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HM Revenue and Customs

Asymmetries in international trade in goods statistics: UK measured against non-EU partners, 2014 to 2016

Summary

- Asymmetries are the differences between the published trade statistics of the reporting country and its partner countries. Each country collects data on their own international trade-in-goods for both imports and exports, simplistically the 'mirror flow' collected by the partner countries should match (i.e. one country's export should mirror the partner countries import). In reality, it is often the case that the figures do not match and this is referred to as an 'asymmetry'.
- The total asymmetry in 2016 between UK reported imports from the UK's top 20 non-EU partners and their reported exports to the UK was -\$3.0bn. The asymmetry was \$4.9bn in 2014, and -\$2.8bn in 2015.
- The total asymmetry in 2016 between UK reported exports to the UK's top 20 non-EU partners and their reported imports from the UK was \$20bn. The asymmetry was \$18bn in 2014, and \$31bn in 2015.
- The relative asymmetry in 2016 between UK reported imports from the UK's top 20 non-EU partners and their reported exports to the UK was -1.1%. The asymmetry was 1.9% in 2014, and -1.2% in 2015.
- The relative asymmetry in 2016 between UK reported exports from the UK's top 20 non-EU partners and their reported imports to the UK was 11%, the asymmetry was 8.3% in 2014, and 15% in 2015.

Table of Contents

1: Introduction

2: Trade in goods asymmetries between the UK's top 20 trading partners by trade value, 2014-2016

- 2.1 Imports: UK's top 20 non-EU trading partner's share of absolute asymmetries
- 2.2 Imports: UK's top 20 non-EU trading partner's relative asymmetries
- 2.3 Imports: UK's top 20 non-EU trading partner's total trade versus average absolute relative asymmetries
- 2.4 Exports: UK's top 20 non-EU trading partner's share of absolute asymmetries
- 2.5 Exports: UK's top 20 non-EU trading partner's relative asymmetries
- 2.6 Exports: UK's top 20 non-EU trading partner's total trade versus average absolute relative asymmetries

3: UK trade in goods asymmetries with the UK's top 20 trading partners by trade value, 2014-2016

- 3.1 Imports: UK asymmetries by partner country
- 3.2 Imports: Top ten UK chapters by share of total absolute asymmetry (2014-2016)
- 3.3 Imports: Top ten chapters by relative asymmetry (2014-2016)
- 3.4 Exports: UK asymmetries by partner country
- 3.5 Exports: Top ten chapters by share of total absolute asymmetry (2014-2016)
- 3.6 Exports: Top ten chapters by relative asymmetry (2014-2016)

Annex 1: HS2 Chapter descriptions Annex 2: Measures of asymmetry

1. Introduction

Asymmetries are the differences between the published trade statistics of the reporting country and its partner countries. Each country collects data on their own international trade-in-goods for both imports and exports, simplistically the 'mirror flow' collected by the partner countries should match i.e. one country's export should mirror the partner countries import. In reality, it is often the case that the figures do not match and this is referred to as an 'asymmetry'.

For example, there may be a difference between what the United Kingdom (UK) records as imports from China, and what China records as exports to the UK. This difference or asymmetry can be measured. Further information on how asymmetries are measured can be found in Annex 2: Measures of asymmetry.

This paper is an asymmetry study covering trade in goods between the UK and the UK's top 20 non-EU trading partners for the calendar years 2014, 2015 and 2016. The data used in the compilation of this report has been extracted from the United Nations International Trade Statistics <u>Database</u>. Additional tables supporting this paper can be found in the accompanying statistical data set.

International trade in goods data detailing trade between the UK and non-EU countries are collected from UK Customs entries made by importing and exporting businesses via the Customs Handling of Import and Export Freight (CHIEF) system.

Both ONS and HMRC are undertaking a series of investigations into asymmetries. Previously published papers in this series are:

- Article 1 <u>Asymmetries in trade data A UK perspective:</u> Published on 13th July 2017, by ONS
- Article 2 <u>Trade asymmetries between the UK and EU Member States</u>, 2014 to 2016: Published on 7th November, by HMRC
- Article 3 <u>Asymmetries in trade data diving deeper into UK bilateral trade data:</u> Published on 29th January 2018, by ONS

2. Trade in goods asymmetries between the UK's top 20 trading partners by trade value, 2014–2016

This section explores the asymmetries of the UK's top 20 trading partners by value, comparing each partner's trade flow against the mirror flow of the top 20 block. For example, China's imports from the UK's top 20 block against exports to China from the UK's top 20 block, this is shown in diagram below.

		Australia	Mexico	Switzerland	
		Brazil	Norway	Thailand	
	Imports from	Imports from Canada		Turkey	
China			Russia	United Arab Emirates	
	Exports to	Hong Kong	Saudi Arabia	United Kingdom	
		India	Singapore	USA	
		Japan	South Africa	Vietnam	

2.1 Imports: UK's top 20 non-EU trading partner's share of absolute asymmetries

For each of these 21 trading partners, Graph 2.1 shows the import absolute asymmetries between each partner and the remaining block, for the years 2014-2016, together with its average import value with this block.

The top five countries by average value of imports between 2014 and 2016 were USA, China, Hong Kong, Japan and Canada. These accounted for 62% of the total absolute asymmetry for imports in 2016. Within this, the four largest importers (USA, China, Hong Kong and Japan) also had the four largest shares of total absolute asymmetry, accounting for 60% between them in 2016. The USA accounted for 19% of this. However, Canada whilst being the fifth largest importer, only accounted for 2.0% of the total absolute asymmetry in 2016, ranking it 12th.

The smallest five countries by average value of imports were Norway, South Africa, Russia, Turkey and Saudi Arabia, they accounted for 8.0% of the total absolute asymmetry in 2016. Of these, Norway had the smallest average import value at \$31bn.

A notable increase was seen for China over the three year time series. In 2014, the Chinese share of the total absolute asymmetry was 2.3% ranking it ninth, this increased to 9.4% in 2015, and further still to 16% in 2016 at rank 2.

Overall, the UK's share of absolute asymmetry remained consistently below 1%. At 0.6%, in 2016, this equated to the fourth smallest share of absolute asymmetry, despite the UK having the eighth largest average import value.

2.2 Imports: UK's top 20 non-EU trading partner's relative asymmetries

Graph 2.2 shows the imports relative asymmetries between each partner within this block for the years 2014-2016.

As seen in graph 2.1 the USA was the largest importer during this period, however its relative asymmetry across the time series was consistently low at an average of 5.7%. In contrast, the

relative asymmetry for Singapore changed from a positive asymmetry in 2014 of 5.6% to a negative asymmetry in 2015 of -2.5% and then returned to a positive asymmetry in 2016 of 1.0%

As seen in graph 2.1 Norway was the smallest importer of the UK's top 20 partners during this period, but its relative asymmetry across the time series was one of the largest. Having said this, it has decreased from its starting point of 35% in 2014, to 31% in 2015 and down further to 24% in 2016.

The asymmetry for South Africa appears as an anomaly whereby in 2014 the relative asymmetry was 13%, this decreased to -0.1% in 2015, before increasing to 10% in 2016, giving a 7.9% average over the three years.

The UK's relative asymmetry across the time series was consistently low with 1.9% in 2014, -1.2% in 2015 and -1.1% in 2016.

2.3 Imports: UK's top 20 non-EU trading partner's average relative asymmetries and import value

Graph 2.3 shows the imports relative average asymmetry (regardless of sign) between each partner within this block for the years 2014-2016, together with the average total trade value.

The USA and China, both large importers, had comparatively small relative asymmetries. In contrast, countries such as Japan, India and Vietnam showed much larger relative asymmetries compared with their import trade value.

Japan had an average import value between 2014 and 2016 of \$466bn, whilst its average relative asymmetry was 18%. In comparison, Canada had the next largest average import value at \$354bn, its average relative asymmetry was -2.8%.

The UK was the eighth largest importer of the top 20 block between 2014 and 2016 with an average import value of \$251bn. During this period it had the lowest average relative asymmetry at 0.1%.



Graph 2.1 Imports: UK's top 20 non-EU trading partners by value, share of absolute asymmetries (2014-2016), ordered by 2016 share of absolute asymmetry

Source: UN Comtrade, DESA/UNSD, extracted March 2018



Graph 2.2 Imports: UK's top 20 non-EU trading partners by value, relative asymmetries (2014-2016), ordered by 2016 value (%)

Source: UN Comtrade, DESA/UNSD, extracted March 2018



Graph 2.3 Imports: UK's top 20 non-EU trading partners by trade value, average total imports versus average relative asymmetries (2014-2016), ordered by average total imports.

Source: UN Comtrade, DESA/UNSD, extracted March 2018

2.4 Exports: UK's top 20 non-EU trading partner's share of absolute asymmetries

For the 21 trading partners, Graph 2.4 shows the share of exports absolute asymmetry for each partner and the remaining block, for the years 2014-2016, together with its average export value with this block.

The top five countries by average value of exports between 2014 and 2016 were China, USA, Japan, Hong Kong and Rep. of Korea. These accounted for 63% of the total export absolute asymmetry in 2016. Hong Kong was the fourth largest exporter with an average value of \$439bn, and had the largest share of total absolute asymmetry in 2016 at 33%. Whereas, Japan was the third largest exporter, at \$477bn, but only had the sixth largest share of total absolute asymmetry in 2016 of 5.6%.

The smallest five countries by average value of exports between 2014 and 2016 were Saudi Arabia, South Africa, Turkey, Norway and United Arab Emirates. These accounted for 17% of the total absolute asymmetry in 2016. This was largely due to Saudi Arabia having 8.8% of the share of absolute asymmetry despite having the lowest average export value of \$26bn between 2014 and 2016.

The UK's share had a share of absolute asymmetry was 1.3% in 2014, increasing to 2.7% in 2015, but then decreased to 1.7% in 2016, ranking it 13th. The UK had the ninth largest average export value between 2014 and 2016 of \$210bn.

2.5 Exports: UK's top 20 non-EU trading partner's relative asymmetries

Graph 2.5 shows the exports relative asymmetries between each partner within this block for the years 2014-2016.

It is worth noting the change in scale of the relative asymmetry axis in graph 2.5 compared with that of graph 2.2. In graph 2.2, the scale is +/- 35% whereas in graph 2.5 the scale is +/- 180%. This was driven by the large asymmetries of Hong Kong and Saudi Arabia. As seen in graph 2.4, Hong Kong was the fourth largest exporter of the UK's top 20 partners during this period. Its relative asymmetry was the largest within the block, at 158% for the three years. Though Saudi Arabia had a low relative asymmetry for imports, it had the second highest average asymmetry for exports at 143%.

Canada had a small relative asymmetry in comparison with its total export value (as seen in graph 2.4), at \$390bn, compared with an average relative asymmetry of -1.0%. Norway was one of the smallest exporters with an average value of \$41bn. However, in contrast to the imports analysis where its relative asymmetry was large, Norway had one of the smallest export relative asymmetries with an average of -3.6%.

The UK had the ninth largest total value for exports, but its relative asymmetry across the time series, although higher than imports, was still moderately low with an average between 2014 and 2016 of 11%.

2.6 Exports: UK's top 20 non-EU trading partner's average relative asymmetries and import value

Graph 2.6 shows the exports relative average asymmetry (regardless of sign) between each partner within this block for the years 2014-2016, together with the average total trade value.

China and the USA, both large exporters, had comparatively small relative asymmetries. In contrast, Hong Kong, the fourth largest average exports at \$436bn, had the highest average relative asymmetry of 158%

The UK had the ninth largest average export value of the top 20 block with \$210bn, during this period they had the eleventh largest average relative asymmetry of 11%.



Graph 2.4 Exports: UK's top 20 non-EU trading partners by value, share of absolute asymmetries (2014-2016), ordered by 2016 share of absolute asymmetry

Source: UN comtrade, DESA/UNSD, extracted March 2018



Graph 2.5 Exports: UK's top 20 non-EU trading partners by trade value, relative asymmetries (2014-2016), ordered by 2016 value (%)



Graph 2.6 Exports: UK's top 20 non-EU trading partners by value, average total exports versus average relative asymmetries (2014-2016), ordered by average total exports.

Source: UN Comtrade, DESA/UNSD, extracted March 2018

3. Trade in goods asymmetries between the UK and each of the UK's top 20 trading partners, 2014-2016

This section explores the asymmetries between the UK and its top 20 trading partners by trade value. Where the last section looked at each country and measured the asymmetries between the block as a whole, this section is focussed on the UK versus each of its trading partners. As this section is at country level, we can also investigate the top 10 goods (using HS2 Chapters) behind the asymmetries. Again, we study the absolute and relative measures of asymmetry.

3.1 Imports: UK asymmetries by partner country

Table 3.1 shows the asymmetries between the UK reported imports from its top 20 trading partners and their reported exports to the UK for the years 2014-2016.

Table 3.1.1 summarises the largest absolute asymmetries, for 2014, 2015 and 2016. China, Hong Kong and Switzerland remained in the top five through all three years. Whereas, the USA was the third largest in 2014, dropping to seventh in 2015, and then rising to fifth in 2016.

	2014	2015	2016
Rank	Country	Country	Country
1	China	Hong Kong	South Africa
2	Norw ay	Sw itzerland	Sw itzerland
3	USA	China	China
4	Hong Kong	South Africa	Hong Kong
5	Sw itzerland	Norw ay	USA

Table 3.1.1 Top 5 countries with the largest absolute asymmetries for UK imports (2014-2016)

Thailand and Australia were among the five countries with the smallest total absolute asymmetry through all three years. There is a notable trend for the years 2014 to 2016 whereby the UK's asymmetry with India reduced from \$1.1bn in 2014 to \$0.44bn in 2015, and reduced further in 2016 to \$0.03bn, making the UK's asymmetry with India the smallest absolute asymmetry within the top 20 trading partners for imports.

The absolute asymmetry with Norway reduced by a factor or five times between 2014 and 2016. Whereas, the absolute asymmetry with the Republic of Korea increased by a factor of over ten times between 2014 and 2015.

Table 3.1.2 summarises the largest relative asymmetries, for 2014, 2015 and 2016. Saudi Arabia had the largest relative asymmetry for all three years. Hong Kong, Singapore and South Africa remained in the top five largest relative asymmetries by magnitude through all three years.

	2014	2015	2016
Rank	Country	Country	Country
1	Saudi Arabia	Saudi Arabia	Saudi Arabia
2	Hong Kong	Hong Kong	South Africa
3	United Arab Emirates	Singapore	United Arab Emirates
4	Singapore	South Africa	Singapore
5	South Africa	Russia	Hong Kong

Table 3.1.2 Top 5 countries with the largest relative asymmetries for UK imports (2014-2016)

3.2 Imports: Top ten UK chapters by share of total absolute asymmetry (2014-2016)

Table 3.2 shows the top ten imports products in order of their share of total absolute asymmetry between the years 2014 and 2016.

Chapters consistently in the top ten through all three years were 84 (Mechanical appliances), 85 (Electronic equipment), 87 (Motor vehicles), 88 (Aircraft), 27 (Mineral fuels), 30 (Pharmaceutical products), 61 (Knitwear) and 99 (Other products).

It is worth noting that Chapter 99 will often appear within both the absolute and relative asymmetry tables. Chapter 99 is used to capture 'other products'. This may include low value consignments, where the goods have been aggregated and classified to a single commodity (9950 0000), and also includes mixed consignments of motor vehicles or aircraft parts (9990 8700). Goods delivered to and from offshore installations also fall within this category.

The UK's total absolute asymmetry followed an increasing trend; \$35bn in 2014, increased to \$42bn in 2015 and then increased further to \$51bn in 2016.

In 2014, the top ten chapters accounted for 68% of the total absolute asymmetry for all chapters, this increased to 75% in 2015 and then remained as such in 2016. Through all three years, the top two chapters alone accounted for over 25% of the total absolute asymmetry, while the top five chapters accounted for around 50% of the total asymmetry for all chapters.

3.3 Imports: Top ten chapters by relative asymmetry (2014-2016)

Table 3.3 shows the top ten import chapters by relative asymmetry between the years 2014 and 2016.

Chapters consistently in the top ten through all three years were Chapter 14 (Other vegetable products), Chapter 18 (Cocoa), Chapter 99 (Other products) and Chapter 47 (Waste paper and wood pulp).

Chapter 45 (Cork) had a large relative asymmetry in 2014 and 2015 (106% and 117% respectively). In 2016, it dropped out of the top 10 chapters: from the detailed tables this can be explained by the large increase in the recorded exports from the UK's partners from \$1.1m in 2014 and 2015 to \$3.2m in 2016.

Table 3.1 Asymmetries between UK imports from UK's top 20 trading partners and UK's top 20 trading partners by value exports to the UK (2014-2016)

2014					2015		2016		
Country	Absolute asymmetry (\$m)	Share of total absolute asymmetry (%)	Relative asymmetry (%)	Absolute asymmetry (\$m)	Share of total absolute asymmetry (%)	Relative asymmetry (%)	Absolute asymmetry (\$m)	Share of total absolute asymmetry (%)	Relative asymmetry (%)
South Africa	2,567.4	6.7	54.1	2,846.7	9.5	63.5	6,628.3	20.3	102.4
Sw itzerland	3,156.1	8.2	-25.8	3,464.7	11.5	-29.0	6,070.7	18.6	-20.5
China	7,006.1	18.2	11.6	3,412.5	11.3	5.6	3,911.8	12.0	6.8
Hong Kong	3,983.3	10.3	-76.0	4,202.5	14.0	-83.8	3,573.5	10.9	-38.0
USA	4,808.6	12.5	8.6	1,963.1	6.5	3.4	1,823.2	5.6	3.2
Russia	2,610.5	6.8	29.6	2,178.0	7.2	38.8	1,727.3	5.3	-28.2
United Arab Emirates	1,824.6	4.7	-68.0	606.0	2.0	-37.7	1,363.3	4.2	-66.9
Singapore	1,835.3	4.8	-60.1	1,829.1	6.1	-76.2	1,105.6	3.4	-42.7
Norw ay	5,219.1	13.6	-17.2	2,372.1	7.9	-11.9	1,075.4	3.3	-6.0
Rep. of Korea	138.2	0.4	2.3	1,549.7	5.2	-21.9	972.6	3.0	-15.1
Saudi Arabia	1,827.9	4.7	105.0	1,201.2	4.0	103.7	897.7	2.7	106.9
Mexico	237.4	0.6	12.3	178.4	0.6	8.7	695.8	2.1	-24.1
Japan	691.8	1.8	-6.4	541.1	1.8	-5.2	662.7	2.0	-5.0
Canada	30.6	0.1	-0.2	1,765.9	5.9	-15.2	523.0	1.6	4.0
Turkey	653.7	1.7	6.4	510.3	1.7	4.7	521.7	1.6	4.4
Australia	81.2	0.2	-2.5	95.8	0.3	3.4	455.8	1.4	-6.3
Brazil	364.0	0.9	9.0	566.0	1.9	17.7	348.5	1.1	11.5
Vietnam	408.7	1.1	10.6	235.4	0.8	4.9	176.4	0.5	3.5
Thailand	3.8	0.0	-0.1	134.8	0.4	-3.6	149.4	0.5	-4.0
India	1,056.1	2.7	10.4	434.8	1.4	4.8	31.0	0.1	0.4
Total	38,504.4	100.0	1.9	30,088.0	100.0	-1.2	32,713.8	100.0	-1.1

	2014			2015		2016			
Chapter	Absolute Asymmetry (\$m)	Share of total absolute asymmetry (%)	Chapter	Absolute Asymmetry (\$m)	Share of total absolute asymmetry (%)	Chapter	Absolute Asymmetry (\$m)	Share of total absolute asymmetry (%)	
84	7,366.9	20.9	84	8,002.3	18.9	84	9,487.2	18.5	
85	2,705.0	7.7	99	4,082.1	9.6	99	5,503.4	10.8	
87	2,521.2	7.1	87	3,378.1	8.0	71	3,799.7	7.4	
99	2,313.4	6.6	27	3,200.8	7.6	87	3,785.4	7.4	
95	1,871.6	5.3	89	2,581.5	6.1	27	3,322.6	6.5	
27	1,695.3	4.8	85	2,542.3	6.0	30	2,633.5	5.1	
30	1,490.8	4.2	61	2,227.1	5.3	88	2,570.0	5.0	
61	1,463.3	4.1	88	2,111.9	5.0	85	2,542.3	5.0	
88	1,367.0	3.9	30	1,940.2	4.6	61	2,388.7	4.7	
89	1,239.9	3.5	62	1,598.3	3.8	62	2,183.2	4.3	
Sum of top 10	24,034.3	68.1	Sum of top 10	31,664.7	74.7	Sum of top 10	38,216.0	74.7	
Unallocated	37.7	0.1	Unallocated	58.8	0.1	Unallocated	92.1	0.2	
Sum of others	11,216.7	31.8	Sum of others	10,641.5	25.1	Sum of others	12,880.3	25.2	
Total	35,288.7	100.0	Total	42,365.1	100.0	Total	51,188.4	100.0	

Table 3.2 Top ten imports chapters by share of total absolute asymmetry (2014-2016)

	2014			2015		2016		
Chapter	Absolute Asymmetry (\$m)	Relative Asymmetry (%)	Chapter	Absolute Asymmetry (\$m)	Relative Asymmetry (%)	Chapter	Absolute Asymmetry (\$m)	Relative Asymmetry (%)
93	146.0	-123.9	99	4,082.1	-131.1	93	143.5	-123.3
45	2.5	106.2	45	3.1	117.4	99	5,503.4	-109.8
89	1,239.9	-99.9	31	134.3	103.1	31	95.1	93.5
31	148.9	93.8	89	2,581.5	-97.7	18	84.3	-78.2
86	352.9	-86.5	86	342.7	-79.9	26	574.3	77.6
14	7.4	77.9	18	78.1	-68.8	14	7.0	70.9
80	32.3	76.7	26	793.2	67.5	97	2,050.3	-69.6
18	81.8	-69.3	14	7.5	62.7	24	52.7	62.6
99	2,313.4	-53.5	80	21.8	59.9	47	82.1	58.1
47	100.0	47.9	47	114.1	59.2	46	44.9	-49.4
Sum of top 10	4,425.3	-58.0	Sum of top 10	8,158.4	-76.6	Sum of top 10	8,637.6	-75.0
Unallocated	37.7	-200.0	Unallocated	58.8	-200.0	Unallocated	92.1	-200.0
Sum of others	30,825.7	3.5	Sum of others	34,147.9	1.4	Sum of others	42,458.8	1.6
Total	35,288.7	1.9	Total	42,365.1	-1.2	Total	51,188.4	-1.1

Table 3.3 Top ten imports chapters by relative asymmetry (2014-2016)

3.4 Exports: UK asymmetries by partner country

Table 3.4 shows the asymmetries between the UK's reported exports to its top 20 trading partners and their reported imports for the years 2014-2016.

The UK's total absolute asymmetry from the top 20 block was \$27bn in 2014, this rose to \$36bn in 2015 but then dropped substantially to \$23bn in 2016.

Table 3.4.1 summarises the largest absolute asymmetries, for 2014, 2015 and 2016. USA and Saudi Arabia were among the top five countries for all three years, of which the USA remained the largest through all three years. The top three countries alone made up over half of the total share of asymmetry during the three year period.

	2014	2015	2016
Rank	Country	Country	Country
1	USA	USA	USA
2	China	China	United Arab Emirates
3	Saudi Arabia	United Arab Emirates	Saudi Arabia
4	India	Saudi Arabia	Hong Kong
5	Canada	Sw itzerland	Turkey

Table 3.4.1 Top 5 countries with the largest absolute asymmetries for UK exports (2014-2016)

The five countries with the smallest absolute asymmetry changed over the three years. The only country to remain in this group for all three years was Vietnam. Turkey had one of the smallest absolute asymmetries in both 2014 and 2015 but then increased to \$852m in 2016, where it had the fifth largest absolute asymmetry.

Australia had an asymmetry of \$572m in 2014, reduced to \$8.0m in 2016, the smallest absolute asymmetry within the UK's top 20 trading partners for the year.

Table 3.4 shows Saudi Arabia had the highest relative asymmetry through all three years for UK exports, as previously seen, Saudi Arabia also had the highest relative asymmetry through all three years on imports.

Table 3.4.2 Top 5 countries with the largest relative asymmetries for UK exports (2014-20	Table 3.4.	4.2 Top 5 countries wi	h the largest relativ	ve asymmetries for l	UK exports (2014-20)16)
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	2014	2015	2016
Rank	Country	Country	Country
1	Saudi Arabia	Saudi Arabia	Saudi Arabia
2	Mexico	United Arab Emirates	United Arab Emirates
3	India	China	Hong Kong
4	Canada	South Africa	Thailand
5	South Africa	Thailand	Mexico

3.5 Exports: Top ten chapters by share of total absolute asymmetry (2014-2016)

Table 3.5 shows the top ten exports chapters by share of total absolute asymmetry between the years 2014 and 2016.

Chapters that were consistently in the top ten throughout all three years included 29 (Organic chemicals), 30 (Pharmaceutical products), 71 (Precious stones, metals and jewellery), 84 (Mechanical appliances), 88 (Aircraft), 97 (Art and Antiques) and 99 (Other products).

In 2014 the total absolute asymmetry was \$42bn. This increased to \$52bn in 2015 but then dropped again to \$43bn in 2016.

In 2014, the top ten exports account for 83% of the share of total asymmetries. This increased to 88% in 2015 then decreased to 84% in 2016. The top two chapters made up around a third of the total share of the absolute asymmetry.

3.6 Exports: Top ten chapters by relative asymmetry (2014-2016)

Table 3.6 shows the top ten exports chapters by relative asymmetry between the years 2014 and 2016.

Chapters that were consistently in the top ten through all three years include 26 (Ores), Chapter 36 (Explosives and pyrotechnics), Chapter 52 (Cotton), Chapter 61 (Knitwear) and 97 (Art and Antiques).

Chapter 93 (Arms and ammunition) had an absolute asymmetry of \$243m in 2014 which increased to \$1,457m in 2015. In same period, its relative asymmetry was -116% in 2014 and then 143% in 2015, in 2016 it then dropped out of the top 10 chapters in 2016 with a relative asymmetry of -49%.

There was a steady increase in the relative asymmetry for Chapter 52 (Cotton), through the three years. Conversely, its absolute asymmetry steadily decreased.

Table 3.4 Asymmetries between UK exports from UK's top 20 trading partners and UK's top 20 trading partners by value, imports to the UK (2014-2016)

		2014			2015			2016	
Country	Absolute asymmetry	Share of total absolute asymmetry (%)	Relative asymmetry (%)	Absolute asymmetry	Share of total absolute asymmetry (%)	Relative asymmetry (%)	Absolute asymmetry	Share of total absolute asymmetry (%)	Relative asymmetry (%)
USA	8,880,9	32.8	14.9	10,494,1	29.2	16.4	6.415.5	27.8	11.0
United Arab Emirates	1.364.4	5.0	13.8	4.277.9	11.9	51.5	3.917.9	17.0	54.8
Saudi Arabia	2.362.7	8.7	41.5	3.542.5	9.8	54.3	3.572.2	15.5	74.0
Hong Kong	1,364.7	5.0	12.0	528.9	1.5	5.4	2,503.8	10.9	32.3
Turkey	198.5	0.7	3.3	142.9	0.4	-2.6	851.7	3.7	14.8
Singapore	54.0	0.2	0.9	418.1	1.2	7.2	817.5	3.5	14.2
Rep. of Korea	529.8	2.0	-7.4	1,037.8	2.9	15.6	746.2	3.2	13.4
Sw itzerland	1,422.2	5.3	4.1	1,572.0	4.4	4.7	688.3	3.0	3.5
India	1,620.5	6.0	28.9	602.7	1.7	10.6	561.4	2.4	13.5
Thailand	380.2	1.4	-14.7	652.4	1.8	-29.5	541.3	2.3	-30.8
China	2,508.8	9.3	10.0	8,691.7	24.2	37.3	539.2	2.3	-2.9
South Africa	648.2	2.4	18.0	871.9	2.4	29.8	506.6	2.2	21.0
Norw ay	267.6	1.0	4.5	100.6	0.3	-2.1	469.6	2.0	12.0
Mexico	786.3	2.9	-37.1	392.3	1.1	-18.3	418.0	1.8	-21.8
Brazil	540.5	2.0	15.3	475.6	1.3	15.7	252.4	1.1	10.4
Japan	744.7	2.8	11.0	74.5	0.2	1.1	106.4	0.5	-1.6
Vietnam	84.2	0.3	-14.0	152.3	0.4	-23.4	72.3	0.3	-10.5
Russia	1,136.7	4.2	-15.8	193.9	0.5	5.1	47.2	0.2	1.4
Canada	1,579.9	5.8	-21.0	1,322.1	3.7	-20.2	9.6	0.0	0.2
Australia	572.0	2.1	9.9	445.8	1.2	8.0	8.0	0.0	-0.1
Total	27,046.7	100.0	8.3	35,990.0	100.0	14.7	23,044.9	100.0	11.5

	2014			2015		2016		
Chapter	Absolute Asymmetry (\$m)	Share of total absolute asymmetry (%)	Chapter	Absolute Asymmetry (\$m)	Share of total absolute asymmetry (%)	Chapter	Absolute Asymmetry (\$m)	Share of total absolute asymmetry (%)
84	8,320.0	19.6	71	10,147.0	19.4	84	7,820.5	18.3
71	7,025.3	16.6	84	7,762.6	14.8	88	4,796.1	11.2
97	4,772.8	11.3	30	7,273.0	13.9	71	4,742.0	11.1
88	3,291.4	7.8	99	6,519.5	12.4	97	4,192.1	9.8
30	3,274.2	7.7	97	5,735.8	10.9	99	3,922.5	9.2
99	3,180.3	7.5	88	3,589.5	6.8	30	3,694.3	8.7
27	1,948.0	4.6	85	1,772.8	3.4	87	2,228.8	5.2
29	1,559.1	3.7	93	1,456.9	2.8	85	2,189.9	5.1
87	1,012.7	2.4	29	1,112.9	2.1	29	1,377.7	3.2
33	678.7	1.6	62	674.8	1.3	33	794.0	1.9
Sum of top 10	35,062.6	82.7	Sum of top 10	46,044.9	87.8	Sum of top 10	35,757.8	83.9
Unallocated	15.7	0.0	Unallocated	35.5	0.1	Unallocated	21.7	0.1
Sum of others	7,342.4	17.3	Sum of others	6,341.6	12.1	Sum of others	6,857.3	16.1
Total	42,420.8	100.0	Total	52,422.1	100.0	Total	42,636.7	100.0

Table 3.5 Top ten exports chapters by share of total absolute asymmetry (2014-2016)

Table 3.6 Top ten exports chapters by relative asymmetry (2014-2016)

	2014			2015		2016			
Chapter	Absolute Asymmetry (\$m)	Relative Asymmetry (%)	Chapter	Absolute Asymmetry (\$m)	Relative Asymmetry (%)	Chapter	Absolute Asymmetry (\$m)	Relative Asymmetry (%)	
26	176.2	168.1	99	6,519.5	-185.8	26	158.5	156.6	
93	243.5	-116.3	26	186.7	162.3	36	24.2	-112.8	
36	21.4	-96.4	93	1,456.9	142.8	61	384.2	96.4	
97	4,772.8	96.4	61	506.4	100.6	52	33.3	91.7	
61	449.7	92.6	97	5,735.8	95.0	28	493.5	-89.4	
91	324.9	90.4	52	40.4	87.9	97	4,192.1	87.7	
28	675.5	-88.2	91	339.5	78.8	54	113.0	-82.8	
52	52.4	84.4	36	45.8	76.3	99	3,922.5	-81.9	
08	7.9	75.9	62	674.8	75.7	42	181.7	81.1	
62	677.3	75.3	67	3.8	75.4	88	4,796.1	71.3	
Sum of top 10	7,401.8	70.1	Sum of top 10	15,509.7	19.6	Sum of top 10	14,299.1	29.2	
Unallocated	15.7	-200.0	Unallocated	35.5	-200.0	Unallocated	21.7	-200.0	
Sum of others	35,003.3	6.0	Sum of others	36,876.9	14.4	Sum of others	28,315.9	9.4	
Total	42,420.8	8.3	Total	52,422.1	14.7	Total	42,636.7	11.5	

Annex 1: HS2 Chapter Descriptions

Chapter Description

01	Live Animals
02	Meat And Edible Meat Offal
03	Fish And Crustaceans, Molluscs And Other Aquatic Invertebrates
04	Dairy Produce; Birds' Eggs; Natural Honey; Edible Products Of Animal Origin, Not Elsewhere Specified Or Included
05	Products Of Animal Origin, Not Elsewhere Specified Or Included
06	Live Trees And Other Plants; Bulbs, Roots And The Like; Cut Flowers And Ornamental Foliage
07	Edible Vegetables And Certain Roots And Tubers
08	Edible Fruit And Nuts; Peel Of Citrus Fruits Or Melons
09	Coffee, Tea, Maté And Spices
10	Cereals
11	Products Of The Milling Industry; Malt; Starches; Inulin; Wheat Gluten
12	Oil Seeds And Oleaginous Fruits; Miscellaneous Grains, Seeds And Fruit; Industrial Or Medicinal Plants; Straw And Fodder
13	Lac; Gums, Resins And Other Vegetable Saps And Extracts
14	Vegetable Plaiting Materials; Vegetable Products Not Elsewhere Specified Or Included
15	Animal Or Vegetable Fats And Oils And Their Cleavage Products; Prepared Edible Fats; Animal Or Vegetable Waxes
16	Preparations Of Meat, Of Fish Or Of Crustaceans, Molluscs Or Other Aquatic Invertebrates
17	Sugars And Sugar Confectionery
18	Cocoa And Cocoa Preparations
19	Preparations Of Cereals, Flour, Starch Or Milk; Pastry cooks' Products
20	Preparations Of Vegetables, Fruit, Nuts Or Other Parts Of Plants
21	Miscellaneous Edible Preparations
22	Beverages, Spirits And Vinegar
23	Residues And Waste From The Food Industries; Prepared Animal Fodder
24	Tobacco And Manufactured Tobacco Substitutes
25	Salt; Sulphur; Earths And Stone; Plastering Materials, Lime And Cement
26	Ores, Slag And Ash
27	Mineral Fuels, Mineral Oils And Products Of Their Distillation; Bituminous Substances; Mineral Waxes
28	Inorganic Chemicals; Organic Or Inorganic Compounds Of Precious Metals, Of Rare-Earth Metals, Of Radioactive Elements Or Of Isotopes
29	Organic Chemicals
30	Pharmaceutical Products
31	Fertilisers
32	Tanning Or Dyeing Extracts; Tannins And Their Derivatives; Dyes, Pigments And Other Colouring Matter; Paints And Varnishes; Putty And Other Mastics; Inks
33	Essential Oils And Resinoids; Perfumery, Cosmetic Or Toilet Preparations

Chapter Description

34	Soap, Organic Surface-Active Agents, Washing Preparations, Lubricating Preparations, Artificial Waxes, Prepared Waxes, Polishing Or Scouring Preparations, Candles And Similar Articles, Modelling Pastes, 'Dental Waxes' And Dental Preparations With A Basis Of Plaster
35	Albuminoidal Substances; Modified Starches; Glues; Enzymes
36	Explosives; Pyrotechnic Products; Matches; Pyrophoric Alloys; Certain Combustible Preparations
37	Photographic Or Cinematographic Goods
38	Miscellaneous Chemical Products
39	Plastics And Articles Thereof
40	Rubber And Articles Thereof
41	Raw Hides And Skins (Other Than Furskins) And Leather
42	Articles Of Leather; Saddlery And Harness; Travel Goods, Handbags And Similar Containers; Articles Of Animal Gut (Other Than Silkworm Gut)
43	Furskins And Artificial Fur; Manufactures Thereof
44	Wood And Articles Of Wood; Wood Charcoal
45	Cork And Articles Of Cork
46	Manufactures Of Straw, Of Esparto Or Of Other Plaiting Materials; Basketware And Wickerwork
47	Pulp Of Wood Or Of Other Fibrous Cellulosic Material; Recovered (Waste And Scrap) Paper Or Paperboard
48	Paper And Paperboard; Articles Of Paper Pulp, Of Paper Or Of Paperboard
49	Printed Books, Newspapers, Pictures And Other Products Of The Printing Industry; Manuscripts, Typescripts And Plans
50	Silk
51	Wool, Fine Or Coarse Animal Hair; Horsehair Yarn And Woven Fabric
52	Cotton
53	Other Vegetable Textile Fibres; Paper Yarn And Woven Fabrics Of Paper Yarn
54	Strip And The Like Of Man-Made Textile Materials
55	Man-Made Staple Fibres
56	Wadding, Felt And Nonwovens; Special Yarns; Twine, Cordage, Ropes And Cables And Articles Thereof
57	Carpets And Other Textile Floor Coverings
58	Special Woven Fabrics; Tufted Textile Fabrics; Lace; Tapestries; Trimmings; Embroidery
59	Impregnated, Coated, Covered Or Laminated Textile Fabrics; Textile Articles Of A Kind Suitable For Industrial Use
60	Knitted Or Crocheted Fabrics
61	Articles Of Apparel And Clothing Accessories, Knitted Or Crocheted
62	Articles Of Apparel And Clothing Accessories, Not Knitted Or Crocheted
63	Other Made-Up Textile Articles; Sets; Worn Clothing And Worn Textile Articles; Rags
64	Footwear, Gaiters And The Like; Parts Of Such Articles
65	Headgear And Parts Thereof
66	Umbrellas, Sun Umbrellas, Walking-Sticks, Seat-Sticks, Whips, Riding-Crops And Parts Thereof
67	Prepared Feathers And Down And Articles Made Of Feathers Or Of Down; Artificial Flowers; Articles Of Human Hair
68	Articles Of Stone, Plaster, Cement, Asbestos, Mica Or Similar Materials
69	Ceramic Products

Chapter Description

70	Glass And Glassware
71	Natural Or Cultured Pearls, Precious Or Semi-Precious Stones, Precious Metals, Metals Clad With Precious Metal, And Articles Thereof; Imitation Jewellery; Coin
72	Iron And Steel
73	Articles Of Iron Or Steel
74	Copper And Articles Thereof
75	Nickel And Articles Thereof
76	Aluminium And Articles Thereof
78	Lead And Articles Thereof
79	Zinc And Articles Thereof
80	Tin And Articles Thereof
81	Other Base Metals; Cermets; Articles Thereof
82	Tools, Implements, Cutlery, Spoons And Forks, Of Base Metal; Parts Thereof Of Base Metal
83	Miscellaneous Articles Of Base Metal
84	Nuclear Reactors, Boilers, Machinery And Mechanical Appliances; Parts Thereof
85	Electrical Machinery And Equipment And Parts Thereof; Sound Recorders And Reproducers, Television Image And Sound Recorders And Reproducers, And Parts And Accessories Of Such Articles
86	Railway Or Tramway Locomotives, Rolling-Stock And Parts Thereof; Railway Or Tramway Track Fixtures And Fittings And Parts Thereof; Mechanical (Including Electro-Mechanical) Traffic Signalling Equipment Of All Kinds
87	Vehicles Other Than Railway Or Tramway Rolling-Stock, And Parts And Accessories Thereof
88	Aircraft, Spacecraft, And Parts Thereof
89	Ships, Boats And Floating Structures
90	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical Or Surgical Instruments And Apparatus; Parts And Accessories Thereof
91	Clocks And Watches And Parts Thereof
92	Musical Instruments; Parts And Accessories Of Such Articles
93	Arms And Ammunition; Parts And Accessories Thereof
94	Furniture; Bedding, Mattresses, Mattress Supports, Cushions And Similar Stuffed Furnishings; Lamps And Lighting Fittings, Not Elsewhere Specified Or Included; Illuminated Signs, Illuminated Name-Plates And The Like; Prefabricated Buildings
95	Toys, Games And Sports Requisites; Parts And Accessories Thereof
96	Miscellaneous Manufactured Articles
97	Works Of Art, Collectors' Pieces And Antiques
99	Other Products

Annex 2: Measures of asymmetry

There are two types of asymmetries for trade in goods that are referred to in this report: the **imports** asymmetry and the exports asymmetry.

The **imports asymmetry** is the difference between the declarant country's imports from the partner country and the partner country's exports to the declarant country. If this asymmetry is positive it means that the declarant country's imports from the partner country are greater than the partner country's exports to the declarant country.

The **exports asymmetry** is the difference between the declarant country's exports to the partner country and the partner country's imports from the declarant country. If this asymmetry is positive it means that the declarant country's exports to the partner country are greater than the partner country's imports from the declarant country.

As an example, the UK's imports asymmetry with China is the difference between what the UK records as imports from China and what China records as exports to the UK. If the value of UK imports minus China exports is negative, it suggests that the UK is recording less goods as received from China, than China is recording as exported to the UK.

If we use D to represent the declarant country and P to represent the partner country, we can set out the main indicators used to calculate the asymmetry. Note that for the purposes of this report the UK will always be the declarant.

Indicators of Asymmetry

(1) Absolute Asymmetry:

= | Value (D) - Value (P) |

This is the absolute difference between the value of recorded by the declarant and their partner country (mirror value).

(2) Relative Asymmetry (%):

- = <u>Value (D) Value (P)</u> X 100
 - 0.5 (Value (D) + Value (P))

The relative asymmetry looks at the difference between the value reported by the declarant country and the value reported by the partner country with respect to the mean of those two flows. This method makes no assumption about which value (D or P) is the correct value and instead looks at the asymmetry with respect to the average of the two values shown in percent.

(3) Share of Total Absolute Asymmetry (%):

$$= \frac{| \text{Value} (D) - \text{Value} (P) |}{\sum | \text{Value} (D) - \text{Value} (P) |} \times 100$$

This percentage dictates the contribution a country or HS¹ Chapter is having on the absolute total of the asymmetries within a certain flow, e.g. Chapter 45 may be responsible for 10 per cent of the total UK imports asymmetry.

Note: The values used within the tables in this report are quoted in US Dollars. UK declarations are made in pounds sterling and converted to US dollars by UN Comtrade. The data that UN Comtrade receives from each country is compiled in the local currency and is then converted to US Dollars using a monthly exchange rate.

Unallocated trade: Whilst the vast majority of trade declared between countries provides detail at value, product and country levels, there is provision for countries to apply suppressions.

For trade reported by the declarant (UK imports and exports), there is some trade 'not allocated' to a country. For example 'countries & territories not specified in the framework of Intra-Community trade' and 'countries & territories not specified for commercial or military reasons in the framework of Intra-Community trade' are identified as 'unallocated'.

For trade reported by our partners (imports and exports), the chapter total does not add up to the country total and is therefore referred to as unallocated.

¹ HS Chapter as defined in the UN Comtrade database