

Tariffs and Trade Deficits

by Lorenzo Caliendo, Samuel S. Kortum, Fernando Parro

Discussion by: Fabrizio Perri
Federal Reserve Bank of Minneapolis
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How do tariffs impact trade deficits?

- Very relevant and important question, as recent increase in U.S. tariffs motivated by large and persistent U.S. trade deficit
- Classic question in the macro literature: Mundell (1961), Svensson and Razin (1983), and a veritable explosion of papers after the recent revival of tariffs
- Less explored in the trade literature, where trade deficits are either not there (static models) or exogenous (Deckle et al. 2007)

The contribution

- Write down a dynamic version of a standard Eaton Kortum trade model with tariffs and
 - Complete Markets
 - Fixed capital
- Since model is dynamic c_{it} generically different from y_{it} so trade deficits endogenously determined
- Complete markets and fixed capital assumption implies solution is a sequence of static trade problems: can use exact hat-algebra trick (from static trade models) to solve for equilibria and counterfactuals

Results and intuition

- Tariffs reduce trade deficits
- How much? in proportion to appreciation of the real exchange rate!
- Why?
- Tariffs have a small effect on real gdp y , and appreciate real exchange rate $e \downarrow$ (trade block)
- CM (with log utility) imply the famous Backus Smith condition (risk sharing block)
-

$$\underbrace{\frac{1}{c}}_{\text{Value of resources home}} = \underbrace{\frac{1}{c^* e}}_{\text{Value of resources abroad}}$$

which implies that when $e \downarrow$ also $c \downarrow$

- Since y stable and $c \downarrow$ trade deficit $c - y$ falls!

Discussion outline

- What happens with **variable capital/investment** and **incomplete markets (IM)**?
- Use a simple macro/trade model, based on Perri(2025) extension of Backus, Kehoe Kydland(1994)
 - Model nests CKP, and easy to introduce incomplete markets and capital/investment
- With IM and Investment exact hat-algebra technique no longer applies (model is truly dynamic), still easy enough to solve for counterfactuals
- Additional effects of tariffs on trade deficits due to:
 - Wealth effects
 - Investment dynamics
- Corollary: role of persistence of tariffs in CKM and in alternative set-up

Sketch of the framework

- Extends standard Armington set-up, to allow for production of both import and export competing goods, a bit more trade structure than BKK
- Two countries: $*$ denotes foreign
- One final good per country F and F^* , each used for consumption and (possibly) investment
- Finals produced using a Cobb Douglas composite of intermediates: G_a , G_b , and G_a^* , G_b^*
- Each intermediate produced using CES (high elasticity) using varieties from each country
- Home more productive in a variety, Foreign in b variety

Production

▸ Varieties

$$y_a = e^{z+\gamma} k_a^\alpha l_a^{1-\alpha} = x_a + d_a$$

$$y_b = e^z k_b^\alpha l_b^{1-\alpha} = x_b + d_b$$

$$y_{a^*} = e^{z^*} k_{a^*}^\alpha l_{a^*}^{1-\alpha} = x_{a^*} + d_{a^*}$$

$$y_{b^*} = e^{z^*+\gamma} k_{b^*}^\alpha l_{b^*}^{1-\alpha} = x_{b^*} + d_{b^*}$$

▸ Final domestic good

$$\begin{aligned} \max_{d_a, t, x_{a^*}, d_b, x_{b^*}} \quad & F - d_a \chi_a - d_b \chi_b - (1 + \tau) (x_{a^*} \chi_{a^*} - x_{b^*} \chi_{b^*}) \\ \text{s.t.} \quad & \end{aligned}$$

$$F = (G(d_a, x_{a^*}))^\theta (G(d_b, x_{b^*}))^{1-\theta}$$

▸ Home tariffs τ induce more home production of variety b which is relatively less efficient

Preferences, tariffs and market structure

▷ Preferences

$$\max_{c_t, l_{a,t}, l_{b,t}} \mathbb{E} \sum_{t=0}^{\infty} \beta^t \left[\log(c_t) - (l_{a,t} + l_{b,t})^2 \right]$$

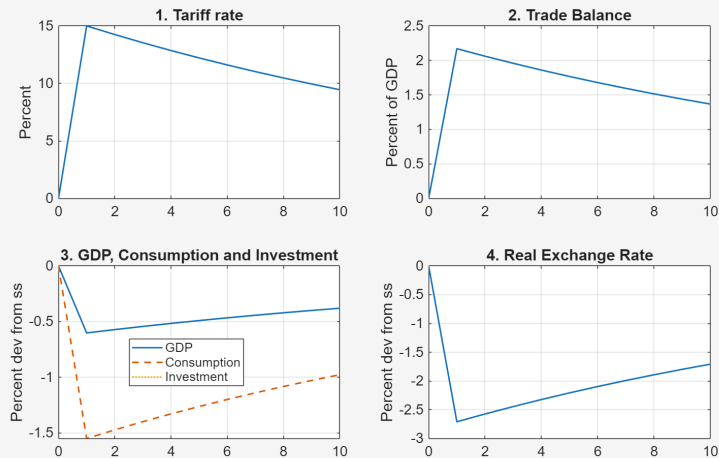
▷ Tariffs

$$\tau_t = \rho \tau_{t-1} + \epsilon_t$$

▷ Market Structure

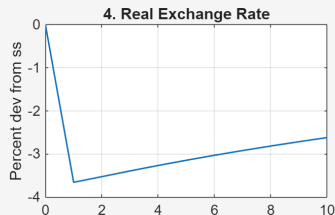
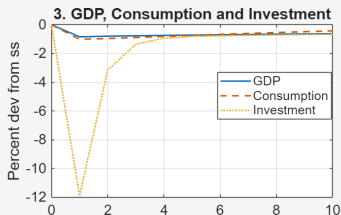
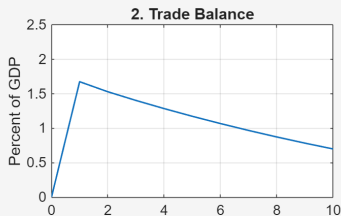
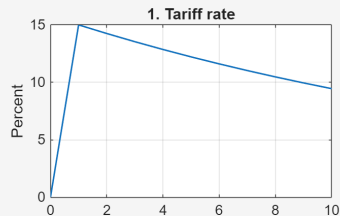
		Capital	
		Variable with investment	Fixed
International mkts	IM (bond only)	CKP+IM+Investment	
	CM		CKP

CKP: CM and fixed capital



- ▷ Increase in tariffs causes small drop in real gdp (loss of efficiency), large e appreciation
- ▷ CM implies that with high tariffs home transfers resources to foreign: large drop in home consumption
- ▷ Increase in trade surplus
- ▷ No impact on investment (by construction)

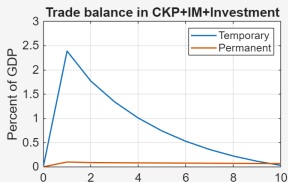
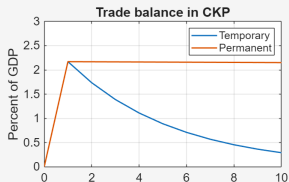
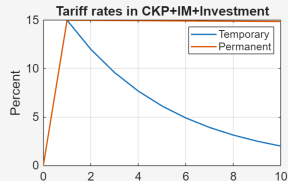
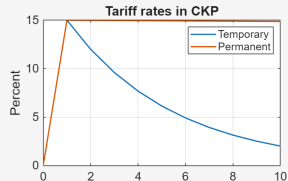
CKP+ IM and standard capital



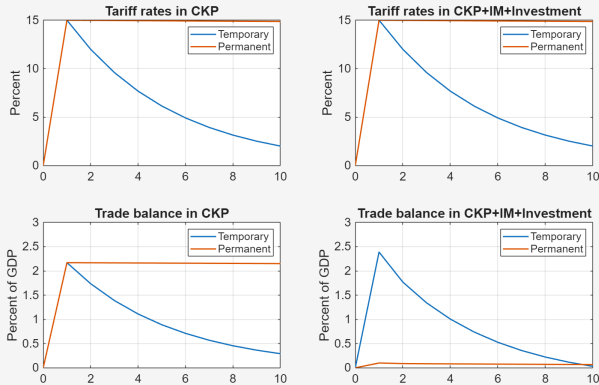
- ▷ Increase in trade surplus now a bit smaller
- ▷ Two offsetting effects:
 - ▷ IM: lower drop in home consumption, as no transfers prescribed by asset markets: smaller impact on trade surplus
 - ▷ Investment: large drop as tariffs reduce home efficiency: bigger impact on trade surplus
- ▷ Overall: trade surplus response to tariffs with investment and IM similar to CKP, but significant change in composition and origin

Persistence of tariffs

- ▷ In CKP (left) permanent and temporary tariffs same exact large impact on trade balance!
- ▷ Solution is static (not myopic): CM allows state-contingent transfers, enables exact hat-algebra trick



Persistence of tariffs



- ▶ In CKP (left) permanent and temporary tariffs same exact large impact on trade balance!
- ▶ Solution is static (not myopic): CM allows state-contingent transfers, enables exact hat-algebra trick
- ▶ With IM (right) permanent/temporary tariffs very different impact!
- ▶ Permanent tariff increases home current and permanent income: consumption follows y , small impact on trade balance ($\neq$ CM)
- ▶ Temp. tariff increases current but not permanent income: smoothed through saving, large impact on TB ($\simeq$ CM)
- ▶ With IM can't use exact hat-algebra, but economics more appealing!

Conclusions

- ▷ Great paper:
 - ▷ Brings together state of the art trade block with intertemporal macro block
 - ▷ Use the two blocks to analyze a very topical policy question
- ▷ Looking forward:
 - ▷ International macro has long ago established that IM and investment crucial to better understand trade balance dynamics
 - ▷ Introducing those elements in CKP has a cost in terms of analytical tractability, but has benefits in terms of economic insights