 234, OECD Publishing, Paris, https://doi.org/10.1787/8fe4491d-en.

Understanding how far government ownership goes in semiconductors



NB: Only a selected and simplified part of the ownership structure is shown. Data are mostly from 2018, so changes in the shareholding structure might have occurred since.

Chinese acquisitions of semiconductor companies spiked briefly in the wake of 2014



Note: Number of international acquisitions of semiconductor companies by jurisdiction of buyer. Vertical line shows 2014. "China" includes acquisitions through Hong Kong, China.

Source: OECD on the basis of data from FactSet.

Chinese firms have increased assets, but profit margins were comparatively low

Note: "Chinese firms" is the simple average of the four Chinese firms included in the sample, "other firms in the sample" refers to the remaining 17 semiconductor companies.

Source: OECD (2019), "Measuring distortions in international markets: The semiconductor value chain", OECD Trade Policy Papers, No. 234, OECD Publishing, Paris, https://doi.org/10.1787/8fe4491d-en.

Findings and policy implications

- Government involvement in semiconductors widespread and longstanding. Some of it might be necessary, but:
  - Support for R&D needs to be well designed
  - Investment incentives run risk of beggar-thy-neighbour
  - Some jurisdictions support through provision of equity
- Benefit and harm from support in global value chains not easy to determine
- Lack of transparency is an issue, regarding subsidies and government ownership

Source: OECD (2021), "Measuring distortions in international markets: Below-market finance", OECD Trade Policy Papers, No. 247, OECD Publishing, Paris, https://doi.org/10.1787/a1a5aa8a-en.

OECD (2019), "Measuring distortions in international markets: The semiconductor value chain", OECD Trade Policy Papers, No. 234, OECD Publishing, Paris, https://doi.org/10.1787/8fe4491d-en.

Findings and policy implications (cont'd.)

- SOEs can be providers and recipients of support → lack of transparency and public body definition
- Below-market borrowings and below-market equity returns hard to measure and especially discipline, requiring commonly agreed benchmark
- Some forms of support could possibly be addressed e.g. through SOE disciplines

Source: OECD (2021), "Measuring distortions in international markets: Below-market finance", OECD Trade Policy Papers, No. 247, OECD Publishing, Paris, https://doi.org/10.1787/a1a5aa8a-en.

OECD (2019), "Measuring distortions in international markets: The semiconductor value chain", OECD Trade Policy Papers, No. 234, OECD Publishing, Paris, https://doi.org/10.1787/8fe4491d-en.

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