Uniform versus Non-Uniform Globalization: *A Framework for Thinking About Welfare Effects of IT-Driven Globalization*

By Kiminori Matsuyama

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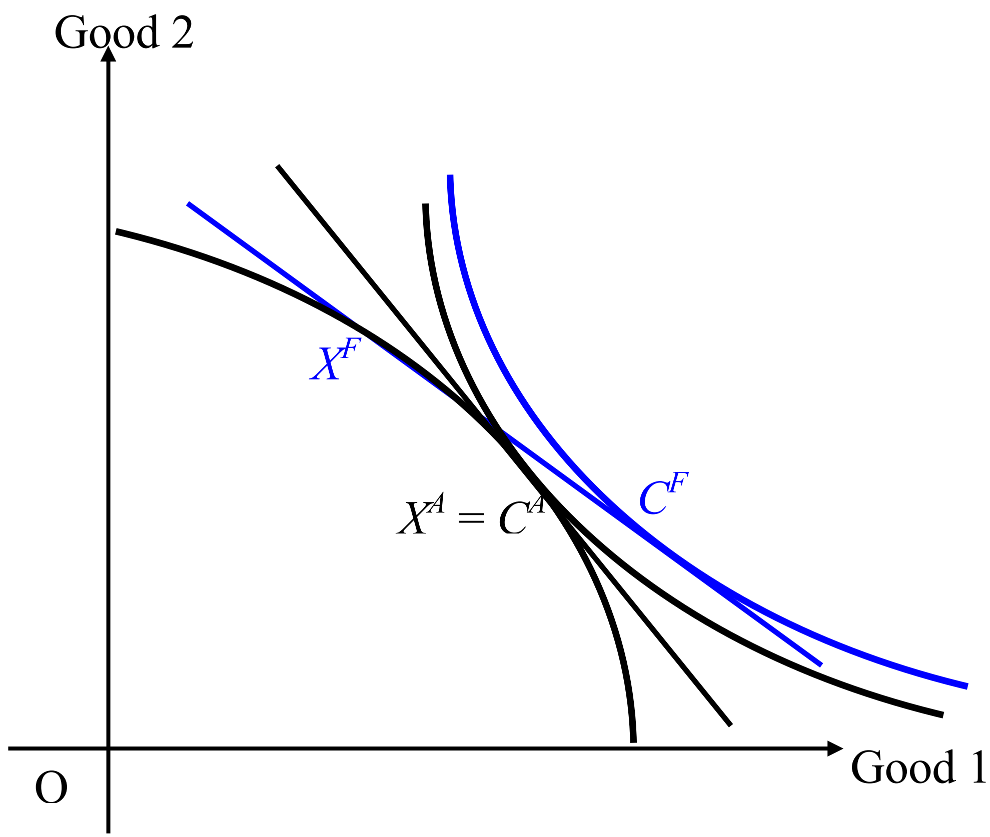
Motivation:

- Most mainstream, academic economists seem to have a rosy view of globalization.
- Their view is based on the standard result on ***Gains from Trade***, which may be captured by this simple diagram that we teach to every undergraduate in the Introductory Economics.



However,

- This logic is misleading and inappropriate for thinking about welfare implications of globalization, particularly when it is driven by IT revolution, at least for ***Three Reasons.***

First, the argument for Gains from Trade relies on the standard set of the neoclassical assumptions. Dropping some of these can overturn the result. (I won't spend any more time discussing this often-forgotten-but-well-understood point.)

Second, the argument for Gains from Trade is widely misinterpreted.

- It says, "*Starting from Autarky*, trade benefits all the countries involved."
- It does *NOT* say, "*Freer* trade brings *more* benefits to all the countries that already trade with each other."

Hence, it says little about the costs and benefits of further liberalization of trade, caused by improvement in information and communication technologies.

Third, the process of globalization is far from uniform across sectors, across goods and services, and across types of activities. For example, in the past three decades, the cost of traveling (shipping people) or shipping majority of goods have declined little, but the cost of communication (i.e., shipping information) has gone down from nearly prohibitive to nearly zero.

In short, there is no widely accepted conceptual framework for thinking about the welfare implications of uneven globalization caused by the recent advances in information and communication technologies.

***My Proposed Framework*:**

Two Countries; Home and Foreign (*)

One Factor of Production; called Labor, L (L^*)

A Continuum of Goods: $z \in [0,1]$.

Households: L (L^*) households at Home (Foreign). Each household supplies one unit of labor and earns the wage income, w (w^*). They share the symmetric Cobb-Douglas preferences over a continuum of goods, $z \in [0,1]$, defined by

$$\text{Max } \log U = \int_0^1 \log[c(z)]dz, \quad \text{subject to } \int_0^1 p(z)c(z)dz \leq w$$

$$\text{Max } \log U^* = \int_0^1 \log[c^*(z)]dz, \text{ subject to } \int_0^1 p^*(z)c^*(z)dz \leq w^*$$

Indirect Utility: $\log U = \int_0^1 \log[w/p(z)]dz \qquad \log U^* = \int_0^1 \log[w^*/p^*(z)]dz$

Home and Foreign differ in the productivities of labor.

Unit Labor Requirement; $a(z)$, $a^*(z)$. Define $A(z) \equiv a^*(z)/a(z)$.

Goods are divided into Tradeables and Nontradeables

F(A) ≡ G(A) + H(A); the measure of the goods with A(z) ≤ A.

G(A): the measure of the tradeable goods with A(z) ≤ A.

H(A): the measure of the nontradeable goods with A(z) ≤ A.

Question: What are the welfare impacts of globalization, which turns some nontradeables into tradeable?

Autarky Equilibriums:

$$\mathrm{p}(\mathrm{z}) = a(z)w \quad \text{for all z} \quad \rightarrow \quad \log U^A = -\int_0^1 \log[a(z)]dz$$

$$\mathrm{p}^*(\mathrm{z}) = a^*(z)w^* \quad \text{for all z} \quad \rightarrow \quad \log U^{*A} = -\int_0^1 \log[a^*(z)]dz$$

Trade Equilibrium: Define $\omega \equiv w/w^*$, the relative wage, or called the terms of trade

- Home imports all the tradeables such that $a(z)w > a^*(z)w^*$, i.e., $A(z) < \omega$. Thus, the Home expenditure on Foreign goods is equal to $G(\omega)wL$.
- Foreign imports all the tradeables such that $a(z)w < a^*(z)w^*$, i.e., $A(z) > \omega$. Thus, the Foreign expenditure on Home goods is equal to $[G(\infty)-G(\omega)]w^*L^*$.

Hence, the equilibrium condition implies $G(\omega)wL = [G(\infty)-G(\omega)]w^*L^*$, or

(BT) $$\frac{\omega L}{L^*} = \frac{G(\infty) - G(\omega)}{G(\omega)}.$$

More generally, if we allow G to have mass points,

(BT): $$\frac{G(\infty) - G\_(\omega)}{G\_(\omega)} \geq \frac{\omega L}{L^*} \geq \frac{G(\infty) - G(\omega)}{G(\omega)}$$

Given $G(\bullet)$, (BT) determines the equilibrium terms of trade, $\omega \equiv w/w^*$.

Measuring the Gains from Trade:

$$\Delta \log U \equiv \log(U/U^A) = \int_0^1 \log\left(\frac{a(z)w}{p(z)}\right)dz\,;\ \Delta \log U^* \equiv \log(U^*/U^{*A}) = \int_0^1 \log\left(\frac{a^*(z)w^*}{p^*(z)}\right)dz$$

If z is tradeable <u>and</u> $\omega > A(z)$, $p(z) = a^*(z)w^*$. Otherwise, $p(z) = a(z)w$.

$$\rightarrow \quad \Delta \log U = \int_0^{\omega} \log[\omega/A]dG(A) > 0.$$

Likewise,

$$\Delta \log U^* = \int_{\omega}^{\infty} \log[A/\omega]dG(A) > 0.$$

Uniform Globalization: A higher γ, where $G(A) = \gamma F(A)$ and $H(A) = (1-\gamma)F(A)$.

(BT): $$\frac{G(\infty)-G_{-}(\omega)}{G_{-}(\omega)} \geq \frac{\omega L}{L^*} \geq \frac{G(\infty)-G(\omega)}{G(\omega)}$$

and hence ω are independent of γ. Therefore,

$$\Delta \log U = \gamma \int_0^{\omega} \log[\omega/A] dF(A); \qquad \Delta \log U^* = \gamma \int_{\omega}^{\infty} \log[A/\omega] dF(A)$$

are both increasing in γ.

In this case, the newly tradeables do not affect the patterns of comparative advantage, and hence the globalization does not affect the terms of trade, and improves the welfare of both countries.

What if globalization is non-uniform?

Non-Uniform Globalization: A Two-Sector Example

Unit labor requirement takes only two values; $A_1 = a^*_1/a_1 > a^*_2/a_2 = A_2$. Home (Foreign) has comparative advantage in Sector 1 (Sector 2).

- $A(z) = A_1$ for α_1 fraction of the goods, of which γ_1 fraction is tradeable.
- $A(z) = A_2$ for $\alpha_2 = 1-\alpha_1$ fraction of the goods, of which γ_2 fraction is tradeable.

If $A_1 > \omega > A_2$, Home exports $100\gamma_1$% of Good 1; Foreign exports $100\gamma_2$% of Good 2.

$$\rightarrow \quad \gamma_2\alpha_2 wL = \gamma_1\alpha_1 w^* L^* \rightarrow \quad A_1 > \omega = \frac{\gamma_1\alpha_1}{\gamma_2\alpha_2}\frac{L^*}{L} > A_2$$

$$\rightarrow \quad \Delta\log U = \gamma_2\alpha_2 \log\left(\frac{\omega}{A_2}\right) = \gamma_2\alpha_2 \log\Gamma\left(\frac{\gamma_1}{\gamma_2}\right) > 0, \text{ where } \Gamma \equiv \frac{1}{A_2}\frac{\alpha_1}{\alpha_2}\frac{L^*}{L}.$$

$$\Delta\log U^* = \gamma_1\alpha_1 \log\left(\frac{A_1}{\omega}\right) = \gamma_1\alpha_1 \log\Gamma^*\left(\frac{\gamma_2}{\gamma_1}\right) > 0, \text{ where } \Gamma^* \equiv A_1\frac{\alpha_2}{\alpha_1}\frac{L}{L^*}.$$

If $\frac{\gamma_1\alpha_1}{\gamma_2\alpha_2}\frac{L^*}{L} \geq A_1 \rightarrow A_1 = \omega > A_2 \rightarrow \Delta\log U = \gamma_2\alpha_2 \log\left(\frac{A_1}{A_2}\right) > 0$ & $\Delta\log U^* = 0$.

If $\frac{\gamma_1\alpha_1}{\gamma_2\alpha_2}\frac{L^*}{L} \leq A_2 \rightarrow A_2 = \omega < A_1 \rightarrow \Delta\log U = 0$ & $\Delta\log U^* = \gamma_1\alpha_1 \log\left(\frac{A_1}{A_2}\right) > 0$.

Let $1/\Gamma^* < \gamma_2/\gamma_1 < \Gamma$, so that

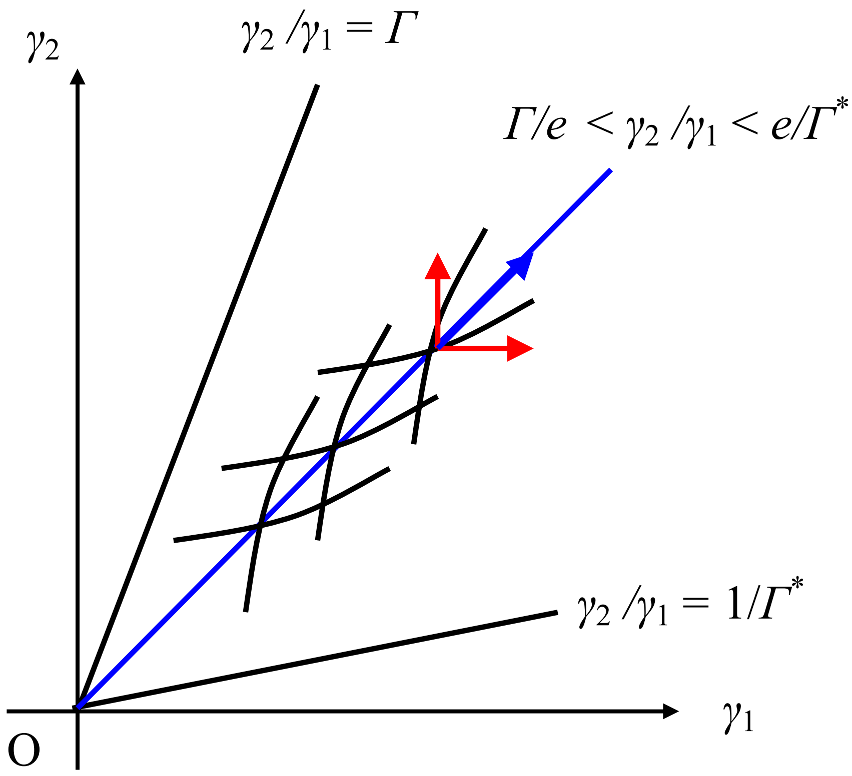
$$\Delta \log U(\gamma_1, \gamma_2) \equiv \alpha_2\gamma_2 \log\Gamma\left(\frac{\gamma_1}{\gamma_2}\right) > 0; \qquad \Delta \log U^*(\gamma_1, \gamma_2) \equiv \alpha_1\gamma_1 \log\Gamma^*\left(\frac{\gamma_2}{\gamma_1}\right) > 0.$$

Clearly, both countries gain from a uniform globalization (a proportional increase in γ_1 and γ_2).

However,

- Home always gains from a globalization in Sector 1 (i.e., a higher γ_1).
- Home *loses* from a globalization in Sector 2 (i.e., a higher γ_2), if $\mathrm{Max}\{1/\Gamma^*, \Gamma/e\} < \gamma_2/\gamma_1 < \Gamma$.

Intuition: Home's terms of trade, *ω,* deteriorates enough to offset the benefits of increased trading opportunities.



Likewise,

- Foreign always gains from a globalization in Sector 2 (a higher γ_2).
- Foreign *loses* from a globalization in Sector 1 (a higher γ_1), if $1/\Gamma^* < \gamma_2/\gamma_1 < \mathrm{Min}\{\Gamma, e/\Gamma^*\}$.

Non-Uniform Globalization: A Continuum Case

- $z \in [0, k)$ are all originally tradeables, for which $A(z)$ is strictly decreasing, so that, given $A(m) = w/w^*$, Home produces all $z \in [0, m)$ and Foreign produces all $z \in [m, k)$.
- $A(z)= A$ for all nontradeables, $z \in [k, 1]$, but a fraction g of these goods of these goods become newly tradeable at zero cost.

If $w/w^* > A$, all of the newly tradeables are produced at Foreign. Because Home produces all the originally tradable goods in $[0, m]$ for both countries and $(1-g)(1-k)$ fraction of the goods (those which remain nontradeable) locally,

$$wL = m(wL+w^*L^*) + (1-g)(1-k)wL \qquad \leftrightarrow \qquad \frac{w}{w^*} = \frac{m}{k+g(1-k)-m}\left[\frac{L^*}{L}\right]$$

If $w/w^* < A$, all of the newly tradeables are produced at Home. Because Home produces $m+g(1-k)$ fraction of the goods for both countries and $(1-g)(1-k)$ fraction of the goods locally,

$$wL = [m+g(1-k)](wL+w^*L^*)+(1-g)(1-k)wL \qquad \leftrightarrow \qquad \frac{w}{w^*} = \frac{m+g(1-k)}{k-m}\left[\frac{L^*}{L}\right].$$

Otherwise, $w/w^* = A$.

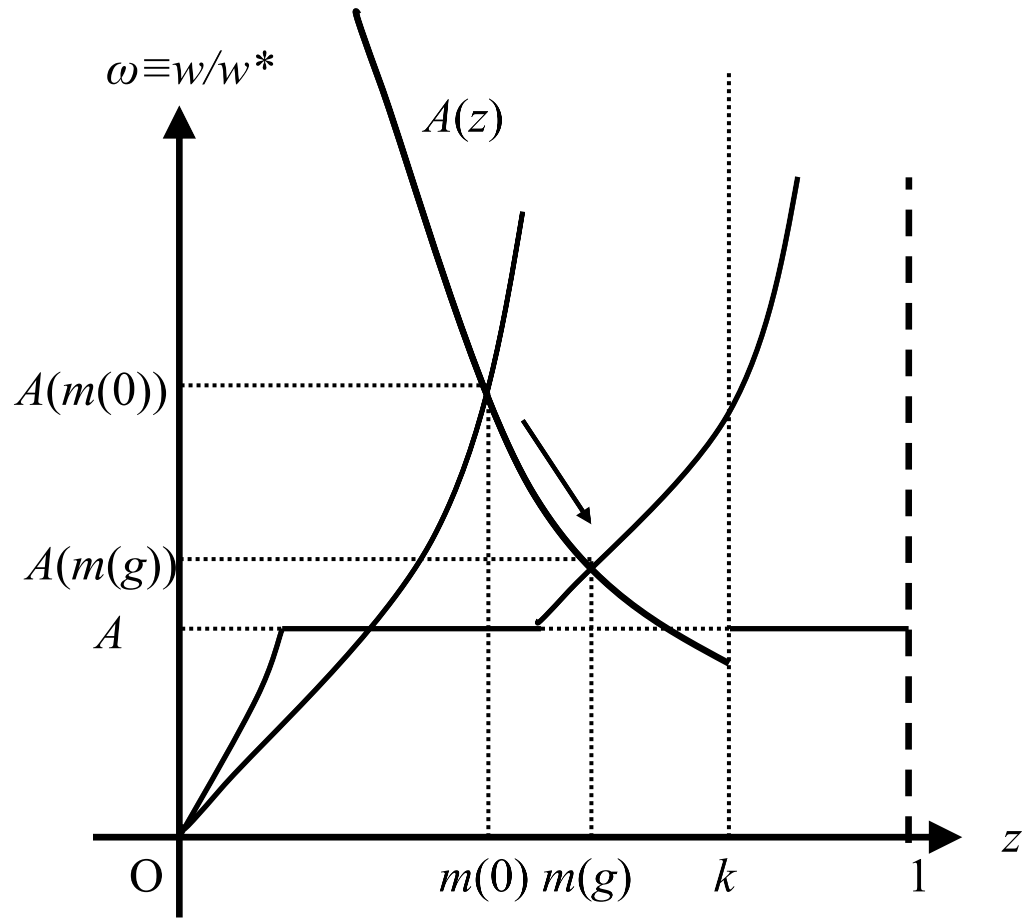
A higher g shifts the BT to the right above $w/w^* = A$ and to the left below $w/w^* = A$.

Suppose that, before globalization, $g = 0$, $\omega = A(m(0)) > A$.

The arrow indicates the shift caused by an increase in g.

When some nontraded sectors are opened up, Home stops producing the new tradeables and starts producing and exporting the goods in $(m(0), m(g)]$, which it previously imported.

ω declines from $A(m(0))$ to $A(m(g))$.



Home & Foreign Welfares:

$$\log U(g) = \int_{m(g)}^{k} \log\left[\frac{A(m(g))}{A(z)}\right] dz + g(1-k)\log\left[\frac{A(m(g))}{A}\right];$$

$$\log U^*(g) = m(g)\log\left[\frac{A}{A(m(g))}\right] + \int_{m(g)}^{k} \log\frac{A}{A(z)} dz - \log A,$$

with the normalization, $A(z) = a^*(z)/a(z) = a^*(z)$ for all $z \in [0,1]$.

A globalization (a higher g) affects the Home welfare through ***Two Effects***:

- **Positive Reallocation Effect:** Home labor moves to the sectors where they have higher relative efficiency, that is, from A to $A(m(g))$ or higher.

- **Negative Terms of Trade Effect:** $\omega = A(m(g))$, deteriorates.

The overall effect on Home welfare is generally ambiguous. However, if a higher g brings down $\omega = A(m(g))$ sufficiently close to A, the positive reallocation effect is dominated by the negative terms of trade effect, so that a further globalization harms the Home welfare.

Foreign always benefits from this type of globalization, as both effects operate positively.

Some Implications for Labor Service Offshoring