Discussion: Trade Adjustment and the Composition of Trade by Erceg, Guerrieri and Gust

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Discussion Outline

- Main lessons learned

- Unanswered questions.

Motivation

- Sectoral decomposition: Capital and non-capital.

- Most US trade in capital and consumer durables but this sector accounts for only 20 percent of GDP.

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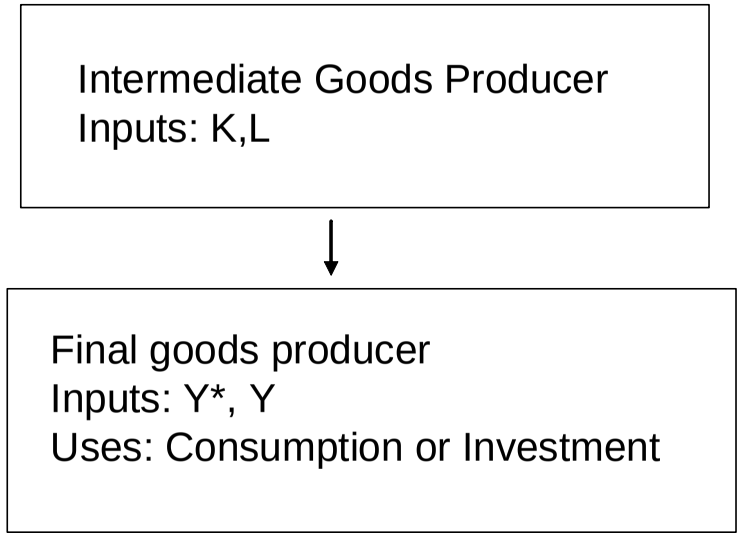
2004	**Nondurable Consumption**	**Durable Consumption plus Capital**	**Supplies**
Imports	28	62	10
Exports	25	61	14

- International Trade Literature suggests it makes sense to treat investment differently
  - Distance is important for trade (gravity equations).
  - Regional specialization of capital exports.
    - Japan to Asia
    - Germany to Europe
    - US to Latin America.
  - Distance matters within blocs. A networking and maintenance/support/service dimension to capital.

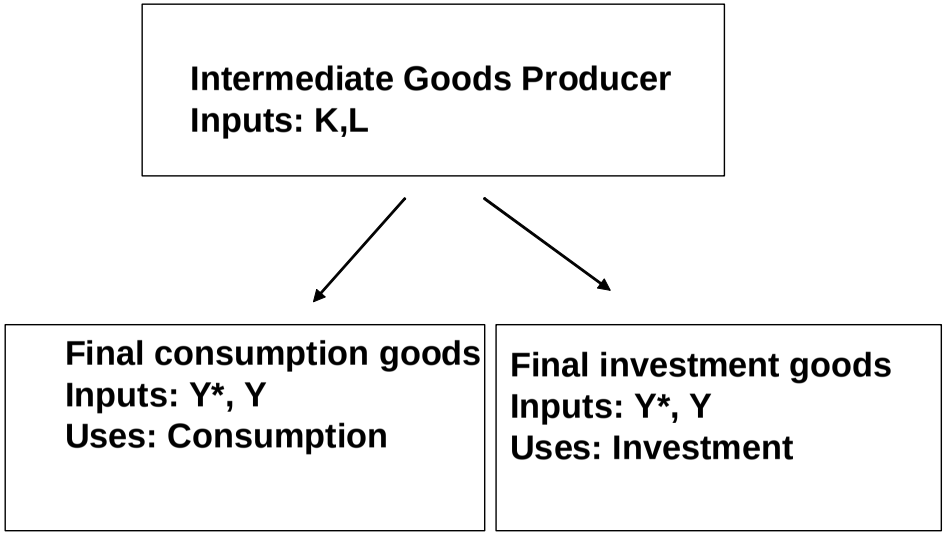
The base model: SIGMA

- Compare two ways of modeling demand for imports.

AT (Aggregated Trade)



DT (Disaggregated Trade)



The SIGMA model

Two countries, some optimization, production, trade, assets, and frictions.

- Continuum of monopolistically competitive intermediate goods firms employ labor and capital.
  - **Calvo pricing for intermediate goods firms**.
  - **Not chosen to reoptimize? Adjust by lagged inflation**.
- Consumption goods producer/distributor combines home and foreign produced composite goods.
  - Home bias

- **Import adjustment cost.** Limits flexibility in ability to vary the mix between home and foreign.

- Investment good producer/distributor.
  - **Adjustment costs analagous to consumption goods producer**

- Households
  - Each household is a little union. **Wage-setting by modified Calvo rule.**
  - Half optimize over consumption, hours, real balances.
  - Half are **'hand-to-mouth' liquidity constrained no asset households.**

- Habit persistence.

- Other frictions
  - **Capital stock adjustment costs**
  - **Exogenous deviation from UIP**
  - **International bond intermediation costs**
  - **International capital market frictions: Net lender: US earns less on foreign bonds Net borrower: US pays higher return on foreign liabilities.**
  - Informational frictions–permanent/transitory shock decomposition to sort out.

- A Taylor rule, exogenous government spending, stochastic tax rates.

Earlier paper: SIGMA vs. FRB/Global

- Monetary expansion (reduce short-term interest rate).
  - Benchmark SIGMA doesn't get enough movement in real variables.
  - SIGMA doesn't get delayed overshooting whereas FRB/Global does.
- Government spending shock (+)
  - FRB/Global responses are more persistent than benchmark SIGMA.
  - Adjust with imperfect information and learning.

- Taste shock (home consmption demand)
  - Real exchange rate response differs across models.(FRB temporary appreciation. SIGMA, permanent appreciation)

- Pass-through to import prices in SIGMA is "too high" (about 1 after a few quarters). Empirical estimates find long-run pass-through about 30 percent.

1 AT versus DT comparison

- DT final goods demand from two sources

$$C_t = \left(\underbrace{\omega_c^{\frac{\rho_c}{1+\rho_c}}}_{\text{Home Bias}} C_{Dt}^{\frac{1}{1+\rho_c}} + (1-\omega_c)^{\frac{\rho_c}{1+\rho_c}} \left(\underbrace{\varphi_{ct}}_{\text{Adj.}} \underbrace{M_{Ct}}_{\text{Import}} \right)^{\frac{1}{1+\rho_c}} \right)^{\frac{1}{1+\rho_c}}$$

$$I_t = \left(\underbrace{\omega_I^{\frac{\rho_I}{1+\rho_I}}}_{\text{Home.Bias}} I_{Dt}^{\frac{1}{1+\rho_I}} + (1-\omega_I)^{\frac{\rho_I}{1+\rho_I}} \left(\underbrace{\varphi_{It}}_{\text{Adj.}} \underbrace{M_{It}}_{\text{Import}} \right)^{\frac{1}{1+\rho_I}} \right)^{\frac{1}{1+\rho_I}}$$

- AT: One final good: consume or invest it. Single distributor technology

$$A_t = \left(\omega_A^{\frac{\rho_A}{1+\rho_A}} \underbrace{A_{Dt}}_{\text{Home}}^{\frac{1}{1+\rho_A}} + (1-\omega_A)^{\frac{\rho_A}{1+\rho_A}} \left(\underbrace{\varphi_{At}}_{\text{Adj.}} \underbrace{M_{At}}_{\text{Import}} \right)^{\frac{1}{1+\rho_A}} \right)^{\frac{1}{1+\rho_A}}$$

- Effect: Increases the relative weight of investment in equilibrium import demand

- Import Dynamics: Changes weight of investment. These look like import multipliers.

$$\widetilde{M}_t = \begin{cases} \left(\left(\frac{C}{A}\right) \widetilde{C}_t + \left(\frac{I}{A}\right) \widetilde{I}_t \right) + F(\widetilde{\psi}_t, \widetilde{\psi}_{t-1}, ...) & \text{AT} \\ \left(\left(\frac{M_c}{M}\right) \widetilde{C}_t + \left(\frac{M_I}{M}\right) \widetilde{I}_t \right) + F(\widetilde{\psi}_t, \widetilde{\psi}_{t-1}, ...) & \text{DT} \end{cases}$$

- Calibration:

$$\begin{aligned} \omega_A &= 0.15 \\ \omega_c &= 0.052, \omega_I = 0.36 \\ \rho_c &= \rho_I = \rho_A = 2 \end{aligned}$$

Is this a typo? Not 5 percent consumer imports. It's 95 percent.

- Feed consumption, investment and relative price data through import demand equation. Compare to data.

Figure 1A: AT Specification

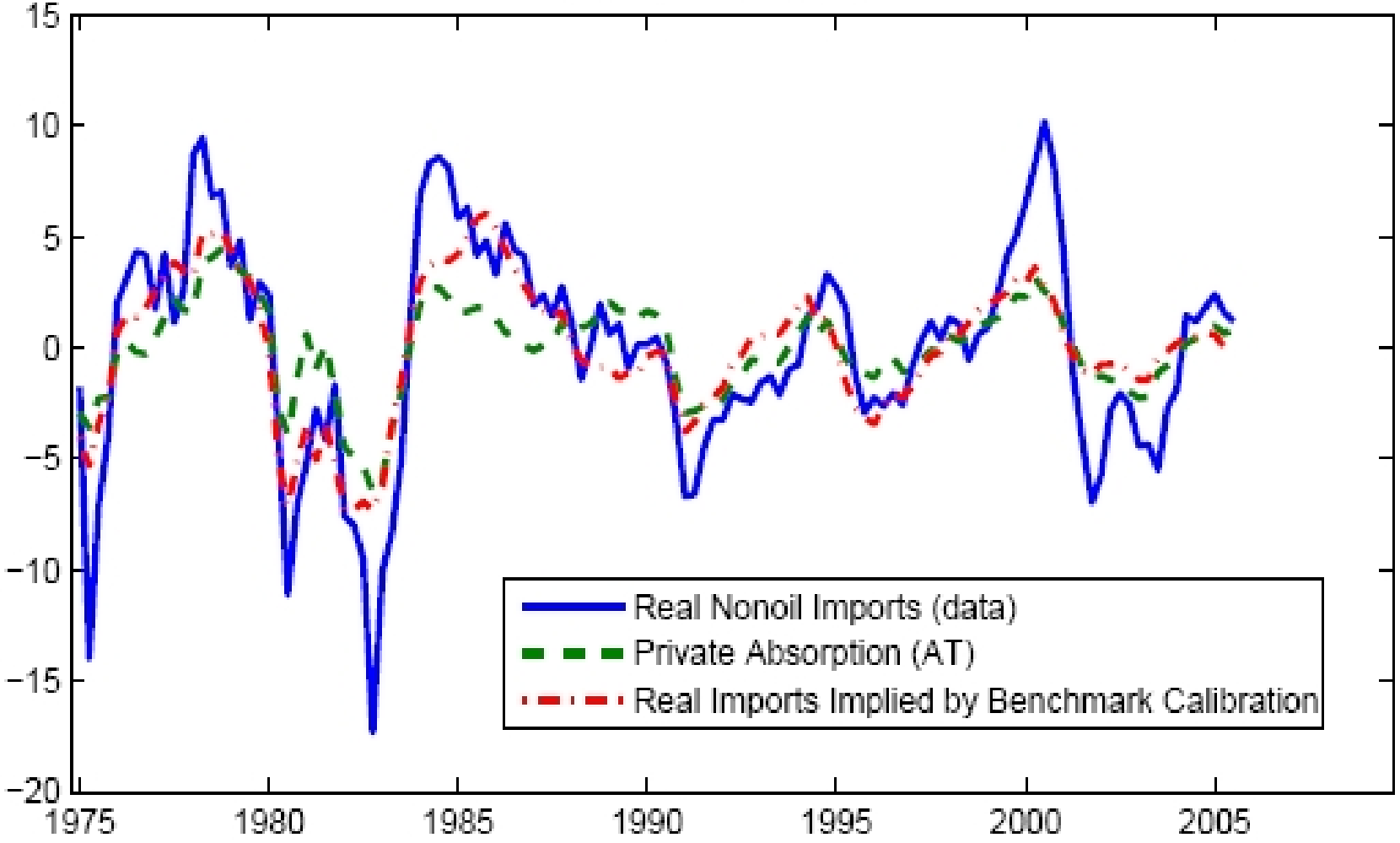
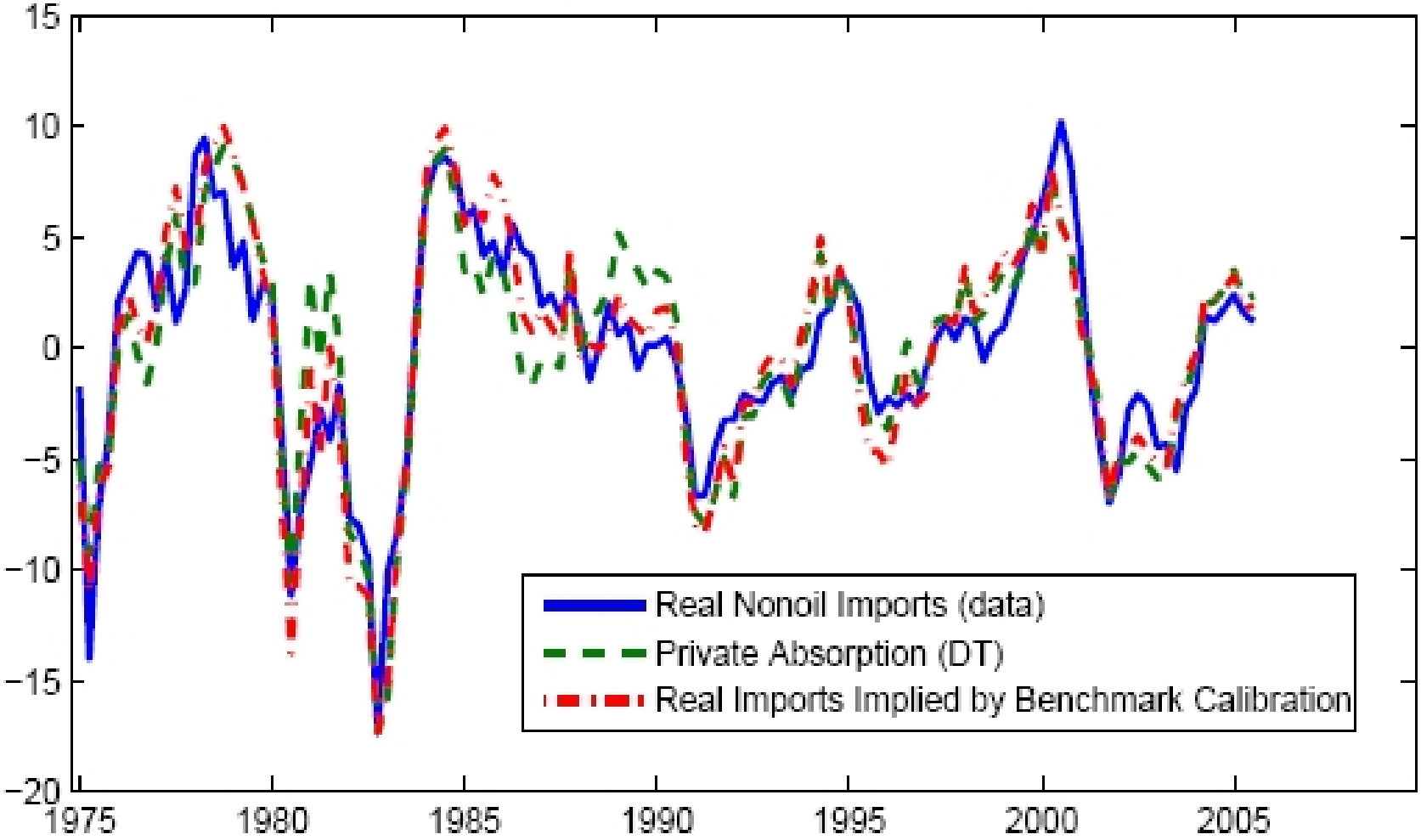


Figure 1B: DT Specification



Impulse response comparison between AT and DT.

- $\uparrow I^* \Longrightarrow \uparrow X$ (exports), $\uparrow (r^* - r)$, $\uparrow e$, $\uparrow r \Longrightarrow \downarrow C, I, M$ (imports)

- DT creates more volatility in quantities than AT because I^* has higher weight.

- C^* shock is qualitatively same as I^* shock. But now AT has more volatility because consumption has higher weight.

Unanswered questions

- A lot of friction. What does each achieve?
  - Calvo rule for firms.
  - Calvo rule for households.
  - Capital adjustment costs. To keep investment volatility down?
  - Exogenous risk premium.
  - Liquidity constrained consumers. To raise consumption volatility?
  - Habit persistence. (Trade and exchange rate dynamics?)

- Import adjustment cost. Lowers elasticity of substitution?
  - Recent estimates of elasticity of substitution are relatively high (5-10).
  - Texas oil vs. Saudi Arabian oil? No. Florida oranges vs. Mexican oranges? No. Chrysler vs. Toyota? No. Dell vs. Lenovo? No.
  - Boeing vs. Airbus? Maybe

- Earlier paper tries to match to FRB/Global?

- Does the model match volatility in the data?
  - Does it capture business cycle properties of the data? Especially for the current account and real exchange rate.

- Exchange rate response seems to differ from more conventional models. Is this closer to the data?

- Why SIGMA?
  - Stochastic International Generalequilibrium Modelling Analysis?
  - σ for permanent/transitory uncertainty?
  - Quicksand or Molassas.

Conclusions

Conclusion: In this paper, we have used simulations of an SDGE model to show that taking account of the expenditure composition of U.S. trade yields implications for the responses of trade flows to shocks that are markedly different from those of a standard" framework that abstracts from such compositional differences. Overall, our preferred trade specification implies that investment shocks, originating from either foreign or domestic sources, may serve as a strong catalyst for trade balance adjustment; and moreover, such adjustment may be consistent with a fairly stable real exchange value of the dollar.