Empirical Evidence on Ricardian and Heckscher-Ohlin Models

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Law of comparative advantage

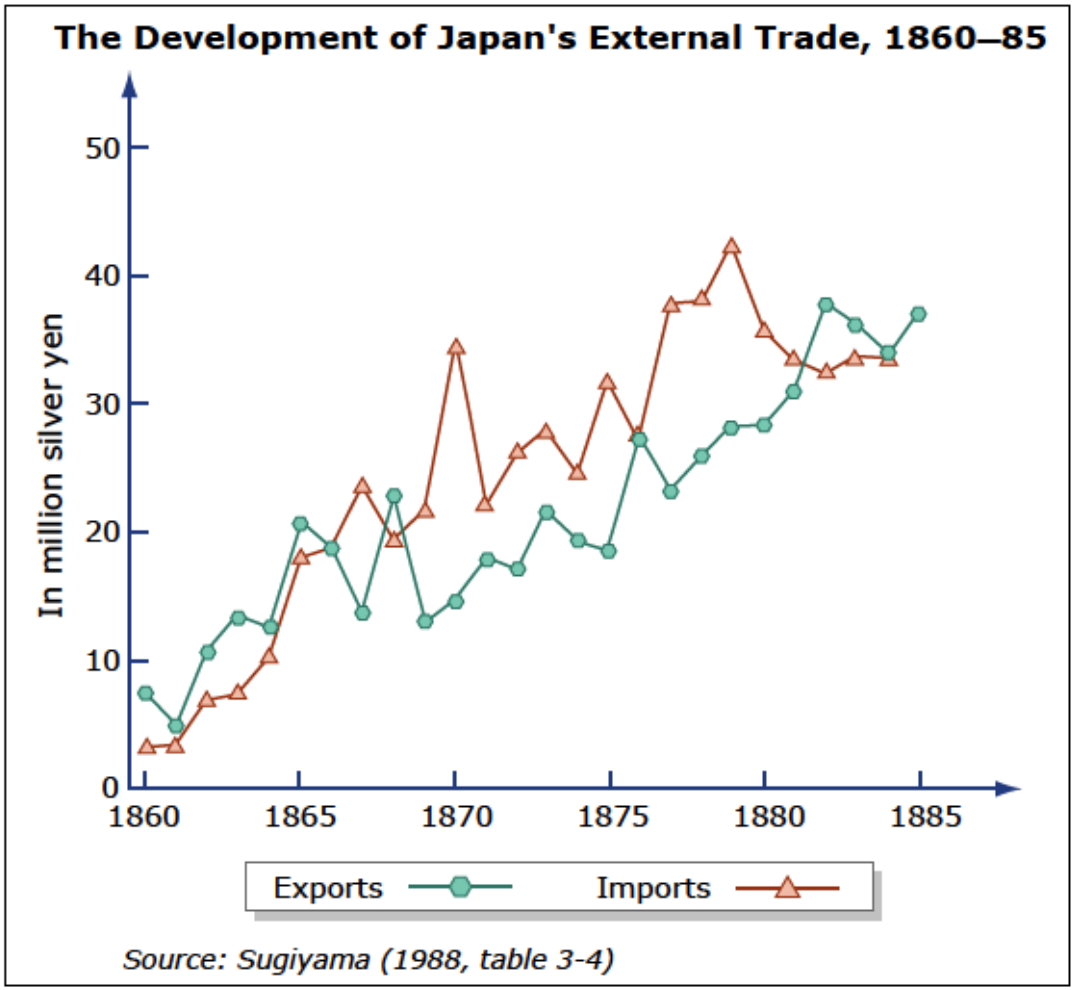
Law of comparative advantage Countries tend to export goods in which they have a CA, i.e. lower relative autarky prices compared to other countries

However, testing the principle of CA can be hard:

- in real world more than 2 countries or goods
- statement about trading behavior but is based on autarky prices that are usually not observed
- periods of autarky rarely observed
- complete specialization not observed

The case of Japan in XIX century

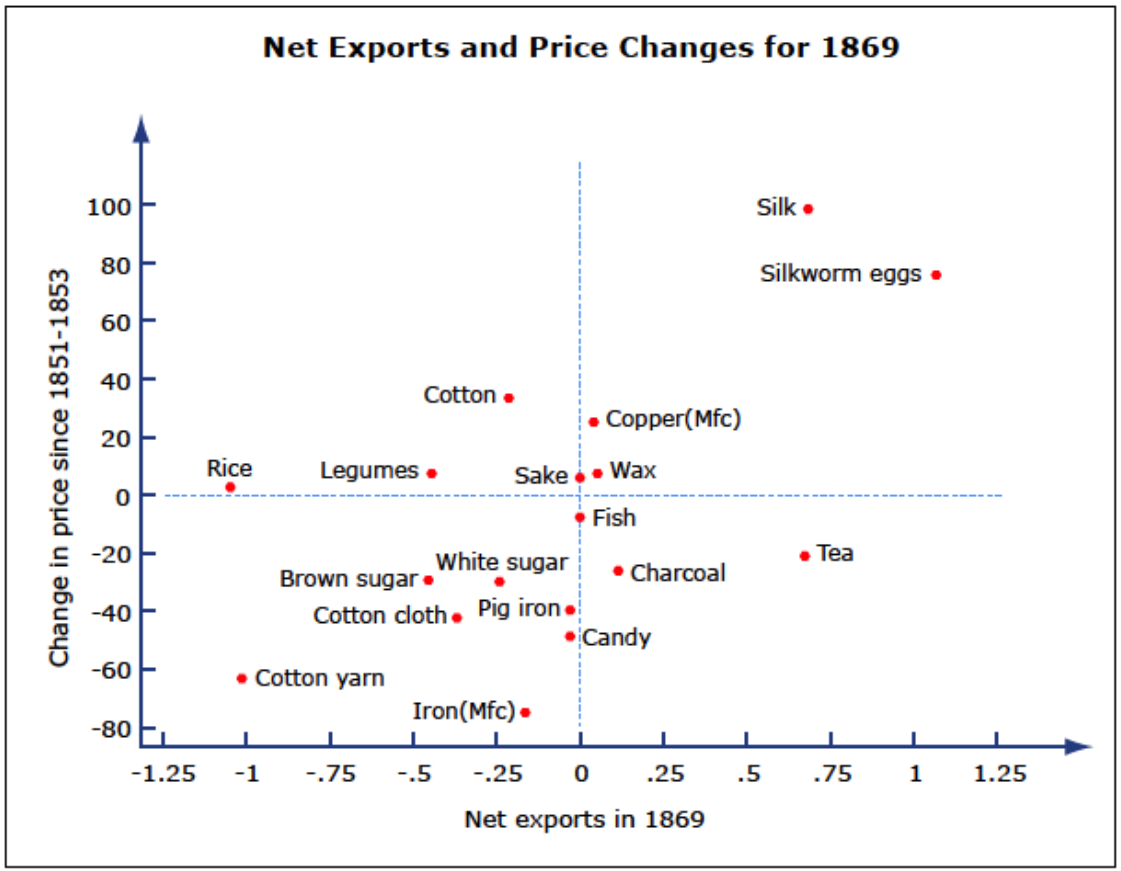
From Bernhofen and Brown (JPE, 2004)



The case of Japan in XIX century

Recall that Ricardian model predicts that a country exports the goods over which it has a comparative advantage:

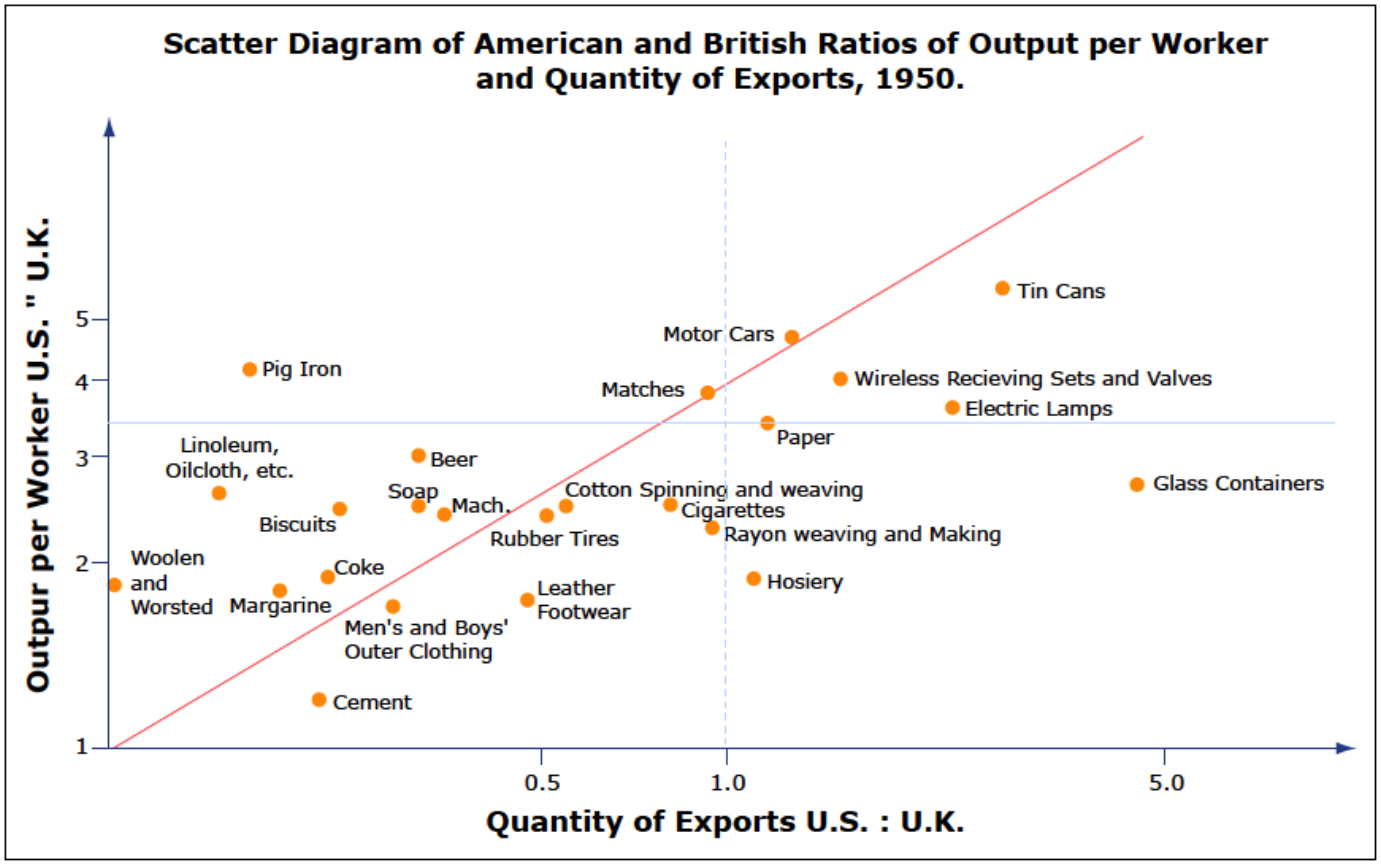
- change in prices of going from autarky to free-trade should be larger for sectors with larger CA, implying also greater exports



US - UK

From MacDougall (1951): each country will export those goods for which the ratio of its output per worker to that of the other country exceeds the ratio of its money wage rate to that of the other country:

$$w/w^* \leq z_i/z_i^*$$



Other examples

Golub and Hsieh (2000) extend previous work by running the following regression across industry k and country i:

$$\log\left(\frac{X^k_{US}}{X^k_{i\rightarrow US}}\right) = \alpha_1 + \beta_1 \log\left(\frac{z^k_{US}}{z^k_i}\right) + \epsilon^k_{1i}$$

$$\log\left(\frac{X^k_{US\rightarrow i}}{M^k_{US\leftarrow i}}\right) = \alpha_2 + \beta_2 \log\left(\frac{z^k_{US}}{z^k_i}\right) + \epsilon^k_{2i}$$

Results of Golub and Hsieh (2000) - I

Relative exports[1] and Relative Productivity[2], for 39 Manufacturing Sectors

		Unadjusted		ICP PPP		ICOP PPP	
	Period	β_{jk}	R^2	β_{jk}	R^2	β_{jk}	R^2
US–Japan	84–90	0.33 (3.03)[3]	0.22	0.31 (2.96)[3]	0.20	0.30 (2.80)[3]	0.18
US–Germany	77–91	0.18 (4.28)[3]	0.08	0.15 (3.55)[3]	0.07	0.15 (3.80)[3]	0.05
US–UK	79–91	0.09 (2.78)[3]	0.03	0.07 (2.45)[3]	0.02	0.23 (4.48)[3]	0.12
US–France	78–91	-0.19 (-3.50)[4]	0.03	-0.24 (-3.92)[4]	0.06	0.09 (1.96)[3]	0.03
US–Italy	78–91	0.36 (5.48)[3]	0.09	0.37 (6.25)[3]	0.13	—	—
US–Canada	72–90	0.21 (5.29)[3]	0.01	0.27 (6.26)[3]	0.04	—	—
US–Australia	81–91	0.16 (2.27)[3]	0.04	0.31 (3.52)[3]	0.10	—	—

Note: $\log(X_{ij}/X_{ik}) = \alpha_{jk_1} + \beta_{jk_1} \log(\alpha_{ik}/\alpha_{ij})_{-1} + \varepsilon_{ijk_1}$ estimated by seemingly unrelated regressions. t-statistics in parentheses, calculated from heteroskedasticity-consistent (White) standard errors.

[1] *Log of US divided by other country exports.*

[2] *Log of US relative to other productivity.*

[3] *The coefficient is significant at 1% level with the correct sign.*

[4] *The coefficient is significant at 1% level with incorrect sign.*

Results of Golub and Hsieh (2000) - II

Bilateral Trade Balances[1] and Relative Productivity[2], for 21 Manufacturing Sectors

		Unadjusted		ICP PPP		ICOP PPP	
	Period	b_{jk}	R^2	b_{jk}	R^2	b_{jk}	R^2
US-Japan	84-91	0.14 (2.07)[3]	0.09	0.20 (2.68)[3]	0.10	0.43 (2.99)[3]	0.25
US-Germany	77-90	0.46 (8.71)[3]	0.06	0.83 (17.03)[3]	0.11	0.07 (1.32)	0.05
US-UK	79-90	-0.08 (-2.93)[4]	0.03	-0.02 (-1.41)	0.02	-0.01 (-0.06)	0.02
US-France	78-90	-0.21 (-7.97)[4]	0.02	0.02 (0.52)	0.02	0.05 (2.70)[3]	0.02
US-Italy	79-89	0.26 (7.11)[3]	0.11	0.25 (7.55)[3]	0.01	—	—
US-Canada	72-89	0.41 (37.44)[3]	0.02	0.73 (77.15)[3]	0.01	—	—
US-Australia	81-91	0.72 (5.75)[3]	0.05	0.89 (7.13)[3]	0.10	—	—
US-Korea	72-90	-0.64 (-11.17)[4]	0.02	-0.12 (-6.71)[4]	0.02	0.93 (36.88)[3]	0.18
US-Mexico	80-90	0.46 (6.12)[3]	0.14	0.31 (4.21)[3]	0.10	0.56 (7.50)[3]	0.18

Note: $\log(X_{ijk}/M_{ijk}) = \alpha_{jk_3} + \beta_{jk_3} \log(a_{ik}/a_{ij})_{-1} + \varepsilon_{ijk_3}$ estimated by seemingly unrelated regressions. t-statistics in parentheses, based on heteroskedasticity-consistent (White) standard errors.

[1] Log of the ratio of bilateral exports to bilateral imports.

[2] Log of US relative to other productivity.

[3] The coefficient is significant at 1% level with the correct sign.

[4] The coefficient is significant at 1% level with incorrect sign.

Heckscher-Ohlin evidence

Empirical studies on the Heckscher-Ohlin model implications have found mixed results:

- the factor price equalization performs bad when compared with the data
- however, relaxing this assumption improves the predictability of the Heckscher-Ohlin

1. Leontief (1953) studied the empirical implications of the HO model:
   - Given that the US was the most capital abundant country, one should expect that its exports are capital intensive and imports labor intensive
   - He concluded exactly the opposite $\rightarrow$ Leontief paradox
2. Other authors, using extended versions of the model, also found poor results

Heckscher-Ohlin other evidence

Recall that FPE relies on three important assumptions

1. all countries have the same technology
2. there is no full specialization
3. there are no trading costs

In Trefler (1995), cross-country differences in technology was allowed $\rightarrow$ the model performed much better against the data
In Davis and Weinstein (2001) allowed for some countries to fully specialize in some sectors $\rightarrow$ the model performed much better against the data
In Romalis (2004) the no trading costs assumption is relaxed $\rightarrow$ the model performed much better against the data

Romalis (2004) evidence