

# Fiscal Policy in Multi-Sector Economies with Production Networks

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# Motivation: Sectoral Heterogeneity and Stabilisation Policy

**Question.** How important is sectoral heterogeneity for the design of stabilisation policy, and what role should fiscal instruments play?

## Networks matter

In input-output (IO) economies, intermediate-input linkages are a *fundamental* driver of cross-sectoral spillovers. Monetary policy targeting **CPI inflation** is suboptimal (Rubbo, 2023).

## Fiscal policy restores divine coincidence

Without IO, **optimal sectoral fiscal policy** makes zero-inflation monetary targeting approximately optimal. Without fiscal, the standard result holds (Cox et al., 2024).

**This talk:** recent theoretical benchmarks (La'O & Tahbaz-Salehi, 2025; Antonova & Müller, 2025) show that rich fiscal instruments restore efficiency — but under assumptions that break in realistic environments. The gap between benchmark and reality is precisely where fiscal policy design becomes essential.

**Setup.** Multi-sector New Keynesian economy with input-output linkages and heterogeneous price stickiness.

**Key mechanism:** intermediate-input propagation. Under Cobb–Douglas production ( $\psi=1$ ):

$$\begin{aligned}\pi_{i,t} &= \kappa_i(\widehat{\text{mc}}_{i,t} - \hat{p}_{i,t}) + \beta \mathbb{E}_t \pi_{i,t+1} \\ \widehat{\text{mc}}_{i,t} &= \alpha_i \hat{w}_t + \sum_j \omega_{ij} \hat{p}_{j,t} - a_{i,t}\end{aligned}$$

The IO term  $\sum_j \omega_{ij} \hat{p}_{j,t}$  links sectoral marginal costs: sticky prices in upstream sectors distort downstream costs even when the downstream sector has flexible prices.

## Central result

**Divine coincidence fails** in IO economies. The optimal monetary rule targets the **divine coincidence index**: a weighted inflation index (not CPI). Monetary policy alone cannot close all sectoral gaps simultaneously.

**Setup.** Multi-sector New Keynesian economy *without* IO linkages. Sectors differ in Calvo parameter  $\theta_k^P$  and public-good share  $\chi_k$ .

**Key result:** when sectoral fiscal policy is optimally conducted, zero-inflation monetary targeting is close to optimal. The welfare approximation:

$$W \approx -\frac{1}{2} \sum_k \mu_k \left[ (1+\varphi) y_{k,t}^2 + \frac{\theta(1-\chi_k)}{\lambda_k} \pi_{k,t}^2 + \chi_k^* (g_{k,t} - y_{k,t})^2 \right]$$

## What they find:

- ▶ Optimal policy: MP stabilises aggregates; fiscal stabilises sectors
- ▶ With optimal fiscal, zero-inflation MP is near-optimal (welfare 3.1 vs. 2.8)
- ▶ With **passive fiscal**, MP must target divine coincidence index (welfare 4.7 vs. 6.3)

## What they assume:

- ▶ No input-output linkages
- ▶ Linear-in-labour production
- ▶ Sectoral shocks do not propagate through intermediate goods

# The Theoretical Benchmark: $2N$ Instruments Restore Efficiency

Two recent papers establish the **polar case**: with sufficiently many fiscal instruments, production efficiency is achievable even in IO economies.

## La'O & Tahbaz-Salehi (2025)

$2N$  sector-specific taxes implement the **Ramsey optimum** (production efficiency) in multi-sector IO economies.

- ▶ Extends Correia, Nicolini & Teles (2008) to networks
- ▶ Optimal taxes **independent of Calvo parameters**

## Antonova & Müller (2025)

$2N$  targeted taxes replicate the **flexible-price allocation** in a Rubbo-style IO framework.

- ▶ “Prices move as if fully flexible”
- ▶ Closed-economy,  $N$ -sector Calvo model

**Critical shared assumption:** both assume **flexible wages** (competitive labour market). The restoration result relies on price-side instruments being sufficient to close all distortionary wedges.

# The Gap: From Benchmark to Reality

## Benchmark (L&TS, A&M)

- ▶  $2N$  fiscal instruments
- ▶ **Flexible wages** (competitive labour market)
- ▶ Closed economy (A&M)
- ▶ Production efficiency achievable

## Our setting (Aguilar et al.)

- ▶ Restricted instruments:  $\tau_k^w, \tau_{ki}^s$
- ▶ **Calvo wages** ( $\theta_k^w = 0.75$ )
- ▶ Open economy ( $K=4$  countries)
- ▶ Quantitative IO ( $I=44$  sectors)

## Why staggered wages change everything

L&TS's  $2N$  instruments are all price-side taxes; with flexible wages, the wage adjusts freely to clear labour misallocation. With **Calvo wage setting**, the wage is a state variable that price-side instruments cannot directly control. The flexible-price restoration of L&TS and A&M is **off the table**.

**Our question:** what can *restricted* fiscal instruments achieve in this richer friction environment?

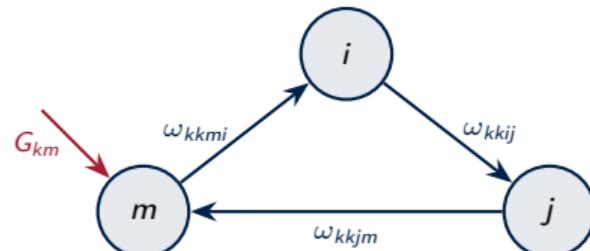
# Aguilar et al. (2025): A Rubbo-Style Economy with Staggered Wages

- ▶  $K=4$  countries,  $I=44$  sectors
- ▶ Nested CES production with IO linkages (OECD ICIO)
- ▶ Sector-specific Calvo pricing + **Calvo wages** ( $\theta_k^w=0.75$ )
- ▶ Country-specific Taylor rules

Marginal cost in sector  $i$ , country  $k$ :

$$\widehat{mc}_{ki,t} = -a_{ki,t} + \underbrace{\mathcal{M}_{ki}\alpha_{ki} \widehat{w}_{k,t}}_{\text{labour}} + \underbrace{\sum_{l,j} \mathcal{M}_{ki}\omega_{klji} \widehat{p}_{klji,t}}_{\text{IO inputs}}$$

This is exactly the IO structure Rubbo identifies as breaking divine coincidence, now at  $K \times I$  scale — with the additional complication of staggered wages (▶ Details).



IO network with fiscal entry point

# Our Contribution: Restricted Fiscal Instruments in the Network

We extend Aguilar et al. with two instruments — a **restricted subset** of L&TS's  $2N$  instrument set.

**Wage Phillips curve** — country-level labour income tax  $\tau_k^w$ :

$$\pi_{wk,t} = \kappa_{wk} \left( \sigma \hat{c}_{k,t} + \varphi \hat{n}_{k,t} - \hat{w}_{k,t} + \hat{\tau}_{k,t}^w \right) + \beta \mathbb{E}_t \pi_{wk,t+1} + u_{k,t}^w$$

→ Addresses **wage rigidity** that L&TS and A&M do not face (flexible wages).

**Price Phillips curve** — sector-specific production subsidy  $\tau_{ki}^s$ :

$$\pi_{ki,t} = \kappa_{ki} \left( \widehat{mc}_{ki,t} - \hat{p}_{ki,t} - \hat{\tau}_{ki,t}^s \right) + \beta \mathbb{E}_t \pi_{ki,t+1} + u_{ki,t}^p$$

→ Same channel as A&M, but **fewer degrees of freedom** ( $K+K \times I$  vs.  $2K \times I$ ).

**Key distinction:** we operate where the flexible-price restoration of L&TS and A&M is impossible. Both instruments propagate through the IO network that makes monetary policy insufficient.

# Research Agenda

**Goal:** what can restricted fiscal instruments achieve when flexible-price restoration is off the table?

- 1 **Sector-specific government purchases** in goods market clearing:

$$Y_{ki,t} = \sum_l C_{lki,t} + \sum_l \sum_j X_{lkji,t} + G_{ki,t}$$

- 2 **Optimal fiscal rule** in the networked economy with staggered wages: characterise how IO structure and wage rigidity jointly shape optimal spending allocation.
- 3 **The critical test:** do the L&TS/A&M efficiency results survive under (a) restricted instruments, (b) Calvo wage setting, (c) open-economy spillovers?
- 4 **Two policy regimes:** fully endogenous spending (level + composition) vs. fixed aggregate budget (composition only). Quantify the welfare gap relative to the  $2N$ -instrument benchmark.

- 1 **The polar case:** La'O & Tahbaz-Salehi (2025) and Antonova & Müller (2025) show that  $2N$  fiscal instruments restore production efficiency in multi-sector IO economies — under **flexible wages**.
- 2 **The break:** Aguilar et al.'s **Calvo wage setting** fundamentally changes the problem. Price-side instruments alone cannot close wage-rigidity-induced misallocation. The benchmark restoration result is off the table.
- 3 **Our agenda:** test what *restricted* fiscal instruments (labour tax + production subsidy) can achieve in this richer environment — a quantitative open-economy IO model with staggered wages.

**Conjecture:** restricted instruments cannot fully restore production efficiency, but sectoral *composition* of spending will matter more than its aggregate level.

**Thank you**

## Appendix: Related Literature

### Production Networks & NK

- ▶ Acemoglu et al. (2012)
- ▶ Baqae & Farhi (2020, 2024)
- ▶ Pasten, Schoenle & Weber (2020)
- ▶ **Rubbo (2023)**
- ▶ La’O & Tahbaz-Salehi (2024)

### Fiscal Policy in Disaggregated Economies

- ▶ Aoki (2001)
- ▶ **La’O & Tahbaz-Salehi (2025, WP)**
- ▶ **Antonova & Müller (2025)**
- ▶ **Cox et al. (2024)**

### Tariffs & Open-Economy NK

- ▶ Galí & Monacelli (2005)
- ▶ Comin & Johnson (2023)
- ▶ **Aguilar et al. (2025)**

### Fiscal–Price Effects (Empirical)

- ▶ Nekarda & Ramey (2020)
- ▶ Ben Zeev & Pappa (2017)

## Appendix: Rubbo (2023) — Model Detail

**Network Phillips curve.** Under Cobb–Douglas production ( $\psi = 1$ ) and Calvo pricing:

$$\pi_t = \kappa \Psi \hat{w}_t + \beta \mathbb{E}_t \pi_{t+1}$$

where  $\Psi = (\mathbf{I} - \Omega)^{-1}$  is the Leontief inverse and  $\kappa = \text{diag}(\kappa_1, \dots, \kappa_N)$ . (The general CES case involves additional relative-price terms.)

**Key insight:** the Leontief inverse maps wage costs into sectoral inflation. A sector with flexible prices but upstream sticky suppliers still experiences inflation distortions through  $\Psi$ .

**Optimal monetary policy (divine coincidence index):**

$$\sum_i \tilde{\mu}_i \hat{y}_{i,t} = 0 \quad \text{where weights } \tilde{\mu}_i \text{ depend on sales shares } \lambda_i \text{ and price adjustment frequencies}$$

Equivalently, the planner targets a specific weighted inflation index (the “divine coincidence index”), not CPI. The weights over-weight sectors that are: (i) large (high Domar weight  $\lambda_i$ ), (ii) sticky (low price adjustment frequency), and (iii) upstream (high influence through the Leontief inverse).

**Failure of zero inflation:** targeting  $\pi_{i,t} = 0 \forall i$  requires all marginal cost gaps to be zero. With IO linkages, this is generically impossible because upstream price distortions propagate to downstream costs.

## Appendix: Cox et al. (2024): Key Quantitative Results

**Model.**  $N$  sectors, no IO. Production:  $Y_{k,t} = A_{k,t} N_{k,t}$ . Calvo pricing ( $\theta_k^P$ ), government share  $\chi_k$ .

**Four policy regimes** (Table 3, baseline U.S. calibration, welfare loss):

	Optimal fiscal	Passive fiscal ( $\tilde{f}_{kt} = 0$ )
Optimal MP	2.8	4.7
Zero-inflation MP	3.1	6.3

**Interpretation:** with optimal sectoral fiscal, zero-inflation MP is approximately optimal (3.1 vs. 2.8). Without fiscal, the standard result holds: optimal MP must target the divine coincidence index (4.7 vs. 6.3).

**Critical assumption:** without IO, sectoral marginal costs depend only on own wages and productivity. There is *no channel* for upstream price distortions to affect downstream sectors, precisely the mechanism Rubio identifies as first-order.

## Appendix: Welfare with $\sigma \neq 1$ and $\kappa \neq 0$

When CRRA preferences and government-demand pass-through are active:

$$\begin{aligned} & -\frac{1}{2} \sum_k \mu_k \left( (1+\varphi) y_{k,t}^2 + \frac{\theta(1-\chi_k)}{\lambda_k} \pi_{k,t}^2 + \chi_k^* (g_{k,t} - y_{k,t})^2 \right. \\ & \quad \left. + (\sigma-1) \left[ (1-\chi_k) \omega_{c,k} \left( \frac{y_{k,t}}{1-\chi_k} - \chi_k^* g_{k,t} \right)^2 + \omega_{g,k} \chi_k g_{k,t}^2 \right] \right) \end{aligned}$$

- The  $\sigma-1$  term introduces an **insurance motive**: the planner uses sectoral fiscal policy to hedge against aggregate risk.
- $\kappa > 0$  steepens Phillips curves ( $\lambda'_k > \lambda_k$ ), making fiscal policy a supply-side instrument.

## Appendix: Relative Allocation Rule — Structural Coefficients

Under exogenous  $\bar{G}_t$  (with  $\sigma = 1$ ,  $\kappa = 0$ ):

$$\begin{aligned} g_{k,t} &= \frac{1-\chi_k}{1-\chi_i} \left( \frac{1+\lambda_i+\varphi\lambda_i}{1+\lambda_i+\varphi\lambda_i(1-\chi_i)} \right) \left( \frac{\omega_{g,k}}{\omega_{g,i}} \right)^\rho \left( \frac{1+\lambda_k+\varphi\lambda_k}{1+\lambda_k+\varphi\lambda_k(1-\chi_k)} \right)^{-1} g_{i,t} \\ &\quad - \frac{\varphi y_{k,t}}{1+\lambda_k+\varphi\lambda_k} - \frac{\theta \varphi (1-\chi_k) \pi_{k,t}}{1+\lambda_k+\varphi\lambda_k} \\ &\quad + \frac{1-\chi_k}{1-\chi_i} \left( \frac{\omega_{g,k}}{\omega_{g,i}} \right)^\rho \left( \frac{1+\lambda_k+\varphi\lambda_k}{1+\lambda_k+\varphi\lambda_k(1-\chi_k)} \right)^{-1} \\ &\quad \times \left( \frac{\varphi y_{i,t}}{1+\lambda_i+\varphi\lambda_i(1-\chi_i)} + \frac{\theta \varphi (1-\chi_i) \pi_{i,t}}{1+\lambda_i+\varphi\lambda_i(1-\chi_i)} \right) \end{aligned}$$

$\omega_{g,k}$ : weight of sector  $k$  in the government Cobb–Douglas aggregator.  $\rho$ : CES elasticity of public-good bundle.

## Appendix: Aguilar et al. —Household Problem

Per-period utility:  $U_t = \left( C_{k,t}^{1-\sigma}/(1-\sigma) - \int_0^1 \mathcal{N}_{gk,t}^{1+\varphi}/(1+\varphi) dg \right) Z_{k,t}$

Consumption nested CES (energy/non-energy, domestic/foreign):

$$C_{k,t} = \left[ \tilde{\beta}_k^{1/\gamma} C_{kE,t}^{(\gamma-1)/\gamma} + (1-\tilde{\beta}_k)^{1/\gamma} C_{kM,t}^{(\gamma-1)/\gamma} \right]^{\gamma/(\gamma-1)}$$

Euler equations:

$$\begin{aligned} C_{k,t}^{-\sigma} &= \beta \mathbb{E}_t C_{k,t+1}^{-\sigma} \frac{1 + i_{k,t}}{1 + \pi_{kC,t+1}} \frac{Z_{k,t+1}}{Z_{k,t}} \\ i_{k,t} - i_{K,t} &= \mathbb{E}_t \Delta e_{kK,t+1} - \gamma_* nfa_{k,t} + \varepsilon_{kK,t}^e \quad (\text{UIP}) \end{aligned}$$

Calvo wage setting yields:

$$\pi_{wk,t} = \kappa_{wk} \left( \sigma \hat{c}_{k,t} + \varphi \hat{n}_{k,t} - \hat{w}_{k,t} \right) + \beta \mathbb{E}_t \pi_{wk,t+1} + u_{k,t}^w$$

## Appendix: Aguilar et al. —Firm Problem

CES production:  $Y_{ki,f,t} = A_{ki,t} \left[ \tilde{\alpha}_{ki}^{1/\psi} N_{fki,t}^{(\psi-1)/\psi} + \tilde{\vartheta}_{ki}^{1/\psi} X_{fki,t}^{(\psi-1)/\psi} \right]^{\psi/(\psi-1)}$

Intermediate bundle mirrors the household CES nesting (energy/non-energy, domestic/foreign).

Log-linearised marginal cost:

$$\widehat{mc}_{ki,t} = -a_{ki,t} + \mathcal{M}_{ki} \alpha_{ki} \widehat{w}_{k,t} + \sum_{l=1}^K \sum_{j=1}^I \mathcal{M}_{ki} \omega_{klji} \widehat{p}_{klji,t}$$

where  $\alpha_{ki}$ : labour share,  $\omega_{klji}$ : IO expenditure share,  $\mathcal{M}_{ki}$ : steady-state markup.

Calvo pricing yields:

$$\pi_{ki,t} = \kappa_{ki} (\widehat{mc}_{ki,t} - \widehat{p}_{ki,t}) + \beta \mathbb{E}_t \pi_{ki,t+1} + u_{ki,t}^p \quad \kappa_{ki} = \frac{(1 - \theta_{ki}^p)(1 - \beta \theta_{ki}^p)}{\theta_{ki}^p}$$

## Appendix: Aguilar et al. — Tariff Propagation

Tariffs enter as price wedges on final and intermediate goods:

$$P_{k,l,i,t} = (1 + \tau_{k,l,i,t}) \tilde{P}_{l,k,i,t}$$

### Propagation:

- 1 Tariff on country  $l$  raises input prices  $\hat{p}_{klji,t}$  for domestic sectors sourcing from sector  $j$  in  $l$ .
- 2 Higher input costs raise  $\widehat{\text{mc}}_{ki,t}$ , feeding into  $\pi_{ki,t}$ .
- 3 Cost increases cascade downstream through the IO network.
- 4 Tariff revenue accrues to the government; currently rebated lump-sum.

Government budget constraint:

$$\begin{aligned} \frac{B_{k,t}}{1 + i_{k,t}} + T_{k,t} + \sum_{l \neq k} \sum_i \tau_{klj,t} P_{klj,t}^l \left( C_{klj,t} + \sum_j X_{klji,t} \right) \\ = B_{k,t-1} + \sum_i \tau_{ki,t}^s \text{MC}_{ki,t} Y_{ki,t} \end{aligned}$$

◀ Back

# Appendix: Aguilar et al. —Calibration

## Households

- ▶  $\beta = 0.99, \sigma = 1, \varphi = 1$
- ▶ Energy/non-energy elast.  $\gamma = 0.4$
- ▶ Trade elasticity  $\delta = 1$
- ▶ Calvo wage  $\theta_k^w = 0.75$
- ▶ Consumption shares from OECD ICIO (2019)

## Monetary policy

- ▶  $\rho_r = 0.7, \phi_\pi = 1.5, \phi_y = 0.125$
- ▶ Target: headline inflation

## Firms

- ▶ Labour/input elast.  $\psi = 0.5$
- ▶ Energy/non-energy elast.  $\phi = 0.4$
- ▶ Trade elasticity  $\mu = 1$
- ▶ IO shares from OECD ICIO (2019)
- ▶ Markups from Eurostat Figaro
- ▶ Calvo prices from ECB PRISMA

## Tariff shocks

- ▶  $\rho^\tau = 0.96, \sigma^\tau = 1$

## Appendix: Derivation —Wage Phillips Curve with Tax

Household FOC with labour income tax  $\tau_{k,t}^w$ :

$$\sum_{l=0}^{\infty} (\beta \theta_k^w)^l \mathbb{E}_t \left[ N_{k,t+l|t} C_{k,t+l|t}^{-\sigma} \left( \frac{(1-\tau_{k,t+l}^w) W_{k,t}^*}{P_{kC,t+l}} - \mathcal{M}_{wk,t} \text{MRS}_{k,t+l|t} \right) \right] = 0$$

Log-linearised reset wage:

$$w_{k,t}^* = (1-\beta \theta_k^w) \sum_{l=0}^{\infty} (\beta \theta_k^w)^l \mathbb{E}_t [ \text{mrs}_{t+l|t} + \mu_{wk,t+l}^n + p_{kC,t+l} + \hat{\tau}_{k,t+l}^w ]$$

Calvo aggregation ( $\pi_{wk,t} = w_{k,t} - w_{k,t-1}$ ):

$$\pi_{wk,t} = \kappa_{wk} (\sigma \hat{c}_{k,t} + \varphi \hat{n}_{k,t} - \hat{w}_{k,t} + \hat{\tau}_{k,t}^w) + \beta \mathbb{E}_t \pi_{wk,t+1} + u_{k,t}^w$$

Tax deviation enters additively: wage-setters pass the wedge through to the pre-tax wage.

## Appendix: Derivation —Price Phillips Curve with Subsidy

Firm FOC with time-varying production subsidy  $\tau_{ki,t}^s$ :

$$\sum_{l=0}^{\infty} (\beta \theta_{ki}^p)^l \mathbb{E}_t [\Lambda_{t,t+l} Y_{ki,t+l|t} (P_{ki,t}^* - \mathcal{M}_{pk,t+l} (1 - \tau_{ki,t+l}^s) MC_{ki,t+l|t}^n)] = 0$$

Log-linearised reset price:

$$p_{ki,t}^* = (1 - \beta \theta_{ki}^p) \sum_{l=0}^{\infty} (\beta \theta_{ki}^p)^l \mathbb{E}_t [mc_{ki,t+l|t}^n + \mu_{pk,t+l}^n - \hat{\tau}_{ki,t+l}^s]$$

Calvo aggregation ( $\pi_{ki,t} = p_{ki,t} - p_{ki,t-1}$ ):

$$\pi_{ki,t} = \kappa_{ki} (\widehat{mc}_{ki,t} - \hat{p}_{ki,t} - \hat{\tau}_{ki,t}^s) + \beta \mathbb{E}_t \pi_{ki,t+1} + u_{ki,t}^p$$

Subsidy increase lowers effective marginal cost  $\rightarrow$  disinflationary cost-push.

# Q&A: Why Not Derive the Ramsey Problem Directly?

## The question

Why modify Phillips curves with fiscal instruments rather than solving a full Ramsey taxation problem?

- ▶ The Phillips-curve approach is a **reduced-form shortcut**: it isolates the cost-push channel of taxation while preserving the existing IO structure of Aguilar et al. (2025).
- ▶ A full Ramsey problem in a  $4 \times 44$  networked model is computationally demanding: it requires solving for  $K \times I$  optimal tax instruments simultaneously.
- ▶ The **research agenda goal** is precisely to move toward the full Ramsey characterisation. The current extensions are a tractable first step.
- ▶ La'O & Tahbaz-Salehi (2025) show that even in simpler networks, the Ramsey problem has a rich structure —  $2N$  instruments implement production efficiency. Our approach builds intuition before scaling up.

# Q&A: How Does This Relate to Antonova & Müller (2025)?

## The question

Antonova & Müller already study fiscal policy in Rubbo's IO framework. What is your contribution?

### Antonova & Müller (2025):

- ▶  $2N$  targeted taxes replicate flexible-price allocation
- ▶ **Flexible wages** (competitive labour market)
- ▶ Closed-economy framework
- ▶ The **polar case**: sufficient instruments + simple frictions

### Our contribution:

- ▶ Restricted instruments ( $\tau_k^w + \tau_{ki}^s$ )
- ▶ **Calvo wages** ( $\theta_k^w = 0.75$ )
- ▶ Quantitative open economy ( $K \times I$ )
- ▶ What can restricted instruments achieve?

**Key distinction:** A&M establish the polar case (flexible-price restoration with  $2N$  instruments and flexible wages). We test what restricted instruments can achieve when staggered wages make that restoration impossible.

## The question

La’O & Tahbaz-Salehi have two relevant papers. How do they relate to your work?

**Econometrica (2024):** optimal *monetary* policy in production networks; network structure shapes the optimal inflation target.

“Missing Tax Instruments” (2025 WP):

- ▶  $2N$  taxes implement Ramsey optimum (production efficiency)
- ▶ Optimal taxes **independent of Calvo parameters**
- ▶ Extends Correia, Nicolini & Teles (2008) to IO

**Key distinction:** L&TS provide the theoretical ceiling. We ask how far restricted instruments can go when wage rigidity makes that ceiling unattainable.

### Our contribution:

- ▶ Restricted instruments ( $\tau_k^w + \tau_{ki}^s$ , not  $2N$ )
- ▶ **Calvo wages** break their flexible-wage assumption
- ▶ Quantitative open economy ( $K \times I$ )
- ▶ Their Ramsey optimum is our benchmark

# Q&A: Why Not Just Use $2N$ Instruments?

## The question

La’O & Tahbaz-Salehi show  $2N$  taxes implement production efficiency. Why not use them?

- 1 **Instrument restriction:**  $2N$  sector-specific taxes require the government to target each sector individually. In practice, labour income taxes are set at *country level* ( $\tau_k^w$ ). Our instrument set ( $K + K \times I$ ) is a strict subset of  $2N$ .
- 2 **Staggered wages:** L&TS and A&M assume **flexible wages**. With Calvo wage setting ( $\theta_k^w = 0.75$ ), wage-rigidity misallocation creates distortions that *no price-side taxes* can address.
- 3 **Open economy:** L&TS study a closed economy. Cross-border IO linkages and exchange rate dynamics introduce additional channels absent from the benchmark.

**Bottom line:** the  $2N$ -instrument result is the polar case. We study the realistic setting where that ceiling is unattainable.