

MIT 14.01: Principles of Microeconomics
Sp 2025, Lecture 13: Trade

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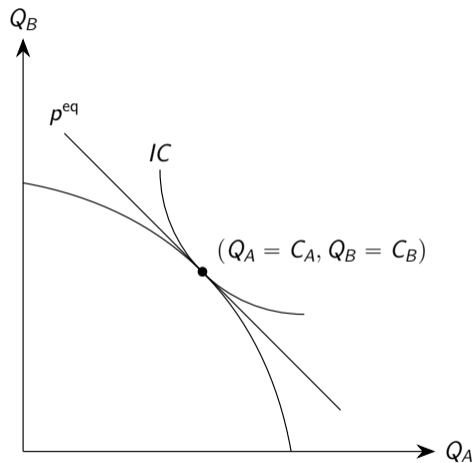
Plan for Today

- Consider two interacting economies that trade goods/services
- Do both economies gain? Does everyone within both economy gain?
- Who will trade what with whom?

“International” Trade

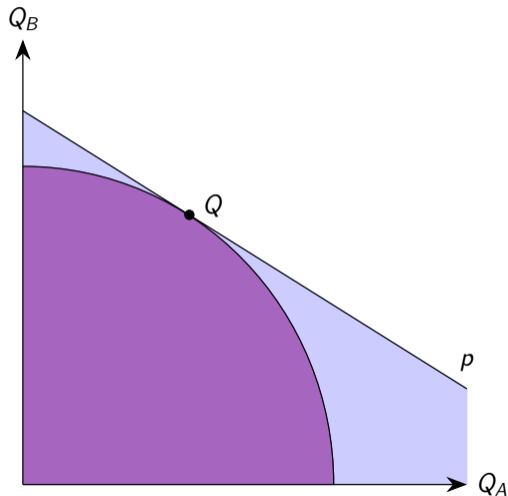
- We will now consider two separate but interacting economies
- Can think of this as two countries. But just as naturally, can think of this as two regions of the same country (e.g. Mass. vs. other 49 US states, or Boston vs non-Boston)
- Countries are distinct (as compared to regions) because:
 1. Typically think that some factors are quite immobile across countries (e.g. due to immigration restrictions, or capital controls) but more mobile within them
 2. Countries often present a “biased” policy perspective that favors one set of agents (e.g. “your” country’s citizens), which is less common for within-country analysis
 3. Countries often have policy tools (e.g. tariffs – taxes on goods crossing borders) that don’t exist within countries (e.g. US constitution forbids cross-state tariffs)
- For us here, the main feature will be that the two “countries” allow goods to be traded across them but factors are unable to move across them

Equilibrium Without Trade



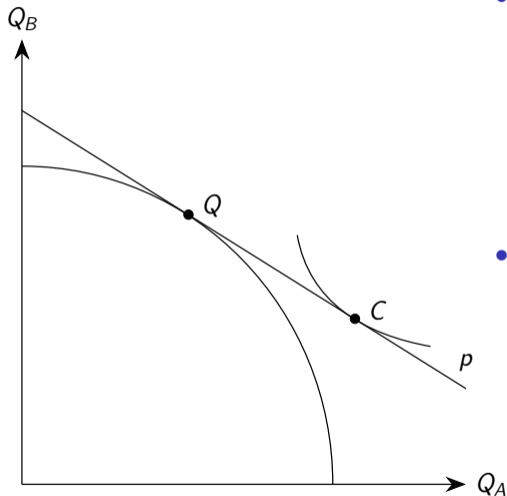
- Recall our discussion of general equilibrium with production in Lecture #12
- This was a *closed economy*: the total amount produced for each good (e.g. Q_A) has to equal the total amount consumed for each good (e.g. C_A)
- Today: what if this economy can trade with some other economy? (That is, what if e.g. $Q_A \neq C_A$ is a possibility?)

Trade Expands Possibilities



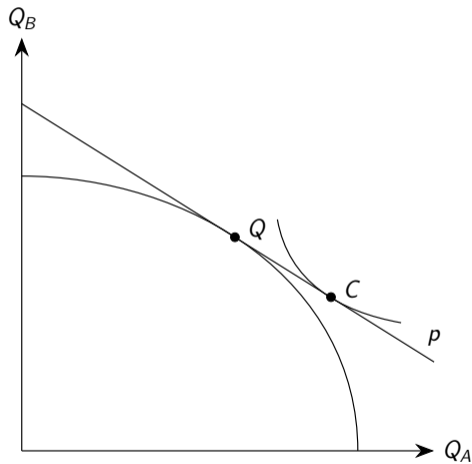
- Imagine a country with the production possibilities set shown here (in purple). And suppose prices p happen to be given by the line drawn here.
 - We'll get into what determines p shortly. But for now any p will do.
- No trade: $\mathbf{Q} = \mathbf{C}$ (what the economy consumes is what the economy produces)
- But if trade is possible (i.e. $\mathbf{Q} \neq \mathbf{C}$) with rest of the world at price p then can consume anywhere along the line (that passes through \mathbf{Q})
- We could call the blue triangle the “consumption possibilities thanks to trade set” (CPTTTS) for this country

Gains from Trade



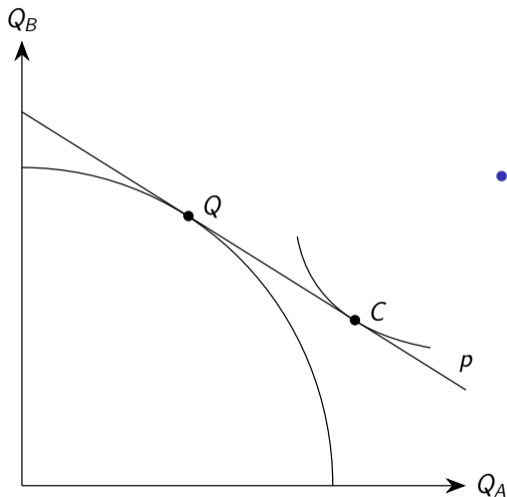
- The CPTTTS is clearly larger than the PPF
 - So for almost all possible preferences in this country, its consumers will benefit from the opportunity presented by trade
 - That is, the IC going through the chosen consumption point C delivers higher utility than the one that passes through Q
- In a sense, trade is just a “technology”: it turns good A into B in a better way than the country’s domestic technology (the PPF) can. David Friedman put this well:
 - “There are two ways we can produce automobiles. We can build them in Detroit or we can grow them in Iowa....put the wheat on ships and send the ships out into the Pacific. They come back with Hondas on them.”

Gains from Specialization?



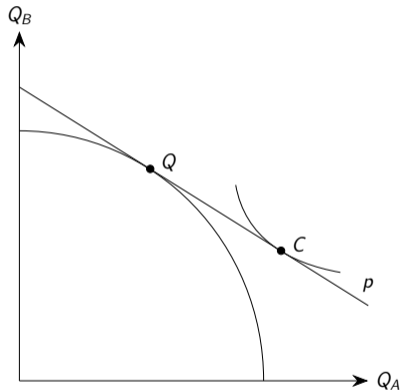
- Perhaps tempting to think of the logic of trading (and gains from trade) as: “trade is good because it allows a country to specialize in what it is good at”
- But this is only a partially correct intuition. In this figure the production bundle Q is not very “specialized” (i.e. it has $Q_A \approx Q_B$) but yet there are gains from trade
 - Instead, the gains come from the fact that the consumer’s preferences are quite “concentrated” (i.e. they want $C_A \gg C_B$)
- The more fundamental intuition is that trade is like a technology that allows production and consumption to be de-coupled
 - Sometimes this leads to specialization of production, but that is more incidental

Gains from Trade



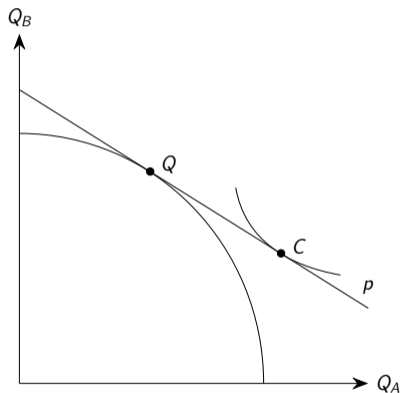
- Note also that the gains are mutual (nothing special about “this” country, could repeat it for the “other one”)
 - So trade is not a “zero-sum game” (where one country gains at the other’s expense)
- Also note how this argument had nothing to do with whether the countries in the rest of the world are:
 - Small or large; productive or not; rich or poor (e.g. using “unfair cheap labor”)
 - Good at high- or low-tech things (or both)
 - Charging tariffs on imports from “our” country
 - (“Unfairly”) subsidizing production
 - Simultaneously (and for whatever reason) receiving pieces of paper that say e.g. “you own one share of Google” (aka running a “trade deficit”...we’ll define that in a moment)

The Pattern of Trade



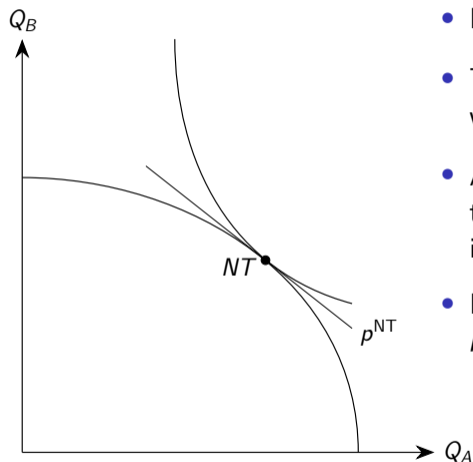
- In this picture, $C_B < Q_B$ and $C_A > Q_A$
- Hence the country is:
 - Importing an amount $M_A \equiv C_A - Q_A$ of A
 - Exporting an amount $X_B \equiv Q_B - C_B$ of B
 - (and $M_B = 0$ and $X_A = 0$)
- And we say that *trade balance* holds:
 - Value of imports = value of exports ($p_A M_A = p_B X_B$)
 - Like the budget constraint we saw in the GE models of Lectures #11 and #12:
$$p_A(Q_A - C_A) = p_B(Q_B - C_B) \iff$$
$$p_A Q_A + p_B Q_B = p_A C_A + p_B C_B$$
 - i.e. trade takes place along the line

Trade Deficits and Trade Surpluses



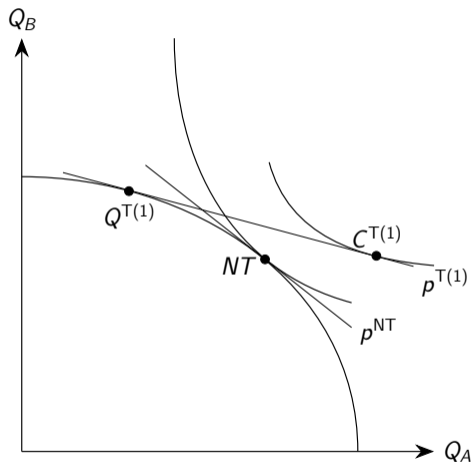
- *Trade deficit*: when value of imports $>$ value of exports
 - If that were to happen in this static setting then it would just be a pure gift to the deficit country (the value of what they receive is less than the value of what they send). Hard to see why that would happen.
 - But if we think of a more dynamic context then such borrowing/lending is natural (e.g. a country could run a deficit today in exchange for pieces of paper that are effectively promises to send goods later)
- *Trade surplus*: simply the opposite, i.e. when value of imports $<$ value of exports

What Determines the Pattern of Trade?



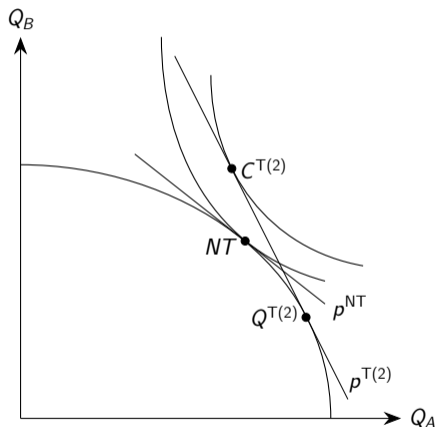
- Here the point NT has no trade (i.e. $Q^{NT} = C^{NT}$)
- This is a setting that we refer to as *autarky* (i.e. when trade is impossible)
- At NT the equilibrium price $p^{NT} = (p_A^{NT}, 1)$ is tangential to both this country's PPF and its indifference curve
- From now on let's denote price vectors as $p = (p_A, 1)$
 - As always, we can normalize the price of one good to = 1
 - Here, we are doing that for good B (that is, B will always be our choice to be the numeraire good)

What Determines the Pattern of Trade?



- Suppose this country allows trade to happen, and when it happens the equilibrium price is $p^{T(1)} = (p_A^{T(1)}, 1)$, with $p_A^{NT} > p_A^{T(1)}$
- Then this country:
 - Produces at $Q^{T(1)}$ and consumes at $C^{T(1)}$
 - Hence imports A ($M_A > 0$) and exports B ($X_B > 0$)

What Determines the Pattern of Trade?



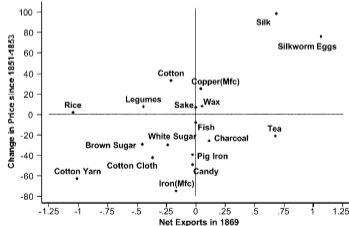
- Now suppose the equilibrium price with trade happens to be $p^{T(2)} = (p_A^{T(2)}, 1)$, with $p_A^{NT} < p_A^{T(2)}$
- Then this country:
 - Produces at $Q^{T(2)}$ and consumes at $C^{T(2)}$
 - Hence imports B ($M_B > 0$) and exports A ($X_A > 0$)

- Do you notice a pattern? In either case we have *The Law of Comparative Advantage*:

$$(p_A^T - p_A^{NT})(X_A - M_A) > 0$$

- This says: a country will import good A (and so, due to trade balance, export B) iff good A is more expensive under autarky than it is under trade (and A being “expensive” means p_A/p_B is high)

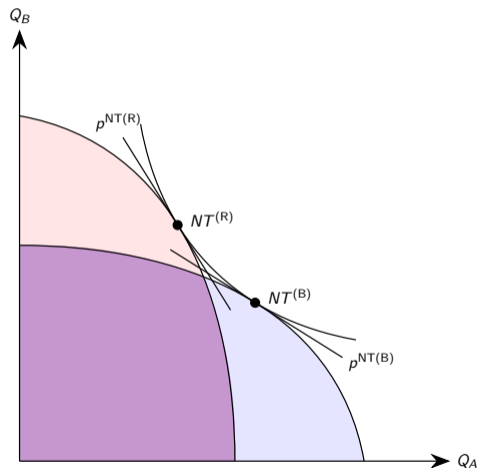
Evidence for the Law of Comparative Advantage



- Japan was forced (by the US Navy!) to end near-autarky in 1858
- These authors found data on the following for each of 18 major products:
 - Price in the autarky era pre-1858 (i.e. the vector p^{NT})
 - Price in the trading era post-1858 (i.e. p^T)
 - Quantity of exports X and imports M
- Top figure: trade grew, and was always approximately balanced
- Bottom figure: pos. correlation, as in the “Law” – but extended to the many-good version: $(p^T - p^{NT}) \cdot (X - M) > 0$

Bernhofen and Brown (*J. Pol. Econ.*, 2004)

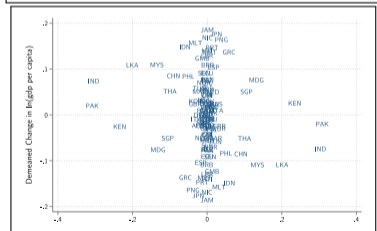
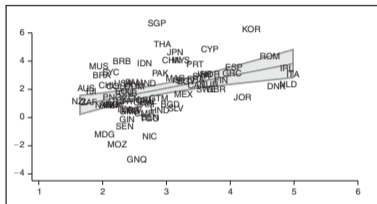
What Is Comparative Advantage?



- Any country has its *comparative advantage* (CA) in the goods that would be relatively cheap in that country if it were in autarky
 - So in a 2-good case, the Law of CA says that a country exports the good that is its CA
- CA can derive from differences in technology and/or preferences. E.g. here, two countries have same prefs. but diff. technologies.
 - Red is relatively good at B and bad at A (so $p_A^{NT(R)}$ is relatively high)
 - Blue is relatively good at A and bad at B (so $p_A^{NT(B)}$ is relatively low)
 - So we say that Blue's CA is in good A and Red's CA is in good B
 - And we know from the Law of CA that if these countries trade, Red will export B and Blue will export A

Evidence About Gains from Trade (Around the World)

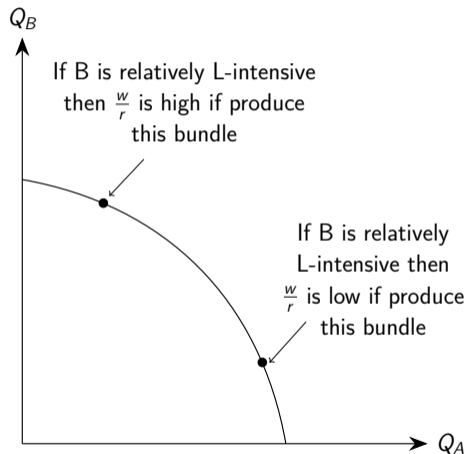
- x-axes in these figures:
 - Top: how much a country's "effective distance" to (average) trading partners changed with 1960-95 move from sea to air shipping
 - Bottom: how much a country's sea distance to (average) trading partners changed with the closure of the Suez canal in 1967 and its reopening in 1975



Feyrer (2019, 2021)

- y-axes in these figures:
 - Top: annual real GDP per capita growth rate (1960-95)
 - Bottom: 5-year real GDP per capita % changes (for both 1965-69 and 1974-78, then demeaned so that the average for each country is zero)
- Estimates imply very large gains from openness to trade – if believe that the main mechanism that connects sea/effective distance to GDP is trade

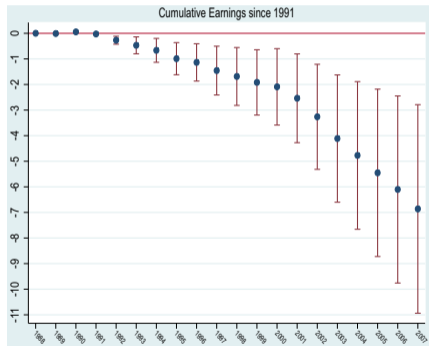
Winners and Losers from Trade



- Recall this figure from Lecture #12: as we move along the PPF, relative factor prices w/r change
 - If B is more labor-intensive than A then at high Q_B (i.e low p_A) the demand for labor (and hence w/r) will be relatively high
- True for any event that causes the change
 - E.g. for trade context: if start trading with country whose CA is in B then p_A will grow, Q_B will fall, and w/r will fall
 - But also true if demand for A rises for other reasons
- In fact, can show (*Stolper-Samuelson theorem*) that labor (in this example) actually harmed:

$$\% \Delta p_A > \% \Delta r > \% \Delta p_B = 0 > \% \Delta w$$

Unequal Effects in U.S. from Growing Trade with China



Autor et. al. (*Q. J. of Econ*, 2014)

- Economic boom in China starting in 1990s: big rise in U.S. imports from China
- Track all US. manuf. workers in 1988 and:
 - Calculate their cumulative earnings from 1991 up to any subsequent date (to 2007)
 - Then compare those who worked (in 1988) in industries that would go on to see high vs low growth of imports from China
- Estimates here: “high” group workers’ earnings relatively lower (than “low” group) by about 3% per year for 16 years
- Consistent with Stolper-Samuelson logic. But estimates don’t actually establish that (1988) high import-growth industry workers were harmed, only that they fared relatively worse.

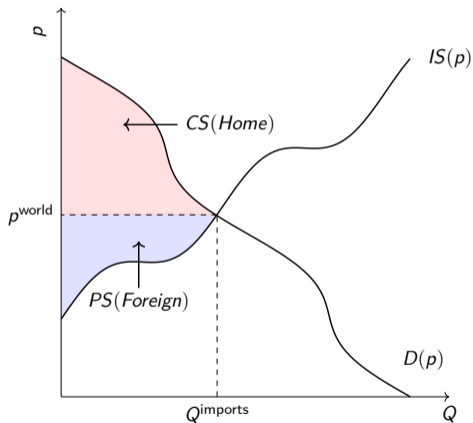
Tariffs

- Import tariffs are a tax on imports (just like the excise fuel tax in MA is a tax on my “imports” of gasoline from ExxonMobil)
- Why impose tariffs? Arguments that apply equally well to domestic taxes:
 1. Redistribution: Pareto Efficient to have no tax, but prefer some non-PE allocation on distributional grounds (i.e. to help certain people at expense of others)
 2. Revenue-generation: might be least-bad way to generate tax revenue (but nowadays income/wealth taxation is considered way more effective than commodity taxation)
 3. Correction of market failures (a motive that we'll cover in future lectures)

Tariffs

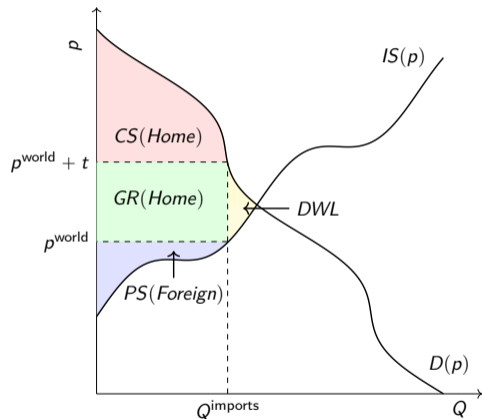
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 2. Revenue-generation: might be least-bad way to generate tax revenue (but nowadays income/wealth taxation is considered way more effective than commodity taxation)
 3. Correction of market failures (a motive that we'll cover in future lectures)
- One extra argument is *per se* distinct for case of tariffs:
 - Suppose we are talking about a “large” country – large enough that its actions affect the prices at which it buys/sells goods on world markets
 - Then economic incidence of the tariff will be partially borne by foreigners
 - This would be considered a good thing (i.e. justify a distortionary tax) by any policy process that puts less weight on foreigners' utility relative to own residents' utility
 - This argument is really a special case of #1 above, but where the redistribution takes place across countries rather than across domestic residents
- And, tariffs create a new cost: they usually incite retaliation by foreign govts.

Trade of a Single Good (No Tariff)



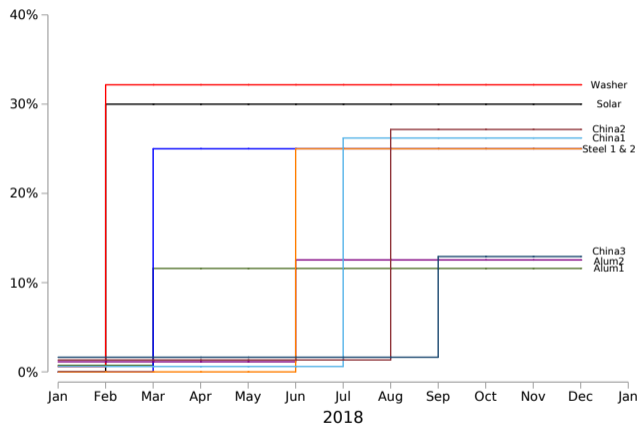
- Suppose the country of interest (“Home”) sources this good entirely from foreign firms (no production of it in Home)
 - So the supply curve is an *import supply curve*, $IS(p)$
 - The fact that this curve is upward-sloping means that Home is “large” – quantity sold in Home does affect the price
- The case of no tariff (free trade) is drawn here: foreign firms get paid p^{world} , and Home’s consumers also pay p^{world}
- Home and foreign share the total surplus:
 - Home consumers get $CS(\text{Home})$
 - Foreign producers get $PS(\text{Foreign})$
 - $DWL = 0$ (because no tariff)

Trade of a Single Good (with a Tariff)



- Now suppose Home sets a tariff, as here:
 - Foreign firms get paid p^{world} , but Home's consumers have to pay that plus the import tariff t (i.e they pay $p^{\text{world}} + t$)
- Effects of the tariff:
 - Home residents get $CS(\text{Home}) + GR(\text{Home})$
 - $DWL > 0$ – Home destroys some global surplus but captures (via $CS + GR$) more of it
 - Foreign producers get less $PS(\text{Foreign})$ – so their government may retaliate
- “The foreigners pay the tariff?”
 - No, the economic incidence of the tariff is shared between Home and foreign
 - But if $IS(\cdot)$ is somewhat inelastic then, yes, *some* of the incidence is borne by foreign (unless foreign retaliates)

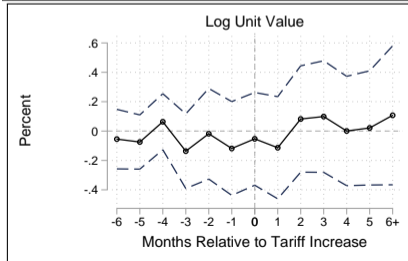
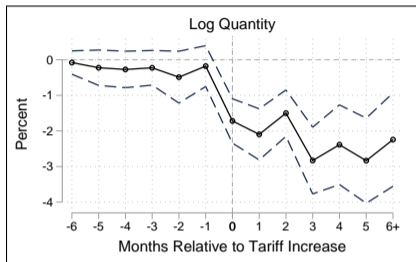
Effects of the 2018 Rise in U.S. Import Tariffs



Fajgelbaum et. al. (*Q. J. of Econ*, 2020)

- In 2018, large and sudden increase in U.S. import tariffs:
 - On certain partners – e.g. many products from China
 - On certain products – e.g. steel & aluminum from nearly all partners
- What impact did this have on pre-tariff prices (i.e. p^{world}) and quantities imported (i.e. Q^{imports})?

Effects of the 2018 Rise in U.S. Import Tariffs



- Difference-in-differences estimates:
 - Observations are product-origin pairs – e.g. a particular type of washing machine, from China
 - “T”: pairs with rise in U.S. tariff
 - “C”: pairs with no U.S. tariff rise
- Top: big effects on import quantities (Q^{imports}) – implied import demand elasticity is around -1.5
- Bottom: effectively zero effect on pre-tariff prices (i.e. p^{world})
- Consistent with U.S. bearing all of the incidence of the tariffs (i.e. even the U.S. not acting like a “large” country)

Concluding Remarks

- **Key concepts from today's lecture:**
 - Trade creates mutual benefits because it (is like a technology that) expands consumption possibilities because it allows separation of consumption from production
 - Balanced trade: value of exports = value of imports
 - Law of Comparative Advantage: country imports goods that are relatively expensive under autarky
 - Comparative advantage (CA): goods that are relatively cheap in autarky
 - Stolper-Samuelson theorem: if the price of a good rises then the price of the factor that uses that good relatively intensively will rise, and the price of the other factor will fall
 - Large country: one whose actions do affect the pre-tariff prices of goods they import and export
 - Tariffs: distortionary effects similar to domestic taxation, but economic incidence will be (for a large country) borne partially by foreigners
- **Next lecture:**
 - Depart from perfect competition and consider imperfect competition (e.g. monopoly/oligopoly settings)