



Asymmetries in International Trade in Goods Statistics: UK measured against non-EU partners, 2016 to 2018

About this release

This release includes commentary on the asymmetries between the

UK and the UK's top trading partners. Detailed tables of the asymmetries can be found at

www.uktradeinfo.com

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Summary

- The total asymmetry in 2018 between UK-reported imports from the UK's 20 largest non-EU partners and their reported exports to the UK was -\$3.9 billion. The asymmetry was -\$3.2 billion in 2016 and -\$0.05 billion in 2017. (Table 2.1.1) The total absolute asymmetry has remained at \$33 billion throughout this period. (Table 3.1.1)
- The total asymmetry in 2018 between UK-reported exports to the UK's 20 largest non-EU partners and their reported imports from the UK was \$17 billion, with a total absolute asymmetry of \$26 billion. The asymmetry was \$19 billion in 2016, with a total absolute asymmetry of \$23 billion, and \$15 billion in 2017, with a total absolute asymmetry of \$24 billion. (Table 2.2.1 and 3.2.1)
- The relative asymmetry in 2018 between UK-reported imports from the UK's 20 largest non-EU partners and their reported exports to the UK was -1.5%. The asymmetry was -1.2% in 2016 and minimal in 2017. (Table 3.1.2)
- The relative asymmetry in 2018 between UK-reported exports to the UK's 20 largest non-EU partners and their reported imports from the UK was 7.9%. The asymmetry was 11% in 2016 and 8.1% in 2017. (Table 3.2.2)

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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. Theoretically, the 'mirror flow' collected by the partner countries should match, i.e. one country's export should mirror the partner country's import. In reality, it is often the case that the figures do not match and this is referred to as '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 1: Measures of asymmetry.

There are numerous reasons for the occurrence of asymmetries, such as methodological discrepancies and misclassification of commodities among others. For more information on the causes of asymmetries, see HMRC's 2012 'Overview of Asymmetries' paper which can be found [here](#).

This paper is an asymmetry study covering trade in goods between the UK and its 20 largest non-EU partner countries (measured by total value of imports and exports) for the calendar years 2016, 2017, and 2018. The data used in the compilation of this report has been extracted from the United Nations International Trade Statistics [Database](#). Therefore, all figures are in USD (\$), as provided by UN Comtrade, for comparability. Additional tables supporting this paper can be found in the accompanying statistical dataset.

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. This data is provided to UN Comtrade on a monthly basis and an average annual exchange rate is applied on an annual basis. This calculation weights the monthly rate with the monthly volume of trade for each country's dataset.

There are numerous measurements of asymmetries and in this report we will be using absolute asymmetry, relative asymmetry, and share of absolute total asymmetry. To understand the definitions, calculations, and significance of each of these measurements, please see the explanations provided in Annex 1.

1.2. Relevant Publications

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

- **Article 1** - [Asymmetries in trade data - A UK perspective:](#)
Published on 13th July 2017, by ONS
- **Article 2** - [Trade asymmetries between the UK and EU Member States, 2014 to 2016:](#)
Published on 7th November 2017, by HMRC
- **Article 3** - [Asymmetries in trade data - diving deeper into UK bilateral trade data:](#)
Published on 29th January 2018, by ONS
- **Article 4** - [Asymmetries in international trade in goods statistics: UK measured against its non-EU partners, 2014 to 2016](#)
Published on 15th May 2018, by HMRC
- **Article 5** - [Asymmetries in trade data: extending analysis of UK bilateral trade data](#)
Published on 30th August 2018, by ONS
- **Article 6** - [Asymmetries in international trade in goods statistics: UK measured against its non-EU partners, 2015 to 2017](#)
Published on 13th November 2018, by HMRC
- **Article 7** - [Asymmetries in international trade in goods statistics: UK measured against its non-EU partners, 2015 to 2017](#)
Published on 15th May 2019
- **Article 8** – [Trade asymmetries between the UK and EU Member States, 2015 to 2017](#)
Published on 15th October 2019, by HMRC
- **Article 9** - [Asymmetries in trade data: updating analysis of UK bilateral trade data](#)
Published on 21st February 2020, by ONS

2. Trade in goods asymmetries between the UK's largest trading partners by trade value, 2016 to 2018

This section explores the asymmetries of the UK's top 20 trading partners by total import and export value in 2018 (according to the available data from the UN Comtrade database), comparing each partner's trade flow against the mirror flow of the top 20 block. For example, Switzerland's imports from the UK's top 20 block against exports to Switzerland from the UK's top 20 block. This is shown in the diagram below.

Switzerland (3rd)	Exports to	USA (1st)	Japan (6th)	Russia (11th)	Saudi Arabia (16th)
		China (2nd)	Canada (7th)	UAE (12th)	Thailand (18th)
	Imports from	Norway (4th)	South Korea (9th)	Australia (14th)	Nigeria (20th)
		Turkey (5th)	Hong Kong (10th)	Singapore (15th)	Mexico (21st)

At the time of extracting the data for analysis (11 March 2020) the UK's 17th largest trading partner, Vietnam, had not published data for 2018. Vietnam has therefore been replaced by Mexico, the UK's 21st largest trading partner.

2.1.1. Imports: Absolute asymmetries between the UK's largest trading partners 2016-2018

Graph 2.1.1 shows the absolute asymmetry for imports between each of these 21 trading partners and the remaining block for the years 2016 to 2018.

- The USA had the largest absolute asymmetry in 2018 at \$89 billion. This is up from the 2nd largest in 2016 and 2017 in which its absolute asymmetry was \$82 billion and \$76 billion respectively.
- Japan had the 2nd largest absolute asymmetry in 2018 at \$88 billion. It experienced the 2nd largest increase over the 3 years, up from the 3rd largest in 2016 and 2017 in which its absolute asymmetry was \$62 billion and \$74 billion respectively.
- China had the 3rd largest absolute asymmetry in 2018 at \$70 billion. It experienced the largest decrease over the 3 years, down from the largest absolute asymmetry in 2016 and 2017 of \$97 billion and \$103 billion respectively.
- India experienced the largest increase in absolute asymmetry over the 3 years, up to \$48 billion in 2018 from \$20 billion in 2016 and \$27 billion in 2017.
- The United Arab Emirates (UAE) experienced the 2nd largest decrease in absolute asymmetry over the 3 years, down to \$7.7 billion in 2018 from \$34 billion in 2016 and \$13 billion in 2017.
- South Korea experienced the 3rd largest increase in absolute asymmetry over the 3 years, up to \$32 billion in 2018 from \$6.6 billion in 2016 and \$18 billion in 2017.
- The UK's absolute asymmetry remained low throughout this period at \$3.9 billion in 2018, up slightly from \$3.2 billion in 2016 and up from \$0.1 billion in 2017.

2.1.2. Imports: Relative asymmetries between the UK's largest trading partners 2016-2018

Graph 2.1.2 shows the relative asymmetries for imports between each partner and the rest of the block for the years 2016 to 2018.

- Norway had the largest relative asymmetry in 2018 at 38%. This was down slightly from 39% in 2017, but grown from 23% in 2016.
- Japan had the 2nd largest relative asymmetry in 2018 at 19%. It grew steadily over the 3 years, from 18% in 2017 and 17% in 2016.
- The UAE experienced a notable change in its relative asymmetry over the 3 years. It was -26% in 2016, which changed to a positive relative asymmetry of 8.6% in 2017, and then reduced to 5.3% in 2018.
- Nigeria also experienced a notable change in its relative asymmetry over the 3 years. It was -5.2% in 2016, but this difference grew to -43% in 2017, and then reduced to -9.2% in 2018.

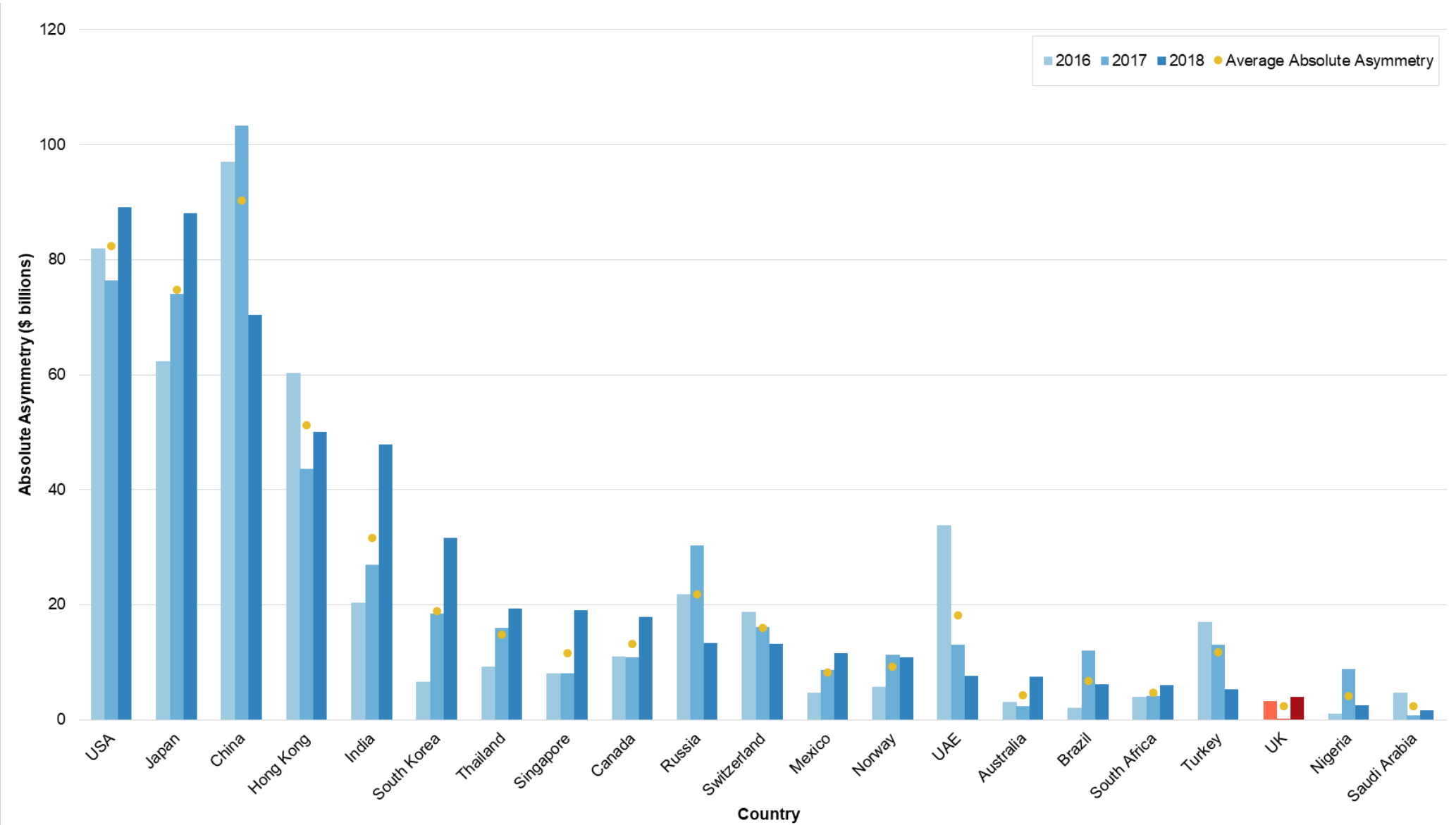
- Russia saw a notable change in its relative asymmetry. In 2018, it reduced to 14% from 31% in 2017 and 27% in 2016.
- Turkey also saw a considerable reduction in its relative asymmetry over the 3 years. It was 21% in 2016, which reduced to 13% in 2017 and then to 5.4% in 2018.
- The UK's relative asymmetry across the 3 years was consistently low, at -1.2% in 2016, less than -0.1% in 2017, and -1.5% in 2018.

2.1.3. Imports: Average annual trade value compared with average absolute asymmetry between the UK's largest trading partners 2016-2018

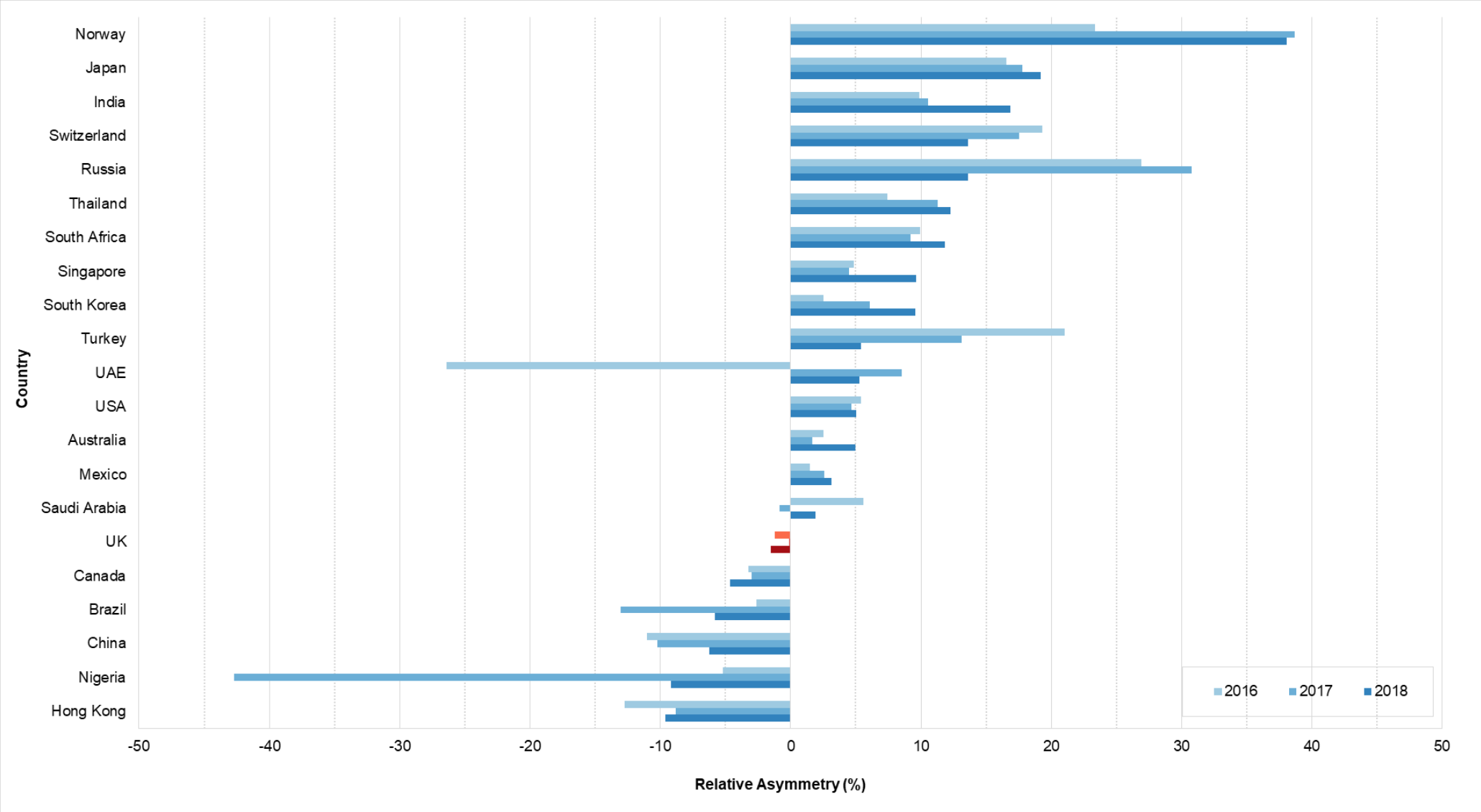
Graph 2.1.3 shows each partner's average share of the total import value and their average share of the total absolute asymmetry within this trading block for the years 2016 to 2018.

- The USA had the largest average import value and the 2nd largest average absolute asymmetry. On average it contributed 27% of the total import value (\$1,683 billion) but only 17% of the total absolute asymmetry (\$82 billion).
- China had the 2nd largest average import value and the largest average absolute asymmetry. On average it contributed 15% of the total import value (\$960 billion) but 18% of the total absolute asymmetry (\$90 billion).
- Hong Kong had the 3rd largest average import value and the 4th largest average absolute asymmetry. On average it contributed 7.5% of the total import value (\$470 billion) but 10% of the total absolute asymmetry (\$51 billion).
- Japan had the 4th largest average import value and the 3rd largest average absolute asymmetry. On average it contributed 7.2% of the total import value (\$455 billion) but 15% of the total absolute asymmetry (\$75 billion).
- Mexico, on average, contributed 5.4% of the total import value (\$342 billion) but only 1.7% of the total absolute asymmetry (\$8 billion).
- Canada, on average, contributed 5.6% of the total import value (\$353 billion), but only 2.6% of the total asymmetry (\$13 billion).
- Russia, on average, contributed 1.6% of the total imports (\$103 billion) but 4.4% of the total absolute asymmetry (\$22 billion).
- The UK, on average, contributed 4.1% of the total imports (\$255 billion) but only 0.5% of the total absolute asymmetry (\$2.4 billion).

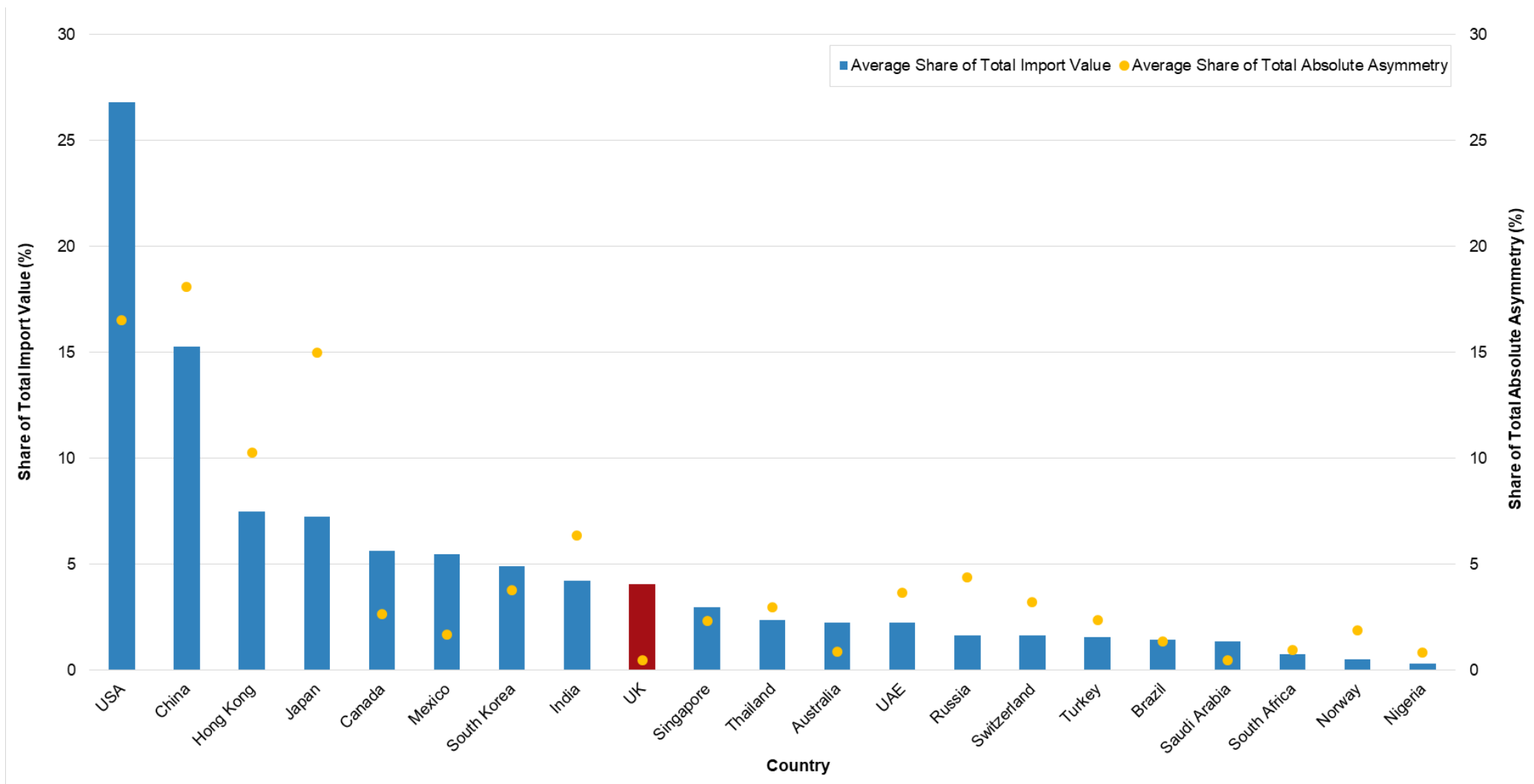
Graph 2.1.1. Imports: Absolute asymmetries between the UK's largest trading partners 2016-2018, sorted largest to smallest by 2018 import value.



Graph 2.1.2. Imports: Relative asymmetries between the UK's largest trading partners 2016-2018, sorted largest positive to largest negative by 2018 import value.



2.1.3. Imports: Share of average annual trade value compared with share of average absolute asymmetry between the UK's largest trading partners 2016-2018, sorted largest to smallest by share of average annual trade value.



2.2.1. Exports: Absolute asymmetries between the UK's largest trading partners 2016-2018

Graph 2.2.1 shows the absolute asymmetry for exports between each of these 21 trading partners and the remaining block for the years 2016 to 2018.

- Hong Kong had the largest absolute asymmetry in 2018 at \$414 billion. It experienced the 2nd largest increase over the 3 years, up from \$370 billion in 2016 and \$400 billion in 2017.
- China had the 2nd largest absolute asymmetry in 2018 at \$201 billion. It experienced the 3rd largest increase over the 3 years, up from \$178 billion in 2016. This is despite decreasing from \$233 billion in 2017.
- Saudi Arabia had the 3rd largest absolute asymmetry in 2018 at \$169 billion. It experienced the largest increase over the 3 years, up from \$99 billion in 2016 and \$127 billion in 2017.
- The USA experienced the largest decrease in absolute asymmetry over the 3 years, down to \$60 billion in 2018 from \$77 billion in 2016 and \$72 billion in 2017.
- Mexico experienced the 4th largest increase in absolute asymmetry over the 3 years, up to \$43 billion in 2018 from \$21 billion in 2016 and \$19 billion in 2017.
- Russia experienced the 5th largest increase in absolute asymmetry over the 3 years, up to \$18 billion in 2018 from \$5.9 billion in 2016 and \$9.1 billion in 2017.
- Singapore experienced the 2nd largest decrease in absolute asymmetry over the 3 years, down to \$62 billion in 2018 from \$66 billion in 2016 and \$65 billion in 2017.
- The UK experienced a small decrease in absolute asymmetry over the 3 years, down to \$17 billion in 2018 from \$19 billion in 2016. However, this was an increase on \$15 billion in 2017.

2.2.2. Exports: Relative asymmetries between the UK's largest trading partners 2016-2018

Graph 2.2.2 shows the relative asymmetries for exports between each partner and the rest of the block for the years 2016 to 2018.

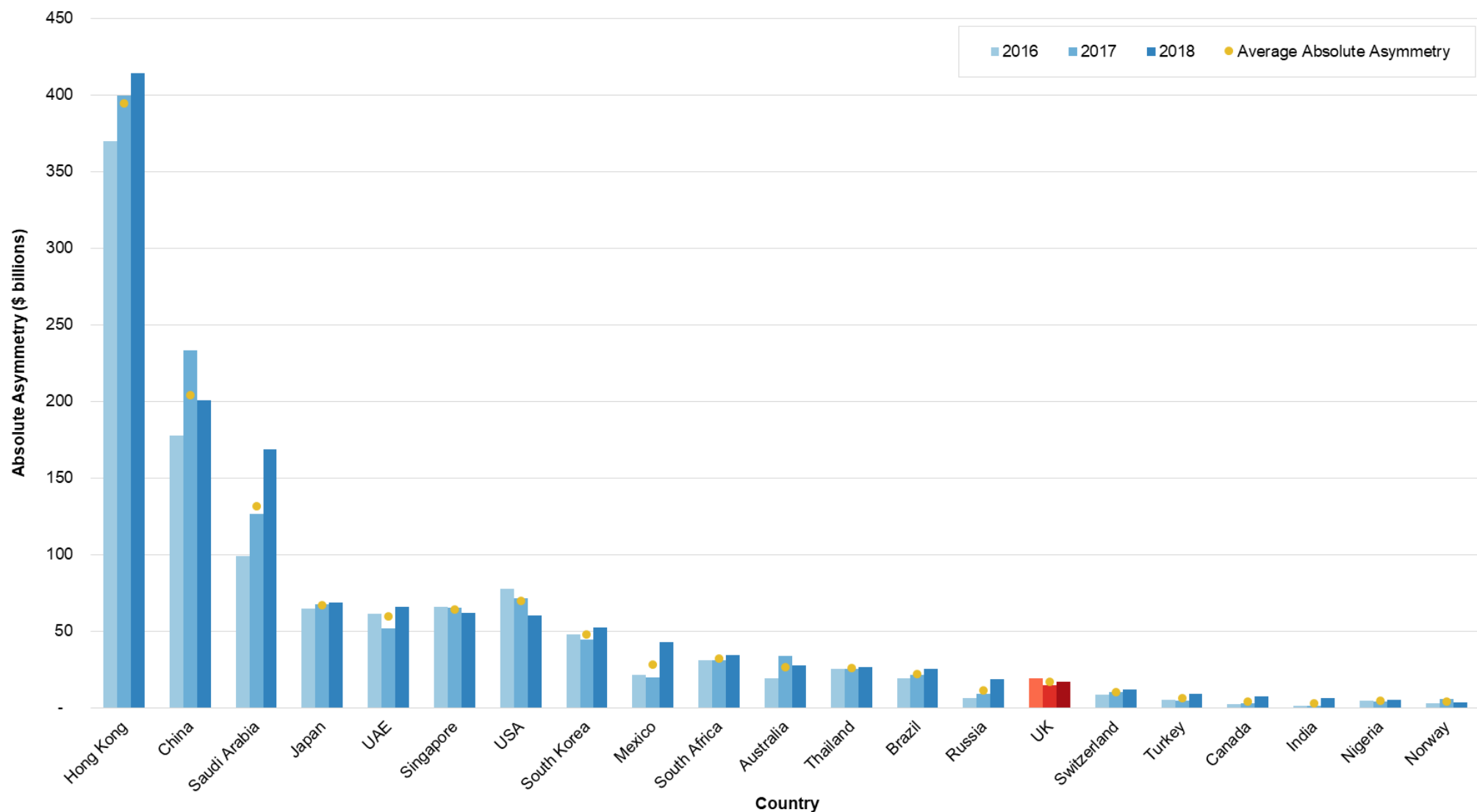
- Hong Kong had the largest relative asymmetry in 2018 at 158%. This is up from 155% in 2017 and 150% in 2016.
- Saudi Arabia had the 2nd largest relative asymmetry in 2018 at -140%. This grew from -138% in 2017 and -134% in 2016.
- The UAE experienced a notable change in its relative asymmetry over the time period. It was -79% in 2016, which reduced to -54% in 2017 and then grew to -59% in 2018.
- Singapore saw a steady reduction in its relative asymmetry over the time period, from 42% in 2016 to 37% in 2017 and then to 32% in 2018.
- Nigeria's relative asymmetry also reduced over the time period. It was -25% in 2016, which reduced to -16% in 2017 and 2018.
- Turkey experienced a notable growth in its relative asymmetry over the time period. It was -12% in 2016, which reduced slightly to -10% in 2017, but then grew to 19% in 2018.
- The UK's relative asymmetry decreased slightly across the 3 years, with 11% in 2016, 8.1% in 2017, and 7.9% in 2018.

2.2.3. Exports: Average annual trade value compared with average absolute asymmetry between the UK's largest trading partners 2016-2018

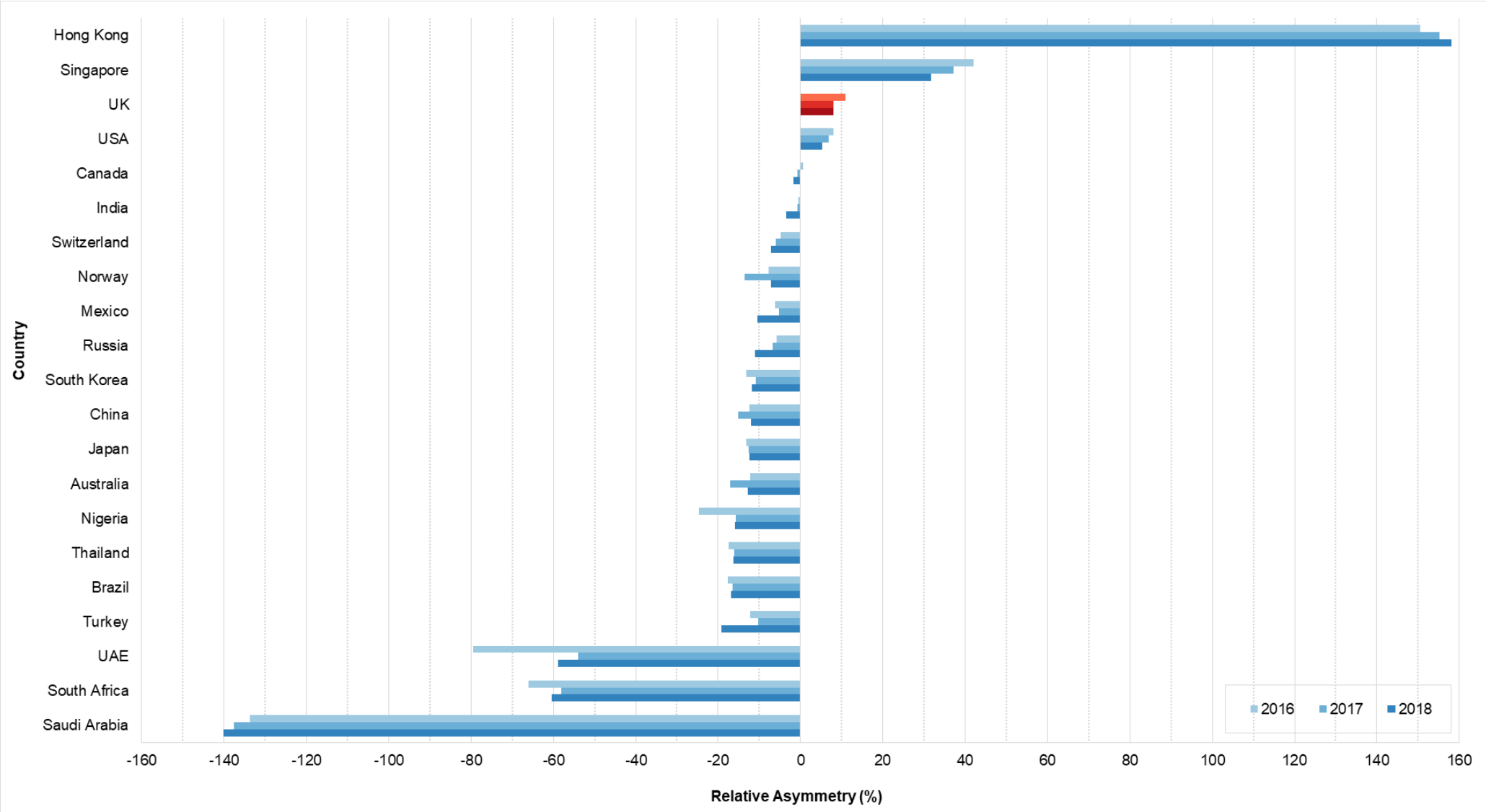
Graph 2.2.3 shows each partner's average share of the total export value and their average share of the total absolute asymmetry within this trading block for the years 2016 to 2018.

- China had the largest average export value and the 2nd largest average absolute asymmetry. On average it contributed 24% of the total export value (\$1,451 billion) but only 17% of the total absolute asymmetry (\$204 billion).
- The USA had the 2nd largest average export value and the 4th largest average absolute asymmetry. On average it contributed 18% of the total export value (\$1,081 billion) but only 5.7% of the total absolute asymmetry (\$70 billion).
- Japan had the 3rd largest average export value and the 5th largest average absolute asymmetry. On average it contributed 8.0% of the total export value (\$494 billion) but only 5.4% of the total absolute asymmetry (\$67 billion).
- Hong Kong had the largest average absolute asymmetry despite having only the 4th largest average export value. On average it contributed 7.4% of the total export value (\$452 billion) but 32% of the total absolute asymmetry (\$395 billion).
- Saudi Arabia had the 2nd largest average absolute asymmetry despite having only the 20th largest average export value. On average it contributed 0.5% of the total export value (\$29.8 billion) but 11% of the total absolute asymmetry (\$131 billion).
- Canada, on average, contributed 6.3% of the total export value (\$385 billion) but only 0.3% of the total absolute asymmetry (\$4.1 billion).
- The UK, on average, contributed 3.2% of the total export value (\$198 billion) but only 1.4% of the total absolute asymmetry (\$17 billion).

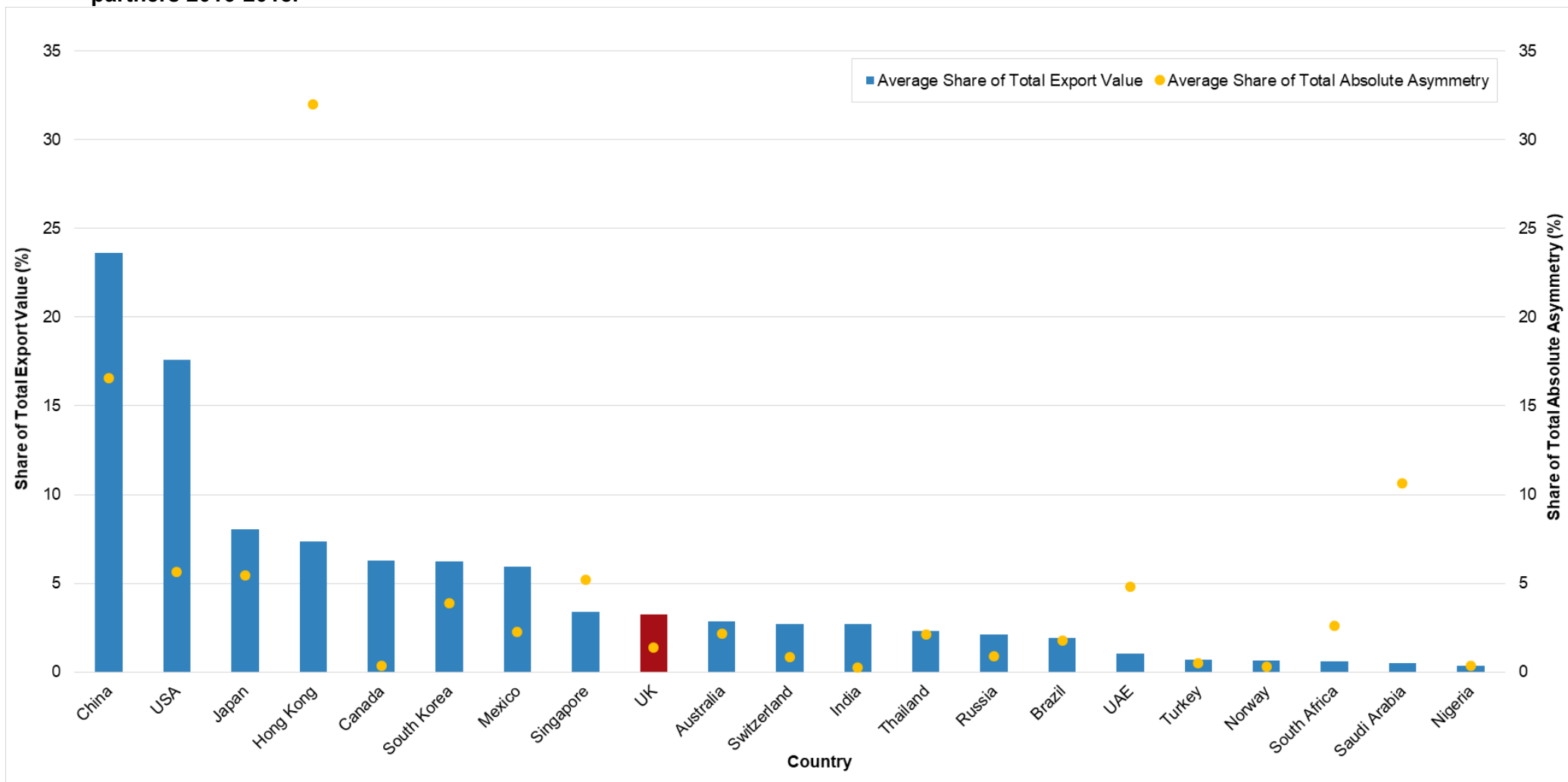
Graph 2.2.1. Exports: Absolute asymmetries between the UK's largest trading partners 2016-2018, sorted largest to smallest by 2018 export value.



Graph 2.2.2. Exports: Relative asymmetries between the UK's largest trading partners 2016-2018, sorted largest positive to largest negative by 2018 import value.



2.2.3. Exports: Average share of average annual trade value compared with average absolute asymmetry between the UK's largest trading partners 2016-2018.



3. Trade in goods asymmetries between the UK and each of its largest trading partners by trade value, 2016 to 2018

This section explores the asymmetries between the UK and its largest non-EU trading partners by trade value. Where the last section looked at each country and measured the asymmetries between each partner and the block as a whole, this section is focused on the UK compared with each of its trading partners.

3.1.1. Imports: The UK's absolute asymmetries with its 20 largest trading partners 2016-18

Graph 3.1.1 shows the absolute asymmetries between UK-reported imports from its 20 largest non-EU trading partners and their reported exports to the UK for the years 2016 to 2018.

- In 2016, the UK's total absolute asymmetry for imports was \$32.7 billion. In 2017 this increased to \$33.3 billion. In 2018 this decreased to \$32.9 billion.
- China had the largest absolute asymmetry with the UK in 2018 at \$6.4 billion. It experienced the largest increase over the 3 years, up from the 3rd largest in 2016 and the 5th largest in 2017 in which their absolute asymmetries were \$3.9 billion and \$3.1 billion respectively.
- Hong Kong had the 2nd largest absolute asymmetry with the UK in 2018 at \$3.9 billion. This was up from the 4th largest in 2016 and the 3rd largest in 2017 in which its absolute asymmetries were \$3.6 billion and \$4.0 billion respectively.
- South Africa had the 3rd largest absolute asymmetry with the UK in 2018 at \$3.2 billion. It experienced the largest decrease over the 3 years, down from the largest in 2016 and the 2nd largest in 2017 in which its absolute asymmetries were \$6.6 billion and \$4.9 billion respectively.
- Singapore experienced the 2nd largest increase in its absolute asymmetry with the UK over the 3 years, up to \$3.1 billion in 2018 from \$1.1 billion in 2016 and \$0.6 billion in 2017.
- Switzerland experienced the 2nd largest decrease in its absolute asymmetry with the UK over the 3 years, down to \$3.2 billion in 2018 from \$6.1 billion in 2016 and \$4.9 billion in 2017.

Table 3.1.1 shows the countries with the largest absolute asymmetries for 2016, 2017, and 2018. China, Hong Kong, South Africa, and Switzerland remained in the top 5 through all 3 years.

Table 3.1.1. Imports: Top 5 countries by largest absolute asymmetries with the UK 2016-18

	2016	2017	2018
Rank	Country	Country	Country
1	South Africa	Switzerland	China
2	Switzerland	South Africa	Hong Kong
3	China	Hong Kong	South Africa
4	Hong Kong	South Korea	Switzerland
5	USA	China	Singapore

3.1.2. Imports: The UK's relative asymmetries with its 20 largest trading partners 2016-18

Graph 3.1.2 shows the relative asymmetries between UK-reported imports from its 20 largest non-EU trading partners and their reported exports to the UK for the years 2016 to 2018.

- Saudi Arabia had the largest relative asymmetry with the UK in 2018 at 123%. This grew over the 3 years from 106% in 2017 and 93% in 2016.
- Singapore had the 2nd largest relative asymmetry with the UK in 2018 at -96%. This grew over the 3 years from -20% in 2017 and -43% in 2016.

- Hong Kong had the 3rd largest relative asymmetry with the UK in 2018 at -89%. This grew over the 3 years from 54% in 2017 and 38% in 2016.
- South Africa also experienced a notable change in its relative asymmetry with the UK over the 3 years. It was 102% in 2016 which reduced to 83% in 2017 and then further to 50% in 2018.
- Mexico also experienced a notable change in its relative asymmetry with the UK over the 3 years. It was -24% in 2016 which changed to a positive asymmetry of 9.2% in 2017 and then grew to 24% in 2018.
- Nigeria also experienced a notable change in its relative asymmetry with the UK over the 3 years. It was -0.8% in 2016 which changed to a positive relative asymmetry of 33% in 2017 and then reduced to 30% in 2018.

Table 3.1.2 shows the countries with the largest relative asymmetries with the UK for 2016, 2017, and 2018. Saudi Arabia, Singapore, Hong Kong, South Africa, and the UAE all remained in the top 5 largest relative asymmetries through all 3 years.

Table 3.1.2. Imports: Top 5 countries by largest relative asymmetries with the UK 2016-18

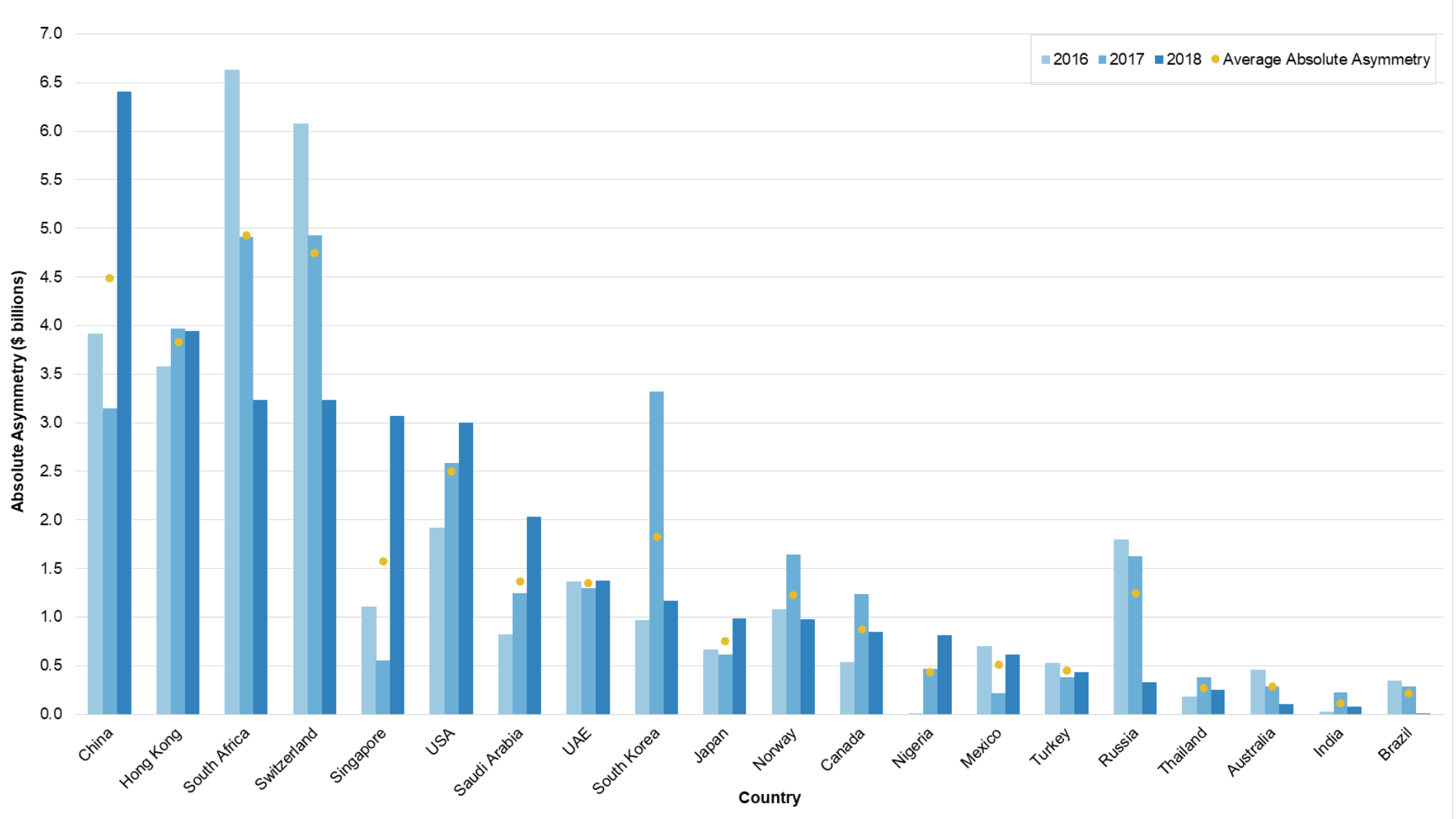
	2016	2017	2018
Rank	Country	Country	Country
1	South Africa	Saudi Arabia	Saudi Arabia
2	Saudi Arabia	South Africa	Singapore
3	UAE	Hong Kong	Hong Kong
4	Singapore	South Korea	South Africa
5	Hong Kong	UAE	UAE

3.1.3. Imports: Average annual trade value compared with average absolute asymmetry between the UK and its 20 largest trading partners 2016-18

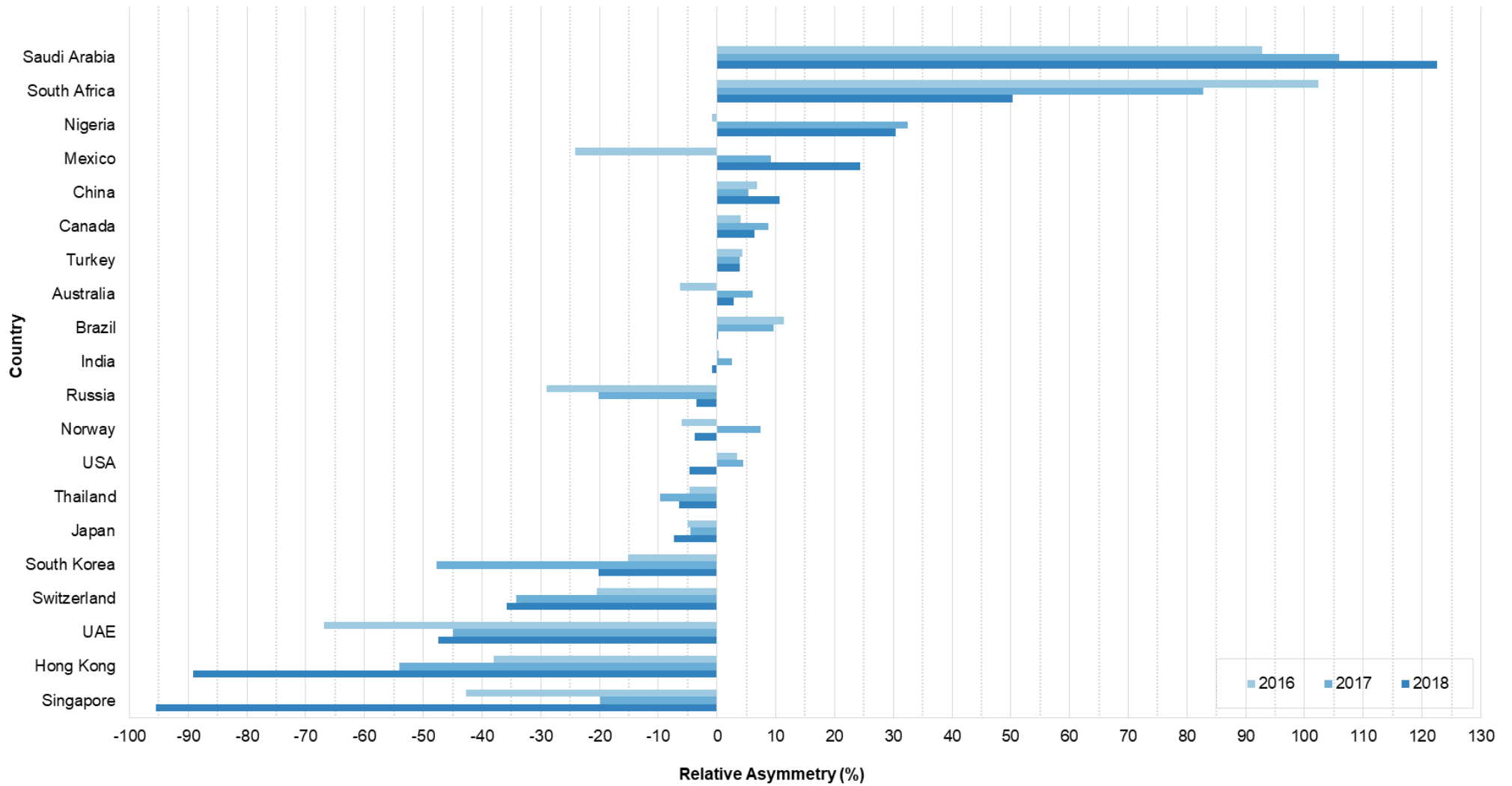
Graph 3.1.3 shows each partner country's average share of the total value reported as imports by the UK and their average share of the total absolute asymmetry for the years 2016 to 2018.

- China had the largest average import value. On average, it contributed 24% of the total import value (\$60.9 billion) but only 14% of the total absolute asymmetry (\$4.5 billion).
- The USA had the 2nd largest average import value. On average, it contributed 23% of the total import value (\$59.7 billion) but only 7.6% of the total absolute asymmetry (\$2.5 billion).
- Norway had the 3rd largest import value. On average, it contributed 8.7% of the total import value (\$22.1 billion) but only 3.7% of the total absolute asymmetry (\$1.2 billion).
- South Africa, on average, contributed 3.4% of the total import value (\$8.7 billion) but 15% of the total absolute asymmetry (\$4.9 billion).
- Hong Kong, on average, contributed 2.0% of the total import value (\$5.1 billion) but 12% of the total absolute asymmetry (\$3.8 billion).
- Switzerland, on average, contributed 6.0% of the total import value (\$15.3 billion) but 14% of the total absolute asymmetry (\$4.7 billion).

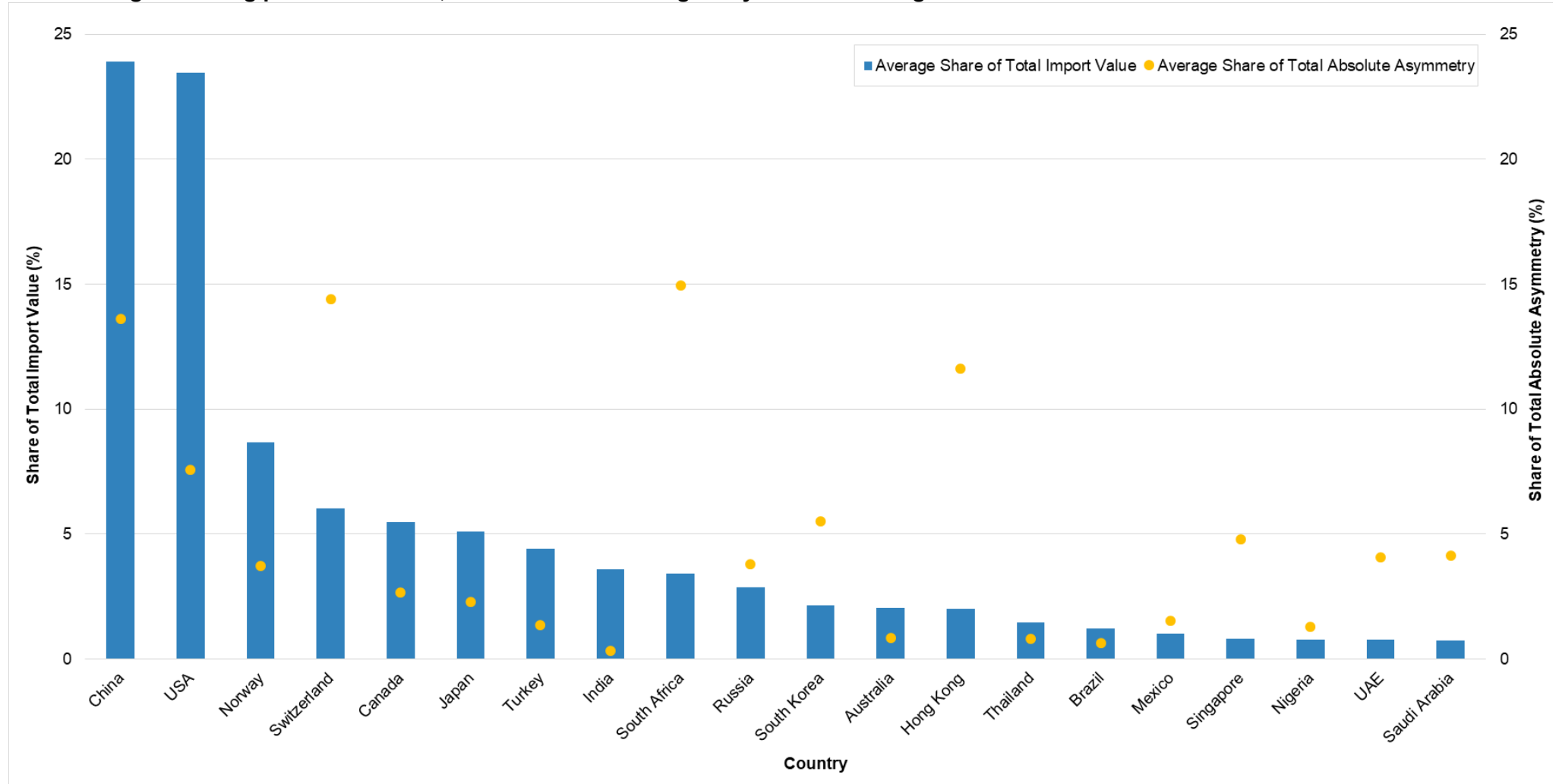
Graph 3.1.1. Imports: The UK's absolute asymmetries with its 20 largest trading partners 2016-18, sorted largest to smallest by 2018 import value.



Graph 3.1.2. Imports: The UK's relative asymmetries with its 20 largest trading partners 2016-18, sorted largest positive to largest negative by 2018 import value.



Graph 3.1.3. Imports: Share of absolute average annual trade value compared with average absolute asymmetry between the UK and its 20 largest trading partners 2016-18, sorted smallest to largest by share of average annual trade.



3.2.1. Exports: The UK's absolute asymmetries with its 20 largest trading partners 2016-18

Graph 3.2.1 shows the absolute asymmetries between UK-reported exports to its 20 largest non-EU trading partners and their reported imports from the UK for the years 2016 to 2018.

- In 2016, the UK's total absolute asymmetry for exports was \$23.3 billion. In 2017 this increased to \$23.6 billion. It then increased further in 2018 to \$26.0 billion.
- Turkey had the largest absolute asymmetry with the UK in 2018 at \$6.2 billion. It experienced the largest increase over the 3 years, up from the 5th largest in 2016 and the 2nd largest in 2017 in which its absolute asymmetries were \$0.9 billion and \$3.0 billion respectively.
- The USA had the 2nd largest absolute asymmetry with the UK in 2018 at \$4.2 billion. It experienced the largest decrease over the 3 years, down from the largest in 2016 and 2017 in which its absolute asymmetries were \$6.4 billion and \$4.9 billion respectively.
- China had the 3rd largest absolute asymmetry with the UK in 2018 at \$3.8 billion. It experienced the 2nd largest increase over the 3 years, up from the 10th largest in 2016 and the 8th largest in 2017 in which its absolute asymmetries were \$0.5 billion and \$0.9 billion respectively.
- Hong Kong experienced the 2nd largest decrease in its absolute asymmetry with the UK over the 3 years, down to \$0.3 billion in 2018 from \$2.5 billion in 2016 and \$1.3 billion in 2017.
- Saudi Arabia experienced the 3rd largest decrease in its absolute asymmetry with the UK over the 3 years, down to \$1.8 billion in 2018 from \$3.4 billion in 2016 and \$2.3 billion in 2017.
- The UAE experienced the 4th largest decrease in its absolute asymmetry with the UK over the 3 years, down to \$2.4 billion in 2018 from \$3.9 billion in 2016 and \$3.0 billion in 2017.

Table 3.2.1 shows the countries with the largest absolute asymmetries for 2016, 2017, and 2018. Turkey, the USA, the UAE, and Saudi Arabia remained in the top 5 through all 3 years.

Table 3.2.1 Exports: Top 5 countries by largest absolute asymmetries with the UK 2016-18

	2016	2017	2018
Rank	Country	Country	Country
1	USA	USA	Turkey
2	UAE	Turkey	USA
3	Saudi Arabia	UAE	China
4	Hong Kong	Saudi Arabia	UAE
5	Turkey	Thailand	Saudi Arabia

3.2.2. Exports: The UK's relative asymmetries with its 20 largest trading partners 2016-18

Graph 3.2.2 shows the relative asymmetries between UK-reported exports to its 20 largest non-EU trading partners and their reported imports from the UK for the years 2016 to 2018.

- Turkey had the largest relative asymmetry with the UK in 2018 at 59%. This grew over the 3 years from 37% in 2017 and 15% in 2016.
- Nigeria had the 2nd largest relative asymmetry with the UK in 2018 at 48%. This grew over the 3 years from 18% in 2017 and -12% in 2016.
- Saudi Arabia had the 3rd largest relative asymmetry with the UK in 2018 at 44%. This reduced over the 3 years from 53% in 2017 and 70% in 2016.

- Hong Kong experienced a notable change in its relative asymmetry with the UK over the 3 years. It was 32% in 2016 which reduced to 15% in 2017 and then further to 3.2% in 2018.
- The UAE also experienced a notable change in its relative asymmetry with the UK over the 3 years. It was 55% in 2016 which reduced to 36% in 2017 and then further to 27% in 2018.
- Singapore experienced notable changes in its relative asymmetry with the UK over the 3 years. It was 14% in 2016 which reduced to 11% in 2017 and then changed to a negative relative asymmetry of -12% in 2018.
- South Africa also experienced notable changes in its relative asymmetry with the UK over the 3 years. It was 21% in 2016 which reduced to 9.2% in 2017 and then changed to a negative relative asymmetry of -4.1% in 2018.

Table 3.2.2 shows the countries with the largest relative asymmetries with the UK for 2016, 2017, and 2018. Saudi Arabia, Thailand, and the UAE all remained in the top 5 largest relative asymmetries through all 3 years.

Table 3.2.2. Exports: Top 5 countries by largest relative asymmetries with the UK 2016-18

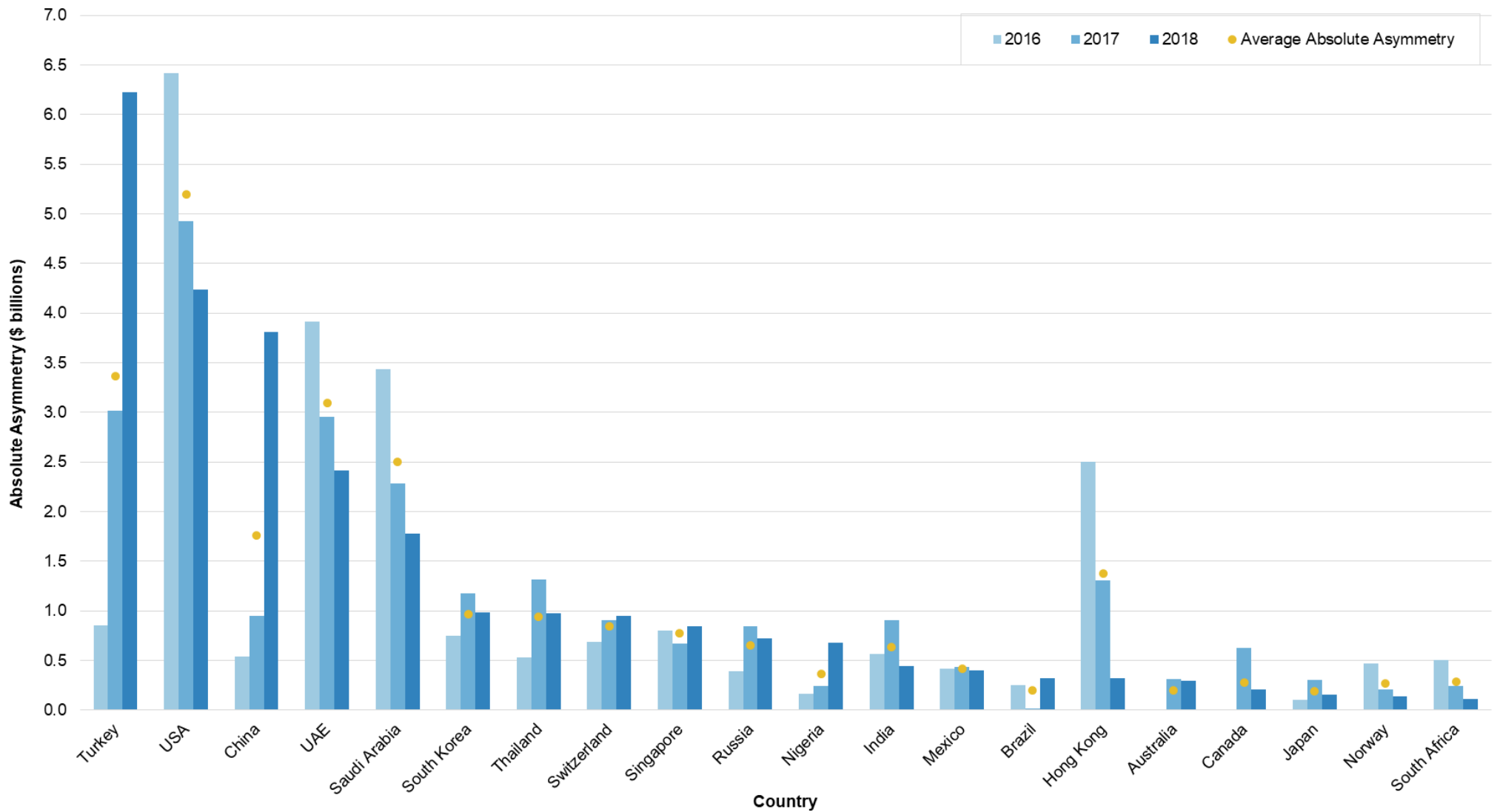
	2016	2017	2018
Rank	Country	Country	Country
1	Saudi Arabia	Thailand	Turkey
2	UAE	Saudi Arabia	Nigeria
3	Hong Kong	Turkey	Saudi Arabia
4	Thailand	UAE	Thailand
5	Mexico	Russia	UAE

3.2.3. Exports: Average annual trade value compared with average absolute asymmetry between the UK and its 20 largest trading partners 2016-2018

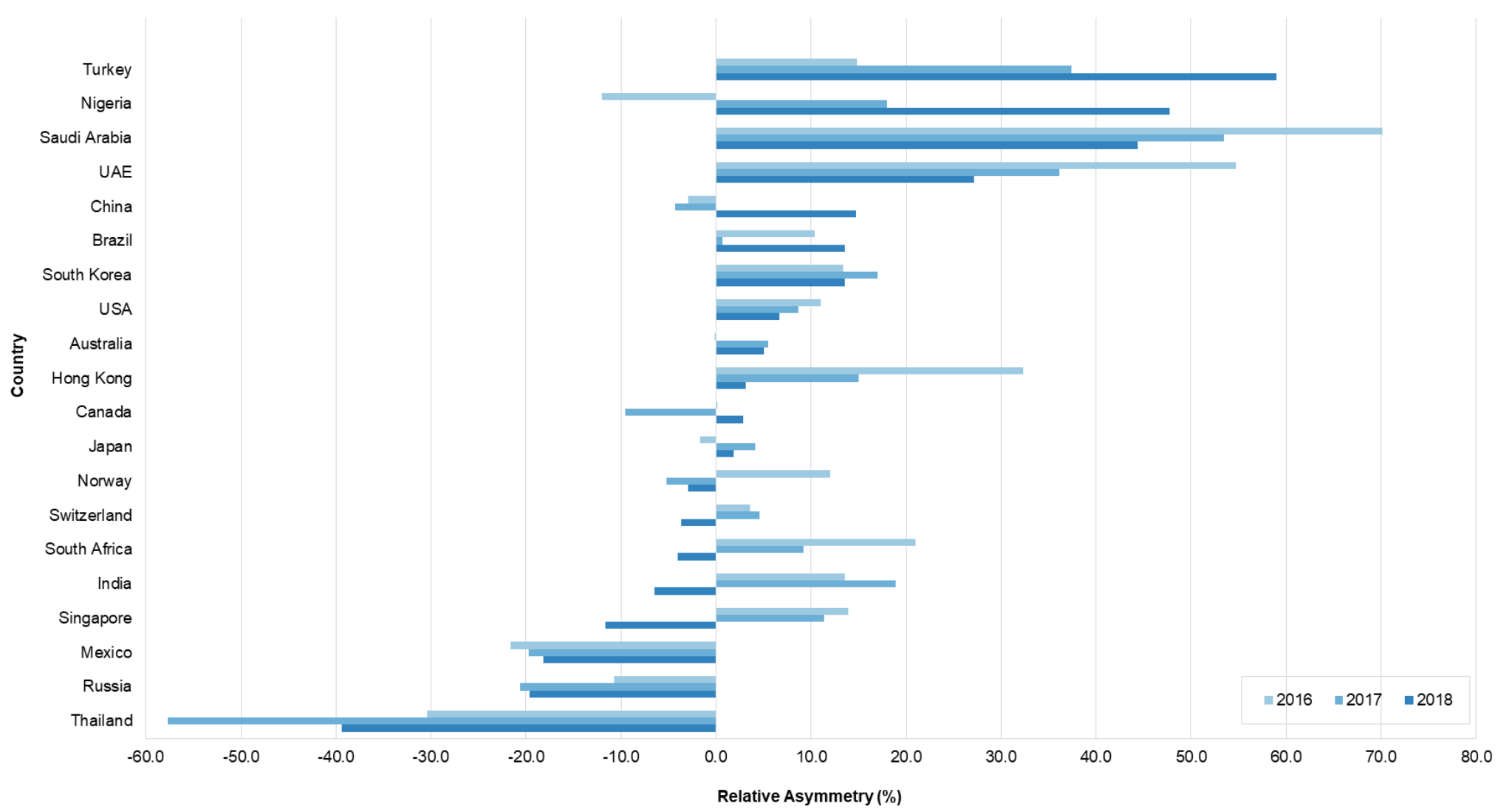
Graph 3.2.3 shows each partner country's average share of the total value reported as exports by the UK and their average share of the total absolute asymmetry for the years 2016 to 2018.

- The USA had the largest average export value. On average, it contributed 31% of the total export value (\$62.2 billion) but only 21% of the total absolute asymmetry (\$5.2 billion).
- China had the 2nd largest average export value. On average, it contributed 11% of the total export value (\$22.4 billion) but only 7.3% of the total absolute asymmetry (\$1.8 billion).
- Switzerland had the 3rd largest average export value. On average, it contributed 11% of the total export value (\$21.9 billion) but only 3.5% of the total absolute asymmetry (\$0.8 billion).
- Turkey, on average, contributed 5.0% of the total export value (\$9.8 billion) but 14% of the total absolute asymmetry (\$3.4 billion).
- The UAE, on average, contributed 4.9% of the total export value (\$9.6 billion) but 13% of the total absolute asymmetry (\$3.1 billion).

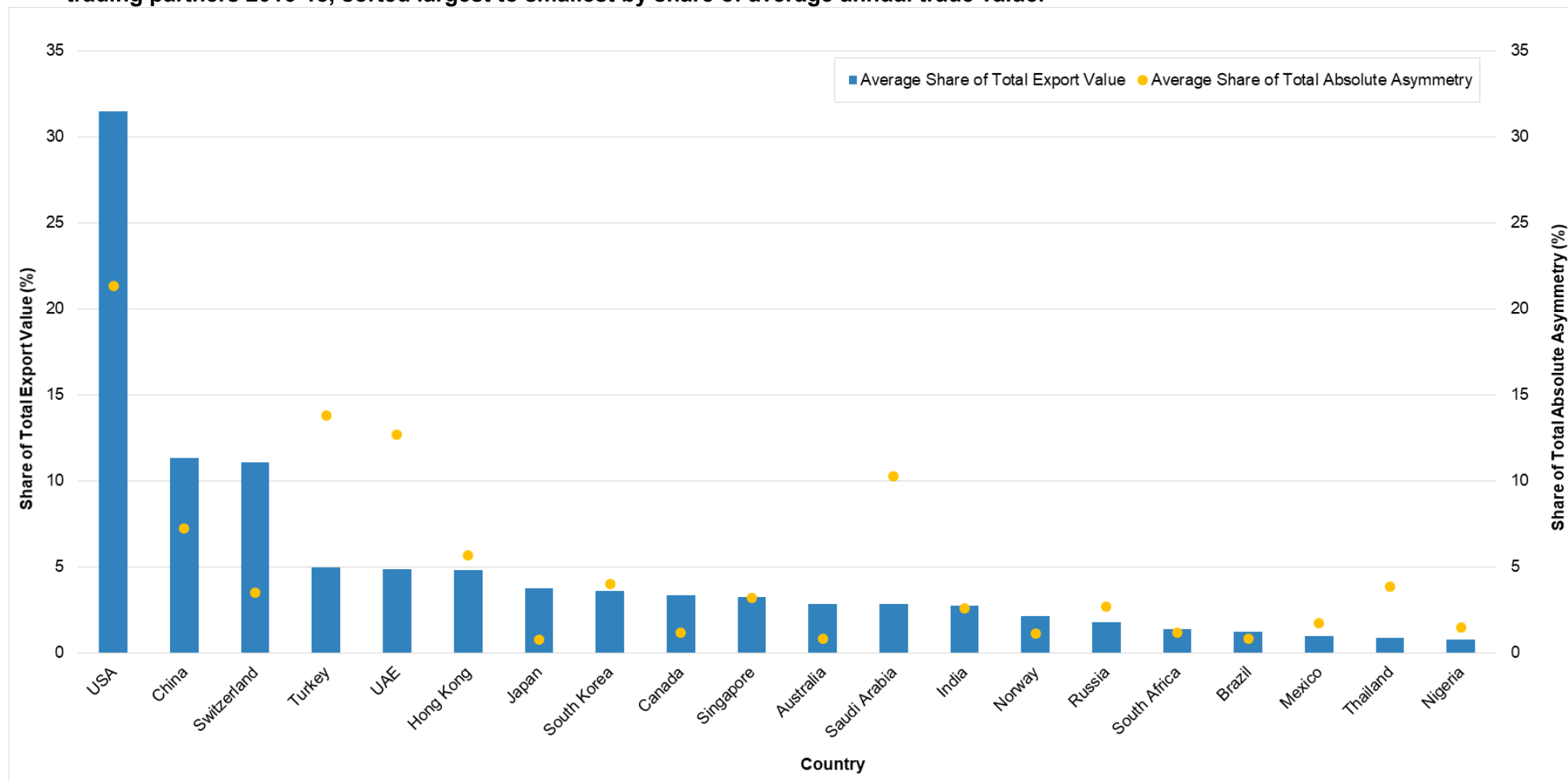
Graph 3.2.1. Exports: The UK's absolute asymmetries with its 20 largest trading partners 2016-18, sorted largest to smallest by 2018 export value.



Graph 3.2.2. Exports: The UK's relative asymmetries with its 20 largest trading partners 2016-18, sorted largest positive to largest negative by 2018 export value.



Graph 3.2.3. Exports: Share of average annual trade value compared with average absolute asymmetry between the UK and its 20 largest trading partners 2016-18, sorted largest to smallest by share of average annual trade value.



4. A chapter breakdown of trade in goods asymmetries between the UK and its largest trading partners by trade value, 2016 to 2018

4.1.1. Imports: The UK's absolute asymmetries by chapter with its 20 largest trading partners 2016-18

Graph 4.1.1 shows the absolute asymmetries between the UK and its 20 largest trading partners for the 10 chapters with the largest absolute asymmetries in 2018.

- In 2016, the total absolute asymmetry for all chapters was \$50.8 billion. In 2017 this increased to \$58.7 billion. In 2018 this decreased to \$55.2 billion.
- Chapter 84 (Mechanical appliances) had the largest absolute asymmetry with the UK in all 3 years, at \$9.5 billion, \$10.2 billion, and \$9.8 billion in 2016, 2017, and 2018 respectively.
- Chapter 88 (Aircraft) had the 2nd largest absolute asymmetry in 2018 at \$9.1 billion. It experienced the largest increase over the 3 years, up from 5th largest in 2016 and 6th largest in 2017 in which its absolute asymmetries were \$2.7 billion and \$3.0 billion respectively.
- Chapter 27 (Mineral fuels) had the 3rd largest absolute asymmetry in 2018 at \$6.2 billion. It experienced the 2nd largest increase in its absolute asymmetry over the 3 years, up from the 4th largest in 2016 in which its absolute asymmetry was \$3.3 billion. However, it was down from the 2nd largest in 2017 in which its absolute asymmetry was \$7.0 billion.
- Chapter 30 (Pharmaceutical products) experienced the largest decrease in its absolute asymmetry over the 3 years, down to \$0.6 billion in 2018 from \$2.6 billion in 2016 and \$2.1 billion in 2017.
- Chapter 71 (Precious metals) experienced the 2nd largest decrease in absolute asymmetry over the 3 years, down to \$2.5 billion in 2018 from \$3.7 billion in 2016 and 2017.
- Chapter 89 (Ships, boats, and floating structures) experienced the 3rd largest increase in absolute asymmetry over the 3 years, up to \$1.8 billion in 2018 from \$0.5 billion in 2016. This was down, however, from \$3.7 billion in 2017.
- Chapter 62 (Clothes, not knitted) experienced the 3rd largest decrease in absolute asymmetry over the 3 years, down to \$0.9 billion in 2018 from \$2.1 billion in 2016 and \$2.0 billion in 2017.

Table 4.1.1 shows the chapters with the largest absolute asymmetries for 2016, 2017, and 2018. There were 9 chapters consistently in the top 10 through all 3 years, which were 84 (Mechanical appliances), 88 (Aircraft), 27 (Mineral fuels), 87 (Motor vehicles), 97 (Art and antiques), 71 (Precious metals), 85 (Electronic equipment), 62 (Clothes, not knitted), and 30 (Pharmaceutical products).

Table 4.1.1. Imports: Top 10 chapters by largest absolute asymmetries 2016-18

Rank	2016	2017	2018
	Chapter	Chapter	Chapter
1	84	84	84
2	87	27	88
3	71	71	27
4	27	89	87
5	88	85	97
6	30	88	71
7	85	87	85
8	61	97	89
9	62	30	62
10	97	62	30

4.1.2. Imports: The UK's relative asymmetries by chapter with its 20 largest trading partners 2016-18

Graph 4.1.2 shows the relative asymmetries between the UK and its 20 largest trading partners for the 10 chapters with the largest relative asymmetries in 2018.

- Chapter 89 (Ships, boats, and floating structures) had the largest relative asymmetry in 2018 at -127%. This grew over the 3 years from -118% in 2017 and -25% in 2016.
- Chapter 45 (Cork) had the 2nd largest relative asymmetry in 2018 at 108%. This reduced from 125% in 2017 but grown from 24% in 2016.
- Chapter 1 (Live animals) had the 3rd largest relative asymmetry in 2018 at -107%. This grew from 59% in 2017 and 19% in 2016.
- Chapter 88 (Aircraft) experienced a notable change in its relative asymmetry over the 3 years. It was 21% in 2016 which grew to 28% in 2017 and then further to 91% in 2018.

Table 4.1.2 shows the chapters with the largest relative asymmetries for 2016, 2017, and 2018. There were 4 chapters consistently in the top 10 through all 3 years, which were 31 (Fertilizers), 97 (Art and antiques), 14 (Other vegetable products), and 47 (Waste paper and wood pulp).

Table 4.1.2. Imports: Top 10 chapters by largest relative asymmetries 2016-18

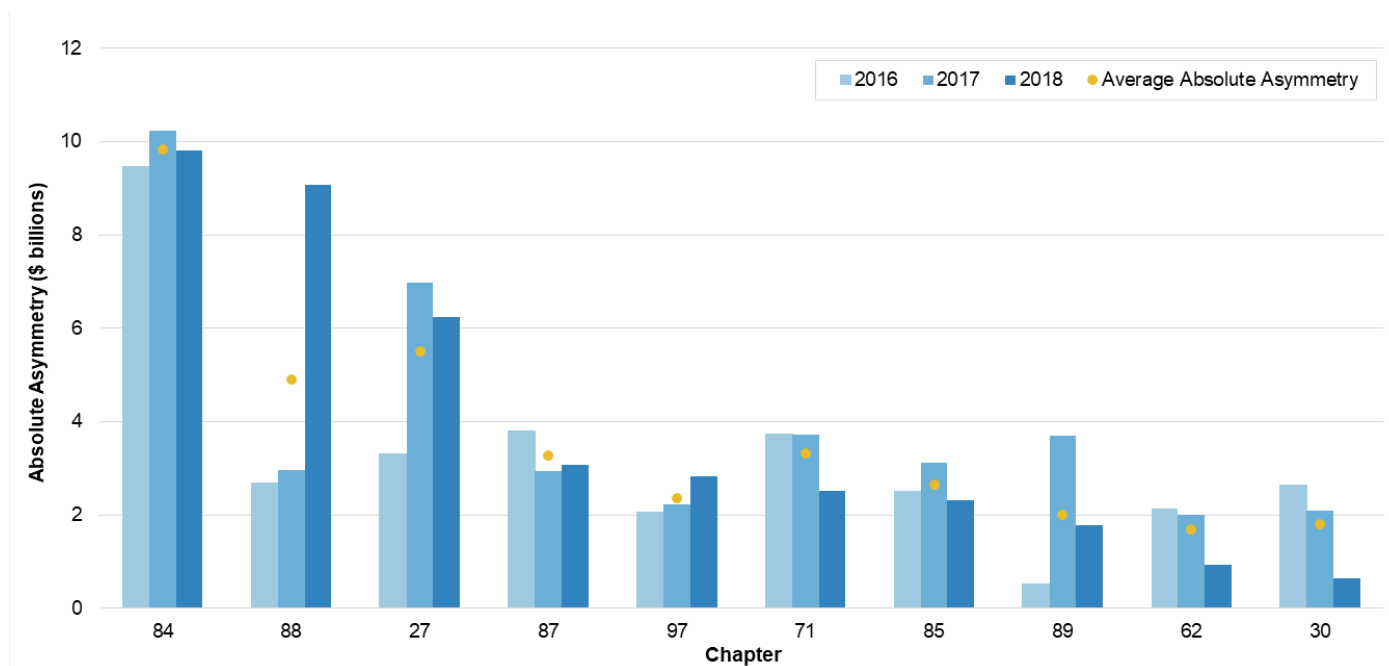
Rank	2016	2017	2018
	Chapter	Chapter	Chapter
1	93	45	89
2	31	89	45
3	26	31	01
4	14	18	93
5	97	97	31
6	24	14	88
7	47	47	97
8	46	01	14
9	03	46	47
10	36	03	46

4.1.3. Imports: Average annual trade value compared with average absolute asymmetry by chapter between the UK and its 20 largest trading partners 2016-18

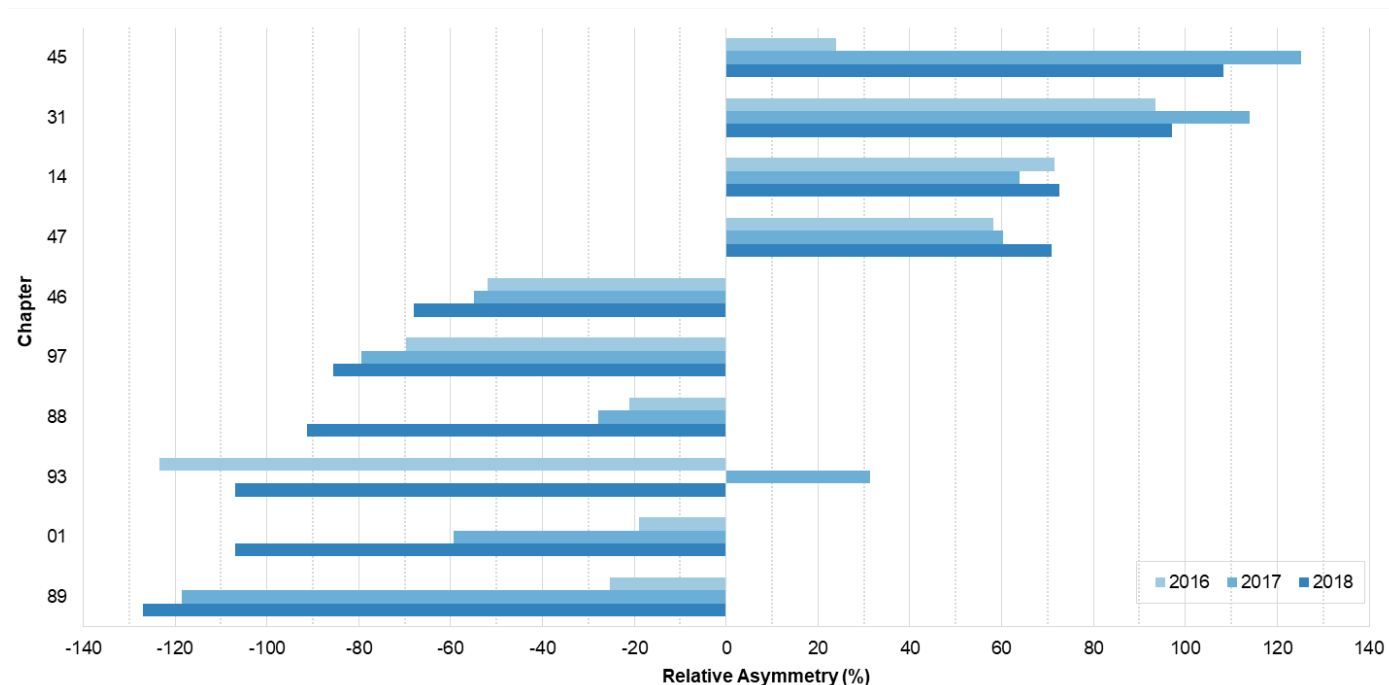
Graph 4.1.3 shows the top 10 chapters by average import value across the 3 years, each chapter's average share of the total value reported as imports by the UK and their average share of the total absolute asymmetry for 2016 to 2018.

- Chapter 71 (Precious metals) had the largest average import value. On average, it contributed 18% of the total import value (\$45.1 billion) but only 6.9% of the total absolute asymmetry (\$3.3 billion).
- Chapter 84 (Mechanical appliances) had the 2nd largest average import value. On average, it contributed 14% of the total import value (\$36.6 billion) but 20% of the total absolute asymmetry (\$9.8 billion).
- Chapter 27 (Mineral fuels) had the 3rd largest average import value. On average, it contributed 14% of the total import value (\$34.7 billion) but only 11% of the total absolute asymmetry (\$5.5 billion).
- Chapter 88 (Aircraft), on average, contributed 3.4% of the total import value (\$8.6 billion) but 10% of the total absolute asymmetry (\$4.9 billion).
- Chapter 97 (Art and antiques), on average, contributed 0.7% of the total import value (\$1.8 billion) but 4.9% of the total absolute asymmetry (\$2.4 billion).

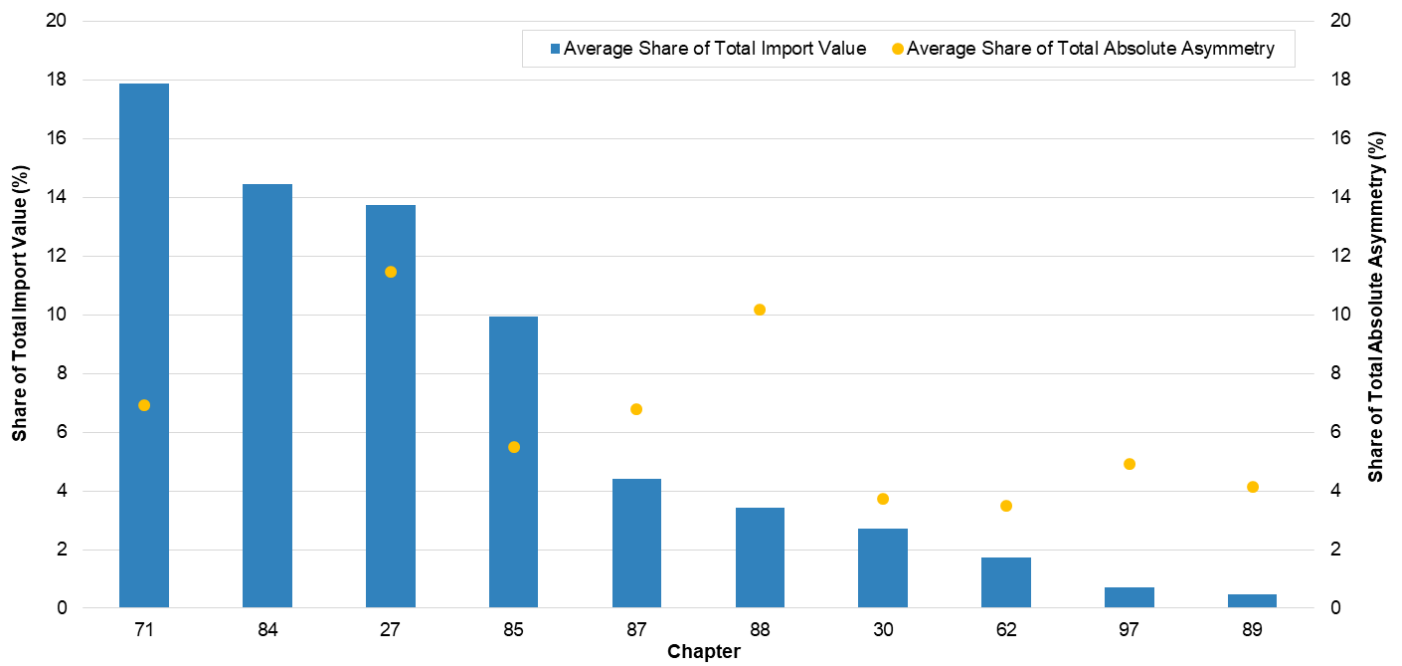
Graph 4.1.1. Imports: The UK's absolute asymmetries 2016-18 with its 20 largest trading partners within its 10 largest chapters of 2018, sorted largest to smallest by 2018 import value.



Graph 4.1.2. Imports: The UK's relative asymmetries 2016-18 with its 20 largest trading partners within its 10 largest chapters of 2018, sorted largest positive to largest negative by 2018 import value.



Graph 4.1.3. Imports: Share of average annual trade value compared with average absolute asymmetry 2016-18 between the UK and its 20 largest trading partners within its 10 largest chapters of 2018, sorted largest to smallest by share of average annual trade value.



4.2.1. Exports: The UK's absolute asymmetries by chapter with its 20 largest trading partners 2016-18

Graph 4.2.1 shows the absolute asymmetries between the UK and its 20 largest trading partners for the 10 chapters with the largest absolute asymmetries in 2018.

- In 2016, the total absolute asymmetry for all chapters was \$41.9 billion. In 2017 this increased to \$43.1 billion. In 2018 this decreased to \$35.1 billion.
- Chapter 71 (Precious metals) had the largest absolute asymmetry in 2018 at \$8.1 billion. It experienced the largest increase over the 3 years, up from the 2nd largest in 2016 and 2017 in which its absolute asymmetries were \$4.7 billion and \$4.6 billion respectively.
- Chapter 84 (Mechanical appliances) had the 2nd largest absolute asymmetry in 2018 at \$6.2 billion. It experienced the 4th largest decrease over the 3 years, down from the largest in 2016 and 2017 in which its absolute asymmetries were \$7.3 billion and \$8.1 billion respectively.
- Chapter 97 (Art and antiques) had the 3rd largest absolute asymmetry in 2018 at \$2.8 billion. It experienced the 3rd largest decrease over the 3 years, despite being up from the 4th largest in 2016 and the 5th largest in 2017 at \$4.2 billion and \$3.3 billion respectively.
- Chapter 88 (Aircraft) experienced the largest decrease in its absolute asymmetry over the 3 years, down to \$1.9 billion in 2018 from \$4.7 billion in 2016 and \$3.4 billion in 2017.
- Chapter 30 (Pharmaceutical products) experienced the 2nd largest decrease in its absolute asymmetry over the 3 years, down to \$2.2 billion in 2018 from \$3.7 billion in 2016 and \$3.3 billion in 2017.

Table 4.2.1 shows the chapters with the largest absolute asymmetries for 2016, 2017, and 2018. There were 9 chapters consistently in the top 10 through all 3 years, which were 71 (Precious metals), 84 (Mechanical appliances), 97 (Art and antiques), 30 (Pharmaceutical products), 87 (Motor vehicles), 88 (Aircraft), 29 (Organic chemicals), 85 (Electronic equipment), and 33 (Cosmetic products).

Table 4.2.1. Exports: Top 10 chapters by largest absolute asymmetries 2016-18

	2016	2017	2018
Rank	Chapter	Chapter	Chapter
1	84	84	71
2	71	71	84
3	88	88	97
4	97	30	30
5	30	97	87
6	87	85	88
7	85	87	29
8	29	29	85
9	33	33	33
10	62	93	38

4.2.2. Exports: The UK's relative asymmetries by chapter with its 20 largest trading partners 2016-18

Graph 4.2.2 shows the relative asymmetries between the UK and its 20 largest trading partners for the 10 chapters with the largest relative asymmetries in 2018.

- Chapter 26 (Ores) had the largest relative asymmetry in 2018 at 136%. This grew from 134% in 2017 but reduced from 157% in 2016.
- Chapter 93 (Arms and ammunition) had the 2nd largest relative asymmetry in 2018 at -121%. This grew from 113% in 2017 and -49% in 2016.
- Chapter 52 (Cotton) had the 3rd largest relative asymmetry in 2018 at 102%. This was the same in 2017 but reduced from 114% in 2016.

Table 4.2.2 shows the chapters with the largest relative asymmetries for 2016, 2017, and 2018. There were 5 chapters consistently in the top 10 through all 3 years, which were 26 (Ores), 52 (Cotton), 54 (Man-made filaments), 42 (Leather goods), and 61 (Knitwear).

Table 4.2.2. Exports: Top 10 chapters by largest relative asymmetries 2016-18

	2016	2017	2018
Rank	Chapter	Chapter	Chapter
1	26	26	26
2	52	93	93
3	36	52	52
4	61	45	54
5	28	42	42
6	97	80	36
7	54	54	91
8	42	97	28
9	46	67	61
10	62	61	55

4.2.3. Exports: Average annual trade value compared with average absolute asymmetries by chapter between the UK and its 20 largest trading partners 2016-18

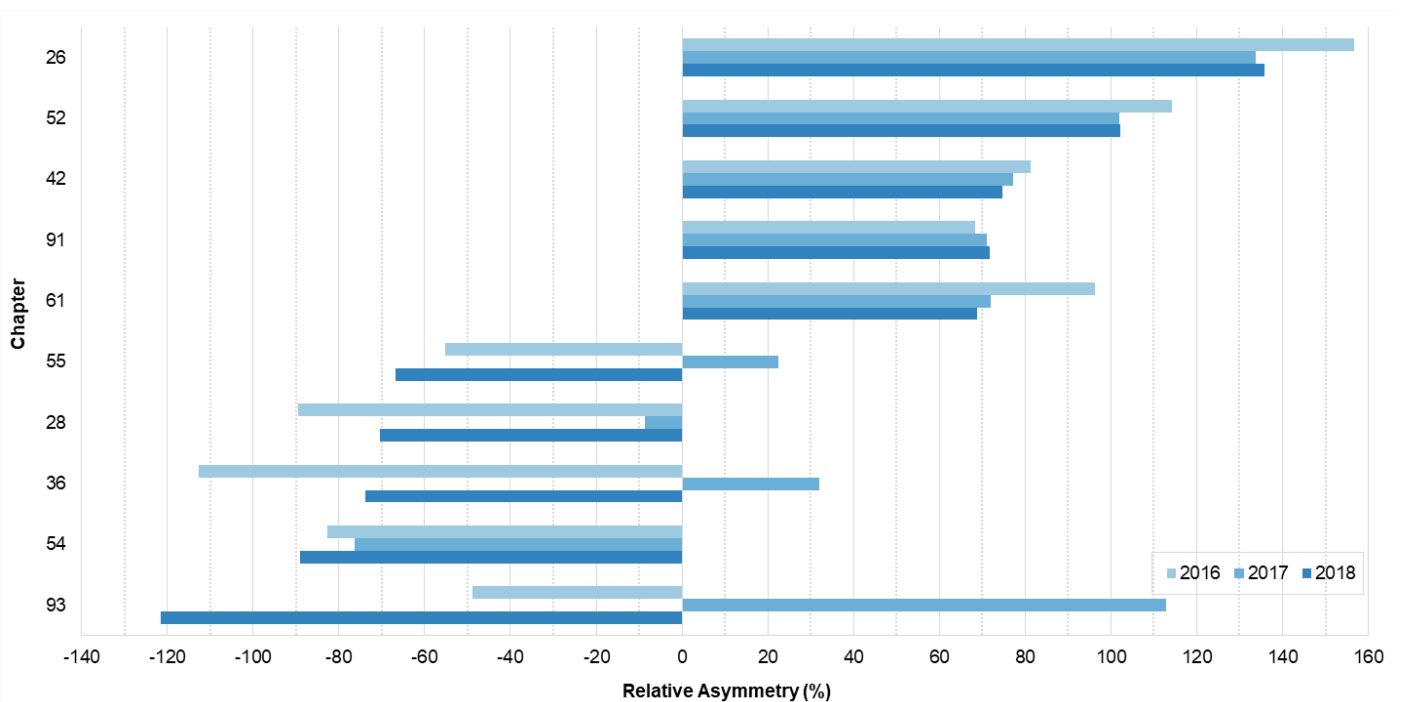
Graph 4.2.3 shows the top 10 chapters by average export value across the 3 years, each chapter's average share of the total value reported as exports by the UK and their average share of the total absolute asymmetry for 2016 to 2018.

- Chapter 84 (Mechanical appliances) had the largest average export value. On average, it contributed 18% of the total export value (\$34.8 billion) and 20% of the total absolute asymmetry (\$7.2 billion).
- Chapter 71 (Precious metals) had the 2nd largest average export value. On average, it contributed 15% of the total export value (\$29.2 billion) and 16% of the total absolute asymmetry (\$5.8 billion).
- Chapter 87 (Motor vehicles) had the 3rd largest average export value. On average, it contributed 13% of the total export value (\$25.6 billion) but only 5.8% of the total absolute asymmetry (\$2.1 billion).
- Chapter 97 (Art and antiques), on average, contributed 3.4% of the total export value (\$6.6 billion) but 9.5% of the total absolute asymmetry (\$3.5 billion).
- Chapter 88 (Aircraft), on average, contributed 4.0% of the total export value (\$7.7 billion) but 9.1% of the total absolute asymmetry (\$3.3 billion).

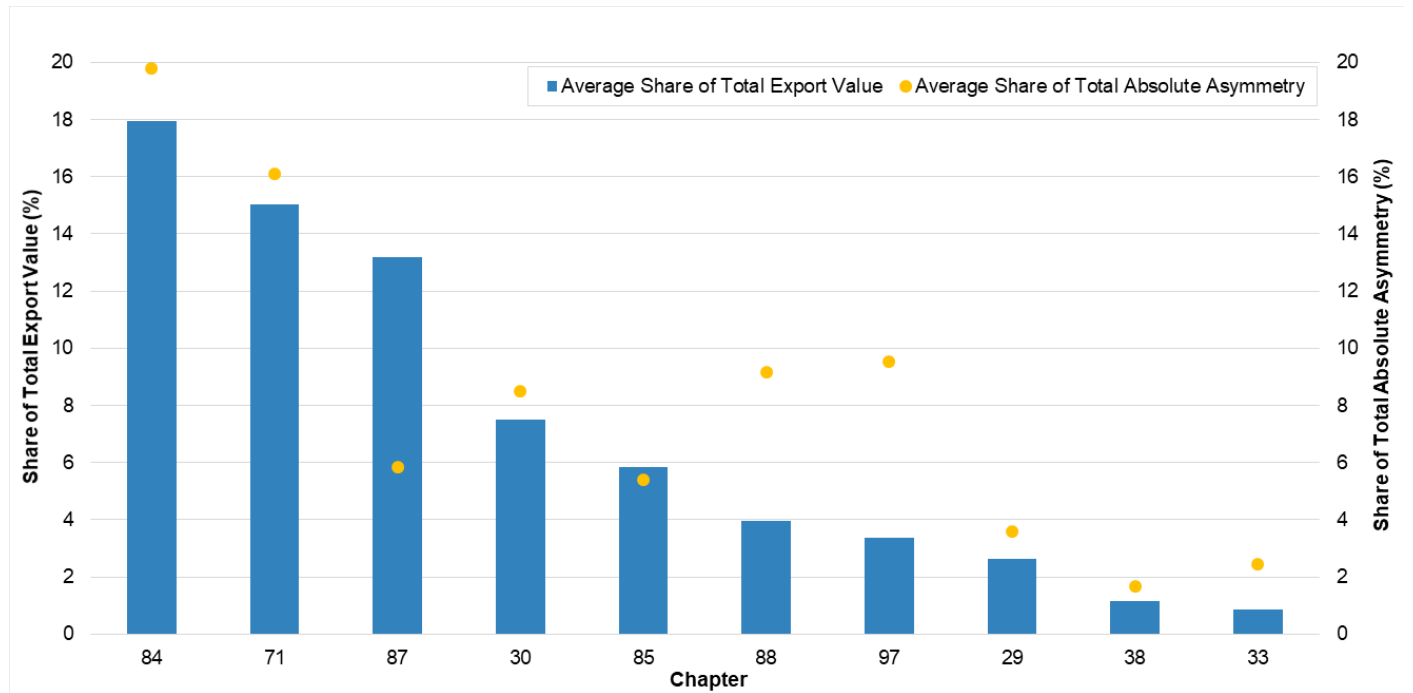
Graph 4.2.1. Exports: The UK's absolute asymmetries 2016-18 with its 20 largest trading partners within its 10 largest chapters of 2018, sorted largest to smallest by 2018 export value.



Graph 4.2.2. Exports: The UK's relative asymmetries 2016-18 with its 20 largest trading partners in its 10 largest chapters of 2018, sorted largest positive to largest negative by 2018 export value.



Graph 4.2.3. Exports: Share of average annual trade value compared with share of average absolute asymmetry 2016-18 between the UK and its 20 largest trading partners within its 10 largest chapters of 2018, sorted largest to smallest by share of average annual trade value.



Annex 1: Methodology

Annex 1.1. 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.

(1) Absolute Asymmetry:

$$= | \text{Value (D)} - \text{Value (P)} |$$

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

(2) Relative Asymmetry (%):

$$= \frac{\text{Value (D)} - \text{Value (P)}}{0.5 (\text{Value (D)} + \text{Value (P)})} \times 100$$

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.

If a reporting country has a positive relative asymmetry, this means that they reported more trade than their partner country. If a reporting country has a negative relative asymmetry, this means that they reported less trade than their partner country.

For example, Country A reports \$100 billion in imports from Country B while Country B reports \$120 billion in exports to Country A. The relative asymmetry here is 18.2%. This means that, relative to the average between the two countries, they differ by 18.2%. Country A has reported 9.1% more trade than the average and Country B has reported 9.1% less trade than the average.

(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.

Annex 1.2. Non-International Trade Data

For the analysis in Section 2 (Trade in goods asymmetries between the UK's largest trading partners by trade value, 2016 to 2018), data was downloaded from UN Comtrade in which all 21 partner countries were entered in both the 'Reporter' and 'Partner' query fields.

In the resultant data output files were several lines of data in which the 'Reporter' and 'Partner' were the same country.

These entries would inherently and inaccurately contribute to the total asymmetry for the affected country because there is no mirror flow against which it would be compared. Therefore, all such lines of data were removed before analysis took place.

Annex 1.3. Chapter 99 Adjustments and Omission from Analysis

The following is a quote taken from the 'Help > Limitations' section of the UN Comtrade website:

"The values of the reported detailed commodity data do not necessarily sum up to the total trade value for a given country dataset. Due to confidentiality, countries may not report some of its detailed trade. This trade will – however – be included at the higher commodity level and in the total trade value. For instance, trade data not reported for a specific 6-digit HS code will be included in the total trade and may be included in the 2-digit HS chapter. Similar situations could occur for other commodity classifications. Detailed data processed after 1. January 2006 and published in HS will sum up to the respective totals due to the introduction of adjustment items with commodity code 9999 and 999999."

This indicates that for all post-2006 data, the total reported trade by a country should match the sum of the chapter totals reported by that country. This was not always the case in the data we downloaded, with numerous small differences and two large differences.

We followed the method indicated above and added all such differences to each country's chapter 99 totals.

Resultantly, we omitted chapter 99 from all analysis in Section 4 (A chapter breakdown of trade in goods asymmetries between the UK and its largest trading partners by trade value, 2016 to 2018). This is because it does not represent an actual group of commodities being traded but rather acts as a 'catch all' for suppressed or otherwise non-specified trade.

¹ HS Chapter as defined in the UN Comtrade database

Annex 2: Chapter List

1	Live animals
2	Meat & edible offal
3	Fish and shellfish
4	Dairy produce and birds' eggs
5	Other animal products
6	Live trees, plants, and flowers
7	Edible vegetables
8	Fruit and nuts
9	Coffee, tea, and mate
10	Cereals
11	Milled products
12	Oil seeds and fruit
13	Vegetable extracts and resins
14	Other vegetable products
15	Animal or vegetable fats, oils, and waxes
16	Preparations of meat or fish
17	Sugars
18	Cocoa
19	Cereal preparations
20	Vegetable preparations
21	Edible preparations
22	Beverages
23	Animal fodder
24	Tobacco
25	Salt, sulphur, plasters, and clays
26	Ores
27	Mineral fuels
28	Inorganic chemicals
29	Organic chemicals
30	Pharmaceutical products
31	Fertilizers
32	Paints, inks, and dyes
33	Cosmetic products
34	Soaps, lubricants, and polishes
35	Glues, proteins, and starches
36	Explosives and pyrotechnics
37	Photographic products
38	Miscellaneous chemical products
39	Plastics and plastic products
40	Rubber and articles thereof
41	Hides, skins, and leather
42	Leather goods
43	Furs
44	Wood
45	Cork
46	Wickerwork and basketwork
47	Waste paper and wood pulp
48	Paper
49	Books and newspaper
50	Silk
51	Wool

52	Cotton
53	Other vegetable textile fibres
54	Man-made filaments
55	Man-made staple fibres
56	Wadding, rope, and cable
57	Carpets
58	Woven fabrics, lace, and embroidery
59	Coated fabrics and textiles
60	Knitted or crocheted fabrics
61	Knitwear
62	Clothes, not knitted
63	Other textile goods
64	Footwear
65	Headgear
66	Umbrellas
67	Feather and hair articles
68	Articles of stone
69	Ceramic products
70	Glass and glassware
71	Precious metals
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
82	Tools and cutlery of base metal
83	Miscellaneous articles of base metal
84	Mechanical appliances
85	Electronic equipment
86	Trains and track fixtures
87	Motor vehicles
88	Aircraft
89	Ships, boats, and floating structures
90	Measuring devices and gauges
91	Clocks and watches
92	Musical instruments
93	Arms and ammunition
94	Furniture and light fittings
95	Toys, games, and consoles
96	Miscellaneous manufactured articles
97	Art and antiques
99	Other products