UK jobs dependent on links to China

cambridge econometrics

clarity from complexity

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Correction (August 2020)

This report was originally published on 14 July 2020. Since then, we have identified an error in the conversion from exports to jobs supported in the following sectors: Motor Vehicles and Other Transport Equipment. Using corrected jobs-to-output ratios, our assessment of jobs supported by UK goods exports to China has been revised down, from 60-80,000 full-time equivalent (FTE) jobs to 50-60,000 FTE jobs. This lowers the overall range of estimates, from 124-149,000 to 114-129,000 FTE jobs.

The report's conclusion remains unchanged, that the UK-China relationship supports over 100,000 jobs.

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Summary

Introduction

This report presents estimates of jobs supported by UK links to China

This report, commissioned by the China-Britain Business Council (CBBC) presents estimates of the number of UK jobs supported by links to China through:

1. Trade: UK production (and thus jobs) to export goods and services to China

2. Foreign Direct Investment: Investments in the UK by Chinese companies

3. Tourism: Expenditure by tourists visiting the UK from China

4. Students: Expenditure by students enrolling at higher education institutions in the UK

Links between the UK and China have grown substantially

Trade, tourism and higher education have grown strongly in recent years

By most of the activities considered, China has been of growing importance to the UK economy.

Of the four areas considered in this report:

1. Exports of goods, in particular, have grown rapidly, to £25bn in 2019 (six times larger than in 2005, in real terms).

   - China is now the UK's third-largest export market for goods
   - services exports are smaller (just over £5bn in 2019) but, here, the UK runs a trade surplus with China

2. The value of Chinese companies' investments in the UK has been stable, at between £1.7bn and £2.3bn (over 2015-18).[1]

   - this is a small share of the total value of investments held by foreign companies in the UK: just 0.2%

3. Tourism visits exceeded 1m in 2019, which is five times larger than in 2009

   - the scale of Chinese tourism has only relatively recently been recognised in official tourism statistics, with a substantial upward revision in the latest (May 2020) release

4. In higher education, there were 120,000 Chinese students enrolled for the 2018/19 academic year, up from 90,000 in 2014/15

   - in that year, Chinese students represented 25% of all international students in the UK

With much potential for future growth, China represents a large potential future market.

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[1] The inward international investment position i.e. the stock of investments held, rather than the value of transactions.

UK links with China support over 100,000 jobs

Even considering potential double counting, the UK-China relationship supports over 100,000 jobs

Substantial growth in UK-China links translates to substantial growth in jobs supported by those links. Our analysis suggests that trade, tourism and students support over 100,000 full-time equivalent (FTE) jobs in the UK.[23]

Adding up the estimates for these economic activities would suggest a jobs figure in the range 114-129,000. Given the possibility of double counting (i.e. if some tourism expenditures were already captured in the trade and students figures), the range could be somewhat lower: 103-118,000, under relatively strong assumptions.[4]

Summary of jobs estimates by economic activity

	Value (£bn)	Jobs ('000s FTE)	Comment
Trade	30	80-95	Goods: £25bn (2019) / 50-60,000 jobs Services: £5bn (2019) / 30-35,000 jobs
Tourism	2	16	Data for 2019
Students	2	18	Data for 2018/19 academic year, excluding income from tuition fees
TOTAL	**34**	**114-129**	**Perhaps 103-118,000 under (relatively strong) assumptions about double counting**

Note(s): Foreign Direct Investment is not reported here, owing to uncertainties about the data and challenges in presenting on a like-for-like basis. Indicatively, Department for International Trade analysis suggests that Chinese FDI may have 'created or safeguarded' over 9,000 jobs based on figures for 2016/17, 2017/18 and 2018/19.

Sources(s): See main report.

This is not to say that these jobs could not conceivably be supported by links to other countries instead. In the absence of the existing UK-China relationship, workers may produce for other country markets. Nevertheless, Chinese expenditure represents a demand for UK output. Workers must be deployed (and indeed have been deployed, in increasing numbers) to meet those demands. Continued growth in China could generate further demand for UK output and, in turn, support further jobs.

The jobs figures are direct jobs. That is those jobs associated with the output of the industries in question. We do not, for example, look to estimate indirect jobs which may in turn be supported through supply chains. That is, expenditure by the industries in question in the production of their output.

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[2] At the level of data that consider links between the UK and China, we advise caution in interpreting the figures at a high level of precision. Figures considered in the tens of thousands seems appropriate.

[3] Given data uncertainties, we put the figures for Foreign Direct Investment to one side when combining the estimates in this way.

[4] A conservative adjustment (i.e. a relatively large estimate for double counting) can be crudely constructed by assuming that any:

- overlap in expenditure between services and tourism is double counted: leaving just jobs in accommodation and food/beverage services, reducing the tourism figure by 8,000 FTE jobs
- students counted in the tourism statistics are also listed in the student enrolment numbers, reducing the tourism figure by a further 3,000 FTE jobs

Combined, this is a large reduction in the total number of jobs supported by Chinese tourism (to around 5,000), restricting tourism expenditure to just a portion of accommodation and food/beverage expenditure. It is in this sense that such an adjustment would involve relatively strong assumptions.

Individual summaries

Trade

UK exports of goods and services: 80-95,000 FTE jobs supported

- UK trade with China has increased substantially since 1999 and now accounts, by value, for 4.5% of total UK gross exports and 6.7% of UK gross imports.

- The number of jobs in the UK supported by trade with China has been increasing since 2005. By 2019, we estimate that these exports support 80-95,000 full-time equivalent (FTE) jobs:

  - goods: 50-60,000 FTE jobs
  - services: 30-35,000 FTE jobs

- For goods, industries with high numbers of jobs supported include: mining and quarrying, electronics and machinery.

- For services, industries with high numbers of jobs supported include: architecture/engineering and business support services.

Foreign Direct Investment

Foreign Direct Investment: Perhaps over 9,000 jobs created or safeguarded in the last three years

- Over 2015-18, the total value of Chinese companies' investments in the UK (the inward international investment position i.e. the stock / 'balance sheet') has been broadly stable, at £1.7-2.3bn.

  - this represents just 0.2% of the total value of foreign investments in the UK
  - relatively more of China's holdings are in transport equipment, retail, and financial services

- Between 2016/17 and 2018/19, estimates from the UK Department for International Trade (DIT) suggest that over 9,000 jobs have been either created or safeguarded by Chinese Foreign Direct Investment in UK projects.

Tourism

Tourism: Some 16,000 jobs supported

- Between 2009 and 2019 the number of tourists from China has increased by 430%, with over 1m Chinese tourists visiting the UK in 2019.

  - this is more than what was previously thought, after a considerable upward revision in the most recent ONS International Passenger Survey figures

- Expenditure by Chinese tourists grew by 500% over the same period.

- Tourism from China, in terms of the number of visits, nights spent in the UK and expenditure, grew faster than from any other part of the world.

- The number of FTE jobs supported by Chinese tourists in 2019 was estimated to be 16,300, a substantial increase of 12,400 from 2009.

Students (higher education only)

Students (higher education): Almost 18,000 jobs supported

- In the 2018/19 academic year there were 120,000 Chinese students registered in UK higher education, a 35% increase from 2014/15 (90,000 students).

  - Chinese students now represent 25% of all international students

- Expenditure by Chinese students (excluding tuition fees) was estimated to be £1.9bn in the 2018/19 academic year.

- Chinese students' expenditure is estimated to have supported 17,600 FTE jobs in 2018/19.

1   Introduction

This report estimates the number of jobs supported by UK links to China

Cambridge Econometrics (CE) was commissioned by the China-Britain Business Council (CBBC) to estimate the number of UK jobs that are dependent on economic links to China. This study focuses on the jobs linked to four economic activities: trade, Foreign Direct Investment (FDI), tourism and (higher) education. The study comprises:

- Phase 1: Estimates of jobs supported by trade, FDI, tourism and education in the UK

- Phase 2: Consideration of the distribution of those jobs across regions and local areas of the UK

This report presents the findings of Phase 1, with estimates of the numbers of jobs supported by these links. We use the term 'jobs supported' to describe the jobs associated with (that are estimated to have contributed to meeting) Chinese demand/expenditure. This is not to say that the output of these jobs is specific to China; only that output requires workers and that at least some workers' production must have been devoted to servicing Chinese demand. The jobs could conceivably have been supported by links to other countries.

The jobs figures are direct jobs. That is those jobs associated with the output of the industries in question. We do not, for example, look to estimate indirect jobs which may in turn be supported through supply chains. That is, expenditure by the industries in question in the production of their output.

This report is structured as follows:

- Chapter 2: Approach – provides a summary of the methods applied to estimate the numbers of jobs supported by those links to China considered in this report. Further detail on the methods and data can be found in Appendix A and Appendix B.

- Chapter 3: Trade – highlights the growing importance of trade with China over the last 20 years and estimates the number of jobs supported by UK exports of goods and services to China.

- Chapter 4: Foreign Direct Investment – provides an overview of the inward and outward international investment positions between the UK and China over the last ten years, and presents estimates of jobs created or safeguarded by Chinese FDI projects.

- Chapter 5: Tourism – highlights the growing importance of Chinese tourists to the UK economy over the last ten years in terms of the number of visitors and their expenditure, and presents the jobs supported by that expenditure.

- Chapter 6: Students – presents the recent trends in Chinese students in higher education institutions in the UK and the jobs supported by their expenditure.

Further details of the approach, source data and further results can be found in the appendices.

2   Approach

This chapter provides a brief overview of the methods applied to estimate the numbers of jobs supported by trade, foreign direct investment (FDI), tourism and students.

'Jobs supported' are our estimates of the number of jobs that would have been required to meet a given amount of Chinese demand/expenditure each year. In principle, had Chinese demand been lower (higher), the jobs figures would also have been lower (higher) and may instead have been supported by (employed to meet) demand from other sources, whether in the UK or abroad.

With the exception of FDI, jobs supported are reported on a full-time equivalent (FTE) basis i.e. weighted to account for the fewer hours worked by a part-time employee.

Full details of the approach and data can be found in Appendix A and Appendix B of this report.

2.1   Trade

Jobs supported by trade are split into goods and services (by industry)

Estimates of jobs supported by trade are calculated based on the volume of goods and services exported by the UK to China each year. This output (which entails production on the part of UK firms, including their workers) is converted to an implied number of jobs based on assumptions about the ratio of jobs per unit of output, differentiated by industry.

The figures for export output (split into goods and services, by industry) are derived from ONS data, with the breakdown of goods exports calculated using OECD data on bilateral trade between the UK and China. As set out in Chapter 3, exports of non-monetary gold represent a significant source of volatility from year to year. This trade is subtracted from goods exports before converting to jobs, on the basis that the large changes in exports from year to year are unlikely to be met by correspondingly large changes in jobs involved in this activity.

Conversions from output to jobs are calculated from ONS and CE-calculated data

Ratios of jobs per unit of (real) output are calculated using ONS data on output by industry from the 2015 input-output analytical tables, combined with estimates of full-time equivalent jobs constructed by CE. The figures for full-time jobs are weighted such that one full-time job, or one person in self-employment, counts as one job, while part-time jobs are calculated as a fraction based on the relative number of hours worked (on average across all jobs and industries).

In the cases of services, figures suppressed (not reported) by ONS to avoid disclosure mean that, at an industry level, the sum does not match the published totals for UK services exports to China. This discrepancy can be large (17% in 2018) and we do not attempt to correct for it in the main results reported. Were we to try to account for this difference (using an average jobs-to-output ratio for the unallocated output), the resulting jobs figure would, accordingly, likely be higher.

2.2   Foreign Direct Investment

There is no straightforward way of estimating the number of jobs supported by Chinese FDI in the UK. This is due to a combination of limited data availability (a known challenge with data about FDI) and difficulties in identifying from these statistics, the amount of investment directly linked to UK production.

Jobs supported by FDI are drawn from DIT-published analysis

Instead, the jobs figures we report are those published by the UK Department for International Trade (DIT) which records the number of projects that result from inward investment into the UK i.e. investments made by foreign companies. Figures for jobs 'created or safeguarded' by new investment are compiled from a combination of other/external data (including from EY and the Financial Times) and consultation with investors. Only jobs considered to be 'permanent' (support for a minimum of two years) are included in this measure.[5] These figures are not on a full-time equivalent basis.

2.3   Tourism

Jobs supported by tourism combine UK passenger statistics and figures from the UK Tourism Satellite Accounts

Tourism statistics are published regularly by the ONS (Travelpac), covering number of visits, nights spent and expenditure. A separate ONS publication (the Tourism Satellite Accounts [TSA]) publishes estimates of the number of jobs supported by all tourism in the UK, from both UK residents and international visitors.

Figures for jobs supported by Chinese tourism are calculated by first the estimating the proportion of jobs supported by all international tourism. These jobs are split out from the TSA using expenditure figures from the TSA. Jobs supported specifically by Chinese tourism are then estimated by applying Chinese expenditure figures from Travelpac to the jobs figures from the first step.

2.4   Students

The focus of the analysis of students in this report is confined to higher education, excluding those attending UK schools or further education, and those on short courses (e.g. summer schools).

Jobs supported by (higher education) student expenditure combine spending figures and statistics on student enrolment

Estimates of UK jobs supported by Chinese students are calculated from estimates of student expenditure and then, as with trade, converted to jobs using jobs-to-output ratios calculated from the ONS input-output analytical tables for 2015 and accompanying estimates of full-time equivalent jobs calculated by CE.

Student expenditure figures are taken from earlier research for the UK Department for Education (the Student Income and Expenditure Survey) on student weekly expenditure by category and mode of study (full-time or part-time). This expenditure covers all categories of spending except for tuition fees. Expenditure on a per-student basis by mode of study (and adjusted for the possibility that part-time students might be working, and thus spending income earned in the UK) is multiplied by student numbers from the UK Higher Education Statistics Agency to estimate total expenditure by Chinese students.

As above, these figures are then converted to jobs using the calculated jobs-to-output ratios.

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[5] See Appendix Section A.2 for the precise criteria.

2.5   Limitations and uncertainties

Various assumptions underpin this analysis, which we discuss in more detail in the individual chapters

With the exception of FDI, the general approach to estimating jobs supported by Chinese expenditure involves some combination of:

1. estimating the portion of output or jobs that might be attributable to Chinese spending, based on the share of Chinese output/expenditure in the total

2. if based on expenditure/output, applying assumptions about the ratio of jobs per unit of output i.e. the number of jobs that would be expected to be required to meet Chinese demand

The key underlying assumptions are that, at the level of detail at which the statistics are available, patterns of spending (e.g. by industry) are similar to the average and that the productivity at which any output is produced is also similar to the average. Were either of these to differ, the estimates would, in turn differ. We discuss the implications of any assumptions and data limitations in each of the chapters that follow.

When combining the figures we also consider the scope for double counting in the combined estimates and the extent to which the final total might be reduced if this double counting were accounted for.

3 Trade

Summary

- UK trade with China has increased substantially since 1999 and now accounts, by value, for 4.5% of total UK gross exports and 6.7% of UK gross imports.

- The number of jobs in the UK supported by trade with China has been increasing since 2005. By 2019, we estimate that these exports support 80-95,000 full-time equivalent (FTE) jobs:
  - goods: 50-60,000 FTE jobs
  - services: 30-35,000 FTE jobs

- For goods, industries with high numbers of jobs supported include: mining and quarrying, electronics and machinery.

- For services, industries with high numbers of jobs supported include: architecture/engineering and business support services.

3.1 Introduction

China is the UK's third-largest trading partner in terms of both exports and imports, after the EU (as a whole) and the US. By 2019, trade with China accounted for 4.5% of UK total exports and 6.7% of total imports. This chapter first provides a summary of how China's trade importance has increased. We then present estimates of the numbers of jobs supported by UK exports to China, split into goods and services.

3.2 Trade

Between 1999 and 2019, the importance of UK trade with China has risen significantly, with the UK's trade deficit with China increasing over these last two decades. This overall trade deficit does, however, mask a trade surplus in *services*, which is more than outweighed by a trade deficit in *goods*.

China's trade importance has grown rapidly

Exports and imports grew by an average of 15.9% and 13.4%, respectively, year-on-year. Consequently, China rose from being the 15th most important UK export destination in 1999 to being the third most important export destination in 2019 (behind the EU and the US), when total goods and services worth £31.4bn were exported. In 1999, China accounted for the sixth-largest share of imports, at around £4bn. Imports subsequently skyrocketed to £49bn in 2019 making China the UK's third most important trading partner for imports (again, behind the EU and the US).

Figure 3.1 shows UK trade with China over 1999-2019, both imports and exports by value (the bars), and as a share of total imports and exports, respectively (the lines). While the overall trend was upward for both exports and imports, there was something of a slump in exports in 2015 and 2016, followed by a return to growth thereafter. This was due to slowing growth in the Chinese economy and depreciation of the renminbi which drove down import values. A clear upward trend is also visible in the export shares: in 1999, China accounted for less than 1% of total UK exports but, by 2019, this share had risen to 4.5%.

Since 2014, the share of imports has levelled off at around 7%, again due to the depreciation of the renminbi and a slowing Chinese economy. Against an

export share that has continued to grow since 2015, the UK's trade deficit with China has been gradually narrowing since 2016.

Figure 3.1: UK exports and import to/from China
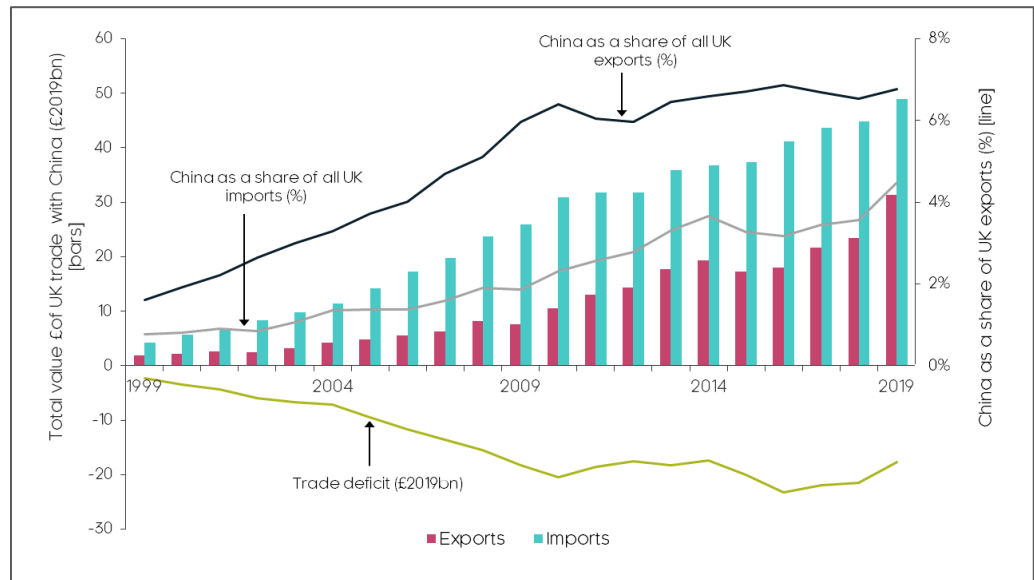
Source(s): CE analysis of ONS (2020) 'Total trade' statistics.

Goods exports

In real terms, UK goods exports to China were six times larger in 2019 than in 2005

In 2019, the UK exported £25bn of goods to China, up from £4bn in 2005 (both at 2019 prices i.e. in real terms). Figure 3.2 shows that the largest individual categories were mining and quarrying, motor vehicles, and metals and metal products. The last of these, however, is volatile from year to year owing to trade in non-monetary gold (£6.5bn in 2019, but just a fraction of that in some other years).[6]

Figure 3.2: UK goods exports to China
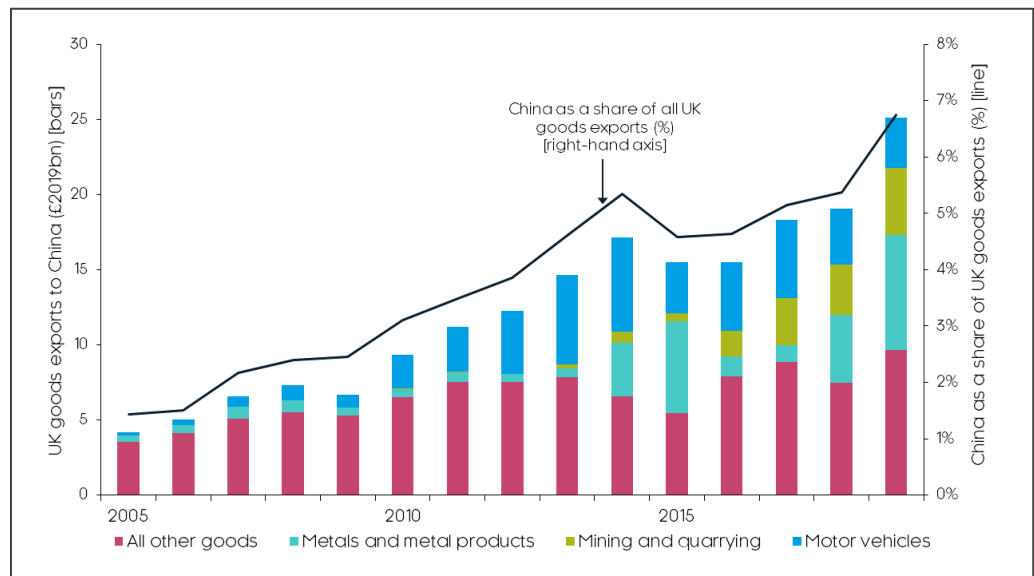
Note(s): OECD data by industry are scaled to match ONS reported totals.
Source(s): CE analysis of ONS (2020) 'Total trade' statistics; and OECD (2020) 'Bilateral Trade in Goods'.

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[6] The UK is a hub for gold trade and changes in ownership, even if the gold does not physically move, count as imports/exports in the statistics. Fluctuations from year to year (which can be large) lead to volatile patterns of trade in basic metals, even though it is a different kind of trade to most others. We exclude this trade from the jobs estimates.

Mining and quarrying exports have exhibited a strong upward trend since 2012, having increased sixteen-fold to 2019, from £277m to £4.5bn. On the other hand, exports of motor vehicles have shrunk by around 35% between 2017 and 2019.

Services exports

UK services exports to China are more modest than goods but have still grown steadily

While UK services exports to China exceed imports, resulting in a trade surplus in services, both the volume and growth have been more modest compared with goods (see Figure 3.3). In 2019, the UK exported £5bn in services to China, which is just one-fifth of the volume of goods exports. Services exports increase over 2016-19, with a large increase of 16% in 2019. The most significant services export categories are architecture/engineering and business support services, which includes management consultancy, travel agency and rental and leasing activities services. The former has increased substantially between 2016 and 2018, superseding financial and insurance services as the second-largest category.

Figure 3.3: UK services exports to China
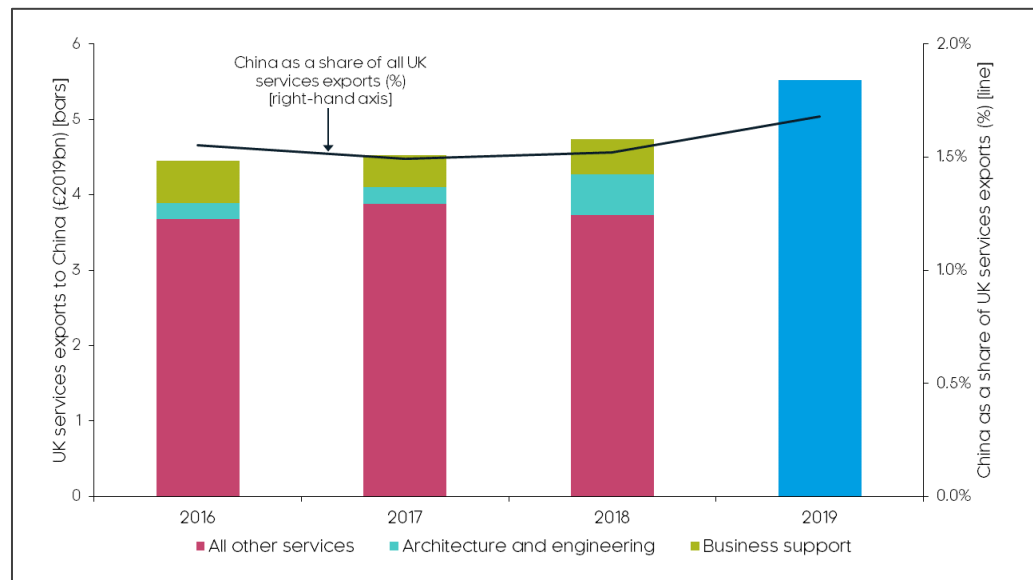
Source(s):   CE analysis of ONS (2020) 'Trade in services' statistics (experimental); and ONS (2020) 'Total trade' statistics.

3.3   Jobs supported by UK exports to China

From the trade figures above, we estimate that UK exports of goods and services to China support between 80,000 and 95,000 FTE jobs:

• goods (excluding trade in non-monetary gold): 50-60,000 FTE jobs

• services: 30-35,000 FTE jobs

Goods

Goods exports are estimated to support 50-60,000 FTE jobs

The rapid growth in UK goods exports to China over 2005-19 bears out in the estimated number of jobs supported by that trade. By 2018/2019, the total number of jobs supported by goods exports to China had more than doubled, if not trebled, from around 20,000 full-time equivalent (FTE) jobs in 2005, to 50-60,000 FTE jobs.[7,8]

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[7] This calculation excludes exports of non-monetary gold. See Appendix A for further details.

[8] See the next section on limitations and uncertainties for further discussion of this range.

Figure 3.4 shows that the sectors most dependent on goods exports with China are mining and quarrying, electronics, and machinery. Together, these three sectors accounted for about a third of the 50-60,000 jobs supported by trade with China. The mining and quarrying sector has seen a significant upward trend in the number of jobs supported by trade with China, in line with the trend in export volumes. However, while mining and quarrying accounts for a large proportion of export volumes, it supports a comparatively smaller proportion of jobs because of the high output-to-labour (productivity) ratio.[9]

Figure 3.4: Estimated jobs supported by UK goods exports to China
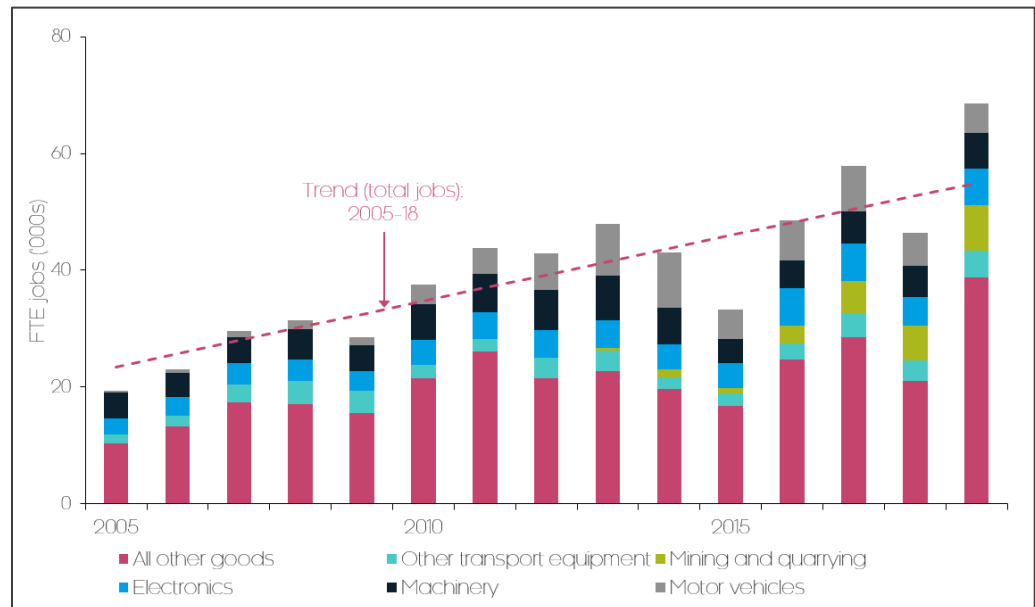
Source(s):   CE analysis of ONS trade in goods statistics (June 2020); OECD (2020) 'Bilateral Trade in Goods'; HMRC (2020) 'Non-monetary gold exports'; and ONS (2019) 'input-output analytical tables'.

Services

Services exports are estimated to support 30-35,000 jobs

Figure 3.5 shows that UK services exports support a smaller number of jobs compared with goods: 30-35,000 FTE jobs, with architecture/engineering and business support services being the largest individual categories (in line with the trade figures presented above).

Note that the data that inform this calculation are not completely allocable to industries. In 2019, the source data (from ONS) leave 17% of the output unallocated to a specific sector because of suppressed figures to avoid disclosure. Were this discrepancy applied back to the jobs figures (as in the 'Residual/Unallocated' component of Figure 3.5), the jobs would be correspondingly higher. However, such an adjustment implicitly assumes that the productivity of this remainder matches the average across the other industries. Rather than speculate, we interpret the results conservatively, with a jobs supported figure of 30-35,000 FTEs.

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[9] As can be calculated, for example, using the EU KLEMS growth and productivity accounts now maintained by the Vienna Institute for International Economic Studies (wiiw): https://euklems.eu/

Figure 3.5: Estimated jobs supported by UK services exports to China
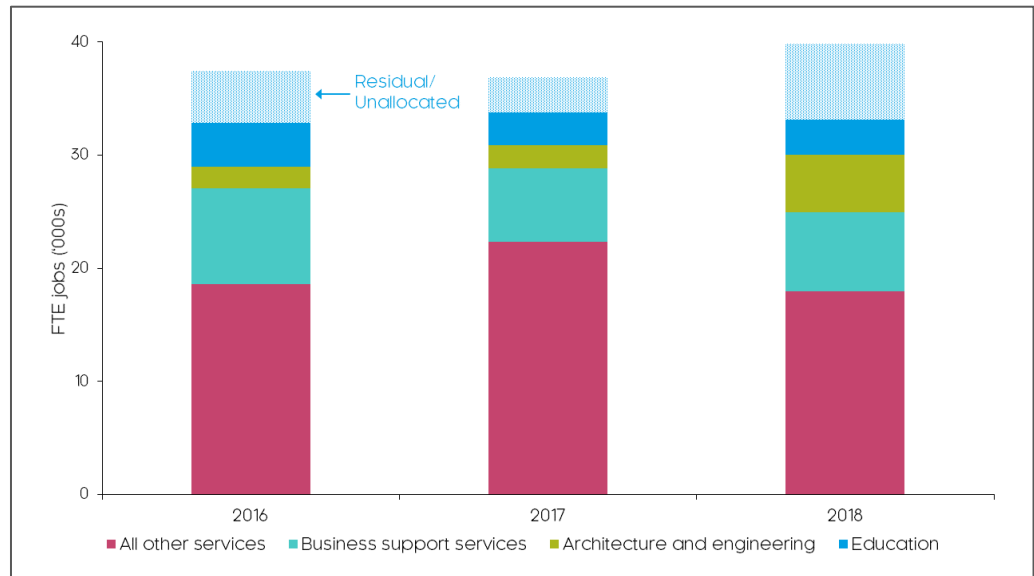
Source(s):   CE analysis of ONS (2020) 'Trade in services' statistics (experimental); ONS (2020) 'Total trade' statistics; and ONS (2019) 'input-output analytical tables'.

3.4   Limitations and uncertainties

We focus solely on jobs supported by Chinese demand

The jobs figures presented above are estimated as those jobs supported by Chinese demand for UK-produced goods and services. In this analysis we do not consider, for example, the potential effect of global competition which may either displace or offshore UK jobs and thus *net* jobs. There is, however, some empirical evidence (e.g. for the US) that suggests that such competition (and from China) may be to the detriment of manufacturing industries with relatively lower-skilled and lower-wage workforces. Equally, this may generate export opportunities for other sectors that supply to (rather than compete with) China. Relatedly, we do not attempt to disentangle the UK and China's respective positions in global supply chains.

The jobs figures may be lower if exporting industries are more productive than we assume

While we assume an average level of productivity for an entire industry when converting from output to jobs, economic theory suggests that production for exports may need to be more productive for these industries to compete in global markets.

As such, it is possible that the jobs figures presented above are over-estimates, because more productive industries are producing these goods and services i.e. with fewer jobs. This may, however, be counterbalanced by a relatively conservative interpretation of the figures.

Goods trade has been volatile recently, making the jobs figures more uncertain

Given the volatility in goods trade since 2014, there is much variation in the accompanying jobs estimates from year to year. Nevertheless, the pre-2014 period and more recent growth is suggestive of a general upward trend in UK exports to China. Given the volatility, however, it would not be reasonable to simply conclude that the estimated jobs figure for goods exports matches the final year of data (2019), when it was at its largest (over 65,000 jobs). Further years of data would be needed to confirm whether this was part of a renewed trend of growth or if goods exports in 2019 were simply unusually high in the context of recent history. Uncertainty as to how 2020 might eventually play out in economic terms further compounds this.

We prefer a conservative range of jobs estimates for goods

Instead, we conclude, more conservatively, that goods trade is more likely to support in the region of 50-60,000 jobs, a range which broadly captures the variation in recent years and is also broadly consistent with a simple trend line over 2005-18. This gives a sense of the magnitude of the jobs supported by Chinese demand for UK-produced goods. Given the evidence and the circumstances it would be difficult to put forward a more precise figure.

Data on goods trade is of high quality and drawn from a range of sources, many of them administrative in nature (such as HMRC). In contrast, data on services trade is more reliant on surveys and businesses' responses, leading to lower data quality (uncertainty).

For disclosure reasons, services data by industry is incomplete but accounting for the discrepancy should be done with caution

In the case of services, we make use of ONS data that allocates exports to specific industries. ONS has suppressed (not reported) some figures to avoid disclosure in cases that might risk identifying firms. This does, however, mean that the sum of all services trade across these industries is less than the reported total in other ONS statistics (because not all values by industry can be disclosed). For the years for which we have data, this discrepancy (an unallocated residual) may be large, with 10% or more of the trade not allocated to a sector (as shown in Figure 3.5 above). In 2018, the discrepancy is 17%.

Excluding this unallocated component, we estimate that Chinese demand for services supports around 33,000 jobs, which has been relatively stable over 2016-18. On this basis, and despite the recent growth in services exports in 2019 (which could be a one-off increase, for similar reasons to goods), an estimated current jobs figure of 33,000 seems appropriate. This is the basis for a figure of 30-35,000 jobs, with higher values possible (especially in 2018, approaching 40,000) if we were to add back in the unallocated figures. This would be on the assumption that the productivity with which these services are delivered is similar to the average of all other services. The validity of such an assumption is unknown (and depends on the nature of the industries for which data are suppressed). We would, again, prefer our more cautious estimate of 30-35,000.

4 Foreign Direct Investment

Summary

- Over 2015-18, the total value of Chinese companies' investments in the UK (the inward international investment position i.e. the stock / 'balance sheet') has been broadly stable, at £1.7-2.3bn.
    - this represents just 0.2% of the total value of foreign investments in the UK
    - relatively more of China's holdings are in transport equipment, retail, and financial services
- Between 2016/17 and 2018/19, estimates from the UK Department for International Trade (DIT) suggest that over 9,000 jobs have been either created or safeguarded by Chinese Foreign Direct Investment in UK projects.
    - by the DIT definition, these are jobs that would be expected to be supported for at least two years
    - these jobs figures are taken directly from DIT publications

4.1 Introduction

Foreign Direct Investment (FDI) is beneficial to the UK economy in several ways: by generating employment, tax revenue for governments and capital support for existing UK firms. The total value of foreign-held investments in the UK (the inward international investment position) is substantial, standing at £1.5tn in 2018. Of that total, a small fraction is held by China: £1.8bn in 2018, representing just 0.2% of the total. Recent trends in the data suggest that Chinese (net) FDI inflows into the UK have stagnated while UK investment in China continues to grow.

Data limitations of the FDI statistics, as well as the challenge of identifying transactions that might specifically relate to investment projects (rather than pure financial transactions) make it difficult to estimate the number of jobs supported by Chinese FDI from these statistics alone. Drawing on reports published by the UK Department for International Trade (DIT), some 9,000 UK jobs have been created or safeguarded by Chinese FDI projects between 2016/17 and 2018/19.

4.2 Inward and outward investment

Figure 4.1 shows the international investment positions between China and the UK over 2009-18:

- inward: Chinese companies' investments in the UK

- outward: UK companies' investments in China

- net: the difference between the two above

Chinese companies' investments in the UK appear to have stabilised… The inward international investment position (the value of Chinese companies' investments in the UK) grew from £0.6bn in 2009 to £1.1bn in 2012. Growth continued in the following years but, more recently (over 2015-18), the inward international investment position seems to have stabilised, at £1.7-2.3bn. This amounts to just 0.2% of the total inward investment position across all countries. That is, of all the investment in the UK controlled by foreign companies, Chinese companies account for just 0.2% by value. Compared to

the average, Chinese investment is relatively more concentrated in transport equipment, retail, and financial services.

…while UK companies' investments in China have continued to grow

Meanwhile over the same period (2009-18), the value of UK investments in China has grown, with a particularly large increase in growth recorded in 2018. As a result, the net investment position between the UK and China has increased, particularly over 2015-18, as the value of Chinese investment in the UK stabilised.

Figure 4.1: UK-China international investment position
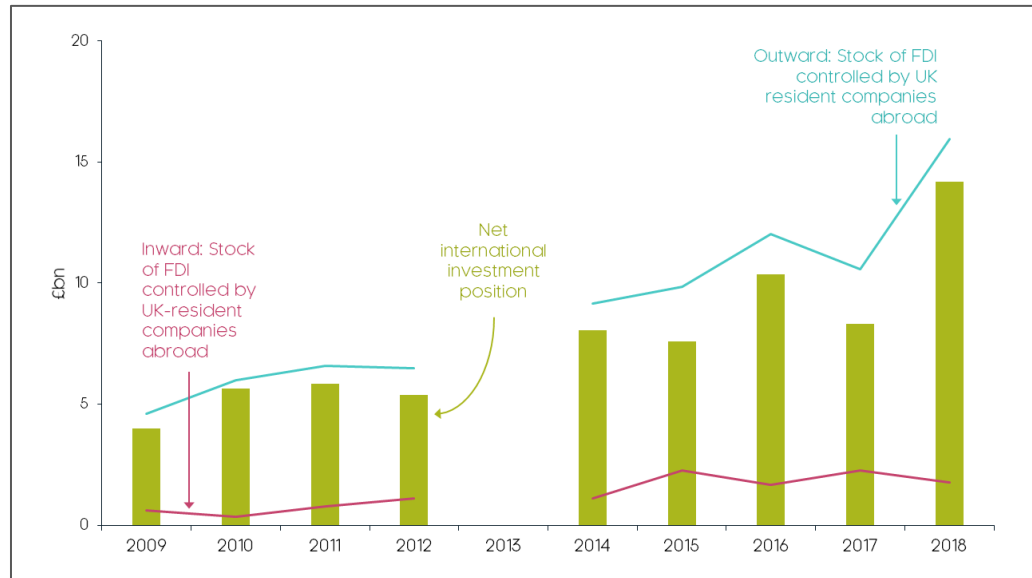
Note(s):   Figures for 2013 not reported: the inward investment position was not disclosed in the original ONS data.
Source(s):   ONS (2020) 'Foreign direct investment involving UK companies: 2018'.

4.3   Jobs created or safeguarded by Chinese FDI

In contrast to the other sources of economic activity considered in this report, there is no straightforward way of confidently estimating, from the ONS FDI statistics, the number of jobs supported by Chinese FDI in the UK. This is due to a combination of lower data quality (a known challenge with FDI data) and difficulties in establishing how much of the investment might be contributing to activities that might be *directly* augmenting UK production e.g. in the form of a construction project such as a new plant.

We report DIT figures on jobs created or safeguarded by Chinese FDI

The Department for International Trade (DIT) does, however, record the number of projects that result from inward investment into the UK. Through consultation with investors and monitoring of external databases, DIT estimates the numbers of jobs created or safeguarded by new investment decisions in the UK.[10] These jobs are considered 'permanent' insofar as they would be supported for at least two years, rather than representing employment over a shorter (temporary) period.

Recent FDI projects could have created or safeguarded some 9,000 jobs in the last three years…

Figure 4.2 shows the number of jobs created or safeguarded by Chinese FDI projects in the UK between the 2012/13 and 2018/19 financial years, as reported by DIT. Between 2012/13 and 2015/16, the number of jobs created or safeguarded each year by Chinese FDI projects almost doubled, from 3,400 to 6,700. As a result, China's share of all new jobs created or safeguarded by FDI projects (i.e. by all countries) grew from 2% to almost 6%.

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[10] In order for a job to be deemed as safeguarded there must be sufficient evidence that, without new additional investment, the UK-based company would potentially reduce its productive capacity and/or employment, ultimately risking the closure of the UK business.

**...but these numbers are likely falling over time**

Since 2015/16 the number of jobs created or safeguarded each year has fallen, to 1,700 by 2018/19 (this is around one-quarter of the 2015/16 figure). This reduction in jobs created or safeguarded was milder than the total reduction (from FDI projects financed by all countries) such that China's share of these jobs fell somewhat more slowly.

Over the last three years of data (2016/17 to 2018/19), DIT figures suggest that 9,400 jobs have been created or safeguarded by Chinese FDI in UK projects. By DIT's definition of a permanent job (as above), these are jobs that would remain for at least two years, representing, in 2018/19:

- 1,700 jobs created or safeguarded by new projects in 2018/19

- a further 7,700 jobs created or safeguarded from projects started in the two previous years

It is not clear from the available data how many jobs might have remained beyond that two-year time horizon.

Figure 4.2: Jobs created or safeguarded by Chinese FDI
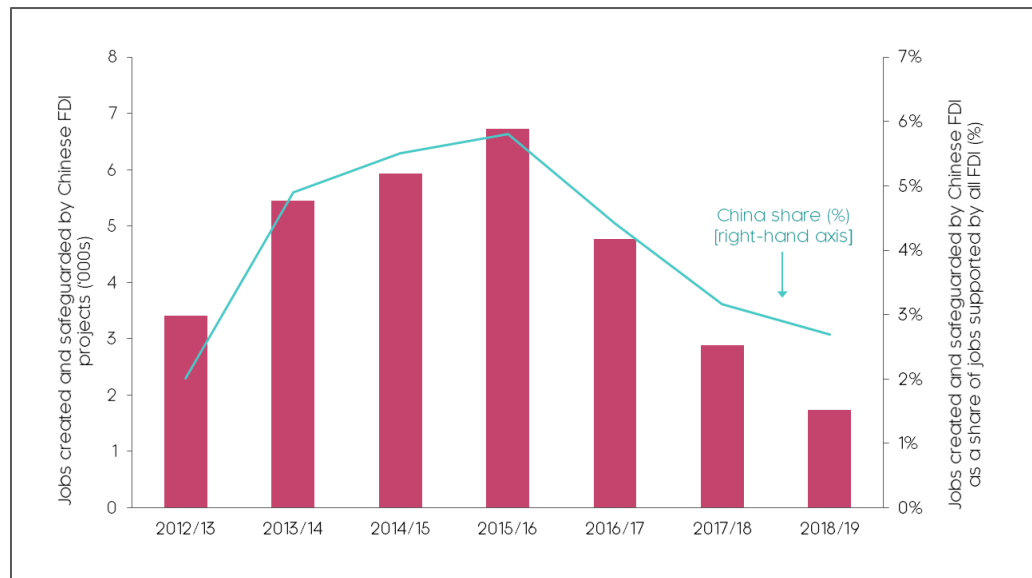
Note(s):   DIT defines FDI projects as new investments into the UK that create business activities for at least three years and create at least one permanent job for two years.

Source(s):   Department for International Trade (2019).

4.4   Limitations and uncertainties

FDI data are typically of low quality

Statistics on FDI are of relatively lower quality compared to other economic data. Because the figures are compiled from survey data, they are subject to sampling error and non-response, affecting their likely accuracy. Moreover, FDI covers a range of transactions, not all of which finance investment in UK production. Nevertheless, the data would seem to suggest that UK investments controlled by Chinese companies represent a small share of total UK investments controlled by foreign companies. In contrast to other economic activities considered in this report, growth has been more muted.

Nevertheless, the jobs figures *could* be higher than those reported

The estimates in Figure 4.2 show the number of new or safeguarded jobs supported by new Chinese FDI projects each year. In that sense, they represent a flow of jobs. As discussed above, in any given year, there will be more jobs supported by FDI because of those created or safeguarded in previous years. If there are jobs that remain beyond the two-year threshold applied by DIT, it is possible that the figures (from a sum over three years) would be higher.

5   Tourism

Summary

- Between 2009 and 2019 the number of tourists from China has increased by 430%, with over 1m Chinese tourists visiting the UK in 2019.
  - this is more than what was previously thought, after a considerable upward revision in the most recent ONS International Passenger Survey figures
- Expenditure by Chinese tourists grew by 500% over the same period.
- Tourism from China, in terms of the number of visits, nights spent in the UK and expenditure, grew faster than from any other part of the world.
- The number of FTE jobs supported by Chinese tourists in 2019 was estimated to be 16,300, a substantial increase of 12,400 from 2009.

5.1   Introduction

Tourism is an important component of the UK economy, with international tourists spending £28.4bn in the UK in 2019.[11] Over the past ten years Chinese tourism in the UK has increased substantially. In 2009, there were only 190,000 visits to the UK by Chinese tourists. By 2019 this had risen to over 1m. As a result, the importance of Chinese tourism to the UK economy has grown considerably. Chinese tourists spent £1.9bn in the UK in 2019, which is estimated to have supported 16,300 FTE jobs.

5.2   Tourism trends

International tourism to the UK has grown strongly…

According to the ONS Tourism Satellite Account (2017), international tourism expenditure represents 1% of UK GDP. Over the past decade there has been a considerable increase in the number of overseas visits to the UK, increasing by 31%, to 40.8m in 2019. That same year, tourism expenditure reached £28.4bn, a 20% nominal increase on 2009.

…and especially so from China

Tourism from China has similarly increased over the past decade. Figure 5.1 shows the trend in visits to the UK from China over 2009-19, along with the share of total overseas visits each year. There has been a more-than-fivefold increase in the number of visits from China between 2009 and 2019, to more than 1m. Tourism from the rest of the world grew by a smaller 29% in comparison. As a result, the share of visits from Chinese nationals has risen to 2.5% of all overseas visits in 2019, up from 0.6% in 2009. This rapid increase in visits from China has been driven by an increase in people visiting for holidays, from 77,000 in 2009 to over 600,000 in 2019.

Figure 5.1 only shows the *number* of visits by Chinese nationals to the UK each year. Depending on the reason for their visit, different visitors may stay for different lengths of time. Figure 5.2 shows the number of nights Chinese nationals spent visiting the UK over 2009-19 and the corresponding share of nights spent by all overseas visitors. The total number of nights spent in the UK by Chinese nationals increased substantially, from 2.4m in 2009 to 15.5m in 2019, driven by an increase in visits for the purpose of holidays and study.

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[11] According to the most recent ONS International Passenger Survey, released in May 2020.

Figure 5.1: Visits to the UK by Chinese nationals
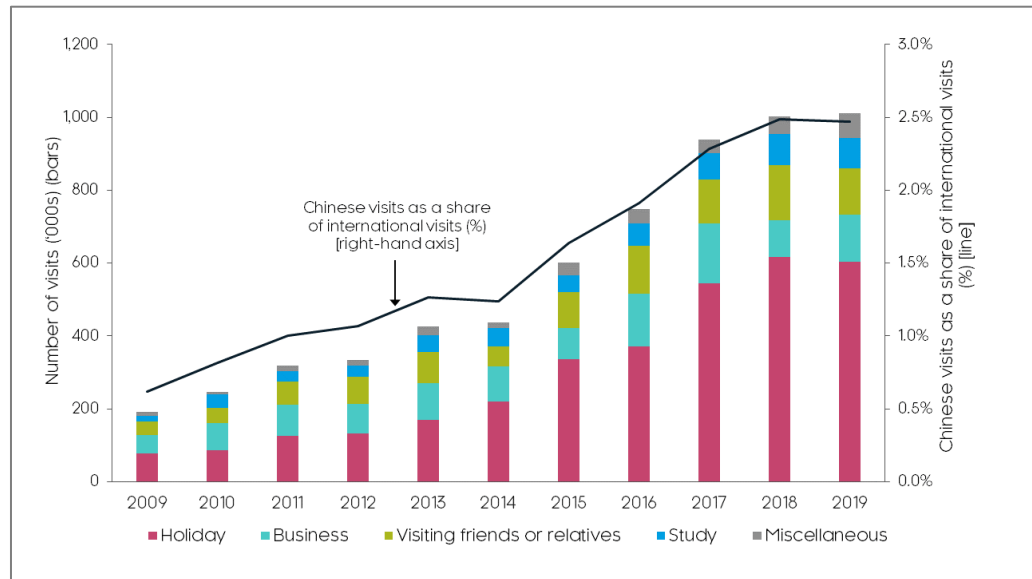
Note(s): Visits to the UK from UK overseas residents in China are not included. Miscellaneous includes all other reasons for travel such as medical treatment, shopping and attending a sport event.

Source(s): ONS (2020) 'International Passenger Survey Travelpac dataset'.

Compared with Figure 5.1, the significance of those who visit the UK for study is more apparent. In 2019 the number of nights spent in the UK by Chinese nationals for the purpose of study was higher than for any other country. Although study makes up a small proportion of the total number of visits, these stays in the UK are longer. In 2019, Chinese nationals visiting for the purpose of study stayed on average for 65 days, while a holidaymaker stayed for just 9 days. In comparison, overseas visits for the purpose of study and holiday by visitors from other countries averaged 38 days and 5 days, respectively.

Figure 5.2: Nights spent in the UK by Chinese nationals

Note(s): Nights spent in UK by UK overseas residents in China are not included. Miscellaneous includes all other reasons for travel such as medical treatment, shopping and attending a sport event.

Source(s): ONS (2020) International Passenger Survey Travelpac dataset.

Chinese tourism expenditure has grown substantially, from £376m in 2009 to £1.9bn in 2019

Figure 5.3 shows real expenditure by Chinese nationals in the UK, from 2009 to 2019. Over the period, real expenditure (in 2019 prices) by Chinese nationals grew substantially, from £376m in 2009 to £1.9bn in 2019 (over five times larger). As a result, the share of expenditure by Chinese visitors among all overseas visitors grew from 1.8% to 6.7%.

Figure 5.3: Expenditure in the UK by Chinese nationals

Note(s):   Expenditure in UK by UK overseas residents is not included.
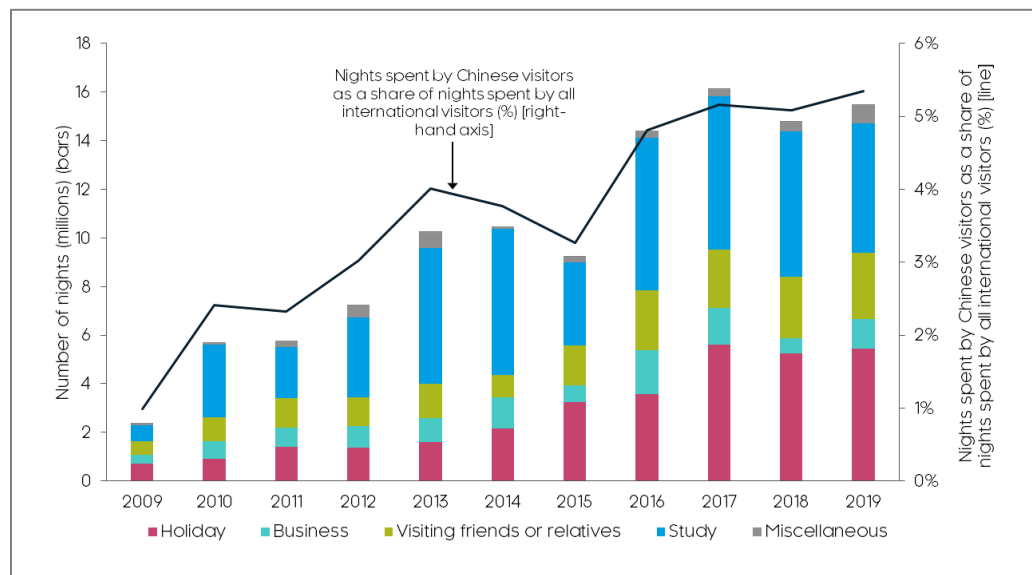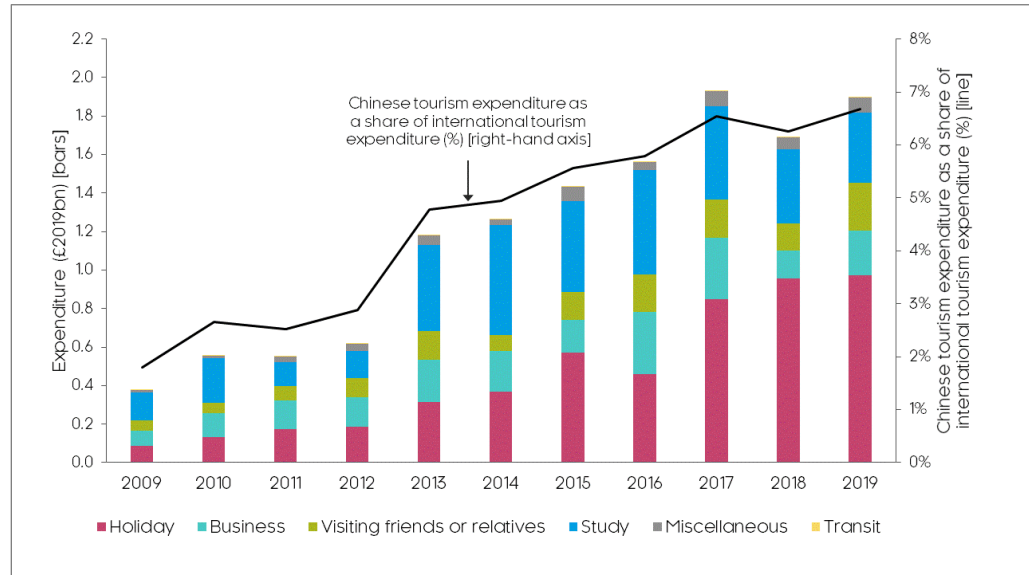Miscellaneous includes all other reasons for travel such as medical treatment, shopping and attending a sport event.
Transit measures expenditure of those passing through the UK en route to other destinations and are not counted as visiting the UK. This represents a small proportion of overall expenditure.
Expenditure is measured in real terms using GDP deflators from HM Treasury.
Source(s):   ONS (2020) International Passenger Survey Travelpac dataset, HM Treasury (2020).

Chinese nationals spend more per night in the UK than the average for all overseas visitors. In 2019, Chinese visitors (across all purposes of visit) spent on average £123 per night, whereas the average overseas visitor (excluding China) spent just £97.[12] Among holidaymakers, the average Chinese visitor spent £178 per night, while other overseas holidaymakers spent just £130.

Growth in Chinese tourism has far outpaced that from the rest of the world

Table 5.1 shows how the number of visits, nights spent and expenditure in the UK by Chinese visitors have changed over 2009-19 relative to overseas tourists form the rest of the world. The growth in Chinese tourism has far outpaced the rest of the world across all measures. Despite Chinese tourism starting from a low base in 2009, the volume of growth shows the growing importance of Chinese tourism to the UK. The number of nights spent in the UK by Chinese tourists grew the fastest over 2009-19, with an increase of 553%. Meanwhile the number of nights spent in the UK by tourists from the rest of the world, increased by only 15%. This reflects the large increase in Chinese students studying in the UK for a short period of time.

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[12] Expenditure by transit passengers is not included in this calculation, as they are not classified as visitors in the International Passenger Survey.

Table 5.1: Tourist visits, nights spent and expenditure in the UK

	2009	2019	Change 2009-19 (%)
Number of visits ('000s)			
China	192	1,010	427%
Overseas visitors excluding China	30,880	39,847	29%
Total	31,072	40,857	31%
Number of nights (m)			
China	2	15	553%
Overseas visitors excluding China	239	274	15%
Total	241	290	20%
Total expenditure (£2019m)			
China	376	1,898	405%
Overseas visitors excluding China	20,564	26,550	29%
Total	20,940	28,448	36%

Note(s):   Expenditure figures have been converted to real prices using HM Treasury GDP deflators.
Source(s): ONS (2020) International Passenger Survey Travelpac dataset; and HM Treasury (2020).

5.3   Jobs supported by Chinese tourism in the UK

The number of jobs that are supported by expenditure from Chinese tourism is estimated using tourism jobs and expenditure data from the ONS UK Tourism Satellite Accounts and Chinese tourism expenditure data from the ONS International Passenger Survey (IPS).[13]

Figure 5.4: Estimated jobs supported by Chinese tourism
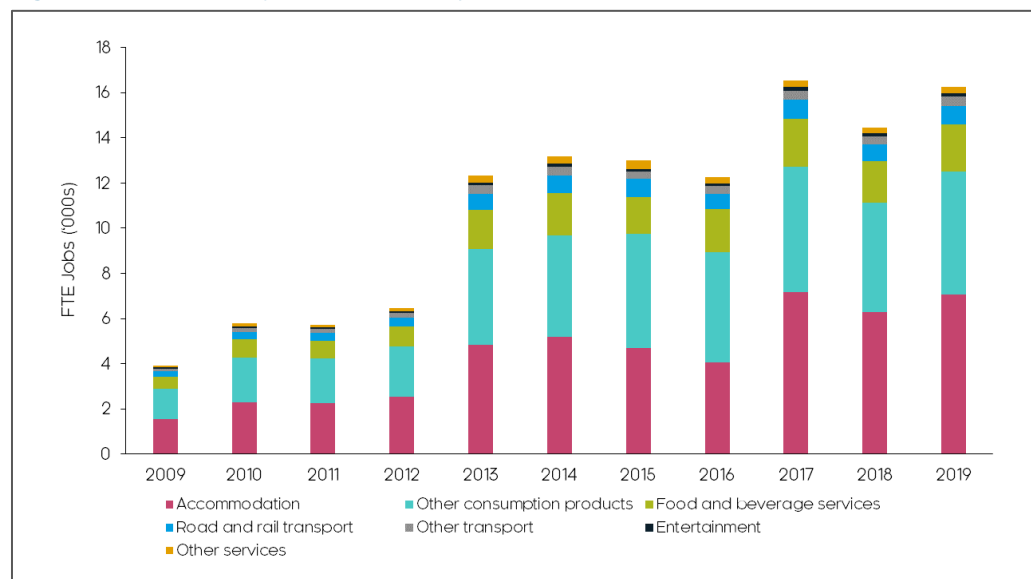
Source(s): ONS (2020) International Passenger Survey Travelpac dataset; and ONS (2019) Tourism Satellite Accounts.

The number of UK jobs supported by Chinese tourism has quadrupled since 2009

Figure 5.4 shows the estimated number of full-time equivalent (FTE) jobs supported by expenditure from Chinese tourism over 2009-19. Over this period, FTE jobs supported by Chinese tourism increased by 314%, from 3,900 jobs in 2009 to 16,300 jobs in 2019. In 2019, 90% of total FTE jobs supported by Chinese tourism were in accommodation (7,100 jobs), other

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[13] See Appendix A for details.

consumption products[14] (5,400 jobs) and food and beverage services (2,100 jobs). The remaining 10% of FTE jobs were in road and rail transport, other transport[15], entertainment[16] and other services[17].

5.4   Limitations and uncertainties

The estimates assume common expenditure patterns by all tourists

The job estimates in this Chapter assume that the pattern of expenditure for Chinese tourists across spending categories is identical to the average international visitor. In practice, Chinese tourists may have different spending patterns. If they were to spend more in sectors with higher productivity, where a given output level relies on less labour input, the job estimates would be lower.

There is some potential for double counting with the students figures

The IPS dataset used in this chapter, defines a tourist as someone who visits and stays in the country for less than a year. This includes Chinese students who come to the UK to study, but report that they have been in the UK for less than a year. This could create an issue of double counting when aggregating the jobs supported by tourism and students in higher education in Chapter 6.

Many of the students in the IPS will be participating in short-term education courses such as language courses or summer school programmes. They would not be counted in the estimates of jobs supported by students, which only focus on students in higher education. However, there may be some students in higher education on a one-year postgraduate course that stay in the country for less than a year. As a result, these students could be double counted in both the tourism and student jobs estimates. The scale of this double counting is not fully known, but we do consider its possible implications when we bring the various results together.

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[14] Other consumption products includes activities such as retail, currency exchange, health, and financial, legal and insurance services.

[15] Other transport includes water and air passenger transport services.

[16] Entertainment captures cultural activities.

[17] Other services includes travel agencies & other reservation services, sport and recreation activities and exhibitions & conferences.

6   Students

Summary

- In the 2018/19 academic year there were 120,000 Chinese students registered in UK higher education, a 35% increase from 2014/15 (90,000 students).
  - Chinese students now represent 25% of all international students
- Expenditure by Chinese students (excluding tuition fees) was estimated to be £1.9bn in the 2018/19 academic year.
- Chinese students' expenditure is estimated to have supported 17,600 FTE jobs in 2018/19.

6.1   Introduction

In 2018/19, there were 485,000 international students in the UK, 25% of which were from China. These students make significant (financial) contributions to the UK economy, not only through the fees that they pay, but also through their expenditure on items such as housing, food, and leisure activities.

6.2   Student trends

International students make up a considerable proportion of students in higher education institutions in the UK. In 2018/19, 20% of all students were international students, which has been roughly stable since 2014/15.[18]

Students from China are an increasing proportion of UK higher education students

Students from China make up a large and growing proportion of international students in UK higher education. Table 6.1 shows the number of Chinese students, other international students and total students studying in the UK from 2014/15 to 2018/19. Over this period, the number of Chinese students studying in the UK grew by 35% from 90,000 to 120,000. In comparison, the number of international students from other countries and total students as a whole grew just 5%. In 2018/19 one in four enrolled international students were from China, compared to one in five in 2014/15.

Taught postgraduate courses have seen the largest increase in Chinese enrolment

Figure 6.1 shows the breakdown of Chinese students by the level of study they were enrolled in between 2014/15 and 2018/19. In 2018/19, 90% of all Chinese students were enrolled in either a First degree or Postgraduate taught study, with the other 10% of students enrolled in Other undergraduate degrees or Postgraduate research. Postgraduate taught study was the most common level of study, with 62,000 Chinese students enrolled in the UK in 2018/19. It also saw the largest percentage increase (40%) over 2014/15-2018/19. In comparison, the number of Postgraduate taught students domiciled in other countries fell by 2.5% over the same period. Meanwhile, Chinese students enrolled in First degrees grew by 30% from 36,000 to 46,000. This was also higher than the trend for international students domiciled in other countries, which grew by 16%.

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[18] International students are students domiciled outside of the UK. Domicile is the country someone treats as their permanent home or lives in and has a substantial connection with.

Table 6.1:   International students in UK higher education institutions

	2014/15	2015/16	2016/17	2017/18	2018/19	Change 2014/15-2018/19
Chinese students ('000s)	90	90	95	107	120	34.5%
Other international students ('000s)	347	346	347	352	365	5.2%
Total students ('000s)	2,266	2,279	2,318	2,343	2,384	5.2%
Share of Chinese students (% of international students)	20.5%	20.7%	21.5%	23.2%	24.8%	-
Share of Chinese students (% of total students)	4.0%	4.0%	4.1%	4.5%	5.0%	-

Note(s):   'Chinese students' refers to students domiciled in China, not necessarily with Chinese citizenship.
Years referred to are academic years (September – August).
Source(s):   HESA (2020).

Figure 6.1: Chinese students by level of study
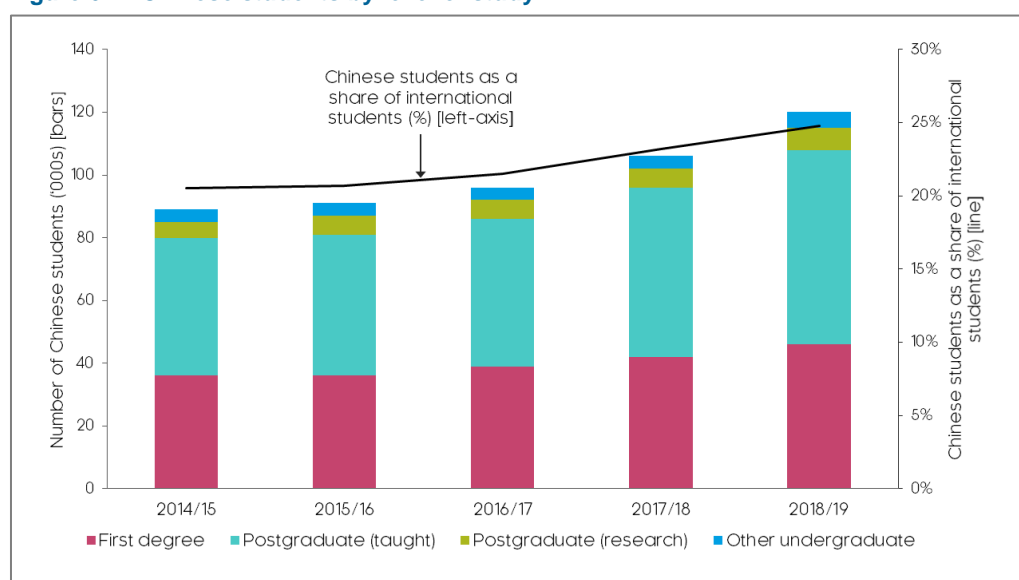
Note(s):   HESA dataset on international students is broken down by country of domicile not nationality.
'Postgraduate research' refers to courses that are predominantly focused on research, with little or no teaching. This includes PhDs, as well as some research focused master's courses.
'Other Undergraduate' refers to undergraduate degrees that are not bachelor's degrees. This includes Professional Graduate Certificate in Education (PGCE), foundation degrees and diplomas in higher education.
Years referred to are academic years (September – August).
Source(s):   HESA (2020).

6.3   Expenditure and jobs supported by Chinese students

Expenditure by Chinese students in the UK is estimated based on the English Student Income and Expenditure Survey for 2014 to 2015.[19] This is used to estimate the number of jobs supported by Chinese students by sector.

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[19] Published in March 2018.

Substantial growth in enrolment translates into substantial growth in expenditure

Figure 6.2 shows expenditure excluding tuition fees by Chinese students from the 2014/15 to 2018/19 academic years. Over the five years, expenditure by Chinese students grew by 35%, from £1.4bn in 2014/15 to £1.9bn in 2018/19. Retail and student accommodation accounted for over 70% of Chinese student's expenditure, amounting to £0.8bn and £0.6bn, respectively. Road and rail transport also made up a considerable proportion of Chinese student expenditure, accounting for a further 15% of their total expenditure in 2018/19.

Figure 6.2: Expenditure by Chinese students
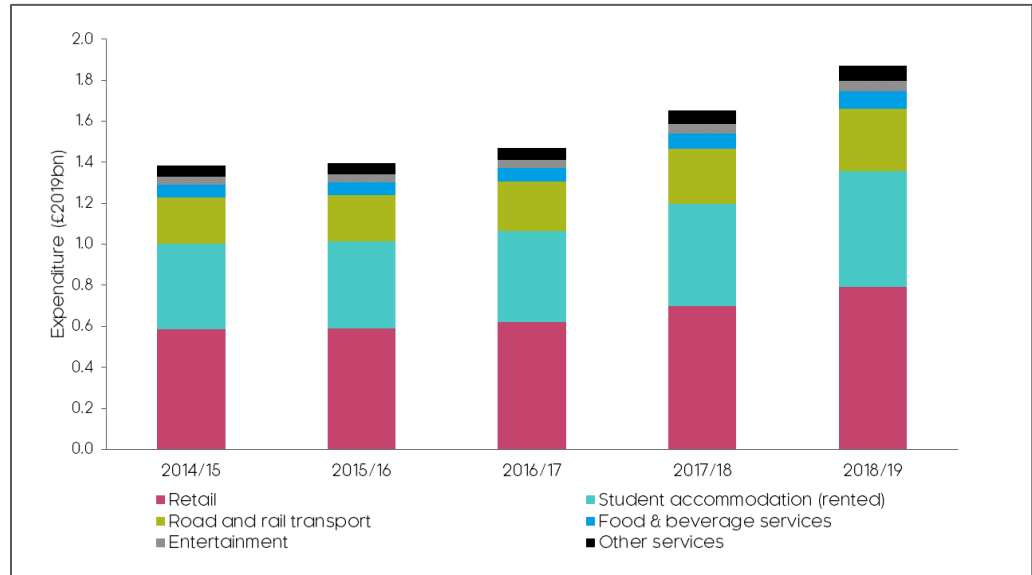
Note(s):   Years refer to academic years (September to August).
Source(s): HESA (2020), Department for Education Student Income and Expenditure Survey 2014 to 2015 (March 2018).

Most of the jobs are supported by students' retail spending

Figure 6.3 shows the number of FTE jobs supported by expenditure from Chinese students from the 2014/15 to 2018/19 academic years. The number of FTE jobs are based on Chinese student expenditure by sector and productivity assumptions.[20] Between the 2014/15 and 2018/19 academic years, the number of FTE jobs supported by Chinese students increased from 13,100 jobs to 17,600 jobs. The majority of the jobs (60%) are in retail, which supported 10,500 jobs in 2018/19, and road and rail transport (20%), which supported 3,200 jobs. While student accommodation accounted for 30% of Chinese students' expenditure, the jobs supported in this sector are comparatively low (accounting for less than 5% of all jobs supported by Chinese students), due to fewer jobs per unit of output in the sector.

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[20] Productivity assumptions are based on data from the ONS (2019) 'UK input-output analytical tables: 2015 detailed'. See Appendix A for details.

Figure 6.3: Estimated jobs supported by expenditure from Chinese students
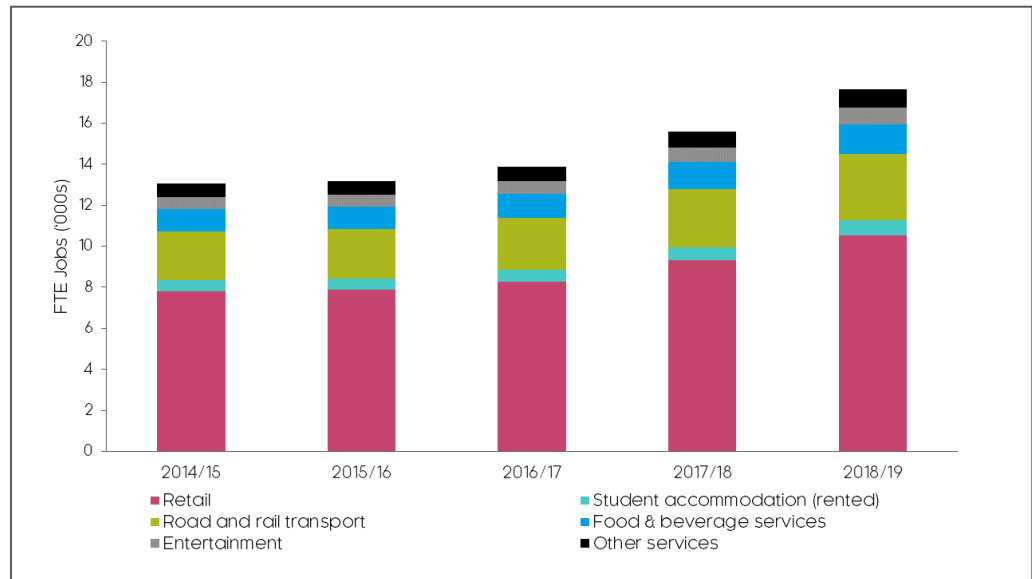
Note(s): Years refer to academic years (September to August).
Source(s): HESA (2020), Department for Education (2018), ONS (2019) 'UK input-output analytical tables: 2015 detailed'

6.4   Limitations and uncertainties

The jobs estimates focus solely on UK higher education and exclude income from tuition fees

The estimates of jobs supported by Chinese student expenditure do not include tuition fees paid by Chinese students. Students who attend institutions outside of higher education, such as private schooling are also not included. As a result, not all student expenditure will be reflected in the jobs estimates.

As mentioned in Section 5.4, there is a potential issue with double counting some students on a one-year postgraduate course that stay in the country for less than a year in both the estimates produced for tourism and students. This is considered when we bring the various results together.

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tasets/uktradeinservicesbyindustrycountryandservicetypeexports.

Appendices

Appendix A   Approach

This appendix sets out the methods by which we estimate jobs supported by each of:

1.   Trade: UK exports of goods and services to China

2.   Foreign Direct Investment (FDI) in the UK by Chinese companies

3.   Tourism: Expenditure of Chinese tourists in the UK

4.   Students: Expenditure by Chinese students registered at UK higher education providers

In each case, we briefly explain the data sources (with further information on the datasets in Appendix B) and the steps by which we estimate the jobs figures.

Jobs supported   As stated in the main body of the report, we use 'jobs supported' to refer to the jobs associated with a particular amount of economic activity in a given year. This may change from year to year.

For example, if £1m of goods was exported to China in a given year, by applying a ratio of jobs to output (i.e. an assumption about productivity), we can estimate the number of jobs that contributed to (were supported by) those exports. However, were just £0.5m of goods exported in the following year, fewer jobs would be supported by trade with China (they may, instead be supported by trade with another country).

In this example, the figures are an indication of the number of jobs associated with trade. With the exception of FDI (for which we make use of UK Department for International Trade figures), they do not represent jobs created or, indeed, jobs that are necessarily specific to the UK-China relationship. Rather they are better interpreted as jobs that are oriented towards meeting Chinese demand but could, in principle meet other countries' demands if expenditure patterns changed.

Full-time equivalent basis   In all cases we seek to identify the full-time equivalent (FTE) jobs supported by these economic activities.

In most cases (and as detailed below), the conversion from output to jobs uses a set of jobs-to-output ratios calculated from:

• CE-calculated figures for FTE jobs, weighting employment by industry as follows:

  - full-time jobs and self-employment each count as 1 FTE
  - part-time jobs are weighted according to hours worked relative to a full-time worker, using data from the UK Annual Survey of Hours and Earnings

• ONS figures for output by industry taken from the UK input-output analytical tables for 2015

A.1   Trade

Data

Estimates of jobs supported by UK exports of goods and services to China make use of the following data:

- UK total trade

  The ONS publishes total trade by trading partner country, split into total goods and total services. These figures cover 1999-2019 and are in current prices (i.e. nominal values).

- Bilateral trade in goods

  The OECD STAN Bilateral Trade Database by Industry and End-use category (BTDIxE) dataset provides values of trade flows between the UK and China, to inform the breakdown of goods estimates by industry. These figures cover 2005-19 and are in US dollars at current prices.

- Non-monetary gold exports

  UK trade in non-monetary gold is volatile from year to year but not presumed to lead to similarly large changes in jobs supported. We exclude this trade before estimating the jobs numbers.

  For this, we use HM Revenue & Customs' (HMRC's) 'Overseas Trade Statistics of the UK', available from the UK Trade Info website. We use these statistics to identify exports of non-monetary gold specifically to China. While not entirely consistent with the final ONS data (which draws on a range of sources, including the HMRC data), this is the most accessible source for this UK-China trade flow.

- UK trade in services

  The ONS publishes data on trade in services by industry and partner country. These statistics are considered as experimental and (incompletely) allocate services exports to exporting industries as defined by the UK Standard Industrial Classification (2007).[21] The figures are incompletely allocated because some values at an industry level have been suppressed, to avoid disclosing data that might relate to individual firms. Along with some rounding of figures, this means that the total across industries does not match (is lower) than the total for services reported in the UK total trade figures above. This can represent quite a large proportion of the total (17% in 2018), which we comment on in the main body of the report.

As well as the above, we use:

- exchange rates from the OECD database to convert the OECD bilateral trade figures from US dollars to pounds sterling

- ONS export deflators (separately for goods and services) to convert monetary values from current to constant (2019) prices

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https://www.ons.gov.uk/methodology/methodologytopicsandstatisticalconcepts/guidetoexperimentalstatistics

Method: Goods

The number of jobs supported by UK goods exports to China are estimated as follows:

1. Take the breakdown of goods exports by industry and end-use from the OECD Bilateral Trade in Goods dataset and convert from US dollars to pounds sterling using OECD-reported exchange rates.

2. For consistency with reported UK totals, scale these figures to match the reported total goods exports from the ONS trade in goods dataset.

3. Subtract exports of non-monetary gold from exports of basic metals and basic metal products using figures from HMRC (UK Trade Info)

    -   by this process, implied basic metals exports in 2015 are actually negative: we adjust for this by taking the mean of the adjacent years (2014 and 2016)[22]

4. Convert from current to constant (2019) prices, using the ONS export deflator for goods.

5. Map the OECD industries to CE's 45-sector industry classification (which is based on SIC 2007 codes; see Appendix D for details).

6. Convert from output to jobs using jobs-to-output ratios calculated from CE figures for FTE jobs and ONS UK input-output analytical tables for 2015.

Method: Services

The number of jobs supported by UK services exports to China are estimated as follows:

1. Take the breakdown of services exports by industry and service type from the ONS 'UK trade in services' dataset and allocate figures to CE's 45 sectors.

2. Convert from current to constant (2019) prices, using the ONS export deflator for services.

3. Convert from output to jobs using jobs-to-output ratios calculated from CE figures for FTE jobs and ONS UK input-output analytical tables for 2015.

Note that, for services, the ONS breakdown by industry does not match the reported total for UK services exports to China. This is due to the absence of values that have been suppressed by ONS, to avoid disclosure. As discussed in Chapter 2, this discrepancy can be large (17% in 2018). We do not attempt to correct for this in interpreting the results but do present its possible effect (in increasing the jobs estimates) in Figure 3.5. On that basis, the numbers could, possibly, be 3-7,000 FTE jobs higher. This would, however, rest on being able to evidence the assumption that this 'missing' output could be produced with a similar level of productivity as the average for all sectors.

A.2   Foreign Direct Investment (FDI)

There are two data sources we use to provide an overview of the general trends and importance of Chinese FDI in the UK:

*   ONS (2019) Foreign direct investment involving UK companies: 2018, which provides data on the inward and outward investment position between the UK and China, broken down by sector

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[22] In the final figures for 2015, this represents 3,400 jobs out of a total of 44,200. Given our approach to interpreting the final jobs figures, it has limited bearing on the final results.

- Department for International Trade inward investment results 2012/13 – 2018/19, which provides data on the number of new projects from Chinese FDI into the UK, and the jobs associated with these projects

ONS Foreign Direct Investment involving UK companies: 2018

This dataset provides estimates of the FDI inflows and inward investment positions between the UK and rest of the world, broken down by partner country and sector. The inward investment position represents the value of foreign companies' investments in the UK, while the outward position represents the value of UK investments abroad.

Department for International Trade inward investment results 2012/13 – 2018/19

The Department for International Trade (DIT) reports the number of new projects that arise from inward investment into the UK in each financial year. DIT also reports the number of newly created or safeguarded jobs that arise from these new projects.[23]

Data and information related to projects that DIT are involved with are recorded in their own internal database. To collect data for projects they are not involved with, DIT reach out through their existing networks to gather the data, as well as monitoring external databases such as Ernst & Young's European Investment Monitor and the Financial Time's fDi Markets.

The FDI projects reported in DIT's reports must satisfy the following criteria:

- they must demonstrate it is bringing in some financial investment into the UK

- business activities supported by the investment project are expected to last at least three years

- new investment must create one or more new jobs in the UK, that are expected to last at least two years

- for projects claiming to safeguard jobs, there must be sufficient evidence that without new additional investment the jobs would have been lost

As a result, this will exclude investments associated with partnership agreements, franchise contracts and investment in UK residential property.

DIT's figures only provide an insight into the jobs created or safeguarded by FDI each year. There are no data for the stock of jobs that Chinese FDI supports (e.g. how many of the jobs created five years ago still exist?). As a result, the total number of jobs supported by FDI over a given period cannot be estimated.

A.3 Tourism

The estimates of UK jobs dependent on Chinese tourism make use of:

- the ONS International Passenger Survey (IPS) Travelpac dataset, which provides data on the number of visits, nights spent and expenditure by Chinese tourists visiting the UK

- the ONS Tourism Satellite Account (TSA), published for the years 2013, 2015, 2016 and 2017, which produces estimates for the total number of

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[23] In order for a job to be deemed as safeguarded there must be sufficient evidence that without new additional investment the UK based company would potentially reduce its production capacity, and/or employment level and could ultimately result in the closure of the UK business.

FTE jobs supported by all tourism in the UK (specifically, Table 7 in the TSA)

Jobs estimates are not available specifically for Chinese tourism in the UK and must thus be split out from the ONS figures. These estimates are constructed in the following two-stage process:

1. Jobs supported by international tourism (as distinct from domestic tourism by UK residents) are first estimated by applying international tourism expenditure as a share of total tourism expenditure in the UK (calculated from Table 4 of the TSA) to jobs supported by all UK tourism.

2. Jobs supported specifically by Chinese tourism are then estimated by applying Chinese tourism expenditure as a share of international tourism expenditure (from the IPS) to jobs supported by international tourism from Step 1 above.

In years for which there are no data from the TSA, jobs figures are estimated using Chinese expenditure data from the IPS and the implied productivity ratios from the TSA's figures for jobs and expenditure, from an adjacent year. Specifically, figures for 2018 and 2019 are estimated using 2017 productivity ratios; figures for 2012 and earlier use 2013 productivity ratios; and figures for 2014 use 2013 productivity ratios.

Tourism trends

The analysis of the latest trends in Chinese tourism is based on the latest release of the IPS (May 2020). The dataset provides information on the number of visits, nights spent in the UK and expenditure by inbound tourists (i.e. non-residents from overseas) to the UK. These expenditure figures are disaggregated by country of residence. This provides an overview of trends in Chinese tourism to the UK over 2009-19.

The IPS classifies tourists into six categories based on the purpose of their visit:

1. Holiday

2. Business

3. Visiting friends or relatives

4. Study

5. Miscellaneous (capturing other categories of travel such as medical treatment, overnight transit, attend sporting events and shopping)

6. Transit (consisting of individuals who transit through the UK onto another destination and is only considered under expenditure)

Inbound tourists are visitors to the UK who stay in the country for less than a year. In some cases, this may include students who attend higher education and report that they have stayed in the country for less than a year. This could create some double-counting issues with the student expenditures reported in Section 6.3 above in the main body of the report, if they are also recorded in the tourism expenditure here. We consider the issue of double counting when we bring the results together in the summary.

In the most recent publication of the IPS the time series of total volume and value of tourism over 2009-19 has been revised upwards. In the latest publication, the number of visits by international visitors to the UK, reported for 2018 was 6% higher than in the previous release. The data for China contained the most significant upward revisions, with the number of visits 120% higher than what was previously reported for 2018 (from 472,000 to

1,001,000). These revisions were due to a change in the way that inbound tourists were sampled when leaving the country. Previously the IPS had been known to under-report departures, particularly for Chinese tourists.[24]

Tourism jobs

The Tourism Satellite Account (TSA), published by the ONS, is a tool to help understand the size and importance of tourism-related economic activity in the UK. The TSA estimates the total number of jobs by sector supported by both inbound tourism and domestic tourism (Table 7 of the TSA). These jobs estimates are not differentiated by country. The TSA also provides a breakdown of expenditure by sector from inbound tourists, which is based on the expenditure data from the International Passenger Survey (Table 4 of the TSA). A significant component of expenditure by tourists is in other consumption products, which includes all expenditure on products not in explicitly tourism-related sectors. This includes activities such as retail, currency exchange, health, education and financial, legal and insurance services.

The TSA has data for 2013, 2015, 2016 and 2017. To estimate the number of jobs supported by Chinese tourists, we start with jobs supported by all tourism (Tourism Direct FTEs from Table 7 of the TSA). Jobs supported by inbound (or international) tourists are then calculated using Inbound tourism expenditure as a share of all tourism expenditure in the UK (both from the Table 4 of the TSA). Jobs supported by Chinese tourism can then be estimated by applying Chinese tourism expenditure as a share of international tourism expenditure (from the IPS) to the jobs supported by inbound tourism.

For years not covered by the TSA data, jobs supported by Chinese tourism are estimated using the expenditure figures from the IPS and applying the implied productivity ratios from FTE jobs and expenditure for adjacent available years in the TSA.

This method relies on the assumption that expenditure by sector by Chinese tourists is the same as the average of all international tourists to the UK. If Chinese tourists in fact spent more in sectors that require fewer jobs per unit of output, the jobs supported by Chinese tourism could be lower than these estimates.

A.4   Students

The estimates of UK jobs supported by Chinese students makes use of the following data sources:

- Data from the UK Higher Education Statistics Agency (HESA); specifically 'Non-UK HE students by HE provider and country of domicile', which provides figures for the numbers of enrolled students by country of domicile, level of study (postgraduate or undergraduate) and mode of study (full-time or part-time). This is an administrative dataset of the number of students enrolled at higher education institutions in the UK at the start of each academic year, covering the years from 2014/15 to 2018/19.

- The Department for Education's 'Student Income and Expenditure Survey 2014 to 2015 (March 2018)', which records the expenditure of a sample of

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[24] These revised figures are now closer to those quoted by the Association of International Retail (AIR). The AIR has previously argued that past (i.e. pre-revision) IPS-based figures have tended to under-estimate the number of visits by Chinese tourists. This argument is based on the higher number of visits implied by Home Office statistics about the number of visitor visas issued.

UK domiciled students and provides a breakdown of expenditure by product category.

The number of jobs supported by Chinese student expenditure are estimated in the following steps:

1 Weekly expenditure is estimated using the breakdown of total expenditure by product category from the Student Income and Expenditure Survey 2014 to 2015 by mode of study (full-time or part-time).[25]

2 The annual expenditure by product category for postgraduate and undergraduate students is calculated across both modes of study. It is assumed that non-EU undergraduate and postgraduate students spend 42 weeks and 52 weeks in the UK, respectively.[26]

3 The number of Chinese students by level of study and mode of study from HESA is used to calculate total Chinese student expenditure (excluding tuition fees).

4 This is then adjusted to reflect that some expenditure by part-time students will be funded through earnings from part-time employment in the UK. We assume that half of all part-time students will work for 20 hours a week and earn the minimum wage.[27]

5 GDP deflators from HM Treasury are applied to convert prices from 2014/15 prices to 2019 prices.

6 The jobs associated with Chinese student expenditure are calculated using productivity assumptions by sector from the ONS 2015 detailed UK input-output analytical tables.[28]

The expenditure figures cover all expenditure on goods and services, apart from tuition fees. The Student Income and Expenditure Survey 2014 to 2015 provides a detailed breakdown of student expenditure by many product categories across four main groups:

• living costs

• housing costs

• participation costs

• spend on children

The sample used in the Student Income and Expenditure Survey 2014 to 2015 only includes UK domiciled students. As a result, our estimates assume that Chinese students will have identical spending patterns to UK domiciled students.

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[25] The expenditure reported in the Student Income and Expenditure Survey 2014 to 2015 are for a standard academic year of 39-weeks.

[26] In line with what was assumed in a study by the Department for Business, Innovation & Skills (BIS) 2011. 'Estimating the Value to the UK of Education Imports'.

[27] In line with what was assumed in the BIS (2011) study.

[28] The expenditure product categories are mapped to sectors.

Appendix B   Data

Appendix Table B.1 below summarises the data that inform this analysis.

Appendix Table B.1: Data sources

Economic activity	Data	Span	Breakdown	Comment	Source	URL
Multiple	Productivity assumptions	2015	Sector	Productivity assumptions were generated as the ratios of gross output to employment (on a full-time equivalent basis)	ONS input-output analytical tables	https://www.ons.gov.uk/economy/national accounts/supplyandusetables/datasets/uki nputoutputanalyticaltablesdetailed
Trade	Bilateral trade in goods	2005-19	Industries (grouped to 26) conforming to ISIC Revision 4	Used exports from the UK to China figures as a starting point for trade in goods analysis. Figures in US dollars are converted to pounds sterling before scaling to ONS totals	OECD BTDIxE Bilateral Trade in Goods by Industry and End-use, ISIC Rev.4	https://stats.oecd.org/Index.aspx?DataSet Code=BTDIXE_I4
	UK total trade	1999 – 2019	Partner country	ONS trade totals the OECD figures are scaled to. Figures were converted to 2019 prices using the ONS annual export deflator	ONS UK total trade: all countries	https://www.ons.gov.uk/businessindustrya ndtrade/internationaltrade/datasets/uktotal tradeallcountriesnonseasonallyadjusted
	UK trade in services	2016-18	Industries (SIC07) and partner country	Figures were converted to 2019 prices using the ONS annual export deflator	UK trade in services by industry, country and service type, exports	https://www.ons.gov.uk/economy/national accounts/balanceofpayments/datasets/ukt radeinservicesbyindustrycountryandservic etypeexports
	Non-monetary gold exports	2005-19	Partner country	Figures for the export of non-monetary gold that are used to adjust basic metals export figures	UK Trade info (HMRC)	https://www.uktradeinfo.com/Pages/Home .aspx
	OECD conversion rate	2000-19	Country	USD to GBP exchange rate	OECD: Conversion Rates	https://data.oecd.org/chart/61p0

Economic activity	Data	Span	Breakdown	Comment	Source	URL
	ONS deflators	-	Goods and services	Trade in goods and services implied deflators, on Balance of Payments basis	UK trade: goods and services publication tables	https://www.ons.gov.uk/economy/national accounts/balanceofpayments/datasets/ukt radegoodsandservicespublicationtables
Foreign Direct Investment	Foreign direct investment involving UK companies: 2018	2009-18	Sector and partner country	Data on the UK's inward and outward investment position between the UK and China	ONS, 'Foreign direct investment involving UK companies: 2018'	https://www.ons.gov.uk/economy/national accounts/balanceofpayments/bulletins/for eigndirectinvestmentinvolvingukcompanie s/latest
	Department for International Trade's inward investment results	2012/13-2018/19	Partner country	Data on the number of projects in the	DIT	https://www.gov.uk/government/collection s/dit-inward-investment-results
Tourism	International Passenger Survey (Travelpac data)	2009-2019	Country of residence and purpose of visit	Data on the number of visits, nights spent and expenditure by Chinese tourists visiting the UK	ONS International Passenger Survey Travelpac data	https://www.ons.gov.uk/peoplepopulationa ndcommunity/leisureandtourism/datasets/t ravelpac
	Tourism Satellite Accounts	2013, 2015, 2016 and 2017	Sector and whether domestic or international tourism	Figures for expenditure by sector for both international domestic tourism and number of FTE jobs for all tourism by sector.	ONS Tourism Satellite Accounts	https://www.ons.gov.uk/economy/national accounts/satelliteaccounts/datasets/uktour ismsatelliteaccounttsatables
Students	International students by country of domicile	2014/15 - 2018/19 (academic years)	Country of domicile, level of study and whether full-time or part-time student	Figures for numbers of Chinese students by level of study and mode of study	HESA	https://www.hesa.ac.uk/data-and-analysis/students/table-28
	Student Income and Expenditure Survey 2014 to 15	2014/15	Expenditure by product categories for Full-time or part-time students	Expenditure by product category used to estimate Chinese student expenditure	Department for Education	https://www.gov.uk/government/publicatio ns/student-income-and-expenditure-survey-2014-to-2015

Appendix C   Results tables

C.1   Trade

Appendix Table C.1: UK exports and import to/from China (£2019bn)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Exports	4.8	5.5	6.24	8.2	7.6	10.5	13.1	14.3	17.7	19.4	17.3	18.0	21.7	23.4	31.4
Imports	14.2	17.3	19.8	23.7	25.9	31.0	31.7	31.8	35.9	36.8	37.4	41.2	43.7	44.9	49.0
Trade deficit	-9.4	-11.7	-13.6	-15.5	-18.3	-20.5	-18.6	-17.5	-18.2	-17.4	-20.0	-23.2	-22.0	-21.4	-17.6
Share of total UK exports (%)	1%	1%	2%	2%	2%	2%	3%	3%	3%	4%	3%	3%	3%	4%	4%
Share of total UK imports (%)	4%	4%	5%	5%	6%	6%	6%	6%	6%	7%	7%	7%	7%	7%	7%

Note(s):   Trade deficit is calculated as the difference between exports and imports.
Source(s):   ONS (2020) 'UK total trade'.

Appendix Table C.2: UK goods exports to China for selected sectors (£2019bn)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Metals and metal products	0.4	0.6	0.8	0.8	0.5	0.6	0.7	0.5	0.6	3.5	6.1	1.3	1.1	4.5	7.7
Mining and quarrying	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	0.6	1.7	3.2	3.4	4.5
Motor vehicles	0.2	0.4	0.7	1.0	0.9	2.3	3.0	4.2	5.9	6.3	3.4	4.6	5.2	3.7	3.4
All other goods	3.5	4.1	5.1	5.5	5.3	6.5	7.5	7.5	7.8	6.6	5.5	7.9	8.8	7.5	9.6
China share (%)	1.4%	1.5%	2.2%	2.4%	2.5%	3.1%	3.5%	3.9%	4.6%	5.3%	4.6%	4.6%	5.2%	5.4%	6.7%

Note(s):   OECD data for these sectors were scaled to match the total export of goods value published by the ONS.
            Figures for metals and metal products include trade in non-monetary gold: this component is excluded before calculating jobs supported.
Source(s):   ONS (2020) 'UK total trade', ONS (2020) 'Export deflator', OECD (2020) 'Exchange rate', and OECD (2020) 'Bilateral trade in goods'.

Appendix Table C.3: UK services exports to China (£2019bn)

	2016	2017	2018	2019
Architecture and engineering	0.2	0.2	0.5	-
Business support	0.6	0.4	0.5	-
All other services	3.7	3.9	3.7	-
Total service exports to China	4.5	4.5	4.7	5.5
China share (%)	1.6%	1.5%	1.5%	1.7%

Note(s):   Experimental statistics by ONS. Some data are subject to disclosure control. No sector breakdown has been published yet for 2019.
Source(s):   ONS (2020) 'Trade in services' and ONS (2020) 'UK total trade'

Appendix Table C.4: Jobs supported by UK goods exports to China ('000 FTEs)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Other transport equipment	1.6	1.9	3.0	3.9	3.8	2.3	2.0	3.5	3.5	1.9	2.1	2.8	4.0	3.5	4.5
Mining and quarrying	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.3	1.0	3.1	5.6	6.0	7.9
Electronics	2.7	3.2	3.7	3.7	3.4	4.2	4.6	4.7	4.6	4.3	4.2	6.4	6.3	4.9	6.2
Machinery	4.4	4.1	4.4	5.3	4.4	6.1	6.6	6.9	7.7	6.3	4.1	4.7	5.6	5.3	6.1
Motor vehicles	0.4	0.5	1.0	1.4	1.3	3.4	4.5	6.3	8.9	9.5	5.1	6.9	7.8	5.6	5.0
All other goods	10.3	13.2	17.4	17.1	15.5	21.5	26.1	21.4	22.7	19.7	16.8	24.7	28.6	21.1	38.8

Note(s):   OECD data for these sectors were converted to pound sterling at constant prices and scaled to match the total export of goods figures published by the ONS.
             Export flows have been converted into FTE jobs using productivity assumptions from ONS input-output analytical tables.
Source(s):   ONS (2020) 'UK total trade', ONS (2020) 'Export deflator', OECD (2020) 'Exchange rate', and OECD (2020) 'Bilateral trade in goods', HMRC (2020) (2020)'Non-monetary
             gold exports', and ONS (2019) 'Input-output analytical tables'.

Appendix Table C.5: Jobs supported by UK services exports to China ('000 FTEs)

	2016	2017	2018
Business support services	8.5	6.5	7.0
Architecture and engineering	2.0	2.1	5.1
Education	3.9	2.9	3.1
Residual/Unallocated	4.6	3.1	6.7
All other services	18.6	22.3	17.8

Note(s): OECD data for these sectors were converted to pound sterling at constant prices. Export flows have been converted into FTE jobs using productivity assumptions from ONS input-output analytical tables.
Column sums may not match reported totals elsewhere due to rounding.
Source(s): ONS (2020) 'Trade in services' and ONS (2020) 'UK total trade', and ONS (2019) 'Input-output analytical tables'.

Appendix Table C.6: Jobs supported by UK goods exports to China ('000 FTEs)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Agriculture etc	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.5	1.3	1.4	0.9	1.3	1.5	0.1	1.5
Mining & quarrying	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.3	1.0	3.1	5.6	6.0	7.9
Manufacturing	16.4	18.2	23.4	25.4	22.3	25.9	30.0	33.9	37.8	33.7	26.5	35.7	42.1	32.2	44.2
Electricity, gas & water	2.4	4.1	5.3	5.2	5.1	6.4	8.0	7.0	6.0	4.5	3.6	5.3	5.2	3.2	2.8
Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Distribution	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transport & storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accommodation & food services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Information & communications	0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
Financial & business services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other services	0.3	0.5	0.7	0.5	0.7	4.9	5.0	1.2	2.0	1.9	0.9	2.8	3.1	4.5	11.8
TOTAL	**19.4**	**23.0**	**29.6**	**31.4**	**28.5**	**37.5**	**43.8**	**42.9**	**48.0**	**43.1**	**33.3**	**48.6**	**57.9**	**46.3**	**68.6**

Note(s): OECD data for these sectors were converted to pound sterling at constant prices and scaled to match the total export of goods figures published by the ONS.
Export flows have been converted into FTE jobs using productivity assumptions from ONS input-output analytical tables. Sectors have been mapped to CE sectors.
Source(s): ONS (2020) 'ONS (2020) 'UK total trade', ONS (2020) 'Export deflator', OECD (2020) 'Exchange rate', and OECD (OECD 2020) 'Bilateral trade in goods', HMRC (2020) 'Non-monetary gold exports', and ONS (2019) 'Input-output analytical tables'.

Appendix Table C.7: Jobs supported by services exports to China ('000 FTEs)

	2016	2017	2018
Agriculture etc	0.0	0.0	0.0
Mining & quarrying	0.0	0.0	0.0
Manufacturing	0.9	1.2	1.6
Electricity, gas & water	0.0	0.0	0.0
Construction	0.3	0.3	0.2
Distribution	0.8	0.8	1.2
Transport & storage	4.9	4.4	3.5
Accommodation & food services	0.0	0.7	0.0
Information & communications	2.0	3.5	3.3
Financial & business services	15.3	15.2	16.5
Government services	4.8	3.8	3.9
Other services	3.9	4.0	2.7
TOTAL	**32.9**	**33.7**	**33.0**

Note(s):   OECD data for these sectors were converted to pound sterling at constant prices. Export flows have been converted into FTE jobs using productivity assumptions from ONS input-output analytical tables. Sectors have been mapped to CE sectors.
Column sums may not match 'TOTAL' due to rounding.
Source(s):   ONS (2020) 'Trade in services' and ONS (2020) 'UK total trade', and ONS (2019) 'Input-output analytical tables'.

C.2 Foreign Direct Investment

Appendix Table C.8: Inward, outward and net international investment positions between the UK and China

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Inward: Stock of FDI controlled by UK-resident companies abroad (£bn)	0.6	0.4	0.8	1.1	-	1.1	2.3	1.7	2.3	1.8
Outward: Stock of FDI controlled by UK resident companies abroad (£bn)	4.6	6	6.6	6.5	-	9.2	9.9	12	10.6	16
Net international investment position (£bn)	4	5.6	5.8	5.4	-	8.1	7.6	10.3	8.3	14.2

Note(s):   Figures for 2013 not reported: the inward investment position was not disclosed in the original data.
Source(s):   ONS (2020) 'Foreign direct investment involving UK companies: 2018'.

Appendix Table C.9: Jobs created or safeguarded by Chinese FDI projects

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Jobs created or safeguarded by Chinese FDI projects ('000s)	3.4	5.5	5.9	6.7	4.8	2.9	1.7
Jobs created or safeguarded by Chinese FDI as a share of jobs supported by all FDI projects (%)	2%	5%	6%	6%	4%	3%	3%

Note(s):   FDI projects are new investments into the UK that create business activities for at least three years and create at least one permanent job for two years.
Source(s):   Department for International Trade (2019).

C.3 Tourism

Appendix Table C.10: Visits to the UK by Chinese nationals by purpose of visit ('000s)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Holiday	77	87	126	131	170	220	335	372	545	617	604
Business	51	73	85	81	101	96	87	143	163	101	129
Visiting friends or relatives	37	42	64	75	85	56	99	131	122	151	128
Study	16	37	29	32	47	49	45	63	72	84	82
Miscellaneous	11	8	16	15	23	16	36	38	37	48	68
Total	192	248	319	334	425	437	602	747	939	1,001	1,010

Note(s): Visits to the UK from UK overseas residents in China are not included.
Miscellaneous includes all other reasons for travel such as medical treatment, shopping and attending a sport event.
Source(s): ONS (2020) 'International Passenger Survey Travelpac dataset'.

Appendix Table C.11: Nights spent in the UK by Chinese nationals by purpose of visit (m)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Holiday	0.7	0.9	1.4	1.4	1.6	2.2	3.2	3.6	5.6	5.3	5.4
Business	0.4	0.7	0.8	0.9	1.0	1.3	0.7	1.8	1.5	0.6	1.2
Visiting friends or relatives	0.6	1.0	1.2	1.2	1.4	0.9	1.6	2.5	2.4	2.6	2.7
Study	0.7	3.0	2.1	3.3	5.6	6.0	3.4	6.3	6.3	6.0	5.3
Miscellaneous	0.1	0.1	0.3	0.5	0.7	0.1	0.3	0.3	0.3	0.4	0.8
Total	2.4	5.7	5.8	7.2	10.3	10.5	9.3	14.4	16.1	14.8	15.5

Note(s): Nights spent in UK by UK overseas residents in China are not included.
Miscellaneous includes all other reasons for travel such as medical treatment, shopping and attending a sport event.
Source(s): ONS (2020) International Passenger Survey Travelpac dataset.

Appendix Table C.12: Expenditure in the UK by Chinese nationals who visit the UK by purpose of visit (£2019m)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Holiday	88	133	172	186	314	367	572	459	849	955	972
Business	79	124	152	152	220	214	170	322	317	147	233
Visiting friends or relatives	51	52	74	100	150	81	145	197	202	138	247
Study	145	233	124	141	444	571	469	539	481	386	367
Miscellaneous	13	12	26	39	51	28	77	43	80	60	79
Transit	0	0	0	0	0	0	0	0	1	1	0
Total	376	555	549	619	1,180	1,261	1,434	1,561	1,931	1,688	1,898

Note(s): Expenditure in UK by UK overseas residents is not included.
Miscellaneous includes all other reasons for travel such as medical treatment, shopping and attending a sport event.
Transit measures expenditure of those passing through the UK en route to other destinations and are not counted as visiting the UK. This represents a small proportion of overall expenditure.
Expenditure is measured in real terms using GDP deflators from HM Treasury.
Source(s): ONS (2020) International Passenger Survey Travelpac dataset, HM Treasury (2020).

Appendix Table C.13:   Jobs supported by Chinese tourism by sector ('000 FTEs)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Accommodation	1.5	2.3	2.3	2.5	4.8	5.2	4.7	4.1	7.2	6.3	7.1
Other consumption products	1.3	2.0	2.0	2.2	4.2	4.5	5.1	4.9	5.5	4.8	5.4
Food and beverage services	0.6	0.8	0.8	0.9	1.7	1.9	1.6	1.9	2.1	1.9	2.1
Road and rail transport	0.2	0.3	0.3	0.4	0.7	0.8	0.8	0.7	0.8	0.7	0.8
Other transport	0.1	0.2	0.2	0.2	0.4	0.4	0.3	0.3	0.4	0.4	0.4
Entertainment	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Other services	0.1	0.1	0.1	0.2	0.3	0.3	0.4	0.3	0.3	0.3	0.3
Total	3.9	5.8	5.7	6.5	12.3	13.2	13.0	12.3	16.5	14.5	16.3

Source(s):   ONS (2020) International Passenger Survey Travelpac dataset, ONS (2019) Tourism Satellite Accounts'.

C.4   Students

Appendix Table C.14:   Chinese students by level of study ('000s)

	2014/15	2015/16	2016/17	2017/18	2018/19
First degree	35.9	36.3	38.6	41.7	46.1
Postgraduate (taught)	44.4	44.6	46.5	54.1	62.0
Postgraduate (research)	5.4	5.7	5.9	6.3	7.3
Other undergraduate	3.9	3.8	4.1	4.4	5.0
Total	89.5	90.4	95.1	106.5	120.4

Note(s):   HESA dataset on international students is broken down by country of domicile not nationality.
'Postgraduate research' refers to courses that are predominantly focused on research, with little or no teaching.
This includes PhDs, as well as some research focused master's courses.
'Other Undergraduate' refers to undergraduate degrees that are not bachelor's degrees. This includes
Professional Graduate Certificate in Education (PGCE), foundation degrees and diplomas in higher education.
Source(s):   HESA (2020).

Appendix Table C.15: Expenditure by Chinese students (£2019bn)

	2014/15	2015/16	2016/17	2017/18	2018/19
Retail	585	590	621	697	790
Student accommodation (rented)	418	422	444	499	565
Road and rail transport	227	228	240	270	306
Food & beverage services	62	63	66	74	84
Entertainment	37	38	40	45	50
Other services	55	55	58	65	74
Total	1,384	1,396	1,468	1,650	1,869

Source(s):   HESA (2020), Department for Education Student Income and Expenditure Survey 2014 to 2015 (March 2018).

Appendix Table C.16: Jobs supported by expenditure from Chinese students ('000 FTEs)

	2014/15	2015/16	2016/17	2017/18	2018/19
Retail	7.8	7.9	8.3	9.3	10.5
Student accommodation (rented)	0.5	0.6	0.6	0.7	0.7
Road and rail transport	2.4	2.4	2.5	2.8	3.2
Food & beverage services	1.1	1.1	1.2	1.3	1.5
Entertainment	0.6	0.6	0.6	0.7	0.8
Other services	0.6	0.7	0.7	0.8	0.9
Total	13.1	13.2	13.9	15.6	17.6

Source(s): HESA (2020), Department for Education (2018), ONS (2019) 'UK input-output analytical tables: 2015 detailed'.

Appendix D   Sector classification

Appendix Table D.1 lists the 45 sectors in CE's industry classification (which we use for convenience in this analysis) and their correspondence to the industries identified in the 2007 UK Standard Industrial Classification.

Appendix Table D.1:   Definitions of CE's 45 detailed sectors in terms of the 2007 Standard Industrial Classification (SIC2007)

Sector	SIC2007
Agriculture, forestry & fishing	01-03
Mining & quarrying	05-09
Food, drink & tobacco	10-12
Textiles etc	13-15
Wood & paper	16-17
Printing & recording	18
Coke & petroleum	19
Chemicals	20
Pharmaceuticals	21
Non-metallic mineral products	22-23
Metals & metal products	24-25
Electronics	26
Electrical equipment	27
Machinery	28
Motor vehicles	29
Other transport equipment	30
Other manufacturing & repair	31-33
Electricity & gas	35
Water, sewerage & waste	36-39
Construction	41-43
Motor vehicles trade	45
Wholesale trade	46
Retail trade	47
Land transport	49
Water transport	50
Air transport	51
Warehousing & postal	52-53
Accommodation	55
Food & beverage services	56
Media	58-60
IT services	61-63
Financial & insurance	64-66
Real estate	68
Legal & accounting	69
Head offices & management consultancies	70
Architectural & engineering services	71
Other professional services	72-75
Business support services	77-82
Public administration & defense	84
Education	85
Health	86
Residential & social	87-88
Arts	90-91
Recreational services	92-93
Other services	94-96