EC3355 International Trade
Problem Set 2: Gravity model

Read the paper by Chen and Jacks (2012) on trade and immigration

1. The authors examine the change in import varieties in Canada. Rather than treating the US as a single trade partner they look trade with individual states. Why is this a useful approach (besides the reasons the authors provide)?

   Answer: It is very likely that states closer to the Canadian border trade more with Canada due to the shorter distance.

2. Which two factors contributed to growth in import variety in the US?

   Answer: The reduction in trade costs made it cheaper to source new varieties from different countries and the growth of economies like China, Korea, and India meant that they produce more varieties for the export market.

3. How does immigration contribute to growth in import variety?

   Answer: Immigrants often reduce trade costs for the imports of certain goods due to their network with their country of origin. Additionally, more immigrants possibly also entails a larger demand for a wider variety in goods, specifically those from the country of origin.

4. The study shows that import substitutability is high for agricultural and mineral products. Why do you think this is the case?

   Answer: These are low value added products and be supplied by a large number of countries guaranteeing a lower price.

Consider the following general gravity model:

$$T_{ij} = g\frac{M_i^{\alpha} M_j^{\beta}}{D_{ij}^{\theta}}$$

5. Let's say that we are interested in knowing α, β, and θ. How do we estimate this model?

   Answer: We can estimate the model by log transforming it resulting in the following linear equation:

$$lnT_{ij} = \gamma + \alpha lnM_i + \beta lnM_j - \theta lnD_{ij} + \epsilon_{ij}$$

6. Explain why distance has such a large effect on trade in the gravity model.

   Answer: A part of this is simply explained by trades costs related to logistics. Moving stuffs costs money. However, as we saw during the lecture trade costs have reduced dramatically over the past 60 years and the impact of distance is more or less the same. Distance can also be seen as a proxy for a number of sources of trade resistance such as uncertainty, localised tastes, and distribution networks.

Table 1: Trade relations

	Belgium	China	Denmark	Estonia
Belgium	-	1	1	0
China	1	-	1	0
Denmark	1	1	-	1
Estonia	0	0	1	-

Consider the trade relations given in table 1 where 1 indicates trade and 0 no trade.

7. China trades with both Denmark and Belgium. Which country-pair do you think has the largest trade flow?

   Answer: Belgium as this country has a larger economy than Denmark. Moreover, Belgium's location is more favourable to trade due to the port of Antwerp.

8. Does an increase in Chinese GDP affect Estonian trade?

   Answer: Not directly, but it does affect Estonia via its trade with Denmark and Belgium who trade with China. When China's GDP increases so does it trade flows which influences the trading partners.

9. Canada and Australia are similar in terms of their main language, institutions, and history and also have populations of similar size. However, Canada's trade to GDP ratio is about 20 percentage points larger than that of Australia. What would explain this?

   Answer: Because of Australia's remoteness it faces high transporting costs for imports and exports. Furthermore, it isn't located near a large economy in the way Canada is. Canada borders the USA with which it has a trade agreement which makes that Canada has higher trade openess.

10. Brazil and Mexico have two very different trading patterns. Brazil trades equally with the US and EU while Mexico trades mainly with the US. Use the gravity model to explain these differences.

    Answer: Mexico is close to the USA and is a member of NAFTA. The distance to the EU is relatively far. Brazil on the other hand is relatively far from both the USA and the EU and only has a trade agreement with relatively small countries.