A Better Way to Calculate Import and Export Price Indexes

60th Annual Conference of the New Zealand Association of Economists

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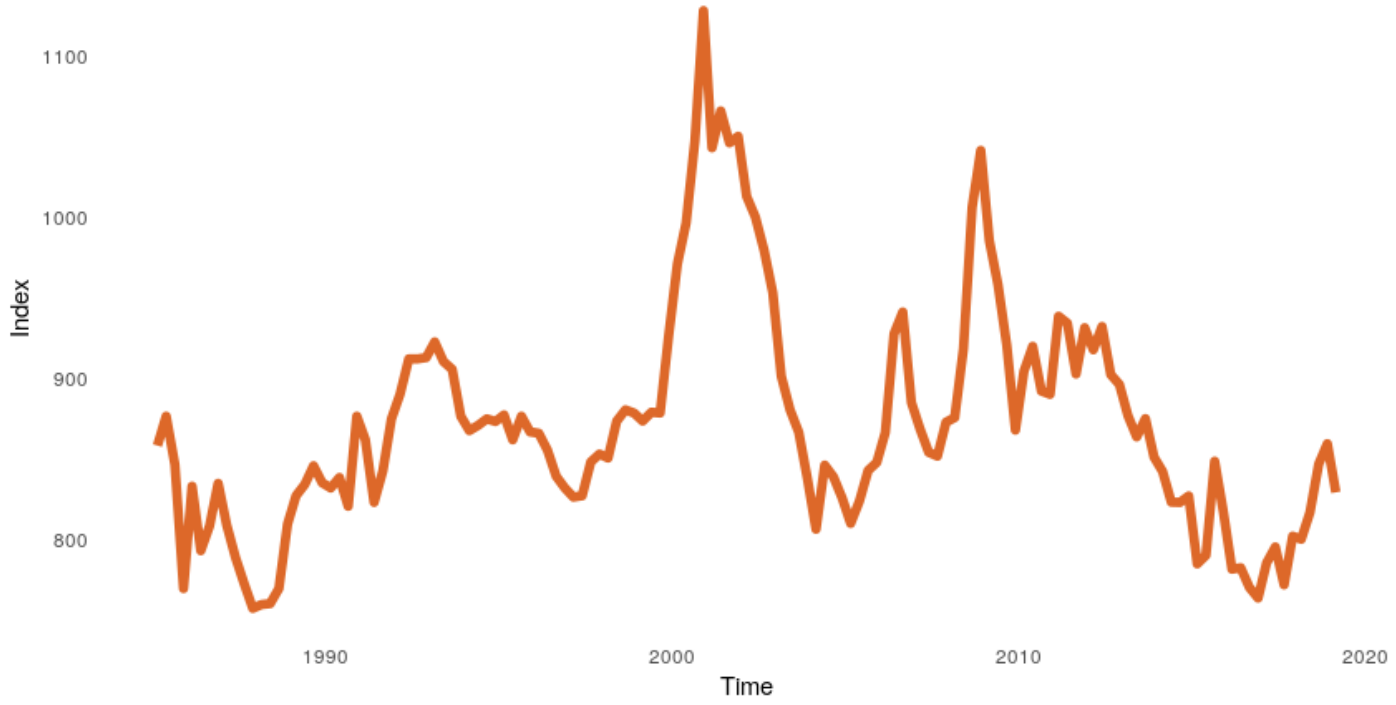
Stats NZ

Price Indexes

- Fixed basket of goods
- Measures change, not level



Period 0 (Ref)	Period 1	% change
1000	1250	25%

What are price indexes used for?

- Measuring inflation across the economy
- Adjusting wage, contract and benefit payments
- Deflating value series into volumes
- To inform where price increases are coming from

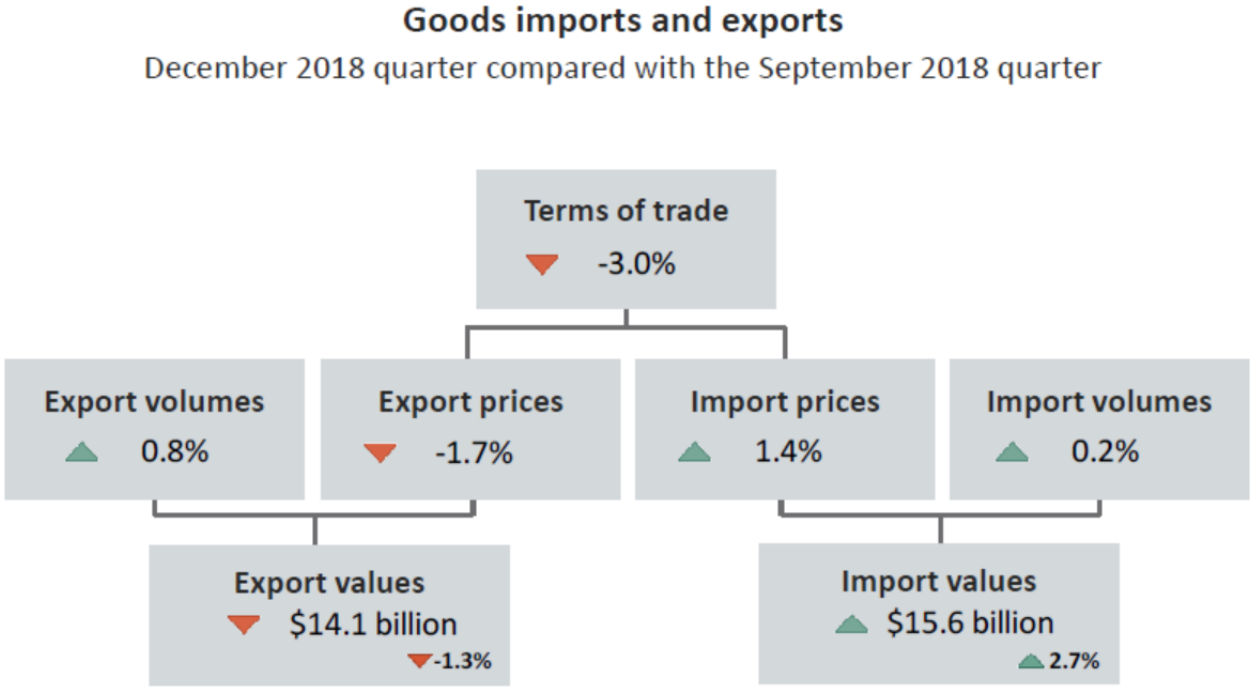
Record export lamb prices nudge terms of trade to new high

Higher fuel prices dent terms of trade

Dairy export volumes advance to new record

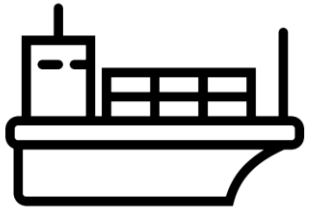
What are we trying to measure?

Export and import price indexes measure the rate of change over time in the prices of exported and imported goods and services.



Data source

- **Overseas Merchandise Trade data (derived from customs data)**
  - Monthly data
  - Processed and cleaned by Stats NZ

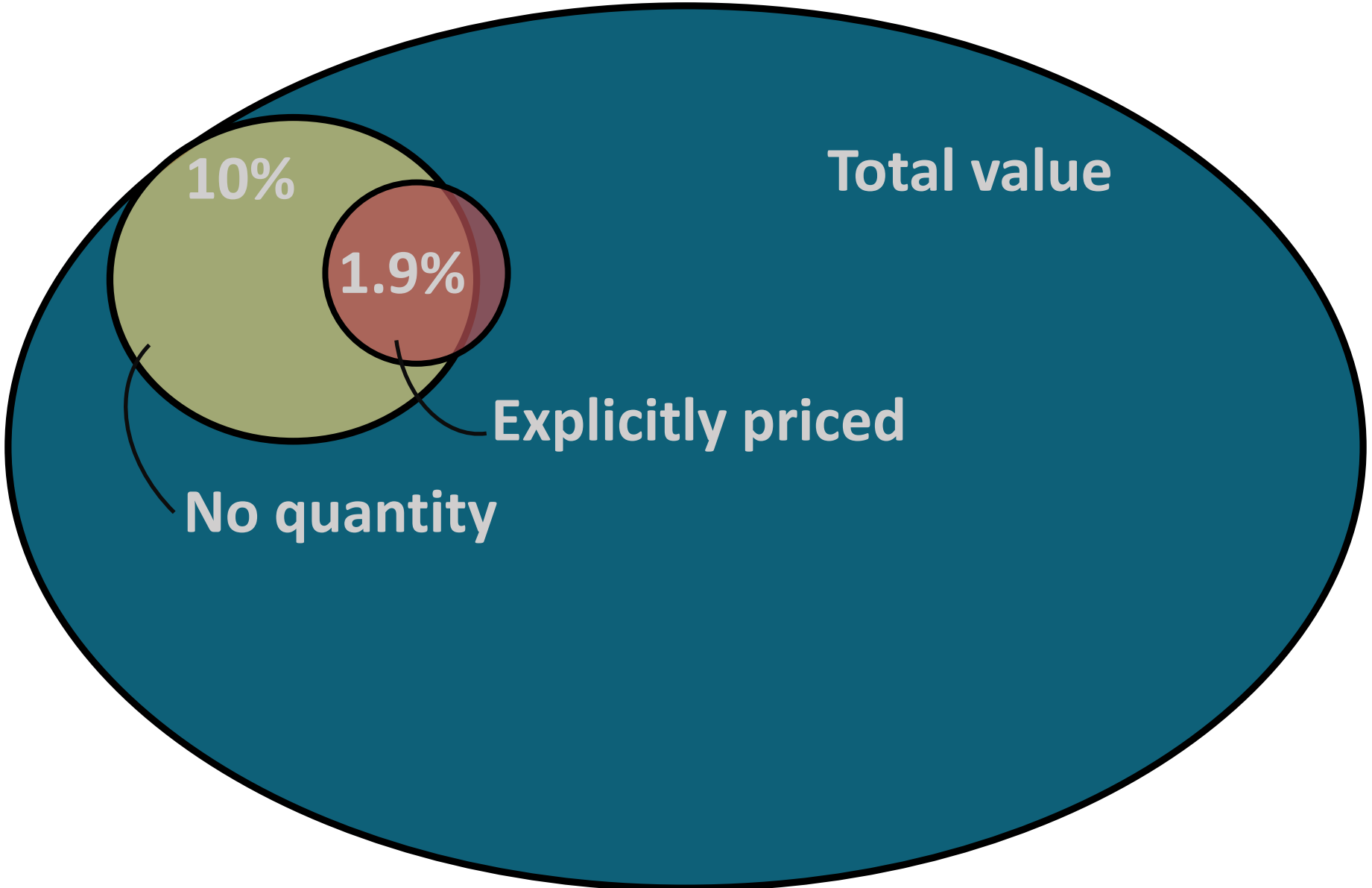


- **Surveyed prices (commodity price survey) called explicit prices**
  - Quarterly data
  - Processed by Stats NZ

(Not real data)

Period	HS10	Details	Quantity	total value
1/03/2018	1701120010	Description,Company,Country,Unit of measurement	9000	$ 700,000
1/03/2018	1701120010	Description,Company,Country,Unit of measurement	3	$ 900,000
1/03/2018	1704100000	1704100000US	1	$ 2,000,000
1/03/2018	1803500000	Description,Company,Country,Unit of measurement		$ 30,000

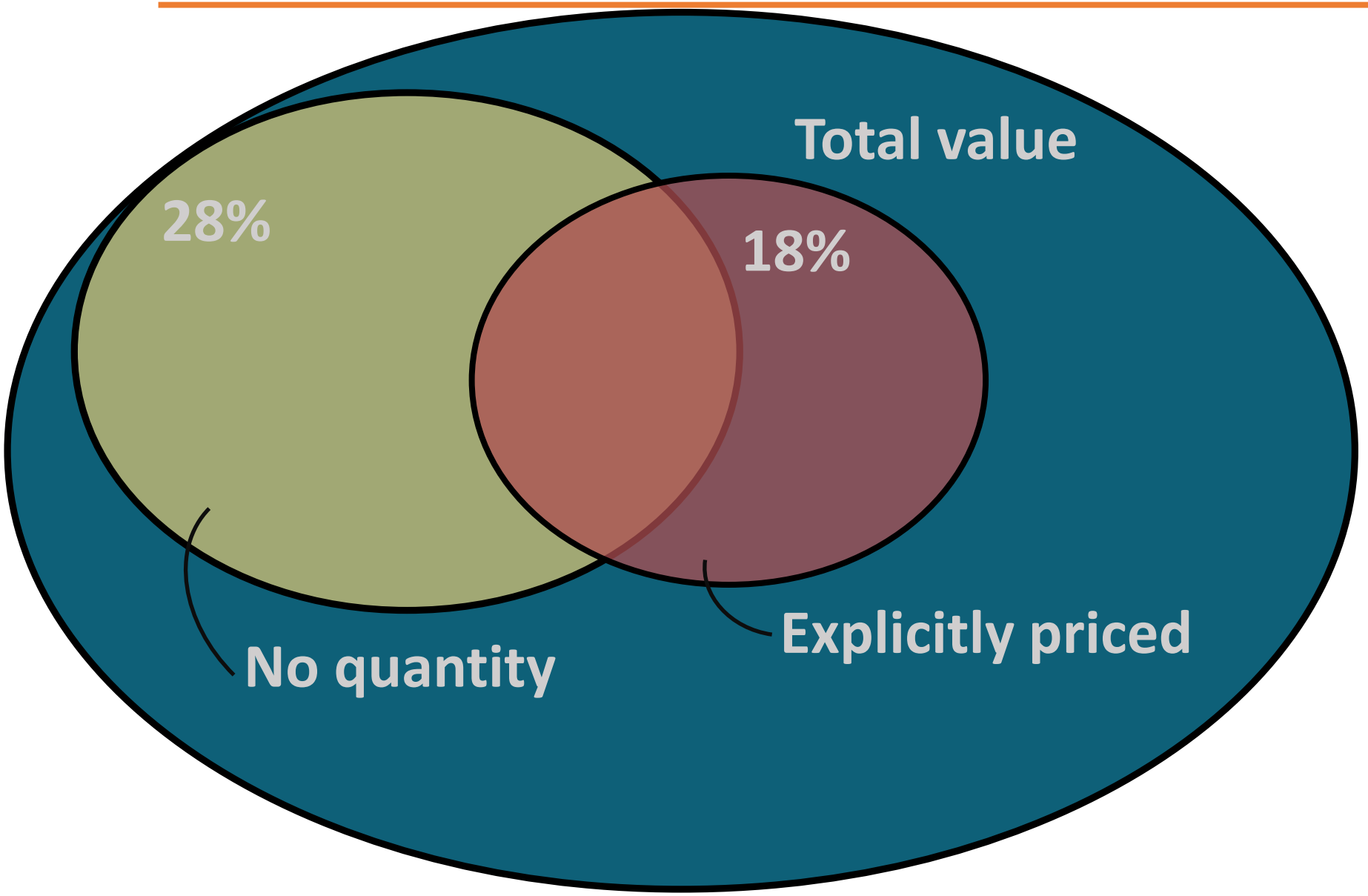
Make up - Exports



For the 2018 year

- 90% had value and quantity
- 10% of value did not have quantity information. 1.71 pp of the 10% was explicitly priced.
- 0.16% did have quantity information available but was still explicitly priced

Make up - Imports

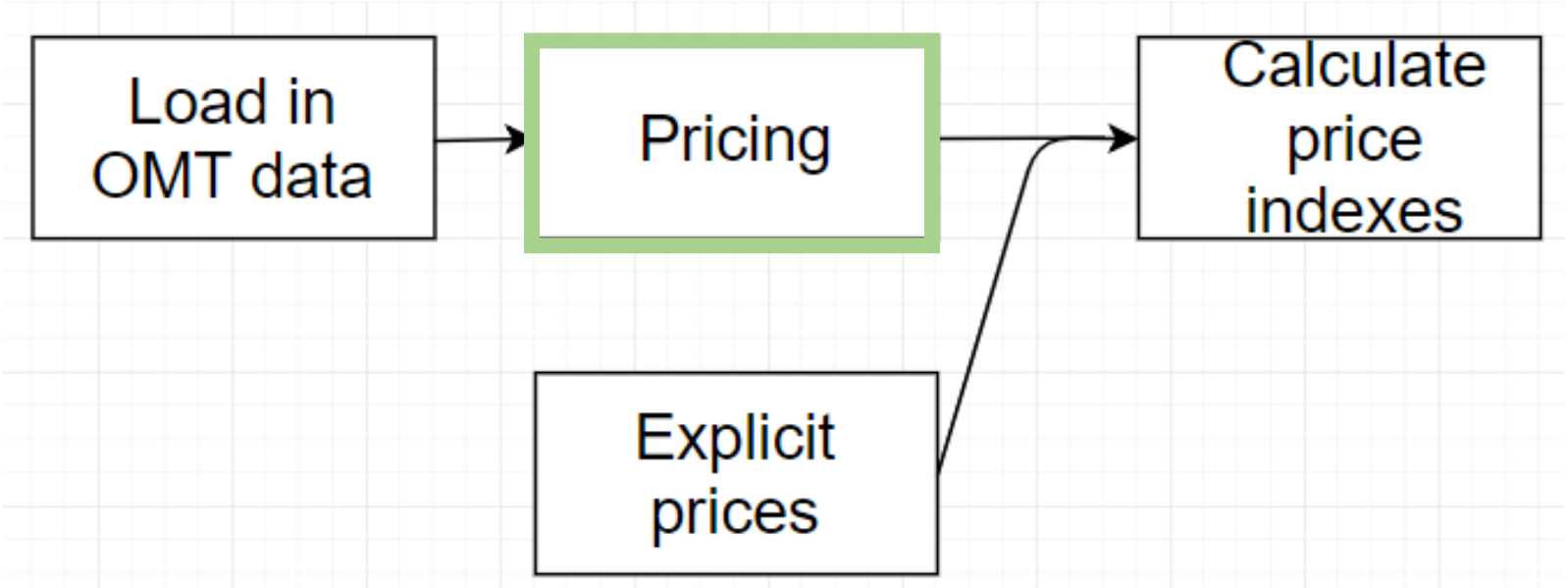


For the 2018 year

- 73% had value and quantity
- 28% of value did not have quantity information. 9pp of the 28% was explicitly priced.
- 9% did have quantity information available but was still explicitly priced

How was it previously done?

- Load in Overseas Merchandise Trade data into our bespoke system
- Pricing



Pricing

- Go through each New Zealand Harmonised System Classification code individually (not all but a large portion).
- Manually determine whether the movements of each country seems sensible.
- This process typically takes two weeks.

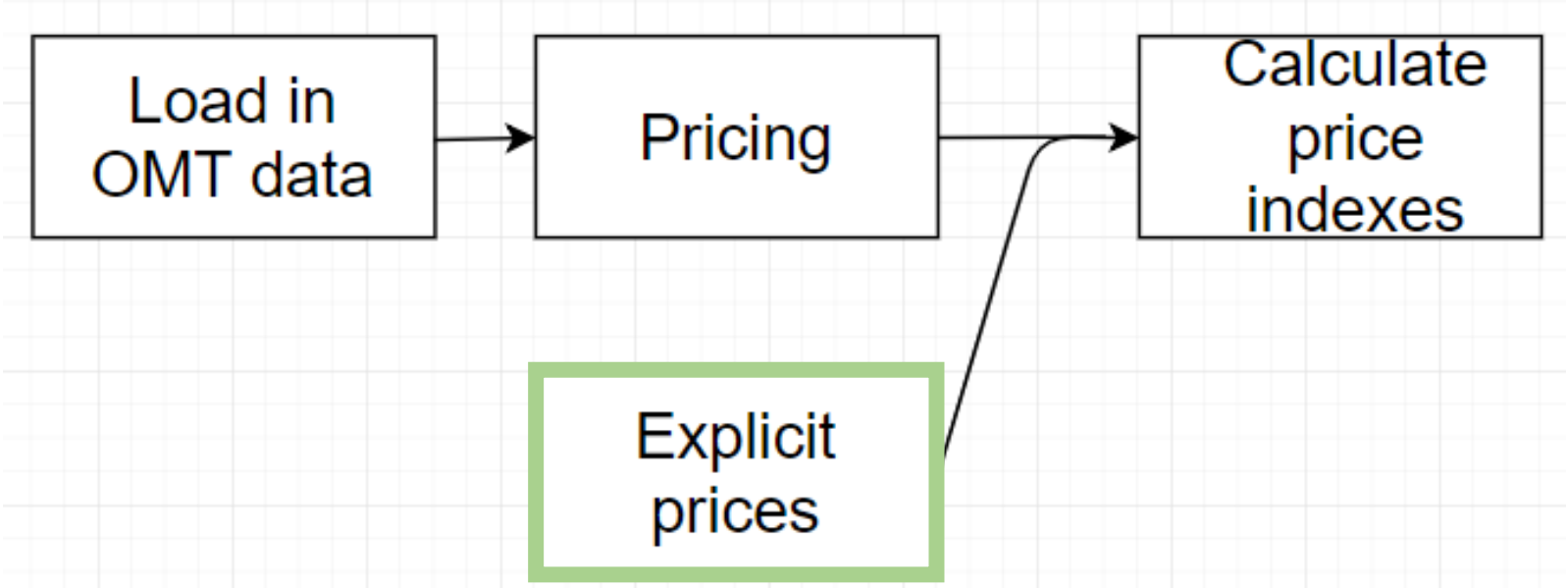
Cereals; oats, seeds *(Not real data)*

	Price change	Base Value	Quality rating
JP	0%	$ 1,000	1/3
CN	5%	$ 40,000	3/1
GB	1%	$ 490	1/3
IN	0%	$ 7,000	1/3
ID	3%	$ 300	1/2
FJ	12%	$ 2,000	1/1

How was it previously done?

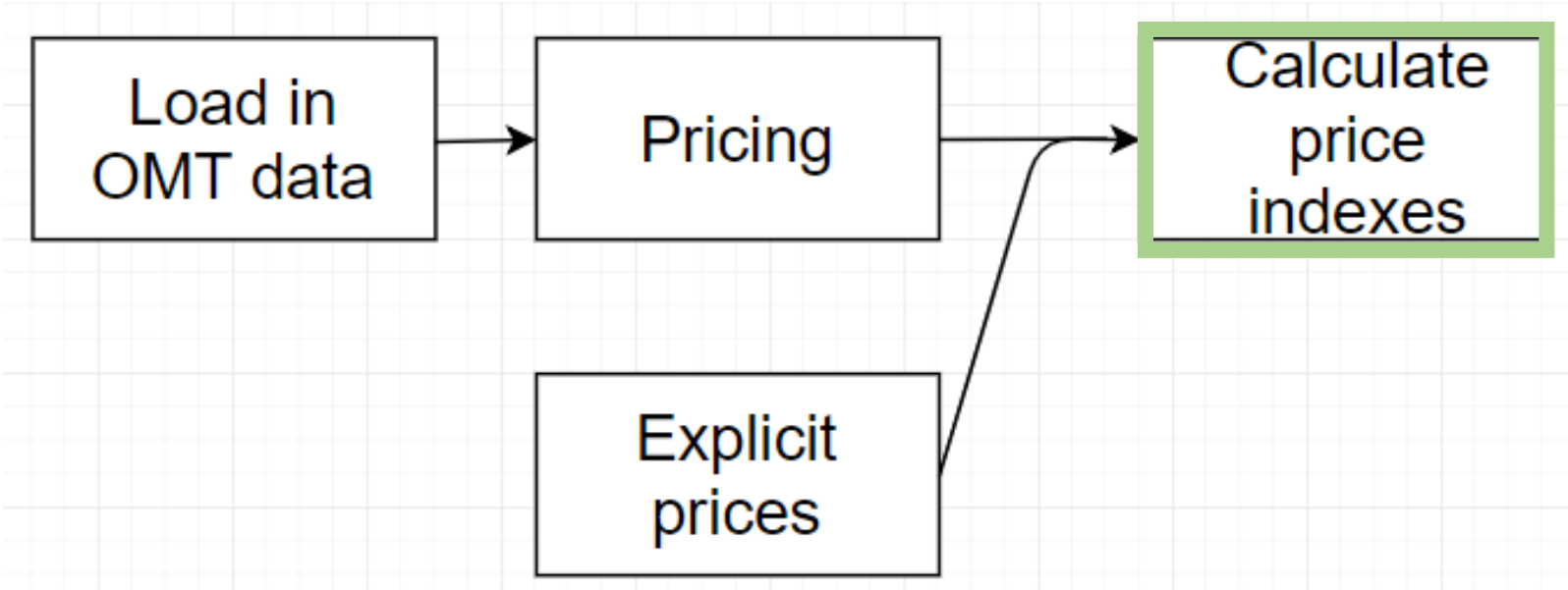
- Once pricing is complete we integrate the explicitly priced HS10s
- Surveyed prices (commodity price survey)

- We include these because we either don't have quantity or we have a better way of measuring the price (e.g. import data directly from big players in industry)



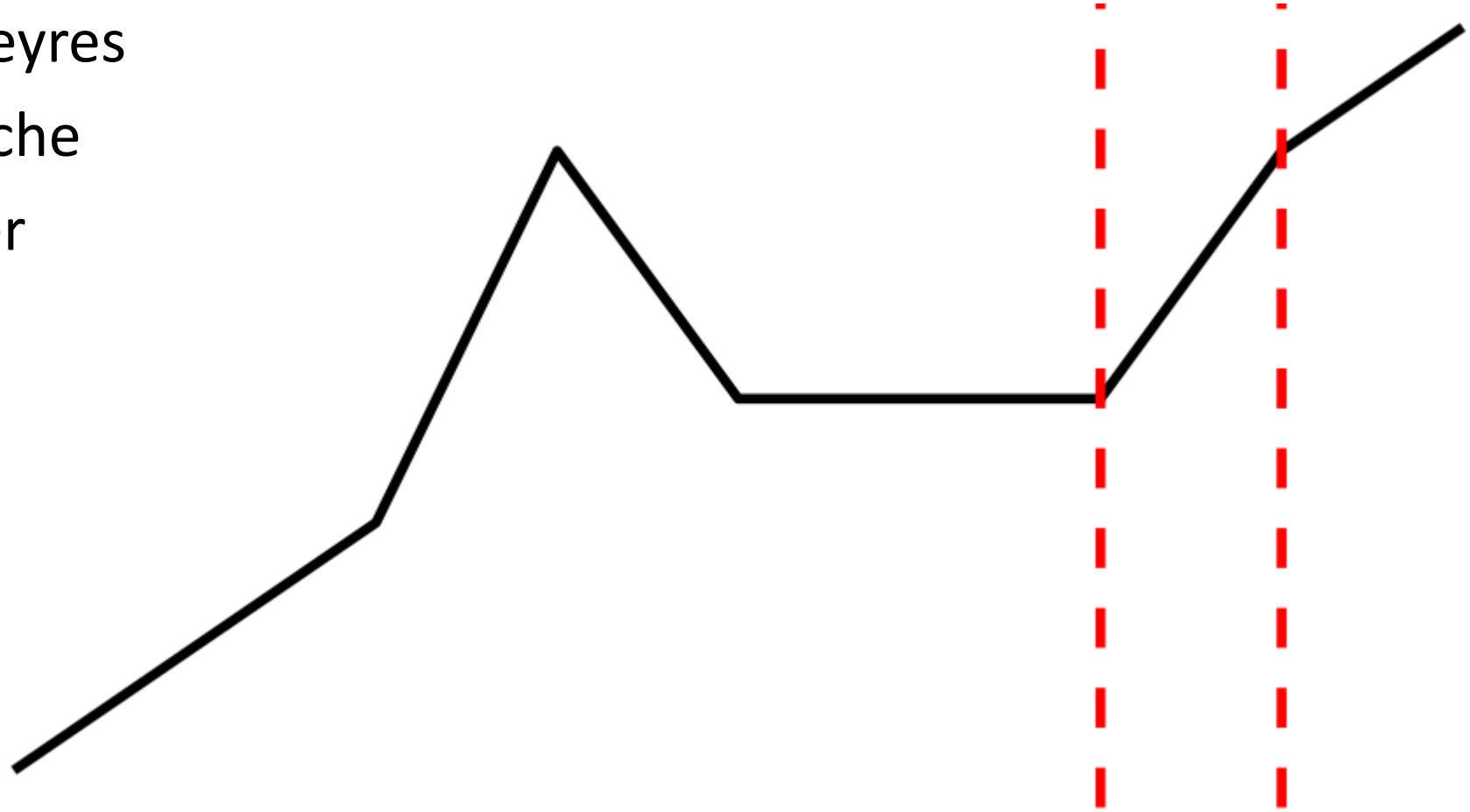
How was it previously done?

- In the current bespoke system we calculate the indexes
- The method is an annually chain-linked Fisher Ideal index



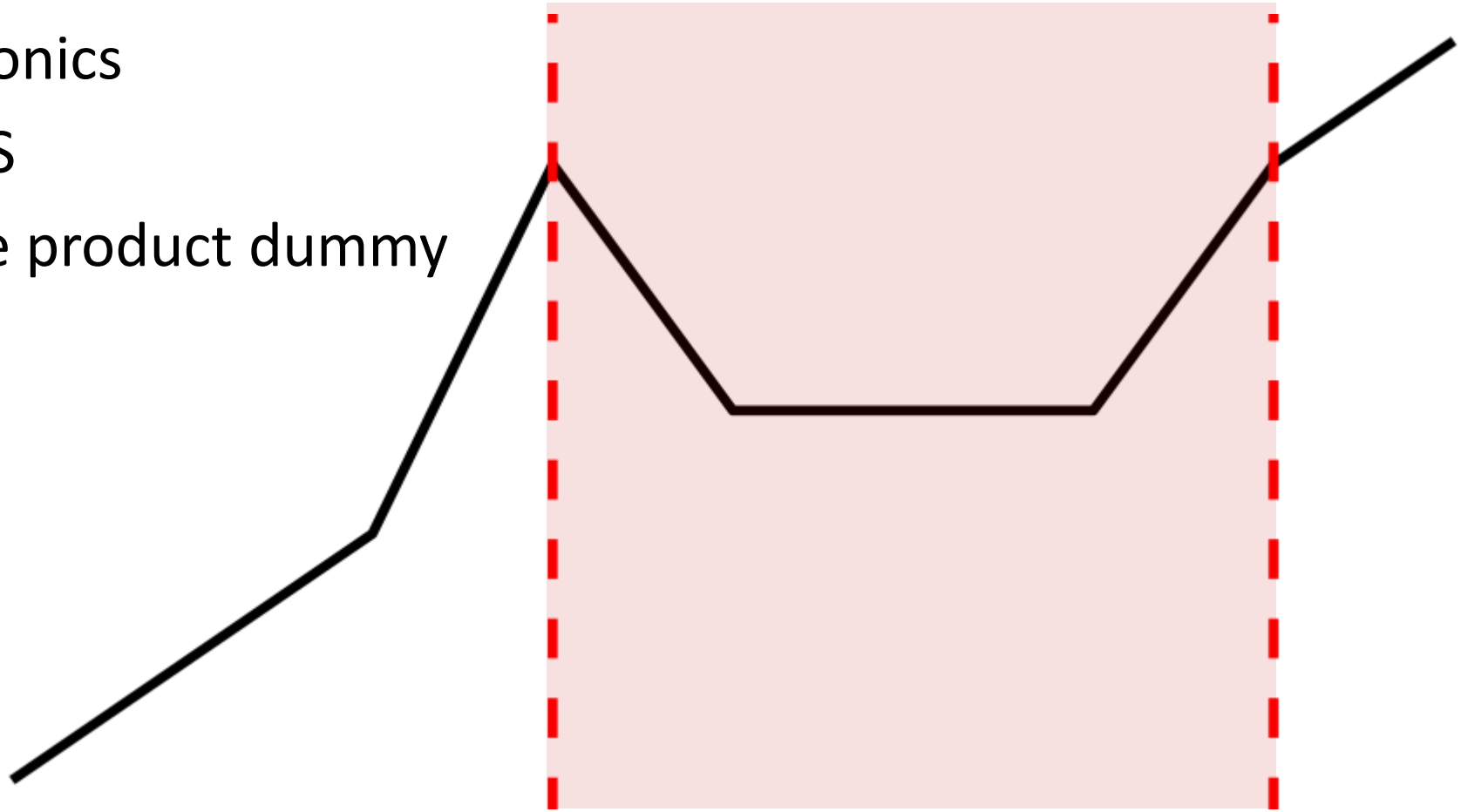
Traditional index calculation methods

- Laspeyres
- Paasche
- Fisher



Multilateral methods

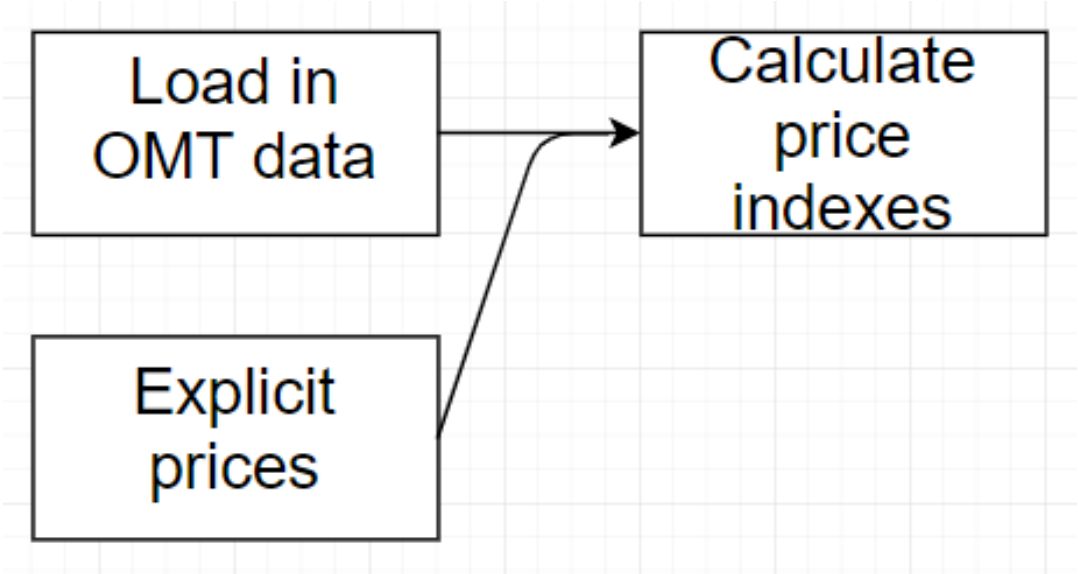
- Hedonics
- GEKS
- Time product dummy



New method

Fixed Effects Window Splice (FEWS)

- Regression based approach over a window to measure pure price change
- Chaining these windows together.
- The FEWS implicitly selects only like for like products avoiding those that are influenced by a change in quality.



Multilateral methods

Pros

- Mostly automated
- Less subjective
- Dynamic universe
- More granular
- Better handling of chain drift

Cons

- Developing field
- Not as easily broken down (contributions)

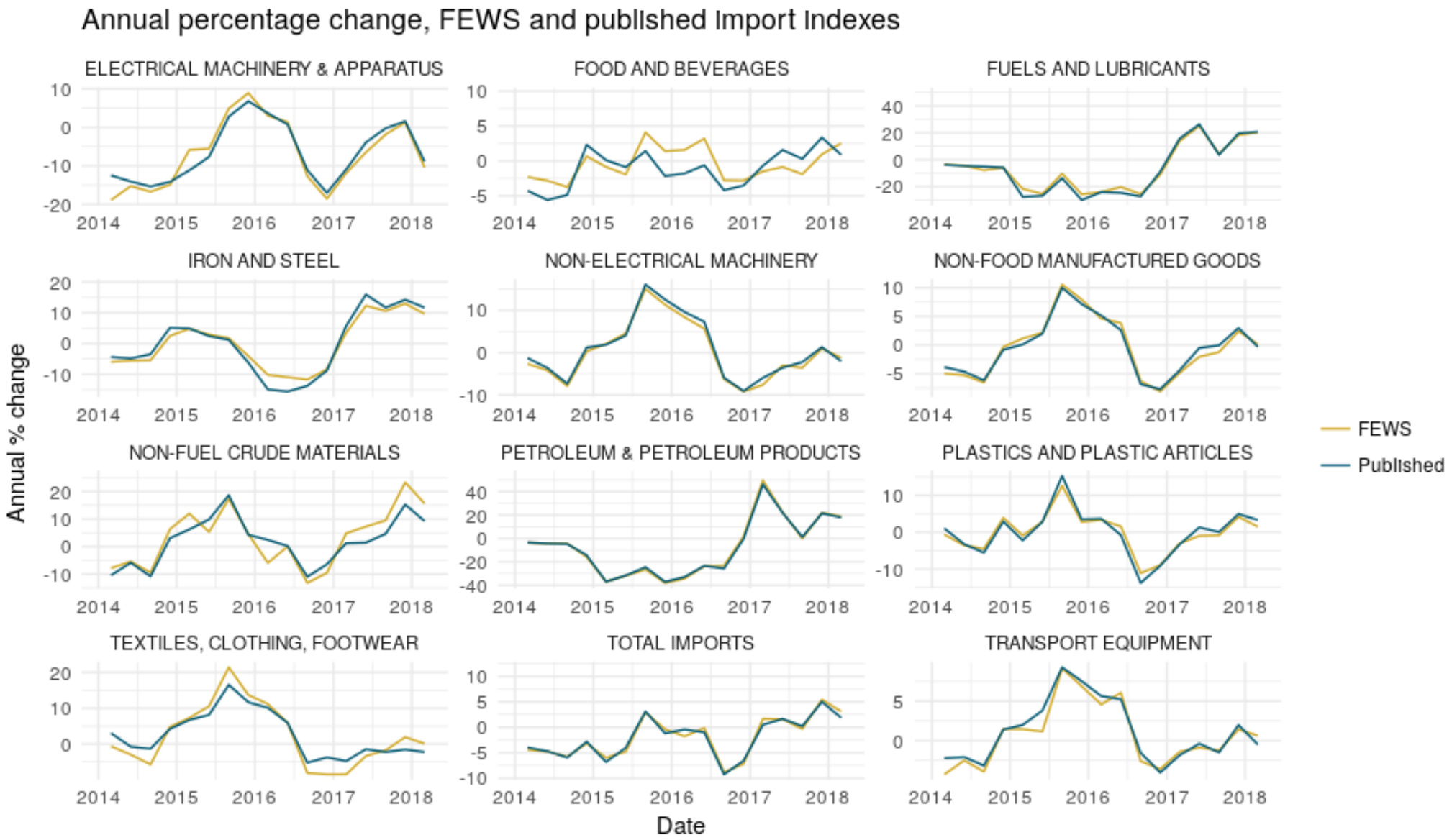
New method

- The regression model does not know what the product is, it sees it as a factor or an ID
- If we are confident that the description, company etc captures all quality we can treat it as an ID itself

(Not real data)

Period	HS10	ID	unit value	total value
1/03/2018	1701120010	Description,Company,Country,Unit of measurement	$ 5	$ 700,000
1/03/2018	1701120010	Description,Company,Country,Unit of measurement	$ 6	$ 900,000
1/03/2018	1704100000	1704100000US	$ 5	$ 2,000,000
1/03/2018	1803500000	Description,Company,Country,Unit of measurement	$ 9	$ 30,000

Preliminary results



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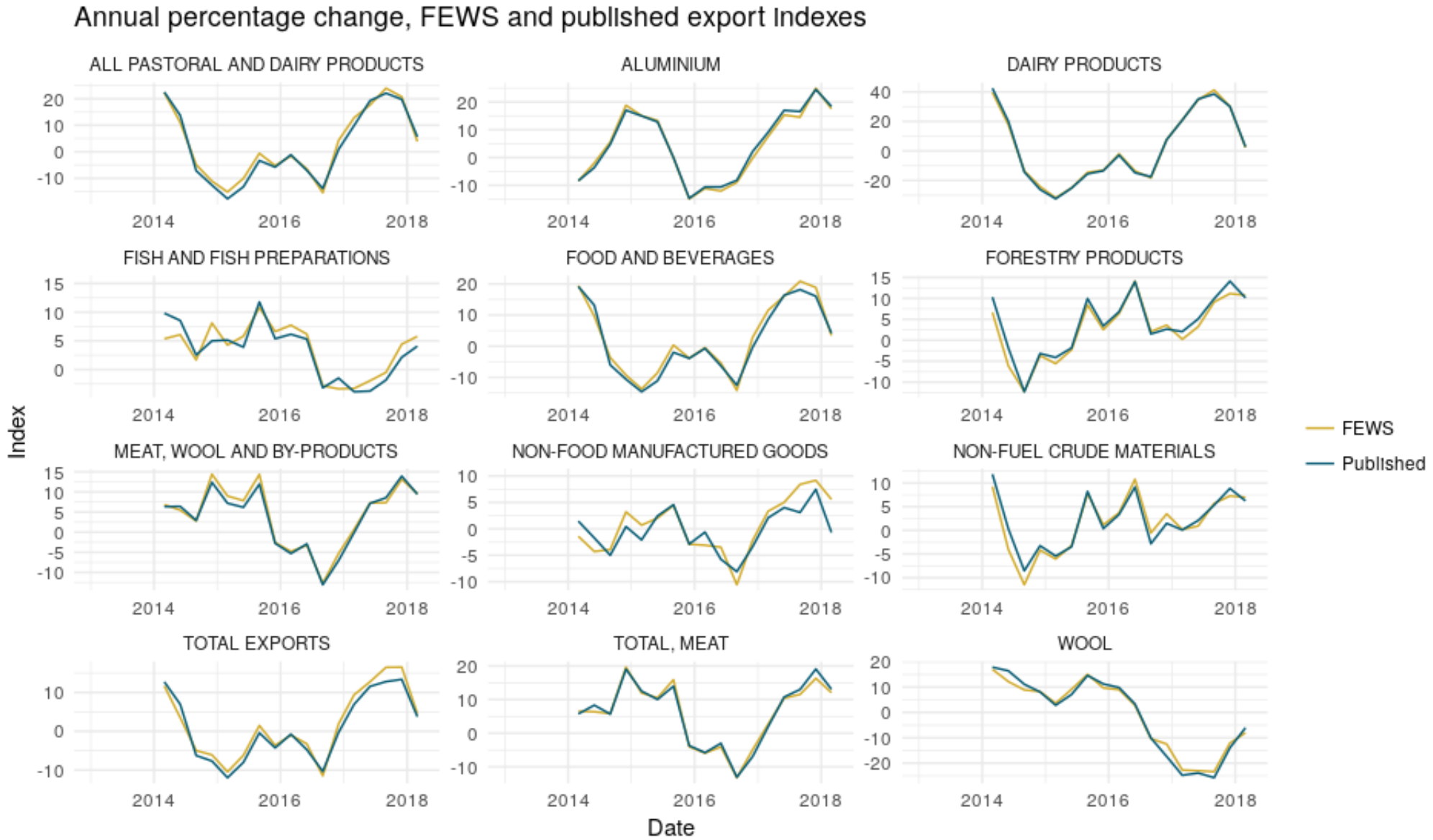
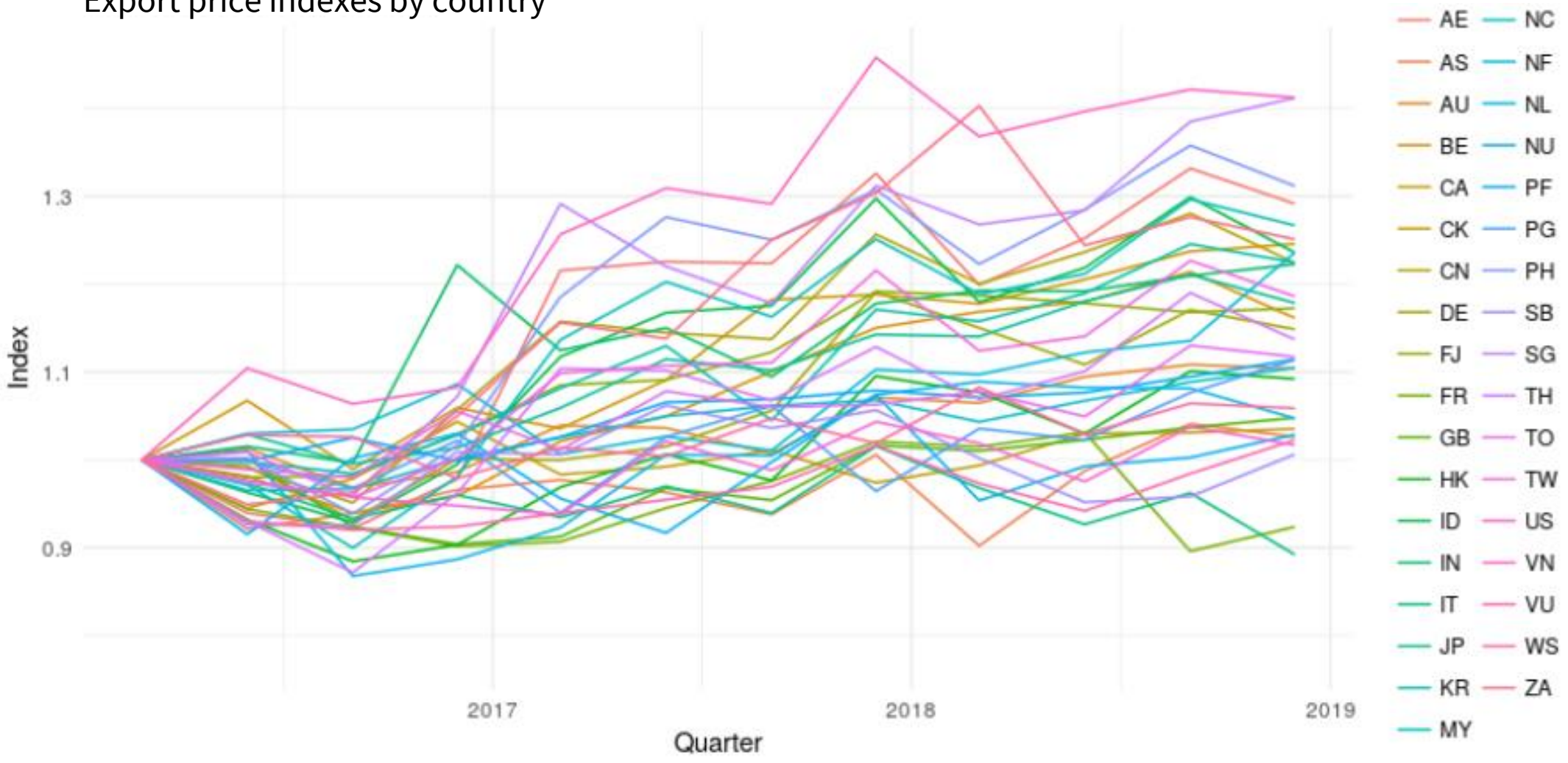


Preliminary results

Preliminary results

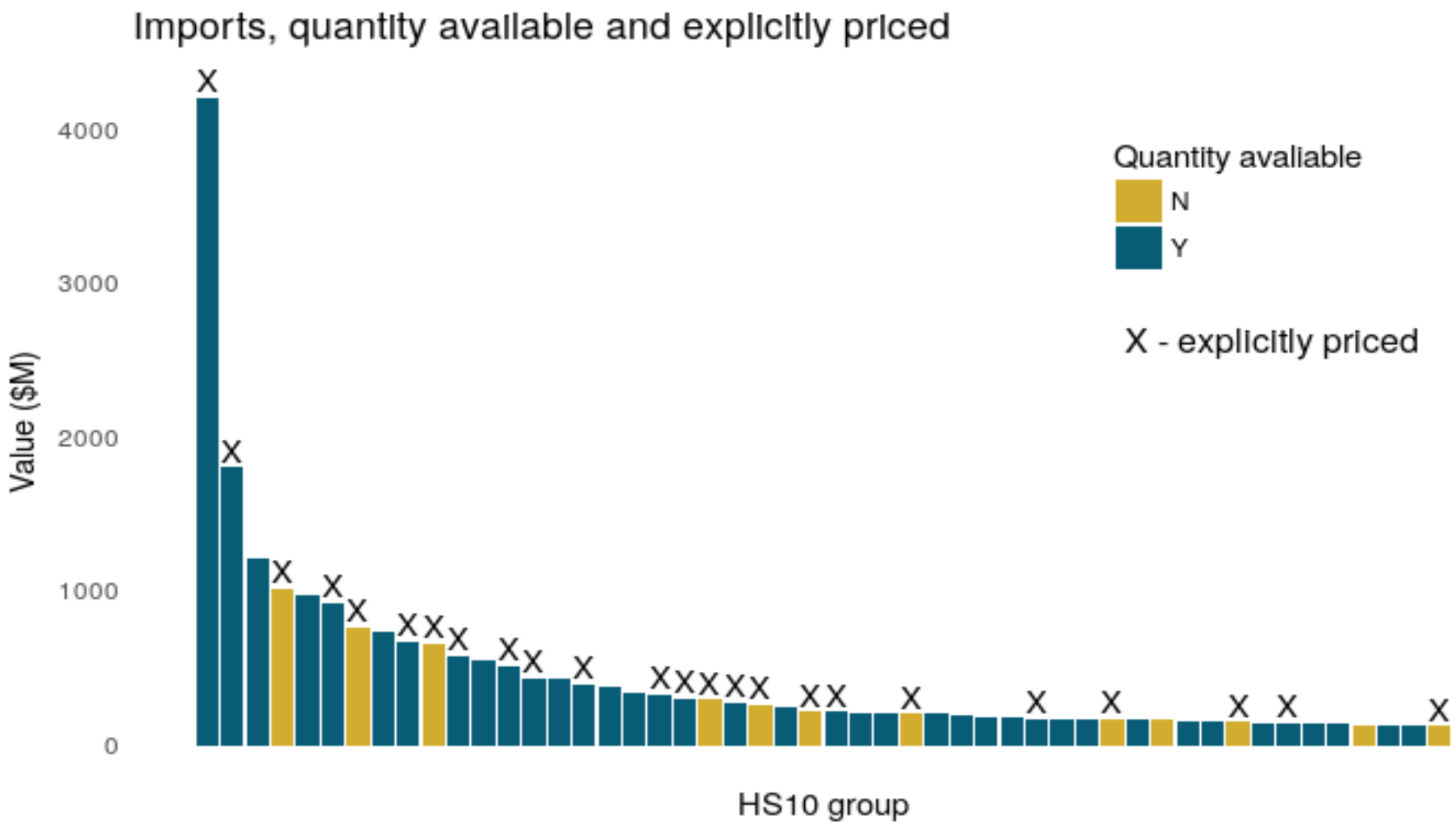
Export price indexes by country



Roadblocks

- Missing information (quantity)
- Description (ID) make up

Roadblocks – Missing information



Roadblocks – Quality of trade data

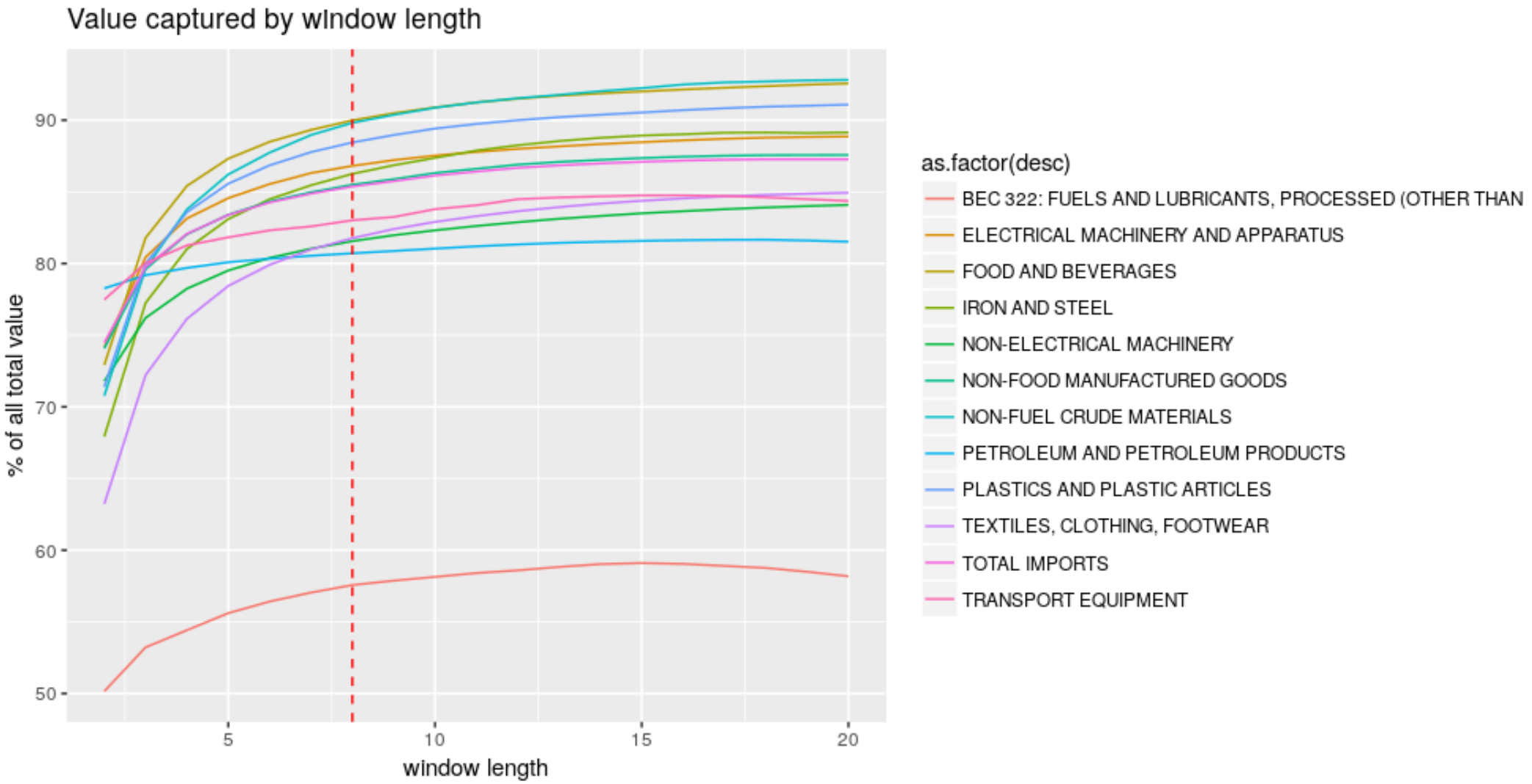
- White space
- Punctuation
- Typos
- Product IDS

Description 13.4kg

CHASSIS NUMBER 234376980

Serial number 0596737

Roadblocks – Quality of trade data



Advantages

- Removing subjectivity
- More granular
- Move away from legacy systems
- Increased frequency
- Arguably a better measure

Disadvantages

- Difficult to explain
- Do not have an accurate contribution measure (currently)
- Some HS10s are just not suitable for this method

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Stats NZ

Location on website during development phase (some things have changed)

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FEWS package used to produce these indexes