Economics of Globalization

Sciences Po Saint-Germain-en-Laye

This week

- Why do countries trade?
- What are the theoretical gains and losses from trade?
- How all countries can gain from trade (*The establishment narrative*)?

China's industrial policy

The economist Barry Naughton, renowned guru of Chinese industrial policy, has described China as being engaged in 'the greatest single commitment of government resources to an industrial policy objective in history.' Other estimates as to the measurable cost of Chinese industrial policy have been made by the OECD, the CSIS, and the Kiel Institute. Ballpark — these come to around 1.5-2 per cent of GDP, or 4-5 times that of large OECD countries.

But China's industrial policy only makes sense if one also acknowledges its geopolitics too. Not to mince words, China's industrial policy is a state-backed effort to knock the United States off the perch of global technological leadership. Having missed out on the mechanisation, electrification and information revolutions, as the CCP narrative has it, China — following Marxist doctrine about the role of 'productive forces' — must now try to dominate the fourth industrial revolution. And this means new technologies including AI, big data, quantum computing and biotechnology. Unlike other nations that have used industrial policy to catch their rivals, China wants to leapfrog them.

What is a model?

- A model is not the real world, it is a simplified version of it.
  - All models are wrong but some are useful.
- It is an abstract construct that aims at understanding how things work.
- It (generally) isolates a few mechanisms and let the other apart (given or not modeled).

$\longrightarrow$ Important part of scientific reasoning: build hypothesis, study their consequences and test them empirically. Discard them if they do not work.

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- Results:
  - What quantities are traded at equilibrium? What are the prices and quantities?
  - How outcomes change when elements of the model are modified? (*e.g.* how trade moves when trade barriers are relaxed?).

Trade models

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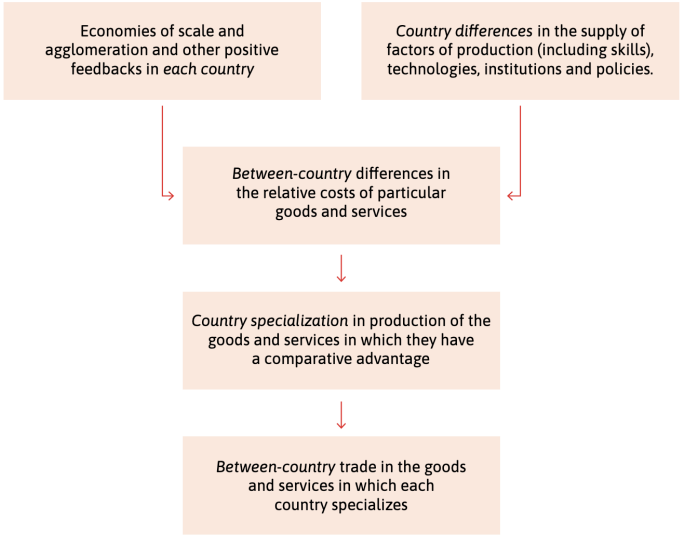
  - **Technology** (Ricardian model): Price differences between countries come from differences in productivity.
  - **Endowments** (Hecksher-Ohlin model): Price differences between countries come from differences in factor endowments.
- Other do not need country differences to explain trade:
  - **Economies of scale** generate the international division of labor through specialization.
- These models need to be seen as complementary (not substitutable). All are useful to understand some characteristics of trade.

The Ricardian Model



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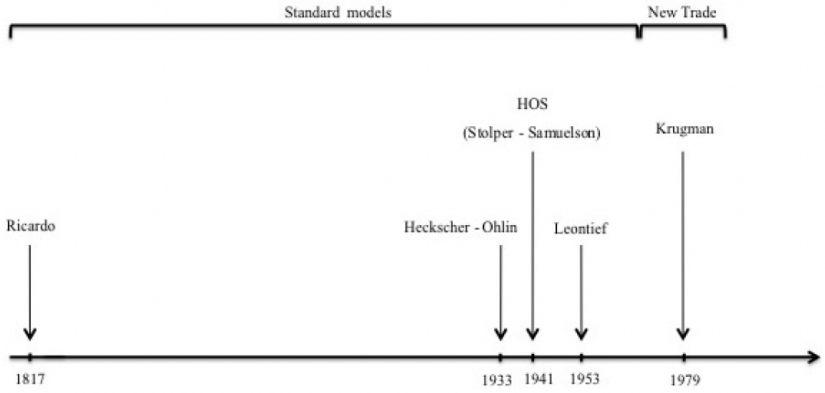

The Ricardian Model

- What is the impact of opening to trade?
  - Fear of job losses in some industries.
  - Expectations of lower prices.
  - Overall, will trade be good for an economy as a whole?
- The Ricardian model explains trade through international differences in technology.
- Because countries are not all good at producing the same thing, there can be gains if each country specializes in what it does better.

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- Now assume that each country fully specializes.
  - France produces 10000 cars.
  - Cambodia produces 10000 shirts.

The Ricardian Model

Intuition

- The world experiences a net gain. With the exact same workforce employed, the world produces 10000 shirts and 10000 cars.
- This is because China is relatively more productive in producing shirts.
- It is better to specialize in it and let France produce cars.
- These are **specialization** gains.
- There are also **exchange** gains coming from the fact that consumers can consume goods produced abroad.

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Definitions

- A country has an **absolute advantage** for a good if its productivity for the production of that good is higher compared to other countries (Adam Smith).

- A country has a **comparative advantage** in a good if its relative productivity for this good is higher than in another country (David Ricardo).

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- One day the mathematician Stanislaw Ulam asked Paul Samuelson about one idea in the social sciences that is both true and non-trivial. A few years later, Samuelson answered that the theory of comparative advantages is one of them.

The Ricardian Model

Assumptions

- There are 2 countries, 2 homogeneous goods, one factor of production (labor).
- Production technologies differ across countries. This is the only thing that differ.
- Constant return to scale.
- Perfect competition (free entry implies 0 profits).
- Identical preferences across countries.
- Workers move freely across sectors but do not move across borders.
- Full-employment.
- No transaction costs.

The Ricardian Model

Table: Number of hours necessary to produce a good

	Boats	Cars
Germany	100	50
France	125	125

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- Who has an absolute advantage in the production of boats ? And cars ?
- Is there still room for specialization?
- Yes because the advantage is not the same in both sectors.
- German workers are much more efficient in producing cars than boats.

The Ricardian Model

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  - France: $125/125 = 1$ car.
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- **Comparative advantage in a good when a country can produce it at a lower opportunity cost than another country.**
  - France has a **comparative advantage in boats.**
  - The converse is true so that Germany has a c**omparative advantage in cars.**

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Assume there are 500 hours of work in each economy.

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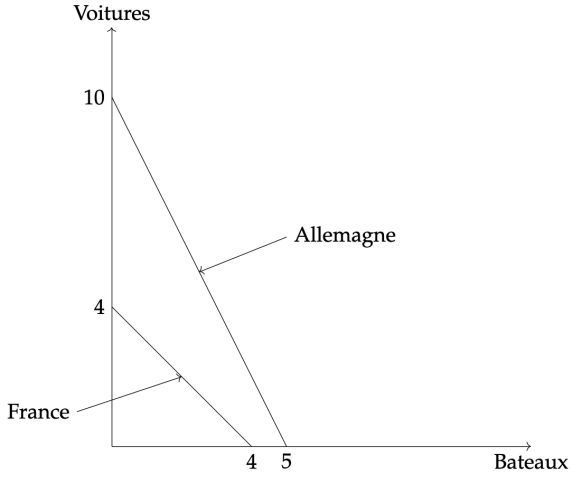

Figure: Production Possibility Frontier

The Ricardian Model

Example

- In France, 1 boat is worth 1 car. This is the relative price of a boat in France (in terms of cars): $p^{France} = \frac{p_{boat}^{France}}{p_{car}^{France}} = 1$
- In Germany, it is 2: one boat costs two cars: $p^{Germany} = \frac{p_{boat}^{Germany}}{p_{car}^{Germany}} = 2$
- If you're French and produce cars (4 a year), you'd better produce boats (4 a year), go to Germany, and sell your boats at the local price (2 cars). Why?

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- **Both countries gain to trade!**

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- Let's assume that the price is between 1 and 2 once borders are opened: $p \in (1, 2)$

The Ricardian Model

- France can produce one boat or one car and can sell boats for a price larger than 1.
- It's better to produce only boats, so France will produce 4 boats.
- These boats can be exported in Germany against p cars, with $p < 2$.

The Ricardian Model

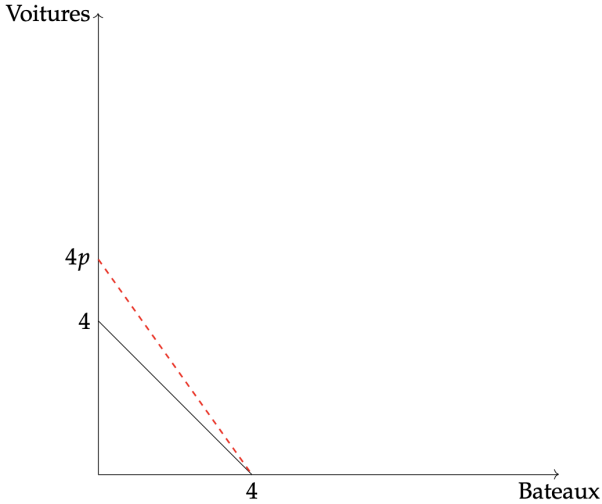
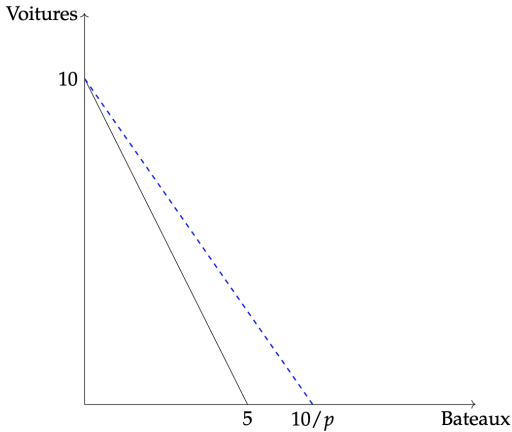


Figure: Possibility of productions frontier in France in close and open economy.

The Ricardian Model



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- Germany does not specialize: it becomes cheaper to produce locally than to trade.
- Same for France if $p < 1$.
- When $p \in (1, 2)$, France produces 4 boats and Germany 10 cars.
- If $p < 1$, France and Germany produce cars only: 14 cars are produced.
- If $p > 2$, France and Germany produce boats only: 9 boats are produced.

The Ricardian Model

- This determines the **supply** of the model.
- Again, we rely on relative supply: $S(p) = \frac{S_{boats}(p)}{S_{cars}(p)}$

Price	< 1	$= 1$	$p \in]1, 2[$	$= 2$	> 2
Boats produced by France	0	$\in [0, 4]$	4	4	4
Boats produced by Germany	0	0	0	$\in [0, 4]$	5
Cars produced by France	4	$\in [0, 4]$	0	0	0
Cars produced by Germany	10	10	10	$\in [0, 10]$	0
Relative supply	0	$\in [0, \frac{4}{10}]$	$\frac{4}{10}$	$\in [\frac{4}{10}, \infty]$	∞

- We also define relative demand: $D(p) = \frac{D_{boats}(p)}{D_{cars}(p)}$

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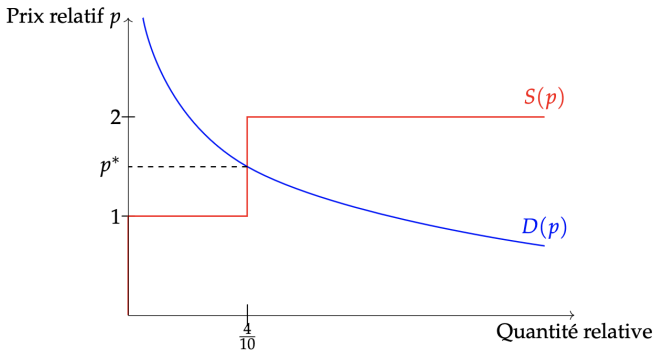

Figure: Relative supply and demand

The Ricardian Model

- You should not produce what you do better than others ... (absolute advantage)
- **But what you're relatively better at** (comparative advantage).
- If countries specialize according to their comparative advantages, the world is better off by producing more with the same amount of labor.
- All countries gain to trade thanks to the division of labor.
- Here, trade is inter-industry: it is cars *vs.* boats.

First conclusions

- Trade is driven by **relative** productivity differences.
- This is a model of **inter-industry trade**.
- Predicts **full specialization** of countries.
- Countries do not trade if they are equally productive.
- **Free-trade increases world output**.
- **No country loses from free-trade**.
- Trade does not impact inequalities... by definition!
  - Individuals are homogeneous here.

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- Imperfect mobility of workers across sectors and unemployment
  - Much bigger issue.
  - In reality, changing sector can take many years: (large) transitory costs to trade.

Empirical exploration

In which goods countries have their comparative advantages?

- It would be hard to measure comparative advantages *ex-ante* but we can measure them *ex-post*.

- A country i has a revealed comparative advantage in product k if its share of exports of product k with respect to the world share of export of product k is larger than 1.

- Formally:

$$\frac{\frac{X_{ik}}{\sum_k X_{ik}}}{\frac{X_{Wk}}{\sum_k X_{Wk}}} > 1$$

Empirical exploration

Revealed Comparative Advantage (RCA)

- Measuring comparative advantage *ex-ante* (from theory) is difficult, but we can measure it *ex-post* using observed trade data.

- A country i has a **revealed comparative advantage** in product k if its share of exports of product k is larger than the world share of that product:

$$\text{RCA}_{ik} = \frac{\overbrace{\frac{X_{ik}}{\sum_k X_{ik}}}^{\text{Share of product } k \text{ in country } i\text{'s exports}}}{\underbrace{\frac{X_{Wk}}{\sum_k X_{Wk}}}_{\text{Share of product } k \text{ in world exports}}} > 1$$

- **Where:**
  - X_{ik} = exports of product k by country i and $\sum_k X_{ik}$ = total exports of country i
  - X_{Wk} = total world exports of product k and $\sum_k X_{Wk}$ = total world exports of all products

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In which goods these countries have their RCA?

Country	Soy Exports ($ bn)	Machinery Exports ($ bn)	Total Exports ($ bn)
Brazil	51	14	328
Germany	0.02	248	1600
World totals	90	2400	29000

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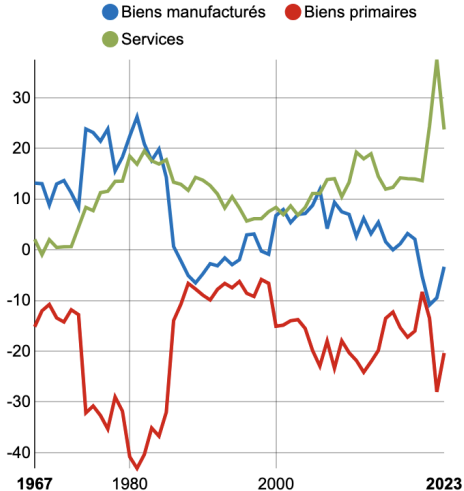
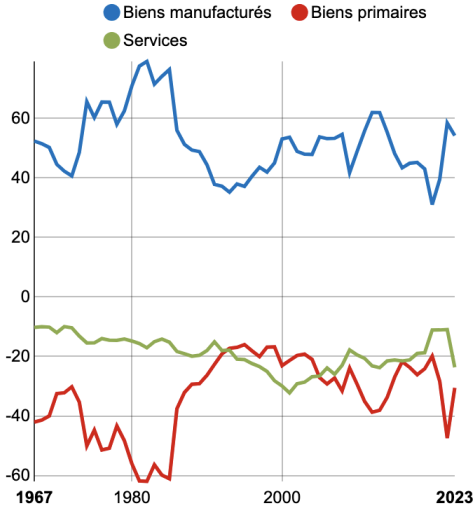


RCA in France

Empirical exploration

In which goods countries have their comparative advantages?



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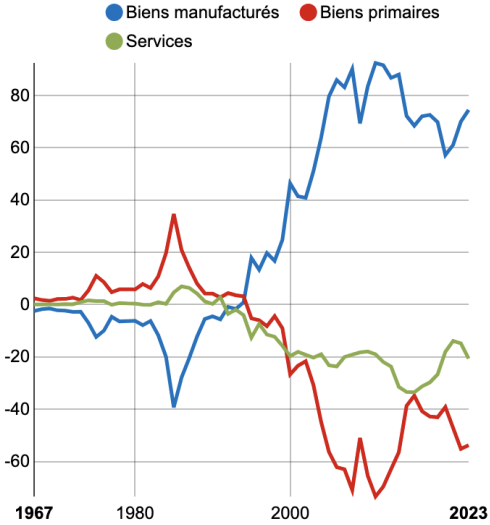


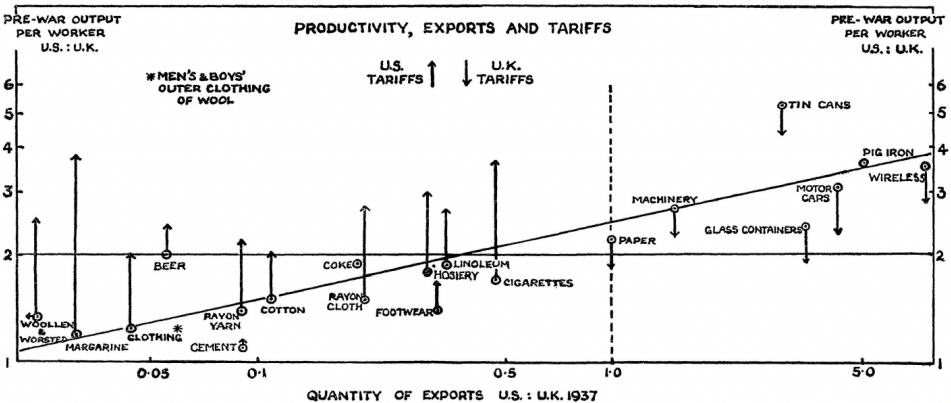
Empirical exploration

Do pattern of trade follow comparative advantages?

- The Ricardian model suggests that a country should export the goods for which it is relatively more productive.
- First empirical tests of the Ricardian model in 1951 (MacDougall).

Empirical exploration

Do pattern of trade follow comparative advantages?



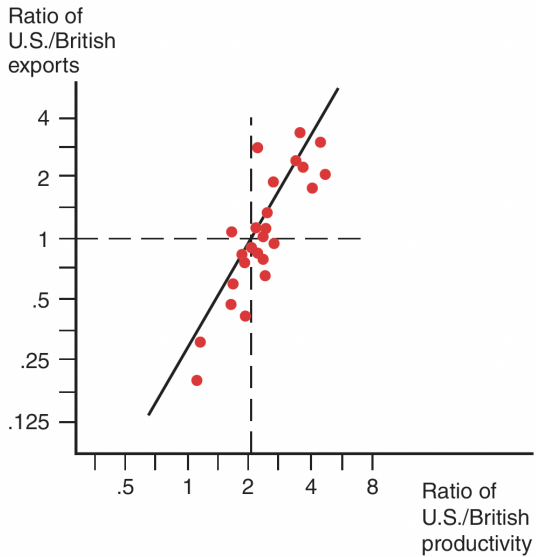
Empirical exploration

Do pattern of trade follow comparative advantages?

- The Ricardian model suggests that a country should export the goods for which it is relatively more productive.
- First empirical tests of the Ricardian model in 1951 (MacDougall).
- British labor productivity is lower than U.S. labor productivity in all sectors!
  - The U.S. have an absolute advantage in everything.
- Though, British exports are as large as U.S. exports at the time.
  - The U.K. exports in sectors in which it has a comparative advantage.

Empirical exploration

Do pattern of trade follow comparative advantages?



Do pattern of trade follow comparative advantages?

- Less clear-cut evidence in recent years.
- The specialization of the economy make that countries simply do not produce goods in which they are bad, so we cannot measure their productivity.
- The example of Bangladesh:
  - Output per worker as % of China in any industry: 28.5%
  - Exports per worker as % of China in any industry: 1%
  - Output per worker as % of China in apparel: 77%
  - Exports per worker as % of China in any apparel: 15.5%

Take-aways

- A simple model of productivity differences generates beneficial trade.
- Trade can be beneficial to both countries if they fully specialize in their **relative advantage**.
- Trade, **through specialization**, is a positive-sum game.
- Results unrealistic, but helpful.
- What we observe reflects Ricardo's predictions.
- Next sessions: introduce new trade models to explain more trade patterns.

The Law of One Price

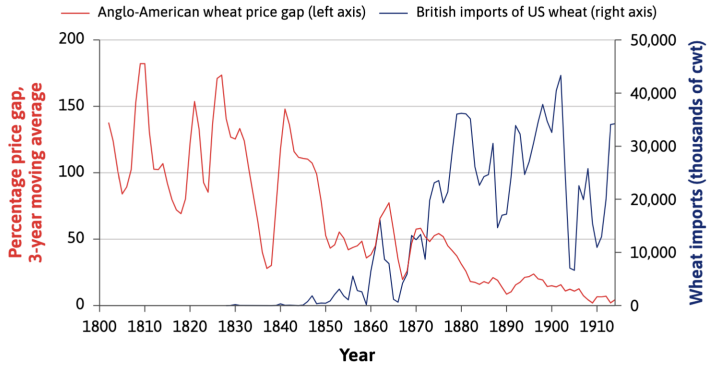


Figure 18.4 The Anglo-American wheat trade (1800–1914).

Figure 3 in Kevin H. O'Rourke and Jeffrey G. Williamson. 2005. 'From Malthus to Ohlin: Trade, Industrialization and distribution since 1500'. *Journal of Economic Growth* 10 (1) (March): pp. 5–34.

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The Law of One Price

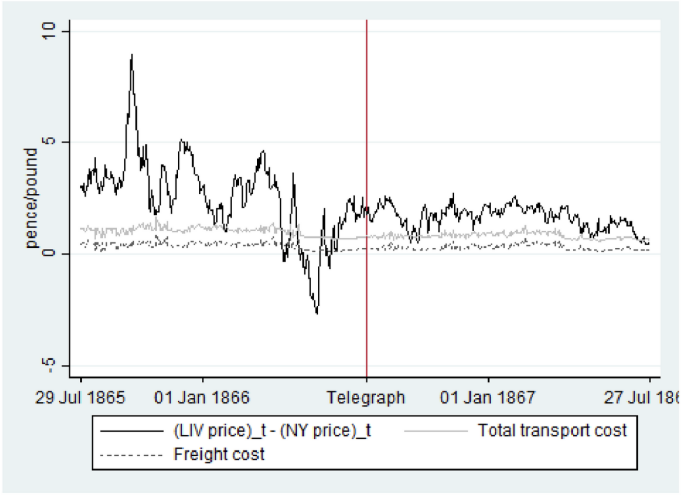

Figure: Impact of the introduction of the telegraph on Anglo–American wheat trade prices