

# GLOBALISATION IN FINLAND:

GRANULAR INSIGHTS INTO  
THE IMPACT ON BUSINESSES  
AND EMPLOYMENT



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ISBN 978-952-244-663-3 (pdf)

## FOREWORD

**I**ncreased inter-connectedness in the global economy has generated significant new opportunities and channels for trade and, in turn, tremendous prosperity to many societies. Small and open economies that have always considered trade a necessity rather than an option are among the greatest beneficiaries, as international fragmentation of production provides opportunities to capitalize on comparative advantages in specialized parts of global value chains.

As trade is such a valuable element of our everyday lives, it is striking that we still have considerable gaps in our knowledge and understanding of its effects and exact nature. In fact, today's mixture of global value chains, multinational enterprises and technology has been challenging our conventional ways of understanding and measuring trade for some time. Long gone are the days when nations traded silk and spice for silver coins. Yet, our analytical tools are not adequately set up to measure these realities.

Even though traditional trade statistics such as trade in goods and services statistics continue to form the bread and butter of trade analysis, we clearly need more. The appetite for information on the effects and impacts of international trade has always been strong, but with the advent of global value chains and an increasing backlash to globalisation, with a creeping tendency towards protectionism in many countries, the hunger for more information has only grown stronger.

Of growing interest, and concern, is a better understanding of the distributional effects of trade. Trade and economic policy makers often struggle at answering questions posed by the general public: how exactly does all this affect jobs of ordinary working people, or even highly skilled professionals for that matter? What implications does trade have in terms of gender? What benefits do multinational enterprises bring to the wider economy?

This report created jointly between the OECD and Statistics Finland, sets out to address these and many related questions. This pioneering work, providing a more granular view of global value chains through the prism of more detailed trade in value added (TiVA) data, will hopefully serve and inspire both officials and decision-makers as well as businesses, academics and other stakeholders, or namely anyone with even a mild curiosity towards international trade.

We genuinely believe that this report fits well in the wider tradition of trade and economic research, in which protectionism never was a serious or constructive policy alternative for rule-based free trade.

When this project started, it was clear that in addition to producing statistics and creating new analytical dimensions, the project would also deliver an infrastructure and legacy that would allow for regular updates to this work, and, in particular, for more timely and more granular TiVA estimates to be produced. This goal has been met. From now on, it is essential to guarantee that this opportunity will not be wasted. Building up a permanent access to constantly updated estimates is essential, as Finland is profoundly connected to global value chains, indeed, as this report shows, even more profoundly than we had previously thought.

As the coronavirus has caused enormous turmoil in the global economy, there is considerable and new uncertainty about what the future holds, particularly for trade and global value chains. We are only beginning to see a vague shape of the potential aftermath of the pandemic.

Yet, some things are certain. In times of massive economic turbulence with preceding protectionist tendencies, precise and fact-based information has significant value and the case for better understanding trade is as strong as, or perhaps stronger than, ever. This study, which brings granular data to the fore, reinforces that case.

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## TESTIMONIAL

Developing better evidence for better policymaking and, in turn, better lives, is a key goal of the OECD Statistics and Data Directorate.

As this report demonstrates, having access to, and capitalizing on, more granular data is crucial to meeting those needs. Better understanding the distributions of people and firms is key to informing 21st century policymaking across all policy domains, and, in particular, with respect to globalisation.

The innovative collaboration adopted in producing this report is one way, among many others that are being explored by the OECD, to tell stories through granularity. These allow us to move our perspectives and statistics away from averages, providing a better view of winners and losers, which is central to informing the discussions around globalisation, in particular, in recent years.

The report provides important evidence in this area but crucially, from a statistical perspective, it also showcases the importance of granularity. I hope therefore that our collaboration with Statistics Finland provides momentum to the many on-going national and international efforts that encourage greater access and use of microdata, and indeed motivates similar national collaborations with the OECD in the coming years.

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## ACKNOWLEDGEMENTS

This report was produced by Guannan Miao and Fons Strik (OECD, Statistics and Data Directorate) and Pontus Lindroos and Henri Luomaranta (Statistics Finland) under the supervision of Nadim Ahmad (OECD) and Kristian Taskinen (Statistics Finland).

Acknowledgements are also due to Youngho Jung and Rodolfo Ostolaza (OECD) and Reetta Moilanen, Saara Roine and Merja Myllymäki (Statistics Finland) for their feedback throughout the production of the report. Special thanks are also due to Markku Rätty, Terhi Tulonen, Sini Liukkonen, Tommi Kaatrasalo and Vilppu Salovaara (Statistics Finland), along with many other colleagues at Statistics Finland, who provided important support for the success of this project.

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## EXECUTIVE SUMMARY

When this report was commissioned in 2018, the outlook for international trade and global value chains (GVCs) in particular – important drivers of global economic growth over the previous two decades – was downcast<sup>1</sup>. Global trade growth was slowing and the pace of expansion in GVCs had stalled. Two related factors were driving this slowdown, at least in part.

The first factor was the growing backlash against globalisation. Although other factors, such as automation, digitalisation, and productivity growth played a role, many, particularly low- and medium-skilled workers in high-income economies, blamed globalisation for job-losses and rising inequalities.

In recent decades, trade, accelerated by the global fragmentation of production, has been a powerful driver of structural change. Reallocating resources to the sectors and areas where they can be most efficient is one of the key gains from trade, helping to create wins both for producers and consumers. However, structural change also generates economic losers, at least in the short term.

Not all of the gains from trade appear immediately and losses may be concentrated on a particular set of workers, industries and regions. In many OECD economies, low-skilled workers in import-competing industries have been especially affected, and labour-force adjustment policies have not always succeeded in finding new jobs for these workers – many remain unemployed or move into jobs with lower pay and less security.

The backlash has played a significant role in driving momentum around the second factor: protectionism, which has seen significant rise in recent years. By the end of 2018, nine percent of G20 imports were estimated to be affected by import restrictions. Geopolitical tensions, such as sanctions against Russia and Brexit, have exacerbated matters, and increased uncertainty, impacting, in turn, foreign direct investment.

Covid-19 has increased that level of uncertainty and raised new questions about the resilience of global supply chains, which have been particularly disrupted by the imposition of lockdown measures in many countries.

As a small open economy, with a relatively high degree of integration in GVCs, these factors carry special weight for Finland. Using more granular data, this report shows that Finland is more dependent on GVCs than we previously thought, with the foreign content of Finland's exports contributing over one-third of the total value of exports – **10 percentage points higher than earlier estimates**. Despite the higher level of integration, the report also illustrates that the dynamic, i.e. change in the pace of GVC expansion, has remained patchy in recent years.

Against a backdrop of relatively weak economic growth and growing signs of inequality, better understanding the nature of Finland's integration in GVCs is crucial to re-igniting it as a potential engine of inclusive growth.

This report, jointly produced by the OECD Statistics and Data Directorate and Statistics Finland, made possible with generous funding from the Finnish Ministry for Foreign Affairs, the Ministry of Economic Affairs and Employment of Finland, the Finnish Prime Minister's

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1 OECD Economic Outlook, 2018, Issue 2



Office and the Teollisuuden ja Työnantajain Keskusliiton säätiö-foundation takes a closer look at the nature of Finland's integration in GVCs over the last decade. It does so by going beyond the traditional perspective of GVC analysis, which looks at firms through the statistical prism of industries, and instead takes a deeper dive. By looking at key firm characteristics including trade participation, MNE-relations, age, size and workforce structure, the report highlights results not previously found on the aggregate level.

### Highlights:

*Manufacturing has been hit hard, but structural transformation is occurring with knowledge-based services expanding significantly*

In the aftermath of the financial crisis, Finnish relative labour costs were high and labour productivity growth sclerotic, both factors severely impacting economic growth and international competitiveness. Manufacturing industries were strongly affected, shedding 20% of jobs in the last decade and significantly more (up to 40%) in import-competitive industries with negative productivity growth.

Ten percent of manufacturing firms have dissolved during this shake-up and whilst surviving manufacturers have been able to capitalise on opportunities provided by GVCs, the net result has been a decline in the overall international competitiveness of Finnish manufacturing industries. The share of jobs sustained by manufacturing exports slowly declined to stand at 13.8% of all jobs in 2016.

However, while globalisation looks like a smoking gun for job losses in manufacturing industries and domestic upstream industries supplying manufacturing exports, it has also provided a source for significant employment growth in service industries. Building on a highly qualified workforce has seen a significant increase in jobs sustained by services exports, **meaning that the share of overall jobs in Finland supported by exports has remained relatively steady at around one in five jobs.**

Finland has developed particularly strong comparative advantages in knowledge-based activities such as the IT and information services industry, which alone accounted for over 15% of value-added exports growth between 2013 and 2018. Finnish 'born globals' are important drivers of export growth in these industries, revealing the importance of start-up and entrepreneurship policies and support for international success. Relations to multinationals are also important when expanding to foreign markets, revealing the important role of both inward and outward FDI in boosting international competitiveness.

In total as **many as 500,000 jobs depend either directly or indirectly on foreign demand.** Over half of these jobs are in services industries providing inputs to both manufacturing and services exports. Whilst manufacturing industries continue to dominate in gross exports, accounting for around 70% of gross exports, the share has fallen by around 20 percentage points since the early 2000s. In fact, measured in **value-added terms, services industries (47% in 2018) now contribute more to overall value-added exports than manufacturing industries (44% in 2018).**

### *Capitalising on skills*

The evidence for Finland points to job polarisation with higher-skilled workers thriving and lower-skilled workers struggling. The skill composition of the Finnish labour force has shifted strongly towards high and medium-skilled employees, and globalisation appears to have reinforced job-polarisation. **Export-oriented firms and MNEs hire more high-skilled workers and their exports support disproportionately more higher skilled labour in upstream firms.**

Out of the 1.4 million employees in the private sector, over a third are high-skilled, nearly a third are qualified in Science, Technology, Engineering and Maths (STEM) subjects and one in eight are qualified with deep digital competency (DDC) degrees. **It is thereby no coincidence that significant growth in production, employment and exports has occurred in information and communications service industries**, which accounted for seven percent of total value-added exports in 2018. This bodes well for future growth and the development of resilient value chains.

### *Safeguarding gender equality*

Gender equality remains an important policy goal in Finland and Finland compares very well to other OECD countries in this regard. However, gender sector segregation is significant in Finland, with women only representing 39% of employees in the private sector.

As wage growth in firms more directly integrated into GVCs outpaces wage growth in other firms, gender segregation within the private sector possibly translates into growing gender wage gaps. **With women working disproportionately in lower-wage industries**, with only indirect links to GVCs, and **in industries that have been adversely affected by foreign competition**, there is a risk that without targeted action the benefits, and risks, of globalisation will not be spread equally.

GVC integration is often the scapegoat for rising wage inequality, but the evidence suggests otherwise. Over the last decade, within-firm pay gaps have grown across nearly all firm types. However, pay gaps within firms that are more highly integrated into GVCs are smaller than in other firms, particularly between the bottom ten percent and median wage earners.

## TIIVISTELMÄ

**K**ansainvälinen kauppa sekä erityisesti globaalit arvoketjut ovat olleet tärkeitä globaalien talouskasvun ajureita viimeisten vuosikymmenten aikana. Kuitenkin tätä tutkimusta aloitettaessa vuonna 2018, molempien näkymät olivat alakuloiset, kun sekä kansainvälisen kaupan että globaalien arvoketjujen kasvu oli hidastunut<sup>1</sup>. Hidastumiselle löytyi ainakin kaksi syytä.

Ensimmäinen syy oli kasvava kritiikki globalisaatiota kohtaan. Vaikka monet muutkin tekijät kuten automatisaatio, digitalisaatio ja tuottavuuden kasvu vaikuttivat työllisyyden laskuun, monet – varsinkin matalasti- sekä keskikorkeasti koulutetut työntekijät korkean tulotason maissa – syyttivät globalisaatiota työpaikkojen katoamisesta ja eriarvoisuuden lisääntymisestä.

Viimeisten vuosikymmenten aikana kansainvälinen kaupankäynti on tuotannon pirstoutumisen kiihdyttämänä aikaansaanut suuria yhteiskunnallisia rakennemuutoksia. Resurssien kohdentaminen niille aloille ja alueille, joissa ne tuovat eniten hyötyä, on kansainvälisen kaupankäynnin kannalta tärkeä valttikortti, joka tuo hyötyä sekä kuluttajille että yrityksille. Lyhyellä aikavälillä tarkasteltuna rakennemuutokset eivät kuitenkaan aina hyödytä kaikkia yhteiskunnan jäseniä tasa-arvoisesti.

Kansainvälisen kaupan hyödyt eivät aina näy heti ja siitä johtuvat tappiot voivat kohdistua tiettyihin työntekijöihin, toimialoihin tai tietyille alueille. Monessa OECD-maassa kansainvälistyminen on vaikuttanut erityisesti matalasti koulutettuihin työntekijöihin eivätkä työmarkkinauudistukset ole pystyneet vastaamaan muutoksiin vaaditulla tavalla – monet ovat jääneet työttömiksi tai joutuneet töihin aiempaa huonommilla ehdoilla.

Globalisaatioon kohdistunut kritiikki on vauhdittanut keskustelua toisen tärkeän syyn ympärillä, nimittäin protektionismin, joka on viime vuosien aikana ollut nousussa. Vuoden 2018 lopulla, arviolta yhdeksään prosenttiin G20-maiden tuonnista kohdistui tuontirajoituksia. **Geopoliittiset jännitteet kuten esimerkiksi Venäjä-sanktiot ja brexit, ovat lisänneet kansainvälisten suhteiden epävarmuutta ja sitä kautta vaikuttaneet myös ulkomaisiin suoriin sijoituksiin.**

Covid-19 pandemia on yhä entisestään lisännyt epävarmuutta ja nostanut uusia kysymyksiä kansainvälisten tuotantoketjujen kestävydestä, kun ne ovat ainakin hetkellisesti katkenneet maiden käyttöön ottamien rajoitusten myötä.

Pienenä ja avoimena kansantaloutena, jonka integraatio globaaleihin arvoketjuihin on yhteellisen vahva, mainitut tekijät vaikuttavat vahvasti Suomeen. Tämän raportin tulokset, jotka perustuvat entistä tarkempaan dataan, osoittavat, että Suomi on jopa aiemmin arvioitua vahvemmin riippuvainen globaaleista markkinoista. Tulosten mukaan ulkomailla tuotettu arvonlisä muodostaa yli kolmasosan koko Suomen bruttomääräisestä viennistä – **yli 10 prosenttiyksikköä enemmän kuin aiemmin on arvioitu.** Samalla tulokset osoittavat Suomen integraation kasvun olleen vaihtelevaa viimeisten vuosien aikana.

Heikon talouskasvun taustoittamana sekä tasa-arvo keskustelujen pysyessä pinnalla, on tärkeää saada tarkempaa tietoa Suomen integraatiosta globaaleihin arvoketjuihin ja niiden mahdollisuuksista nostaa talous takaisin kaikkia hyödyttävälle kasvun uralle.

<sup>1</sup> OECD Economic Outlook, 2018, Issue 2

Tämä OECD:n ja Tilastokeskuksen yhteisraportti, jonka ulkoministeriö, valtionvarainministeriö, valtioneuvoston kanslia sekä Teollisuuden ja Työnantajain Keskusliiton (TT-) säätiö ovat rahoituksellaan mahdollistaneet, tutkii aiempia tutkimuksia tarkemmin Suomen integraatioita globaaleihin arvoketjuihin viimeisen vuosikymmenen aikana. Raportti porautuu perinteisen arvoketjuanalyysin kuoren alle tarkastelemalla arvoketjuintegraatiota toimialojen lisäksi yritysten ominaisuuksien mukaan. Tarkasteltavat ominaisuudet ovat muun muassa ulkomaankauppaan osallistuminen, suhteet monikansallisiin yrityksiin, ikä sekä kokoluokka. Tarkempi analyysitaso paljastaa tuloksia, joita ei ennen ole löydetty aggregoidulla analyysitasolla.

## Nostoja tutkimustuloksista

Finanssikriisin jälkeen Suomen työvoimakustannukset olivat suhteellisen korkeita ja tuotavuuden kasvu heikkoa, ja molemmat tekijät vaikuttivat huomattavasti Suomen talouskasvuun sekä kansainväliseen kilpailukykyyn. Talouden ongelmat näkyivät selvästi teollisuuden toimialoilla, joilla työpaikkojen lukumäärä väheni yhteensä 20 prosenttia viimeisen vuosikymmenen aikana. Negatiivinen kehitys oli vielä voimakkaampaa tuontituotteiden kanssa kilpailevilla aloilla, joilla työpaikat vähenivät jopa 40 prosenttia.

Yritysten määrä on teollisuuden toimialoilla vähentynyt kymmenellä prosentilla heikon tilanteen myötä, ja vaikka jotkut yritykset ovat onnistuneet tarttumaan globaalien arvoketjujen tarjoamiin mahdollisuuksiin, on tuloksena ollut teollisuustuotannon laskeva kansainvälinen kilpailukyky. Teollisuuden toimialojen viennistä riippuvien työpaikkojen osuus on ollut tasaisessa laskussa ja oli vuonna 2016 enää 13,8 prosenttia.

Teollisuuden sekä teollisuutta tukevien toimialojen ollessa hahtaalla, globalisaatio on samalla luonut huomattavia kasvumahdollisuuksia palvelutoimialoilla. Suomalaiset yritykset ovat käyttäneet hyödyksi korkeasti koulutettua työvoimaa ja kasvattaneet palveluviennistä riippuvien työpaikkojen lukumäärää jopa niin paljon, että **ulkomaankaupasta riippuvien työpaikkojen määrä on pysynyt lähes ennallaan viime vuosikymmenen aikana.**

Suomalaiset yritykset ovat luoneet uusia kilpailuetuja varsinkin tietointensiivisillä palvelualoilla kuten ohjelmistot- ja tietopalvelut. Nämä kaksi toimialaa vastasivat yhdessä yli 15 prosentin osuudesta arvonlisäviennin kasvusta vuosien 2013 ja 2018 välillä. Suomalaiset 'born global'-yritykset ovat näiden alojen tärkeitä kasvuajureita, osoittaen start-up-yrityksiä ja yrittäjyyttä tukevien toimintojen tärkeyden kansainvälisen menestyksen luomisessa. Suhteet monikansallisiin yrityksiin ovat myös tärkeitä kansainvälistymisen kannalta, korostaen ulkomaalaisten sekä ulkomaille suuntautuvien yritysinvestointien tärkeyden.

Suomessa yhteensä noin 500 000 työpaikkaa on riippuvaisia, joko suoraan tai epäsuorasti, ulkomaisesta kysynnästä. Yli puolet näistä työpaikoista on palvelutoimialoilla. Vaikka teollisuuden toimialat yhä dominoivat vientiä bruttolukuja 70 prosentin osuudellaan, niiden osuus viennistä on laskenut arviolta 20 prosenttiyksikköä 2000-luvun alkuvuosista. Lasku on ollut niin huomattavaa, että **palvelutoimialojen (47 prosenttia vuonna 2018) osuus koko Suomen arvonlisäviennistä on nyt suurempi kuin teollisuuden toimialojen (44 prosenttia vuonna 2018).**

### *Koulutus hyötykäyttöön*

Tämän tutkimuksen tulokset kertovat myös Suomen työmarkkinoiden polarisaatiosta, jossa korkeasti koulutetut työntekijät (raportissa high-skill) pärjäävät hyvin matalamman koulutuksen omaavien työntekijöiden tilanteen heikentyessä. Työvoiman rakenne on vahvasti muuttunut korkeasti- ja keskikorkeasti (raportissa medium-skill) koulutettujen yksilöiden dominoimaksi, ja globalisaatio näyttää vauhdittavan tätä polarisaatiota. **Vienti-intensiiviset ja monikansalliset yritykset palkkaavat suhteessa korkeammin koulutettuja työntekijöitä ja niiden vienti tukee myös enemmän korkean koulutuksen työpaikkoja.**

Yksityisen sektorin noin 1,4 miljoonasta työntekijästä yli kolmasosa kuuluu korkeasti koulutettuihin, melkein kolmasosalla on tieteen, teknologian, tekniikan tai matematiikan alan koulutus (STEM – Science, Technology, Engineering and Maths) ja joka kahdeksannelta löytyy digitaalisen osaamisen koulutus (DDC – deep digital competency). **Työvoiman, tuotannon ja tuottavuuden kasvu ohjelmistot- ja tietopalvelut** toimialoilla ei näin ollen ole yllätys. Nämä toimialat vastasivat vuonna 2018 noin 7 prosentista koko arvonlisäviennistä. Laskevan teollisuusviennin aikana palvelualojen kasvu luo luottamusta tulevaan talouskasvuun ja kestävien arvoketjujen luomiseen.

### *Sukupuolten tasa-arvon turvaaminen*

Sukupuolten välinen tasa-arvo on Suomelle tärkeä tavoite ja Suomi pärjääkin hyvin kansainvälisissä vertailuissa. Suomessa sukupuolten segregatio eri sektoreille on kuitenkin huomattavaa, kun naiset edustavat vain 39 prosentin osuutta yksityisen sektorin työvoimasta.

Vahvemmin globaaleihin arvoketjuihin integroituneiden yritysten palkkakasvun ollessa nopeampaa kuin muissa yrityksissä, sukupuolten segregatio eri sektoreille ja toimialoille voi johtaa kasvaviin palkkaeroihin. **Naisten työskennellessä suhteessa enemmän matalapalkkaisilla toimialoilla**, jotka ovat vain epäsuoraan integroituneet globaaleihin arvoketjuihin, ja **toimialoilla joihin kansainvälinen kilpailu on vaikuttanut negatiivisesti**, on mahdollista, että globalisaation edut sekä riskit jopa lisäävät sukupuolten epätasa-arvoa.

Globaalien arvoketjujen integraatiota syytetään usein kasvavista palkkaeroista, mutta tämän tutkimuksen tulokset indikoivat toista. Viimeisen vuosikymmenen aikana yritysten sisäiset palkkaerot ovat kasvaneet lähes kaikissa yritysryhmissä. Yritysten sisäiset palkkaerot ovat kuitenkin pienemmät yrityksissä, jotka ovat vahvemmin integroituneet globaaleihin arvoketjuihin.

## GLOSSARY

DDC	Deep digital competency
FATS	Foreign affiliates statistics
FDI	Foreign direct investment
FIGARO	Full International and Global Accounts for Research in Input-Output Analysis
FLEED	Finnish Longitudinal Employer-Employee Data
FOLK	Updated FLEED data set (FLEED from 2017 onwards renamed FOLK)
GDP	Gross domestic product
GVC	Global value chain
ICIO	OECD Inter-Country Input-Output Tables
IMTS	International Merchandise Trade Statistics
ISIC	International Standard Industrial Classification
MDL	Micro data linking
MNE	Multinational enterprise
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne, Statistical classification of economic activities in the European Community
SME	Small and medium-size enterprises
STEM	Science, technology, engineering and mathematics
TiVA	Trade in Value Added
ULC	Unit labour cost
WIOD	World Input-Output Database

# 1. INTRODUCTION

A number of statistical initiatives have been launched in recent years, such as the OECD-WTO Trade in Value-Added (TiVA) database, WIOD, and Eurostat's FIGARO<sup>1</sup>, to improve our understanding of economic interdependencies and to better inform the debate around globalisation.

However, because the development of the underlying global input-output tables used in these initiatives is a considerable statistical undertaking, bringing together views of production, consumption, and trade in a globally coherent way, necessarily, these tables only provide a macro view of international interactions and dependencies.

This, in turn, limits the strength with which they can be applied to policy making. Within every aggregated industry, there is a multitude of sub-industries, producing different products and using different technologies, and within each of those industries, there is a multitude of firms exacerbating those same differences in products and technologies. Policies based on the aggregate view therefore may not work as intended for all firms within an industry, potentially exacerbating conditions that create winners and losers – with the losers being mainly those firms and industries that only contribute marginally to the aggregate. Typically, these are smaller and younger firms, which are often the most dynamic part of the economy and a considerable source of innovation and growth. This, of course, is not a criticism of those initiatives, as they provide a critical view of the bigger picture that was missing until they were developed. It is however a cautionary note that is often forgotten in analyses, despite the best efforts of all the statisticians working to produce global input-output tables.

High levels of aggregation are not the only reason why caveats are needed in the use of global input-output tables. High levels of aggregation also often result in biases in the associated indicators they generate. One critical bias concerns indicators that measure the propensity with which firms use imports in their production.

Whilst global input-output tables can produce a relatively good estimate of the import content of the **total production** of any aggregate industry, they are typically **(downward) biased** when it comes to producing an estimate of the import content broken down by the **destination of that production**.

Granular firm type evidence reveals that firms that disproportionately serve foreign markets also disproportionately use imports, and therefore, disaggregated measures of the import content of exports will typically be higher than those based on aggregates. Similarly, the evidence also reveals that exporting firms typically have a higher level of labour productivity, and as a result, their output will generate fewer direct jobs for a given monetary unit of output. Because these same firms have a higher import content, they will also generate fewer indirect jobs than similar firms with lower import content. Combined, this means that estimates of jobs sustained by, or embodied in, exports will be, typically, **upward biased**.

Efforts are being made by the statistical community to improve this situation, with international efforts being led by the OECD Expert Group on Extended Supply-Use Tables. These tables tackle the issue of granularity head-on, through the production of tables that differentiate between groupings of firms to generate more homogeneous aggregates around notions of technologies, import use and productivity, and thus provide more robust and more granular insights on global value chains (GVCs). Actual groupings used by countries depend on national data availability and also on policy relevance. For example, many countries are focussing on groupings on 'ownership' structures of firms to provide insights on the role of foreign direct investment (FDI), whilst others are looking at breakdowns on the basis of size, to assist in policymaking related to small and medium size enterprises (SME). Others are looking at groupings based on trading status, including on whether firms are dedicated processing firms (China) or whether firms operate from Customs-Free Zones (Costa Rica).

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1 OECD TiVA database: <https://www.oecd.org/sti/ind/measuring-trade-in-value-added.htm>  
WIOD database: <http://www.wiod.org/home>  
EUROSTAT FIGARO database: <https://ec.europa.eu/eurostat/web/experimental-statistics/figaro>



Whatever the approach used, because of the additional granularity, all efforts produce more accurate measures related to trade in value-added terms<sup>2</sup>.

With generous financing made available by the Finnish Ministry for Foreign Affairs, the Ministry of Economic Affairs and Employment of Finland, the Finnish Prime Minister's Office and the Teollisuuden ja Työnantajain Keskusliiton säätiö-foundation, and building on earlier efforts financed by the Nordic Council, this report highlights the efforts of a collaboration between Statistics Finland and the OECD Statistics and Data Directorate to capitalise on rich firm-level data to build more granular insights on Finland's integration in GVCs. In doing so, it tackles granularity through a number of dimensions, by: firm size and dependencies; ownership status; trading status; firm age; firm productivity; and firm growth. Further, to provide more insights on the impacts on jobs (and in particular, types of jobs) it integrates data looking at skills, qualifications and gender.

Through the presentation of more granular insights, the report seeks to inform ongoing debates in a number of areas. For example, what are the impacts of greater GVC integration, which firms win and which firms lose (see Melitz, 2003)? Has trade liberalisation allowed firms to achieve higher productivity (see Ruane & Sutherland 2005, Bernard et al, 2007, Yashiro & Hirano 2009, Muuls & Pisu 2009 and Smeets & Warzynski 2010)? Is higher productivity of trading firms a cause or effect of trade (Eliasson et al. 2009, Van Biesebroeck 2005 and De Loecker 2007)? Has globalisation increased inequality (Helpman et al. 2012, Akerman et al 2013, Gonzalez et al 2015 and Moritz, 2017, Nogueira and Afonso, 2018) and impacted on jobs and wages (Feenstra and Hanson 1997, Biscourp and Crest-Ensaë 2007, Autor and Hanson 2013, Görg and Görlich 2012, Grossman and Rossi-Hansberg 2008, Irwin 2009)?

Sticking close to the role of statisticians, the report is deliberately cautious in its approach to answering these, and many other questions, which in any case rarely result in a single unqualified answer. The truth, as the data reveal, is much more complex, specific types of firms that may be winners in some industries may be losers in another, reflecting a myriad of exogenous factors and megatrends that are not covered in this report. Globalisation and foreign competition is certainly one factor that the report tries to cover but a full assessment of its heterogeneous impact on different industries within Finland requires a more comprehensive assessment that pulls in considerable additional information from other countries. Analyses of the impact of megatrends such as digitalisation and automation are also beyond the scope of this report.

That said, the data presented in this report provide significant scope to serve as an improved platform to investigate these phenomena with the rigour and scrutiny they deserve. Statistics Finland and the OECD Statistics and Data Directorate are already in discussions to explore whether many additional questions could be considered in follow-ups. These include looking at: agglomeration effects that may work to drive disparities within Finland; churning effects; import competition and factors driving displacement; and broader notions of welfare gains that capture the consumer dimension.

The report is structured into four chapters. This chapter (1) sets the scene by providing some underlying but very simple economic and statistical context that can help to support some of the reading in the following substantive chapters. In addition, and given the timing of its release, it also takes a look at potential impacts from the covid-19 pandemic. Chapter 2 looks at GVCs from a production perspective, chapter 3 considers employment and chapter 4 wages. Annex 1 provides a description of the data sources and assumptions used, and caveats needed, in this report.

## 1.1 A broad view of GDP growth

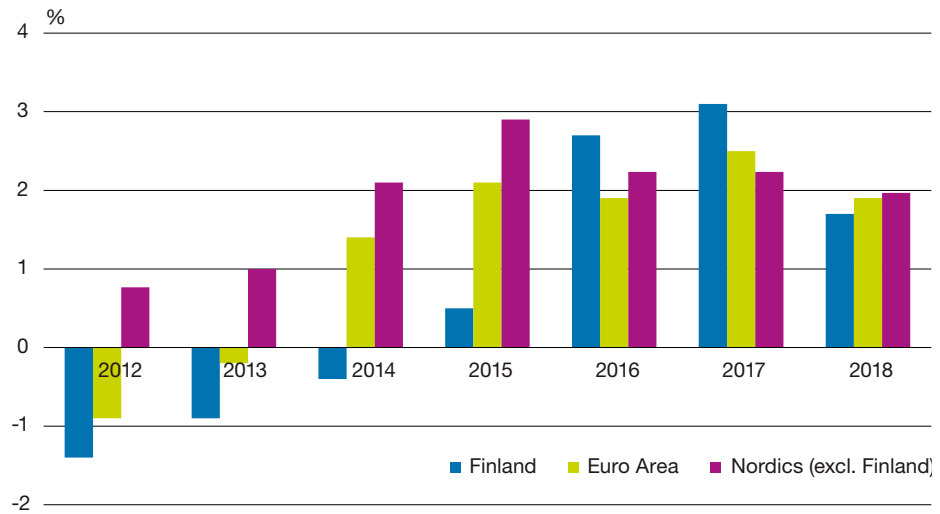
Finnish GDP growth struggled to recover in the wake of the financial and then the Euro zone crisis, with GDP contracting in 2012–2014 and significantly lagging growth in other Nordic economies and the Euro Area until 2015 (Figure 1.1). Exacerbating matters were Finland's relatively high exposure to Russia, which accounted for about 10% of Finland's gross exports, and the impact of sanctions imposed in the wake of Russia's intervention in the Crimea, and also the significant economic impact of restructurings in the domestic electronics manufacturing indus-

2 See for example, *The Challenges of Globalization in the Measurement of National Accounts*, NBER



try (see also Fornaro & Luomaranta, 2018). In the following years, however, in part reflecting churning that followed these events, the Finnish economy posted robust growth, outpacing other Nordics and Euro Zone economies in 2016 and 2017 (Table 1.1).

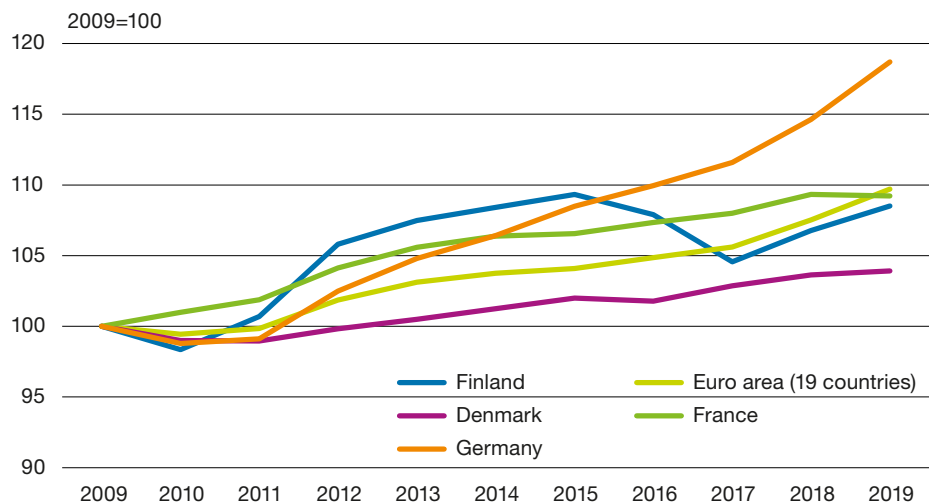
**Figure 1.1**  
Annual GDP growth, 2012–2018



Source: OECD National Accounts database

Underpinning the dynamic, at least in part, has been Finnish unit labour costs (ULCs), which outpaced most other euro area economies from 2012–2015, and so eroded Finland’s international competitiveness (Figure 1.2). The relative improvement in ULCs in 2016 and 2017 coincided with stronger GDP growth. Attempts to consolidate those gains were made through the “Competitiveness Pact” – a tripartite labour market agreement signed on June 2016, which, among other things, included a wage freeze for 2017 – aiming to improve competitiveness, increase exports and employment, and boost economic growth.<sup>3</sup>

**Figure 1.2**  
Unit labour costs in Finland and selected European countries, 2009–2019



Source: OECD Unit Labour Costs database

<sup>3</sup> For details see <https://www.sak.fi/en/working-life/agreements/competitiveness-pact>

**Table 1.1**  
Average annual nominal value-added growth rate by industry, 2013–2018

Industry	Growth	Industry	Growth
Motor vehicles	12.3%	Total	2.8%
Activities auxiliary to financial services and insurance	12.0%	Petroleum	2.7%
Mining	10.7%	Residential care and social work	2.6%
Employment activities	10.0%	Security and investigation	2.5%
Financial services	9.6%	Fabricated metals	2.3%
Publishing activities	9.1%	Rubber and plastic	2.3%
Air transport	7.3%	Advertising and marketing	2.0%
Basic metals	6.5%	Sewerage and waste	1.9%
Rental and leasing activities	6.4%	Electrical equipment	1.9%
Chemicals	6.4%	Non-metallic minerals	1.5%
Motion picture, video, television	6.2%	Furniture	1.5%
Basic pharmaceuticals	6.1%	Telecommunications	0.7%
Paper	5.7%	Land transport	0.5%
Accommodation and food	5.4%	Activities of membership organisations	0.4%
Construction	5.4%	Human health activities	0.4%
Computer and information services	5.1%	Retail trade	0.4%
Machinery and equipment	4.8%	Food	0.3%
Legal and accounting activities	4.7%	Public administration	0.2%
Forestry	4.5%	Textiles	0.1%
Insurance	4.4%	Electricity and gas	0.1%
Real estate	4.2%	Wholesale trade	0.1%
Architectural and engineering activities	4.1%	Fishing	0.1%
Other professional services	4.1%	Arts and entertainment	0.0%
Wholesale and retail (motor vehicles)	4.1%	Scientific R&D	-1.3%
Travel agency	3.9%	Water transport	-1.6%
Other personal services	3.6%	Other transport	-2.5%
Wood	3.5%	Computers and electronics	-2.5%
Repair and installation of machinery	3.4%	Postal and courier activities	-3.1%
Recreation activities	3.4%	Repairs	-3.6%
Water	3.0%	Printing and recorded media	-5.8%
Warehousing and support activities	2.9%	Agriculture	-6.1%

Source: Finnish Supply–Use Tables

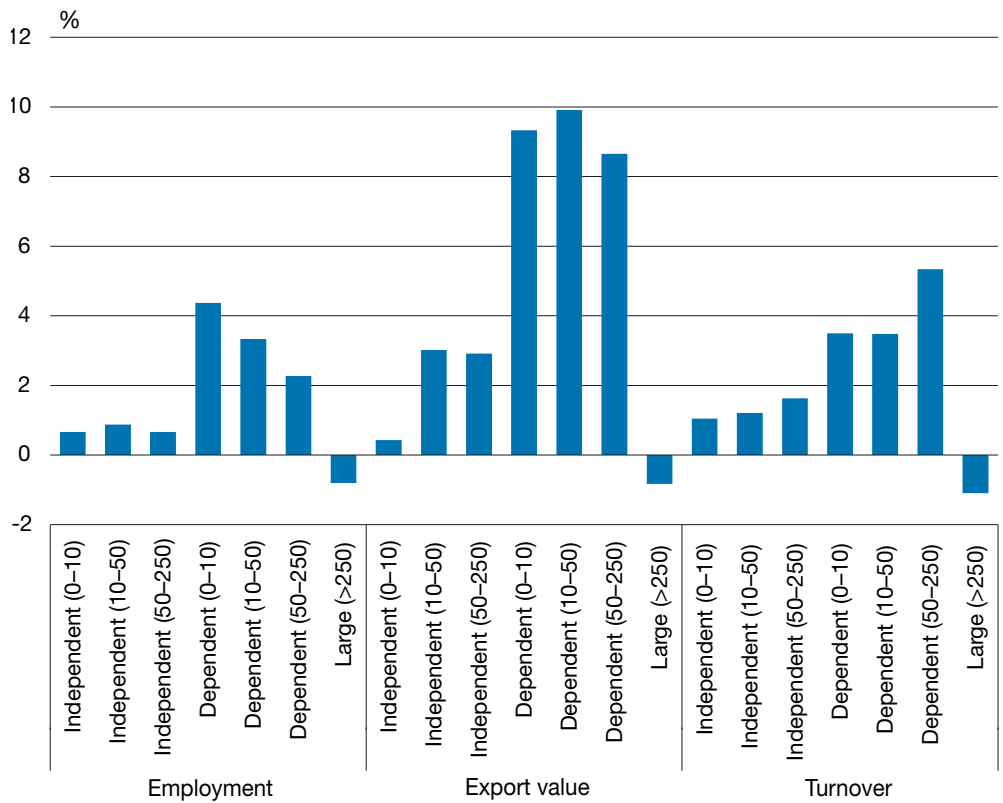
## 1.2 A broad view of firm dynamics

The declining importance of large firms to the Finnish economy has led to significant realignment of activity and firm dynamics towards smaller firms (Figure 1.3), with start-up rates particularly high in knowledge-based activities (Figure 1.4).

SMEs have outpaced larger firms in nominal growth of employment, exports and turnover over the last decade. While the role of large firms has decreased, the importance of cooperation and firm relations has been an important factor in the growth of SMEs. Dependent firms with intra-firm relations to larger entities have significantly outpaced independent firms in all areas of growth.

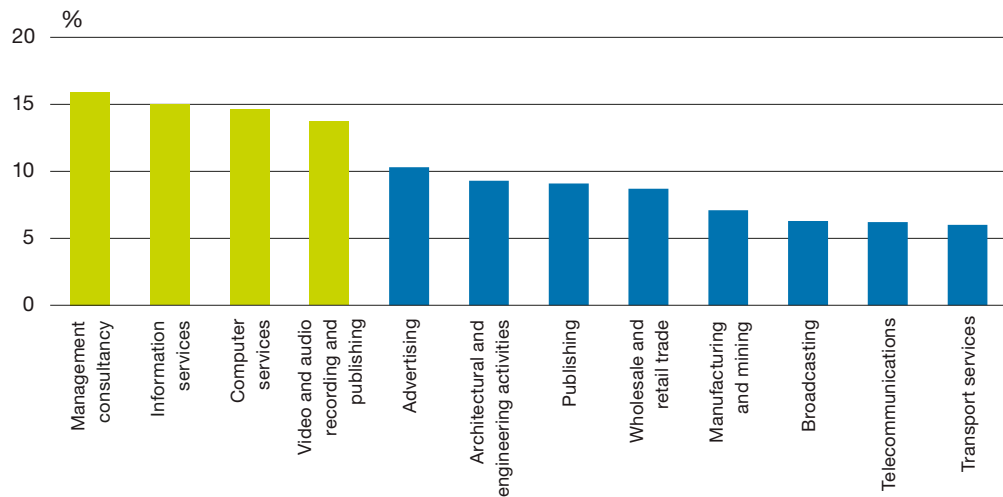
**Figure 1.3**

Average annual employment, export value and turnover growth rate by firm size and dependency, 2008–2018



**Figure 1.4**

Employer enterprise birth rate, selected industries, 2017



Source: OECD Business Demography statistics database

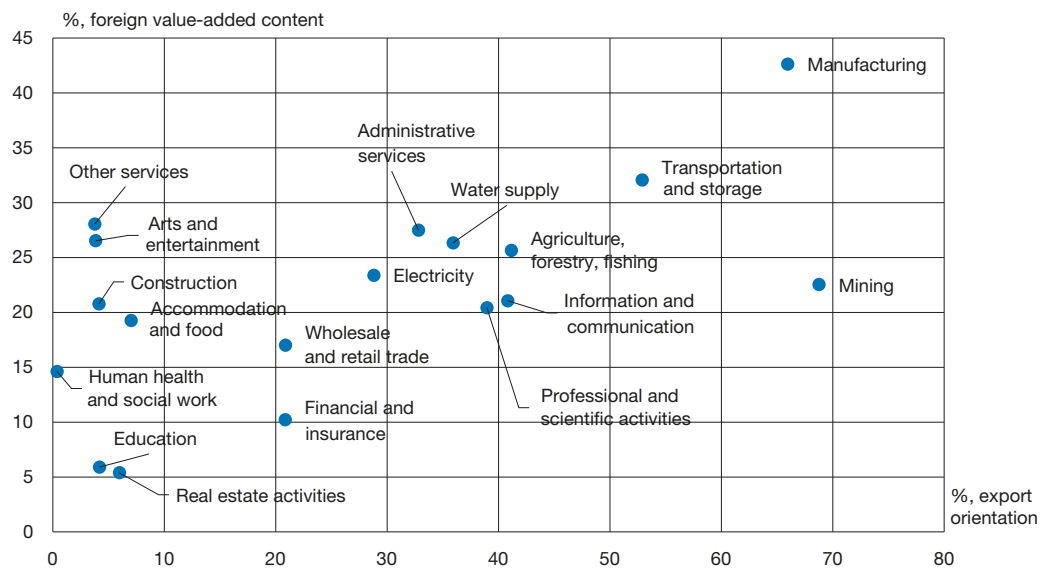
### 1.3 Spotlight on covid-19

Although much uncertainty remains around the magnitude and longer-lasting impact of the economic shock of covid-19, it is expected to be profound. In its immediate wake, with many countries imposing lockdowns, there have already been significant disruptions to both domestic and international supply chains. While, for example, restaurants and accommodation services have suffered significantly from direct policy measures, the value-chain effects will not be visible until much later.

Although Finland has been less directly affected than many other countries and despite its large share of trade with Sweden, where lockdown restrictions have not been imposed, it remains highly exposed to a global economic downturn. As a small open economy with high reliance on imports for production and exports for growth, changes in international supply chains are likely to affect Finnish firms and their positions in these chains.

Larger firms, particularly in manufacturing industries, with an average foreign content of exports at over 40% and an export orientation of close to 70%, are likely to be most directly affected (Figure 1.5). Although the direct impact of disruption in global supply chains is likely to be more limited in other parts of the economy, as upstream suppliers to manufacturing, they will also be affected indirectly. This will exacerbate the direct impact of containment measures, whether imposed by governments or through changes in consumer behaviour, on those same upstream industries, many of which are strongly consumer oriented. SMEs, which typically have limited cash reserves, are particularly vulnerable to a prolonged lockdown (OECD, 2020).

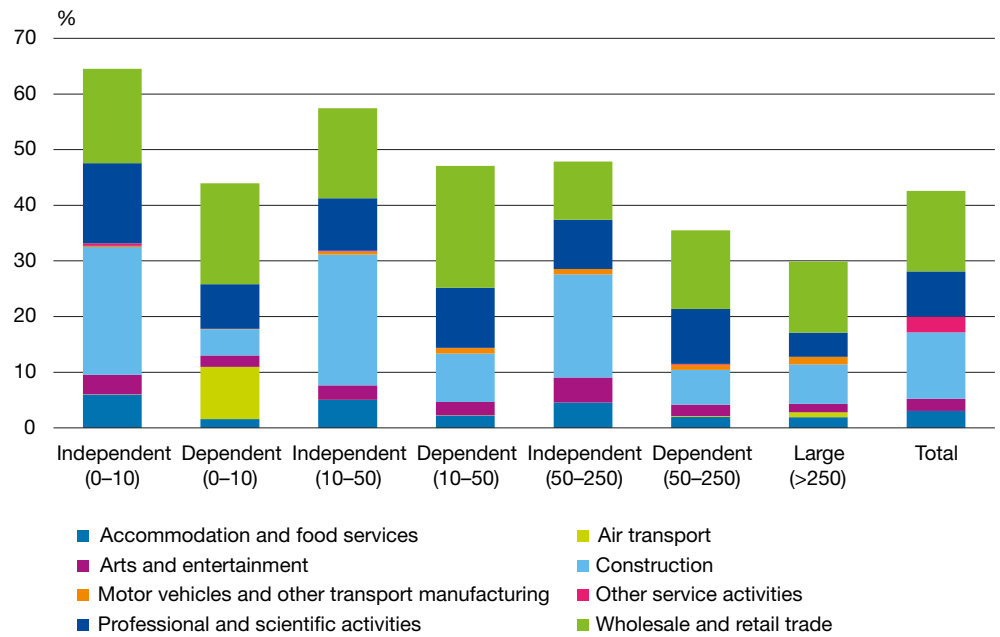
**Figure 1.5**  
Finnish GVC integration by industry, 2018



As this report illustrates for other areas, those potential impacts are likely to be differential, affecting some categories of workers and firms more severely. Following the assumptions used in previous OECD (2020b) analysis, Figure 1.6 reveals that the impact on independent micro enterprises could be severe, consequently affecting a significant part of the labour force in these enterprises, especially low-skilled employees, as indicated by Figure 1.7.

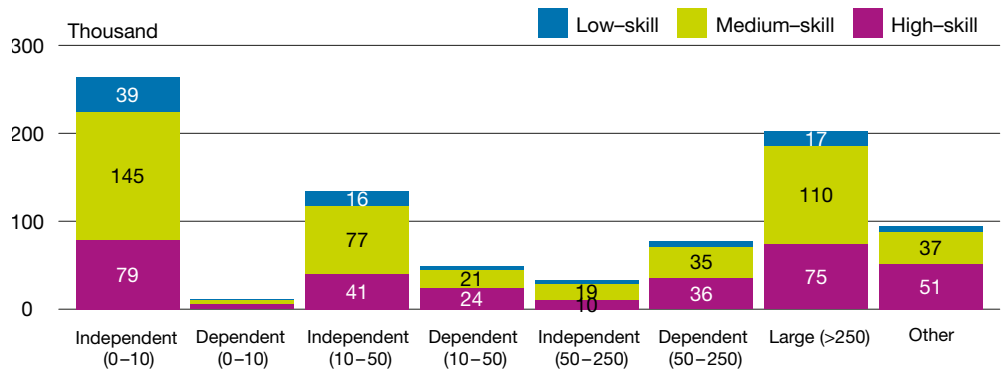
**Figure 1.6**

Production in industries most directly affected by lockdown measures, share of total value-added by firm size and dependency, 2018



**Figure 1.7**

Employment by employee skill in industries most directly affected by lockdown measures typically imposed by countries, by firm size and dependency, 2018



Note: Includes employment in the following industries (using the ISIC Rev. 4 classification): motor vehicles and other transport manufacturing (29-30); construction (41-43); wholesale and retail trade (45-47); air transport (51); accommodation and food services (55-56); professional and scientific activities (69-75); arts and entertainment (90-93); and other service activities (94-96).

## 2. FINNISH BUSINESSES IN GLOBAL VALUE CHAINS

### Highlights

More granular data for Finland reveal a significantly higher degree of integration in global value chains (GVCs) than when using macro approaches such as OECD TiVA: the foreign content of Finland's exports is **10 percentage points higher**. However, at the same time, Finland's export orientation is lower; albeit only marginally.

Although its export orientation has been broadly stable in recent years, the stability masks significant changes at the industry and firm level, as Finland develops new global comparative advantages, especially within knowledge-based services, which have been significant drivers of growth in recent years. In fact, such has been the growth that services industries as a whole now outweigh manufacturing industries in their share of exports in value-added terms.

Inward investment has played an important part in the switch towards service-driven exports, but so too has organic growth within the country, with young 'born globals' playing a significant role. This bodes well for the future, as services are likely to prove more resilient to potential changes in production processes that occur in the wake of covid-19. However, many other firms, especially young goods manufacturers that have managed to penetrate non-European markets, may be vulnerable to prolonged downturns.

### 2.1 Introduction

Trade has been the global driver of economic growth for the last two decades, propelled by the decrease in the costs of trade at the border and behind the border, and in transport and communications logistics, which in turn, boosted by investment liberalisation, accelerated trends towards global production and global value chains.

GVCs have complicated conventional notions of trade, and, in particular, the previously much simpler relationships between trade and growth. Prior to the explosion in GVCs, most of what was traded could be seen as having been largely made in the country from which it originated. But that is no longer the case. Today, most imports contain contributions from a multitude of countries and firms in, often complex, value chains; each adding a bit of value as the final product is brought together before it reaches its final destination and is consumed by households, charities, companies, governments, or as fixed capital.

This means it is much harder than it used to be to identify how exports contribute to economic growth and, in addition, it is much easier to appreciate the importance of intermediate imports in producing exports.

Statistical tools such as Trade in Value Added have greatly transformed our ability to understand and navigate these chains, and in turn better understand how exports need imports, how dependent countries are on consumers at the end of value chains, and what competitiveness means in a world shaped by GVCs. Those same tools have also allowed us to better understand potential risks in those chains that may arise from disruption, be the cause economic or natural, as the current covid-19 crisis has well illustrated.

However, by design, because they require the construction of a global input-output table, those same tools can only provide a very aggregate view, and so can say little about the distributional impacts of trade, or indeed what types of firms thrive and what types of firms wither in GVCs.

This chapter tries to get closer to providing a more detailed view. First through a higher disaggregation of industries than is typically available with conventional global input-output tables and, secondly, by drilling down within those industries to explore the dynamics being shaped by

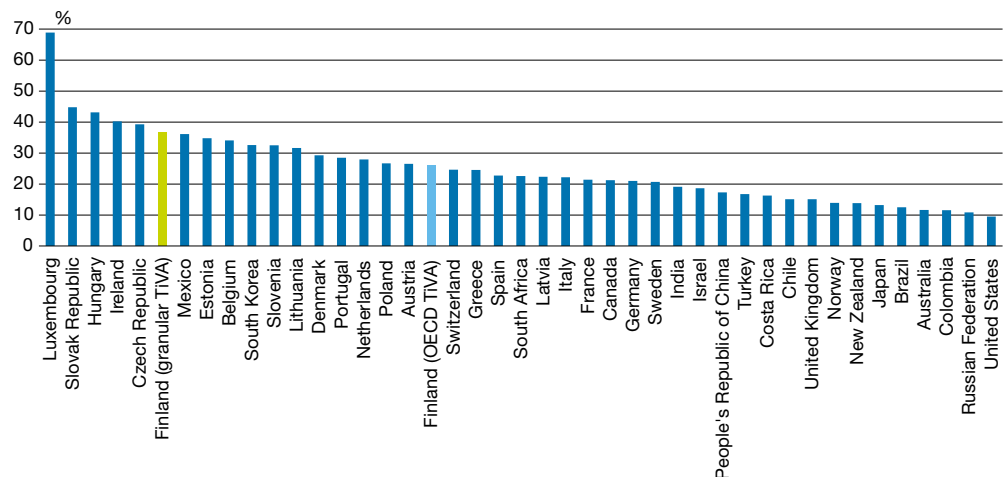
different categories of firms within industries. Those categories look at key firm characteristics that are likely to play a significant role in shaping the nature of a firm's integration, including ownership, size, trading status and age.

## 2.2 Finland's integration in GVCs – an overview

*Finland is much more deeply integrated in GVCs than previously thought*

As a small open economy, Finland's gross exports and imports of goods and services as a percentage of GDP were both around 40% in 2018. Based on existing OECD TiVA estimates, around one-quarter of the value of Finland's gross exports reflects foreign content, revealing high dependencies and integration in GVCs. This put it roughly on a par with similar sized economies: ahead of Sweden and Latvia but behind Denmark and Estonia. However, the findings of the more granular approach adopted in this report reveal a significantly higher dependency on GVCs, **more than 10 percentage points higher**, than reflected in current OECD TiVA estimates (Figure 2.1), putting Finland just behind the Czech Republic. Of course, some caution is needed in comparing these new granular estimates with OECD TiVA estimates for other countries, as the expectation would be for all countries to see an increase in their foreign content shares if their estimates were also derived from more granular data. But the key message is clear: **Finland has a much higher degree of GVC integration than we had previously thought.**

**Figure 2.1**  
Foreign value-added content of exports by country, 2015

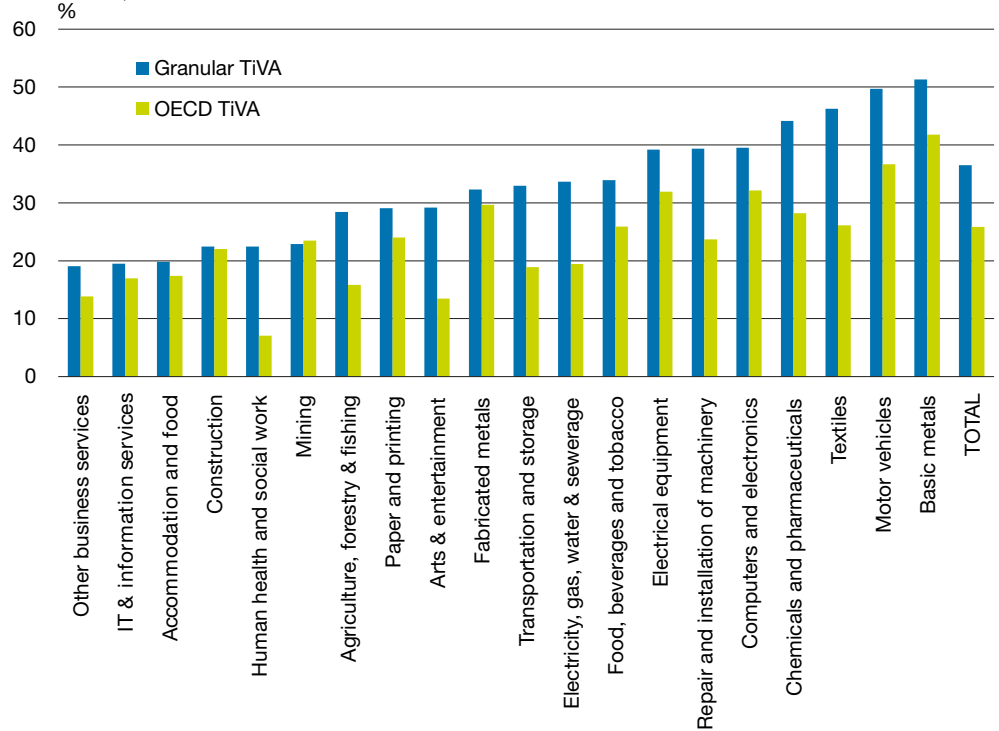


Source: OECD TiVA and Finnish study estimates

At the industry level, the granular data reveal a similar ranking of industries on the basis of their import-intensity to those shown in existing OECD TiVA estimates. However, significant differences exist in the shares, with the foreign content of exports, based on the granular data used for this publication, being higher in nearly every industry, including all industries that contribute significantly, whether directly or upstream, to Finnish exports (Figure 2.2). In the textiles industry (13–15), for example, the difference in foreign content share is around 20 percentage points, while motor vehicles (29) have a close to 15 percentage point difference. The foreign value-added content in gross exports of other business services (69–82), which play an important upstream role in GVCs, is also five percentage points higher using more granular data.

**Higher granularity can reveal much higher international dependencies:** one of the most important reasons why this work was undertaken.

**Figure 2.2**  
Foreign value-added content of exports by industry, selected industries, 2015

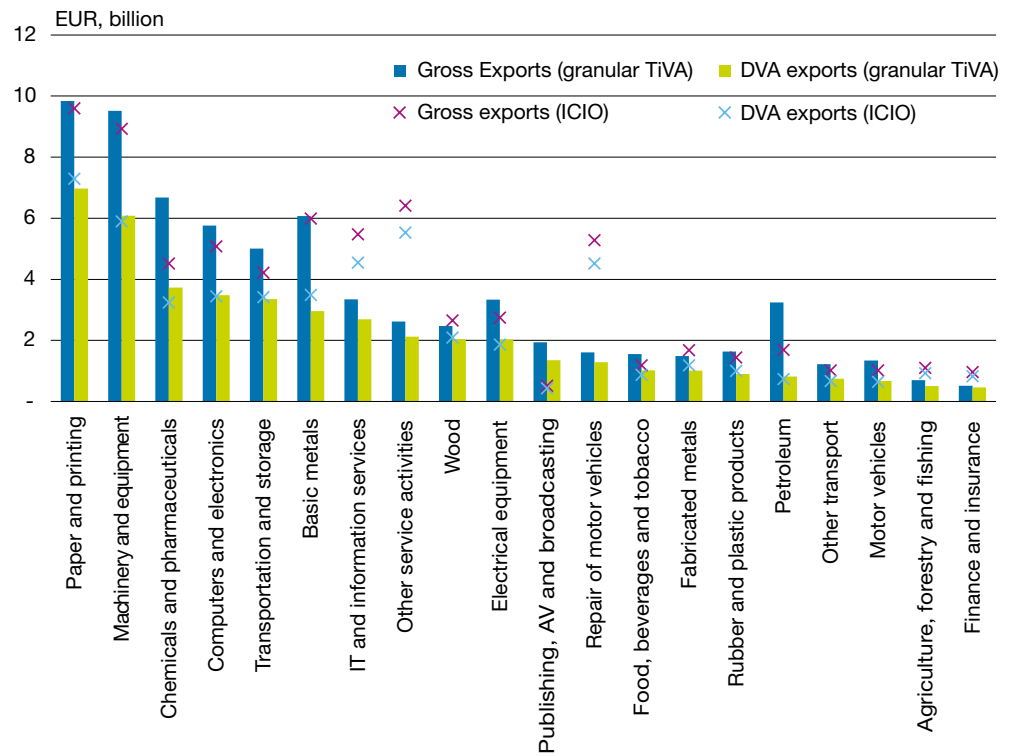


Source: OECD TiVA and Finnish study estimates

By and large, and perhaps not altogether surprising, the use of more granular data reveals a similar picture of the importance of each industry in driving overall domestic value-added exports, with paper products (17–18) remaining as the top exporting industry and machinery and equipment (29) remaining second in 2015 (Figure 2.3). However, there are some important differences in a number of industries, reflecting the different estimates of gross exports provided by Statistics Finland and other revisions to GDP used in this study (and, so, not related to granularity). These chiefly concern other business services (69–82), IT and information services (62–63) and wholesale and retail trade (45–47) services where gross exports are all lower, and the petroleum (19) industry where exports are higher.



**Figure 2.3**  
Exports in gross and domestic value-added terms by industry, selected industries, 2015

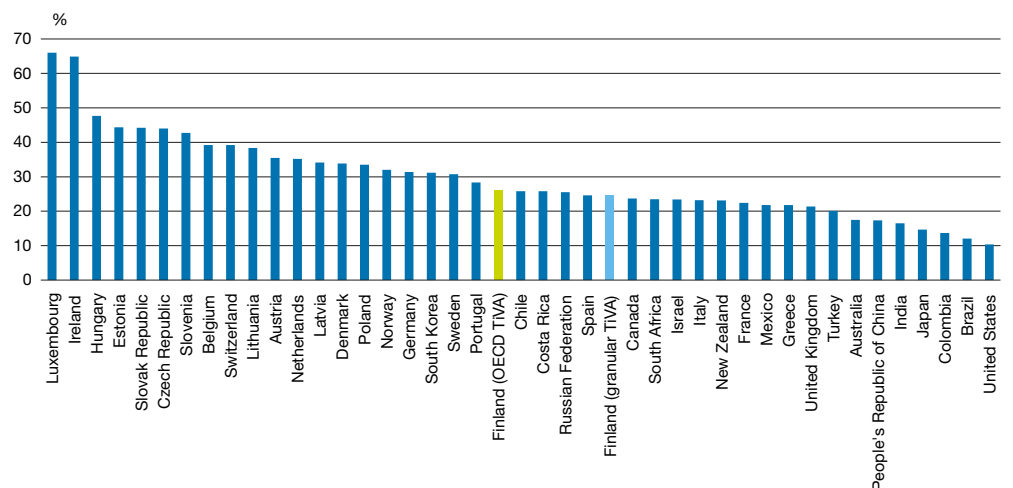


Source: OECD TIVA and Finnish study estimates

*The corollary of higher foreign content shares is lower domestic content shares, and so, for fixed gross exports and GDP, lower export intensities. Compared to similar sized countries, Finland is underperforming.*

Despite its relatively high integration compared to the average for OECD countries, Finland's export performance – measured as the share of exports of domestic value-added in GDP – underperforms to comparably sized economies (Figure 2.4). Revised data show that its export intensity is even lower, albeit only marginally, than previously thought, putting it further behind neighbouring similarly sized economies such as Sweden, Denmark, Latvia and Estonia.

**Figure 2.4**  
Exports of domestic value-added by country, share of total gross value-added, 2015

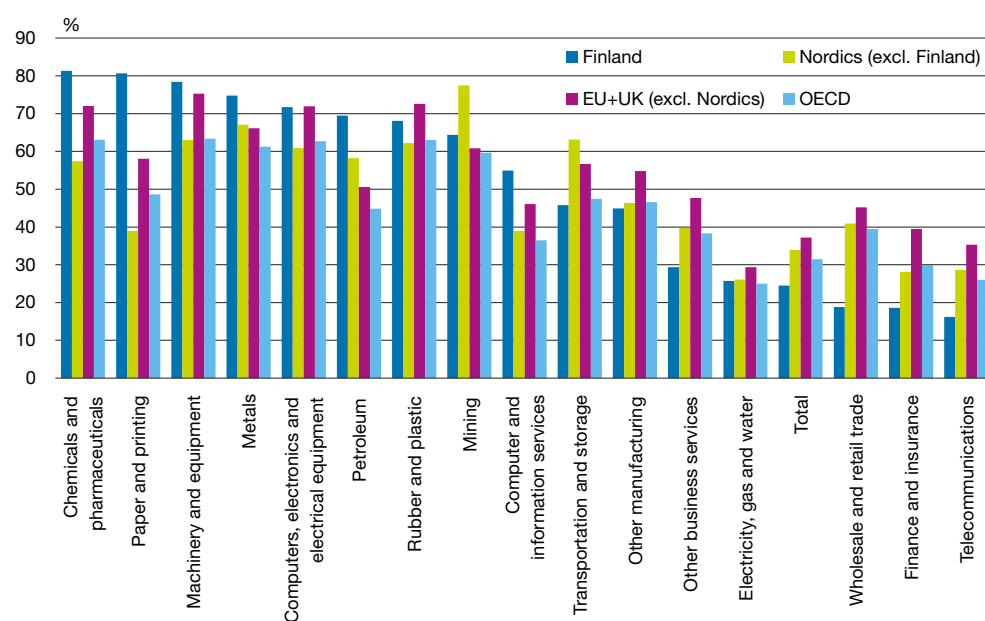


Source: OECD TIVA and Finnish study estimates

*However, export intensities of individual industries are high relative to other countries*

However, the total picture masks significantly higher export intensities at the industry level than in comparable countries, painting a more positive picture of underlying competitiveness (Figure 2.5). Although in some industries, for example the computers and electronics industry (26), high export intensities have not arrested a slow decline in output and exports (see also Figure 2.8). Lower total economy export intensities in this sense could reflect a number of factors, for example: higher relative prices of domestically consumed non-tradable services<sup>1</sup>; higher shares of government expenditures; or relatively higher (compared to other countries) concentration in activities generating relatively low domestic value-added output<sup>2</sup>.

**Figure 2.5**  
Export intensity by industry, selected areas, selected industries, 2015



Source: OECD TIVA and Finnish study estimates

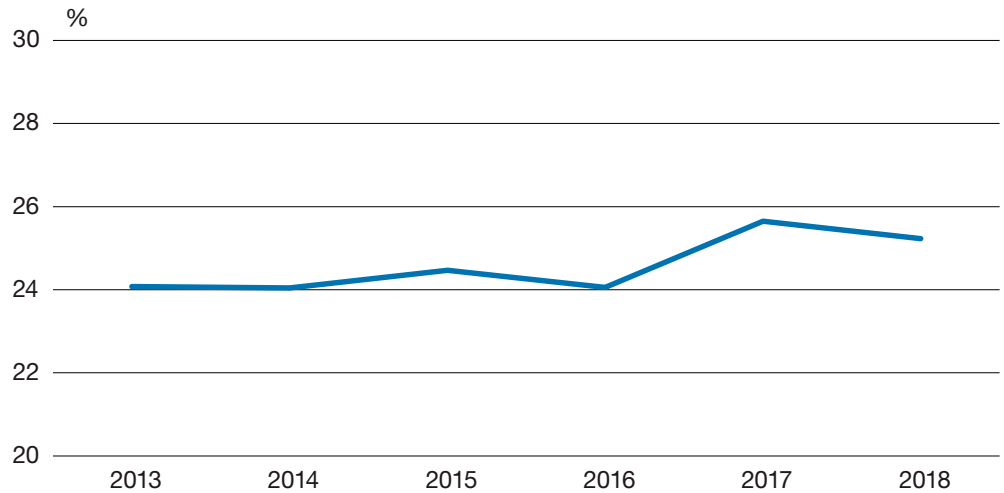
*Although whole economy export intensity has changed little in recent years, this masks significant change at the industry level*

The importance of exports to overall growth and GDP has changed little in recent years (Figure 2.6) but this masks considerable change at the industry level (Figure 2.7). Significant changes can be seen in top exporting industries.

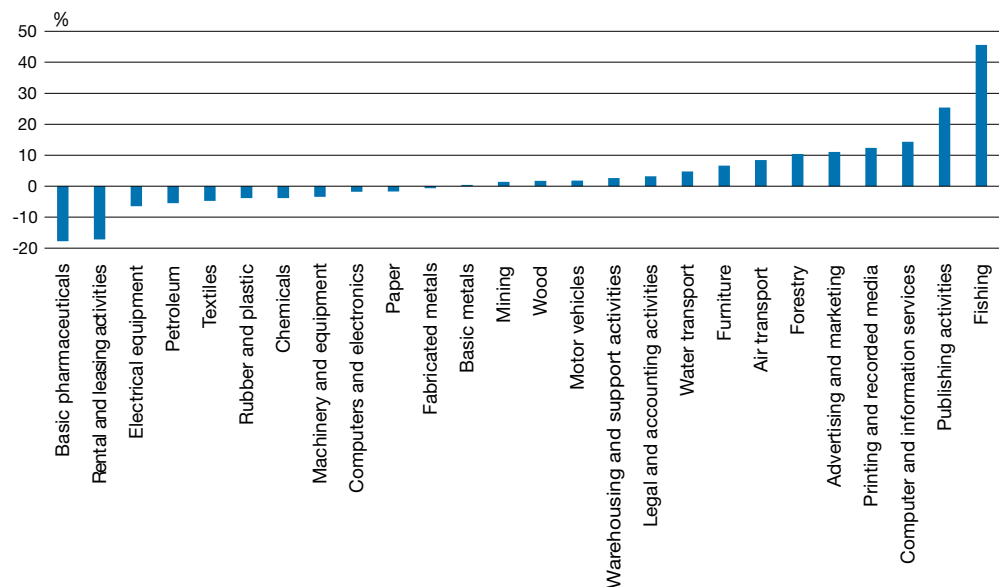
1 However, whilst Finland's domestic price levels are higher than the OECD average, which may work to depress its measured whole economy export intensities, this cannot explain its poorer overall performance relative to other Nordic economies that have even higher relative purchasing price levels.

2 The point is not to say that higher export intensities at the total economy level are not desirable but rather that some care is needed in drawing overly strong conclusions from cross-country comparisons. Further work is planned to look more deeply into potential drivers for low overall relative performance in a follow-up study.

**Figure 2.6**  
Contribution of exports of domestic value-added to GDP, Finland, 2013–2018



**Figure 2.7**  
Percentage point change in export intensity by industry, 2013–2018

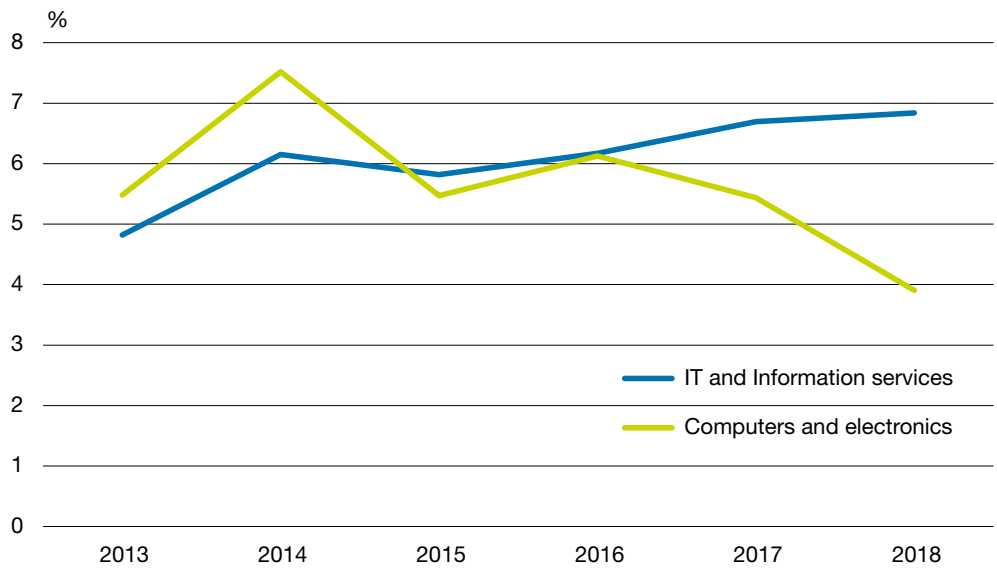


*Strong comparative advantages are being developed in IT services*

Changes in export orientation cut across industries, with increases and decreases seen in both goods and services industries. Yet some strong patterns are emerging pointing to a shift in comparative advantages towards higher skilled services activities. This is particularly clear in the IT and information services industries (62-63). Relative to other countries, Finland has an especially high export orientation in the IT and information services industries, with close to 60% of its total value-added being exported directly or indirectly to foreign markets, 20 percentage points higher than the average for other Nordic economies, and significantly above the EU average.

Between 2013 and 2018, overall exports in nominal value-added terms grew by close to 20%, with close to one-fifth of that growth reflecting IT services. The industry saw phenomenal growth – close to 70% – over the period, and now accounts for close to 7% of all exports in value added terms; more than offsetting the steady decline in exports of the computers and electronics industry (26) (Figure 2.8).

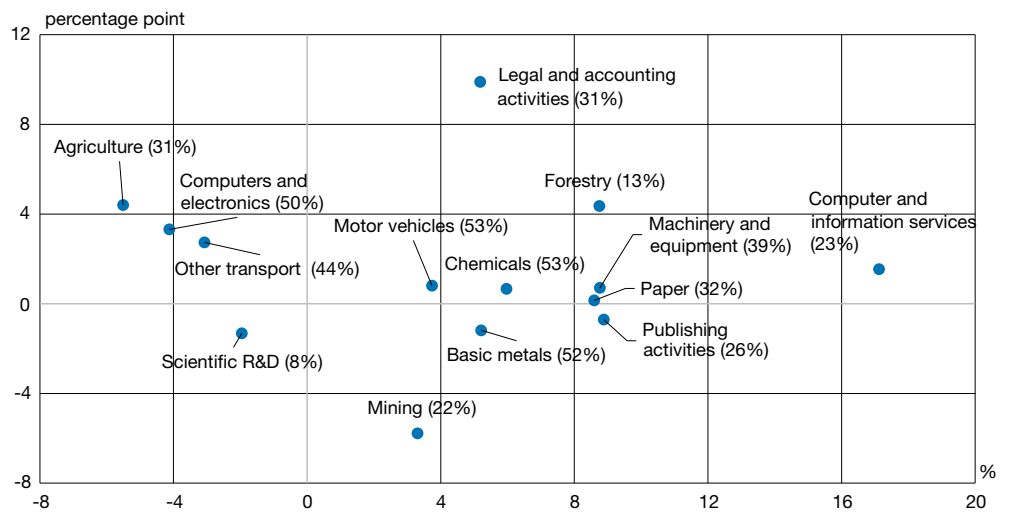
**Figure 2.8**  
From goods to services: share of total economy value-added exports, selected industries, 2013–2018



*And strong growth has also been seen in other service industries*

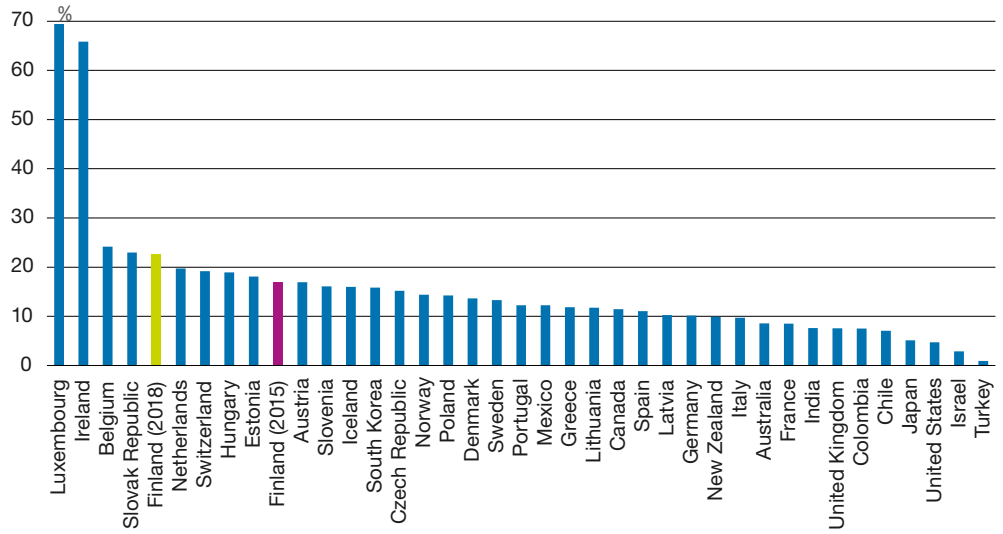
Other services industries, notably legal and accounting services (69–70) and publishing services (58) also saw significant growth in domestic value-added exports (both directly and indirectly). Interestingly, the growth in legal and accounting and indeed in IT services went hand in hand with higher foreign content, pointing strongly to the growing role of services based international value chains (Figure 2.9a). Although some care is needed in making international comparisons, as the results for Finland use more granular data, in both industries, the foreign content of exports is significantly higher than current OECD TiVA estimates in other countries (Figures 2.9b and c).

**Figure 2.9a**  
High export growth in knowledge-based services: contribution to total economy value-added export growth (x-axis), percentage point change in foreign content share of exports (y-axis) and industry foreign content share of exports in 2018 (parenthesis), 2013–2018



**Figure 2.9b**

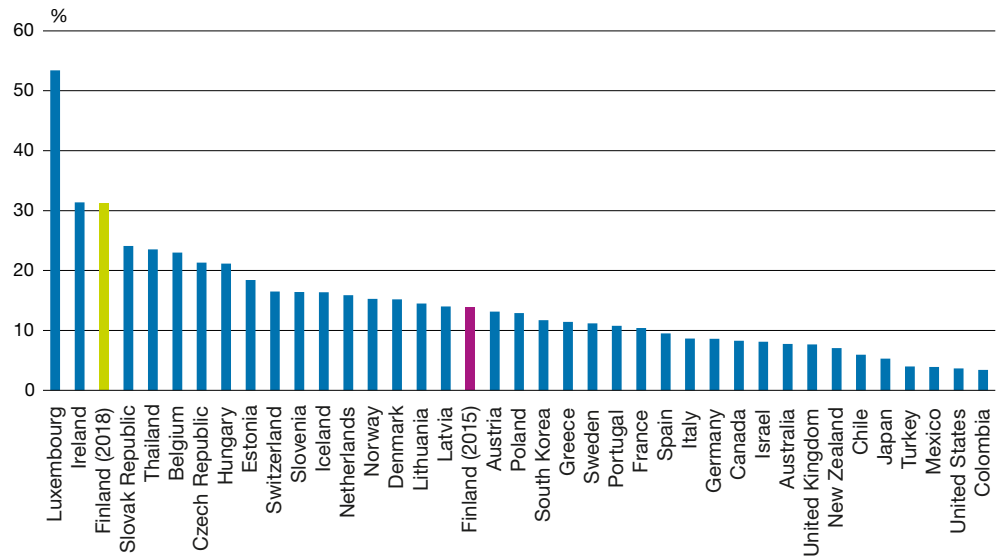
High integration in GVCs has helped drive growth in IT and information services (62–63), Finland 2018, OECD countries 2015



Source: OECD TIVA and Finnish study estimates

**Figure 2.9c**

High integration in GVCs has helped drive growth in legal and accounting services (69–70), Finland 2018, OECD countries 2015



Source: OECD TIVA and Finnish study estimates

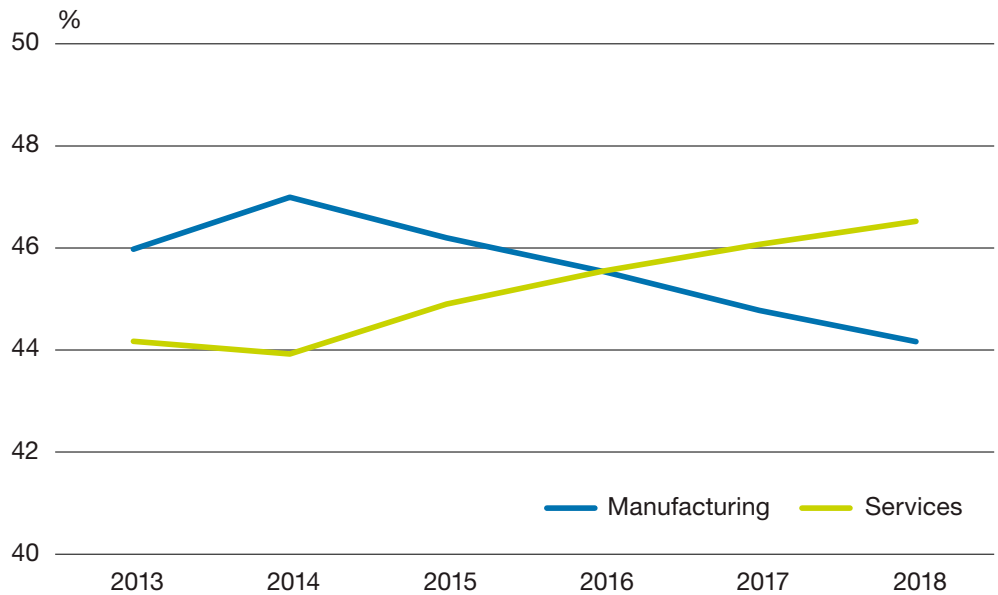
Note: Finland 2018, legal and accounting services only. All other countries, 2015, other business services, including legal and accounting.

*Services are now a more important source of domestic value-added exports than manufacturing*

The strong growth in key services activities derives from both direct and indirect exports. In gross terms, this has meant that the service industries' share of gross exports has increased from 17% in 2013 to 23% in 2018. Indeed, from a value-added perspective, services industries have overtaken manufacturing industries (Figure 2.10).

**Figure 2.10**

Services industries have overtaken manufacturing industries: share in domestic value-added exports by source industry, 2013–2018



Note: Manufacturing includes industries 10-33 and services includes industries 41-98.

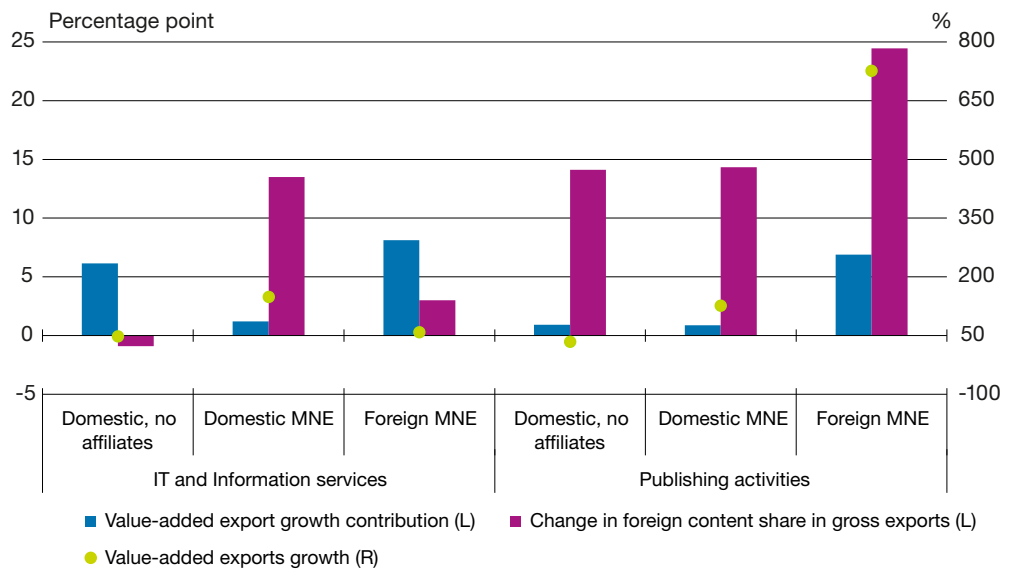
*Foreign investment has been an important driver of services-led export growth, but not uniquely*

In the IT and information services (62–63) and publishing activities (58) industries, the biggest contribution to overall export growth came from foreign-owned enterprises. Foreign MNEs in the two industries alone contributed 15% of the whole economy value-added exports growth between 2013 and 2018 (Figure 2.11), with significant increases in the foreign content share of exports providing strong evidence of multinational supply chains being put to good effect.

In foreign-owned IT firms, for example, the foreign content share of exports increased by three percentage points to 29%, while in foreign-owned publishing firms (which saw a more than seven-fold increase in overall value-added exports), the foreign content share increased by close to 25 percentage points to 38%. Other firms, which may reflect agglomeration and clustering effects created by the larger foreign MNEs, including through upstream support, also saw stellar growth. In the IT and information services industry, for example, domestic firms without affiliates saw exports in value-added terms grow by nearly 50% while domestic multinationals saw growth of close to 150%. In the publishing industry, the same two firm categories saw growth of 30% and 125%, respectively.

**Figure 2.11**

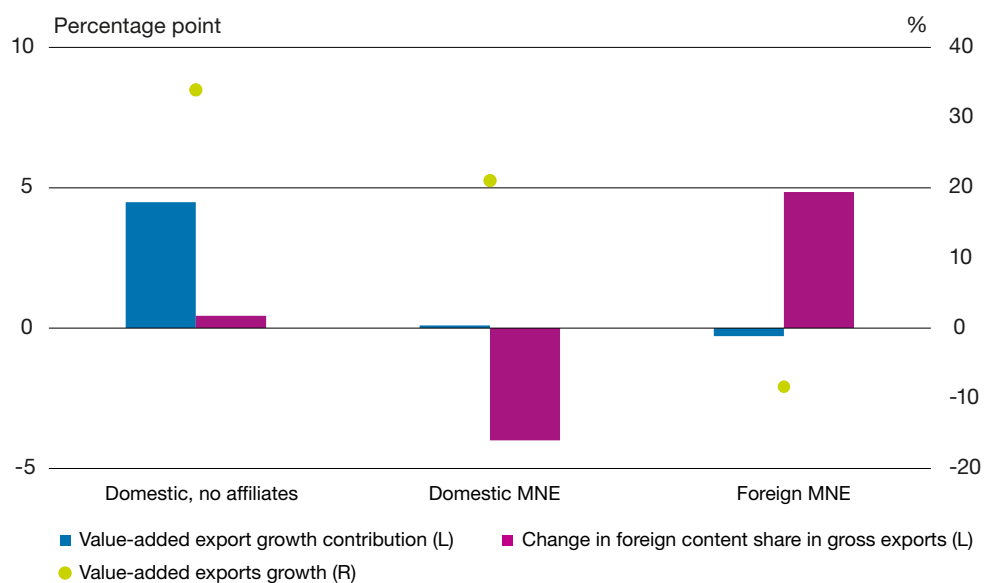
Multinationals have played a crucial role in driving export growth in IT and information services (62–63) and publishing activities (58), 2013–2018



However, foreign investment is not the only driver of export-driven value-added growth. In the legal and accounting (69–70) industry, for example, domestic-owned firms, providing large shares of upstream services, saw significant export driven growth (up by nearly 35% in value-added terms) whilst foreign-owned multinationals saw contractions (Figure 2.12). Domestic MNEs also saw significant growth but, as they comprise only a marginal share of overall production, this translated into a negligible contribution to overall export growth in value-added terms. Differences in the performance of foreign MNEs across industries is of course not altogether surprising, especially with regard to legal services, where comparative size-based advantages of larger foreign firms are likely to be offset by the intrinsic 'home' based advantages of domestic operators.

**Figure 2.12**

In some industries, home advantage matters, legal and accounting activities (69–70), 2013–2018

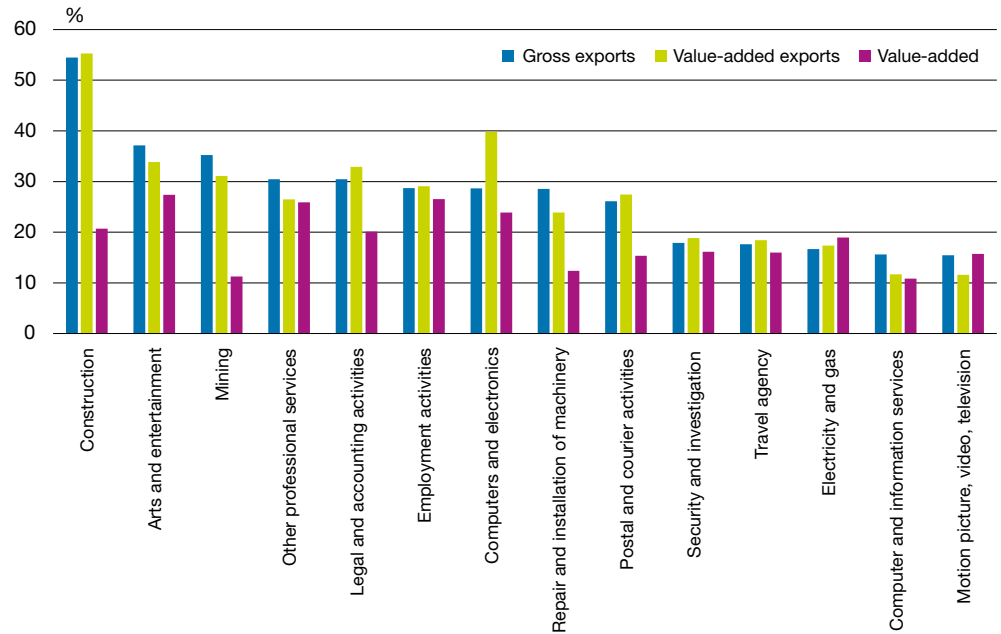


## Born globals are driving export growth

Young firms have played an important role in driving export growth in knowledge-based activities such as the IT and information services (62–63), and ICT goods (26), together accounting for around one-third of the total direct exports of these ‘born globals’ in 2018. The growing importance of these younger ‘born globals’ is evident across all industries (Figure 2.13), revealing the importance of start-up and entrepreneurship policies and support (such as access to finance) in driving export growth.

**Figure 2.13**

Young firms share in gross exports, value-added exports and total value-added, selected industries, 2018

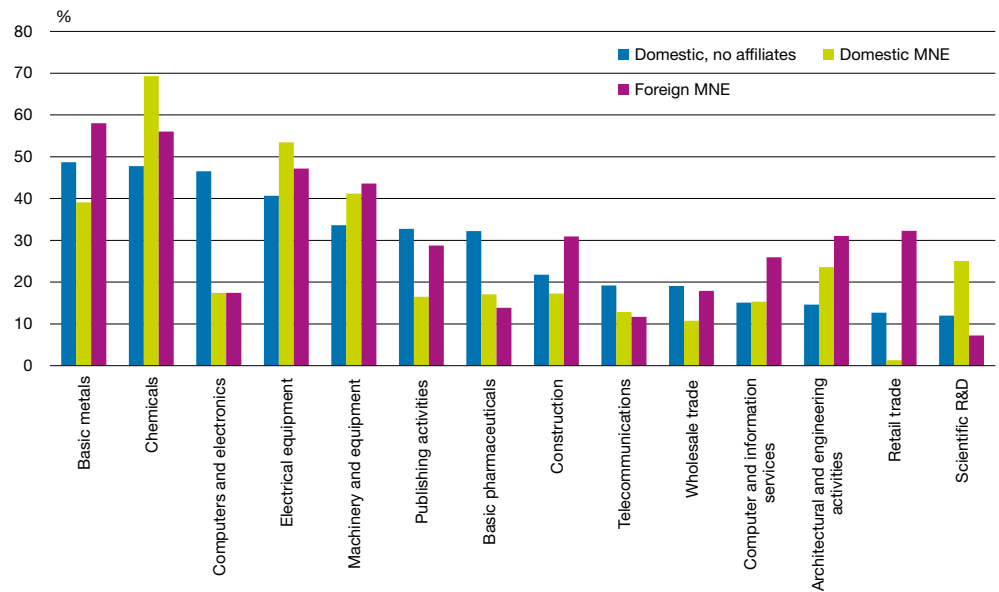


## *In general, foreign-owned firms do not have systematically higher foreign content than domestic multinationals*

In general, the larger the firm the larger the share of foreign content used in a given production process. This reflects the relatively easier access to foreign inputs that size provides and the proportionally lower fixed costs relative to turnover larger firms face. Being part of a larger enterprise group provides similar benefits, even to smaller affiliates. In addition to the easier access to intra-firm imports, multinational firms generally, but not always, have higher import content than purely domestic firms. Interestingly, at the industry level, foreign-owned multinationals do not have systematically higher foreign content than domestic MNEs (Figure 2.14).



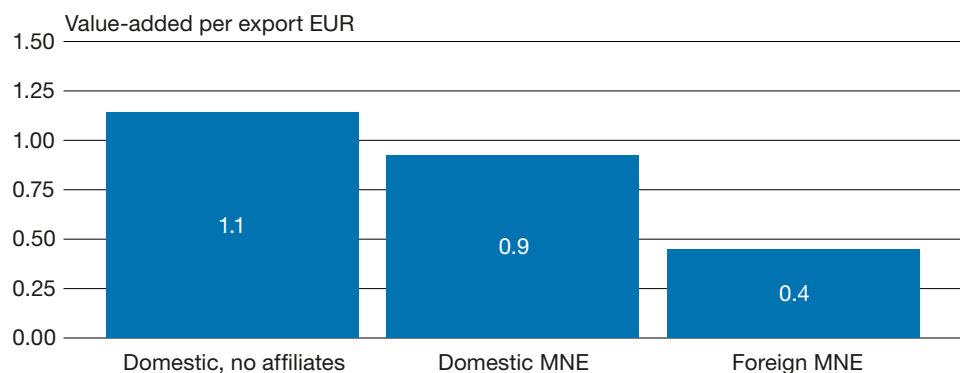
**Figure 2.14**  
Foreign value-added content of exports in top 15 exporting industries with foreign MNE presence, 2018



*However, because of differences in industry specialisation, foreign-owned multinationals as a whole generate smaller domestic backward linkages through exports*

At the whole economy level, reflecting differences in the weighting of industries where they appear as well as the export intensities of those industries, foreign-owned firms generate smaller backward linkages in the domestic economy than domestic firms do (see also Section 2.4). For each euro of value-added exports by domestic-owned firms without foreign affiliates, an additional 1.1 euros of value-added is generated by upstream domestic suppliers compared to 90 cents for domestic MNEs and less than 50 cents for foreign-owned multinationals (Figure 2.15).

**Figure 2.15**  
Domestic backward linkages by firm ownership; domestic value-added generated per euro of value-added exports, 2018

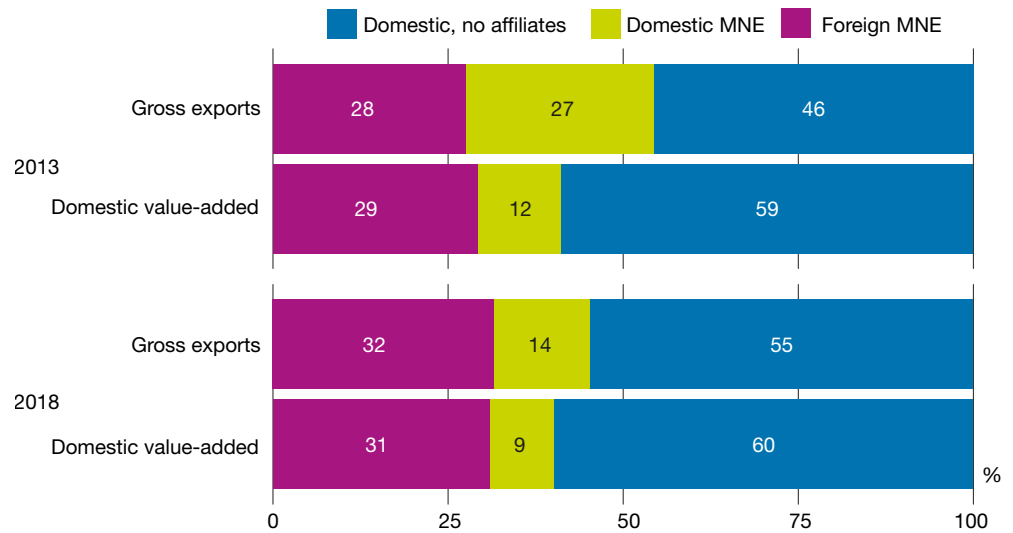


Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other services activity (S).

*And so, domestic-owned multinationals are more important channels for domestic firms without affiliates than foreign-owned multinationals*

Domestic-owned firms without foreign affiliates not only have strong domestic backward linkages, but also depend on exports of other firms to indirectly participate in GVCs. Whilst the contribution to gross exports by domestic multinationals amounts to 14% of gross exports, and by domestic firms without affiliates 55%, in value-added terms these shares are 9% and 60%, respectively (Figure 2.16).

**Figure 2.16**  
Gross and domestic value-added exports by firm ownership, 2013 and 2018



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other services activity (S).

### *Size matters – but having big friends can mitigate size-class biases*

Although smaller firms are often more nimble and agile than larger firms, allowing them to adapt quickly to changing circumstances and demands, they suffer from size class disadvantages related in particular to economies of scale. Whilst digitalisation has helped address some of these disadvantages in knowledge-based services activities that provide scope to have scale without mass, significant size class barriers remain for goods producers and indeed even in some services industries. For trade, behind the border measures, including services trade restrictions and adapting to a multitude of bilateral or even plurilateral trade agreements, exacerbate size-based biases as the value of costs of navigating the various regulations are fixed, and so amount to a higher share of exports for smaller firms.

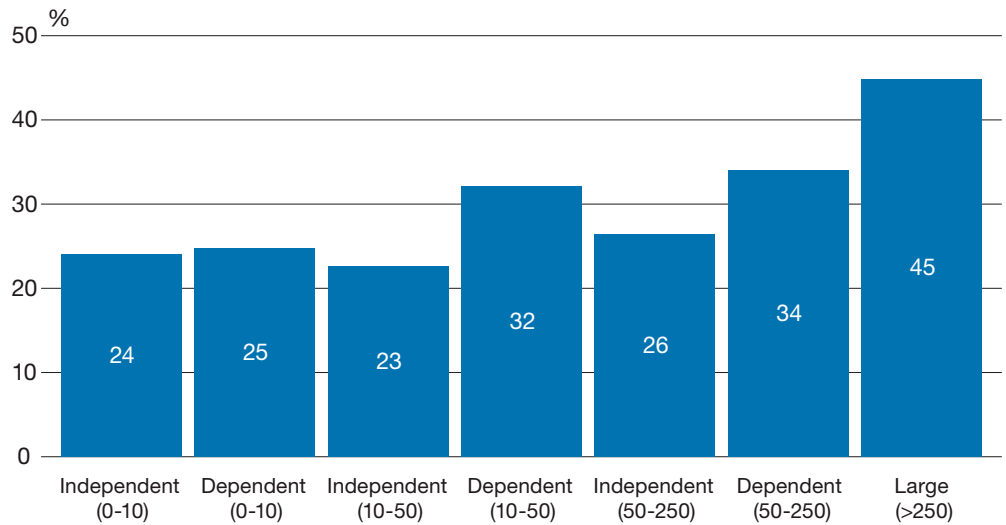
This is a key reason why smaller firms typically trade closer to home and in a limited number of markets (see also Section 2.3). The lower diversification of trade leaves smaller firms highly exposed to slowdowns in those markets and to events that cause ruptures in supply-chains – whether those ruptures arise through political events, such as trade sanctions with Russia, natural disasters, such as floods in Thailand and earthquakes in Japan, or indeed pandemics, as is presently the case with covid-19.

In smaller economies, where the contribution of smaller firms to overall output is especially high (around two-thirds of market activity in Finland<sup>3</sup>), overcoming size-related barriers is particularly important.

One way of mitigating risks and the impact of barriers to enable benefits from trade to accrue to smaller firms is through access to and integration within larger firms' domestic supply chains. For smaller firms with affiliative dependencies to larger firms, this provides a means to access cheaper imports, which helps explain why their share of imports used in production is, often significantly, higher than the equivalent shares for independent firms of the same size (Figure 2.17).

<sup>3</sup> See OECD SME and Entrepreneurship Outlook 2019

**Figure 2.17**  
Foreign value-added content of exports by firm size and dependency, 2018



Note: Private sectors excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other services activity (S).

*Upstream integration is especially important to spreading gains from trade...*

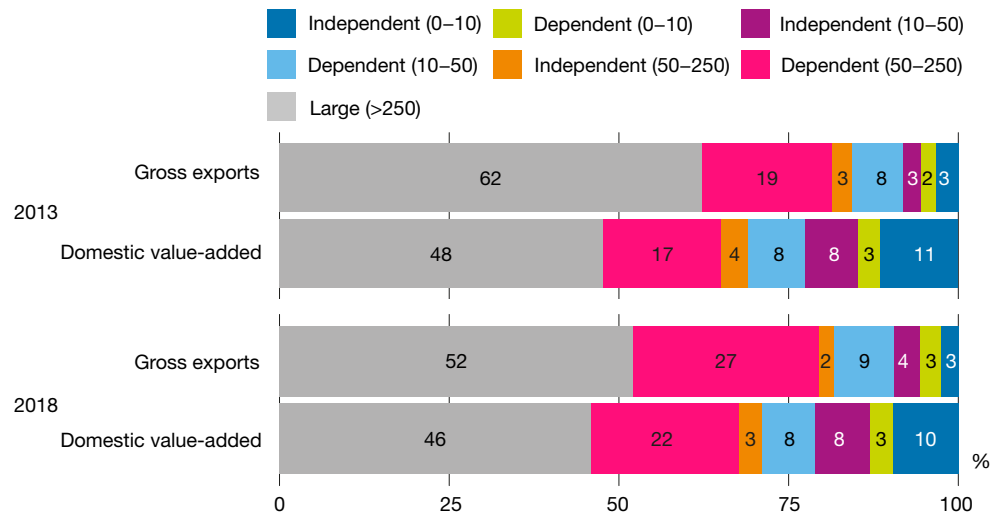
These same dependencies also help smaller dependent firms access foreign markets, which helps explain why they account for a significantly higher share of direct gross exports than their independent counterparts. For example, in 2018, dependent SMEs with 10 to 50 employees exported over twice as much directly as their independent counterparts (9% compared to 4%, Figure 2.18). However, smaller non-trading independent firms can still benefit from trade<sup>4</sup> indirectly, as upstream suppliers to larger exporting firms. Indeed, this is precisely what is happening in Finland. In value-added terms, dependent and independent firms with between 10 and 50 employees both accounted for 8% of total exports in value-added terms. Independent SMEs with fewer than 10 employees<sup>5</sup> saw an especially large increase in their overall share in value-added terms (10%) compared to gross terms (3%).

4 Note that these estimates do not capture all of the spill-overs from trade. They only capture benefits accruing through inter-firm transactions and, so, do not, for example, capture spill-overs from the expenditures of employees working in exporting firms of social transfers that result from tax revenues generated through higher profits and pay.

5 Micro firms in Finland (firms with fewer than 10 employees) account for around 90% of all firms. These include a diverse range of firms providing a wide range of purely domestic services including delivery services, cleaning services and many other, specialised, services (see also Figure 2.19).

**Figure 2.18**

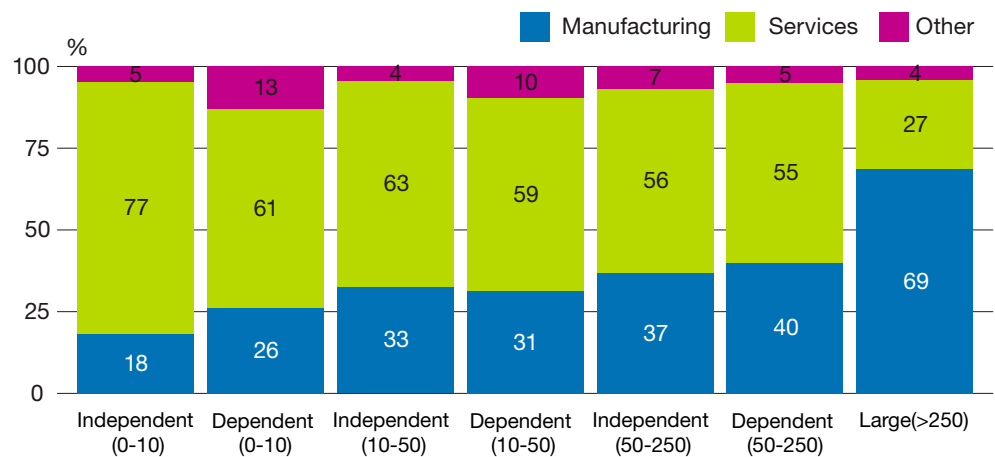
Gross and domestic value-added exports by firm size and dependency, 2013 and 2018



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other services activity (S).

**Figure 2.19**

Share of domestic value-added exports by firm size and dependency and by source industry, 2018



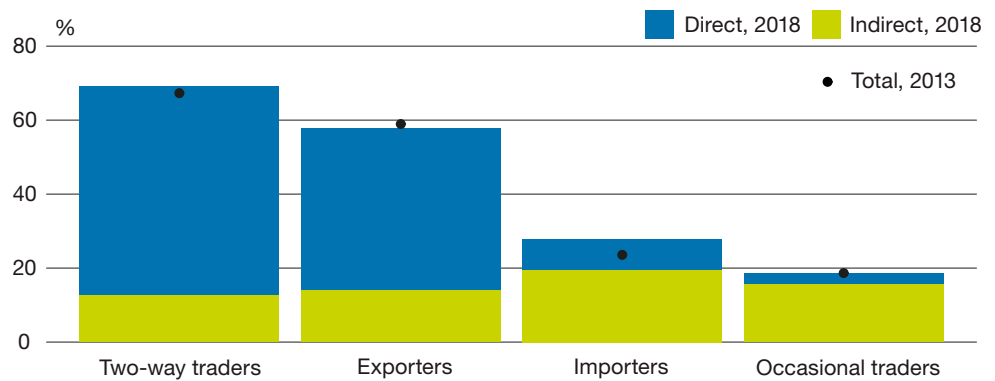
Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S). Manufacturing includes industries 10–33, services includes industries 41–98 and other industries include agriculture, forestry and fishing (1–3), mining industries (4–9) and electricity, gas and water supply (35–39).

*...meaning that even non-exporting firms have significant exposure to foreign markets*

Another way of revealing the importance of domestic supply chains in generating spill-overs from trade is through the trading status of firms. Whilst there is little surprise that two-way traders<sup>6</sup> and exporting firms have very high export intensities in value-added terms (around two-thirds of total value-added), even importing firms and occasional traders have significant dependencies on exports amounting to around one-quarter of their total value-added production – most of it generated indirectly (Figure 2.20).

<sup>6</sup> Exporters (exporting-only firms) are defined as firms' having an export value of more than EUR 5,000 and exporting more than 5% of their turnover, while importers (importing-only firms) have an import value of more than EUR 5,000 and they import more than 5% of their purchases. Two-way traders satisfy the criteria of exporters and importers, while occasional traders satisfy none of these criteria. Note, however, that occasional traders therefore still export and/or import small amounts.

**Figure 2.20**  
Domestic value-added exports as share of total value-added by firm trading status, 2013 and 2018



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other services activity (S).

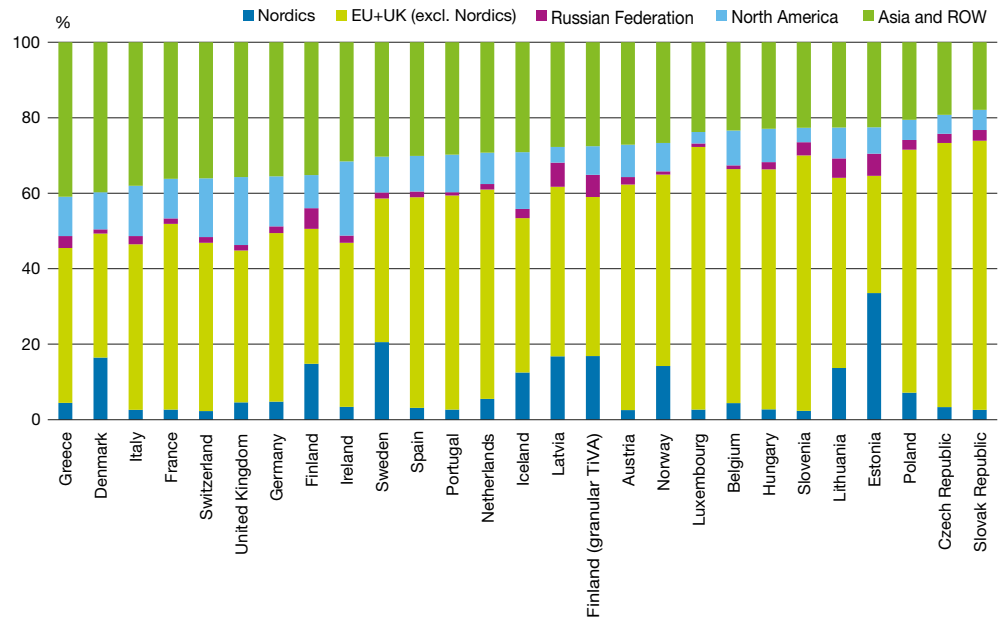
## 2.3 Location matters

Despite the widespread use of the term ‘global value chains’, in truth much of what we see in today’s global production arrangements is still centred around regional production arrangements. That is not to say that inter-regional intermediate trade is not important, it is, especially concerning trade in digitisable services and commodities, but, by and large, manufacturing processes still retain a distinctly regional element, with final goods driving a large part of the global (intra-regional) trade dimension. Just-in-time production processes are an important factor here but so too are communication and transportation costs, despite the widespread falls in recent years – for example, from containerisation and trade agreements.

Even though costs related to distance may be small, they are not ignorable. Countries with intrinsic comparative advantages in manufacturing but on the peripheries of regional trading blocs may still find themselves at a comparative disadvantage. Smaller economies on the periphery have a double disadvantage in this respect, as size biases also interact with location biases, which explains why, in many smaller economies, trade is often significantly skewed towards fewer and neighbouring economies.

Finland, at least in part, suffers from both of these factors but, as shown above, the significant growth in trade in services – which are less affected by size and location biases – can help to mitigate and arbitrage the risks from being overly exposed to downturns in key markets. Compared with many other European OECD economies, Finland has a relatively diversified export orientation, with around one-third of its trade heading to markets outside of the EU and the UK, Russia and the Nordic countries (Figure 2.21). Former Eastern European trading economies, for example, which are deeply integrated into European supply chains, are heavily skewed towards EU trade.

**Figure 2.21**  
Geographic distribution of gross exports by country, 2015



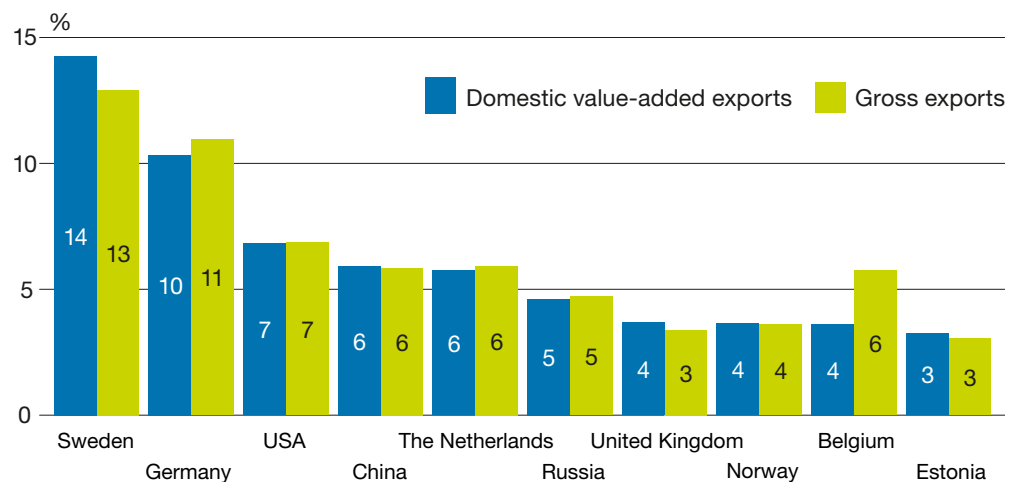
Source: OECD TIVA and Finnish study estimates

*Diversification in far-flung markets can be a blessing and a curse*

Whether this diversification reflects ‘periphery’ effects is difficult to determine but it is notable that Denmark, which is closer to the core of the European factory, also has high exposure to further-flung markets. In a pre-covid-19 world, Finnish levels of broad diversification could have been seen as a strength but with current pressures pushing towards the development of ‘resilient’ global value chains, high levels of exposure to further-flung markets may fall victim to on-shoring or retrenchment of supply-chains.

That being said, a significant share of Finland’s trade is absorbed by a few markets, as consequently are the risk of economic downturns. Two-thirds of Finnish trade is, for example, with ten economies, measured both in value-added and gross terms (Figure 2.22).

**Figure 2.22**  
Finland’s main trading partners, 2018



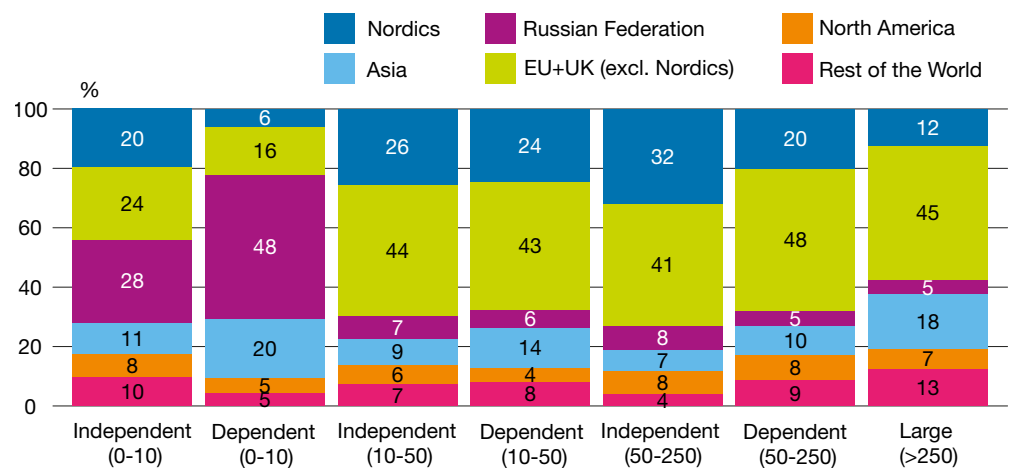
Risks from high dependencies with a few countries have already impacted on the Finnish economy. Sanctions imposed on Russia following its intervention in the Crimea, and especially Russia's ensuing counter sanctions on EU imports, saw the share of trade with Russia halve between 2013 and 2018, exacerbating the slowdown in economic growth. Geo-political tensions are likely to continue in the short-term with regards to Brexit, potentially affecting up to 4% of Finland's exports in value-added terms (see Box 2.1).

### Exposure to markets is not uniformly spread

Because trading patterns vary by firm type, in particular in relation to the size and the ownership of the firm, the benefits that accrue from trade, as well as the potential risks from slowdown, have an unequal impact on different categories of firms (see also Section 2.4).

Larger firms drive much of the exports to markets outside Finland's core neighbourhood (the EU, Nordics and Russia) and, so, are, generally, most exposed to potential covid-19 induced slowdowns in those markets as well as potential shifts in supply chains. The dynamic of differential trade patterns is starkly revealed by micro firms, which have particularly high exposure to Russia (close to half for dependent micro firms and over one-quarter for independent micro firms, Figure 2.23).

**Figure 2.23**  
Domestic value-added exports by destination and firm size, manufacturing industries, 2018



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other services activity (S).

### Young manufacturing firms have disproportionate penetration in Asia... but also exposure

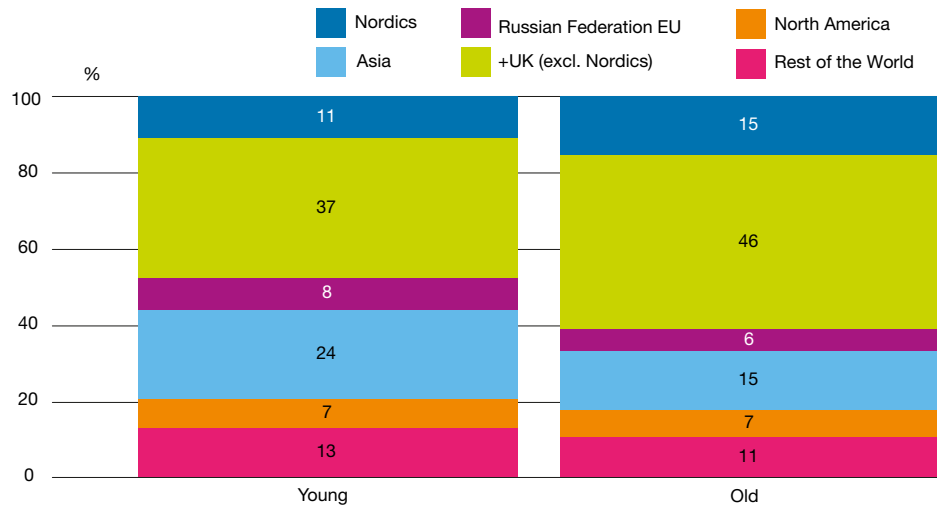
Born globals have successfully penetrated further-flung markets, with nearly a quarter of their trade going to Asia – and half of that to China<sup>7</sup>. However, covid-19-induced impacts may also leave them more exposed to downside risks, especially those younger firms that have liquidity pressures (Figure 2.24).<sup>8</sup>

<sup>7</sup> This corresponds to previous research on born globalism Nordic Council of Ministers (2016), which showed that Finnish born globals export relatively more to further away countries than other Finnish enterprises do, as well as born globals from most other Nordic countries.

<sup>8</sup> Young enterprises are aged five years or less and continue operating in the reference year. Of note is that firms restarting operations with an existing business ID are also considered young, if they satisfy the demographic requirement of a 'dead' firm in a previous reference year (in other words two concurrent years of no operation). Old enterprises are aged six years or more and continue operating in the reference year.

**Figure 2.24**

Domestic value-added exports by destination and firm age, manufacturing industries, 2018



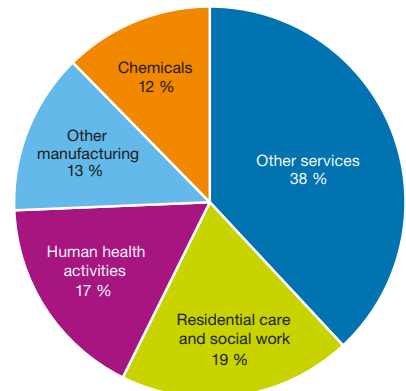
Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other services activity (S).

**Box 2.1 Brexit**

A bad Brexit could have a significant impact on Finnish exports, with up to 4% of Finnish exports in value-added terms ending up in the UK. Indeed, industries importing parts and services from the UK would also be affected – 3% of foreign value-added used in manufacturing industries originates from the UK and 7% for services industries – which could have a further knock on impact of around 2% of exports. Some industries are more highly exposed: the administrative and support services and professional, scientific and technical services industries export 10% and 6% of their total exports to the UK. Industries with high dependency on imports from the UK include the information and communication and transportation and storage industries, with UK imports amounting to close to 7% of their total intermediate inputs.

Although the risks of a hard Brexit should be restricted to trade there may also be spill-overs to investment. UK-owned firms in Finland mainly operate in services industries (Figure Box.2.1), accounting for 1.6% of Finnish GDP and 1.3% of total exports.

**Figure Box.2.1**  
UK-owned firms operating in Finland: value-added shares by industry, 2018



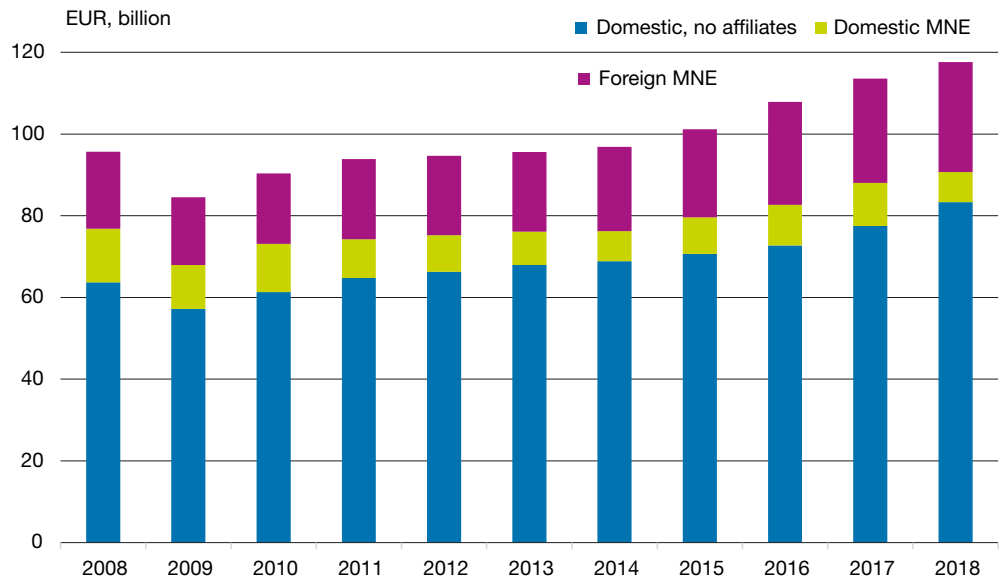
2.4 Spotlight on foreign investment

*Foreign-owned multinationals produced close to one-quarter of total Finnish market sector value-added in 2018*

As shown above, foreign direct investment has been an important driver of Finnish exports, but it is also a significant driver of GDP, accounting for 23% of Finnish whole economy market sector value-added in 2018, up from 20% in 2008 (Figure 2.25).

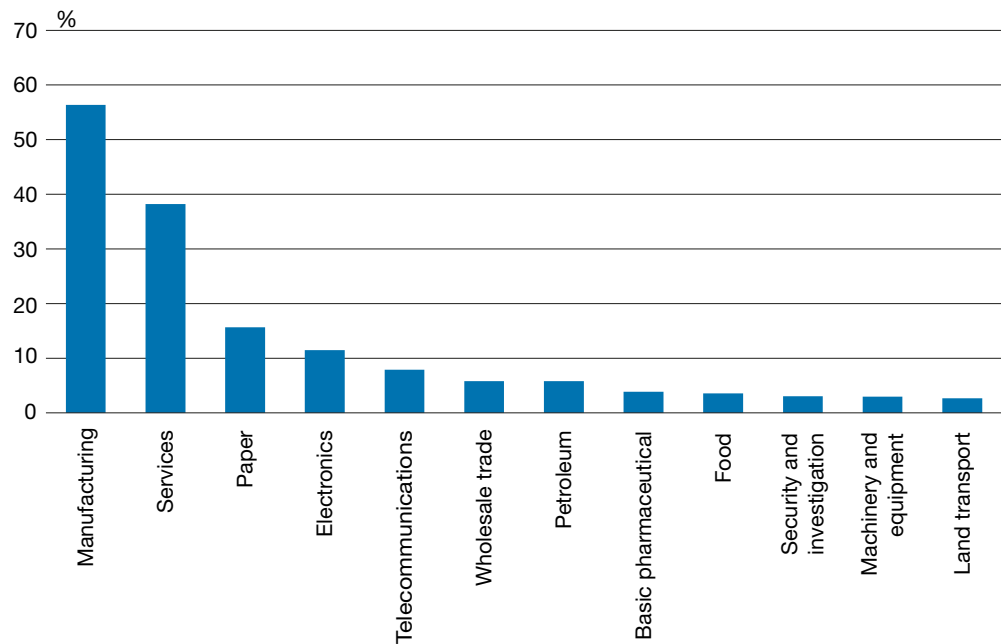


**Figure 2.25**  
Private sector value-added by firm ownership, 2008–2018

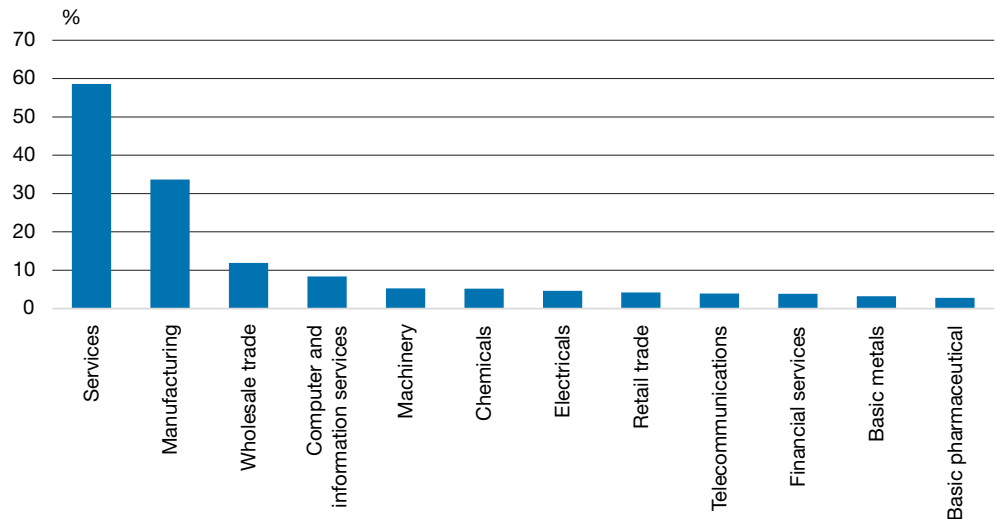


Much of that investment is in service-based activities, which is a marked difference to the pattern of investment by domestic-owned multinationals, meaning that 59% of value-added generated by foreign-owned multinationals was from services industries, compared to only 38% for domestic-owned multinationals (Figures 2.26a and 2.26b).

**Figure 2.26a**  
Share of value-added generated by domestic multinationals by industry, 2018



**Figure 2.26b**  
Share of value-added generated by foreign multinationals by industry, 2018

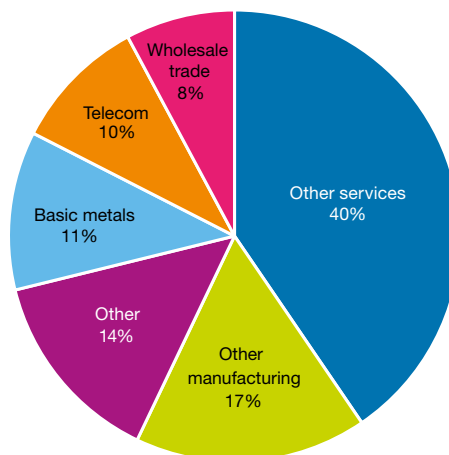


Swedish (6%), US (3%), German (3%), British (2%) and Swiss (1%) owned firms generate the highest shares of value-added by country of ownership.

#### 2.4.1 Swedish investment

Sweden has invested most in the basic metals industry. From 2008 to 2018, total value-added produced by Swedish firms in the basic metals industry tripled to EUR 761 million, and Swedish firms now account for 44% of total value-added in the industry. Swedish-owned firms are also large producers of telecommunications services (EUR 647 million) and wholesale trade (EUR 525 million) (Figure 2.27).

**Figure 2.27**  
Swedish-owned firms operating in Finland: value-added by industry, 2018



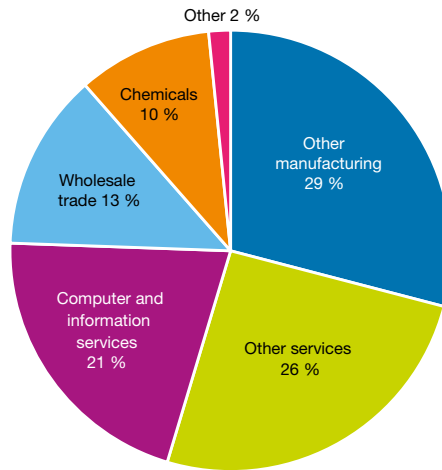
#### 2.4.2 US investment

US-owned enterprises produced most of their value-added in the computer and information services industry in 2018 (EUR 568 million). US-owned firms are a major player in the industry accounting for 15% of value-added in the computer and information services industry.<sup>9</sup> Almost two-thirds (64%) of output of US firms in the industry are exported. Significant investments

<sup>9</sup> At the more detailed level, US firms produce 56% of value-added in the information services (63) industry

also arise in wholesale trade and chemicals industries (Figure 2.28). US firms within wholesale mainly serve the Finnish market – only 3% of turnover is exported, while the chemicals industry is again very export oriented – 65% of turnover is exported.

**Figure 2.28**  
US-owned firms operating in Finland: value-added by industry, 2018



### 2.4.3 German investment

German multinationals produced most of their value-added in the pharmaceuticals industry (EUR 790 million) and accounted for 59% of Finnish production in the industry. German firms also invested in the wholesale and retail trade industries, producing EUR 481 million and EUR 361 million in these industries, respectively (Figure 2.29).

**Figure 2.29**  
German-owned firms operating in Finland: value-added by industry, 2018



### 2.4.4 Investment and trade relationships

Swedish, German and to a lesser extent US firms have a domestic bias when it comes to their international trading partners. Figure 2.30a shows that Swedish and German firms exported significant shares of their total exports back to their parent country in 2018: 35% of Swedish-owned firms' and 47% of German-owned firms' total exports. To illustrate the importance of these relationships, only 13% and 11% of total Finnish exports go to Sweden and Germany, respectively.

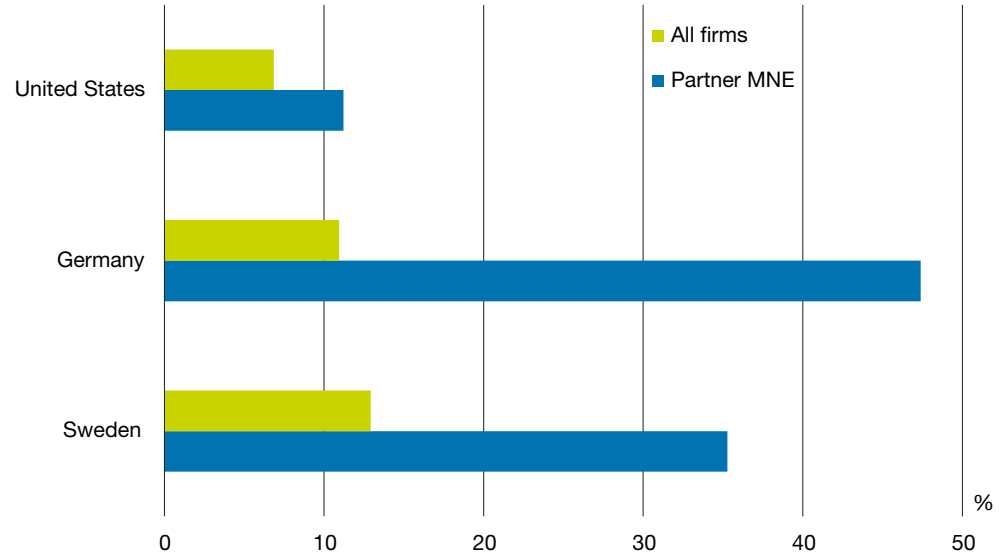
Exports of US-owned firms, however, are relatively less concentrated on their home country, with only 11% exported to the US in 2018. However, some caution is needed in interpreting

trade flows, especially with respect to digitally intensive or knowledge-based industries, as 12% of exports by US firms operating in Finland are exported to Ireland.

Similarly, home countries are also important sources of imports (Figure 2.30b). Again, US-owned firms appear on the surface to import less from the US, but this may reflect fiscal optimisation. US firms operating in Finland also import significantly from the Netherlands, for example.

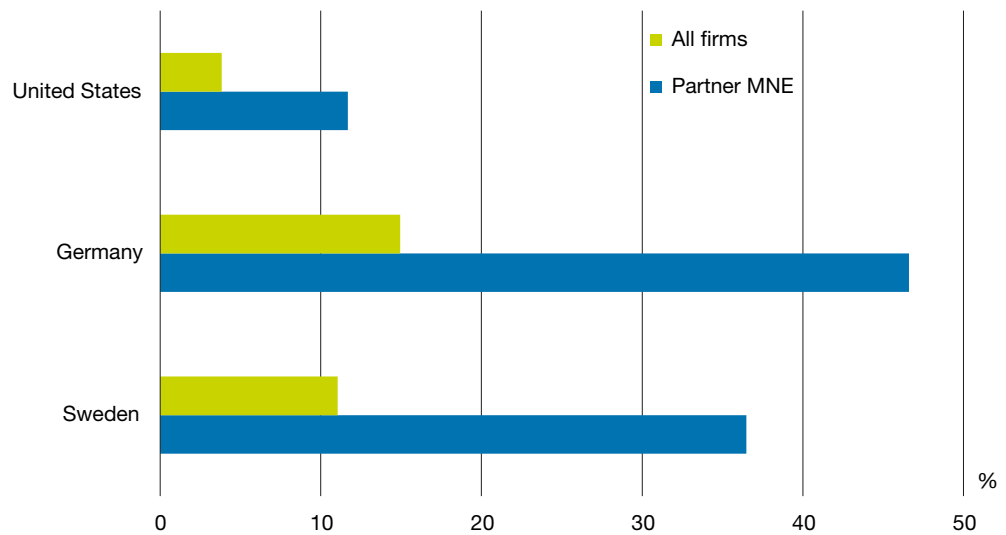
**Figure 2.30a**

Gross export share by partner country for firms owned by partner and all firms, 2018



**Figure 2.30b**

Gross import share by partner country for firms owned by partner and all firms, 2018



# 3. EMPLOYMENT AND GLOBAL VALUE CHAINS IN FINLAND

## Highlights

Around 20% of manufacturing jobs in Finland have been lost in the last decade. With sclerotic labour productivity growth and relatively high unit labour costs over much of the period, Finnish international competitiveness eroded. This resulted in a slow decline in jobs supported by manufacturing exports, which stood at 13.8% in 2016. However, building on its highly qualified workforce, Finland experienced a significant increase in jobs sustained by services exports, which accelerated significantly between 2013 (4.4%) and 2016 (5.8%). Therefore, the share of overall jobs in Finland supported by exports has remained relatively steady at around one in five jobs.

Most of these export-supported jobs are for workers classified as medium-skilled or high-skilled, with only around one in ten jobs classified as low-skilled in 2016 – a group of workers significantly affected by restructurings that occurred since the global financial crisis.

In addition, despite a negligible gender gap in employment at the whole economy level, and despite relatively strong domestic backward linkages in the economy, significant gender gaps exist with respect to jobs supported by exports – with women accounting for only 29% of these jobs – reflecting significant differences by gender in participation rates by industry.

## 3.1 Introduction

There is considerable interest in the impact of globalisation on jobs, especially in developed economies where labour costs, even after adjusting for relative differences in productivity, can be high relative to developing economies. A key concern in this respect reflects labour-intensive activities in developed economies, where higher use of capital to compensate for relative price differences can have only a marginal impact. The initial wave of global value chains saw many firms capitalise on these savings through international outsourcing to lower-cost economies, resulting in declines in the labour intensive, and typically lower skilled parts of their workforces. More recent years saw an acceleration of these trends to other, higher parts of the value chain, often affecting higher skilled workers.

However, through these efficiencies, outsourcing firms have been able to improve their international competitiveness, increase exports and, consequently, jobs through specialisation in higher parts of the value chain, creating, in theory, overall win-wins. New firms have been created precisely because they were able to specialise in niche activities that international fragmentation has provided.

Nevertheless, within this churning of jobs there have been winners and losers. Even if the losers may only be temporary as they re-skill to engage in new activities where their country has carved out comparative advantages, this churning is an important element behind the broad backlash against globalisation. This chapter tries to provide information, data and broader insights on the issue in the case of Finland.

## 3.2 Background

To help frame the discussion in the sections that follow, this section provides an overview of the structure of the labour market and the changes that have been observed in recent years. However, it is important to introduce a few caveats in advance.

Whilst the bigger picture on employment at the industry level are drawn from annual national accounts data, which captures all employment in the labour force, including the self-employed, the information on individual firms is only, generally, available for incorporated firms, i.e. those with employees, using data available in the Finnish Longitudinal Employer-Employee Database (FLEED before 2016 and FOLK thereafter).

For industries where the self-employed contribute only marginally, such as manufacturing, differences in the levels of employment from the two sources are not significant. However, this

is not the case for all industries and so, some care is needed in interpreting the more detailed results below. The caveats mainly concern the agricultural industry and household-oriented services, meaning that the caveats are generally not needed in assessing the employment dynamics in most industries.

However, the caveats are needed when looking at the aggregate picture broken down by firm type. These aggregations will tend to overstate the contribution of larger firms relative to smaller firms. By the same token, estimates of skills breakdowns may also be affected if the skills profile of the self-employed differs significantly from the profile of employees operating in the same industry. There is no strong a priori reason why this may be so, much depends on the factors that drive individuals into self-employment, but the evidence that looks at skills profiles of employees across different categories of firms suggests there may be differences. Typically, although not always, the smaller the firm the lower the skills requirements. If this bias also applies in the case of the self-employed, it follows that low-skilled jobs relative to higher skilled jobs will be underestimated.

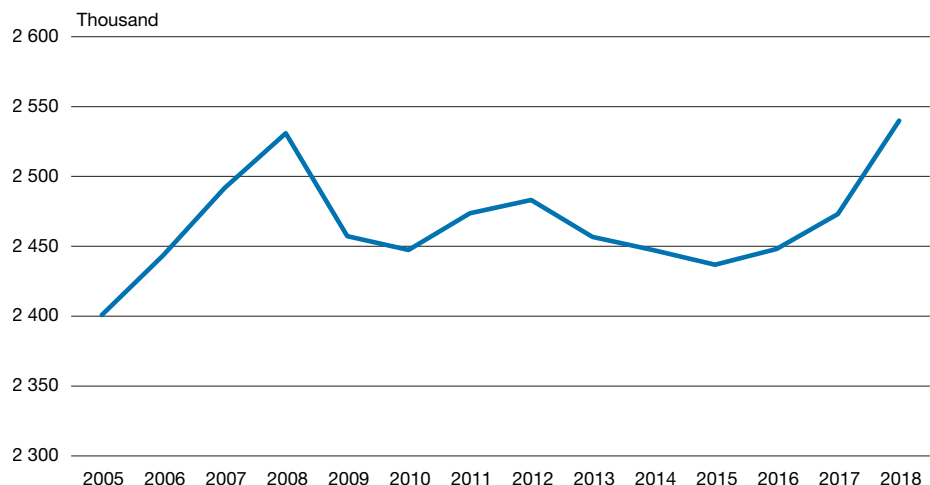
One final caveat is needed with respect to estimates of skills. Because skills are proxied by measures of educational attainment they are: (i) not a perfect proxy – for example, there are likely to be cases of skills-educational attainment mismatches in the labour force (e.g. PhD students working part-time in a fast-food store); and (ii) may overstate the shift towards higher-skilled jobs that is taking place in the economy (as it is in many other OECD economies), as Finland, like many other countries, experiences increases in participation in higher education. This means, in particular, that some care is needed in cross-linking results of skills and age.

Finally, all measures of employment in chapter 3 refer to number of employees and not full-time equivalents. Note that the same caveats also apply, but are not repeated, in Chapter 4.

### *Significant loss of jobs in nearly all manufacturing industries*

Between 2008 and 2016 – the target reference period for this section given the current coverage of the FLEED data – the Finnish economy shed close to 40,000 jobs (around 1.5% of all jobs), with employment only returning to pre-financial crisis levels in 2018 (Figure 3.1). However, the relatively small overall change and pattern of growth over the period masks significant churning and structural change (Figures 3.2 and 3.3).

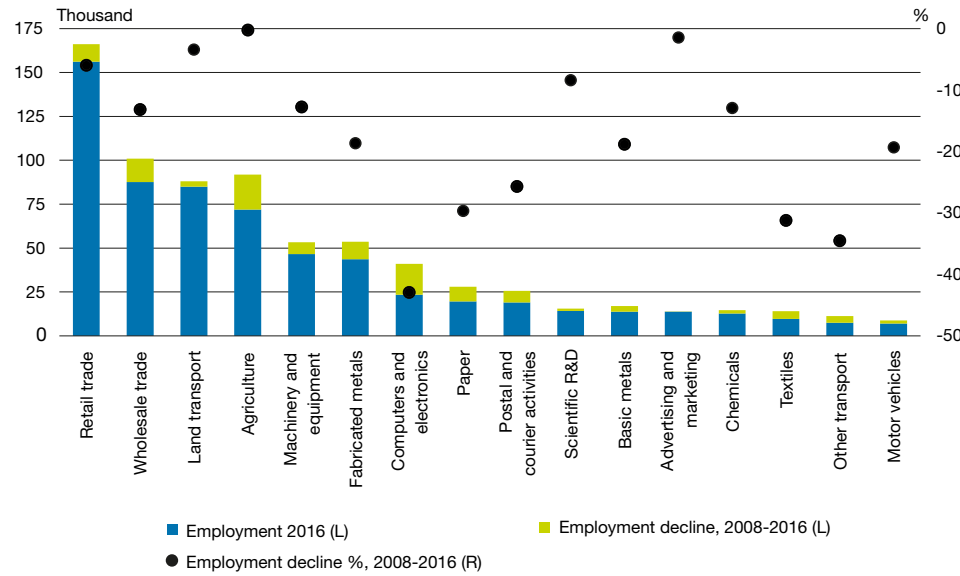
**Figure 3.1**  
Employment in Finland, 2005–2018



Source: Annual Labour Force Survey

Manufacturing industries as a whole, for example, shed around 80,000 jobs (around 20%), with the sharpest contractions in industries highly exposed to foreign competition: computers and electronics (17,600) and textiles (4,400); both shedding over 30% of their total employment (Figure 3.2). However, many domestically oriented activities also saw significant retrenchment. Wholesale and retail, for example, lost around 20,000 jobs, as did the agriculture, forestry and fishing industries.

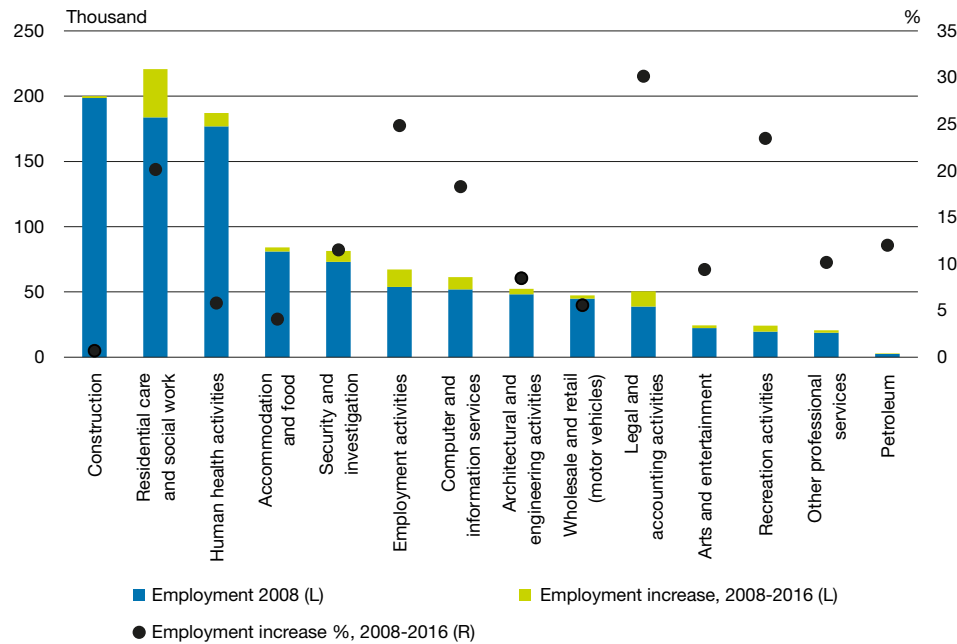
**Figure 3.2**  
Industries with declining employment between 2008 and 2016



Source: National accounts employment data

Largely offsetting these losses were health and social services, which together generated close to 50,000 net new jobs between 2008 and 2016. Computer and information services also added close to 10,000 new jobs (Figure 3.3).

**Figure 3.3**  
Industries with increasing employment between 2008 and 2016



Source: National accounts employment data

*Globalisation looks like a smoking gun for job losses in many manufacturing industries*

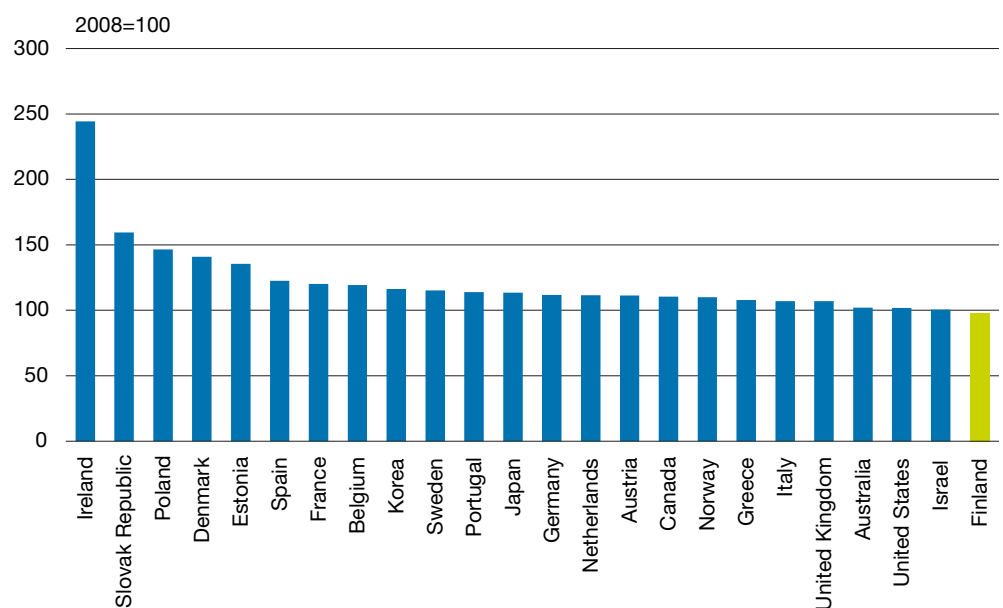
Without further detailed analyses looking into a number of factors, it is not prudent to be unequivocal about the causes underpinning the significant contraction in manufacturing jobs in Finland. Many other countries have also experienced significant employment declines in these industries, whilst also increasing output driven by productivity growth. However, for Finland,

the picture, at least for the period covered in this report, points more strongly towards increased foreign competition and eroding international competitiveness (see also Figure 1.2) as factors explaining the decline.

In virtually all industries of manufacturing, with the notable exceptions of chemicals, pharmaceuticals and basic metals, output (value-added) in volume terms contracted – often significantly – over the period 2008-2016. Indeed, there were close to 3,000 (nearly 10%) fewer manufacturing firms in 2016 than there were in 2008; many of these were small micro enterprises, but one fifth were firms with 10 or more employees. Moreover, despite the significant contraction in employment, labour productivity in Finland (in 2008 prices) also fell over the period – Finland is the only OECD country not to have seen net labour productivity growth between 2008 and 2016 (Figure 3.4). Although, in more recent years, there has been significant growth in labour productivity, Finland remained behind all OECD countries bar Greece and the United Kingdom in 2018.

**Figure 3.4**

Labour productivity in OECD countries, 2016 (2008=100), 2008 prices



Source: OECD productivity database

*But integration within GVCs may have helped to dampen a broader erosion in international competitiveness*

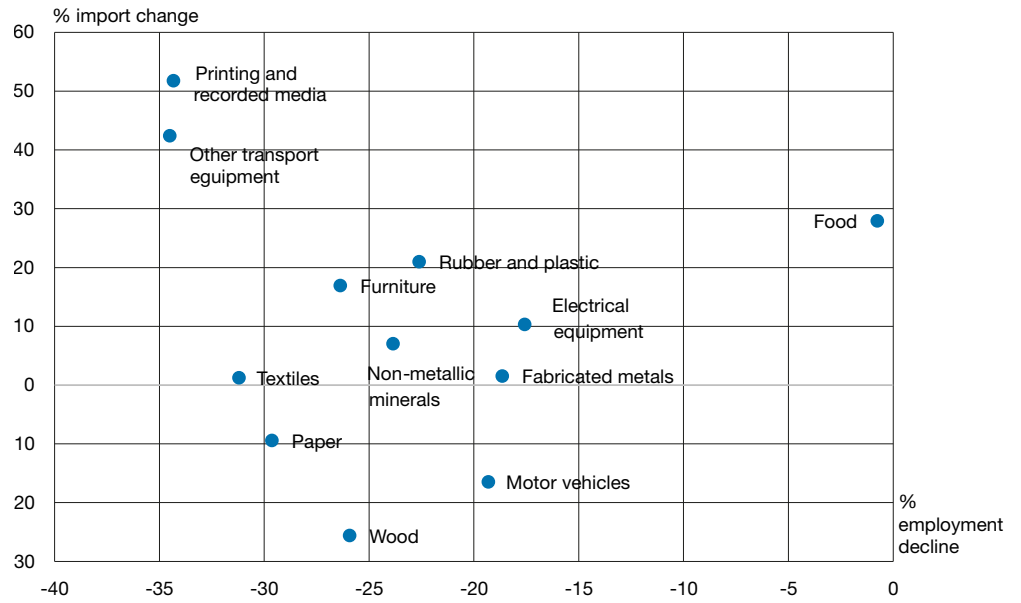
Notwithstanding the need to avoid drawing overly strong conclusions without further analyses, the strong correlation in competitive import growth and job losses in comparable industries (Figure 3.5) points strongly to globalisation induced job losses – with eroding international competitiveness (higher unit labour costs) playing a role. Adjusting for falling prices in imports is likely to result in an even stronger correlation of falling jobs and rising imports in volume terms. In industries highly dependent on intermediate imports, such as motor vehicles, imports also contracted but by significantly lower percentages than the fall in jobs.

Figure 3.6 reveals that nearly all categories of manufacturing firms were affected, reflecting the impact of negative spill-overs from reduced output in exporting firms cascading down to upstream manufacturing suppliers. However, it also reveals that two-way traders, on average, fared comparatively better (in particular dependent firms), suggesting that access to cheap intermediate imports provided a dampening effect on a broader erosion of competitiveness that may have arisen from higher upstream domestic prices.



**Figure 3.5**

In most contracting manufacturing industries with negative productivity growth, higher imports were strongly correlated with job losses



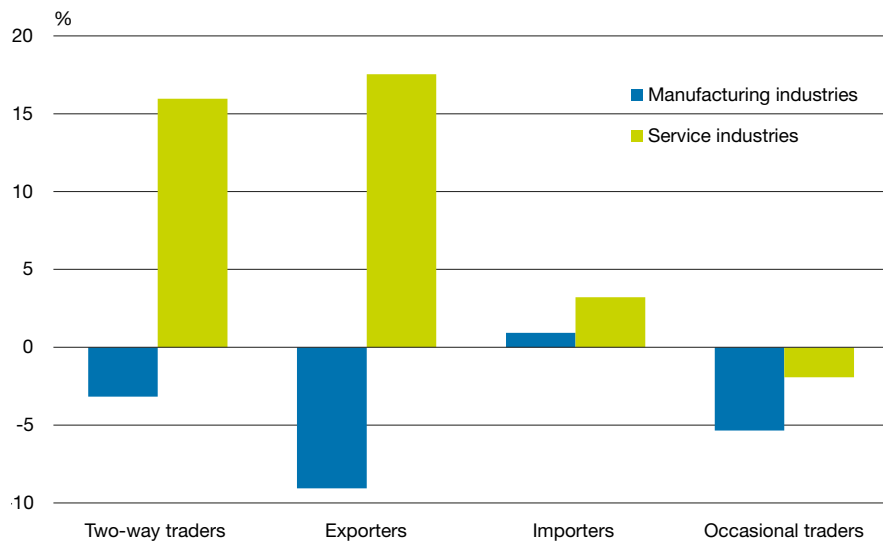
Note: Excludes the computer, electronics and optical products industry (26) as the significant contraction in the industry also led to a significant contraction in intermediate imports. The petroleum industry is also excluded.

*But globalisation has also provided a source of significant services jobs growth...*

Although a significant part of job growth in industries with net job gains between 2008-2016 has been in largely domestically orientated activities, such as health and social care, the flip side of manufacturing job losses has been significant growth in jobs of exporting firms in the services industries such as IT and information services (Figure 3.3). In fact, average annual employment growth in exporting services firms amounted to more than 15% in nominal terms between 2008 and 2016 (Figure 3.6).

**Figure 3.6**

Average annual employment growth by firm trading status, manufacturing and services industries, 2008–2016

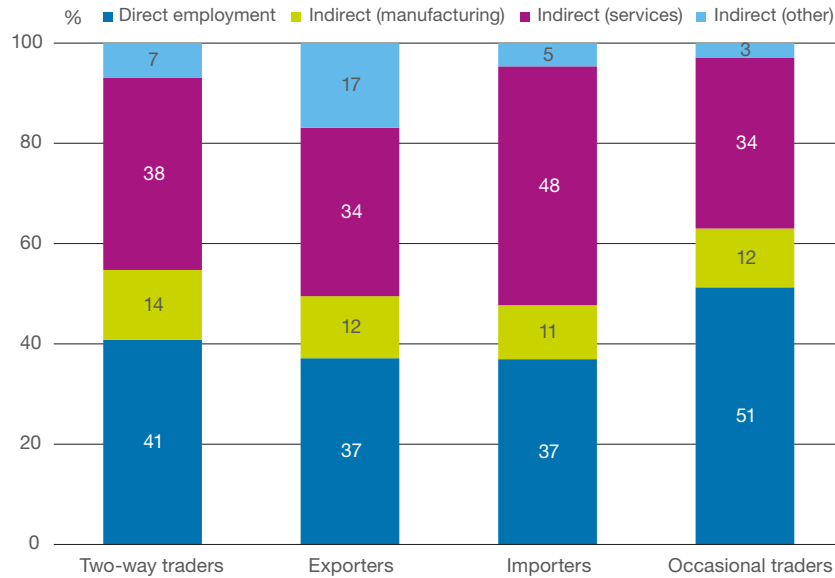


Note: manufacturing includes industries 10–33 and services includes industries 34–98.

...which has helped to mitigate the upstream impact on services jobs lost due to declining manufacturing exports...

The strong growth in direct services exports helped to offset jobs lost in services industries due to their backward linkages to contracting manufacturing industries: around 40% of all jobs supported by manufacturing exports are in service industries (Figure 3.7).

**Figure 3.7**  
Jobs embodied in manufacturing exports, by trading status, 2016



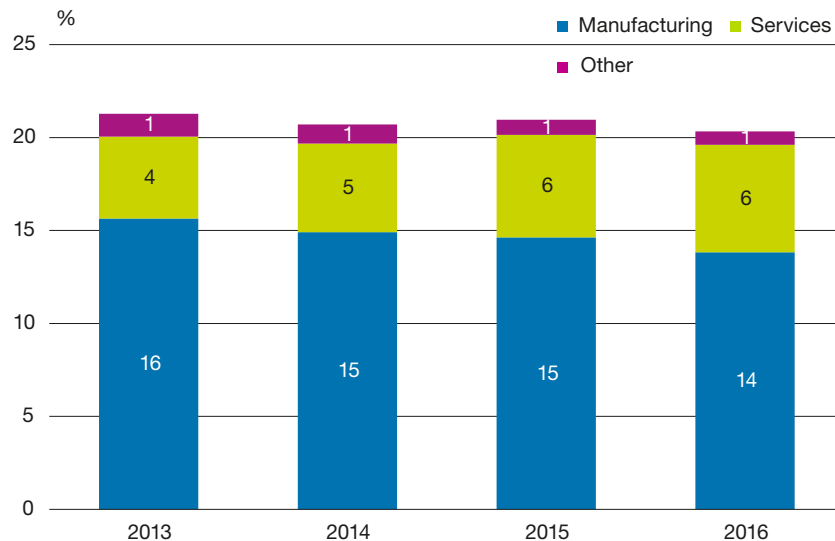
Note: Indirect employment refers to employment in firms sustained by demand from manufacturing exporting firms. These source firms may operate in manufacturing (source manufacturing) or services (source services) industries.

Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

...and in turn mitigated the declining share of overall jobs sustained by exports, which remains at around one-fifth of all jobs

The decline in the contribution of manufacturing industries exports to overall direct and indirect jobs sustained by exports – which fell by 1.8 percentage points between 2013 and 2016 – has been largely offset by growing direct services exports – which increased by 1.4 percentage points over the same period (Figure 3.8).

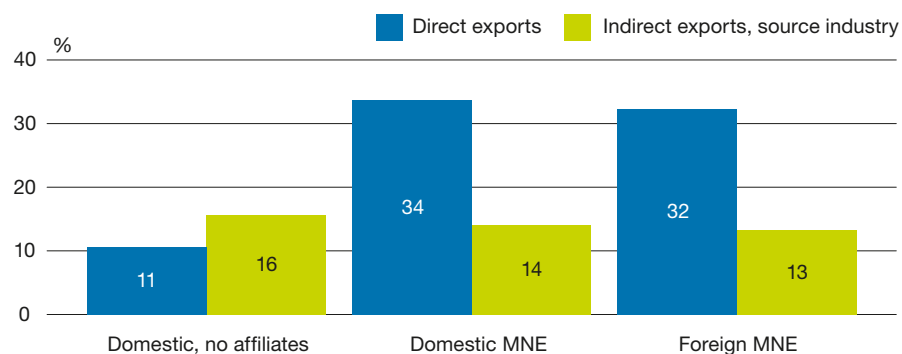
**Figure 3.8**  
Jobs embodied in exports by exporting firm industry, 2012–2016



*Multinationals have played an important role in sustaining jobs dependent on foreign demand*

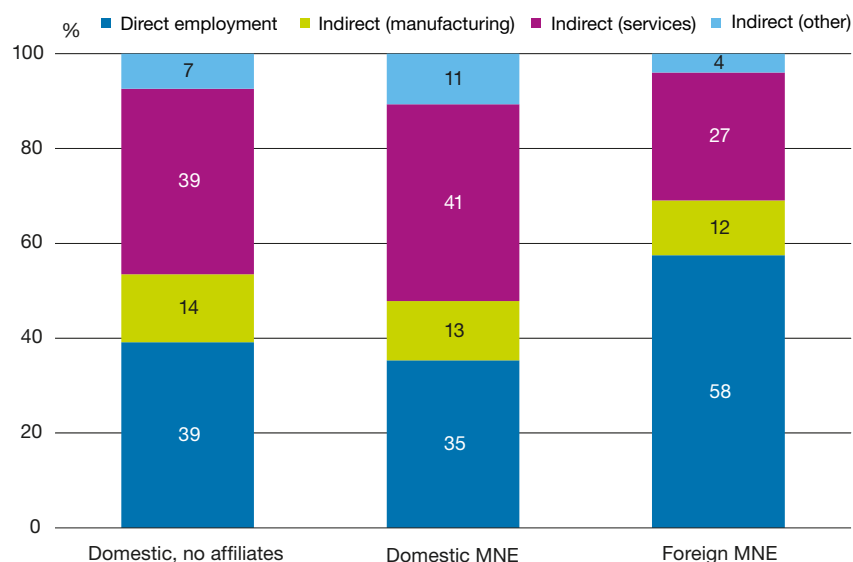
Over 45% of jobs in multinationals are sustained by exports (Figure 3.9), although foreign owned-multinationals in manufacturing industries – who typically have higher foreign content – generate fewer upstream jobs relative to direct jobs sustained (Figure 3.10).

**Figure 3.9**  
Share of total firm type employment embodied in direct exports and indirect exports by firm ownership, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities(S).

**Figure 3.10**  
Jobs embodied in manufacturing exports by firm ownership, 2016



Note: Indirect employment refers to employment in firms sustained by demand from manufacturing exporting firms. These source firms may operate in manufacturing (source manufacturing) or services (source services) industries.

Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

### Box 3.1 Employment and MNEs

As shown above, and indeed throughout this report, foreign direct investment is an important channel for driving integration into GVCs, and in turn, for sustaining and generating jobs, both directly within the MNE, and indirectly through upstream domestic value chains that supply the MNE.

As described in Chapter 2, the industries in which foreign firms invest in Finland is highly related to the comparative advantages of the investing firms and their parent countries. As such, spillovers into the wider economy and the degree of integration within GVCs will also vary depending on the investing country. Some MNEs invest in Finland to capitalise on comparative advantages, to create efficiencies in their global production processes (for example, US firms investing in ICT service industries) or to boost Finnish exports, whilst others invest to access local markets (for example, Swedish firms investing in retail industries).

To help paint a picture of these differences, this box provides descriptive statistics looking at the direct jobs sustained by foreign MNEs broken down by the investing country. The data are shown as a box rather than a separate section, as the focus is less on understanding the nature of these firms GVCs engagement. It is also designed to drive thinking on potential follow-ups to this report that take a closer look at the nature of foreign direct investment and its impact on the economy and jobs.

Typically, there is a bias for a greater share of trade of an affiliate with its home country (see also section 2.4.4), whether through higher imports of goods and services or through exports (for those companies investing in Finland to capitalise on its comparative advantages). In practice, this means that decompositions of gross exports into value-added by country-of-origin, using current TiVA estimates, will typically underestimate the degree of the importing country's own contribution of its imports from Finland. In an extreme case, there may be such differentiation in the nature of intermediate imports, that intermediate imports from one country, or a small group of countries, are used to generate exports whilst similar intermediate imports from other countries are used in the production of similar goods and services to those that are exported, except that they are sold uniquely in home markets.

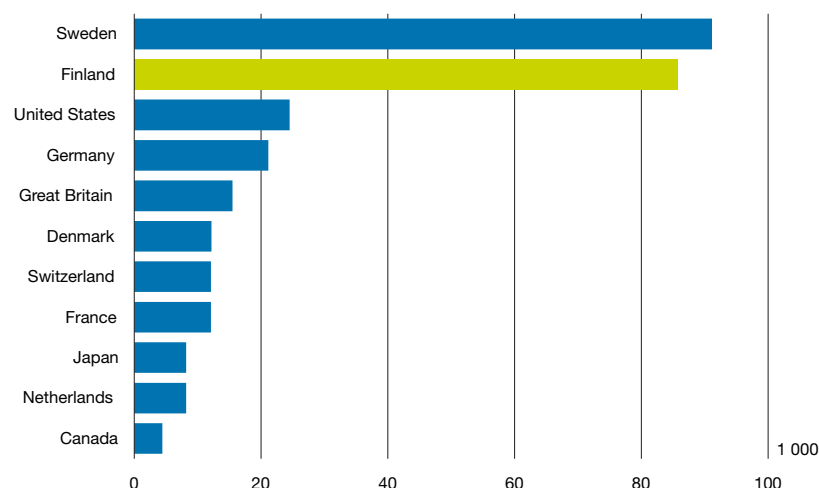
Similarly, this will also mean that jobs in Finland dependent on access to those imports, and thereby imports from specific countries, will be underestimated. An area that has not been possible to investigate in this report, and indeed, an area that still remains largely unexplored in most existing analyses using TiVA data. Building on the strong collaboration developed between the OECD and Statistics Finland, these dependencies could be investigated in a follow-up to this report.

*The number of employees working at Swedish-owned firms in Finland (91,000) is now higher than the number of employees in Finnish multinationals (86,000)*

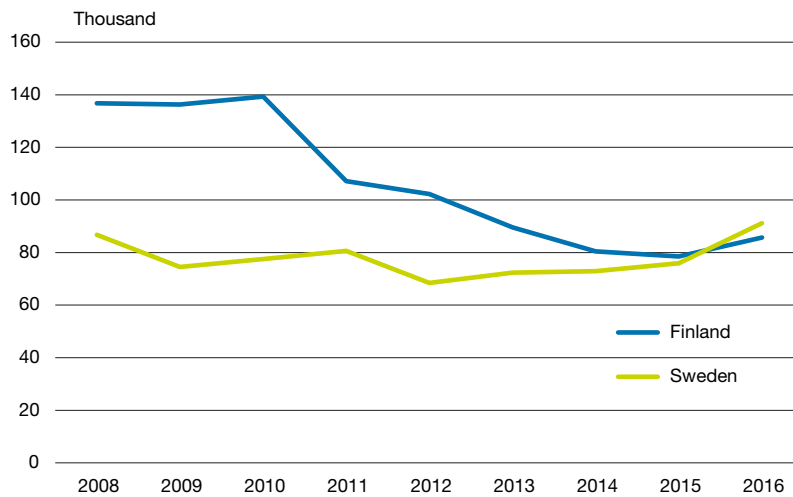
Foreign-owned multinationals contributed about 240,000 jobs to Finnish employment in 2016 – about 17% of the private sector labour force. Due to strong geographical, economic and cultural ties, over one-third (91,000) of these jobs are in Swedish owned firms; 5% higher than in 2008. US-, German- and UK-owned multinationals combined employed 61,000 people in 2016 (Figure Box.3.1).

On the other hand, employment in domestic-owned multinationals declined by 37% between 2008 and 2016. This decline is primarily due to restructurings in high-tech manufacturing industries, restructurings that reshaped not only employment but the whole Finnish economy. The aggregate decline in domestic MNE-employment led to Swedish-owned firms surpassing domestic MNEs in total employment by 2016 (Figure Box.3.2).

**Figure Box.3.1**  
Employment in MNEs by ownership country, 2016



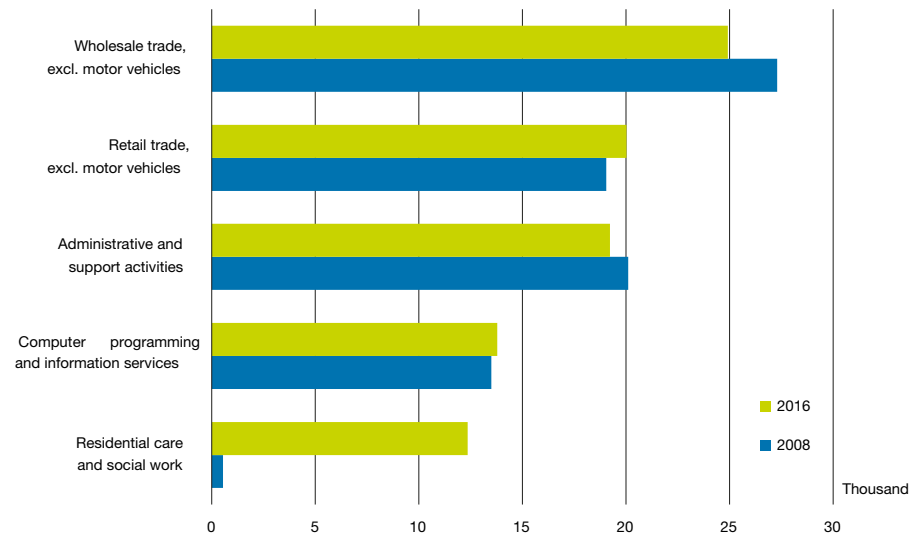
**Figure Box.3.2**  
Employment in Finnish and Swedish MNEs, 2008–2016



*The wholesale and retail trade industries drive the employment figure of foreign MNEs*

In 2016, the industries where foreign MNEs employed most workers were the wholesale and retail trade (46-47), office administration and support service (80-82), computer programming and information service (62-63), and residential care and social work (87-88) industries. Wholesale and retail trade was by far the largest industry, contributing a total of 45,000 jobs (Figure Box.3.3). The most significant increase in the number of jobs occurred in the residential care and social work industries, reflecting considerable investment from Sweden and the UK.

**Figure Box.3.3**  
Employment in foreign MNEs in Finland, selected industries, 2008 and 2016



### 3.3 Jobs and skills

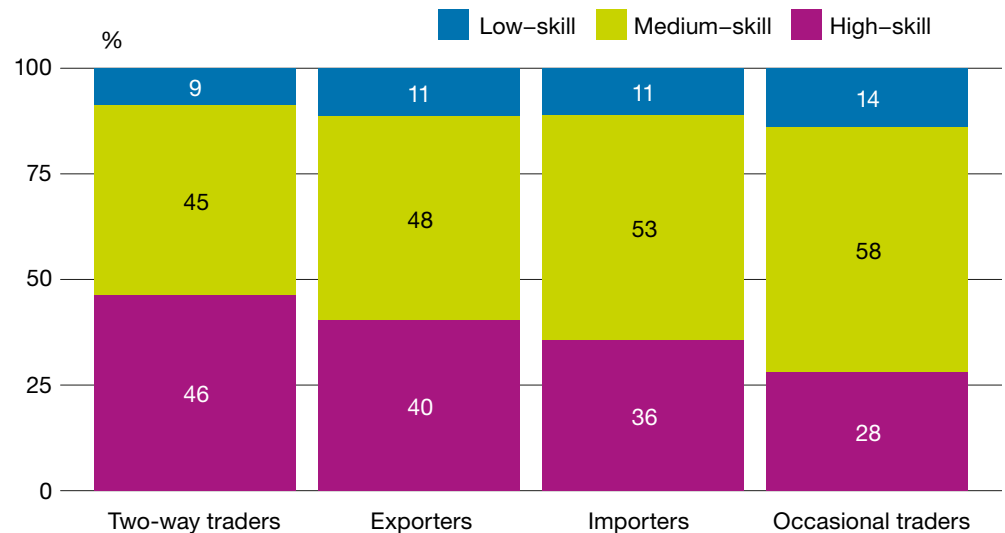
*The skill composition of the Finnish labour force appears to have shifted strongly towards high and medium-skilled employees.*

In 2016, about 35% of the Finnish market labour force was high-skilled and 53% medium-skilled, both having seen an increase of 3 percentage points since 2008.<sup>1</sup> Between 2008 and 2016, the share of jobs classified as low-skilled declined by about 88,000 and was spread broadly across industries.

Export oriented firms and MNEs hire more high-skilled workers and their exports take in disproportionately more higher-skilled employees from upstream firms.

Two-way traders employed proportionally more high-skilled workers, at 46%, as a share of their workforce than other firms in 2016 (Figure 3.11a). The same goes for both domestic and foreign MNEs where the labour force consisted of 45% high-skilled employees, compared to 31% in purely domestic firms (Figure 3.11b). Nearly two-thirds of jobs in two-way traders are sustained by exports, while nearly one-sixth of jobs in occasional traders are sustained through indirect channels (Figure 3.11c).

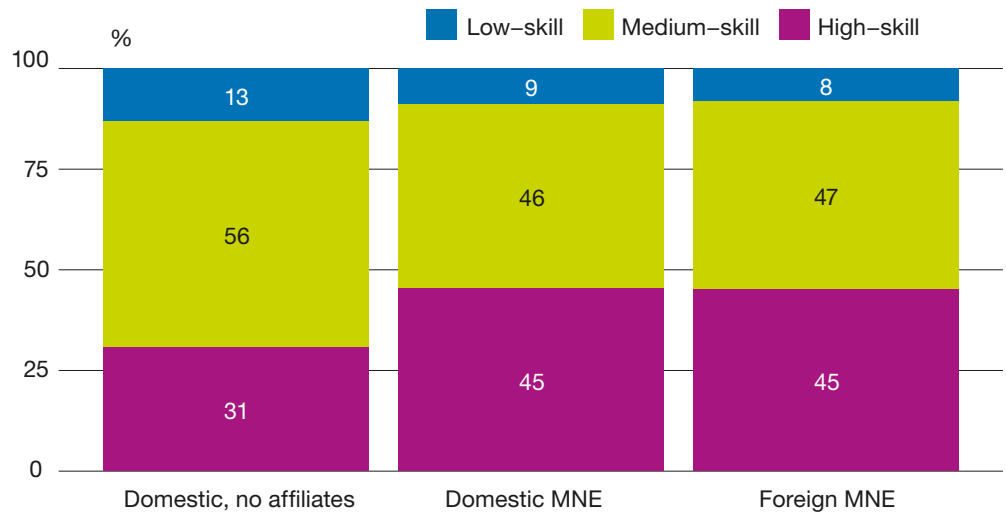
**Figure 3.11a**  
Employment by firm trading status and employee skill, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

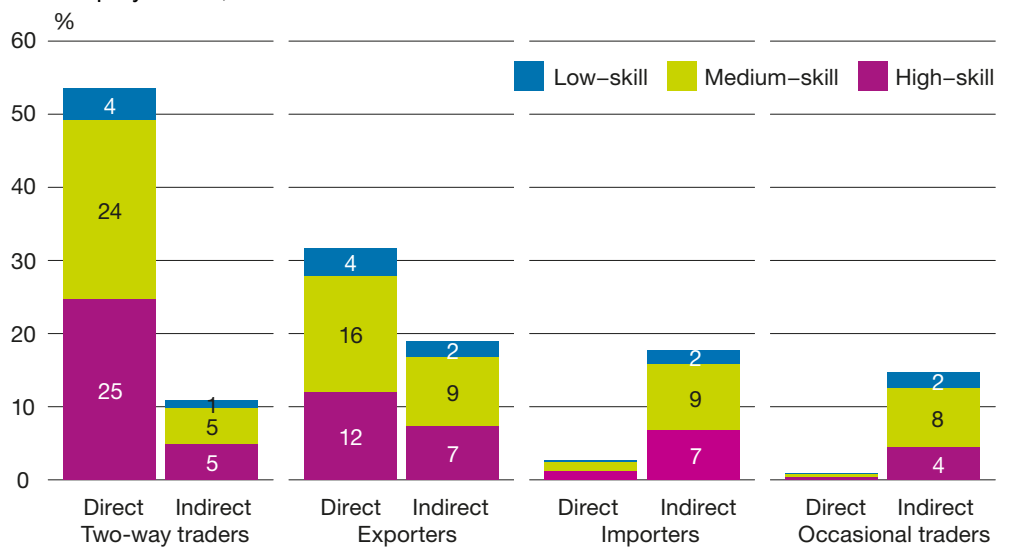
<sup>1</sup> Employees are divided into three groups by level of education: *low-skill*, *medium-skill* and *high-skill* employees. The groupings are based on the *International Standard Classification of Education* maintained by the UNESCO Institute for Statistics. The education classifications are explained in detail in (UNESCO Institute for Statistics, 2012). Employees with education levels *early childhood education* (code 0), *primary education* (code 1), *lower secondary education* (code 2) or *unknown level of education* (code 9 or no code) are considered low-skill employees. Employees with education levels *upper secondary education* (code 3) or *post-secondary non-tertiary education* (code 4) are considered medium-skill employees.

**Figure 3.11b**  
Employment by firm ownership and employee skill, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

**Figure 3.11c**  
Jobs embodied in domestic value-added exports by firm ownership and employee skill, 2016



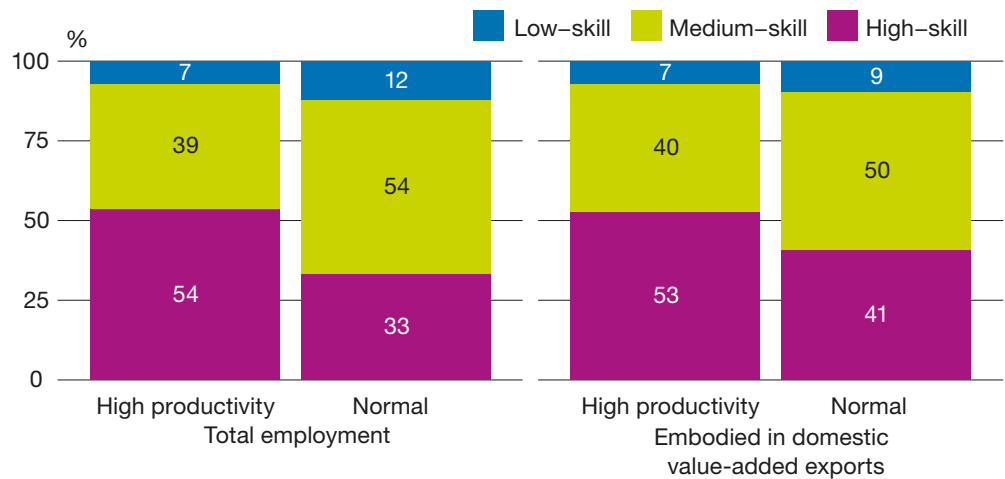
Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

*Higher productivity firms also hire disproportionately more high-skilled workers*

High productivity firms<sup>2</sup> hire disproportionately more high-skilled workers than other firms, at over 50% compared to one third in other firms. Although gaps narrow with respect to shares embodied in exports, they remain significant at over 10 percentage points (Figure 3.12).

<sup>2</sup> The most productive enterprises are defined as the top 5% of firms (10 FTEs or more) with the highest value-added per FTE with respect to each industry.

**Figure 3.12**  
Employment and jobs embodied in exports by firm productivity and employee skill, 2016

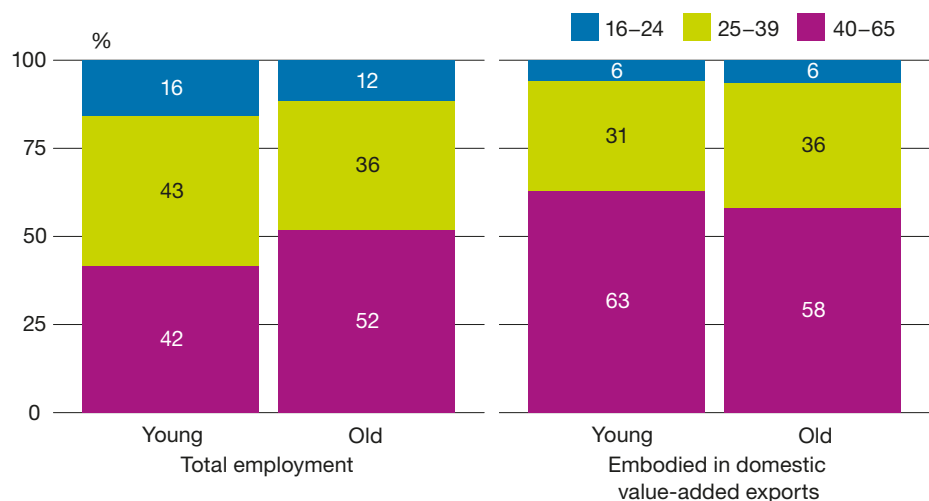


Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

*Although younger firms hire proportionally more young employees, younger exporting firms do not*

Nearly 60% of employees in young firms are aged under 40 years compared to fewer than 50% in older firms. However, positions are reversed when considering the jobs embodied in exports broken down by age, suggesting that export-oriented young firms employ disproportionately more experienced workers than their non-exporting counterparts (Figure 3.14).

**Figure 3.13**  
Employment and jobs embodied in exports by employee age and firm age, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).



### Box 3.2 STEM and DDC qualifications

Nearly 30% of the Finnish market labour force has Science, Technology, Engineering, and Mathematics (STEM) educational qualifications and 8% has Deep Digital Competency (DDC) qualifications. The share of employees with these qualifications has remained quite stable since 2008. However, there is a strong gender bias among STEM and DDC employees – only 12% of employees with STEM qualifications are female and the share is even lower among DDC qualified employees (6%). The share of female employees holding these qualifications is lower in Finland than in many other countries.<sup>3</sup>

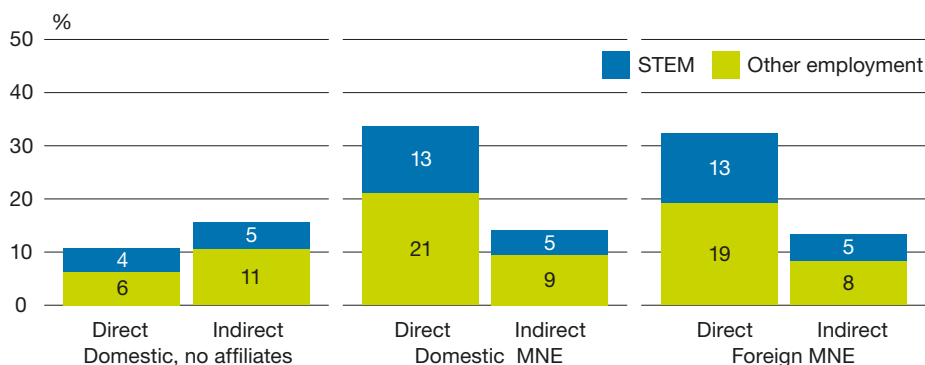
#### STEM and DDC qualifications matter more for certain industries

In the repair and installation of machinery (33) and architectural and engineering (71) industries, nearly 70% of employees have STEM qualifications. Human health activities (86), on the other hand, has the lowest STEM rate of all industries. The petroleum (19), chemicals (20), electrical equipment (27), and electricity and gas (35) industries have the highest employment rates for DDC qualified employees

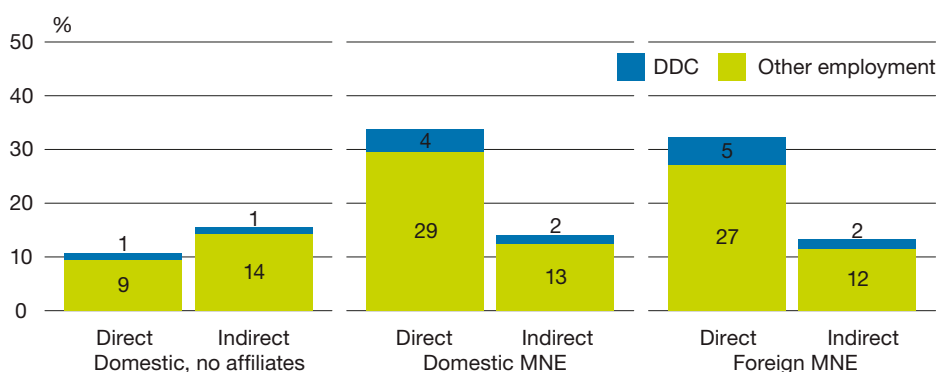
#### A significant share of MNE exports require STEM qualifications

Trade requires competences in STEM and DDC. Figure Box.3.4 and Figure Box.3.5 show that MNEs have much higher percentages of jobs in STEM and DDC categories embodied in exports than non-MNEs. For example, nearly one in five jobs (18%) in MNEs are STEM qualified jobs sustained by exports either directly or indirectly, compared to less than one in ten for other firms, whilst 6-7% are DDC qualified in MNEs compared to 2% in non-MNEs.

**Figure Box.3.4**  
Employment embodied in domestic value-added exports by firm ownership and STEM/non-STEM employees, 2016



**Figure Box.3.5**  
Employment embodied in domestic value-added exports by firm ownership and DDC/non-DDC employees, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

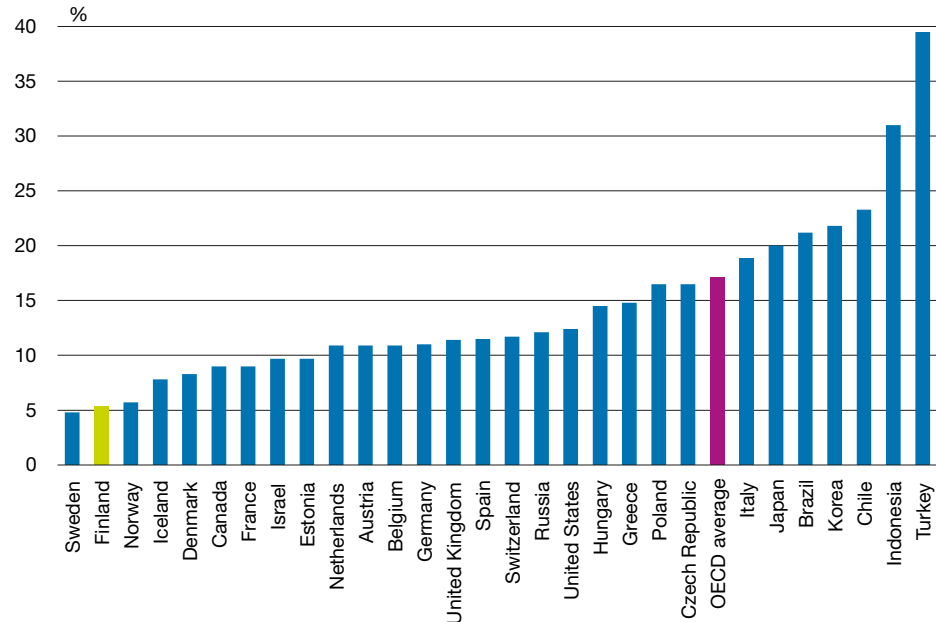
<sup>3</sup> See also an article on this topic “Economists discover the power of social norms”, the Economist, 6 Feb 2020

## 3.4 Gender and employment

### *Finland has the second lowest gender employment gap in the OECD*

In 2016, the female labour participation rate in Finland was 64%, well ahead of the OECD average at 53%. In fact, the Finnish employment gap between men and women was the second lowest in the OECD in 2016 (Figure 3.14).

**Figure 3.14**  
Male to female employment rate gap by country, 2016

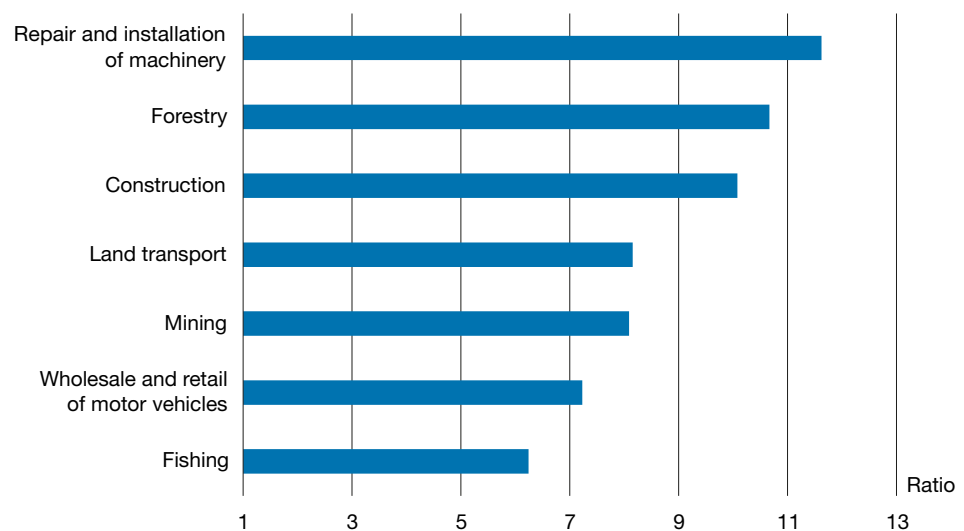


Source: OECD Employment database

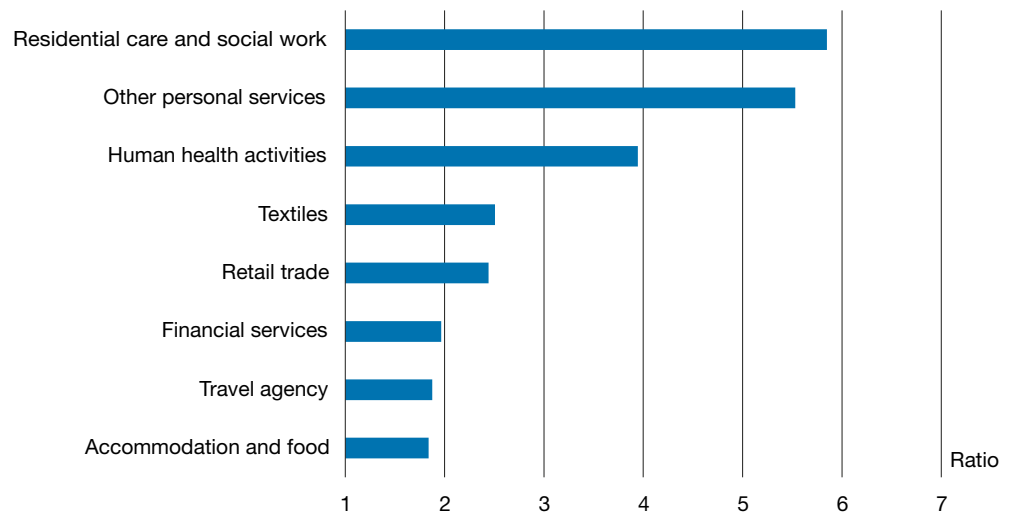
### *Female participation varies significantly by industry...*

There is a clear distinction between male and female employment at the industry level, with significant differences in participation in industries such as repair and installation of machinery (33), forestry and logging (02), and construction (F). For example, in repair and installation of machinery, the male to female labour ratio is 12 to 1. On the other hand, in industries such as residential care and social work (87-88), the number of female employees is almost six times higher than the number of male employees (Figure 3.15a and 3.15b).

**Figure 3.15a**  
Industries with the highest male-to-female participation rates, 2016



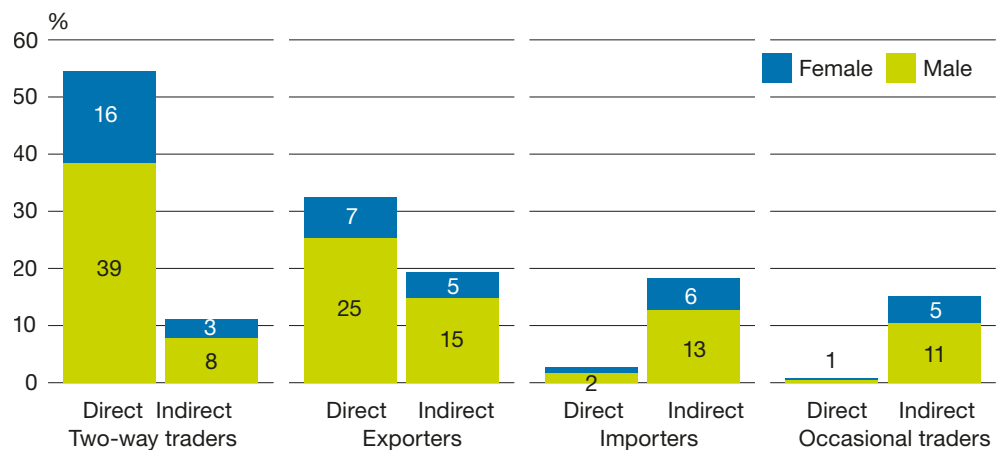
**Figure 3.15b**  
Industries with the highest female-to-male participation rates, 2016



*...which impacts on women's share of jobs supported by exports*

At the aggregate level, women's share of jobs supported by exports is significantly lower than the share for men, at 29% compared to 39% in the whole private sectors. As women are disproportionately employed in non-exporting firms, their direct contribution to Finland's exports is significantly lower than that of their male counterparts. However, many non-exporting firms employing relatively more female workers provide upstream goods or services to exporting firms, consequently bringing up female employees' indirect contribution to Finnish exports (Figure 3.16).

**Figure 3.16**  
Jobs embodied in domestic value-added exports by gender and firm trading status, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

## 4. WAGES, WAGE EQUALITY AND GLOBAL VALUE CHAINS

### Highlights

Significant wage gaps exist between industries, reflecting in part skills requirements but also the degree of integration into global value chains (GVCs). Export-oriented firms and multinationals pay a significantly higher wage than the average firm does, and they also have much smaller within-firm pay gaps. Although marginally, pay has also increased more rapidly in these firms.

However, there are signs that within-firm pay disparities may be increasing. With the top one percent of earners having seen disproportionate wage growth in the last decade and pay for the bottom ten percent having seen little change, within-firm wage inequality has increased across all firm types.

Gender pay gaps are significant across firm types and across industries. Women are working disproportionately in lower-wage industries, with only indirect links to GVCs, or in industries that have been adversely affected by foreign competition. There is a risk that without targeted action, including through programmes to encourage higher participation in successful GVC-intensive industries, the benefits of globalisation, and indeed the risks, will not be spread equally.

### 4.1 Introduction

GVCs have reshaped global production and have been instrumental in pulling millions out of poverty in both low-income and emerging economies. In developed economies, GVCs have provided consumers, in particular, with significant benefits as the costs of production fall. But, especially in recent years, there has been growing concern that the benefits may not have been spread equally in society, generating winners and losers, especially in developed economies.

The ability of firms to source cheap intermediates from abroad has been an important driver in generating job growth in many countries, especially through the creation of new firms that are able to integrate within GVCs through specialised tasks, in a way that would have been un-economic in the past. Equally, GVCs have provided scope for growth in existing firms through changes in their procurement processes by substituting domestic inputs for imports, or through adapting their production processes by specialisation.

GVCs not only create an international production process, they also create an international marketplace, exposing many firms to heightened international competition. Prior to the explosion in GVCs, many firms were protected not only by tariffs and behind the border non-tariff measures, but also by the higher costs involved in transportation and logistics. All of these have seen significant falls in recent decades, at least up until the recent backlash against globalisation which again has prompted an increase in protectionist measures. Moreover, exacerbating the situation for these firms is the increase in the volume of competition as new firms capitalise on GVCs to boost their competitiveness.

Many firms, especially those engaging in labour-intensive activities, are only able to survive through specialisation, often in capital-intensive parts of the value chain or in niche activities, or through suppressing labour costs. In fact, even in firms that thrive in a GVC world, it is not always evident that the gains necessarily accrue to employees equitably.

This chapter seeks to provide evidence on the situation in Finland, in particular through a focus on measures of wage inequalities and wage growth.

## 4.2 The broad view of within and between industry wage gaps

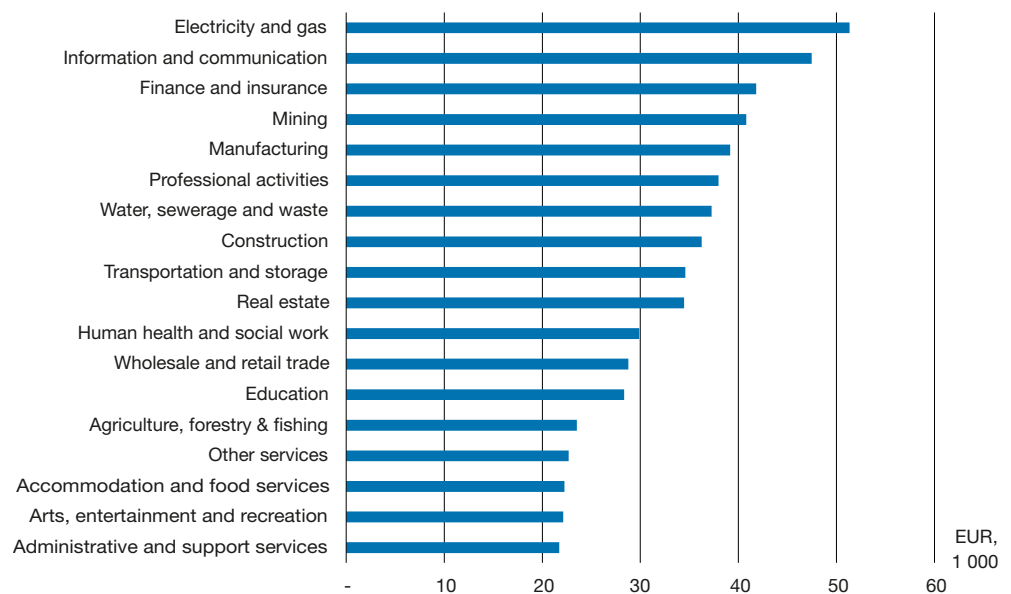
In any discussion around wages and wage inequalities, background and context are important, and this is no different for Finland, where a large part of current wage inequalities reflects the structure of the economy. In that respect, it is important to note that a not-insignificant part of wage inequalities in any given country is unrelated to the degree of integration into GVCs or indeed exposure to foreign competition. Many service-based activities, such as labour-intensive personal and recreational services, have very limited direct exposure to globalisation effects. Although there will be indirect effects, for example through globalisation's impact on overall labour supply and income, with the exception of 'migration', these are not expected to have a significant impact on wage dynamics in less exposed industries.

### *Differences in the degree of exposure to GVCs are unlikely to explain differences in wage levels across industries*

A comparison of median wages across industries (Figure 4.1) bears this out. Workers in electricity and gas distribution (D), for example, which is generally less exposed to foreign competition, earn the highest median wages in Finland, and over twice as much as workers in the arts and entertainment (R) and accommodation and food (I) industries (which are also, generally, relatively less exposed to foreign competition). What drives these differences is similar to other countries, namely, and most importantly, skills levels, along with, for example, unionisation, collective bargaining, and labour supply.

Interestingly, similar sized differences are also apparent when looking at specific activities that are more exposed to globalisation, such as manufacturing (C) which is near the top of the wage scale, and agriculture (A) and administrative support activities (N), which are at the lower end of the pay scale. The degree and nature of exposure to globalisation certainly has a role to play in explaining these gaps, but, in the main, as is the case for activities less affected by globalisation, other structural factors are likely to play a bigger role.

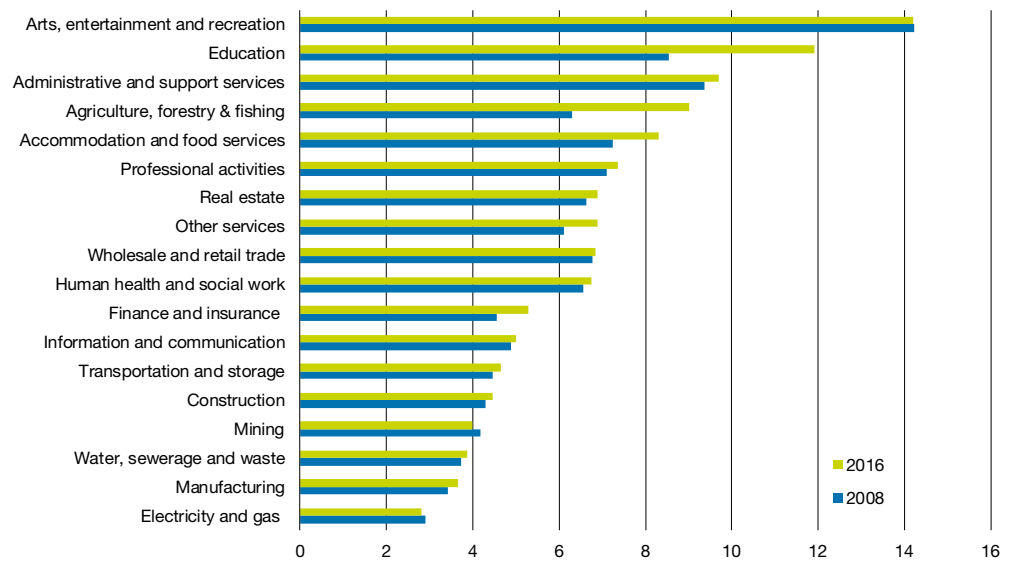
**Figure 4.1**  
Median salary by industry, 2016



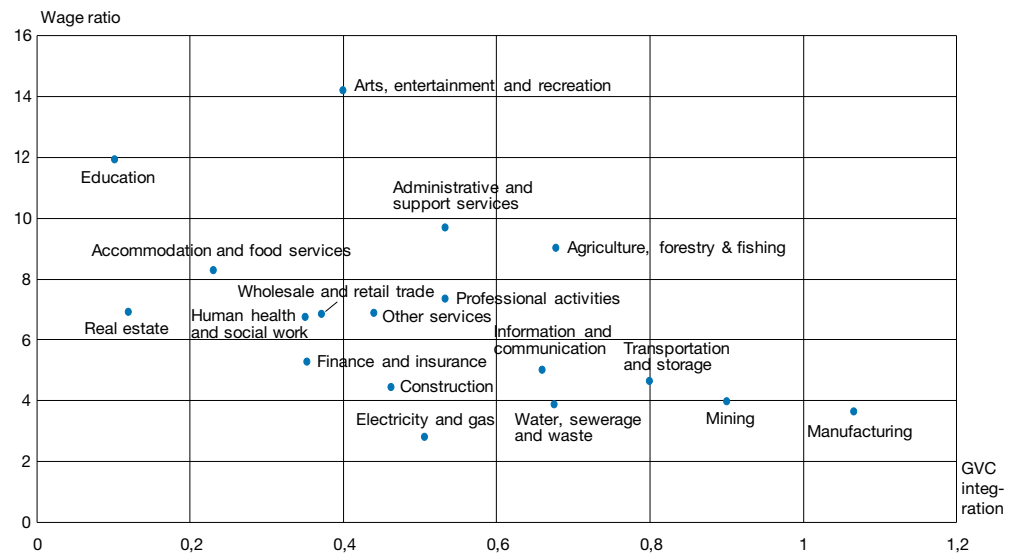
*Industries more highly exposed to GVCs have smaller wage disparities between the top 10% and the bottom 10%*

When looking at pay gaps within industries<sup>1</sup>, significant differences emerge (Figure 4.2). These differences, on the surface, show very little evidence that greater exposure to foreign competition or greater integration into GVCs generates larger disparities. In general, the higher the degree of integration, the lower the wage disparity (Figure 4.3). Arts and entertainment (R), education (P), and administrative and support services (N) industries, for example, have the highest pay disparities, with workers in the 90th percentile earning between 10 to 14 times more than workers in the 10th percentile, whilst manufacturing has among the smallest gaps, in part reflecting higher than average wages of its employees in the bottom decile. In addition, across most activities, in particular those highly exposed to GVCs, wage gaps have shown little change over the last decade.

**Figure 4.2**  
Wage ratio of the 90<sup>th</sup> percentile to the 10<sup>th</sup> percentile by industry, 2008 and 2016



**Figure 4.3**  
The higher the degree of GVC integration, the lower the wage disparities.  
Wage ratio of the 90<sup>th</sup> percentile to the 10<sup>th</sup> percentile (y-axis) and GVC integration – foreign value-added content of gross exports plus domestic value-added exports in total value-added (x-axis), 2016

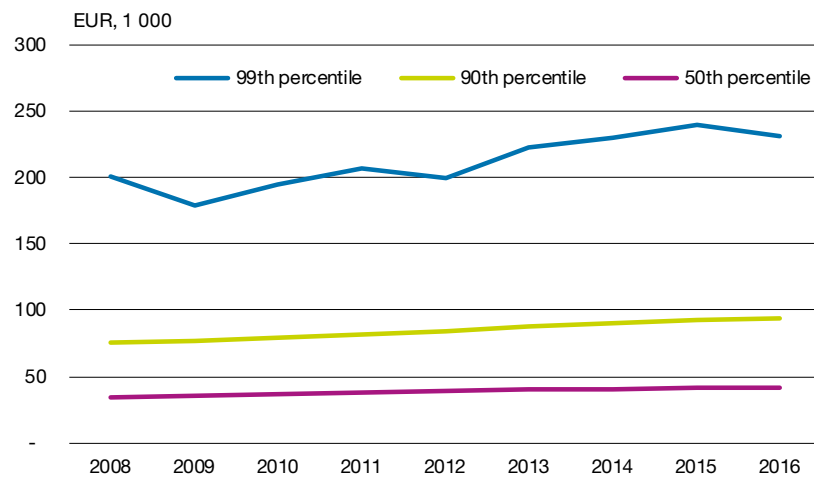


<sup>1</sup> Measured as the ratio of the average 90th percentile wage to the average 10th percentile wage

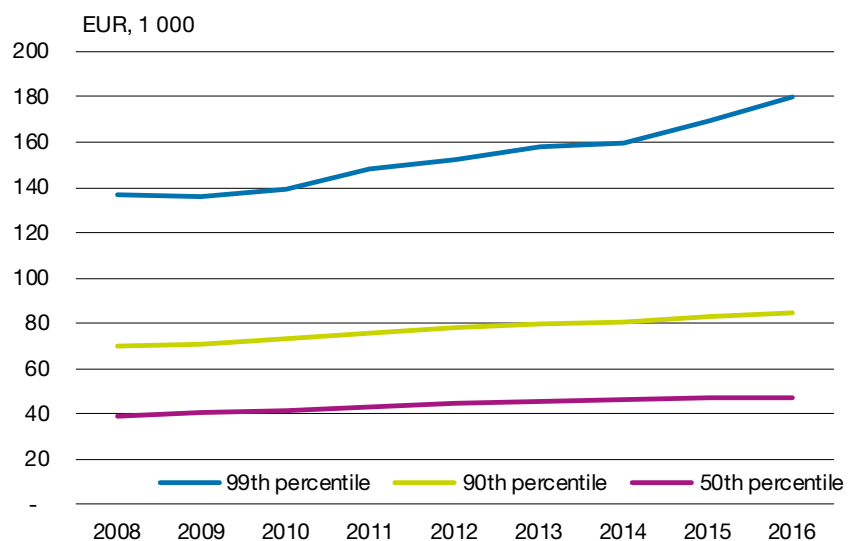
*The top one percentile has seen disproportionate growth in the last decade*

The industry with the highest wages in the top one percentile is the financial and insurance activities industry (K) at EUR 231,000 per annum in 2016, nearly EUR 140,000 above the wages of employees in the 90th percentile (Figure 4.4). The information and communication services (J), and the electricity and gas (D) industries rank second and third. Employees in the information and communication services industry saw their wages increase most, in the economy as a whole, but particularly the top one percentile, whose wages increased by 32% from 2008 to 2016, significantly outpaced the wage growth of other employees in the industry.

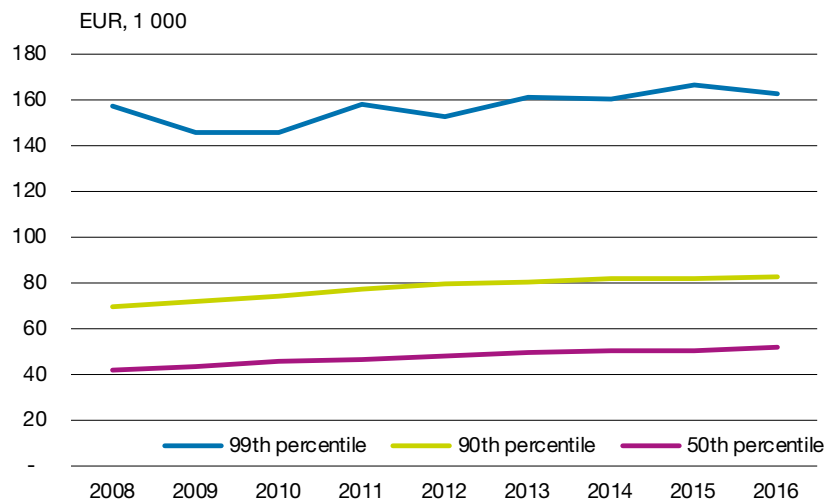
**Figure 4.4a**  
Wages in the 99<sup>th</sup>, 90<sup>th</sup> and 50<sup>th</sup> percentiles, financial and insurance activities, 2008–2016



**Figure 4.4b**  
Wages in the 99<sup>th</sup>, 90<sup>th</sup> and 50<sup>th</sup> percentiles, information and communication, 2008–2016



**Figure 4.4c**  
Wages in the 99<sup>th</sup>, 90<sup>th</sup> and 50<sup>th</sup> percentiles, electricity, gas, steam and air conditioning supply, 2008–2016



### 4.3 The granular view of wages by industry

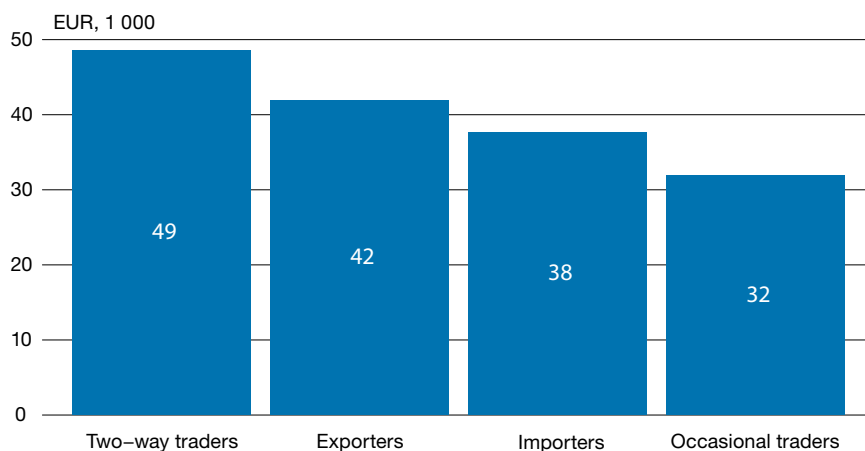
#### *Export-oriented firms and multinationals pay higher wages...*

Of particular interest in this report are the gaps within industries, and in particular whether those gaps can, at least partly, be explained by different levels of exposure or integration into GVCs. Perhaps not surprisingly, in part reflecting differences in the propensity of where firms operate, export-oriented firms and multinationals pay higher wages than other firms.

In 2016, export-oriented firms paid the highest average annual wages, at EUR 49,000 – 53% higher than the average wages paid by occasional traders, and 17% higher than those paid by exporting-only firms (Figure 4.5a).

Similarly, in 2016, domestic-owned multinationals paid an average wage of EUR 50,000 – 47% higher than the average wages paid by domestic firms without foreign affiliates. Whilst still significantly above the whole economy average, foreign-owned multinationals paid on average EUR 4,000 less to their employees than domestic-owned multinationals (Figure 4.5b).

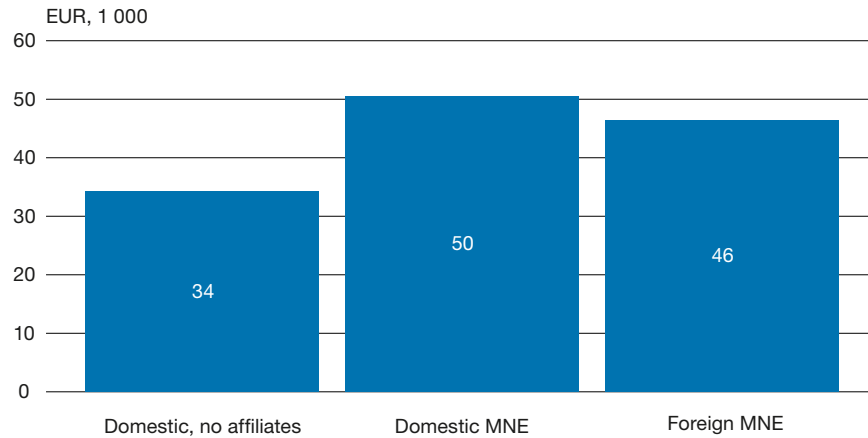
**Figure 4.5a**  
Average wage by firm trading status, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).



**Figure 4.5b**  
Average wage by firm ownership, 2016

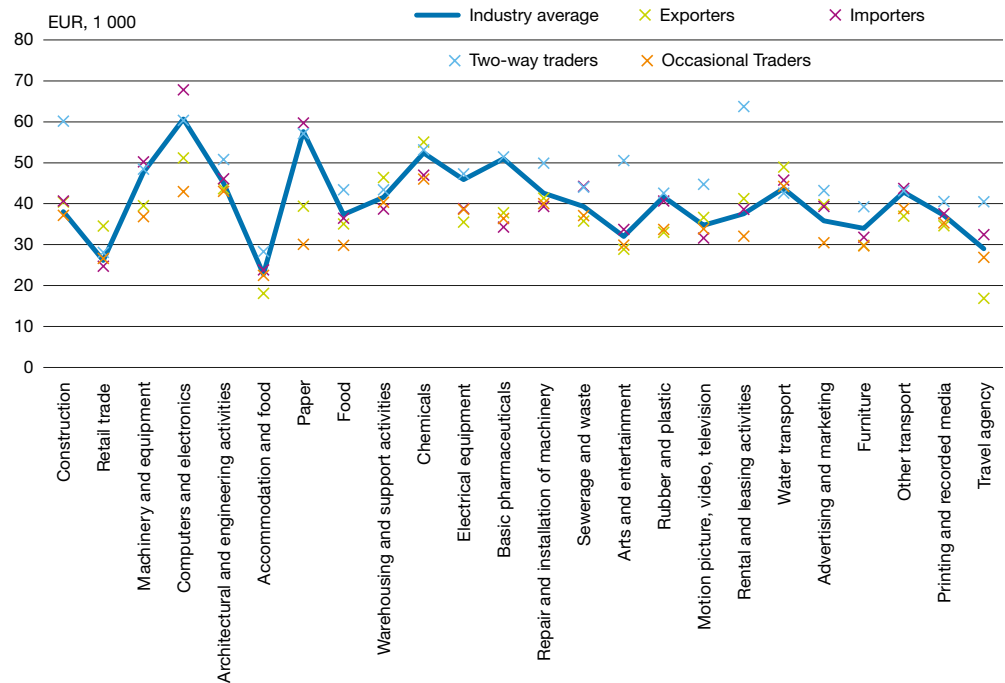


Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

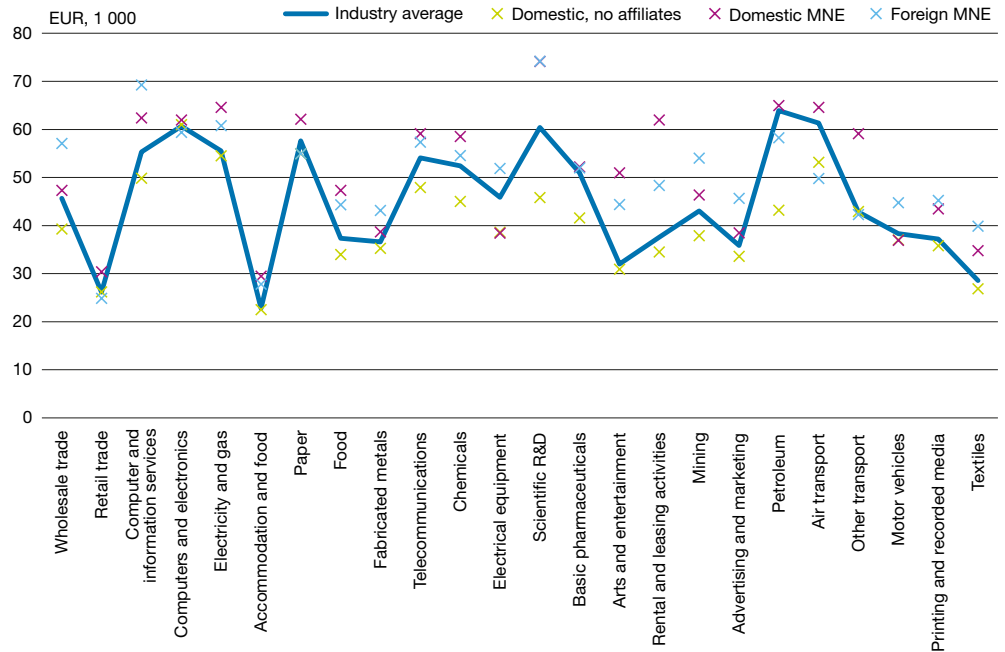
*...across nearly all industries*

The differences between the various categories of firms partly reflect differences in the industrial mix but, even at the individual industry level, a similar pattern emerges with export-oriented firms nearly always outperforming the average (Figure 4.6a), with a similar pattern emerging for multinationals (Figure 4.6b).

**Figure 4.6a**  
Average wage by industry and firm trading status, 2016



**Figure 4.6b**  
Average wage by industry and firm ownership, 2016

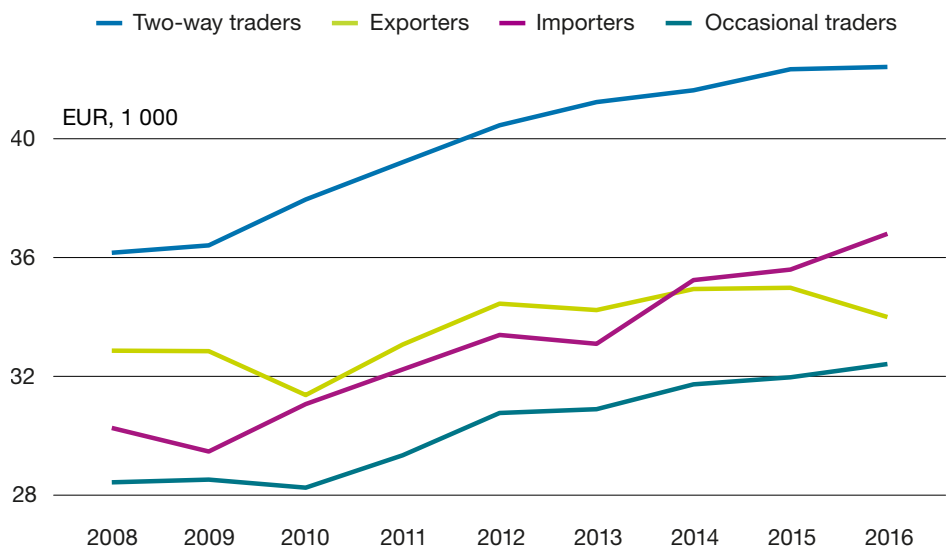


Not surprisingly, size plays an important role here, with occasional traders that are typically small (average 2.2 FTE per firm) consistently paying lower wages than other firm types.

*Although only marginally, pay in export-oriented firms and multinationals is increasing faster than in other firms*

Pay gaps have increased, even if only moderately, over the last decade. The median wage in manufacturing export-oriented firms increased by 17% between 2008 and 2016 compared to 14% in manufacturing occasional traders (Figure 4.7a). In some activities, the increase in the gap has been particularly significant. In the information and computer services industry, the corresponding wage increase for export-oriented firms was 50% and merely 4% for occasional traders (Figure 4.7b).

**Figure 4.7a**  
Median wage by firm trading status, manufacturing industries (C), 2008-2016



**Figure 4.7b**  
Median wage by firm trading status, information and computer services industries (62–63), 2008–2016<sup>2</sup>



*Pay gaps within export-oriented firms and multinationals are much smaller than within other firms...*

In export-oriented firms, employees with top-decile wages earn almost four times more than employees at the bottom decile; but the pay gap is almost twice as wide between employees working in occasional traders (Figure 4.8a). Similarly, domestic-owned and foreign-owned multinationals have lower pay gaps than domestic-owned firms without foreign affiliates (Figure 4.8b).<sup>3</sup> The pattern of lower within-firm pay gaps in firms more highly exposed to GVCs holds in most industries.

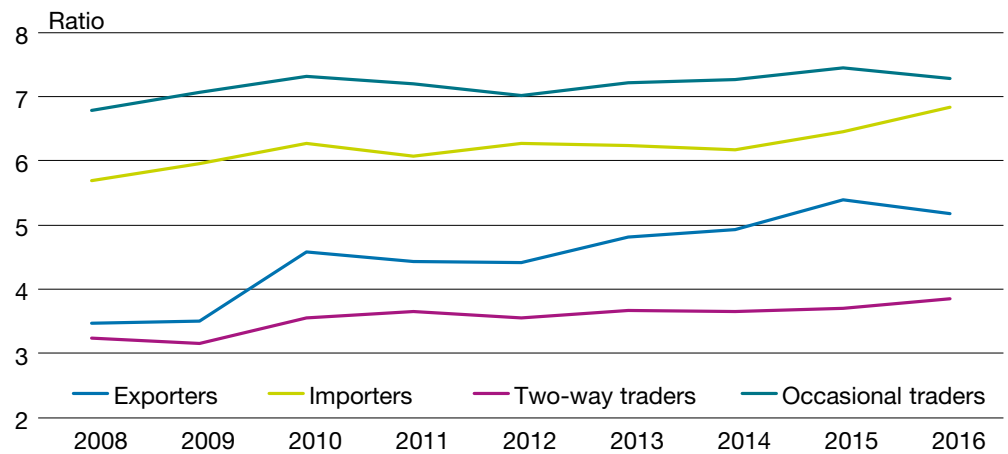
*...but within-firm pay gaps across nearly all firm types have grown over the last decade*

Pay gaps within firms of similar characteristics have widened since 2008. For example, in export-oriented firms, the highest decile earned nearly four times as much as the lowest decile in 2016, compared to 3.2 times more in 2008. A similar trend, of a greater magnitude, is observed in exporting firms and importing firms. Finnish-owned multinationals have been the only exception – the distance between the top and bottom deciles decreased slightly between 2008 and 2016 (Figures 4.8a and 4.8b).

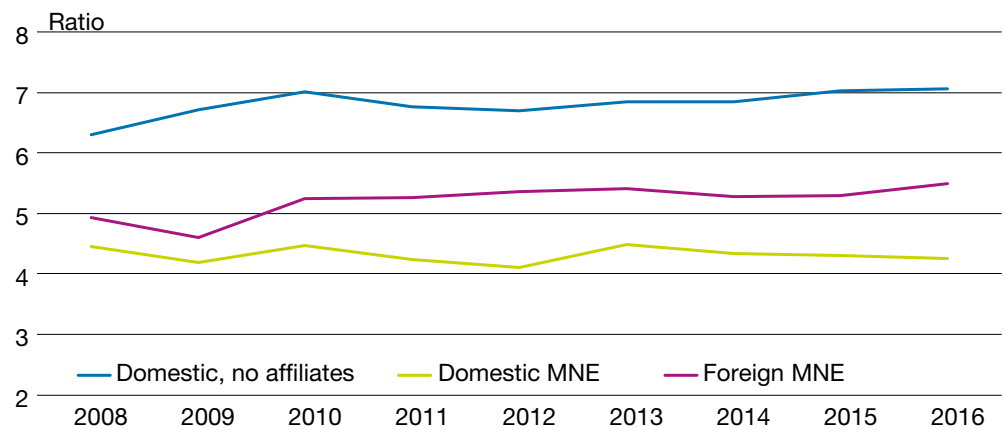
<sup>2</sup> The big increase in 2009-2010 for firms highly integrated into GVCs reflects significant restructurings in the computer and electronics industry and related industries.

<sup>3</sup> Wages at the bottom decile are likely disproportionately affected by higher shares of part-time workers. According to the Finnish Labour Force Survey, on average 20% of female and 10% of male employees worked part time in 2016, with significant variations at the industry level.

**Figure 4.8a**  
Ratio of top to bottom decile earners by firm trading status, total private sector, 2008–2016



**Figure 4.8b**  
Ratio of top to bottom decile earners by firm ownership, total private sector, 2008–2016

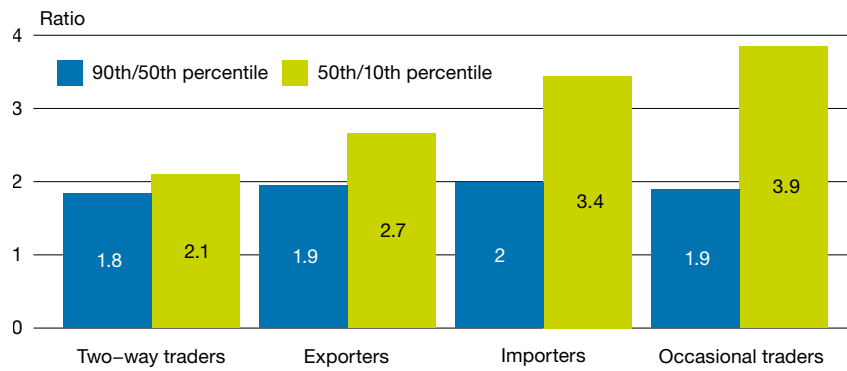


*Pay gaps are especially skewed for the bottom 10% of earners in non-GVC participating firms*

Looking more closely at the distribution of wages by firm types, it becomes apparent that the larger pay gaps between the top and bottom 10% in non-GVC firms also reflect significant wage gaps between the median and bottom 10%. In non-GVC firms, the pay gaps between the median and top 10% are almost identical to those observed in other firm types, with the top 10% earning roughly twice the pay of median workers. However, employees in the bottom decile in non-GVC firms earn roughly one-quarter to one-third the median wage, compared to closer to half in export-oriented firms (Figure 4.9a and 4.9b).

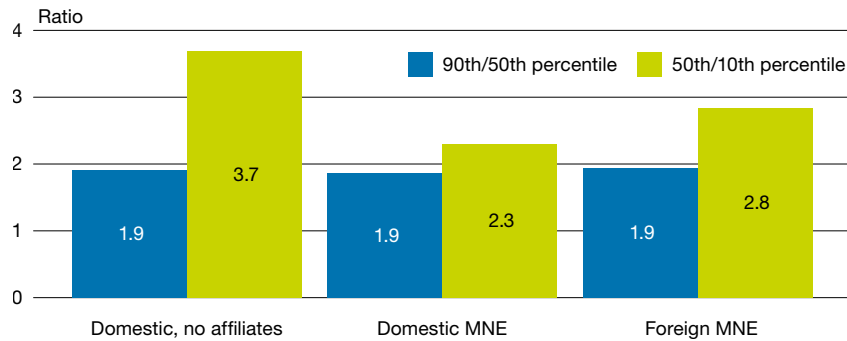
**Figure 4.9a**

Wage ratio of the 90<sup>th</sup> to the 50<sup>th</sup> percentile and the 50<sup>th</sup> to the 10<sup>th</sup> percentile by firm trading status, total private sector, 2016



**Figure 4.9b**

Wage ratio of the 90<sup>th</sup> to the 50<sup>th</sup> percentile and the 50<sup>th</sup> to the 10<sup>th</sup> percentile by firm ownership, total private sector, 2016

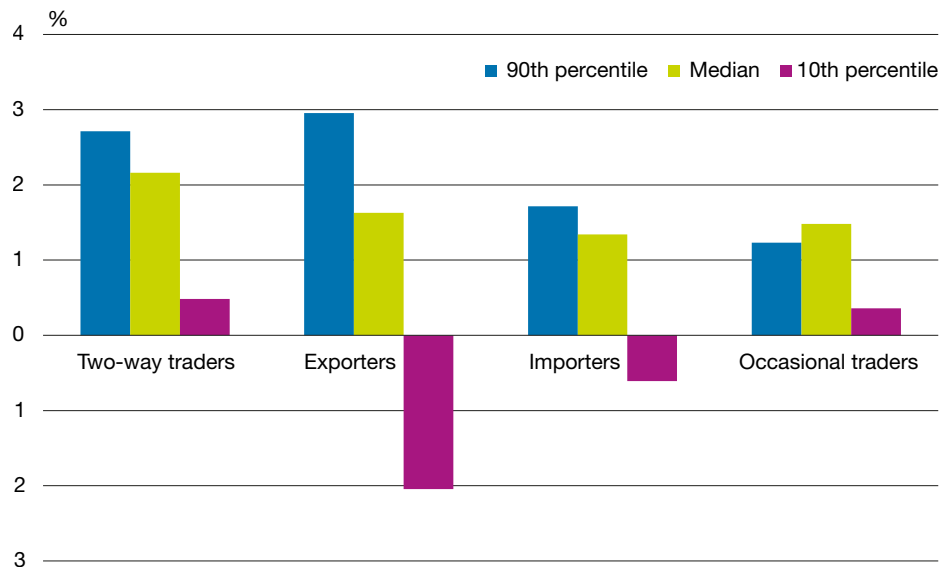


*Wages for the bottom 10% have seen little change in the last decade across all firm types*

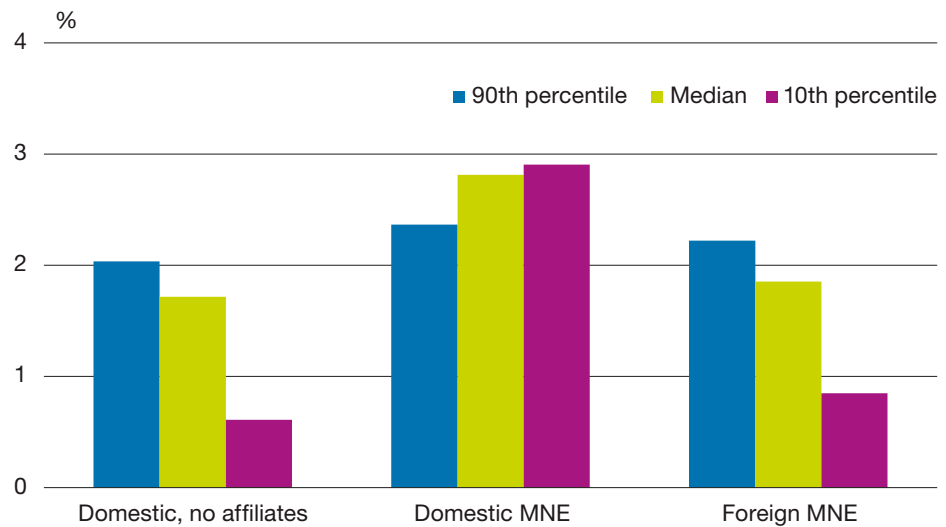
The evidence above (Figure 4.8 and 4.9) points to increasing pay gaps, but of particular concern is the fact that across all firm types the bottom 10% have seen little change in their nominal pay in the last decade (which translates into falls in real purchasing power, Figure 4.10a and 4.10b).

**Figure 4.10a**

Wage increases at the 90<sup>th</sup>, 50<sup>th</sup> and 10<sup>th</sup> percentile by firm trading status, total private sector, 2016



**Figure 4.10b**  
Wage increases at the 90<sup>th</sup>, 50<sup>th</sup> and 10<sup>th</sup> percentiles by firm ownership, total private sector, 2016

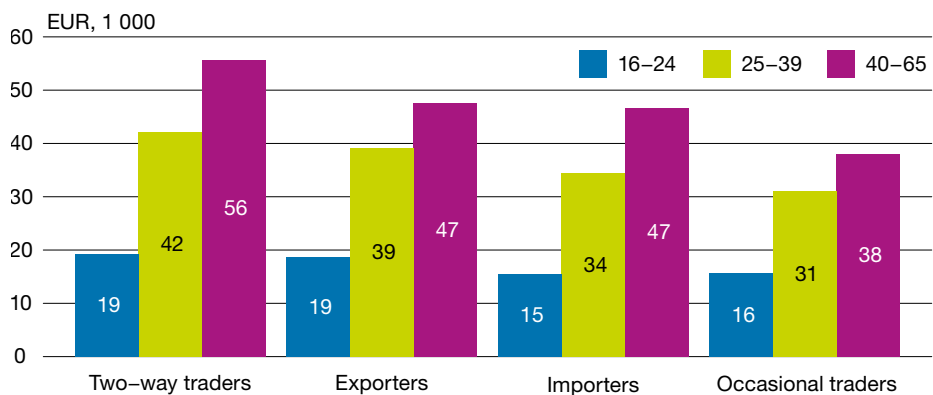


*Between-firm and within-firm pay gaps are, in part, driven by age profiles of employees*

Some care is needed in interpreting data on pay gaps as the larger pay gaps in non-GVC firms may, at least in part, reflect higher shares of part-time workers. In addition, a secondary factor that may be driving the higher wage gaps in non-GVC firms, and indeed wage gaps in general, is the age profile of employees. A perhaps not unexpected commonality across all firm types and industries is that the younger you are the lower your pay – as age usually goes hand in hand with experience (Figure 4.11a and 4.11b).

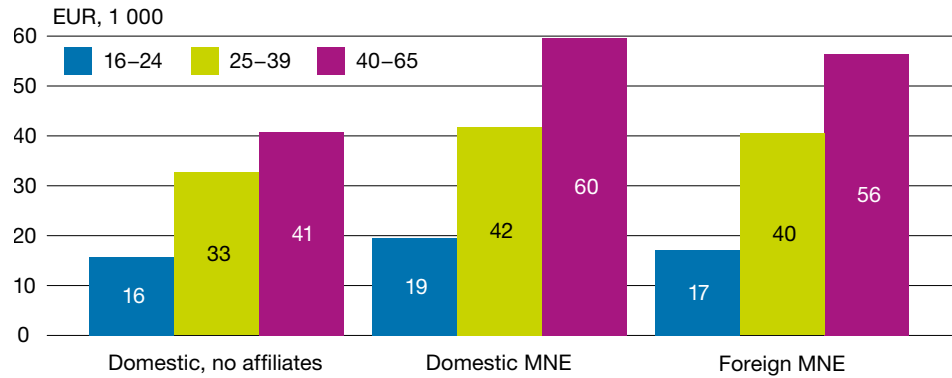
Interestingly, pay gaps between young and old workers are much larger in firms that have higher integration into GVCs, despite their lower overall pay gaps, reflecting in part the fact that these firms generally employ proportionally fewer young workers than non-GVC firms. This in turn partly reflects differences in the distribution of activities of the different categories of firms as well as the greater pulling-power that export-oriented firms have in the labour market.

**Figure 4.11a**  
Average wage by employee age group and firm trading status, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

**Figure 4.11b**  
Average wage by employee age group and firm ownership, 2016

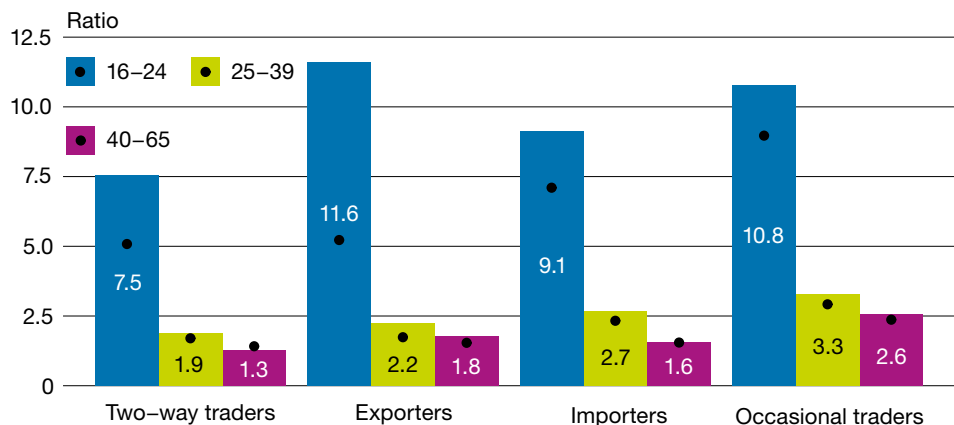


Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

*Within-firm pay gaps are significantly smaller when controlling for employee age*

Once controlling for age differences between employees, within-firm pay gaps appear much smaller. While employees in the top decile earn close to four times more than employees in the bottom decile in export-oriented firms, within-firm pay gaps in the age groups 25-39 and 40-64 are much smaller (Figure 4.12). Not surprisingly, given the likely larger share of part-time workers, and differences in skills sets among young employees (16-24), wage gaps here are significantly above the average. Consistent with the earlier messages, however, is that non-GVC firms have higher wage disparities even after controlling for age.

**Figure 4.12**  
Ratio of the top to bottom decile earners by firm trading status and employee age, total private sector, 2008 (dot) and 2016 (bar)

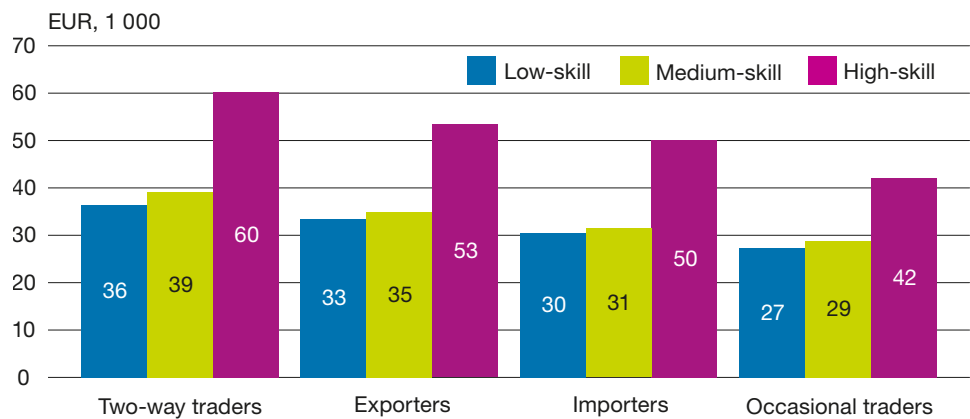


## 4.4 What role do skills play in wage-gaps?

### *Average wages in export-oriented firms and multinationals are higher across all skill groups*

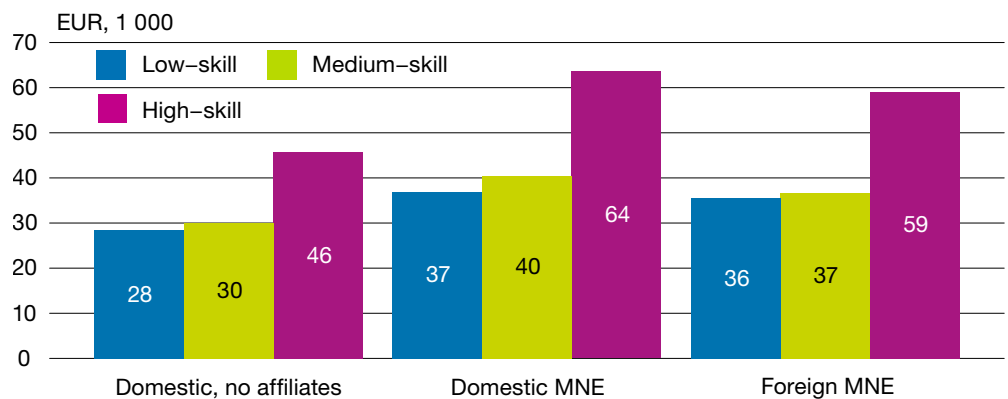
One of the reasons why export-oriented firms and multinationals pay higher average wages is that they employ relatively more high-skilled workers than other firms (see also Chapter 3). However, even when accounting for differences in skill levels, export-oriented firms and multinationals pay higher average wages than other firms (Figures 4.13a and 4.13b). Wage premiums in two-way traders ranged from EUR 9,000 for low-skilled employees to EUR 18,000 for high-skilled employees in 2016, whilst domestic MNEs paid their high-skilled employees an average of EUR 64,000 per annum in 2016, 40% above the average wages of Finnish firms without foreign affiliates. The premiums of working in a multinational for low-skilled and medium-skilled employees are of a similar scale, ranging from EUR 7,000 to 10,000 per annum.

**Figure 4.13a**  
Average wage by firm trading status and employee skill level, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

**Figure 4.13b**  
Average wage by firm ownership and employee skill level, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

Skills wage gaps vary considerably across industries, irrespective of the trading status of the firms. For example, importers in the arts and entertainment (R) industry and in the computers and electronics (26), water supply (36) and scientific R&D (72) industries pay their high-skilled workers over double the wages of their low-skilled workers. Exporters in the advertising and market research (73) industry also pay over double the wage to high-skilled workers compared to low-skilled workers. Larger gaps emerge when looking at multinationals, with domes-



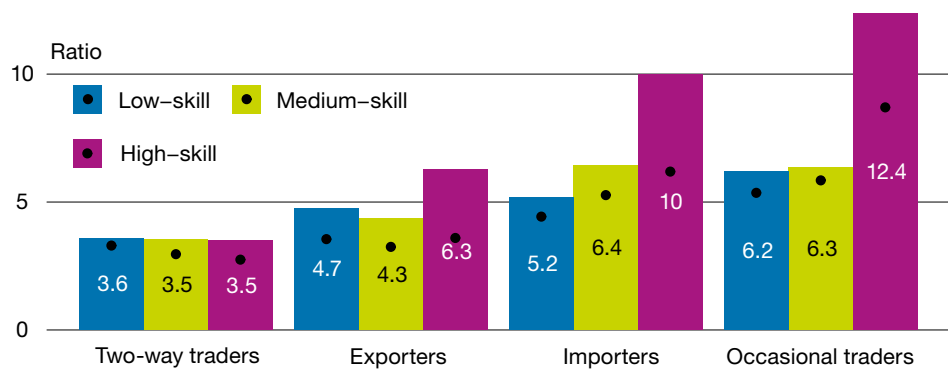
tic MNEs in the manufacture of other transport equipment (30) and scientific R&D industries paying skilled workers over three times the wages of low-skilled workers, whilst foreign MNEs in the arts, entertainment and recreation industry and postal and courier activities (53) industry pay closer to four times more.

### *Pay gaps within skills groups are much smaller in export-oriented firms*

In export-oriented firms, within any given skills group, employees at the 90th percentile consistently earn around three times that of employees at the 10th percentile. However, for import-only firms and occasional traders, the wage disparities are significantly larger – especially for low-skilled workers. Indeed, gaps have grown significantly in all skills/firm sets. For example, low-skilled workers in occasional trading firms saw wage disparities increase from a factor of 8 to over 12 between 2008 and 2016 (Figure 4.14).

**Figure 4.14**

Ratio of the top to bottom decile earners by firm trading status and employee skill level, total private sector, 2008 and 2016



## 4.5 Spotlight on high productivity and high growth firms

### *Higher productivity goes hand-in-hand with higher wages*

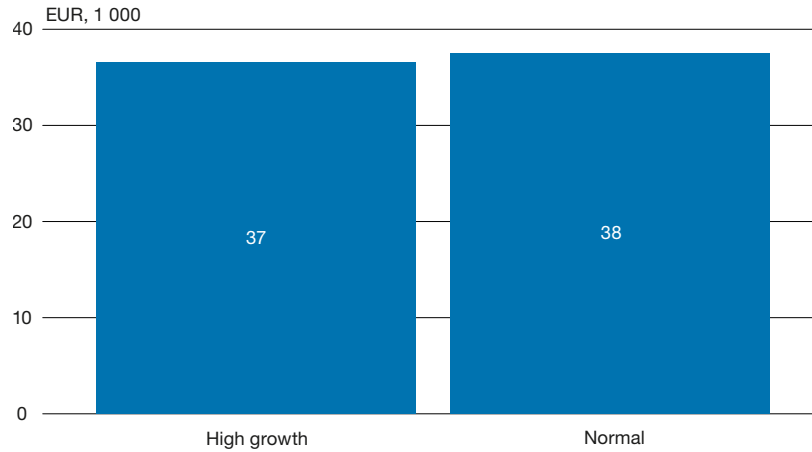
As shown in earlier chapters, higher-productivity firms are more engaged in GVCs. Sections 4.2 and 4.3 above revealed that the higher the GVC intensity, the higher the average wage, and, so, not surprisingly and perhaps potentially because of the higher productivity, higher-productivity firms also pay on average higher average wages than other firms.

In 2016, the average annual wage paid by high productivity firms was about EUR 59,000 or nearly 60% higher than the corresponding average in other firms (EUR 37,000). In many industries, the premium was even higher: publishing activities (58) (EUR 74,000), computer and information services (62–63) (EUR 57,000) and scientific R&D (72) (EUR 50,000). However, the case is not universally true. For example, in the air transport industry (51), average wages in high-productivity firms were around EUR 10,000 lower than in other firms.

### High growth does not necessarily equate to higher wage

Although there is some variability depending on the industry, on the whole, despite their typically smaller size and the fact that many are in the start-up phase, high-growth firms pay around the same wages as other firms (Figure 4.15).

**Figure 4.15**  
Average wages by firm growth rate, 2016

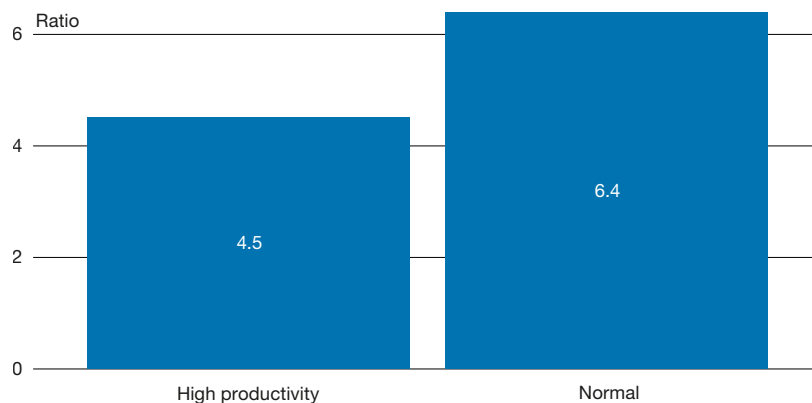


Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

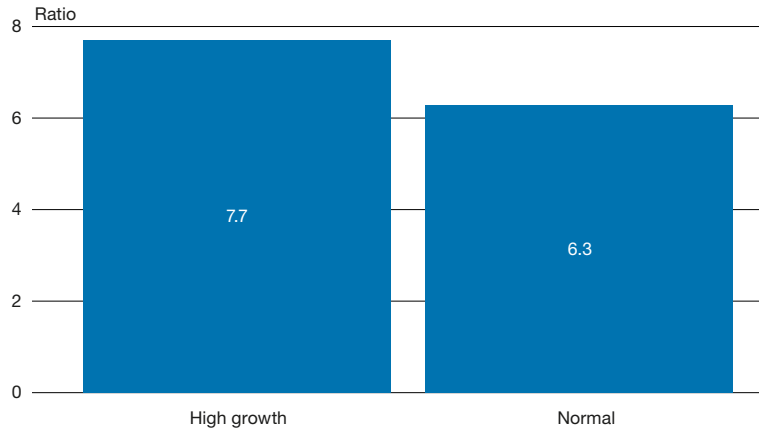
### Within-firm pay disparities are smaller in high-productivity firms but larger in high-growth firms

As is the case for GVC-intensive firms, high-productivity firms also have smaller within-firm pay disparities than the average firm, while high-growth firms show larger-than-average disparities. In productive firms, the top decile earns 4.5 times the bottom decile's wage compared to 6.4 times in other firms (Figure 4.16a) and 7.7 times in high-growth firms (Figure 4.16b).

**Figure 4.16a**  
Ratio of top to bottom decile earners by high productivity firms versus other firms, total private sector, 2016

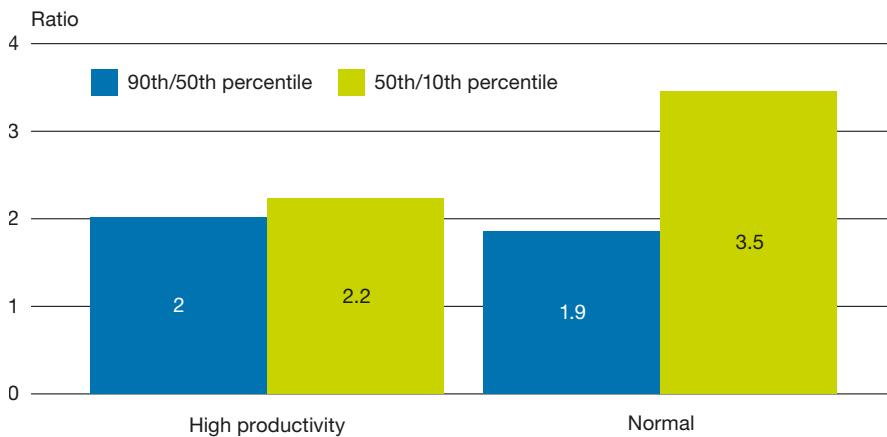


**Figure 4.16b**  
Ratio of top to bottom decile earners by high growth firms versus other firms, total private sector, 2016

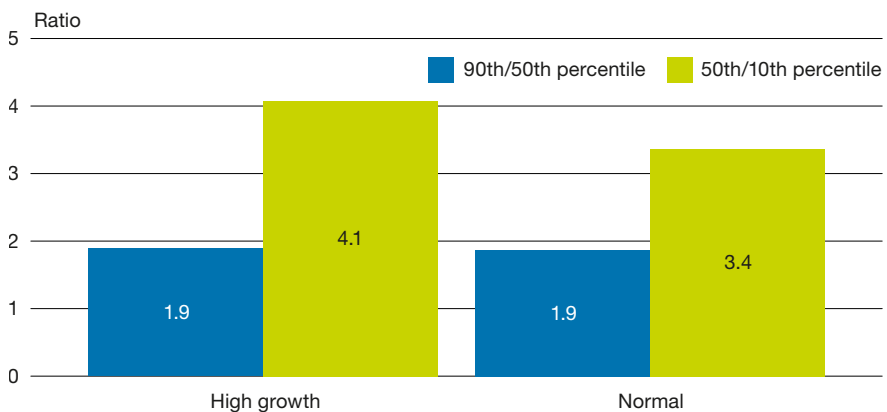


Comparing the top and bottom deciles to median wages further illustrates this point. The difference between high-productivity and high-growth firms is clear: the wage gap between the median and the bottom decile in high-growth firms is twice the gap of high-productivity firms (Figure 4.17a and 4.17b).<sup>4</sup>

**Figure 4.17a**  
Wage ratio of the 90<sup>th</sup> to the 50<sup>th</sup> percentile and the 50<sup>th</sup> to the 10<sup>th</sup> percentile by high productivity firms versus other firms, total private sector, 2016



**Figure 4.17b**  
Wage ratio of the 90<sup>th</sup> to the 50<sup>th</sup> percentile and the 50<sup>th</sup> to the 10<sup>th</sup> percentile by high growth firms versus other firms, total private sector, 2016



<sup>4</sup> High growth enterprises have a minimum average annual employment growth rate of 10% over three consecutive years (minimum total 33%) and have at least 10 FTEs in the first year of the growth period. All other enterprises are considered normal enterprises.

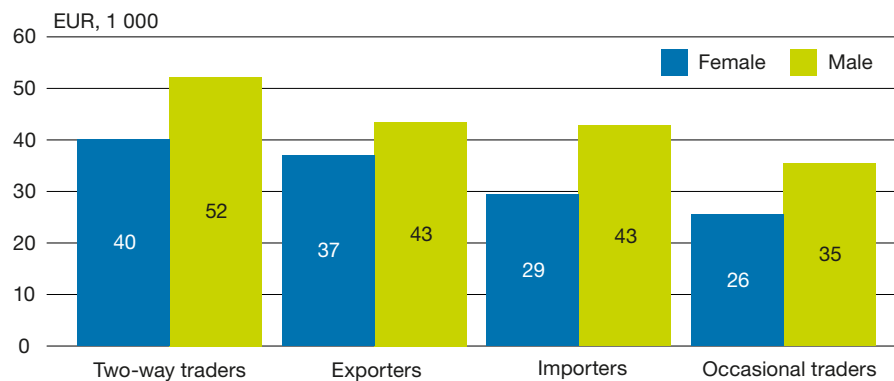
## 4.6 Spotlight on gender

### *Gender pay gaps exist across all firm categories*

Although women in export-oriented firms earn significantly higher wages than women in other categories of firms, in part reflecting slightly higher shares of part-time working in non-GVC firms, women in export-oriented firms still earn less than men – on average EUR 12,000 less per annum (Figure 4.18a).

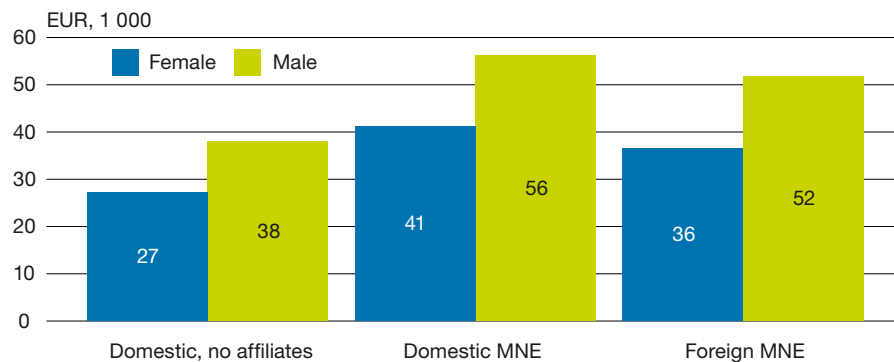
Indeed, a firm's engagement in GVCs does not substantially affect the gender wage gap – across all firm types, men are paid more than women. Significant gender pay gaps also exist when looking at firms through the prism of ownership (Figure 4.18b).

**Figure 4.18a**  
Average wage by employee gender and firm trading status, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

**Figure 4.18b**  
Average wage by employee gender and firm ownership, 2016



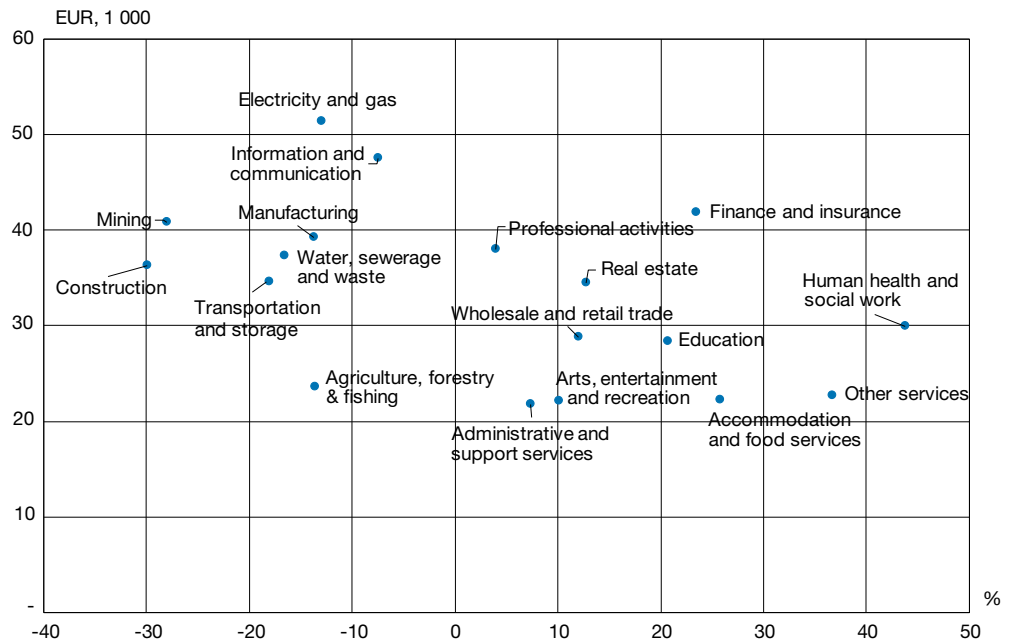
Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

### *Where women work has a significant bearing on the gender pay-gap*

Some care is needed when looking at gender pay gaps at the whole economy level as they, at least partly, reflect differences in where women work. Figure 4.19 reveals that female participation is disproportionately higher than the share of females in the total market labour force (at 39%) in those industries where median wages are lower. That being said, although gender pay gaps are typically smaller at the industry level, and in some industries, such as advertising and marketing (73), average female wages are higher than for men, they are persistent. Existing gender employment gaps at the sectoral level are the biggest barrier to ensuring that the benefits of globalisation are spread equally between male and female employees, especially as many of the industries that have been adversely affected by foreign competition, for example, textiles (13), have typically had significantly higher female participation rates.

**Figure 4.19**

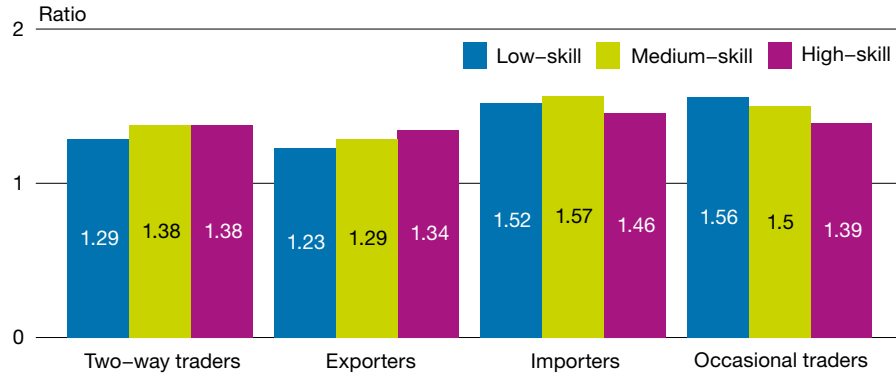
More women work in lower-paid service industries: female labour force participation deviation from national average and median wage by industry, 2016



Indeed, even adjusting for skills reveals pay gaps remain across all firm types (Figure 4.20a and 4.20b) and most industries.

**Figure 4.20a**

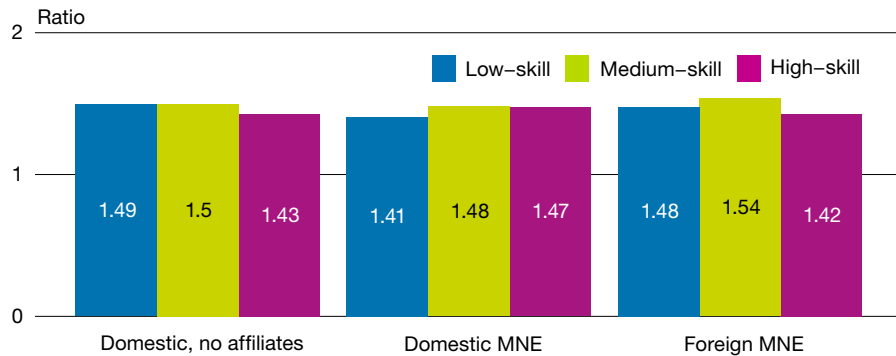
Gender wage ratio by employee skill level and firm trading status, 2016



Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

**Figure 4.20b**

Gender wage ratio by employee skill level and firm ownership, 2016



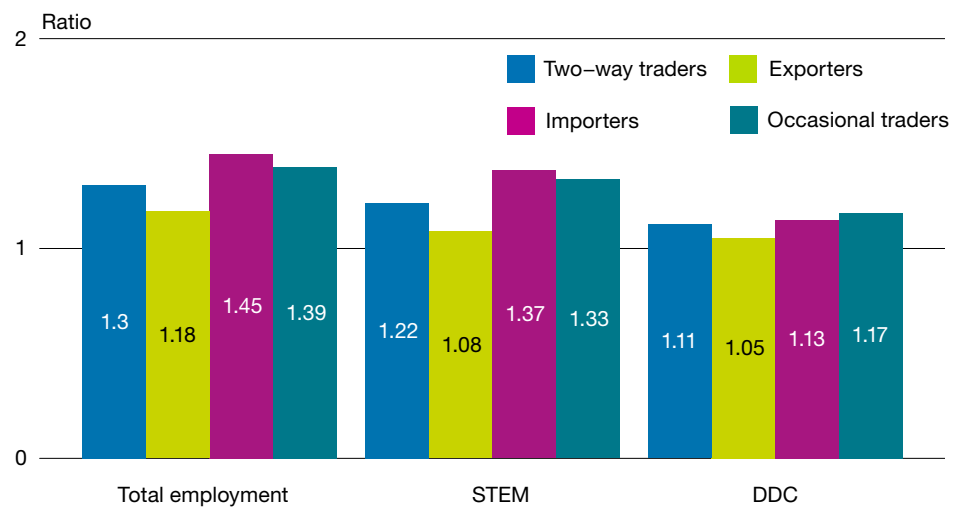
Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S).

*Controlling for STEM and DDC qualifications results in significantly smaller pay gaps, especially in GVC-intensive and high-productivity firms*

There is a strong correlation between STEM and DDC qualifications and industries. The gender gaps are much smaller once controlling for these qualifications; however, they remain significant (Figure 4.21). The highest gaps are observed in firms that do not export (i.e. occasional-trading and importing only firms). In two-way traders, exporting and high-productivity firms, the pay gaps are much lower. In fact, in many industries DDC qualified women in export-oriented firms have higher average wages than their male counterparts. Unlike firm breakdowns based on GVC intensities, pay gaps are similar across all categories of firm ownership.

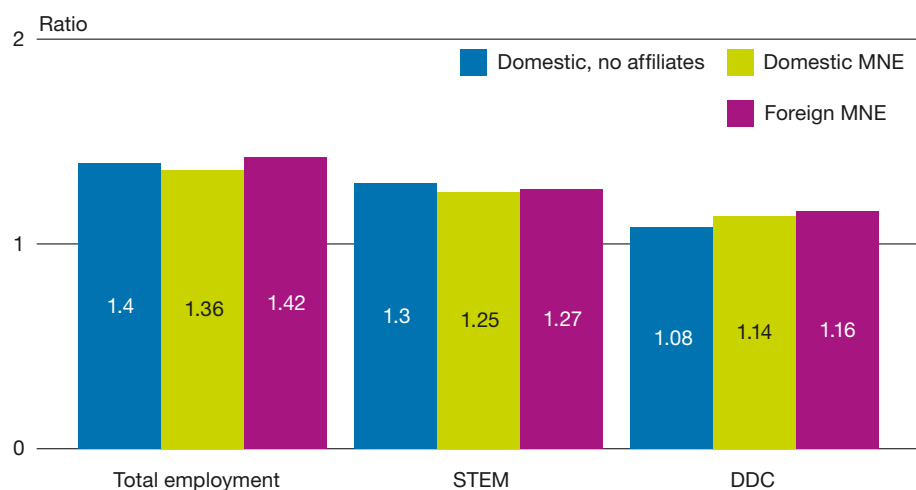
**Figure 4.21a**

Gender wage ratio of all, STEM- and DDC-qualified employees by firm trading status, 2016



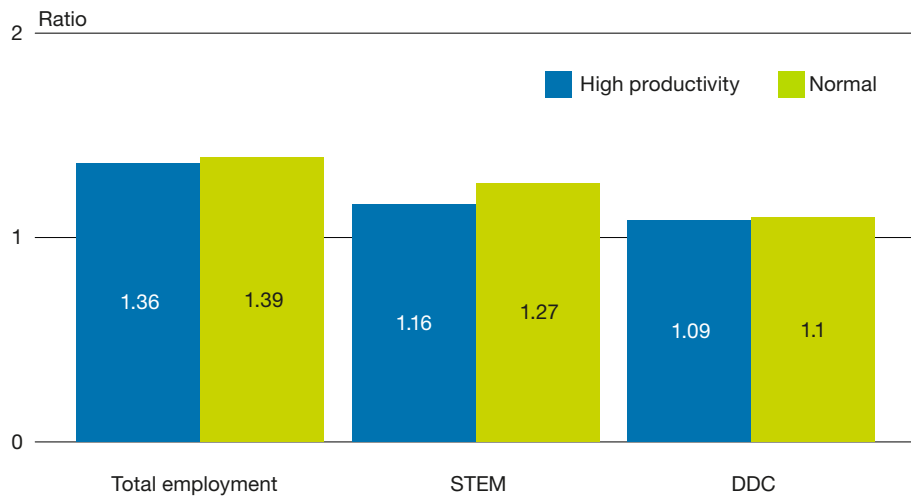
**Figure 4.21b**

Gender wage ratio of all, STEM- and DDC-qualified employees by firm ownership, 2016



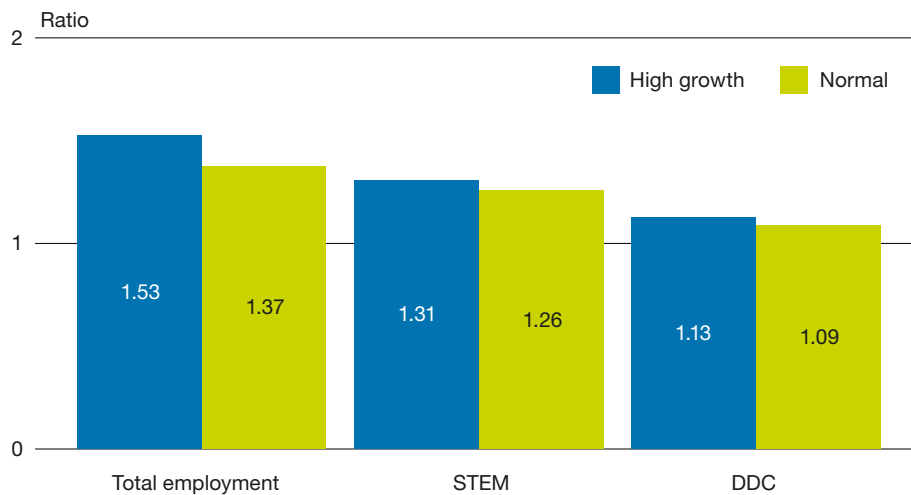
**Figure 4.21c**

Gender wage ratio of all, STEM- and DDC-qualified employees by high productivity firms versus other firms, 2016



**Figure 4.21d**

Gender wage ratio of all, STEM- and DDC-qualified employees by high growth firms versus other firms, 2016



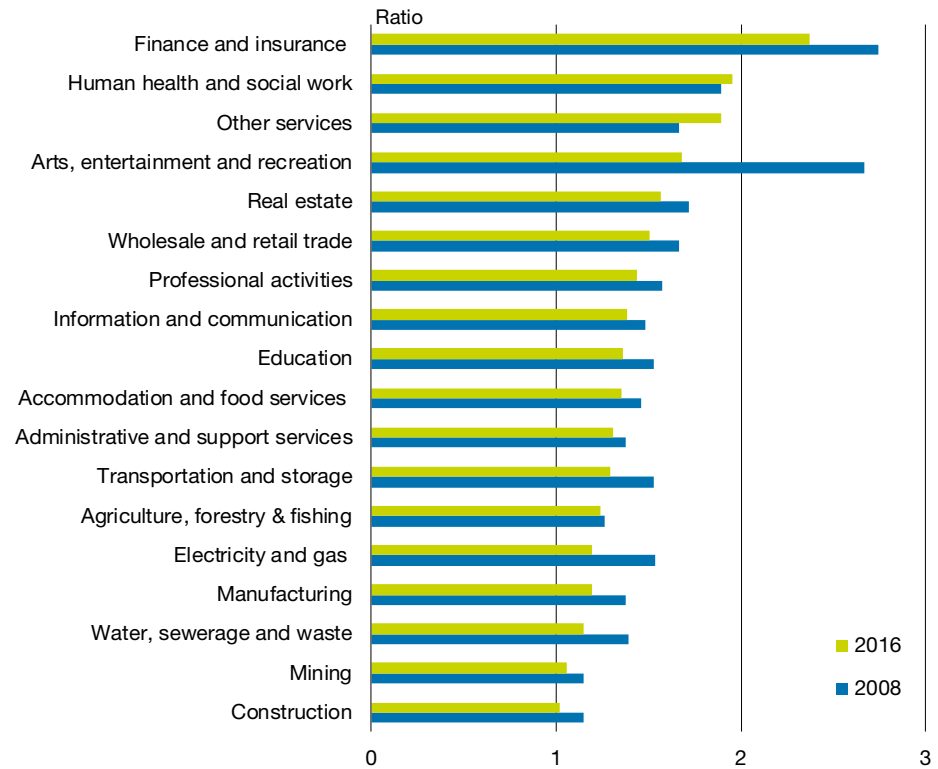
Note: Private sector excluding agriculture (A), finance & insurance (K), real estate (L), education (P), health and social work (Q) and part of other service activities (S). This applies to Figure 4.21a-4.21d.

### *Gender pay gaps for the top 1% remain but are getting smaller*

The gender pay gaps for top earners have decreased considerably across all industries over the past eight years. In the arts and entertainment industry (R), for example, wages of the top one per cent of male employees were 1.6 times higher than wages of the top one per cent female employees in 2016, significantly down from the 2.6 times in 2008 (Figure 4.22a). The bottom one percentile shows mixed trends in terms of the development of the gender pay gap, possibly reflecting part-time positions (Figure 4.22b).

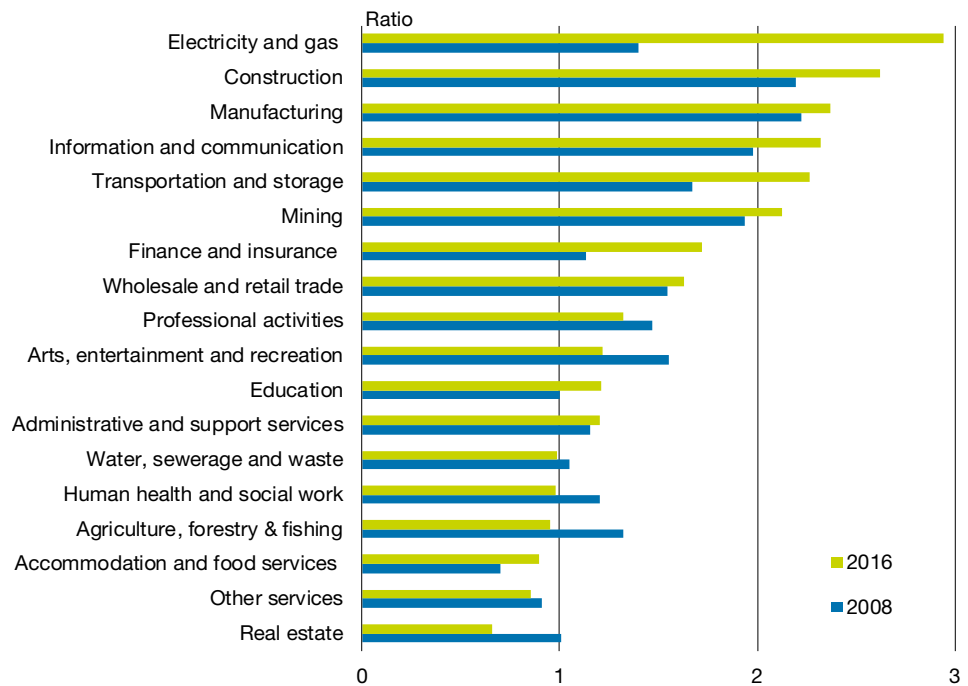
**Figure 4.22a**

Gender wage ratio for the top 1-percentile by industry, 2008 and 2016



**Figure 4.22b**

Gender wage ratio for the bottom 1-percentile by industry, 2008 and 2016





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# Annex 1. METHODOLOGY

To respond to policy questions on the nature and degree of integration of Finnish firms in global value chains (GVCs), and the corresponding impact on income and, indeed, income dispersion, a number of data sources have been integrated (described below) to develop granular (extended) supply-use tables. This chapter describes how we construct the extended SUTs, and the methodology for balancing SUTs, which were used to derive GVC indicators by firm characteristics. A series of challenges specific to the integration of granular business statistics within the national accounts' framework are also addressed.

## Annex 1.1 Data sources and firm categories

### Data sources

The data used for this joint research project of the OECD and Statistics Finland include a combination of linked microdata, national accounts data, international trade statistics and Finnish Supply and Use Tables (SUTs), as described below.

#### *National supply-use tables*

The most recent data provided by Statistics Finland include SUTs from 2012 to 2018, broken down by 80 industries and products.

All tables, apart from those covering the last three years (2016-2018), were fully balanced and consistent with the underlying national accounts at the time of their release. However, subsequent to their release, revisions have been made to the national accounts, that have not yet been incorporated into official releases of SUTs.

The most recent update of the Finnish national accounts occurred in March 2020, and, as such, all national SUTs were revised by the OECD to align with these latest data. Furthermore, the original SUTs for 2016–2018 provided by Statistics Finland were provisional and not balanced, and, so, the OECD has balanced these tables for use in this study (see Section A1.3).

In line with international standards, and the requirements of the project, all tables are available in both basic<sup>1</sup> and purchaser's<sup>2</sup> prices. Industries are classified according to the NACE Rev.2 classification<sup>3</sup>.

#### *Micro data linking, the MDL database*

Micro data linking (MDL) brings together several enterprise data sources, for example the business register, structural business statistics, international trade in goods and services data, and inward and outward foreign affiliate statistics (IFATS and OFATS). The MDL-database covers nearly all businesses in the Finnish private sector, and the various data sources are linked using unique Business ID numbers. All limited liability firms in Finland are legally bound to declare their financial statements, enabling Statistics Finland to combine information such as turnover, value added and R&D purchases with trade flows, industry affiliation, ownership, size-class, and year of firm establishment.

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1 The basic price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any tax payable, and plus any subsidy receivable, by the producer as a consequence of its production or sale. It excludes any transport charges invoiced separately by the producer.

2 The purchaser's price is the amount paid by the purchaser, excluding any VAT or similar tax deductible by the purchaser, in order to take delivery of a unit of a good or service at the time and place required by the purchaser. The purchaser's price of a good includes any transport charges paid separately by the purchaser to take delivery at the required time and place.

3 NACE Rev.2 is the European version of the International Standard Industrial Classification of all Economic Activities (ISIC Rev. 4).

## *Linked employer-employee database*

The Finnish Longitudinal Employer-Employee Database (FLEED<sup>4</sup>) is a register-based dataset from Statistics Finland with data available for the period 2008-2016. This database covers the universe of the working age population in the private sector with detailed information on individual characteristics, such as education, age, annual wages, and gender.

## *International trade data*

Statistics on international trade in goods and services describe exports and imports of goods and services with a broad classification of products. The statistics cover the entire scope of international trade and form a link between goods trade, published by Finnish Customs, according to the IMTS manual (International Merchandise Trade Statistics) and services trade statistics, published by Statistics Finland, according to the BPM (Balance of Payments Manual).

### *International trade in goods statistics*

The international trade in goods statistics (ITGS) are available at the 8-digit Combined Nomenclature (CN08) level by partner-country and is subsequently mapped to CPA08 classification. Extra-EU trade data cover all relevant transactions. Intra-EU trade is available for firms with annual imports or exports to all other EU countries above EUR 100,000 (representing about 96.5 percent of the total imports from and exports to other EU countries according to Finnish Customs).

### *International trade in services*

International trade in services (ITS) data is collected from about 3,000 enterprises annually, a group which consists of firms that responded to the previous year's survey, as well as a random sample drawn from all other firms in Statistics Finland's Business Register. The classification used in the compilation of these statistics follows the international standard as presented in the Manual on International Trade in Services - Extended Balance of Payments Services (EBOPS) classification. Firms have to declare service imports and exports by partner country and service type (EBOPS classification at the 3-digit level), which is subsequently mapped to CPA.

The data cover modes 1, 2 and 4 of trade in services as defined in the General Agreement of Trade in Services (GATS). Services covered include manufacturing services, maintenance and repair services, postal and courier services, construction services, tourism, financial services, telecommunication, information technology and information services, royalties and license fees, other business services, and personal, cultural and recreational services. Transport services for exports are available but not for imports – however, imports were estimated using CIF-FOB rates. Insurance services are not included in the microdata, because these data, drawn from administrative sources, are only available at an aggregate level.

For this joint report, Statistics Finland has prepared the following variables:

- Gross output (turnover), value added, employment, exports, imports, total purchases, share of intermediate products in imports, share of intermediate products in exports, exports and imports, by 2-digit NACE code;
- Breakdown of goods imports and exports by CPA 2-digit, industry, partner country, and end-use using UN Broad Economic Categories classification;
- Breakdown of services imports and exports data by CPA 2-digit, industry, and partner country; and
- Labour inputs by educational attainment - used as a proxy in this report for skills. Qualifications such as Science, Technology, Engineering, and Mathematics (STEM) and Deep Digital Competency (DDC), age, gender are also available income distribution. Some of the cross measures for labour input, including gender by skills, gender by age, qualification by age, and skills by age, all broken down by NACE classification.

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4 From statistical year 2016 onwards called FOLK



**Table A1.1**  
Data source and coverage

Data source	Coverage
Supply and use tables	2012–2018 (2016, 2017 and 2018 tables balanced by OECD)
Annual national accounts main aggregates	2013–2018
Micro data linking (Business Register, SBS, ITGS, ITS, OFATS, IFATS, Business Annual Report)	2008–2018
International trade in goods statistics (ITGS) by partner	2008–2018
International trade in services (ITS) by partner	2013–2018
Linked employee-employer database	2008–2016

## Firm categories

We categorised Finnish firms according to their trade and production variables and their characteristics into the following:

- Enterprise trading status
- Enterprise size and dependency
- Enterprise ownership
- Enterprise age
- Enterprise size and ownership
- High growth enterprises versus others
- High productivity enterprises versus others

### *Enterprise trading status*

This classification categorises firms with respect to the way they engage in GVCs, and includes exporters, importers, two-way traders and occasional and non-traders. The value of imports/exports is calculated from the MDL-ITGS, MDL-ITS tables and VAT-data maintained by the Finnish Tax Administration.

- Exporters have a total export value of more than EUR 5,000 (goods and services) and export more than 5 per cent of their turnover (or if turnover is below 0 or missing) but do not meet the importers' criteria;
- Importers have a total import value of more than EUR 5,000 (goods and services) and import more than 5 per cent of their purchases (or if purchases are below 0 or missing) but do not meet the exporters' criteria;
- Two-way traders fill the criteria for both importers and exporters;
- Occasional and non-traders are enterprises that do not fill the criteria for the exporter- or importer-category.

### *Enterprise size and dependency*

This classification groups firms by size, measured by number of full-time equivalent employees (FTE). In addition, through linking, it provides additional breakdowns that determine whether the firm is dependent on a larger parent company.

Firms are split into four groups by size; micro (<10 FTE), small (10–<50 FTE), medium (50–<250 FTE) and large (250+ FTE).

Firms are considered dependent or independent based on their relation to parent companies and subsidiaries. Firms that have an enterprise group ID and/or exist in the IFATS- and/or OFATS-statistics are considered dependent. All other firms are considered independent.

### *Enterprise ownership*

The ownership split separates Finnish domestic-owned firms from foreign-controlled enterprises, and further splits domestic firms into two groups based on whether they have affiliates abroad or not.

An enterprise operating in Finland is classified as foreign controlled when a foreign owner (or foreign owners) holds more than 50% of its capital, i.e. the majority of ordinary shares or voting power.

Domestic-owned firms are split into two categories: domestic enterprises with only domestic affiliates/no affiliates; and domestic enterprises with affiliates abroad.

### Enterprise age

Enterprise age is determined in accordance with the definition of firm births used in the Eurostat-OECD Business Demography Manual.<sup>5</sup> Firms are separated into two groups, young and old.

Young enterprises are aged five years or less and continue operating in the reference year. Of note is that firms restarting operations with an existing business ID are also considered young, if they satisfy the demographic requirement of a 'dead' firm in a previous reference year (in other words two concurrent years of no operation).

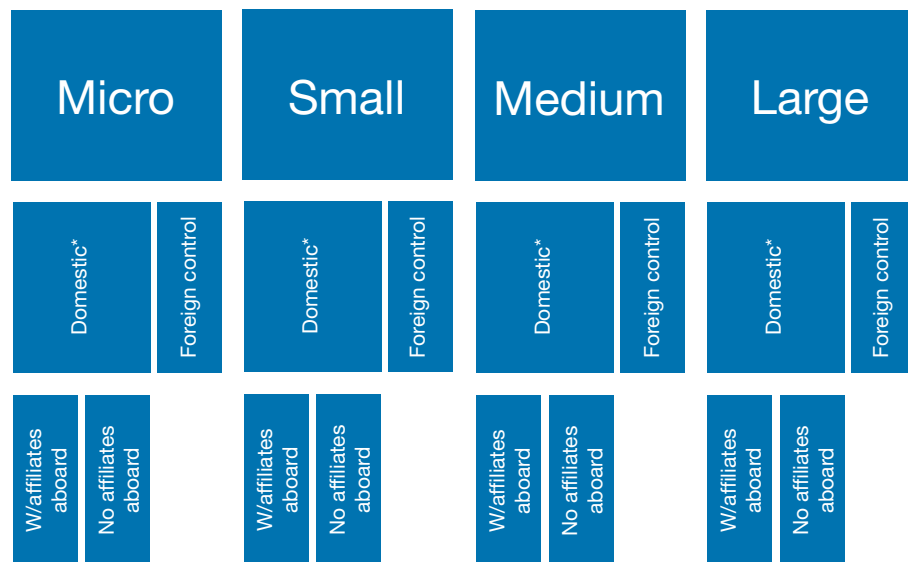
Old enterprises are aged six years or more and continue operating in the reference year.

Firms that cease operations (e.g. due to a bankruptcy or that disappear through other demographic events, such as through a merger or acquisition) are not included in either the young or old category.

### Enterprise size and ownership

This classification groups firms by size, measured by number of full-time equivalent employees (FTE), combined with firm domestic or foreign ownership. Enterprises are split into 10 sub-groups, as follows:

**Figure A1.1**  
Enterprise size and ownership splits



\* These subsequent splits by firm affiliation were merged for data stability.

### High growth enterprises versus others

Enterprises are split into two groups based on their three-year growth rates following the definitions adopted by the OECD and Eurostat in their collections of business demography statistics.

<sup>5</sup> See Eurostat-OECD Manual on Business Demography Statistics 2008



High growth enterprises have a minimum average annual growth rate of 10% over three consecutive years (minimum total 33%) and have at least 10 FTEs in the first year of the growth period. All other enterprises are considered normal enterprises.

As the first growth period starts in 2008, information on high growth enterprises is only available for the period starting 2011.

### *High productivity enterprises versus others*

The most productive enterprises are defined as the top 5% of firms (10 FTEs or more) with the highest value-added per FTE with respect to each industry. All other enterprises are considered normal enterprises.

## Annex 1.2 Estimating extended SUTs using business microdata

### Harmonising conceptual differences between business data and SUTs

#### *Allocating imports and exports of wholesale and retail services to the appropriate industry*

SUTs, in line with concepts of the System of National Accounts 2008 (2008 SNA), allocate imports to firms as direct imports even if these flows pass through resident wholesale and retail industries first. In the same way, the gross value of imports of goods by wholesalers and retailers for re-sale (i.e. without any further processing) are not recorded as their imports in SUTs. Instead the 'margin' provided by wholesalers/retailers is added to the intermediate costs of firms purchasing the imports (as part of the overall cost of the import, when measured in purchaser's prices and separately when measured at basic prices).

Similarly, for exports by wholesalers/retailers, for SUTs at purchaser's prices the margin is added to the value of the good being exported, whilst for SUTs at basic prices, the margin is shown separately as if it were a distinct export of margins. In both cases, SUTs only record as output of the retailer/wholesaler, the value of the margin being provided – intermediate consumption, in turn, does not include the costs of acquiring any goods bought for resale.

At the industry level used in conventional SUTs, determining the use of imports at the industry level can be readily derived, as the information is readily available. However, allocating the imports used by industries to specific firm types required for the extended supply-use tables used in this analysis is more complicated. Trade by Enterprise Characteristics data (which links firms to trade data) provide a view of the pure direct imports and exports made by firms. But this also means that any trade passing through wholesalers/retailers is also recorded as their direct imports or exports. The challenge is to convert the trade flows passing via wholesalers/retailers so that they align with the corresponding flows in conventional supply-use tables, and, also, to break them down by the categories of firms identified above

The first step in achieving this is to allocate those direct imports by firms outside of the wholesale and retail sectors within the respective industries within conventional SUTs. For any given product this generates a missing residual (at the industry level) that reflects those imports that pass through wholesalers/retailers to the firms that purchases these inputs as intermediates. This residual is allocated to specific firm types based on their respective shares of intermediate consumption, after direct imports have already been accounted for. A similar approach is used to allocate exports by wholesalers/retailers (where it is assumed that exports of particular products are only made by the industry with the same classification as the product), except here turnover (minus direct exports) is used as the basis of allocation across firm type. One of the implications of this adjustment is that in the breakdown of firms by trading status, certain "export only" firms may in fact still import, from a national accounts perspective, via wholesalers, while certain non-exporting firms may also export in a national accounts sense.

## No special treatment for processing trade, merchanting and factory-less goods production

The 2008 SNA principle of change in ownership of goods results in changes to the recording of merchanting and of goods sent for processing, both abroad and within the domestic economy, and later returned to the owner. The SNA states that “*measuring goods for processing by the processing fee instead of by the full value of the processed goods changes the nature of input-output coefficients. They no longer represent the technological structures of an industrial process but an economic process*”. These changes align trade flows with international financial transactions that are increasingly important in a globalised economy. Ideally, for GVC analysis, a view of physical, rather than monetary flows, is preferable, however no such adjustments have been made in this analysis, which retains the view of trade presented in the 2008 SNA.

## From SUTs to extended IO tables

### From SUTs to extended SUTs

In what follows, we describe the sequence for estimating extended SUTs in detail. The first step requires disaggregating conventional SUTs by firm characteristics, using aggregated business data.

The principles for splitting SUTs by firm ownership, trading status, and other firm characteristics introduced in this paper are the same. The SUTs are benchmarked to the national accounts main aggregates, to reflect the recent updates in its revisions.

In the Supply table:

- Step 1: break down gross output by firm characteristics using business data
- Step 2: split columns of supply matrix using proportionality assumption
- Step 3: estimate domestic supply of products by firm characteristics using business data
- Step 4: breakdown total imports by firm characteristics using business data
- Step 5: calculate total purchases by firm characteristics from domestic purchases and total imports

In the Use table:

- Step 6: split value added by firm characteristics using business data
- Step 7: split intermediate import use matrix proportionally by firm characteristics using business data (see above, the discussion on wholesale/retail).
- Step 8: domestic intermediate use is calculated, by firm type, as the remainder of gross output less value added and imports in intermediates.
- Step 9: break down total exports by firm characteristics using business data (see also the discussion on wholesale/retail)
- Step 10: split the rows by firm characteristics. This allocates the remainder of purchases to intermediate use and final consumption by firm type. This is perhaps the most important of the assumptions used in creating extended SUTs, as by design, it generates relationships between categories of firms (for example intermediate consumption of domestically controlled firms provide to foreign-controlled affiliates). The approach used here takes a neutral position by assuming that the share of residual purchases (purchases minus exports) for a given category of firms, say domestically controlled firms, that is allocated to final demand (excluding exports) and intermediate use follows what is seen in the industry. In practice, this potentially generates a bias if, for example, domestically controlled firms in many sectors provide relatively more intermediate parts for foreign-owned affiliates.

The extended SUTs are finally balanced using a bi-proportional RAS technique.

## *From extended SUTs to extend IO Tables*

From extended SUTs, IO tables by firm heterogeneity can be estimated using a fixed product sales structure assumption. For further explanation, refer to model D in the Eurostat Manual of Supply, Use and Input-Output Tables (2008 edition).

## Conflicts between SUTs and microdata

Primary business statistics, as available in the linked microdata, are often not fully consistent with national accounts aggregates.

Information for industries not covered by SBS requires estimation or special treatments. More precisely, starting from 2008, Finnish SBS cover sections B to N and Division S95 of NACE Rev.2. Industries such as public administration and social security, and activities of households as employers are not available in the SBS. Furthermore, financial services and real estate activities are covered by SBS but do not allow for a solid separation of industries into various clusters by firm characteristics. Problems occur with trade flow data. For example, the Finnish mining services industry is fairly small, and no data is available for imports and exports (as trade in services statistics is a sample survey). However, according to SUTs, both import and export flows of the Finnish mining services industry are positive.

These challenges are dealt with in the following way:

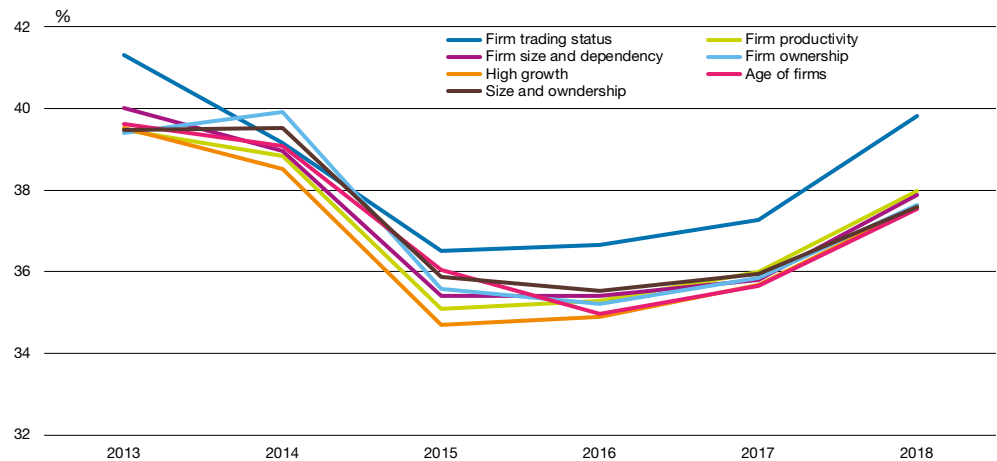
- If a type of firms' total supply in business statistics is less than total imports figures are generated from the above, its share in supply is increased to the same value as imports (while other types of firms supply shares are decreased). These imports data are prioritised over supply is not only because the imports by firm type are more robust (because of import tariff and duties) but also due to these values having a stronger impact on what we aim to measure – the GVC participation indicators.
- If a type of firms' share in value added is relatively high but its share in gross output is low, gross output may be lower than value added. In these cases, gross output is adjusted (re-allocated) across the respective firm types.
- If a type of firms' share in value added plus imports is relatively high compared to its share in gross output, negative values may occur for domestic intermediate consumption. When this occurs, the distribution of imports is reallocated across firm types.
- Finally, if a type of firms' share in total domestic purchases is relatively low compared to its share in exports, adjustments are made for the purchases.

## Differences in the estimates of backward GVC participation indicator foreign value-added content

Estimating extended SUTs by various firm types results in slightly different outcomes each time for import flow matrices as well as for domestic use tables and, consequently, for the Leontief inverse matrices. In turn, associated TiVA results will also differ. Figure A1.2 below illustrates these differences for the foreign value-added content of exports – which ranges from 39% to 41% in 2013, and 38% to 40% in 2018 depending on the underlying extended SUT.

**Figure A1.2**

Foreign value-added content of exports, by firm heterogeneity, 2013–2018



## Breaking down trade geographically

The additional information provided by Statistics Finland on the geographical origins and destinations of trade by firm type is also available by NACE classification and by product.

However, there are data conflicts between what is observed as total trade values in the SUTs and what is reported in business statistics with partner breakdowns, with respect to trade in goods and trade in services data. More specifically, the sum of total imports for each partner across firm types does not necessarily match the corresponding data in adjusted SUTs. To solve this, the trade matrix in the SUTs is used as a constraint – total imports and exports of a given product are distributed to partners for each individual firm category within an industry using the respective shares.

## Annex 1.3 Balancing 2016–2018 SUTs

Statistics Finland has provided Finnish Supply and Use Table (SUTs) from 2012 to 2018. The SUTs from 2012 to 2015 are published and fully balanced, while the SUTs from 2016 to 2018 are provisional and unbalanced. Table A1.3 shows that the value-added and output ratios, as given in the Finnish SUTs, are relatively stable over the years.

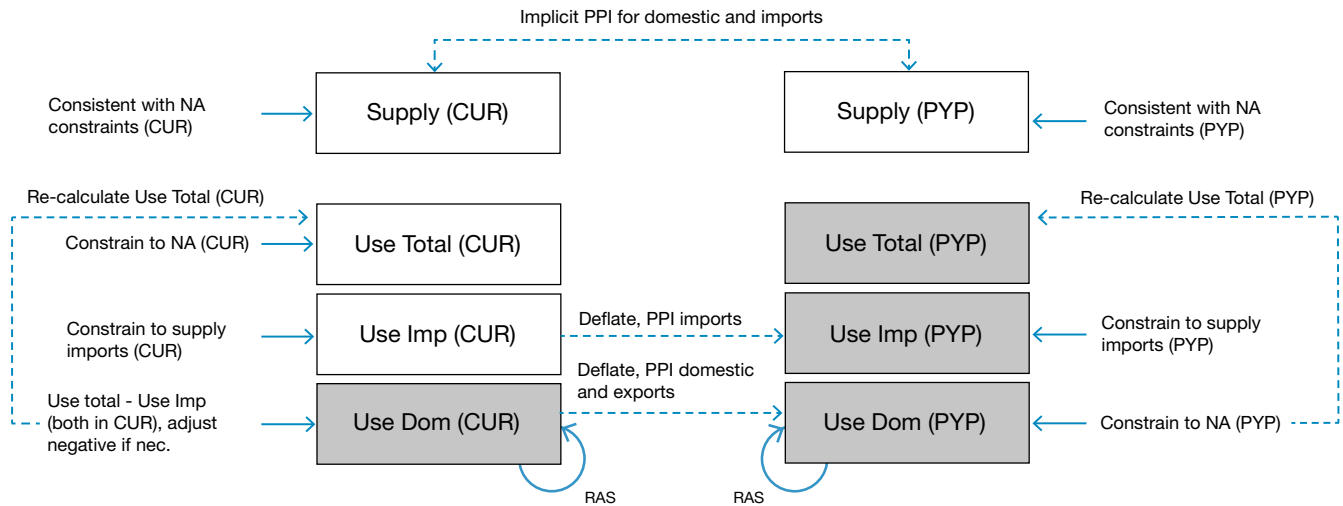
Even if the SUTs are published and balanced, these earlier tables are not aligned to the very latest national accounts data, reflecting on-going revisions. For the benchmark year 2015, however, the SUTs were updated in December 2019 to reflect the changes in the national accounts. SUTs from 2016 to 2018 were balanced using RAS, consistent with the latest national accounts.

Table A1.4 shows the balancing situation of national accounts main aggregates. Clearly, the discrepancy items are quite small. Table A1.5 compares the national accounts main aggregate constraints with updated SUTs for 2013–2015, as well as balanced and updated SUTs for 2016–2018, and this highlights the differences between the two.

Figure A1.3 shows the process flow for balancing SUTs for 2016 to 2018. The supply tables in current prices and previous years prices are provided by Statistics Finland. From these two tables, implicit price indices can be derived for both domestic use and import use tables, which will be the data source to deflate the use tables in current prices. The total use table and import use matrix are available in current prices, and these are constrained to national accounts main aggregates and total imports as in the supply table. Subsequently, the total use table needs to be updated again so that it is consistent with the domestic use table and the import use table.

To estimate the use table in previous year's price, domestic use and import use tables are deflated using implicit price indices (as calculated previously using supply table in current and in previous year's prices). The data from national accounts main aggregates in previous years' prices are now the new constraints. The same constraining and balancing process is then repeated for both the import use and domestic use matrices.

**Figure A1.3**  
Balance 2016–2018 SUTs



Note: White boxes indicate that data are provided by Statistics Finland while grey boxes mean that the underlying data structure is not available; solid blue lines mean to apply NA constraints or price indices given by Statistics Finland to SUTs and dotted blue lines mean to use the implicit information derived from SUTs.

**Table A1.2**  
Finland SUTs value-added gross output ratio, by industry, 2013–2018

INDUSTRIES	2013	2014	2015	2016	2017	2018
Agriculture, forestry and fishing	0.529	0.514	0.508	0.523	0.527	0.538
Mining and quarrying	0.317	0.311	0.344	0.334	0.396	0.360
Manufacturing	0.266	0.275	0.295	0.301	0.299	0.292
Electricity, gas, steam and air conditioning supply	0.472	0.469	0.453	0.433	0.457	0.471
Water supply; sewerage, waste management and remediation activities	0.480	0.484	0.474	0.484	0.465	0.456
Construction	0.384	0.389	0.392	0.394	0.387	0.376
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.544	0.537	0.529	0.528	0.536	0.535
Transportation and storage	0.385	0.380	0.390	0.388	0.383	0.373
Accommodation and food service activities	0.393	0.402	0.408	0.415	0.416	0.419
Information and communication	0.528	0.519	0.511	0.509	0.506	0.504
Financial and insurance activities	0.445	0.485	0.488	0.484	0.500	0.479
Real estate activities	0.685	0.684	0.734	0.736	0.736	0.738
Professional, scientific and technical activities	0.568	0.568	0.562	0.560	0.559	0.547
Administrative and support service activities	0.581	0.579	0.588	0.589	0.586	0.577
Public administration and defence; compulsory social security	0.561	0.561	0.529	0.516	0.511	0.517
Education	0.735	0.733	0.725	0.727	0.718	0.718
Human health and social work activities	0.634	0.631	0.646	0.643	0.622	0.613
Arts, entertainment and recreation	0.489	0.472	0.460	0.461	0.447	0.460
Other service activities	0.521	0.518	0.521	0.518	0.516	0.508
Activities of households as employers;	1.000	1.000	0.957	0.959	0.956	0.958
All industries	0.458	0.462	0.473	0.474	0.469	0.463

**Table A1.3**

National accounts constraints and SUTs (after update/balancing)

	2013		2014		2015		2016		2017		2018	
	NA	SUTs	NA	SUTs	NA	SUTs	NA	SUTs	NA	SUTs	NA	SUTs
Final Demand (A)	284,250	284,162	284,147	283,661	287,423	287,432	295,948	296,016	310,787	310,662	325,818	326,494
Value Added (B)	175,985	175,985	178,410	178,410	182,599	182,599	187,394	187,394	195,242	195,242	202,334	202,334
Imports (C)	79,841	79,841	77,858	77,858	76,047	76,047	78,498	78,498	84,826	84,826	92,124	92,124
Tax on products (D)	28,336	28,336	27,393	27,393	28,786	28,786	30,124	30,124	30,594	30,594	32,036	32,036
(A-B-C-D)	88	-0	486	-0	-9	0	-68	0	125	0	-676	0

**Table A1.4**

Discrepancies in national accounts and SUTs (after update/balancing)

	2013			2014			2015			2016			2017			2018		
	NA	SUTs	gap	NA	SUTs	gap	NA	SUTs	gap	NA	SUTs	gap	NA	SUTs	gap	NA	SUTs	gap
Total output	384,149	384,151	-2	385,897	385,897	0	386,213	386,213	0	395,265	395,265	0	416,217	416,217	0	437,408	437,408	0
Final Demand	284,250	284,162	88	284,147	283,661	486	287,423	287,432	-9	295,948	296,016	-68	310,787	310,662	125	325,818	326,494	-676
Household consumption	105,701	105,613	88	107,428	106,941	487	109,967	109,976	-9	112,890	112,957	-67	114,938	114,813	125	118,402	119,077	-675
NPISH consumption	5,172	5,172	0	5,236	5,236	0	5,168	5,168	0	5,279	5,279	0	5,222	5,222	0	5,309	5,309	0
Government consumption	50,133	50,133	0	50,705	50,705	0	51,545	51,545	0	51,489	51,489	0	51,570	51,570	0	53,274	53,274	0
GFCF	44,967	44,967	0	44,425	44,425	0	44,877	44,877	0	49,418	49,418	0	52,486	52,486	0	55,399	55,399	0
Changes in inventories	599	599	0	874	875	-1	1,021	1,021	0	1,153	1,153	0	1,486	1,486	0	3,026	3,026	0
Exports	77,678	77,678	0	75,479	75,479	0	74,845	74,845	0	75,719	75,719	0	85,085	85,085	0	90,408	90,408	0
Value-added	175,985	175,985	0	178,410	178,410	0	182,599	182,599	0	187,394	187,394	0	195,242	195,242	0	202,334	202,334	0
Imports	79,841	79,841	0	77,858	77,858	0	76,047	76,047	0	78,498	78,498	0	84,826	84,826	0	92,124	92,124	0
Tax on products	28,336	28,336	0	27,393	27,393	0	28,786	28,786	0	30,124	30,124	0	30,594	30,594	0	32,036	32,036	0

# Annex 2: LIST OF INDUSTRIES

Ind. code (A21)	Ind. code (A88)	Industry Name	Ind. code (A21)	Ind. code (A88)	Industry Name
A	01	Crop and animal production, hunting and related service activities	H	49	Land transport
A	02	Forestry and logging	H	50	Water transport
A	03	Fishing and aquaculture	H	51	Air transport
B	05_06	Mining of coal and lignite and extraction of crude petroleum and natural gas	H	52	Warehousing and support activities for transportation
B	07	Mining of metal ores	H	53	Postal and courier activities
B	08	Other mining and quarrying	I	55	Accommodation
B	09	Mining support service activities	I	56	Food and beverage service activities
C	10	Manufacture of food products	J	58	Publishing activities
C	11	Manufacture of beverages	J	59_60	Audio-visual activities
C	12	Manufacture of tobacco products	J	61	Telecommunications
C	13	Manufacture of textiles	J	62_63	Computer and information service activities
C	14	Manufacture of wearing apparel	K	64	Financial activities
C	15	Manufacture of leather and related products	K	65	Insurance activities
C	16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	K	66	Activities auxiliary to financial and insurance activities
C	17	Manufacture of paper and paper products	L	68	Real estate activities
C	18	Printing and reproduction of recorded media	M	69	Legal and accounting activities
C	19	Manufacture of coke and refined petroleum products	M	70	Activities of head offices; management consultancy
C	20	Manufacture of chemicals and chemical products	M	71	Architectural and engineering activities etc.
C	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	M	72	Scientific research and development
C	22	Manufacture of rubber and plastic products	M	73	Advertising and market research
C	23	Manufacture of other non-metallic mineral products	M	74	Other professional, scientific and technical activities
C	24	Manufacture of basic metals	M	75	Veterinary activities
C	25	Manufacture of fabricated metal products, except machinery and equipment	N	77	Renting and leasing activities
C	26	Manufacture of computer, electronic and optical products	N	78	Employment activities
C	27	Manufacture of electrical equipment	N	79	Travel agencies etc.
C	28	Manufacture of machinery and equipment n.e.c.	N	80	Security and investigation activities
C	29	Manufacture of motor vehicles, trailers and semi-trailers	N	81	Services to buildings and landscape activities
C	30	Manufacture of other transport equipment	N	82	Office administrative and other business support activities
C	31	Manufacture of furniture	O	84	Public administration and social security
C	32	Other manufacturing	P	85	Education
C	33	Repair and installation of machinery and equipment	Q	86	Human health activities
D	35	Electricity, gas, steam and air conditioning supply	Q	87_88	Social work activities
E	36	Water collection, treatment and supply	R	90_91	Cultural activities
E	37	Sewerage	R	92	Gambling and betting activities
E	38	Waste collection etc. activities; materials recovery	R	93	Sport, amusement and recreation activities
E	39	Remediation activities and other waste management services	S	94	Activities of membership organisations
F	41	Building construction	S	95	Repair of household goods
F	42	Civil engineering	S	96	Other personal service activities
G	45	Trade and repair of cars etc.	T	97_98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
G	46	Wholesale trade (excl. cars etc.)			
G	47	Retail trade (excl. cars etc.)			





ISBN 978-952-244-663-3 (pdf)