Discussion of

# International Risk Sharing and the Transmission of Productivity Shocks

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## OUTLINE

The framework

The objective

The key element

Challenges

THE FRAMEWORK (Minimal)

Two countries, two goods IRBC models

- $A = a + a^*,\ B = b + b^*$

- $c = G(a, b),\ c^* = G(b^*, a^*)$

$$G(a, b) = \left(\omega^{\frac{1}{\sigma}} a^{\frac{\sigma-1}{\sigma}} + (1-\omega)^{\frac{1}{\sigma}} b^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}}$$

$\sigma$ is the elasticity of subst. btwn $a$ and $b$

$\omega$ is the share of dom. prod. goods.

Relative prices

TOT (p. of $b$ in terms of $a$) $p = \left(\frac{1-\omega}{\omega}\right)^{\frac{1}{\sigma}} \left(\frac{a}{b}\right)^{\frac{1}{\sigma}}$

RER (p. of $c^*$ in terms of $c$) $rx = \frac{G_a(s^t)}{G_{a^*}(s^t)} \approx (2\omega - 1)p$ (under LOP)

Challenges for standard IRBC models are:

1) Obtain a volatile $rx$ and

2) Low or negative correlation between $rx(s^t)$ and $\frac{c(s^t)}{c^*(s^t)}$ (disconnect)

<u>OBJECTIVE</u>

Can low elasticity and incomplete markets solve these puzzles?

*Low elasticity*

$$p = \left(\frac{1-\omega}{\omega}\right)^{\frac{1}{\sigma}} \left(\frac{a}{b}\right)^{\frac{1}{\sigma}}$$

Productivity shocks $A \uparrow$ increase $\left(\frac{a}{b}\right)$ so if $\sigma$ is large, fluctuations in $p$ (and $rx$) are large (If compositional risk cannot be perfectly insured!)

*Imperfect Risk Sharing*

Define $\lambda(s^t) = G_a(s^t)u_c(s^t)$

$$\lambda^*(s^t) = G_{a^*}(s^t)u_{c^*}(s^t)$$

The marginal value of $a$ in state $s^t$ in cty 1 and cty 2.

If (w.m.l.o.g.) $u(c) = \frac{c^{1-\gamma}}{1-\gamma}$

$$\frac{\lambda(s^t)}{\lambda^*(s^t)} = \frac{G_a(s^t)}{G_{a^*}(s^t)}\left(\frac{c(s^t)}{c^*(s^t)}\right)^{-\gamma} = rx(s^t)\left(\frac{c(s^t)}{c^*(s^t)}\right)^{-\gamma}$$

Define

$$\frac{\lambda(s^t)}{\lambda^*(s^t)} = rw(s^t)$$

$rw(s^t)$ is relative wealth fluctuations.

$$rx(s^t) = rw(s^t)\left(\frac{c(s^t)}{c^*(s^t)}\right)^{\gamma}$$

Example

C.M. model $rw(s^t) = \kappa$

$$rx(s^t) = \kappa \left( \frac{c(s^t)}{c^*(s^t)} \right)^\gamma$$

Possible to obtain high volatility with high $\gamma$, impossible to obtain disconnect.

If $rw(s^t)$ fluctuates potential for disconnect.

KEY ELEMENTS

IM and Elasticity

*Case 1.* High elasticity ($\sigma > 1$)

$A \uparrow$ makes $p \uparrow$, $rx \uparrow$( $a$ is cheaper but not much since $\sigma$ is large). Since $\sigma > 1$ relative income of C1 goes up, and from IM $\frac{c(s^t)}{c^*(s^t)} \uparrow$. No disconnect, no volatility.

*Case 2.* Low elasticity ($\sigma^* < \sigma < 1$)

$A \uparrow \Rightarrow rx \uparrow\uparrow$( $a$ is a lot cheaper since $\sigma$ is low). Since $\sigma < 1$ relative income of C1 goes down and, from IM, $\frac{c(s^t)}{c^*(s^t)} \downarrow$ . Potential volatility and disconnect (requires extra bit of work) BUT..

CDL provides conditional evidence that $A \uparrow$ are associated with $\frac{c(s^t)}{c^*(s^t)} \uparrow$ and with $rx \downarrow\downarrow$

*Solution?*

Case 3. Very low elasticity ($\sigma < \sigma^* < 1$)

When the elasticity is very low $A \uparrow \Rightarrow rx \downarrow\downarrow$ ( $a$ gets much more expensive).

Counterintuitive..

With very low elasticity to convince people to use the extra $A$ need very large decline in prices.

..but right!

Combination of unconventionally sloped demand curve (higher prices, higher demand) and GE effect

*Unconvent. sloped world demand*

World demand for $A$

$$a(p) \approx \omega p^{\sigma-1}$$

$a$ is declining in $p$ (income effect and substitution effect have same sign but IE dominates) and price has the largest impact with $\sigma = 0$ (no subst. effect)

$$a^*(p) \approx (1-\omega)p^{\sigma+1}$$

$a^*$ is increasing in $p$ (income and substitution have the same sign) and price has the smallest impact with $\sigma = 0$

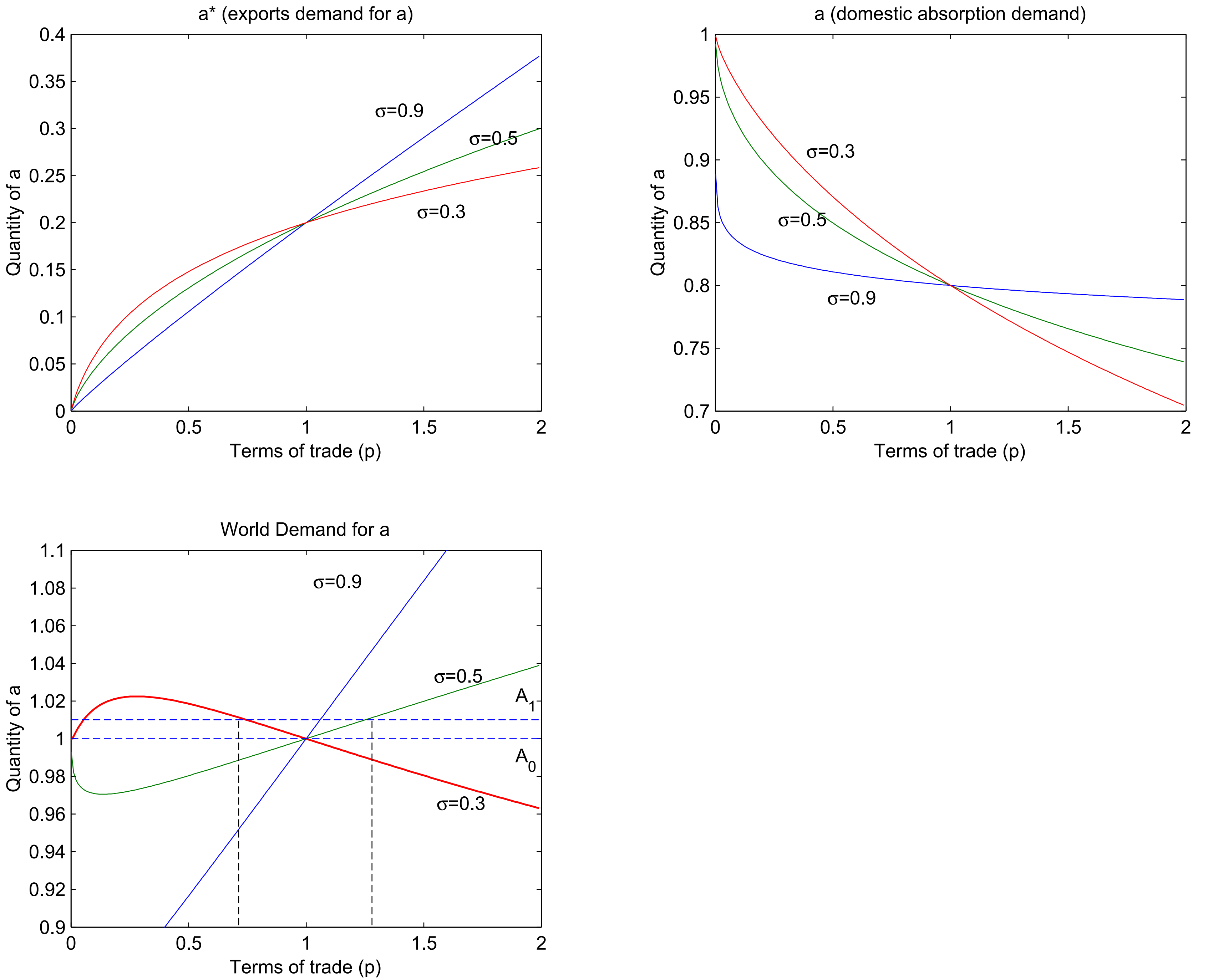
Since $\omega > (1-\omega)$ (Real home bias) there exists a $\sigma$ *low enough* for which world demand for $a$ is declining in $p$.

In this case market clearing for $a$

$$A = a(p) + a^*(p)$$

implies that $A \uparrow \Rightarrow rx \downarrow\downarrow$

More likely to happen for closed countries (High $\omega$)



a* (exports demand for a)
Quantity of a
Terms of trade (p)
σ=0.9
σ=0.5
σ=0.3
a (domestic absorption demand)
Quantity of a
Terms of trade (p)
σ=0.3
σ=0.5
σ=0.9
World Demand for a
Quantity of a
Terms of trade (p)
σ=0.9
σ=0.5
σ=0.3
A1
A0

*Intuition*

Why when american tradables are cheaper there is less world demand for them?

American tradables are mainly demanded by Americans and provide income to the Americans

Them being cheaper reduce income of Americans so much that their world demand is reduced.

A positive productivity shock to american goods requires their prices to go up as this is the only way to generate the demand for the additional american goods.

CHALLENGES

The very low $\sigma$ case consistent with $rx$ disconnect, volatility and conditional correlation of TFP with $\frac{c(s^t)}{c^*(s^t)}, rx$.

High praise to CDL (new and interesting result)!

..BUT..

How about cross country correlation of tradables sectors? (see Heathcote and Perri 2002)

If $A \uparrow$ implies $p \downarrow$ then productivity shocks greatly increase incentive to production at home and greatly reduce it abroad..Potential for very negative correlations

| | Corr(c,c*) | Corr(y,y*) | Corr(n,n*) | Corr(x,x*) |
|---|---|---|---|---|
| $\sigma = 0.5$ | 0.70 | 0.77 | 0.67 | 0.68 |
| $\sigma = 0.3$ | 0.01 | -0.72 | -0.91 | -0.90 |