

The Costs of Conditionality

IPCEIs and the Constrained Politics of EU Industrial Policy

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Overview

- Paper available as preprint: <https://osf.io/preprints/osf/f63gd>
- IPCEIs as one core instrument of EU industrial policy (in addition to EIB, Chips Act, TCTF...)
- Case study of the use of conditionality in industrial policy
- Methodology:
 - 18 interviews with policy officials (EU Commission & member states) and representatives of firms who were involved in the IPCEI process, conducted in 2023 and early 2024
 - Analysis of official documents (Strategic Forum on IPCEIs; Joint-European Forum on IPCEIs; published states aid decisions)
 - Descriptive statistics based on the data from the official documents

Industrial Policy & Conditionality

- Conditionality as the tool to make industrial policy conform with public goals (Bulfone et al. 2023, Bulfone et al. 2024, Mazzucato and Rodrik 2023, Rodrik 2004)
 - ‘reciprocity—linking carrots to sticks’ (Meckling and Strecker, 2023)
- South Korea’s use of **reciprocal control mechanisms** (Amsden 2001), policy support in exchange for export success [sidenote: their importance for SK’s development success is debatable]
- The **challenges/costs** of implementing conditionality, which requires:
 - breaking down abstract goals into measurable and/or legally viable indicators
 - demonstrating and assessing compliance, often by making informed assumptions about counterfactual scenarios, and
 - reconciling the rigidities required by a credible instrument with the equally necessary flexibilities demanded by an uncertain and fast-changing world (Molica, 2024).
- Industrial policy & conditionality are not implemented in a political vacuum: **political economy** factors determine whether, which and how conditionalities are implemented and enforced (Bulfone et al. 2024; Juhász and Lane 2024).

EU Industrial Policy/State Aid



- Member state money, EU state aid governance (true for IPCEI, Chips Act, TCTF)
- Governing agency for state aid: DG Competition (EU Commission)
- State aid rules are enshrined in the Treaty of 1957 (forbidden in principle, but exceptions)
- The rules are open to interpretation by DG Competition (guidelines; enforcement), and have been interpreted differently over time
 - Pre-1980s: very lenient;
 - late 1980s until mid-2010s: very strict;
 - since mid-2010s: a bit more lenient again
- Generally, the main principles for state aid governance are primarily **efficiency**-oriented (based on a restrictive understanding of market failure & government intervention)
 - Recent exposition: Piechucka et al. (2023) “Industrial Policies, Competition, and Efficiency: The Need for State Aid Control”
- Principles for good state aid (assessment criteria): necessity; appropriateness; incentive effect; proportionality; positive effects outweigh negative effects of distortion of competition
- But DG Competition does not operate in isolation. Influenced by external pressure (other DGs; member states): New industrial policy instruments (IPCEI, Chips Act, TCTF) are results of that bargaining.

Important Projects of Common European Interest

- €37bn in state aid, €66bn in expected private investment, 283 firms in 22 member states
- IPCEIs are a state aid exception found in 107(3)(b) in TFEU (dormant since 1957; activated in 2014)

*“The following may be considered to be compatible with the internal market: (b): aid to promote the execution of an **important project of common European interest** or to remedy a serious disturbance in the economy of a Member State.”*

- Aid up to 100% of the funding gap for first industrial deployment (not mass production) of global-frontier innovation
- Allows more state aid than before (not just plain R&D)
- Format of state aid decided by member state (usually grants)
- Approval criteria:
 - The five general principles for good state aid
 - IPCEI-specific criteria

Approved Integrated Important Projects of Common European Interest (IPCEI)

	Participating companies	Participating projects	State aid approved (EUR billion)	Expected private investments (EUR billion)	Participating Member States
First IPCEI on Microelectronics (2018)	29	43	1,9	6,5	
First IPCEI on Batteries (2019)	17	23	3,2	5	
Second IPCEI on Batteries - EuBatIn (2021)	42	46	2,9	9	
First Hydrogen IPCEI - Hy2Tech (2022)	35	41	5,4	8,8	
Second Hydrogen IPCEI - Hy2Use (2022)	29	35	5,2	7	
Second IPCEI on Microelectronics and Communication Technologies (2023)	56	68	8,1	13,7	
IPCEI on Next Generation Cloud Infrastructure and Services (2023)	19	19	1,2	1,4	
Third Hydrogen IPCEI - Hy2Infra (2024)	32	33	6,9	5,4	
Fourth Hydrogen IPCEI - Hy2Move (2024)	11	13	1,4	3,3	
IPCEI Med4Cure (2024)	13	14	1	5,9	
Total	283 247*	335	37,2	66	22 Member States, UK and Norway participated in at least one IPCEI

*Excluding the companies that participated in more than one IPCEI

Exemplary IPCEI

Commission approves up to €8.1 billion support by 14 Member States for an IPCEI in **Microelectronics and Communication Technologies** ("IPCEI ME/CT")

SENSE

novel sensors to collect data

THINK

chips to process and store data

ACT

microelectronic systems performing actions

COMMUNICATE

systems for fast, secure and reliable transmission of information

- ◆ Contributes to key EU objectives
- ◆ Boosts breakthrough innovation
- ◆ Generates positive spill-over effects across the EU
- ◆ Ensures proportionate public spending
- ◆ Ensures fair competition



- ◆ 14 Member States:
- ◆ 56 companies of all sizes
- ◆ 68 research, development and first industrial deployment projects
- ◆ 30+ associated partners
+
- ◆ Around 600 indirect partners all over Europe
- ◆ Expected to unlock €13.7 billion of private investments



Wider IPCEI ME/CT Ecosystem

S
SENSE

T
THINK

A
ACT

C
COMMUNICATE

Research Organisation

Direct Participants

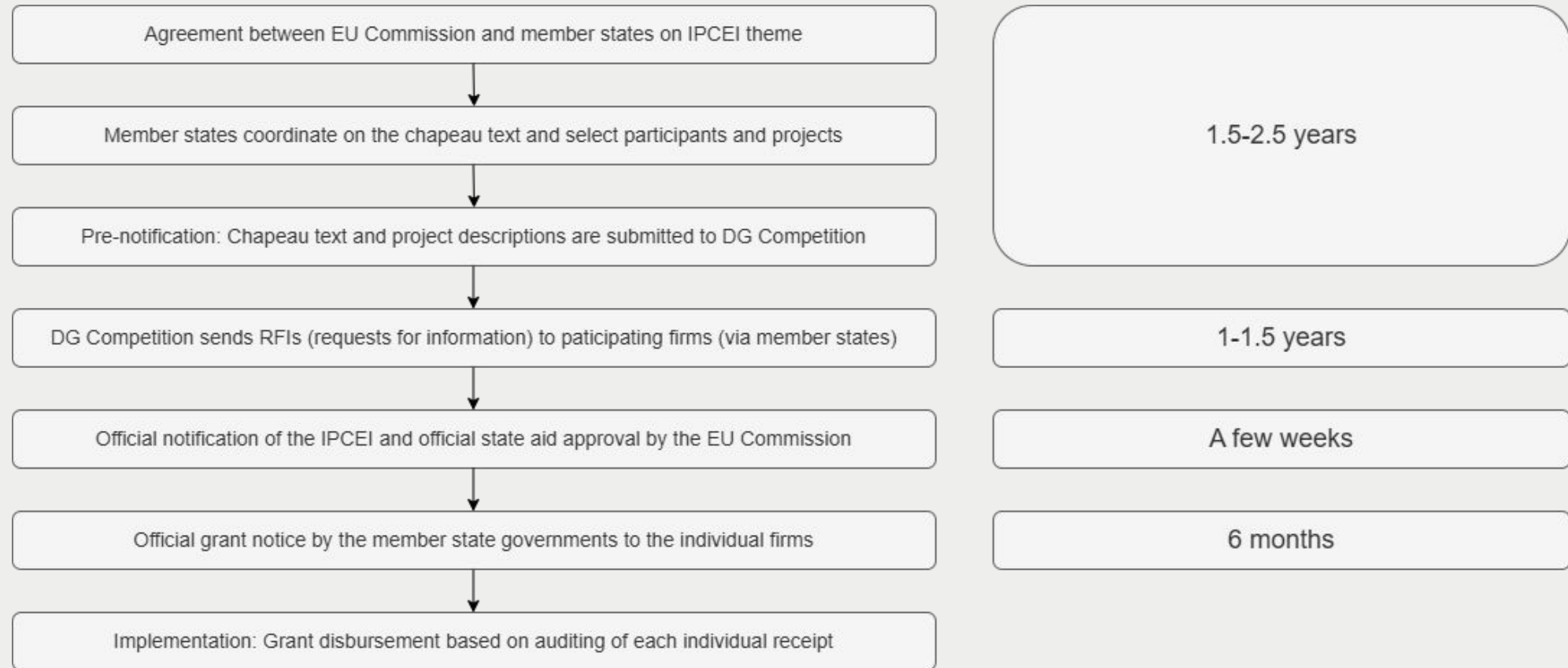
ADVA **S** Airbus **C** Aledia **A** Analog Devices **A** ASML **T**
AT&S **S T A C** AVL **S T A C** Bizzcom **T** Black Semiconductor **T**
Bosch **S T A C** Carl Zeiss **T** Codaip **C T** Cognitive Innovations **C**
Cologne Chip **T** Continental Automotive **A T** Continuum Technologies **C T**
EEMCO **A** Elmos Semiconductor **S T A** Ericsson **C**
Ferroelectric Memory **S T** Freiburger Compound Materials **A C**
GlobalFoundries **T A C** Infineon **S A** Innova IRV Microelectronics **C**
KDPOF **S C** Lynred **S** MEMC **A** Menarini Silicon Biosystems **S**
mi2-factory **A** Mycroft Mind **S T** Nearfield Instruments **T** Nokia **T C**
NXP **S T A C** Openchip **T** Orange **C** OSRAM Opto Semiconductors **S**
Renault **A** Rohde & Schwarz **C** Semidynamics Technology Services **T**
Semikron Elektronik **T A** SGL Carbon **A** SIAE Microelettronica **C**
Soitec **S T A C** STMicroelectronics **S T A C** Sunlight Group **T**
Tachyum **T C** Teledyne **S T C** ThermoFisher **S T** Trumpf Photonic **S C**
United Monolithic Semiconductors **C** Valeo **A** Vigo Photonics **S** Vitesco **A**
Wacker Chemie **S T C** X-FAB **S T A C** ZF Friedrichshafen **A**

Associated Participants

Akronic **C** Analog Devices **T** Ansys Hellas **C** Applied Materials **S T**
ATEP-AMKOR **S T A C** BelGan **S T A C** Beyond Semiconductor **C**
CEA **S T A C** CNR **A** DAS Photonics **C** Derivados del Flúor **S T C**
Elaphe Propulsion Technologies **A** Fondazione Bruno Kessler **S**
IMT Bucharest **A** iPronics **C** Latvijas Mobilais Telefons **C**
Murata **S T A** Nanometrisis **T** Nordic Semiconductor **T**
NXP **S T A C** OPTOI **S** PIC advanced **C**
Silicon Austria Labs **S A C** SINTEF **S** Soitec **S A C**
Swissbit Germany **C** Tungsram **C** UJP Praha **C**
VLC-Photonics **C** Vodafone **C** Wootix **C**

Around 600 indirect partners

Process of IPCEI design & approval



Authors' elaboration based on interview data, specifically on the two microelectronics IPCEIs, and official member state documents

General state aid criteria/conditionalities	IPCEI-specific criteria/conditionalities
Necessity of aid and incentive effect Companies need to provide counterfactual scenario (i.e. case of no aid) with evidence	Addresses important market or systemic failure Member states negotiate with EU Commission
Appropriateness of aid DG Competition assesses if IPCEI is the most suitable instrument; participants (member states and firms) argue their case	Concrete, clear and identifiable contribution to the Union's objectives and strategies Chapeau text written by participating firms
Proportionality of aid - Companies submit detailed funding gap analyses (expected positive and negative cash flows over the lifetime of a project) - Claw-back mechanism (if a project is more profitable than forecasted in the funding gap analysis)	Involves at least four member states
Positive effects outweigh negative effects of distortion of competition DG Competition conducts 'balancing test'	Generates positive spillover effects across the EU Firms suggest and negotiate with DG Competition
	Needs to be of 'major innovative nature' in the light of the global state of the art in the sector EU Commission assesses project description
	Only eligible costs [First industrial deployment (subsequent to the pilot line), incl. testing & bringing batch production to scale, but not mass production] Member states assess receipts before disbursing money

The costs of conditionality

- Perverse outcomes

- The time it takes from emergence to approval and disbursement of funds is much too long in the fast-moving technologies that IPCEIs address
- Mass production cannot be supported
- The innovativeness-at-the-global-frontier requirement repels the companies that IPCEIs aim to attract (Tesla; TSMC)

- Adverse selection

- The complex application and review processes for IPCEIs create a significant administrative burden
 - We document cases where companies dropped out because of this burden and/or because of the lengthy duration of the process (even though they were otherwise suitable to be part of an IPCEI)
- The administrative burden disproportionately affects smaller companies and member states with less experience navigating EU funding mechanisms
 - Overrepresentation of larger companies or those from member states with more administrative capacity and experience
 - Larger member states can afford to outsource to consultancies (e.g. Germany) [implications for state capacity?]

- Workarounds

- Companies opt for subsidy instruments with less stringent requirements (no requirement for cross-country collaboration and spillover effects) and where their investment is assessed individually (EU Chips Act; TCTF)
- Some companies have invested elsewhere where conditionalities are less strict (e.g. US IRA or a semiconductor firm investing in Singapore instead)

Conclusion

- We don't question the *if* of conditionalities, but the *what/how*. Since conditionalities also have costs, one needs to be smart about which conditionalities to attach.
- Conditionalities are not created in a political vacuum but are shaped by the political, institutional, and ideational constraints in which they are introduced and enforced.
 - In the case of IPCEI and in EU industrial policy more broadly, conditionalities are designed excessively in line with the efficiency-oriented principles of its state aid regime.
- Conditionalities that IPCEIs do not attach: limits on stock buybacks; requirements to use renewable energy; employment commitments; local content requirements.

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A chip wafer on display at TSMC's facility in Tainan, Taiwan. The US is in a global fight to attract advanced chipmakers as governments around the world offer subsidies and tax breaks to TSMC/ Bloomberg

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34

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The paper is available as a preprint:

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