TOO BIG TO AGGREGATE: CORPORATE CONTROL AND POLICY-INVARIANT AGGREGATION

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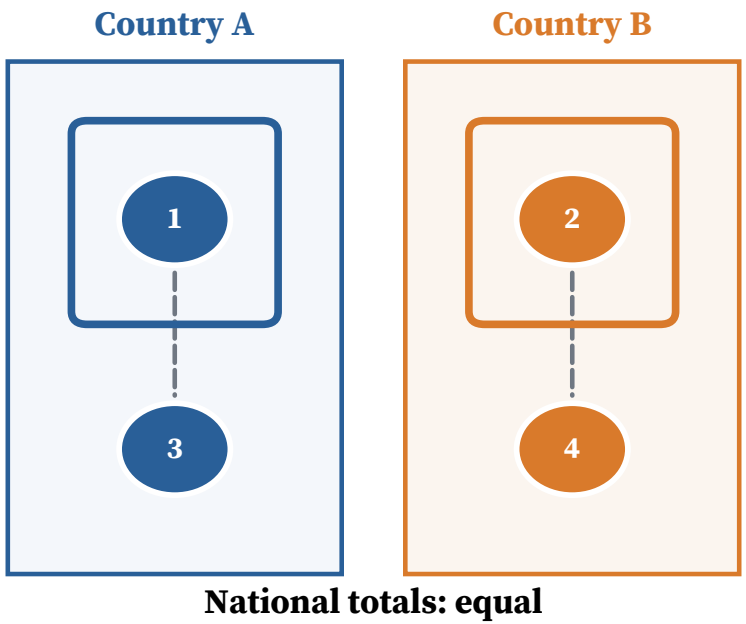
WHAT IS THE ECONOMIC QUESTION?

Which corporate-control information must accompany a national state to preserve a declared policy response?

- National accounts locate production and employment.
- Corporate control links the decisions through which those quantities respond to policy.
- The paper asks when a supplied national representation closes a response family.

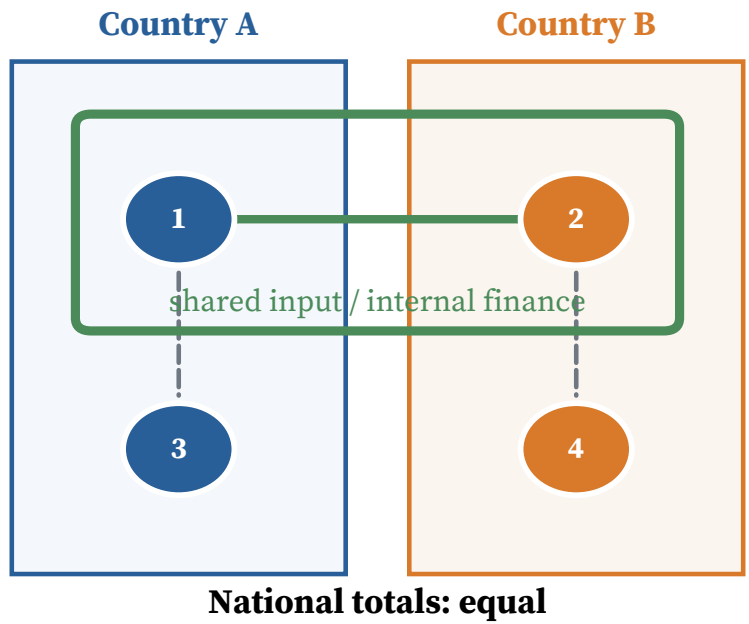
CAN THE SAME NATIONAL STATE HIDE DIFFERENT CONTROL SYSTEMS?

A. Separate decision perimeters



National totals: equal

B. Shared corporate perimeter



National totals: equal

The same residence-based allocation can map to different decision Jacobians.

Main-text collision schematic for national accounts and corporate control.

HOW CAN EQUAL NATIONAL TOTALS HIDE DIFFERENT POLICY TRANSMISSION?

- Two economies can report the same production, employment, and sector totals.
- One can concentrate control in a common parent while the other separates decision rights across firms.
- A monetary shock can then propagate through different financing and employment-response blocks.

WHAT IS POLICY-INVARIANT AGGREGATION?

- A national reporting map fixes the state available to the analyst.
- A declared policy experiment fixes shocks, horizons, outcomes, and loss weights.
- Closure requires the target response to remain constant along hidden directions of the national report.

HOW CAN THE SAME NATIONAL STATE TRANSMIT POLICY DIFFERENTLY?

Same national accounts

Different corporate control

Different policy response

WHEN DOES THE NATIONAL STATE CLOSE THE RESPONSE?

Theorem (Policy-invariant aggregation characterization)
First-order closure holds at a state if and only if the kernel of the national reporting differential lies inside the kernel of the target-response differential. Under local constant-rank conditions, the target factors through the reported state.

The condition asks whether every omitted state direction is response irrelevant for the declared target.

WHAT IS THE CLOSURE CONDITION?

$$\ker Dq_R(s_0) \subseteq \ker DT_{\mathcal{E}}(s_0)$$

- q_R is the supplied national reporting map.
- $T_{\mathcal{E}}$ is the response target for the declared policy experiment $\mathcal{E}$.
- Every direction erased by national accounts must also leave the target response unchanged.

HOW MANY CONTROL COORDINATES REPAIR THE STATE?

Proposition (Minimum state repair)

Every smooth first-order repair needs at least the rank of the target response along omitted directions. A local augmentation of that dimension separates the relevant quotient and attains closure.

The rank gives a lower bound and a matching local construction.

How is the minimum repair constructed?

- Restrict the target differential to directions erased by national accounts.
- Choose coordinates whose differentials separate a basis of the resulting quotient.
- For approximate finite experiments, leading right-singular coordinates attain the first-order frontier.

WHEN ARE NATIONAL ACCOUNTS SUFFICIENT FOR POLICY TRANSMISSION?

- Closure requires every corporate-state direction erased by the report to leave the declared policy response unchanged.
- Failure of this kernel condition identifies the target-relevant control directions missing from national accounts.
- A quotient basis gives the minimum local repair, while the singular spectrum orders approximate repairs for finite experiments.

WHAT IS THE COST OF KEEPING FEWER COORDINATES?

Proposition (Policy-response compression frontier)
For small finite experiments, the best rank-d approximation is governed at first order by the $(d+1)$*st singular value of the hidden response map, with curvature terms controlling the finite-experiment remainder.*

Leading singular coordinates attain the first-order frontier.

WHAT DOES THE EURO-AREA DESIGN ESTIMATE?

- Local projections estimate ECB monetary responses in euro-area manufacturing.
- Lagged corporate-control indices interact with the declared monetary innovation.
- Joint uncertainty is reported for the response-compression frontier across horizons.

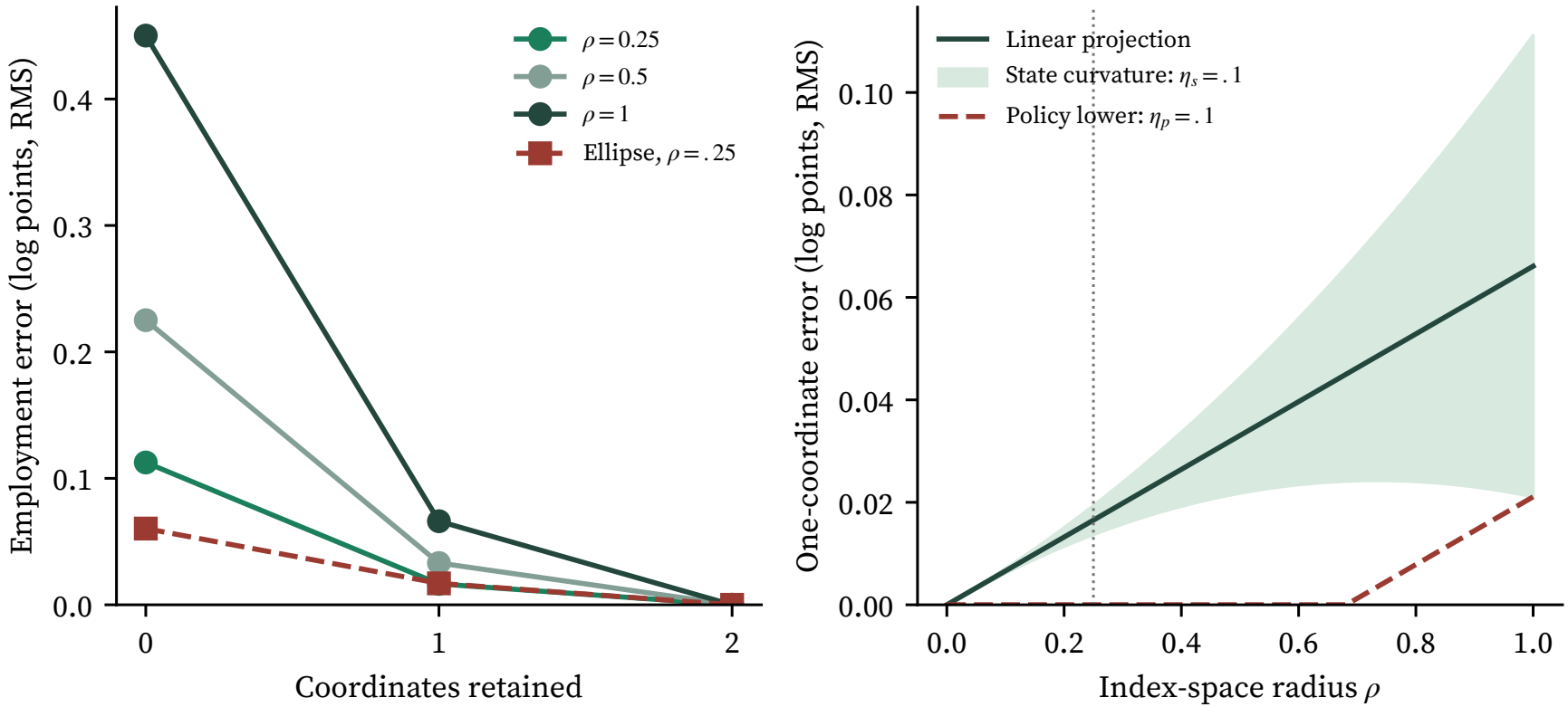
HOW DO MEASURED CONTROL INDICES ENTER THE EMPIRICAL FRONTIER?

- Lagged control indices define observed coordinates of the corporate state.
- Interactions with the monetary innovation estimate how response paths vary across those coordinates.
- The fitted coefficient map is converted into coordinate-retention error at the declared index radius.

WHICH AGGREGATION FAILURE IS MEASURED?

- Employment responses vary with two measured corporate-control coordinates.
- Credit and investment expand the target beyond employment alone.
- The exercise measures response heterogeneity across corporate states.

HOW MUCH EMPLOYMENT-RESPONSE ERROR REMAINS AT EACH STATE DIMENSION?



Main-text employment-unit repair frontier.

WHAT IS THE FITTED COST OF OMITTING CONTROL COORDINATES?

- At a quarter-unit index radius and one-standard-deviation monetary innovation, omitting both coordinates gives a fitted worst-case employment error of 0.1125 log percentage points.
- The simultaneous 95% interval is $[0.0312, 0.1939]$ across four horizons.
- One coordinate lowers the point error to 0.0165; the second becomes more valuable when credit and investment enter the target.

WHICH LITERATURES HELP PLACE THE QUESTION?

- Grossman and Hart (1986) and Hart and Moore (1990): control rights and organizational boundaries.
- Herskovic et al. (2020): firm volatility and propagation through granular networks.
- Carvalho and Grassi (2019): large firms and aggregate business-cycle dynamics.
- This paper asks which corporate-control coordinates national accounts need for a declared policy response.

WHAT CAUSAL CLAIM DOES THE EMPIRICAL FRONTIER SUPPORT?

- The estimates describe monetary-response heterogeneity across measured corporate states.
- The target, horizons, index radius, and shock normalization define the reported error.
- The effect of changing corporate control requires separate variation.

WHAT SHOULD THE READER CARRY FORWARD?

1. National accounting closure is a response-specific property.
2. Hidden-response rank gives the minimum local state repair.
3. Corporate-control coordinates materially change the fitted monetary-response frontier.

TECHNICAL APPENDIX

WHICH DEFINITIONS AND ASSUMPTIONS ORGANIZE THE PAPER?

- Assumption: Smooth regular equilibrium
- Assumption: Institutionally fixed aggregation
- Assumption: Pure control perturbations
- Assumption: Finite control-factor structure
- Assumption: Uniform finite-experiment regularity

HOW DO THE MAIN RESULTS BUILD ON ONE ANOTHER?

Policy-invariant aggregation characterization

Minimum state repair

Policy-response compression frontier

WHICH FORMAL RESULTS SUPPORT THE ARGUMENT?

- Theorem: Control transmission
- Theorem: Primitive hidden-response dimension
- Theorem: Policy-invariant aggregation characterization
- Theorem: Minimum state repair
- Theorem: Policy-response compression frontier
- Proposition: Two-coordinate employment transmission
- Proposition: Sufficient conditions for aggregation

WHICH SCOPE CONDITIONS GOVERN THE CLAIMS?

- The estimates describe monetary-response heterogeneity across measured corporate states.
- The target, horizons, index radius, and shock normalization define the reported error.
- The effect of changing corporate control requires separate variation.