Food Supply Networks

Team 2

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- Several metrics exist in the literature to measure different aspects of how a network is impacted by disruptions.
- The collection of these measurements together with some interpretation should yield an overall picture of the effect.
- The analysis occurs within the paradigm of *Supply Networks*.

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II. **Understanding dataset**
   - To know what information is contained in the provided data.
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III. **Constructing platform for data analysis**
   - To build an interface so that one can easily do analysis with the huge data set for specific purposes.

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It's basically a graph with weights!

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But there's many more!

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II. The Data

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- Provided by **Comtrade** in the form of a spreadsheet with over
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- Provided by **Comtrade** in the form of a spreadsheet with over <u>30 million rows</u>.
- Each row represents a trade of a specific type of item from one country to another.

A	B	C	D	E	F	G	H	I
Trade Flow	Reporter	Partner	Commodity	Qty Unit	Qty	Netweight (kg)	Trade Value (US$)	Commodity Code
Import	Albania	Italy	Cheese and curd	Weight in kilograms	598810	598810	3944881	406

II. The Data

- Some lines are subsections of other lines.

A	B	C	D	E	F	G	H	I
Trade Flow	Reporter	Partner	Commodity	Qty Unit	Qty	Netweight (kg)	Trade Value (US$)	Commodity Code
Import	Belgium	Australia	Meat and edible meat offal	No Quantity	0	0	13096249	2
Import	Belgium	Australia	Meat of bovine animals; fresh or chilled	Weight in kilograms	232388	232388	3713369	201

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- Every item has a commodity code, which uses a nested format.

Problem 1: The data contains much more than just food.

Solution: A python program was written to remove all non-food items from the data. □

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Problem 2: Many quantities are listed as zero.

Solution: The trade values in US\$ will be used to weight the graphs, not the quantities. $\square$

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Problem 1: The data contains much more than just food.

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Problem 2: Many quantities are listed as zero.

Solution: The trade values in US$ will be used to weight the graphs, not the quantities. □

Problem 3: The subsection trade values do not sum to the section values. i.e, the total value of meat sent from Country1 to Country2 does not equal the sum of all the individual types of meat sent.

Solution: It is likely some type of food fall into multiple subsections or none at all. For most analysis, the broadest sections are used to avoid double/under counting. □

II. The Data (Problems and Solutions)

Problem 4:

Imports and exports are not mirrored. i.e, Country1 exports to Country2 but Country2 doesn't import from Country1. Furthermore, when imports and exports are mirrored, they don't match! This is because the exports include tax but the imports do not.

	A	B	C	D	E	F	G	H	I
	Trade Flow	Reporter	Partner	Commodity	Qty Unit	Qty	Netweight (kg)	Trade Value (US$)	Commodity Code
	Import	Albania	Argentina	Meat and edible meat offal	No Quantity	0	0	146743	2
	Export	Argentina	Albania	Meat and edible meat offal	No Quantity	0	0	1581240	2

Solution: We are currently only using export values. We aim to find some 'average scaling factor' that accounts for tax, allowing us to roughly convert between import and export values. □

II. The Data (Problems and Solutions)

Problem 5: The data set is still huge!

Solution: Focus on specific foods. □

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Specific food program

- Subsets of the data have been created that only contain the ingredients required for making certain meals.
- A program has been written that presents the data in a readable way.

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- Build an interface that enables us to do analysis for country to country/specific food program.

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- Language: python.

Future Plans

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- Perform network analysis
- Study network analysis
- Improve the program in ways such as:
  - Clean up any errors
  - Integrate analysis techniques
  - Create graph visualisations

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