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Retention and economic impact of international students in the OECD

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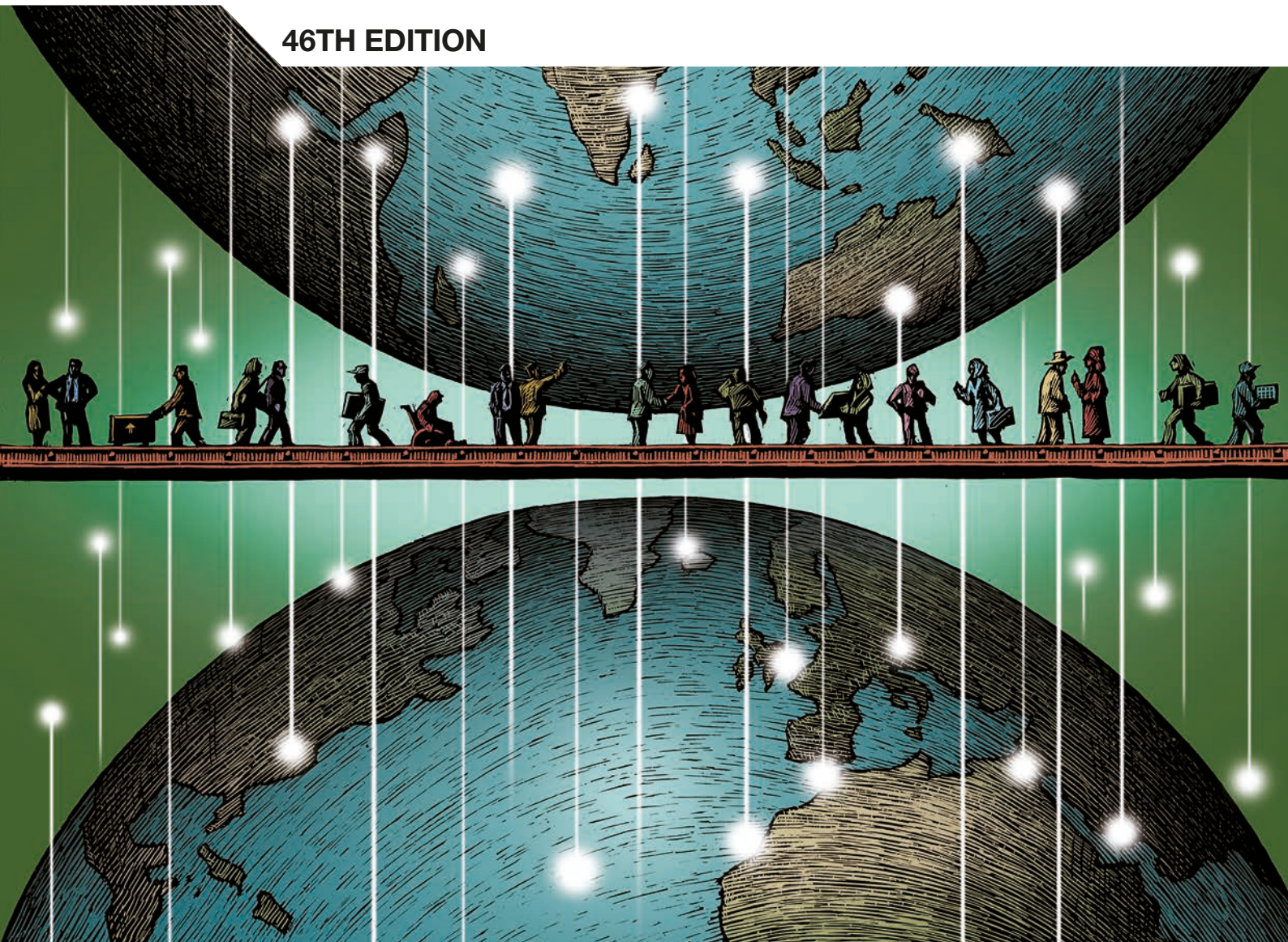
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7 Retention and economic impact of international students in the OECD

Elisabeth Kamm and Thomas Liebig

This chapter discusses the retention of international students, their importance as a feeder for labour migration, and their economic impact. It starts by providing estimates for their stay rates, five and ten years after admission. It follows with a discussion of the magnitude of international students as a source to labour migration. The chapter ends with a discussion of the economic impact of international students in the host country.

In Brief

- The retention of international students varies greatly across OECD countries. Five years after initial admission to the country, more than 60% of international students who obtained a permit for study reasons in 2015 were still present in Canada and Germany, around half in Australia, Estonia and New Zealand, and around two in five in France and Japan. This is the case for one in six in the United Kingdom, and less than one in seven in Denmark, Italy, Norway and Slovenia.
- Retention rates of international students tend to be higher for more recent cohorts of international students, coinciding with greater efforts to enable them to stay on and change status after study.
- Students from China and India, the two largest groups of international students in the OECD, show remarkably different retention behaviours. Indian students tend to have a higher stay rate than the overall international student population. The retention behaviour of Chinese students is more diverse, with overall larger shares leaving after their education.
- Former international students are an important feeder for labour migration in many countries. The share of educational permits changed to a work permit accounted for a large share of total admissions for work in 2019, especially in France (52%), Italy (46%) and Japan (37%). In the United States, former study (F1) permit holders accounted for 57% of temporary high-skilled (H1B) permit recipients.
- In the OECD as a whole, direct export revenues in nominal terms from international students increased from over EUR 50 billion in 2010 to over EUR 115 billion in 2019. These education-related services exports include the direct contribution of international students to the host country's economy during studies for tuition, food, accommodation, local transport, and other services.
- In English-speaking OECD countries, education-related services are important export items. In Australia and New Zealand, exports of education-related services accounted for 8% and 5% of total exports, respectively, in 2019. Canada, the United Kingdom, and the United States follow at around 2% of total exports.
- During their studies, between one in three and one in four international students work in the EU, the United Kingdom and the United States, about one in two in Australia and nine in ten in Japan. International students can thus be an important contributor to local labour markets, especially in large cities and in the hospitality and education sectors in where they are overrepresented compared with domestic students. For example, data from the European Labour Force suggest that a quarter of working non-EU students were employed in the hospitality sector in 2020, compared with one in ten among native-born students.
- Scholarships and in-country costs for international students often account for a large share of Official Development Assistance (ODA). In 2020, this item accounted for 24% of the total ODA in Austria, 45% in Hungary, and over half of all ODA in Poland and Slovenia. While Germany was the country with the highest amount of ODA allocated to in-country international students, with USD 1.8 billion, this accounted for only 7% of the country's total ODA.
- International students who remain in the host country post-study have long-term employment rates that are on par with those of labour migrants and well above those of migrants overall. Their overqualification rates are half of those of labour migrants or other migrant groups.

Introduction

International students are a unique group of migrants. Given their domestic study experience, international students are often considered a pre-integrated source of future labour supply. It is thus no surprise that most OECD countries have created specific or facilitated pathways for international students to remain in the country after study to take up employment. Indeed, despite their initial admission for temporary stay, many remain in their country of study supported by policies to retain them for work. Yet, little is known with respect to how many actually stay on across OECD countries, and with respect to the importance of this channel for labour migration overall.

Already during study, many international students work or otherwise contribute to the economy. In countries with high tuition fees, international students are an important factor for financing the higher education system, as student fees are often higher for international students than for domestic students. In contrast, in countries where tertiary education is tuition free, imputed student costs for international students from developing countries can be an important factor of official development assistance.

Against this backdrop, this chapter provides a comparative assessment of the stay rates of international students across OECD countries using national permit data. It first reviews the available evidence and then presents novel data with respect to both retention and the contribution of international students as a feeder to overall labour migration. This is followed by a brief look at the economic impact of international students. The chapter concludes with a discussion of the role of international study for migration policy.¹

Staying on: Retention of international students

Retention as a policy focus

How to retain international students after graduation is a key question in many OECD countries. Nearly half the countries covered in a study by the European Migration Network consider attracting and retaining international students a policy priority (European Migration Network, 2018^[1]). For example, the Government of Latvia has set a goal of increasing the share of international students staying in the country after graduation to 10% by 2030 (OECD, 2017^[2]). The Estonian strategy for the international promotion of Estonian higher education includes an indicator on employment in Estonia after graduation. The objective is that 30% of international students at master or doctoral level remain to work in Estonia. Australia, Canada, New Zealand, and the United Kingdom highlight in their international education strategies the role of international graduates to fill vacancies (Australian Department of Education, Skills and Employment, 2021^[3]; Government of New Zealand, 2018^[4]).

Available evidence

Available evidence on the retention of international students is mostly country-specific. In recent years, about a third of OECD countries have looked into this issue. The most common approach in these studies has been to calculate the share of individuals remaining in the country a specified number of years after the initial study permit or, alternatively, after their graduation. These estimations use different methodological approaches, reference periods, and data sources. Results are thus not comparable across countries. Table 7.1 provides an overview.

Table 7.1. Available evidence of student stay rates in OECD countries

Country	Approach and data	Results	Source
Australia	Follow-up of student/temporary or permanent permit holders, pooled from 2000/01 and 2013/14 (1.6 million individuals).	16% of all international students eventually transitioned to permanent residence.	(The Treasury and the Department of Home Affairs, 2018 ^[5])
Austria	Pooling graduation cohorts from 2008/09 to 2018/19. Based on residence status at graduation, 1, 2, 3 years later. Report lists numbers by nationality and separated by type of study and years since graduation.	Master's graduates 2016/17 who had left the country ("Wegzugsquoten"): Austrian nationals: 5%; German nationals: 64%; other EU: 53%; other non-EU (includes UK): 43%.	(Statistics Austria, 2021 ^[6])
Belgium	Belgian National Register, individuals residing for study reasons in 2010. Socio-economic position in 2014 (4 years later).	43% had an active labour market status in Belgium (working or job seeking) in 2014.	(Federale Overheidsdienst, 2017 ^[7])
Canada	Share of international students obtaining a post-graduation work permit after their study permit expired. 2008-17 cohorts.	43% of international students whose study permit had expired in 2017 obtained a post-graduation work permit within one year. This share was 48% for the 2012 cohort five years after their first study permit had expired.	(Crossman, Lu and Hou, 2022 ^[8])
Czech Republic	Survey of graduates who studied in the Czech Republic between 2012 and 2021. 3 136 responses.	45% of the graduates of full-degree programmes have been staying in the Czech Republic for work purposes.	(DZS, 2022 ^[9])
Denmark	–	42% of graduates from English-language programmes at Master level left Denmark within 2 years of completing their studies. Only about a third remain in the Danish workforce after 2 years.	(Danish Ministry of Higher Education and Science, 2018 ^[10])
Estonia	Immediate transition to work after graduation.	Graduates with master or doctoral degree who worked immediately after graduation; 56% in 2016/17; 58% in 2017/18.	(Statistics Estonia, 2019 ^[11])
Finland	Tracking 13 (years) graduating cohorts across national data registries. Stay rates 3 years after graduation international students graduating in Finland between 1999 and 2011.	67% of bachelor's, 64% of master's graduates were residing in Finland three years after graduation. Sample excludes those who lived in Finland before enrolment.	(Mathies and Karhunen, 2020 ^[12])
France	Metropolitan France, nationals of third countries having obtained a first student permit in 2015, follow-up in subsequent years until 2020.	One year after first permit, 37% had left France (or became nationals); 5 years after first permit, 57% had left (or became nationals).	(Ministère de l'Intérieur, 2021 ^[13])
Germany	Pooling third-country nationals who had studied in Germany in the period January 2005 – October 2013, follow-up in October 2014.	In October 2014, 54% of the former students were still living in Germany.	(Hanganu, 2015 ^[14])
Korea	Immediate transition to work after graduation.	12% of master's and PhD graduates worked immediately after graduation in 2021.	(Ministry of Education Korea, 2021 ^[15])
Luxembourg	Place of first registered employment.	46% of international master and PhD graduates of 2014-19 had a first registered employment in Luxembourg.	Data provided by the University of Luxembourg, 2022
Netherlands	Stay rates of international graduates cohorts of 2006/07 and 2012/13 based on linked data by Statistics Netherlands.	Almost 25% of the international students who studied in the Netherlands still live there 5 years after graduating.	(NUFFIC, 2022 ^[16])
Norway	Immigrants who graduated with a bachelor or master degree in Norway in 2007 and 2012, and their labour market status five years later.	78% of international graduates of 2007 were still living in Norway five years after graduation – 88% among these were in employment. 76% of international graduates of 2012 were still living in Norway in 2017, 85% of these were employed.	(Statistics Norway, 2020 ^[17])
New Zealand	Follow-up five years after initial permits.	Two-thirds (66%) of all first student permit (FSV) holders in 2009 are overseas five years after they obtain their FSV.	(New Zealand Ministry of Education, 2017 ^[18])
Switzerland	Place of residence of graduates of Swiss universities one year after the year of graduation.	36% of international students (bachelor graduates of a university of applied sciences, graduates of a pedagogical university as well as master and PhD graduates) were residing abroad in 2015.	(Bundesamt für Statistik, 2017 ^[19])
United Kingdom	Longitudinal Educational Outcomes dataset to link higher education and tax data, and to chart the transition of graduates from higher education into the workplace.	Five years after graduation of the graduation cohort of 2013-14, about 39% of EU and 15% of non-EU graduates were recorded in "sustained employment", further studies, or both.	(UK Department for Education, 2022 ^[20])

Note: National research presented in this table uses differing methodologies, years and target groups. Shares are thus not comparable between countries and do not necessarily refer to international students with a permit based on education, as used in the OECD estimations below.

Research has also looked at the share of residents who initially arrived for the purpose of education. Data from Canada show that in 2021, more than a third (39%) of new permanent immigrants admitted in that year held a Canadian study permit at some point in the past. This share has substantially increased in the past years, up from just 16% in 2017. Data from Australia show that about 21% of the over 160 000 permanent residence permits issued in 2017/18 were obtained by applicants who held, or previously had held, an Australian student permit (Birrell, 2019^[21]).

In contrast to the growing amount of country-specific evidence on retention rates, internationally comparable evidence is scarce. In virtually all OECD countries, international students² who do not benefit from free mobility receive a study permit to take up their studies, but student permit statistics do not incorporate information on whether or not a student has graduated. Therefore, while a proxy for entries (issued permits) exists, the calculation for staying on is less straightforward. Previous estimations, including by the OECD and the European Commission, do not allow for tracing international students over time, but rather provide a snapshot of staying behaviour one year after enrolment in studies (see Box 7.1).

Box 7.1. Previous international evidence

An approach previously taken by the OECD (2011^[22]), was to calculate the share of student permit holders changing to a status other than “education”, relative to the number of international students not renewing their student permit in the same year, which includes both people changing status or leaving the host country. The number of students not renewing their permit was proxied by subtracting the difference in observed stocks of international students between year t and year $t-1$ from the number of inflows (measured in permits). The number of status changes relative to this overall number gave an indication of the overall share of students staying on in the country. In 2008/09, this share was between 17-33% for the countries covered. However, it is important to acknowledge the potential drawbacks of this approach in a context of changing intakes of students, different study durations and lags involved in their potential permit changes.

There have also been estimates for the EU as a whole, based on data from Eurostat on permits. Focusing on non-EU origin countries, for the EU as a whole, aggregate stay rates of previously studying non-EU citizens were estimated to be between 16% and 29%, depending on the assumptions taken regarding study duration and other parameters not observed in the data. A report by the European Commission (2018), using the European Union Labour Force Survey (EU-LFS) and focussing on staying behaviour of intra-European students, calculated the shares of respondents who were EU citizens with a different citizenship than their country of residence, had lived in the host country for more than a year, and were a student in that country the year before the reference year. Estimates were only obtained for the United Kingdom, the Netherlands and Sweden. In each of these countries, stay rates were estimated of 40% or higher for those who finished their studies.

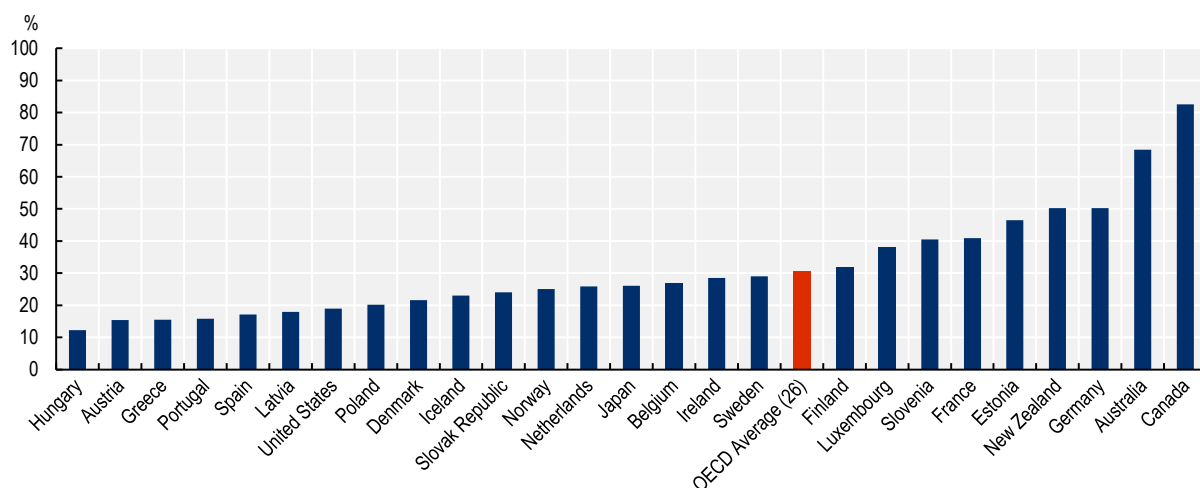
Source: OECD (2011^[22]), *International Migration Outlook 2011*, https://doi.org/10.1787/migr_outlook-2011-en; Weisser (2016^[23]), “Internationally mobile students and their post-graduation migratory behaviour: An analysis of determinants of student mobility and retention rates in the EU”, <https://doi.org/10.1787/5jlwxbvmb5zt-en>; European Commission (2018^[24]), *Study on the movement of skilled labour: Final report*, <https://doi.org/10.2767/378144>.

The OECD and Eurostat collect data on the type of permits given to previous study permit holders by year (EUROSTAT, 2021^[25]). These numbers also show that the channel through which retention occurs differs widely. In Belgium, Lithuania, Poland and Slovenia, more than 40% of international study permit holders who change status change to a family permit. In contrast, in Denmark, France, Germany, Italy, the Netherlands, and the Slovak Republic, more than three in four status changes are towards work-related permits.

Relating these numbers to the annual education permits issued in previous years provides a first indication of retention. The data show that about one in three student permit holders change their initial education permit to a different type of permit in subsequent years. As visible in Figure 7.1, these data are sensitive to changes in student numbers over time.

Figure 7.1. About one in three study permit holders extend their stay

Estimated share of education permits changed to a different permit (or accessing post-study work) in 2019, relative to average annual education permits issued from 2016 to 2018



Note: Shares are calculated as the number of educational permit holders who changed their permit in 2019 to any other permit, relative to the average annual number of new permits issued to international students from 2016 to 2018. The OECD average is the simple average of countries included in the graph. Australia and Canada: transition to post-graduation permits for job search as well as direct transitions to permanent residence. United States: Students with an F1 visa who transitioned into H1B in the United States. Japan: transition from education/study to work.

Source: OECD Secretariat based on International Migration Database and Eurostat data, 2022.

StatLink  <https://stat.link/x0bdnc>

Methodological considerations and limitations

A retention rate analysis typically starts with a cohort admitted or graduated and considers their retention in the country at different time intervals. The graduation year or time since first permit are both possible reference points. A disadvantage of the latter is that duration of study varies, making it difficult to have a clear cut-off year for post-study retention. While the graduation year provides a clear cut-off date, this information is generally not available in permit data. What is more, not all international students graduate. The following analysis takes the issuance of the first study permit as the starting point for analysis. Many, though not all, OECD countries record permit data and mark these permits with a unique person-specific identifier. Based on this unique identifier, it is possible to connect a permit recipient who initially arrived for educational purposes with all his/her subsequent permits. In some countries, it is not possible to make this link, and thus estimations here cannot follow individual permit receivers but only look at transitions to other categories in a given year and relate them to other variables of interest, such as prior admissions for education or current admission for work.

Permit statistics have some methodological shortcomings. First, they only give an indication of a person's presence in a country in a given year and serve as an approximation of actual staying behaviour. Many countries do not distinguish between degree students and exchange or language students, so initial permits include many students who stay only a few months or one academic year. What is more, in some

countries, the study permit is simply prolonged for those who want to search for a job. Hence, individuals might appear in the statistics as if they are still studying, while they are in fact already looking for a job. Moreover, international students who transition to permanent residence or become naturalised in some countries drop out of permit statistics and cannot be distinguished from those who leave the country. In other countries, these individuals can be identified and separately tabled. These limitations can lead to bias, as one of the main assumptions of the permit identifier approach is that individuals for whom no data is recorded have left the country.

Calculation of retention requires a decision as to who is to be included in the “retained” group. Retention rates can focus solely on former international students currently in the country as labour migrants or can also include former international students who have transitioned to other categories, such as family permits. The following analysis examines all subsequent permits, including labour, family, and humanitarian permits.

Estimations based on permit data do not allow for any information on individuals who benefit from free mobility rights. Therefore, the calculations below exclude student movements in free mobility zones such as the EU/EEA and the New Zealand-Australian Trans-Tasman Agreement.

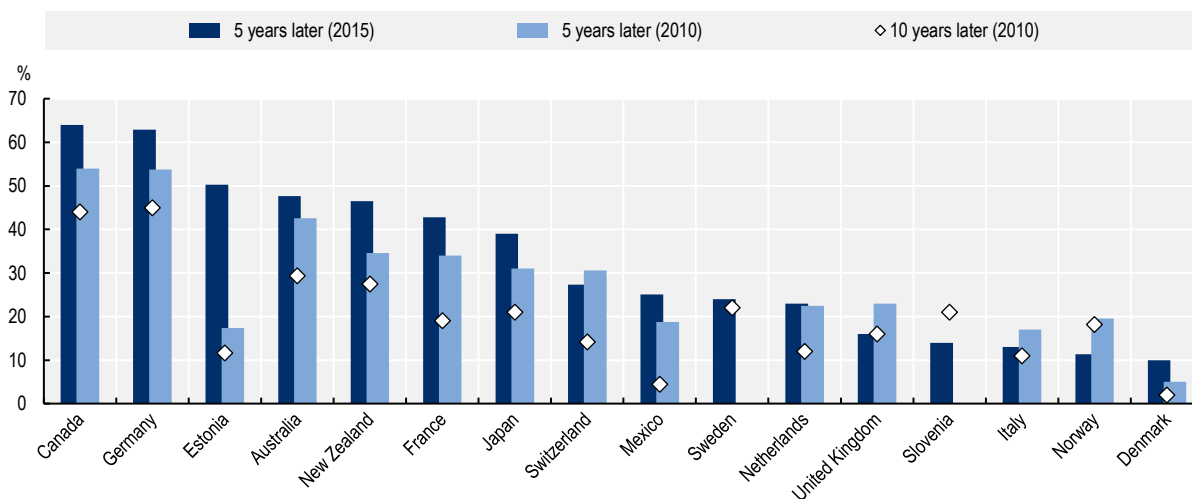
Results

Stay rates over time

Overall, five years after receiving their first education permit in 2015, around 30% of international students still hold a valid permit in their host country, though there are strong differences across OECD countries (Figure 7.2). Ten years after first admission, this share drops strongly in most countries, but remains at almost 50% in Canada and Germany and around 30% in Australia and New Zealand.

Figure 7.2. Five-year retention rates are often higher for the cohort of 2015 than the cohort of 2010

Share of first study permit receivers in 2010 and 2015, recorded with valid permit in 2020



Note: Data include individuals on a valid permit, including those with an education permit. Data from Denmark, Sweden and Switzerland include returning individuals. Data for Germany includes persons already resident who obtained a first time education permit. Data from Italy and Mexico refer to the 2011 cohort instead of 2010, and thus to 4 years after admission in the year 2015 and 9 years later in 2020. Data do not include individuals who have become citizens in France, New Zealand and the Netherlands. Data from the United Kingdom refer to out-of-country visa grants with no valid leave in the prior 12 months, are based on nationality and include a small number of minors arriving for secondary education. This graph refers to permit statistics and does not include individuals benefiting from free mobility.

Source: OECD Secretariat calculations, 2022.

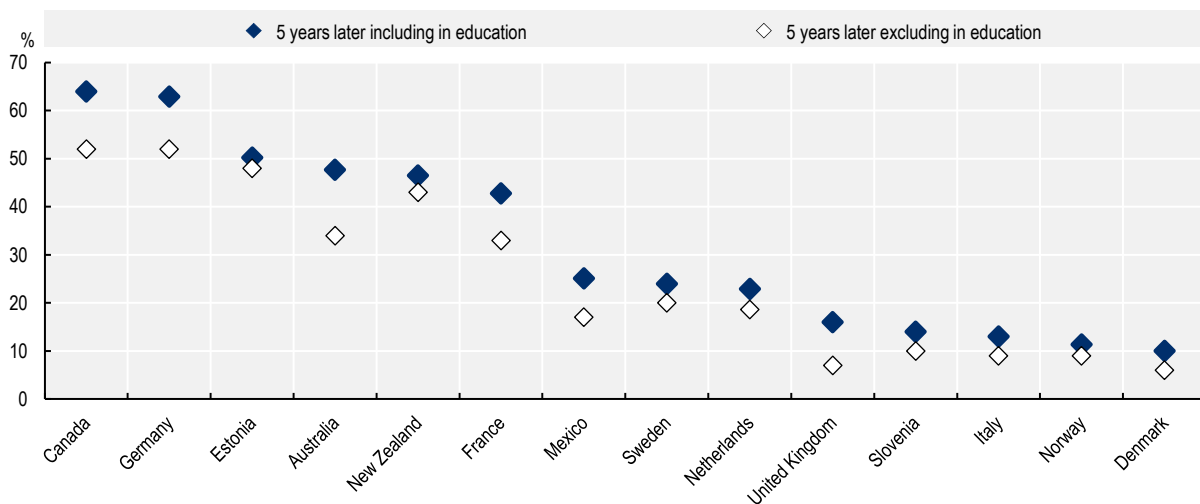
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The available data suggest that retention has tended to increase for more recent cohorts. With the exception of Switzerland, the United Kingdom, Norway and Italy, the cohort of 2015 is more likely to remain in the country five years later than the 2010 cohort. The most striking difference is visible in Estonia, where retention rates increased from less than one in five to about one in two. The small numbers for the Nordic countries need to be interpreted in the context of large shares of students admitted for education purposes coming from other high income OECD countries.

It should be noted that the figures shown above include individuals who are still, or again, on a study permit. In some countries, this group is considerable. For example, in Canada and Germany, about a quarter of initial permit receivers in 2015 were still recorded to have a study permit in 2020. A similar figure has been observed in Australia (20%). In contrast, in the United Kingdom and New Zealand, this was only the case for 10% and 6%, respectively, of the 2015 cohort. Excluding current study permit holders from the baseline leads to a reduction in retention rates. Not surprisingly, the decline is largest in Australia (14 percentage points), Canada (by 12 percentage points) and Germany (by 11 percentage points). It is also large in France (10 percentage points) and the United Kingdom (9 percentage points). However, the overall ranking of countries in terms of retention remains largely the same (Figure 7.3).

Figure 7.3. Excluding individuals with education permit decreases retention rates

Share of first study permit receivers in 2015, recorded with valid permit in 2020, including and excluding education permits



Note: Data include individuals on a valid permit. Data from Denmark and Sweden include returning individuals. Data for Germany includes persons already resident who obtained a first time education permit. Data do not include citizens in France, New Zealand and the Netherlands. Data from the United Kingdom refer to out-of-country visa grants with no valid leave in the prior 12 months, are based on nationality and include a small number of minors arriving for secondary education. This graph refers to permit statistics and does not include individuals benefiting from free mobility.

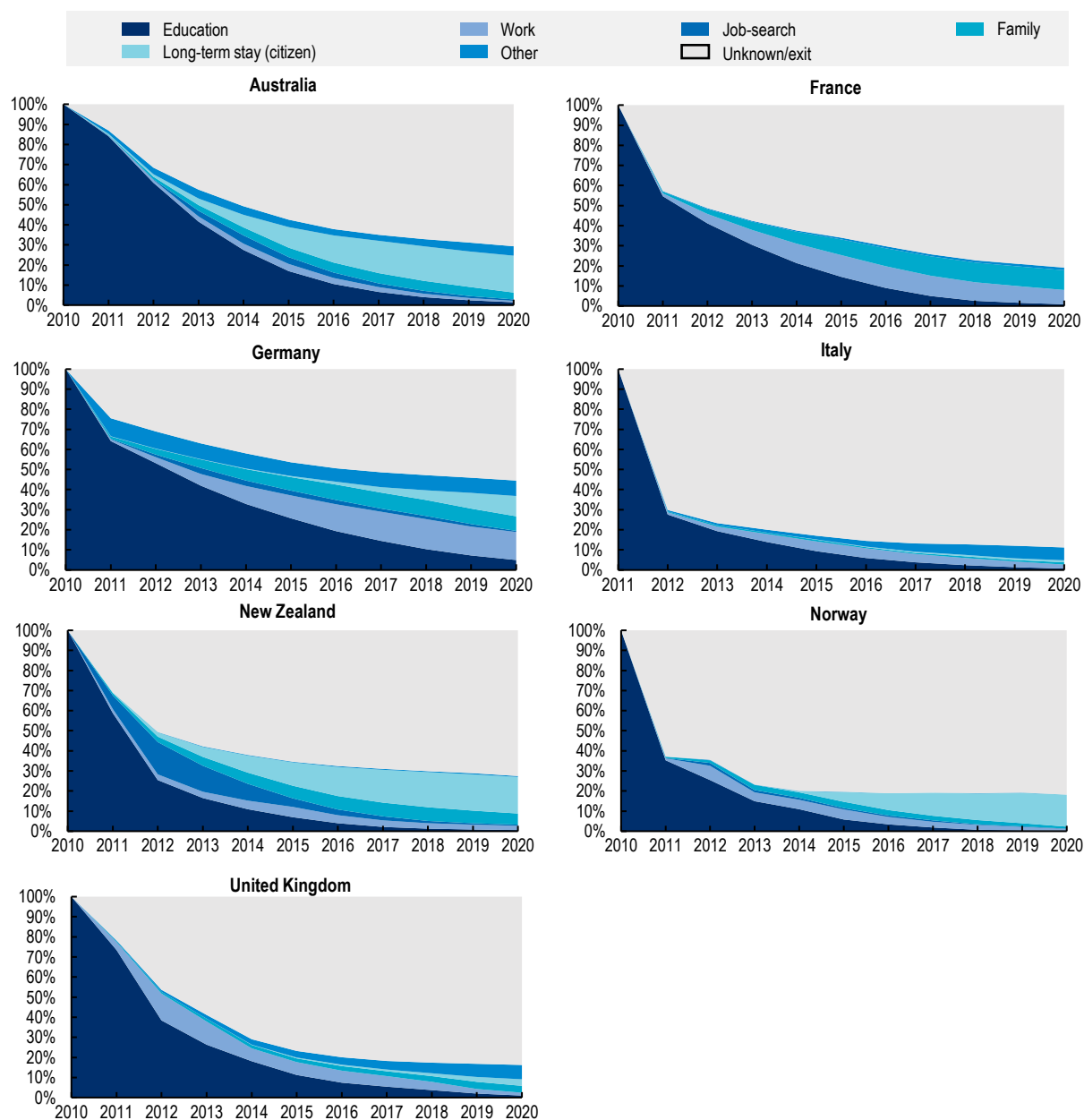
Source: OECD Secretariat calculations, 2022.

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Detailed data on the annual trajectory of permit holders are available only from a few OECD countries (Figure 7.4). These data show that individuals in Australia, France and Germany remain on a student permit for a relatively long time. By contrast, in New Zealand, Italy and Norway, students transition much faster to other permit categories. In New Zealand, two years after admission, 16% hold a job-search permit, which accounts for about a third of all those who remained after study. In other countries where this data is available, shares are below 5% in all years. Italy does not have a job-search permit.

Figure 7.4. The retention of international students over a decade

Permit recorded for individuals who received their first educational permit in 2010, from 2010 to 2020



Note: Data only include individuals who received a permit, thus excluding individuals benefiting from free mobility schemes. Long-term stay category includes long-term / permanent work classes in New Zealand and Australia. Data from New Zealand and France do not include individuals who transitioned to citizenship. These are included in the unknown/exit category. Data from the United Kingdom refer to out-of-country visa grants with no valid leave in the prior 12 months. They are based on nationality and include a small number of child students arriving for secondary education.

Source: OECD Secretariat calculations, 2022.

StatLink  <https://stat.link/y2hn8w>

Data from Australia suggest that international students complete their studies faster than nationals, and are also more likely to successfully graduate.³ Data from Canada point in a similar direction. Almost two-thirds (65%) of international master's degree students who started their programme in 2013 had graduated within two years, compared with 58% of Canadian students. Most international (87%) and Canadian (83%) master's students had graduated within four years of starting the programme (Statistics Canada, 2020^[26]).

Ten years after the first education permit, former international students in Australia, Canada, New Zealand, Norway, and Sweden are predominantly on a long-term permit if they are still in the country.⁴ In Germany, this is the case for only about one-quarter of those still in the country, and most who still reside in the country have a permit for work.

Transition to a family permit is overall less common. Less than one in ten initial student permit receivers in 2010 hold a family permit ten years later, with shares reaching 10% in France, 7% in Germany, 6% in New Zealand, 2% in Sweden and in the Netherlands, and only 1% in Canada, Italy, Norway, Denmark and the United Kingdom.

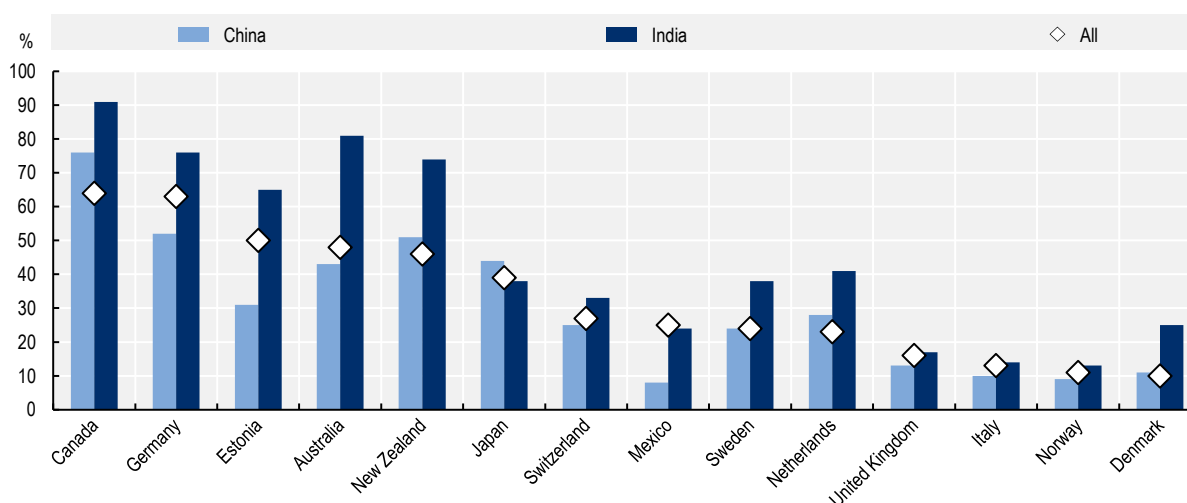
Stay rates of Chinese and Indian students

As seen in Chapter 5, China and India are key origin countries for international students in most OECD countries, accounting for 22% and 10%, respectively, of the total in the academic year 2020.

International students from India have a higher stay rate than international students overall. For Chinese students, the pattern is more diverse. In most countries, they have a lower stay rate than the overall student population, with the exceptions of Canada, Japan, the Netherlands and New Zealand (Figure 7.5). Likewise, data from the United States show that Indians are more likely to remain in the country for an initial work experience than Chinese students (Box 7.2).


Figure 7.5. Indian students have higher stay rates than other permit holders

Stay rates in 2020 of Chinese, Indian, and all permit holders with first education permit in 2015



Note: Stay rate includes individuals still enrolled as students. Data with less than 40 nationals in the base year are excluded. Data from Denmark and Sweden include returning individuals. Data from New Zealand do not include individuals who transitioned to citizenship. Data from the United Kingdom refer to out-of-country visa grants with no valid leave in the prior 12 months and include a small number of child students arriving for secondary education.

Source: OECD Secretariat calculations, 2022.

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Data on the retention behaviour of Chinese and Indian students also show differences in speed of transition to other categories, especially work permits. In Germany, where international students remain on a study permit for a relatively long time, the share of Chinese among the 2015 cohort still on an education permit in 2020 was slightly higher than the overall share, 27% compared with 23% overall. In contrast, only 10% of Indians admitted in 2015 for study were still on a student permit in 2020. A similar picture regarding differences between the two groups emerges in New Zealand, where just 6% of all first-time admissions in 2015 were still on a study permit in 2020. Seventeen percent of Chinese students admitted in 2015 were still on an education permit five years later, whereas this was only the case for 2% of Indian students. Instead, 45% of Indians were on a short- or long-term (including permanent) work permits. The share of Chinese students with a work permit was just 14%. In the United Kingdom, while overall about 4% of 2015 admissions held a work permit in 2020, this was the case for only 2% of Chinese, but 9% of Indian students. In Canada, 54% of Chinese but only 9% of Indian students were still on a study permit in 2020, 5 years after admission, compared with 29% among all study permit receivers. In the same year, 71% of the Indians admitted in 2015 held a work permit, compared with 18% of Chinese, and 26% of all 2015 admissions. Numbers from Estonia are too small for publication, but indicate a similar difference between the two groups. However, this pattern does not hold everywhere. In Australia, 5 years after admission in 2015, 24% of Chinese and 27% Indians were still recorded with an educational permit.

In Sweden, only 5% of all students remained on a study permit five years after first admission. For both China (9%) and India (7%), the shares are slightly higher. However, in 2020, a comparatively large share of former Indian students in Sweden held a work permit (23%) against much lower shares among Chinese (6%) and among all students (7%) admitted five years earlier. In the Netherlands, five years after admission in 2015, only 4% of all permit recipients were still recorded on a study permit. In contrast, 14% held a work permit. This share was slightly higher among Chinese (16%) and significantly higher among Indian nationals (36%). In Denmark, just 4% of all admitted in 2015 held a work permit in 2020. This share was 5% among Chinese nationals and 14% among Indians.

In sum, available country-specific evidence by nationality suggests that Indian students are more likely than the overall international student population to stay following their initial permit in the host country. They are also more likely in most countries to hold a work permit five years after first admission than Chinese and other peers.

In this context, it is key to note that international students from India are more likely enrolled at the master or PhD (ISCED 7 or 8) level than Chinese students, which might explain their quicker transition to the labour market and shorter period on an education permit. Overall, 58% of Indian students study at a master or PhD level in OECD countries, compared to just 45% of Chinese international students in 2020.

Box 7.2. Indian students account for the bulk of post-study work authorisations in the United States

International students who pursue a tertiary degree in the United States are generally not allowed to work off-campus during the first academic year but may take up on-campus employment. After the first academic year, students may engage in off-campus employment via Optional Practical Training (OPT). An OPT authorisation allows temporary employment that is directly related to a student's major area of study for up to 12 months total employment. This can be used pre- or post-completion of studies. Since 2008, students with STEM degrees may apply for an additional 24-month of post-graduate OPT. Data on OPT authorisations show that virtually all OPTs are obtained for post-graduate work. Indian students are overrepresented among students who receive both a general OPT and a STEM extension.

Indian nationals also have long accounted for the bulk of direct transitions from a study permit (F1) to a temporary high-skilled permit (H1B). In 2019, they accounted for 60% of such transitions, up from around 40% in 2010. By contrast, at their peak over the past decade in 2015, Chinese nationals made up 31% of direct transitions, while in 2019 their share reached only 23%. This is true despite the fact that there have been approximately two to three times as many Chinese students in the United States as Indians over this decade. These data thus indicate that, as in other countries, Indian students are more likely to remain in the United States, at least compared to Chinese students.

Source: United States Immigration and Customs Enforcement (2022^[27]), *Homeland Security Investigations: Student and Exchange Visitor Program*, data shared with the OECD June 2022.

International students as future labour migrants

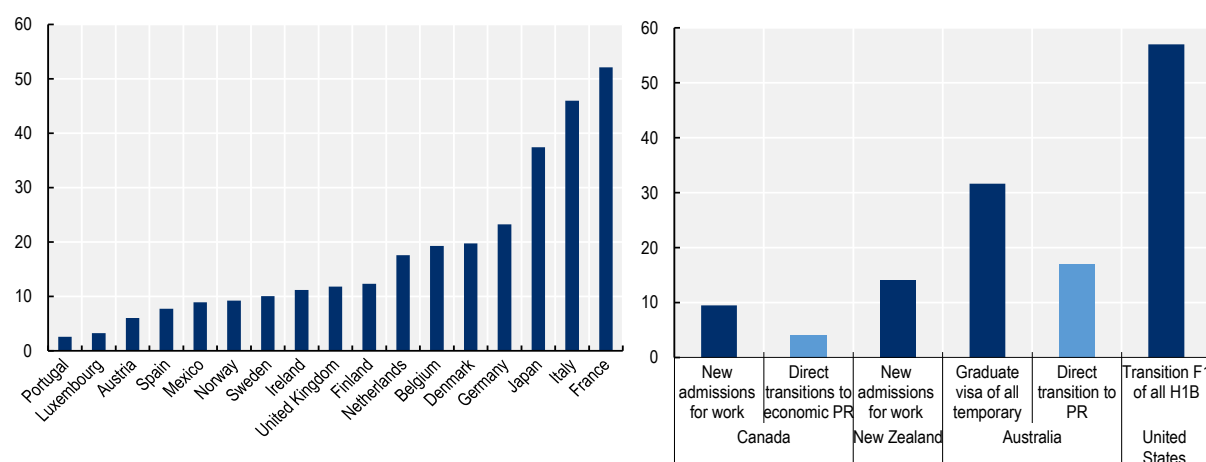
It is not possible to quantify the importance of international students as a feeder to labour migration through stay rates alone, due to variations in overall numbers and composition of the international student cohort in different OECD countries, as well as the scale of overall labour migration and national populations.

To assess the impact of international students as a feeder to labour migration, one needs to relate the transition from an educational to a work permit to the overall numbers admitted for work. Doing so shows considerable differences across countries (Figure 7.6). In France, Italy and Japan, the share of educational permits changed to a work permit account for 30% or more of the total admissions for work in 2019, while this figure is below 10% in countries like Austria, Norway, Portugal and Spain.

In the settlement countries, international students can transition directly to permanent residence, but most of those who remain stay initially on temporary permits. In 2019, 14% of permits for work in New Zealand were obtained by individuals initially admitted for study. This share was 9% in Canada. The large majority of these temporary work permits to international students were for post-graduation work (81% in New Zealand and 73% in Canada). In Australia, 17% of permanent residency visas were granted to former international students in Australia in 2019-20. In the United States, former study (F1) permit holders accounted for 57% of high-skilled temporary (H1B) permit recipients in 2019.

Figure 7.6. International students are a feeder to labour migration, to varying degrees

Education permits changed to a work permit in 2019, relative to admission for work 2019 (left); Permits issued relative to specified migration class, 2019 (right), in %



Note: Data for European OECD countries and Japan (left graph) refer to education permits changed to permits for work. Australia (light blue): permanent residency (PR) visas granted to former international students in Australia relative to all permanent residency visas granted for work in 2019-20. Australia (dark blue): Temporary Graduate visas (subclass 485) granted relative to all temporary permits. New Zealand (dark blue): New admissions for work of persons who were first admitted on a study/education permit, relative to all new admissions for work. Canada (dark blue): Initial work permit holders who were first admitted as study permit holders, relative to all Initial work permit holders with permit that became effective in 2019. Canada (light blue): direct transitions of former students to economic category of permanent residency (PR). United States: Former F1-study permit holders relative to share of H1B recipients, 2019.

Source: European OECD countries: OECD Migration database and Eurostat, permit statistics national data for Japan. New Zealand: Ministry of Business, Innovation & Employment, 2022. Canada: IRCC, CDO, 2022 Data. Australia: Australian Government Migration Statistics, 2022.

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Economic impact

The presence of international students affects host countries' economies in a variety of ways. This section assesses three different dimensions of the economic impact, that is, the macroeconomic impact as measured in the national accounts, the impact on Official Development Assistance (ODA) and on the labour market. The section ends with a short discussion on the long-term outcomes of previous international students in the host-country labour market, based on novel data for the OECD EU countries.

Previous evidence on the economic impact of international students comes primarily from country-specific studies. Given the growing importance of international study, in-depth research is surprisingly scarce and often dated (see the overview in Annex Table 7.A.1). For example, evidence from France and Germany, the two main destination countries for international students in continental Europe, is limited to only one dated study per country (Campus France, 2014^[28]; Prognos, 2013^[29]).

The OECD countries with the most frequent assessment of the economic impact of international students are the English-speaking OECD countries: Australia, Canada, New Zealand, the United Kingdom, and the United States. Several studies have also been carried out for Belgium (particularly for the Flanders region), Estonia, Ireland, the Netherlands, Spain and Sweden. Half of the OECD countries have no available studies on the economic impact of international students.

Estimates of the macroeconomic impact

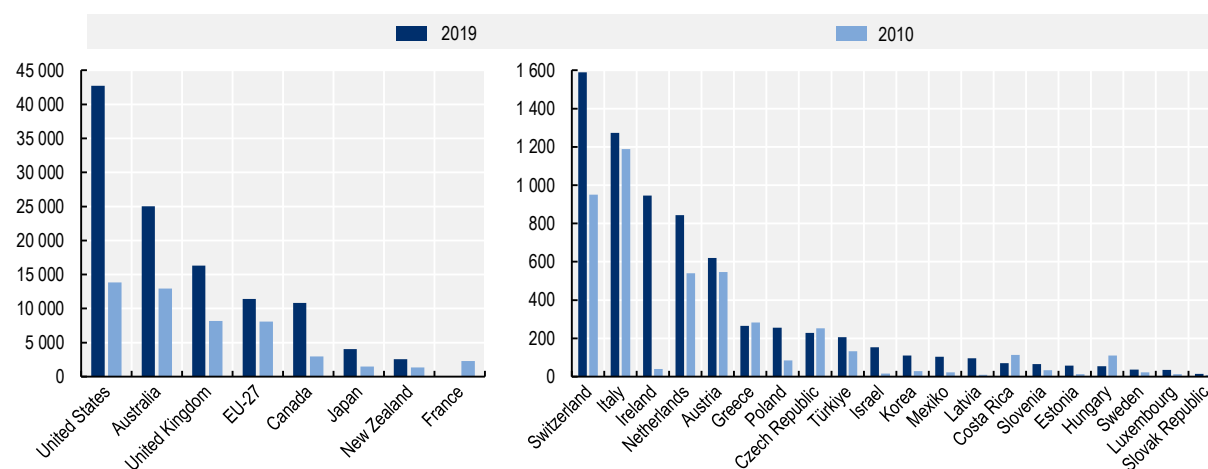
The estimate of the macroeconomic impact is based on an export data analysis, which has two advantages. First, despite not being able to quantify the indirect and induced economic contributions, it provides an accurate measure of the direct economic contribution (tuition fee + non-tuition fee spending) during studies. Second, it allows to have comparable statistics for most OECD countries over the last decade, while most of the previous evidence is country-and-year specific and hardly comparable.

An internationally comparable estimate of the macroeconomic impact of international students is available from the national accounts. The data on the exports of education-related services cover expenditure by international students on tuition fees, food, accommodation, local transport, and health services. These data are collected by the OECD as part of the national accounts statistics on international trade.

Figure 7.7 shows general growth of exports of education-related services across most OECD countries, with total revenues in the OECD area increasing from EUR 50 billion in 2010 to over EUR 115 billion in 2019.

Figure 7.7. From 2010 on to 2019, revenues from international students increased almost everywhere

Education-related services exports (gross) in millions of EUR, 2010 and 2019, current values



Note: For Austria, data for 2010 refer to 2012. For France, data for 2010 refer to 2011. For Ireland, data for 2010 refer to 2012. For Japan, data for 2010 refer to 2014. For the Netherlands, data for 2010 refer to 2014. For the Slovak Republic, data for 2010 refer to 2013. For Türkiye, data for 2019 refer to 2018.

Source: Data from OECD EBOPS 2010 – Trade in Services by Partner Economy database. Data for Switzerland are from the Swiss National Statistical Office (BFS). Data for the United Kingdom are from The Pink Book time series by the Office of National Statistics.

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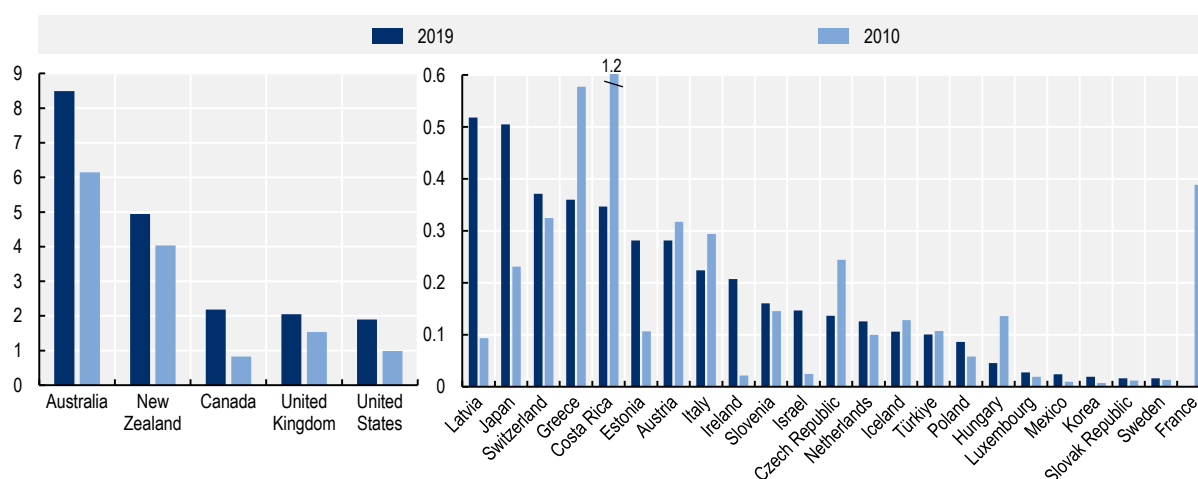
English-speaking OECD countries, including the United States, Australia, the United Kingdom, Canada and New Zealand, rank as the top five countries by gross revenues, accounting for more than 80% of the total revenues from the exports of education-related services in the OECD area in 2019. The figures for the United States and Canada have more than tripled over the past decade, while Australia, New Zealand, and the United Kingdom saw a twofold increase. The growth in exports of education-related services has been particularly strong in Japan, whose revenues from international students almost tripled from 2014 to 2019, as well as in Ireland (20-fold increase), Israel and Latvia (both tenfold). Virtually all Central and Eastern European OECD countries experienced significant increases in their education-related services exports, often doubling or tripling over the past decade. The EU-27 average growth rate has been

significantly lower (+42%), as large recipient countries such as Austria and Italy experienced more modest growth rates.

The gross values of exports of education-related services can be compared with total exports (Figure 7.8). Again, the English-speaking OECD countries show the highest shares, and all recorded increases over the past decade. In Australia, the share increased from 6% to 8.5%, and, in New Zealand, from 4% to 5%. Canada, the United Kingdom and the United States have seen their shares of education-related services increase to 2% of their total exports. In the remainder of OECD countries, exports of education-related services remain well below 1% of total exports. Among these, Estonia, Ireland, Israel, Japan and Latvia have seen strong increases. In contrast, Costa Rica, the Czech Republic, Greece, Hungary and Italy have seen sizeable decreases as a share of total exports from 2010 to 2019.

Figure 7.8. English-speaking countries have the highest exports of education-related services

Education-related services exports (gross) as percentage of total exports, 2010 and 2019



Note: For Austria, data for 2010 refer to 2012. For France, data for 2010 refer to 2011. For Iceland, data for 2010 refer to 2013 and data for 2019 refer to 2018. For Ireland, data for 2010 refer to 2012. For Japan, data for 2010 refer to 2014. For the Netherlands, data for 2010 refer to 2014. For the Slovak Republic, data for 2010 refer to 2013. For Türkiye, data for 2019 refer to 2018. Calculations based on current prices and current exchange rates.

Source: Data from OECD EBOPS 2010 – Trade in Services by Partner Economy database. Data for Switzerland are from the Swiss National Statistical Office (BFS). Data for the United Kingdom are from The Pink Book time series by the Office of National Statistics.

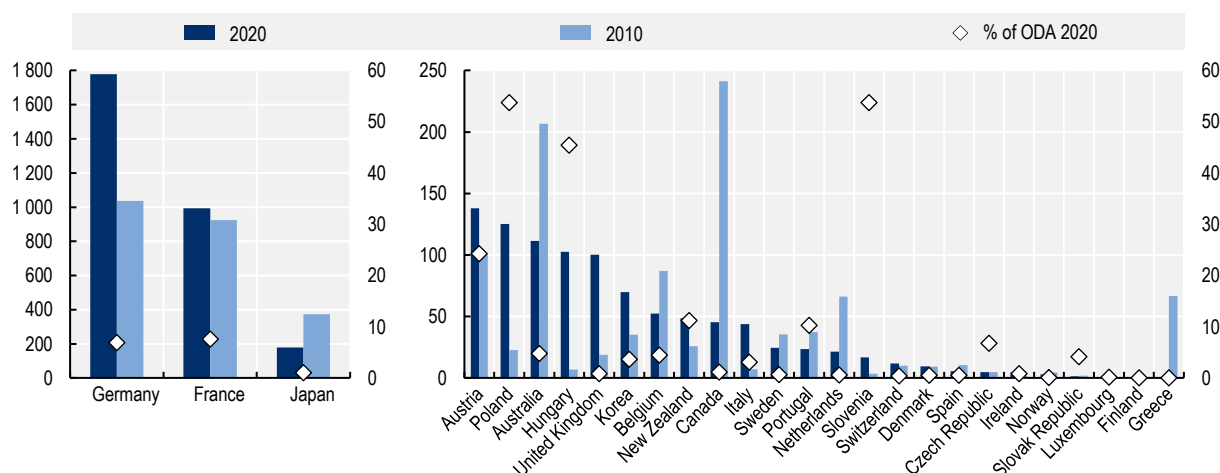
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Official Development Assistance

The implicit counterpart to revenue from high tuition fees are scholarships and subsidised study for international students. For students from developing countries, the two items are considered Official Development Assistance (ODA). The rationale behind counting these towards a country's ODA has been that international students will return home with additional human capital, which contributes to development. This accounting has been questioned in recent years, given the enhanced efforts of most OECD countries to retain international graduates in the host country.

Figure 7.9. ODA to international students is highest in countries with low or no study fees

ODA to scholarships and student costs in donor countries, USD millions in constant prices (left) 2010, and 2020 and relative to total ODA in 2020 (right)



Note: Data include both scholarships and in-country student costs. For Austria, data for 2010 refer to 2014. For Canada, data for 2020 refer to 2019. For Norway and the United Kingdom, data for 2010 refer to 2013. For Switzerland, data for 2010 refer to 2011.
Source: OECD ODA Database, 2022.

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Not surprisingly, this part of ODA is highest in countries with many international students and low tuition fees (Figure 7.9). As a result, in 2020 as in 2010, Germany was the country with the highest amount of ODA allocated to in-country international students, with almost USD 1.8 billion in 2020. France reported the second highest figure, with USD 1 billion. However, the growth over the past decade was much less marked in that country, as education fees for international students experienced a substantial increase in 2019. All other countries have values below USD 400 million in both years.

ODA to international students is also a substantial share of total ODA in some countries. In 2020, scholarships and student costs accounted for 24% of total ODA in Austria, 45% in Hungary, and over half of all ODA in Poland and Slovenia. By contrast, the share of ODA provided via scholarships and student costs in the donor country was rather low in Germany (7%), France (8%) and Japan (1%), despite the overall large amounts. Most of the English-speaking OECD countries that ranked in the top for revenues from international students (see above) did not provide a substantial share of their total ODA to international students. Only New Zealand devolved slightly more than 11% of its total ODA to international students. Most other countries also provided only small shares of their total ODA to in-country international students.

As mentioned, ODA to international students consists of two components: scholarships and student costs in donor countries. In countries with high tuition fees, scholarships account for the bulk of ODA to international students. This is the case for most OECD countries. Only in a few countries do the estimated student costs account for the bulk of ODA to international students. This is notably the case in Germany (95%), Austria (95%), Belgium (93%), Poland (93%) and Slovenia (96%). In France, about 18% of the ODA to international students goes to scholarships and about 82% to student costs. Considering only scholarships, France donated the largest total amount to international students in 2020 (USD 186 million), followed by Japan (USD 178 million) and Australia (USD 111 million).

Labour market impact at national and local level

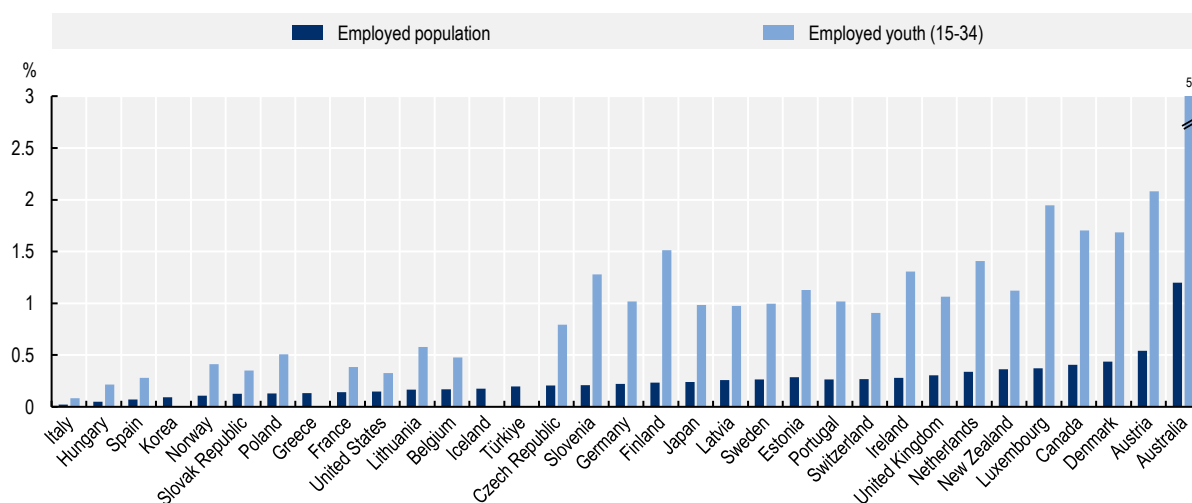
In most OECD countries, upon their arrival, international students have the right to work alongside their studies, at least part-time. The contribution of students to the host country's employed population is bound by the country-specific rules on student work, but also depends on students' decision to take up employment.

In the 2019 International Migration Outlook, the OECD estimated for the first time the potential contribution of international students to the labour market (OECD, 2019^[30]). This methodology has also been used for this section. The contribution is estimated in full-year and full-time equivalent (FY/FTE) terms. An upper-bound estimate is that all international students work the maximal hours allowed by the rules of their permit. In full-year full-time equivalent terms, in the academic year 2020, international students added up to 1.2% to the working age population in Australia and 0.5% in Austria. In other countries, their maximal potential contribution is below 0.5%. This estimation represents the upper bound of the contribution of international students to the employed population.

Relative to the employed youth, this number is significantly higher in all countries and reaches a full 5% in Australia (Figure 7.10).

Figure 7.10. International students add up to 1% and more to the employed youth population in many countries

Estimation of the contribution of international students to employed population and employed youth, 2020



Notes: The estimated contribution of international students to the employed population assumes that the average international student works 34% of the maximal hours of work allowed per year by the permit rules. Available shares of international students working are used for Australia, Austria, Belgium, Denmark, France, Germany, Hungary, Ireland, Italy, Japan, Luxembourg, the Netherlands, Portugal, Spain, Sweden, United Kingdom and United States.

Source: OECD Migration Database.

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Within this bound, the actual choice of international students to take up employment alongside their studies varies across countries. A proxy for European OECD countries can be obtained from labour force data on the employment of foreign-born students in tertiary education who arrived less than five years ago. These data show that about a third of all students in the EU are employed, with similar levels among foreign-born (34%) and native-born (35%), but higher shares among EU-born (42%) than non-EU-born (31%). Using

the same approximation, about a third of international students in the United States are working (35%). In France and the United Kingdom, about one in four work. In Australia, according to the 2016 Census, about half of international students were in employment, mostly working part-time. The highest shares are observed in Switzerland and Denmark, where around 60% of international students are in employment, as well as in Japan, where this figure reaches 90%.

The labour market impact is not equally distributed across the country. It is strongly concentrated locally in the municipalities with tertiary education institutions, and within these, in the proximity of the areas where international students reside. Data from the 2019 European Labour Force Survey show that foreign-born students aged 15-34 in tertiary education who arrived less than five years ago are strongly overrepresented in urban areas. Eighty percent live in cities, compared with 53% of their native-born peers. Likewise, labour force data from the United States from 2019 show that among foreign-born students aged 15-34 in tertiary education who arrived less than five years ago, 53% lived in a principal city against 32% of their native-born peers.

International students are also concentrated in certain sectors, especially hospitality as this is a sector where labour needs are often outside of the regular university schedule and where entry barriers are low. According to the European labour force survey in 2019, a quarter of working non-EU students was employed in the accommodation and food service sector, compared with one in five EU-born students and one in ten native-born students. While native-born students are thus twice as likely to work in this sector than the overall population (10% vs 5%), non-EU-born international students are five times as likely (25% versus 5%). Compared to the overall population, international students are also strongly over-represented in the education sector, at 16% versus 11% for native-born students and 8% for the total population.

Long-term outcomes of international students who remain in the host country

Some tentative evidence on the long-term outcomes of international students is available from the 2021 European Labour Force Survey, which includes information on the (self-declared) reason for migration of immigrants for most major international student destinations in Europe. This information is synthesised in (Table 7.2).

In most countries for which data are available, five years after arrival, immigrants who arrived for education reasons (i.e. predominantly international students) have higher employment rates than the overall foreign- and native-born populations, but slightly below those who arrived as labour migrants. Overall in European OECD countries for which these data are available, three out of four of those who arrived for education purposes are in employment.

These data also show that international students, when in employment, tend to be able to put their formal qualifications in good use. The incidence of overqualification, which is the share of tertiary-educated who are working in jobs requiring only lower levels of education, is much lower for this group than for labour migrants or for migrants overall, in all countries with available data. Indeed, overall their overqualification rates are roughly the same as for their native-born peers and half of those of labour migrants or other migrant groups.

Likewise, a recent report by Statistics Canada has shown that shortly after admission as permanent labour migrants, those with previous Canadian study earned considerably more than those who did not study in Canada (Crossman, Lu and Hou, 2022^[8]). This advantage was entirely due to their better language skills and higher likelihood to have worked in Canada. When compared only with immigrants who had similar language knowledge and Canadian work experience, those with Canadian study initially earned less, mostly because of their higher tendency to pursue further schooling in the early years after immigration. The benefit of Canadian study grew over time and around 10 years after immigration, permanent labour migrants with at least one year of Canadian study had significantly higher earnings than their peers with foreign degrees, even after controlling for other factors.

Table 7.2. Outcomes of previous international students who remain in the host country compared with other migrant groups

Selected European OECD countries, 2021

	Arrived for education	Arrived for work	All Foreign-born	Native-born
Employment rate				
All (EU in OECD)	74.9%	75.6%	65.7%	68.3%
Germany	77.5%	81.1%	70.9%	77.8%
France	75.4%	73.4%	62.5%	67.2%
Italy	68.2%	74.9%	61.0%	58.1%
Spain	67.5%	72.1%	61.8%	63.1%
Sweden	72.4%	84.1%	66.1%	77.9%
Overqualification rate				
All (EU in OECD)	19.3%	37.5%	33.1%	20.8%
Germany	15.1%	30.8%	30.5%	17.7%
France	18.6%	26.0%	28.1%	19.6%
Italy	23.1%	65.9%	49.3%	18.5%
Spain	32.0%	56.4%	51.9%	34.7%

Note: Employment rate for the foreign-born refers to individuals with at least 5 years of residence in the country. Overqualification is defined as persons in employment working in a job at ISCO Level 4-9 who have completed a tertiary degree (ISCED 5-8) and are not in education.

Source: OECD Secretariat calculations on the basis of data from the European Labour Force Survey (EU-LFS).

In Europe, the long-term impact of participation in the Erasmus programme (see Chapter 5) on later employment outcomes has also been relatively well studied. A recent overview of the literature found that participants tended to enjoy higher wages, were more likely to hold a managerial position, and undergo an international career (Crăciun, Orosz and Proteasa, 2020^[31]). Likewise, for international students from Spain, participation in the Erasmus programme was found to have a positive effect on the probability of becoming an entrepreneur (Conti, Heckman and Pinto, 2016^[32]).

Conclusion

International students are an increasingly important part of international migration flows. In the decade preceding the COVID-19 pandemic, the intake of international students rose significantly in most countries. International students have emerged as a key feeder for labour migration, with large and growing shares staying on for employment in their host countries after graduation.

Compared with other migrant groups, international students have a number of advantages in accessing to labour migration channels in host countries. They are “pre-integrated” in the host-country society and have often tied contacts with host-country labour markets due to part-time employment or internships. In addition, they have domestic credentials that are familiar to employers, facilitating labour market entry. Concerns about “Brain Drain”, whether or not justified, are also less pressing than for other groups of educated workers recruited from less developed countries, as international students have acquired at least part of their human capital in host countries.

The above analysis has also provided a number of insights into the importance of specific policy levers. For example, countries approach tuition fees for international students in various ways. In countries with high fees, international student expenditure often accounts for a large share of services exports and for financing the tertiary education system. Countries with minimal or no fees, while not benefitting from the presence of international students in terms of the public purse, are able to declare the associated costs as official development assistance. The rationale behind counting costs for hosting international students

towards ODA has been that international students will return home with their newly formed human capital, which is means of development assistance. The increasing numbers of students remaining, and the efforts of countries to retain international graduates, might however come into conflict with this objective.

Overall, there seem to be clear benefits associated with international student migration, notably in terms of labour market integration. At the same time, their rising importance as a feeder for labour migration, both in absolute terms and relative to other channels, also raises questions whether international students are meeting the exact skills needs for which labour migration pathways are designed. While labour migration through this channel is greatly facilitated, actual work skills have not been “tested” in any meaningful way. International student migration is also not a solution to the shortages in mid- and lower-skilled segments of the labour markets that many OECD countries are facing. Likewise, the high concentration of international students in capital cities in many countries suggests that international student migration could often exacerbate regional disparities.

A balance should be maintained in the migration system to avoid that countries become overly dependent on this particular channel, and are aware of its specificities. That notwithstanding, attracting international students has broad economic payoff, including through better post-study outcomes of international students compared with other migrant groups. The available evidence shows that countries are becoming better at retaining students who have studied in their countries.

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Annex 7.A. Supplementary table

Annex Table 7.A.1. Recent studies on the economic impact of international students in OECD countries

	Approach and data	Estimated economic impact	Years analysed	Author
AUS	To model the economic contribution from student expenditure on fees and living expenses, different lines of revenues were considered.	International education was estimated to contribute AUD 17.1 billion to Australia's GDP in 2014/15. The export revenues were estimated to support over 130 700 Full Time Equivalent (FTE) employees in 2014/15., accounting for 1.3% of Australia's total employment.	2014/15	(Deloitte Access Economics, 2015 ^[33])
AUT	Based on an analysis of the literature, an input-output model was developed to quantify the economic contribution of international students.	The value added calculated for international students amounted to around EUR 8 000 per head. Every 10 international students, 15 jobs were estimated to be added to the economy (8 800 in aggregate). The aggregate value added contributed by each graduate amounted to around EUR 74 000.	2011	(Prognos, 2013 ^[29])
BEL (Flanders)	The methodology used a cost-benefit analysis, by which the direct and indirect benefits and costs of international students are calculated. The long-term impact of international students is examined by estimating the stay rate after graduation and the subsequent contribution to the national economy. Data on students from the Flemish Ministry of Education and stay rates data are from the Flemish Government Social Security Data.	Regarding direct contribution: the private social contribution made by students (e.g. due to student jobs) is close to EUR 48 million, tuition fee income is close to EUR 57 million, while the non-tuition fee income from spending amounts to nearly EUR 630 million. Furthermore, long-term benefits outweigh the costs, with a long-term net benefit estimated between EUR 4.2 and 5.6 billion.	2015/16	(De Witte and Soncin, 2021 ^[34])
CAN	An input-output model was built upon extensive secondary research involving reviewing literature, collecting existing statistical data and information, as well as consultations with representatives from the provincial and territorial education sectors, and representatives from organisations promoting and researching trends in international education in Canada and/or its provinces.	In 2018, the combined direct and indirect GDP contribution of all student expenditures amounted to CAD 19.7 billion, considering not only the sectors directly impacted by international student spending, but also the many other industries in the supply chain of those directly impacted. In terms of employment, 218 577 jobs were associated with international students.	2020	(Global Affairs Canada, 2020 ^[35])

	Approach and data	Estimated economic impact	Years analysed	Author
CHE	Based on an analysis of the literature and a survey, an input-output model was developed to quantify the economic contribution of international students.	The gross value added per student amounted to EUR 17 500. For every 10 international students, 18 jobs are estimated to be added to the economy (4 100 in aggregate). The aggregate gross value-added effect per head was estimated around EUR 24 400.	2011	(Prognos, 2013 ^[29])
DEU	Based on an analysis of the literature and national data, an input-output model was developed to quantify the economic contribution of international students.	International students generated EUR 400 million in tax revenues and created 22 000 jobs. Public expenditure is estimated to amortise if 30% of international graduates stay and work in Germany for at least five years.	2011	(Prognos, 2013 ^[29])
DNK	A cost-benefit analysis was carried out by the Danish Ministry of Education from national registry data. The average net contribution per international student are calculated on the basis of students from the period 2004-15 with a focus on the year groups that started in the period 2004-07. This follows the behaviour of the international students for up to 11 years after the start of their studies.	Approximately one in four international students in the business academy and professional bachelor programs, respectively, was estimated to make a positive net contribution to public finances. In the master's programs, a little more than one in three was estimated to make a positive net contribution. Overall, including also those who left Denmark immediately after graduating, each student contributed on average between DKK 2000-7 500 per year from the start of studies.	2004 to 2016	(Danish Ministry of Higher Education and Science, 2018 ^[10])
ESP	The estimation technique was based on an input-output model. Data are from various public and private educational institutions in Spain.	International students made an overall economic contribution to the Spanish economy amounting to EUR 3.7 billion (with a multiplier effect of 2.27).	2018/19	(Grasset and Menéndez, 2020 ^[36])
EST	Calculations were made from population census data collected by Statistics Estonia.	International students paid EUR 3.6 million in income tax and EUR 7.8 million in social contributions. The total tax receipts from international students who graduated in academic year 2019/20 and continued working in Estonia was estimated EUR 4.5 million.	2019/20	(Statistics Estonia, 2022 ^[37])
FRA	Exports approach built on survey data. 4 200 questionnaires were answered by a representative sample of the international students who had studied in France for at least 3 months in the previous 3 years, or who had started their study programs more than 3 months before the survey.	International students contributed EUR 4 billion to the French economy and 11 000 jobs to the tourism industry.	2013	(Campus France, 2014 ^[28])
GBR	The approach adopted was an input-output model. The analysis focused on the aggregate economic benefits and costs to the UK economy associated with the 272 920 international students commencing their studies in 2018/19, taking account of the impact associated with these students over the entire duration of their study in the United Kingdom (adjusted for completion rates).	The 2018/19 cohort of international students delivered a net economic benefit of GBP 25.9 billion to the United Kingdom. This is a 19% increase in real terms from the net benefit found for the 2015/16 cohort of international students reported in previous studies.	2018/19	(London Economics, 2021 ^[38])

	Approach and data	Estimated economic impact	Years analysed	Author
HUN	Mixed methodology, using expert interviews and focus group studies as well as a survey and administrative data.	Overall, the direct economic contribution by the students and their guests was around HUF 181 billion (about EUR 543 million) through fees, living expenses, and tourism. Through their spending, students have an average employment effect of 8.37 workers added per 100 students. Considering the indirect effects and the intersectoral relations, the employment effect is close to 20 000 added jobs. Besides, students' spending also generated public revenues of around HUF 11 billion (EUR 33 million).	2019/20	(Tempus Public Foundation, 2020 ^[39])
IRL	Contribution of tuition fees to the economy was estimated with export data from the Irish University Authority, while non-tuition fee expenses come from the Higher Education Authority's student survey.	Net contribution of international students from tuition fees was around EUR 216 million. The estimated total non-tuition expenditure by international students was of EUR 119.5 million. The total annual export income generated for the Irish economy by international students was around EUR 336 million.	2017/18	(Indecon International Economic Consultants, 2019 ^[40])
LVA	The approach used was an input-output model built on a survey of students in Latvia in the 2015/16 academic year. For the analysis of the indirect effects, OECD multipliers have been used.	International students directly contributed around EUR 73 million to the Latvian economy. The indirect contribution was estimated around EUR 75 million. The total impact of international students on the Latvian economy was estimated to be around EUR 148 million (0.61% of GDP). Also, they contributed about EUR 20 million a year to the Latvian budget in taxes and created about 1 474 jobs (2.7 for every 10 students).	2015/16	(Domnica Certus, 2016 ^[41])
NLD	Microdata from the Dutch Central Bureau of Statistics were used to calculate the chances of staying and subsequent labour market outcomes. For the calculation of costs and benefits, a distinction was made according to type of education and origin (EEA or non-EEA).	The balance of income and costs during and after the study is positive for both EEA and non-EEA students, but the positive balance is much larger for students from non-EEA countries. The labour market participation rate of foreign vocational school and university graduates who continue to live in the Netherlands after studies is lower than the labour participation rate of Dutch-born graduates.	2006 to 2017	(Centraal Plaanbureau, 2019 ^[42])
NZL	The economic contribution associated with international students' spending was estimated using a multi-regional input-output model. The assessment was delivered using a staged approach with a survey to collect information.	International education was estimated to deliver an economic contribution of NZD 5.1 billion to the New Zealand economy (4.8 on-shore and 0.3 off-shore) and supported an estimated 47 490 jobs. Visiting guests added a further NZD 460 million to the economy.	2017	(Market Economics Limited, 2018 ^[43])

	Approach and data	Estimated economic impact	Years analysed	Author
POL	Based on an analysis of the literature, an input-output model was developed to quantify the economic contribution of international students.	The gross value added per student amounted to EUR 3 900. Every 10 international students add 23 jobs to the economy (5 700 in aggregate). The aggregate gross value-added effect per head was EUR 22 100. The long-term tax revenues from indirect taxes on consumer goods and services as well as direct taxes on the earnings arising from job creation were around EUR 1 200.	2011	(Prognos, 2013 ^[29])
SWE	For the calculations, an input-output model built on Swedish Higher Education Authority's data was employed.	International students' expenditure amounted to an estimated SEK 2.4 billion in the year under study, supporting around 2 900 jobs. The economic activity and employment sustained by international students' subsistence spending generated SEK 660 million in tax revenues for the Swedish national and municipal government.	2017/18	(Oxford Economics, 2020 ^[44])
USA	The approach adopted was exports-based. Tuition and living expense data come from the U.S. Department of Education's National Center of Educational Statistics Integrated Postsecondary Education Data System (IPEDS). Datasets used to calculate the number of jobs created or supported came from the U.S. Department of Commerce, specifically International Trade Administration and Bureau of Economic Analysis.	International students contributed USD 28.4 billion to the economy and supported 306 308 jobs. For every three international students, one US job is created and supported by spending occurring in the higher education, accommodation, dining, retail, and transportation sectors.	2020/21	(Nafsa, 2021 ^[45])

Notes

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² For the calculation of retention data, international students are defined as foreign individuals who obtained a permit for study purposes. The use of permit statistics generally does not allow to include data on individuals benefiting from free mobility schemes, such as intra-European mobility.

³ Data from the Australian Government Department of Education, Skills and Employment show that international students in Australia are more likely to graduate than domestic students, and to have shorter durations of study. Overall, 70% of international students at bachelor level who started in 2016 had graduated four years later. This compares to just 43% of domestic students. Nine years after starting their bachelor's degree studies in 2011, 73% of domestic students had graduated, compared with 80% for international students.

⁴ These findings for Canada are in line with earlier results that show that about three in ten international students who arrived in Canada between 2005 and 2009 became permanent residents within ten years of arrival (Choi, Crossman and Hou, 2021^[46]).