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SERVICES TRADE AND LABOUR MARKET OUTCOMES

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This report draws on individual-level and firm-level data to better understand the relationships between services trade and labour market outcomes. It seeks to shed light on how firms benefit from the rise in services trade, which groups of workers are affected the most, how employment and wages adjust to increased services trade, and the impact of policy settings on outcomes in these areas. It relies on new empirical analyses undertaken on the European Union, Brazil, India, Italy, Slovenia, Sweden, the United Kingdom, and Viet Nam together with insights from economic literature and a meta-analysis of the results underlying this report. Findings suggest that firms' importing, offshoring and exporting activities are generally associated positively with firm employment in advanced and emerging market economies, although the relationship is more uncertain for the latter group of countries. Firm's overall wage responses to services trade are on average positive as well, but quantitatively small. Looking at the distributional impact, there is mixed evidence for a skill bias in wages related to increased services exports and imports. Women are found to benefit from services export growth, while increased imports are estimated to exert downward pressure on the wages of women compared to the ones of men.

Keywords: Employment, wages, individual and firm-level data

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Executive summary

The importance of services in total employment has increased significantly over time in countries at all levels of development. Services trade flows have been dramatically affected by the COVID-19 crisis, and unemployment has risen to unprecedented levels in a number of countries. This report draws on individual-level labour market information and firm-level trade data to better understand the relationships between services trade and labour market outcomes such as employment and wages.

It seeks to shed light on how firms benefit from the rise in services trade, which groups of workers are affected the most, how employment and wages adjust to increased services trade, and the impact of policy settings on outcomes in these areas. Analytical insights from a diverse set of countries with different levels of income help to compare these findings with established literature related to manufacturing trade. Empirical analyses from the European Union, Brazil, India, Italy, Slovenia, Sweden, the United Kingdom, and Viet Nam form the basis of this report, which also takes into consideration insights from economic literature.

Findings suggest that firms' importing, offshoring and exporting activities are generally associated positively with firm employment in advanced and emerging market economies, although the relationship is more uncertain for the latter group of countries. A relationship is also found with, firm performance characteristics, such as productivity and turnover.

Firm's overall wage responses to services trade are on average positive as well, but quantitatively small. More detailed analyses relying on individual wages of workers within the same job also suggest that higher exports and imports are linked to wage improvements on average. Among other factors, these may be linked to wage boosts due to trade-related productivity gains. Correcting for those gains shows that a rise in both services imports and exports has ambiguous and generally small effects on individual wages across countries. Results for one country also indicate that higher services trade barriers, as measured by the OECD STRI, coincide negatively with wages.

Looking at the distributional impact, there is mixed evidence for a skill bias in wages related to increased services exports and imports. The bias towards mid-skilled workers in an emerging economy and towards high-skilled ones in OECD countries is in line with the aggregate skill structure of services observed across countries. While higher exports reduce the risk of job losses for women, results also point to higher services imports that mildly penalise women's wages as compared to men's.

These findings are generally consistent with previous research on the labour-market impact of manufacturing and services trade and have important policy implications to foster a sustainable recovery. The concurrent nature of trade and productivity implies that reducing trade barriers can potentially enhance gains in productivity through an expansion of businesses into foreign markets. It also has implications for domestic policies that aim to improve productivity and growth.

Trade policies that intend to reduce (or increase) trade barriers should consider their joint impact related to the increased servicification of trade, and their corresponding role for employment and wages. The present analysis reveals the link between increased manufacturing and services trade and labour-market outcomes. This is in line with modern patterns of production and specialisation in global value chains. This finding is pertinent, because the large scale of output and labour market disruptions in the face of the COVID-19 pandemic will require appropriate policy responses which take these linkages into account. It should be noted that the present approach focuses on causal trade rather than general equilibrium effects

and does not take into account spillovers, adjustments and reallocations induced by trade across or within countries.

Finally, heterogeneous labour market effects across OECD and emerging market countries underline the need to consider the distributional impact of services trade on a country-by-country basis, especially when linking trade with growth and development policies. Previous research indicated that large changes in trade flows have considerable implications on jobs and wages for some categories of workers. These costs differ across skill, gender and age. Redistribution policies can mitigate such costs, and education, on-the-job training and active labour market policies (e.g. inclusion of women, improving skill levels, matching employers with skilled employees) promote equal opportunity and help to adapt skills to the requirements of a service-based economy.

Summary of findings

- **Services trade tends to benefit firm performance and employment.** While this result is stronger in advanced than in emerging market economies, trade policy aimed at removing restrictions to trade in services in particular can help augmenting performance measures such as productivity and output.
- **Higher services trade has a small impact on individual wages in a number of countries.** Similar wage effects due to increased manufacturing trade are typically bigger. Because the findings in this report differ across countries, in particular when comparing advanced and emerging economies, policies should take the specificity of the business environment into account.
- **Evidence suggests a mild skill premium due to trade in services.** Redistribution policies are therefore most effective when targeting workers instead of specific jobs or industries. Active labour market policies that enhance the matching between employers and skilled employees, as well as policies targeting skills and aiming at the inclusion of women can boost the resilience of labour markets and mitigate losses for specific groups of firms and workers.
- **Barriers to trade in services and goods should be addressed jointly.** Findings point to the complementary importance of both services and goods trade in impacting labour-market outcomes. Furthermore, the labour demand of firms active in both the manufacturing and services sector is affected by services trade.

1. Introduction

The role of services in job creation and international production has surged across economies at all levels of development. This ongoing shift in the structure of the global economy underscores the importance of better understanding the relationships between services trade and labour market outcomes.

To date, research into the effects of trade, including its distributional effects, has focussed on manufacturing to a greater degree than services.[1] This draft report aims to close this gap by:

- describing structural trends related to international services trade and labour markets
- documenting new empirical results regarding the contribution of services trade and services trade policy to shifts in labour demand and adjustments of workers
- delineating initial policy-related consideration with the aim of ensuring that gains from trade in services are widely shared.[2]

The report relies both on existing economic research and new empirical analyses on services trade. Findings are derived from many sources. It starts with the analysis of individual-level labour market information and sectoral trade data for the European Union (EU) and India. Examination of country-specific employer-employee linked micro-data further deepens the perspective. The present draft draws from the cases of a large euro area country (Italy), a Central European country (Slovenia), a Nordic high-income country (Sweden), an Anglo-Saxon country with a services focus (the United Kingdom) and two dynamic emerging markets (Brazil, Viet Nam).

These country studies seek to illustrate the responses of employment and wages related to trade in services. They examine *inter alia*:

- the extent to which the development of services trade materialises into higher wages and new jobs
- the groups of workers that benefit most from services trade, including through individual rising wages and additional demand for skills
- how workers (depending on characteristics such as gender, skill, age and occupation) and firms (differing in size and productivity) adjust to services trade.

The next section discusses the surge of services in international production, and its concomitant implications for labour markets. Section 3 documents cross-country evidence on job characteristics and job transitions from the EU Labour Force Survey as well as an examination of the differential trade effect on women versus men's earnings for India. Section 4 provides summary statistics on data about services trade and labour markets in various countries at the micro level and describes the estimation of the effect of services trade on employment and wages and findings thereof. Concluding remarks and initial policy observations are presented in Section 5.

[1] For exceptions, see (Crinò, 2010; Geishecker & Görg, 2013; Hijzen, A., M. Pisu, R. Upward, and P.W. Wright, 2011; Borghi & Crinò, 2013; Ornaghi, Van Beveren, & Vanormelingen, 2017; Eppinger, 2019; Liu & Trefler, 2019).

[2] There is substantial work on welfare and trade, starting with the early contributions from Paul Samuelson, showing that trade is Pareto improving if gains from trade are redistributed as lump-sum taxes to compensate losers (Samuelson, 1938; Samuelson, 1939; Samuelson, 1962).

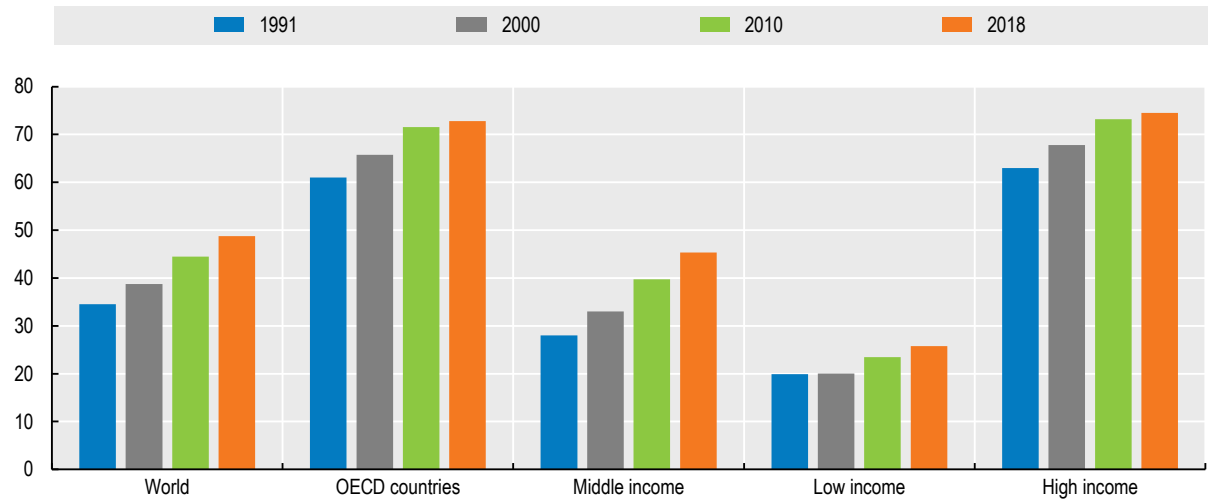
2. Trade and employment in services sectors

2.1. A services surge in jobs and international production

The services sector represents the biggest share of economic activity with global employment in services in 2018 at almost 50% of total employment, with value added in services accounting for 65% of GDP, and trade in services for 13% of GDP. These figures are even higher in OECD countries, amounting to 73%, 70% and 14%, respectively. The role for services in total employment has strongly increased over time in all country groups (Figure 2.1).[3] A value-added perspective further enhances the importance of services, which globally accounted for 33% of total exports in 2015.[4]

Across countries, patterns of employment can be explained by sectoral composition, as well as by their role in global value chains. Specialisation in services sectors coincides with higher employment, in contrast to specialisation in manufacturing, and not necessarily at the cost of productivity, because value added also exhibits higher growth rates in some services sectors (Miroudot & Cadestin, 2017). Evidence suggests that services value chains contribute more to employment creation than manufacturing value chains.

Figure 2.1. Employment shares in the services sector are increasing over time, %



Note: Share of services employment in total employment in percentage. Based on modelled ILO estimates. Middle-income economies are those in which 2017 GNI per capita was between USD 996 and USD 12 055. High-income economies are those in which 2017 GNI per capita was USD 12 055 or more. Low-income economies are those in which 2017 GNI per capita was USD 996 or less.
Source: World Development Indicators, World Bank (2019).

[3] Figures from the World Development Indicators Database (World Bank) for 2018; figures for services value added for 2017. This upward trend could not be observed for manufacturing employment during the same time period. WTO (2019) provides a recent summary of the role of services trade for global trade.

[4] OECD-WTO TiVA. These shares have only slightly increased over the past decade.

2.2. Services trade is highly concentrated and complementary to goods

The growing importance of services in international production networks corresponds with two structural trends that have important repercussions for labour market outcomes.

First, services trade – akin to goods trade – is highly concentrated among few firms. For example, between 6% and 29% of services exporters serve more than 25 destination markets, yet account for between 50% and 90% of total trade volumes. Furthermore, firm size measured by turnover is strongly correlated with cross-border services export volumes and foreign affiliate sales (Rouzet, Benz, & Spinelli, 2017).[5]

Against this background, the effect of higher services trade on employment and earnings may be relatively more important in larger firms, conditional on their skill mix. Services trade liberalisation and sizeable changes to global demand on the other hand may enable easier market access for SMEs (Rouzet, Benz, & Spinelli, 2017). This could enhance the productivity or size expansion of those firms, with corresponding benefits regarding the labour demand of such firms.

Second, trade in goods and services are highly complementary.[6] Bi-exporters, firms that export both goods and services, are considerably larger in most sectors, both in terms of turnover and the number of employees, than firms solely exporting services (Rouzet, Benz, & Spinelli, 2017). Accordingly, both goods and services trade policy will impact the overall labour demand of firms. Similarly, firms in manufacturing rely to a substantial extent on services functions. This *servicification* of manufacturing strongly relates to patterns of specialisation in global value chains (Miroudot & Cadestin, 2017).

Third, employment and compensation[7] in services trade differ from those in goods trade in terms of their integration into the global economy. Figure 2.2 demonstrates how aggregate employment and employee compensation are embodied in foreign final demand and gross exports. This illustrates the extent to which employees in OECD countries depend on integration into the global economy. Clearly, this is less pronounced in the services sector, compared to manufacturing. The reverse applies regarding the domestic compensation of employees, as the share in gross exports is more important for services, compared to manufacturing.

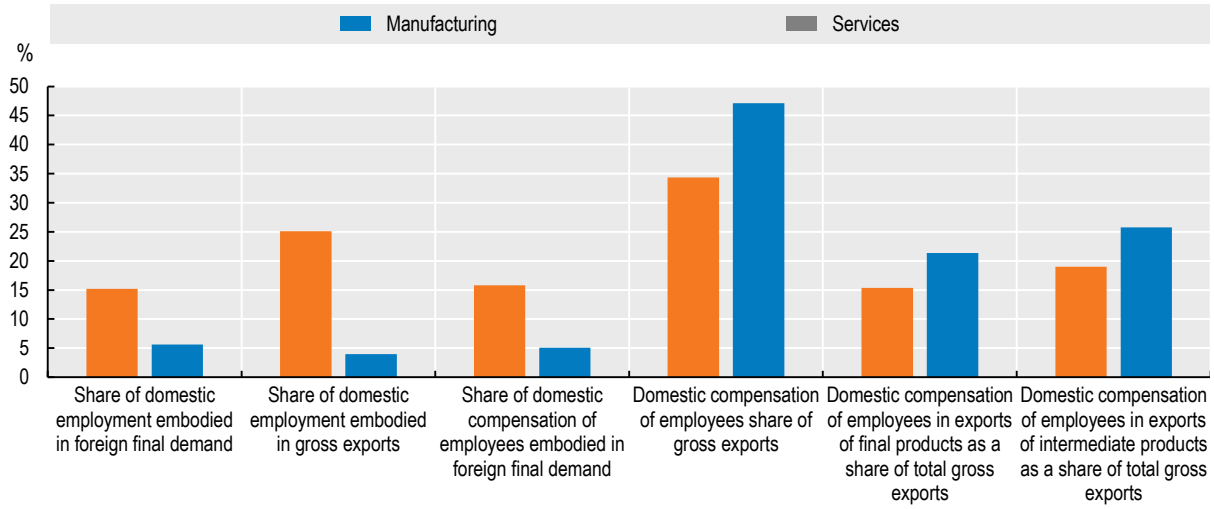
[5] Evidence in (Gaulier, Milet, & Mirza, 2011; Breinlich & Criscuolo, 2011; Temouri, Vogel, & Wagner, 2013; Ariu, 2016; Federico & Tosti, 2017; Morikawa, 2019) (Kelle & Kleinert, 2010) supports this finding.

[6] See also (Kelle, 2013; Lodefalk, 2014; Crozet & Milet, 2017a; Crozet & Milet, 2017; Ariu, Andrea; Breinlich, Holger; Corcos, Gregory; Mion, Giordano, 2019).

[7] The compensation of employees referred to here “includes wages and salaries of employees paid by producers as well as supplements, such as contributions to social security, private pensions, health insurance, life insurance and similar schemes.” For further information see the OECD TiM database metadata. For simplicity, later sections looking at disaggregate (individual-level) data use the term wages throughout, even if statistical concepts embodied in data sources of different countries may deviate (for example, earnings typically include income from other sources such as interest payments). See Annex A for further details.

Figure 2.2. Labour market indicators in global production networks

OECD average, 2015



Source: Trade in employment (TiM), OECD. The figures should be considered as weighted averages of OECD countries.

2.3. Services activities are beneficial to manufacturing employment

Services create value in manufacturing activities in three ways (Miroudot & Cadestin, 2017). First, they may link manufacturing activities or serve as inputs to manufacturing. Examples include transport and logistics, R&D, consulting, marketing and legal services. Second, manufacturers may bundle exports of goods together with exports of services (*servitisation*). As an example, automobile manufacturers offer a host of services complementary to their product, from leasing to smart connectivity services and car sharing services. Third, services activities may be provided in-house in order to boost productivity and efficiency in the production process. R&D and IT services together with other activities requiring specific skills constitute examples. Against the backdrop of fragmented production and deeper specialisation, this latter channel highlights the importance of make-or-buy decisions faced by firms in global value chains. Such effects generate additional income sources for firms, from which workers may benefit.

Furthermore, services support functions globally represent 25% to 60% of employment in manufacturing firms. In particular, business functions related to support services and R&D have a relatively high employment share in sectors, which are capital and technology intensive (e.g. ICT & electronics, machinery, and chemicals). The importance of such in-house services activities has also grown over time. In fact, employment has shifted within a relatively short period of time, from value chains (e.g. logistics, marketing) and value networks (e.g. platforms connecting customers and service suppliers) to value shops (e.g. professional, consultancy, engineering and R&D services). The latter focus on solving customer problems with expert and professional help instead of providing standard processes.

Specifically, and depending on the services function, estimates suggest that a one-percentage point increase in narrow offshoring reduces manufacturing employment by 1.5% to 3% (Nordås, 2019).[8] For example, this is the case for marketing, R&D and transport, while other outsourced functions such as IT complement in-house tasks in the same function. The most important determinant of substitution versus

[8] Note that the literature partly uses the terms offshoring and imports interchangeably. This report henceforth considers narrow offshoring to differ from import competition in that the former is measured by intermediate or final goods and/or services imports in a firm's exports categories, and that the latter refers to the import penetration or exposure from a particular country, or a set of countries.

complementarity is complexity, i.e. the length of the global value chain, and to a lesser extent ICT intensity and the stringency of the regulatory environment.

2.4. Differential impact of skills in services and goods

Turning to the examination of more fine-grained, micro-level data, there is vast empirical evidence from studies focusing on the manufacturing sector confirming that goods trade has distributional effects for individuals.[9] In particular, gains and costs appear to be unequally distributed across industries, regions, skills and tasks (routine versus non-routine).

These distributional effects have coincided with growing wage inequality and job polarisation over time and in many countries. However, among the several explanations for increased polarisation and inequality, there is less conclusive evidence on goods offshoring as a driver of increased job polarisation, at least compared to other factors. Factors such as routinisation (or routine-biased technological change), skill-biased technological change and structural change seem to be more important determinants of this trend.[10]

Globally, the effects of international goods trade on wages are generally positive for exports, but offshoring leads to increased skill premia within firms. This implies benefits from increased import competition for manufacturing workers with higher skill levels and losses for the ones with lower skill levels.

Given the increased *servicification* of manufacturing and the findings for manufacturing, one may expect similar elasticities of labour market variables for services trade. This is supported by the fact that stylised results for firms in manufacturing trade more or less apply to firms in services trade as well (Breinlich & Criscuolo, 2011; Rouzet, Benz, & Spinelli, 2017). However, there is little evidence of the impact on wages and jobs of trade in services, or of goods trade on firms and workers in the services sector.

Skill is one key aspect where differential effects of services versus goods trade on labour markets may be observed (Liu & Trefler, 2019). Many tradeable services are skill-intensive and performed by workers with high levels of education, but there are large wage differentials across countries. Furthermore, trade in services encompasses various modes of supply and are more widely used as intermediate inputs, implying that services imports may have wider spillovers on the labour market than goods imports.

To shed light on the differential evolution over time, Figure 2.3 provides an overview of the evolution of skill shares for the services and manufacturing sectors in OECD and non-OECD countries from the early 1990s. Two observations stand out.

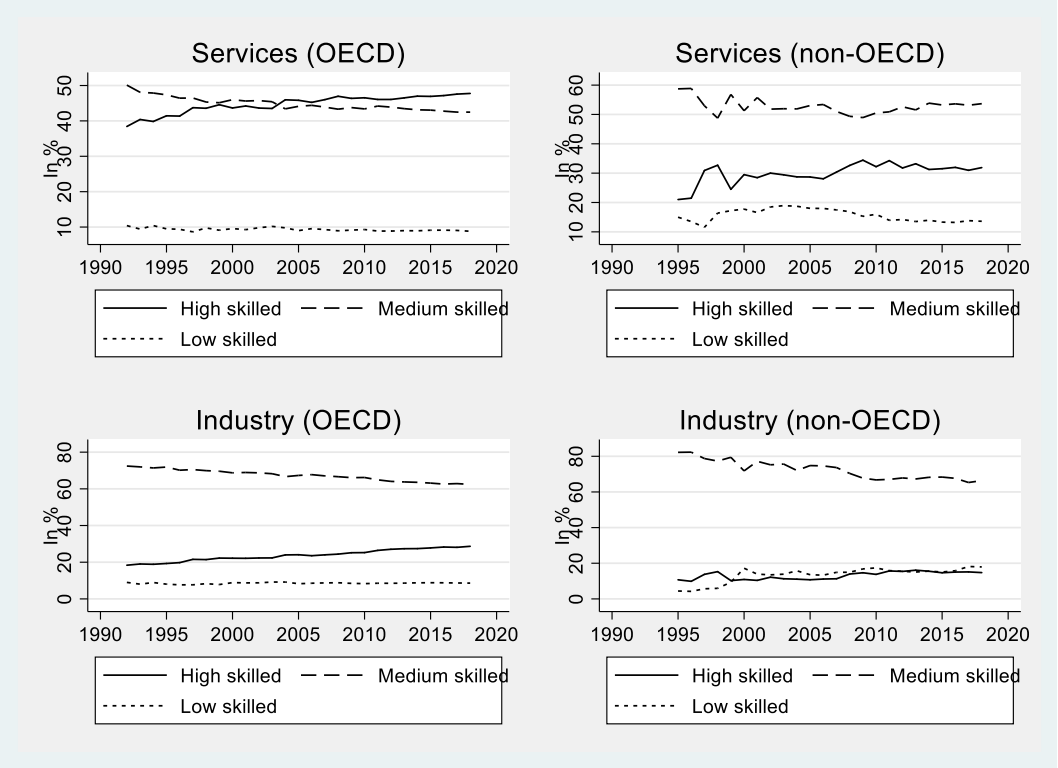
First, the share of high-skilled workers is substantially higher in OECD countries than in non-OECD countries, but increases over time in both groups compared to the share of workers with medium skills in both groups.

Second, medium-skill shares are prevalent in both country groups in the industrial sector but shrink over time, in OECD countries particularly at the benefit of high skilled workers. The following sections will provide further insights on the importance of skills in determining the link between trade and labour market outcomes.

[9] See among others, (Topalova, 2007) for India, (Menezes-Filho & Muendler, 2011; Kovak, 2013; Dix-Carneiro & Kovak, 2017; Dix-Carneiro & Kovak, 2019) for Brazil; (Geishecker & Görg, 2008) for the United Kingdom; (Autor, Dorn, & Hanson, 2013; Autor, David H.; Dorn, David; Hanson, Gordon H.; Song, Jae, 2014; Ebenstein, Avraham; Harrison, Ann; McMillan, Margaret; Phillips, Shannon, 2014; Hakobyan & McLaren, 2016) for the United States; (Dauth, Findeisen, & Suedekum, 2014; Dauth, Findeisen, & Suedekum, 2017) for Germany; and (Hummels, D., R. Jørgensen, J. Munch, C. Xiang, 2014; Keller & Utar, 2016; Utar, 2018) for Denmark.

[10] For example, (Goos & Manning, 2007; Goos, Manning, & Salomons, 2009; Criscuolo & Garicano, 2010; Autor & Dorn, 2013; Goos, Manning, & Salomons, 2014; Keller & Utar, 2016; Bárány & Siegel, 2018).

Figure 2.3. Sectoral skill shares in OECD and non-OECD countries



Note: Skill shares are calculated by country and year, relative to total employment in the respective sector, and then aggregated according to OECD membership. High skills refer to ISCO skill levels 3 and 4 (ISCED categories 5, 6 and 7 involving education starting at ages 17 or 18 with a duration of about four years and resulting in a degree), medium skills to skill level 2 (ISCED categories 2 and 3, including first and second stages of secondary education with a duration of about three years), and low skills to skill level 1 (ISCED category 1, primary education with a duration of about five years). New Zealand is not available in the data.
Source: ILOSTAT, Annual employment by economic activity and occupation; accessed November 2019; own calculations.

There is evidence that, at the sectoral level, offshoring in services exhibits a skill bias. Exploiting US occupational and sectoral level data for white-collar jobs, Crinò (2010) suggests that offshoring in services enhances skilled relative to unskilled employment. However, conditional on skill levels, tradeable occupations are more likely to be offshored than non-tradeable occupations, thus reducing employment in these occupations. (Geishecker & Görg, 2013) confirm these findings using industry-level offshoring together with worker-level data on wages in the United Kingdom. Linking Italian employer-employee data to industry-level offshoring measures, Borghi and Crinò (2013) provide evidence of a widening wage gap in favour of skilled workers. Furthermore, they illustrate that increased offshoring of business services negatively affects wages, whereas total offshoring and offshoring of other services have no wage effect.

Related studies based on firm-level information are scarce and point to positive employment effects related to surging services trade. Exploiting firm-level information for Germany, Eppinger (2019) finds that a rise in the volume of service offshoring has increased firm employment, with an elasticity of 6.0% to 7.6%. Those effects are stronger for firms with higher initial services offshoring activity levels. Similarly, Hijzen et al. (2011) base their study on import data for the United Kingdom, showing that increased services offshoring is related to higher employment growth.

Finally, there is evidence that the increased participation of the People's Republic of China (hereafter "China") and India in global services trade have led to labour-market adjustments, both in terms of employment and wages. Liu and Trefler (2019) study occupational exposure to services imports and exports from China and India, and the corresponding effect on occupational switching at the worker level

in the United States. They find that both downward and upward occupational switching have increased and provide weak evidence for a rise in the white-collar unemployment rate. Furthermore, white-collar wages were reduced by 1% overall, with switchers and individuals who lost their jobs being penalised by 15% and 47% in terms of wages, respectively. The study also suggests that increased service exports can partially offset the effects on switching and unemployment.

3. New evidence on services trade and labour markets

Given the lack of strong evidence on the impact of services trade on labour market outcomes, the following sections present new empirical analysis exploiting disaggregated country-specific data, including:

- evidence of the effects of trade on employment, including employment dynamics and the decomposition of such effects by gender.
- a description of micro-level data in various countries that are used to overcome the limitations of aggregate data analysis.

The focus on micro-data presents a number of advantages. While the examination of aggregate data allows for general equilibrium analysis, they mask changes in patterns at the firm level, where decisions on labour demand about overall employment and the occupational and wage distribution take place. Similarly, the analysis of aggregate data may conceal how trade affects specific groups of workers possessing heterogeneous characteristics.

3.1. Trade and part-time employment

Focusing on the prevalence of part-time and fixed-term employment in all EU and EFTA countries, Benz and Johannesson (2019) find robust evidence for a positive correlation between imports and voluntary part-time employment and a negative one between offshoring and voluntary part-time employment. For example, a 10% increase in total imports is related to a rise in the share of voluntary part-time employment per worker or output by 1.7% in all sectors. In services sectors, this rise is stronger, at about 2%. An intuitive explanation could be that the working hours of those workers who actually prefer to work less, respond to stronger import competition. The corresponding effect for offshoring as measured by imports of intermediate inputs lies between –1.9% (in all sectors) and -6.9% (in commercial services).

Increased exports have differential effects on women and men, reducing involuntary part-time employment of women. Furthermore, growth in exports by 10% coincides with a rise in fixed-term employment ranging between 0.7% and 1%. This holds both for the aggregate of all sectors as well as services. In the latter sector, exports are weakly positively correlated with involuntary fixed-term contracts for women, and with fixed-term apprenticeships for men.

3.2. Exports and hiring rates

There is evidence for a positive correlation between exports and job take-up in commercial services, whereas hiring rates for workers already in employment are unaffected (Benz & Johannesson, 2019). For example, a 10% increase in exports of commercial services corresponds to an increase of the hiring rate by 1.3% to 1.6%, for workers in unemployment or inactivity. A decomposition of these dynamics for women and men allows for insights along the gender dimension, revealing that job take-up rates decrease for women in unemployment or inactivity in a much more pronounced way than for men as imports grow.

3.3. Export growth and job stability

Sectoral export growth also reduces the individual risk of job loss for existing employment, both when looking at all economic sectors and services sectors only (Benz & Johannesson, 2019). This holds for both men and women, but for women in a more robust way. At the same time, increased offshoring is correlated with an increased probability of losing a job without finding employment in the subsequent year for both genders, but there is stronger evidence for a significant relationship between the two for men.

3.4. Trade intensity and the gender wage gap

Johannesson and Nordas (2019) shed light on the role of international trade as a source of increased competitive pressure on domestic markets, and how it affects differences in relative wages between men and women in India. As sectors of comparative advantage versus ones of comparative disadvantage exhibit different trade intensities and are thus more or less exposed to trade shocks, the wages of male and female workers may be impacted differently.

Sectors with relatively higher trade intensity have the lowest gender wage gap. Overall, women earn on average 24% less than their male counterparts, 40% less in manufacturing and 28% less in services. As expected, the effect of tertiary education is highly influential in determining wages in all sectors, with those workers earning around 67% higher wages in all sectors, compared to those with only a primary education.

A decomposition of these findings with respect to trade intensity suggests that the total gender wage gap in services sectors revealing comparative advantage is rather minor, but it is quite substantial in manufacturing, regardless of relative trade intensity. A further wage decomposition shows that women in sectors with higher relative trade intensities would have lower wages if they had the same level of wage-determining factors, such as education, age and tenure, than men. In particular, women are potentially more educated than their male counterparts in similar jobs.[11]

4. Trade, employment and wages under the microscope

This section describes new stylised facts from the analysis of employer-employee linked micro data in several countries. Countries were selected primarily according to the availability of appropriate micro-level data. The aim was to obtain results for a set of countries exhibiting diversity along several dimensions, most importantly income, size and geography. Most studies underlying this report were carried out based on confidential data from International Trade in Services, structural business and labour market surveys, or even census data. Such data, provided by statistical agencies and central banks, usually contain information on individual labour income, as well as firm-level information on goods and services trade and characteristics of firms such as size. In cases where individual or firm-level information were not available, sector level information supplemented these datasets.

This report summarises employer-employee micro-level data for Brazil, Italy, Slovenia, Sweden, the United Kingdom and Viet Nam. The sources and additional information on the data used are described in Annex A. Trade measures are calculated either at the level of the firm (Italy, Slovenia, Sweden, United Kingdom), or the industry in which the firm reports its main activity (Brazil, Viet Nam). For Slovenia, only goods trade data are available, yet one can distinguish between firms active in the manufacturing and the services

[11] This is achieved by applying results for male wages to female wages in order to obtain women's counterfactual wages, referring to the wage women hypothetically receive if it is determined equivalently to the one for men. The difference between counterfactual and observed wages for women is attributed to the explained part of the gender wage gap, commonly known as the endowment effect.

sectors. When available, two different measures of trade exposure can be employed, importing and exporting (for an illustration of the variables available in different countries, see Table 4.1). It is noticeable that wage data in Viet Nam include informal sector wages.

Table 4.1. Comparison of micro-level data across countries

	Brazil	Italy	Slovenia	Sweden	United Kingdom	Viet Nam
	Trade exposure variables					
Exports	Sectoral	Firm	Firm	Firm	Firm	Sectoral (net)
Imports	Sectoral	Firm	Firm	Firm	Firm	Sectoral
Narrow offshoring	NO	NO	NO	NO	Firm	NO
Survey	YES	YES	YES	YES	YES	YES
Weighted	NO	YES	NO	NO	YES	NO
Trade in	S	S	M	M & S	S	M & S
Years	2014-2017	2008-2017	2009-2017	1994-2014	2004-2017	2005-2016
Use of STRI	NO	NO	NO	NO	YES	NO
	Labour market variables					
Employment	Firm	Firm	Firm	Firm	Firm	Firm
Wages	Worker	Firm	Worker	Worker	Worker	Worker
Transition rates	YES	NO	NO	YES	NO	NO
Survey	NO	NO			YES	
Weighted	NO	NO	NO	NO	YES	NO
Sectors	M & S	M & S	M & S	M & S	M & S	M & S
Years	2005-2017	2008-2017	2009-2016	1999-2014	2004-2016	2011-2016

Note: All countries but Viet Nam offer information on exports and import flows. For the United Kingdom, narrow offshoring – defined as imports by a firm in the same sector as its' exports – was analysed as well. The terms imports and (broad) offshoring are used interchangeably. Narrow offshoring refers to firms importing in the same product as exporting. Weighted is indicated as yes whenever survey weights are applied to survey data in the analyses. M & S refers to manufacturing and services. Trade: annual (Brazil, Slovenia, Sweden, United Kingdom, Viet Nam), quarterly (Italy); Employment: annual (Sweden, United Kingdom, Viet Nam); Wages: annual and hourly (Brazil); average monthly gross (Italy); annual and hourly (Slovenia); annual, FTE (Sweden); annual, weekly and hourly (United Kingdom); hourly (Viet Nam).
Sources: (Bamieh, Bripi, & Fiorini, 2020), (Benz & Lassmann, forthcoming), (Jaax & Johannesson, 2019), (Lassmann & Spinelli, forthcoming)and (Nordås, Lodefalk, & Tang, 2019).

While Table 4.1 points to differences in the data for different countries, this report also draws from a meta-analysis, presented in the subsequent section, going beyond the plain comparisons of different studies. That said, the various elasticities presented in the Appendix should not be compared directly across countries because the variables of interest may be slightly distinct, and because the methodologies vary in subtle ways. The countries differ also economically.

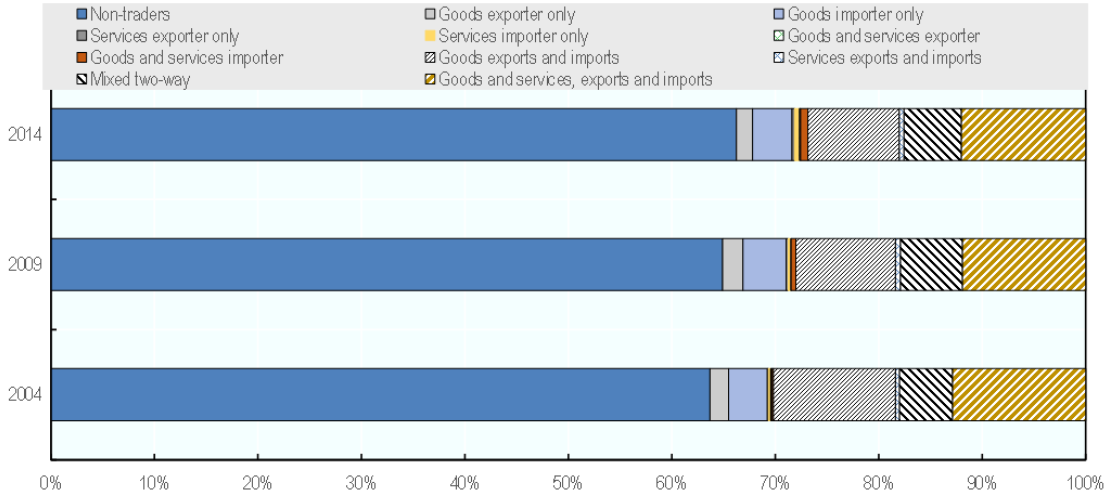
Among the advanced (OECD) countries in this report, Slovenia, Sweden and the United Kingdom have comparatively low restrictions on trade in services and are net exporters of services. Slovenia's focus is on travel and other business services, business services also account for the lion share of Sweden's services trade, and financial industry services and other business services are the key services traded by the United Kingdom. Italy is a net importer of services, and its main sectors are travel and business services.

Brazil is the fifth most populous country in the world, and is a relatively closed economy compared to the other countries examined in this report. It is a net services importer and trades primarily in business, professional and technical services. Finally, Viet Nam has emerged as a country which underwent profound structural reforms in the 1980s and 1990s, accessed the WTO in 2007, and is dynamic in export-oriented manufacturing activities that are intensive in labour. Foreign services value added contribute nearly 20% to exports, and the country records substantial growth in services imports, with transportation and travel representing by far the largest shares (Jaax & Johannesson, 2019).

These data confirm previous patterns on employment and wage patterns in firms engaging in international trade and are consistent with the size distribution of those firms and the strong concentration patterns in international trade. While non-traders account for the bulk of total employment (Figure 4.1), traders have more employees on average (Figure 4.2) and pay higher wages (Figure 4.3).

Due to the structural shift to domestic services, the share of non-traders in employment has gone up over time in Sweden (Figure 4.3). This trend may be due to the higher use of healthcare, social care and education services. Furthermore, firms that both export and import goods or services make up for large contributions to employment, compared to firms focusing on one-directional flows, or on services only. Finally, the gap in wages between traders and non-traders has increased between 2004 and 2014.[12]

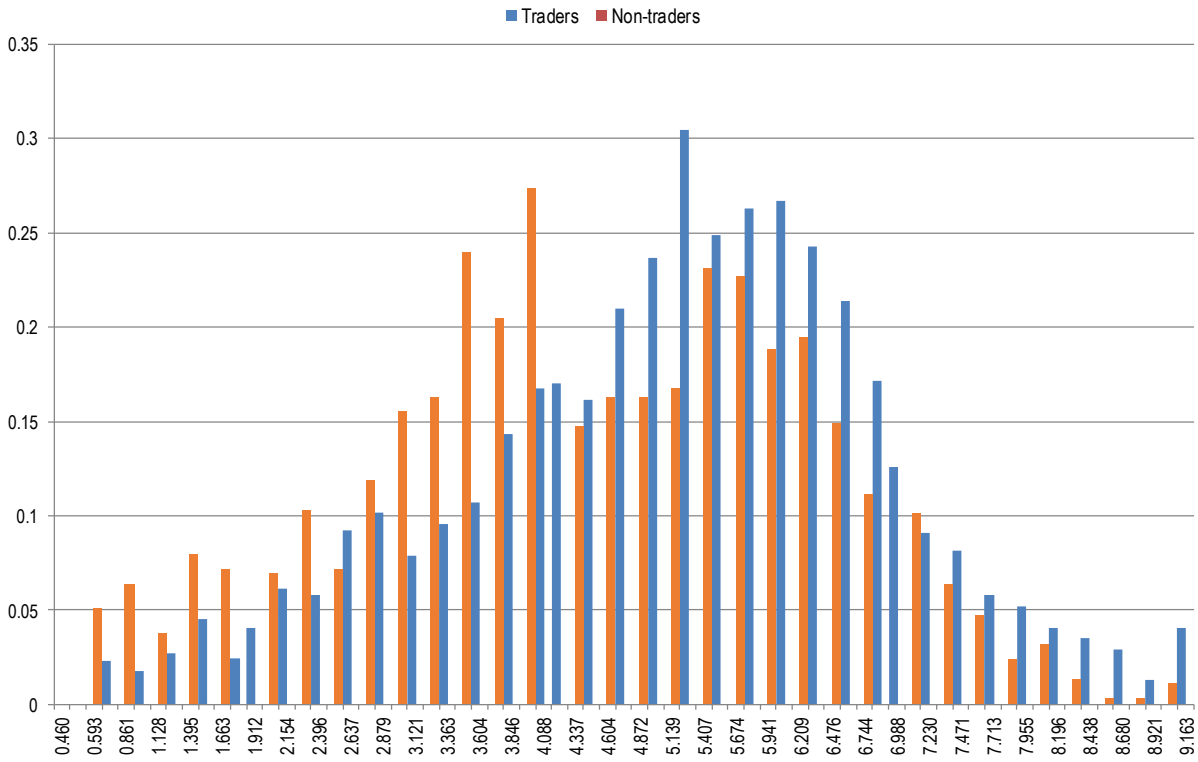
Figure 4.1. Employment shares by export status of the firm: Example of Sweden



Source: (Nordås, Lodefalk, & Tang, 2019), with authors' calculations based on the MONA database from Statistics Sweden. Two-way refers to firms that export and import.

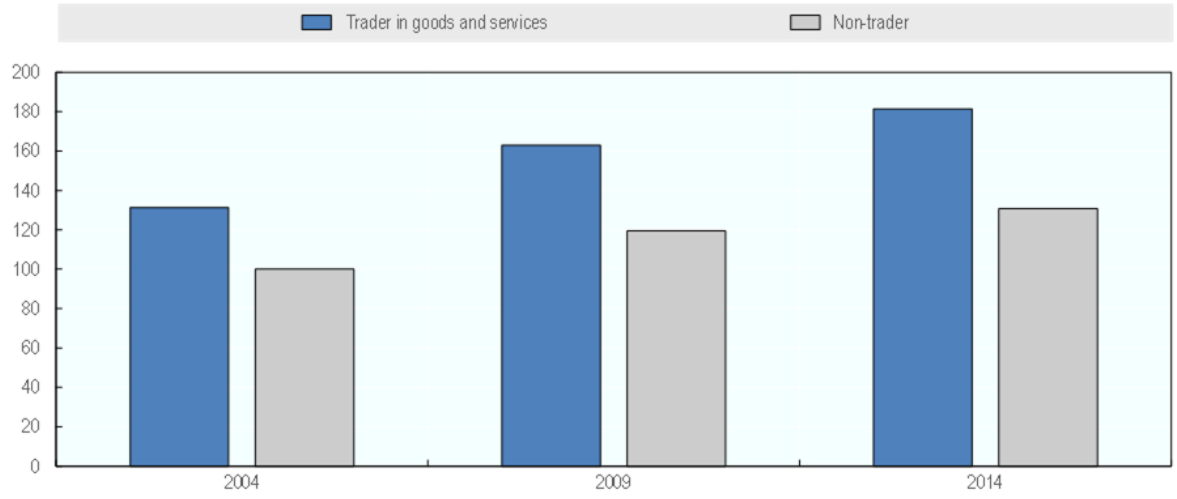
[12] The data do not allow for observations of corresponding figures across partner countries.

Figure 4.2. Distribution of employment for traders and non-traders: Example of Italy



Source: (Bamieh, Bripi, & Fiorini, 2020).

Figure 4.3. Average wages in non-trading versus trading firms: Example of Sweden



Note: Non-trading firms in 2004=100.
Source: (Nordås, Lodefalk, & Tang, 2019), authors' calculations based on the MONA database from Statistics Sweden.

4.1. Towards a causal effect of services trade on labour-market outcomes

This section examines both correlations between trade, in particular services trade, and labour market outcomes and a causal effect of services trade on such outcomes. The methodology follows Hummels, Jørgensen, Munch and Xiang (2014). The empirical approach is adjusted to focus on services trade and includes:

- a firm-level or sector-firm-level analysis on the link between trade and firm employment and wages
- a worker-based examination of the link between trade and wages
- distributional effects in terms of wages, which are assessed for specific groups of workers.

The advantage of a causal strategy is that it allows the identification of clear-cut effects of services trade, including the separate effects of imports and exports, as well as offshoring when available. Several factors could lead to a bias in the results in conventional analysis. For instance, while *a priori* employment should be reduced when firms outsource a service, efficiency gains from trade may help firms to expand, with potentially beneficial effects on employment.[13] Even if some of those omitted factors can be included, an increase in firm-level demand or productivity can simultaneously influence firm-level trade and its wage decisions.

As a note of caution, the approach is not able to identify general equilibrium effects, and it is important to highlight that trade may induce spillovers, adjustments and reallocations both within and across countries, which the chosen approach cannot capture. For instance, one might expect a positive effect on employment and wages stemming from an increase in export demand. However, this may not be true for specific job spells, because global trade shocks in a sector lead to changes in prices (including wages) in this sector. It depends on specialisation patterns of countries, whether these can be reaped or not. Similarly, offshoring may lower wages in a given job but could still overall increase wages in a given country or even sector by way of reallocations.

This implies that questions related to whether trade effects on labour markets in one country are transmitted to other countries, for example through competition on labour costs, are beyond the scope of this report. Finally, as the analysis focusses on clearly identified effects for firms engaged in services trade, the impact on labour demand of domestic firms cannot be assessed by way of this design.

4.2. Services trade and employment

As a first step, the regression analysis aims at estimating the effect of importing and exporting of services on different outcomes at the firm level. As the availability of data varies by country, the variables measuring imports and exports may relate to the sector and time, instead of the firm and time level, and so do the unobserved variables that can be accounted for methodologically. Firm fixed effects are included and appropriate methods to obtain findings for importing and exporting that can be interpreted in a causal manner are applied if possible.[14] The results can be summarised as follows.

[13] Such efficiency gains pertain to improved labour productivity and use of inputs, and an expansion in firm output; For the link between offshoring and productivity, see (Grossman & Rossi-Hansberg, 2008), and for micro-founded empirical evidence for services, see for example (Breinlich & Criscuolo, 2011) and (Kelle, M., J. Kleinert, H. Raff, F. Toubal, 2013).

[14] As the availability of data varies by country, the variables measuring imports and exports may relate to the sector and time, instead of the firm and time level, and so do the unobserved variables that can be accounted for. Firm fixed effects are included and appropriate methods to obtain findings for importing and exporting that can be interpreted in a causal manner are applied if possible. Empirical strategies have been developed to deal with cases, where worker-level data are existent but firm-level trade data are unavailable. The report lays out the corresponding methodology in Annex B.

Services trade tends to be positively associated with firm employment

Services trade and firm-level employment are positively associated in Brazil, Italy, Slovenia, United Kingdom and Viet Nam (Table 4.2). Figure 4.4 indicates the distribution of the findings, showing that most estimates for this link are positive and small. As alluded to above, there is heterogeneity in the six country studies presented in this report. While relying on a common empirical approach, they deviate slightly in the data and methodology used. Figure 4.4 thus helps to shed first light on the magnitudes of the underlying results but does not account for these differences. Instead, meta-analysis constitutes a useful tool to summarise and generalise the findings from the different studies, correcting some of the heterogeneity across them. Using such an approach, the estimated employment elasticities amount to about 0.04 both regarding imports and exports.[15] Full country results are reported in Annex C. The magnitude of these effects is quantitatively moderate as shown in Table A C.1 and Table A C.4.

Table 4.2. Overview of the link between services trade, firm employment, and firm wages

	Brazil	Italy	Slovenia	United Kingdom	Viet Nam
	Employment				
Exports	+ ***	+ **(*)	+ ***	+ ***	NA
Imports	+ ***	+ **(*)	+ ***	+ ***	- **(*)
Narrow offshoring	NA	NA	NA	+ ***	NA
	Average wages				
Exports	- ***	0	NA	+ ***	NA
Imports	0	0	NA	+ ***	+ *(**)
Narrow offshoring	NA	NA	NA	+ ***	NA

Note: + indicates a positive sign of the estimated coefficients, whereas – indicates a negative one. *** p<0.01, ** p<0.05, * p<0.1 refer to significance levels. Employment at the level of firms and average wages to the total wagebill (total wages paid by firms), divided by the number of employees, at the level of firms. Results for Italy and the United Kingdom are based on firm-level services trade data, whereas ones for Slovenia are based on firm-level manufacturing data (services sector firms). Results for Brazil and Viet Nam rely on sectoral services trade data, whereby imports are measured as services import intensity in Viet Nam. For detailed descriptions and full estimates see Annex A and Annex C. NA stands for not available and 0 for not significant. Stars in parentheses indicate that findings are not throughout significant, or not significant at the same levels.

To put a number of country-specific findings into context, the 76% increase in services imports in the United Kingdom observed in the data between 2012 and 2017, translates into a rise in employment of between 2.4% to 11.7%. The rise in offshoring by 5% would explain an employment growth of 1.7% to 3.4%, and the increase in services exports by 56% would imply a 3% to 3.1% rise in employment. At an average number of 269 employees per firm in the sample, this corresponds to an average increase in employment over seven years to at most 300 associated with services importing, to 274 when considering the average rise in offshoring, and to 277 in association with increased services exports.[16] Similar calculations for Italy,

[15] The performed meta-analysis includes a large number of coefficients even beyond the ones reported in Annex C, stemming from different estimation results per country. It tackles the heterogeneity between studies by using random effects for each study. Random effects also account for sampling error within studies and require less restrictive underlying assumptions compared to meta-analysis with fixed effects (most importantly, it is not assumed that the populations and variables studied are the same, which is the case in this context). The estimated means amounted to 0.042 for imports, and to 0.037 for exports. Meta-analysis is applied in order to pool different studies with the aim to obtain an overall effect of a variable of interest, here services trade. It is frequently used in medical research.

[16] These figures are derived from estimates presented in Lassmann and Spinelli (forthcoming), and from descriptive statistics underlying these estimates. The coefficients on narrow offshoring are not shown in Table A C.11. They amount to 0.034 (t-statistic 1.75) with firm controls, 0.0375 (1.57) without firm controls, 0.0391 (2.95) with firm controls and simultaneously including exports, and 0.0678 (2.28) without firm controls and simultaneously including exports.

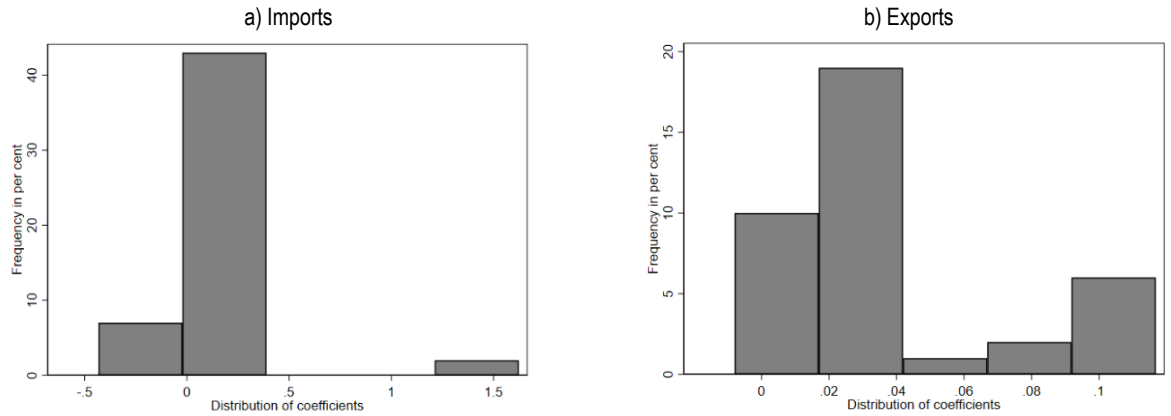
where firms employ on average 668 workers indicate that employment would go up very little as the found effects are smaller than for the United Kingdom.

The firm-level employment elasticities estimated for this report are qualitatively similar to those from existing studies on high-income countries (Eppinger, 2019) for Germany and for the United Kingdom (Hijzen et al. (2011).

By contrast, sectoral-level services trade evidence from Viet Nam suggest that higher services exports and imports coincide with negative employment growth (Table 4.2). It may be noted that the report covers countries at a different stage of economic development.[17]

According to results for Viet Nam shown in, a one percentage point increase in service import intensity is associated with an employment decline of roughly 0.4%. If import intensity would hypothetically increase from the average level observed in the analysis (6%) to the highest level (17% in other business services in 2011), this would induce an employment fall of 4.1%. Note that this obviously represents an upper bound estimate.[18]

Figure 4.4. Summary of services trade effects on firm employment



Note: The figures plot the distribution of the employment coefficients related to services exports (estimated for Brazil, Italy, United Kingdom) and imports (estimated for Brazil, Italy, Germany, United Kingdom, Viet Nam). The x-axis shows the magnitudes of these coefficients. Values are divided in five bins, and frequencies are shown on the y-axis (the proportion of coefficients falling into either of these bins). Slovenia was excluded because the analysis relies on manufacturing trade.
Sources: Own calculations; (Bamieh, Bripi, & Fiorini, 2020); (Benz & Lassmann, forthcoming); (Eppinger, 2019); (Jaax & Johannesson, 2019); (Lassmann & Spinelli, forthcoming).

The employment impact of services trade varies across sectors and firms

The impact of trade on firm employment varies across sectors. In Slovenia, for instance, manufacturing trade is found to have an effect of lower magnitude for firms active in the services sectors than for ones with primary activity in manufacturing (Table A C.3). With a sample average of about 760 employees, these estimates translate into additional 127 employees in services sector firms between 2010 and 2016, as manufacturing imports grew by 17% on average, and 690 additional workers as exports have risen by 90% during that time.

[17] Furthermore, trade for Brazil and Viet Nam is based on sectoral data. However, estimates using services trade data for firms grouped into volume categories for Brazil also suggest positive employment effects. For example, firms with services trade volumes between USD 10 and USD 50 million exhibit 16.9% higher employment than firms that do not trade services.

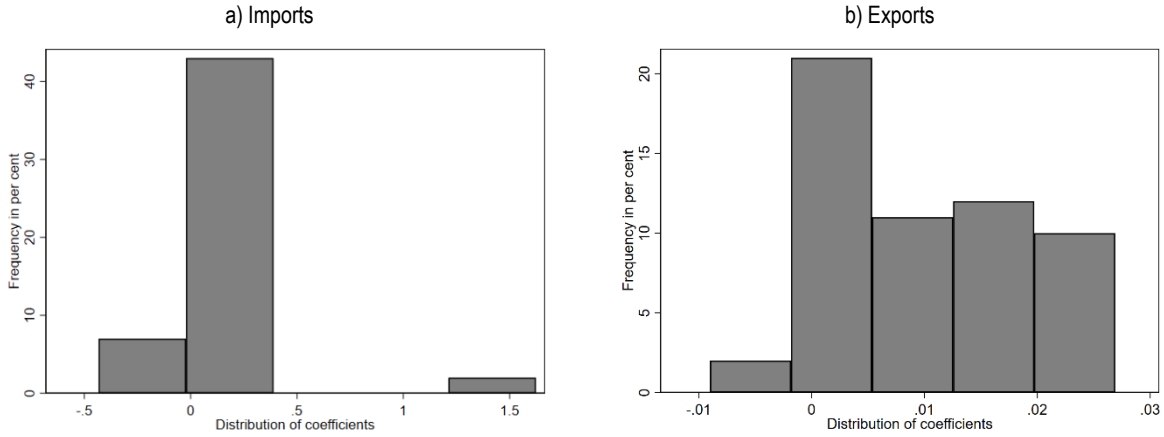
[18] Comparable results about the role for services trade intensity for Italy suggest a positive, yet qualitatively non-important role for both firm-level export and import intensity with respect to employment.

Further results suggest a negative causal role for services imports in the retail and a positive one in the construction and transport sectors in Viet Nam. A similar decomposition by firm size shows that imports reduce domestic employment for micro, small and large firms, but are related to employment expansions for mid-sized firms. The latter may be a result of enhanced productivity.

4.3. Services trade and wages

The link between services trade and firm wages is found to be small in magnitude, with estimated wage elasticities amounting to only 0.004 for services imports and 0.008 for services exports on average across countries.[19] The distribution of these effects is illustrated in Figure 4.5. Specifically, in two countries, the United Kingdom and Viet Nam, services trade is associated positively with total wages paid by firms. Corresponding results are quantitatively and qualitatively negligible for Italy.

Figure 4.5. Summary of services trade effects on firm wages



Note: The figures plot the distribution of the firm wage coefficients related to services exports (estimated for Brazil, Italy, United Kingdom) and imports (estimated for Brazil, Italy, Germany, United Kingdom, Viet Nam). The x-axis shows the magnitudes of these coefficients. Values are divided in five bins, and frequencies are shown on the y-axis (the proportion of coefficients falling into either of these bins). Slovenia was excluded because the analysis relies on manufacturing trade.
Source: Own calculations; (Bamieh, Bripi, & Fiorini, 2020); (Benz & Lassmann, forthcoming); (Eppinger, 2019); (Jaax & Johannesson, 2019); (Lassmann & Spinelli, forthcoming).

Furthermore, Brazilian firms with services trade volumes up to USD 50 million pay a higher wagebill and higher average wages than firms that are not active in services trade (Table A C.5.). Using sectoral trade data, it is found that rising services exports and imports impact the total wagebill of an average firm positively. However, the corresponding effect of services trade on average wages in Brazilian firms becomes negative or insignificant.[20]

Results at the level of individual workers are broadly consistent with firm-level findings, and show that the relationship between services trade and wages is ambiguous across countries (Table 4.3). While higher imports seem to be partly negatively linked to wages of workers within the same job, findings regarding increased exports point more towards a positive impact of services trade for individual wages.

[19] Again, the findings were generalised by way of meta-analysis with random effects for the different studies.

[20] These results are somewhat in line with (OECD, 2020), however the latter focus on regional data and trade liberalisation as measured by tariff reductions, whereas the results in this report are derived from exploiting individual-level labour and firm-level or sectoral trade data, as well as causal methods. Regional differences are accounted for by way of regional fixed effects.

Interestingly, results differ when looking at direct (net of productivity) effects of trade on wages and when looking at estimates, which include trade-related boosts to firm productivity.[21] Furthermore, since both manufacturing and services trade play a role for services firms, this points to a complementarity between the two.

Table 4.3. Overview of services trade and individual wages

	Slovenia	Sweden	United Kingdom	Viet Nam
	Individual worker wages			
Exports	+/- (***)	+ ***	+ (***)	NA
Imports	+/- ***	- (***)	+ ***	+/- (***)

Note: + indicates a positive sign of the estimated coefficients, whereas – indicates a negative one. *** p<0.01, ** p<0.05, * p<0.1 refer to significance levels. Wages at the level of individual workers: hourly wages for Slovenia, United Kingdom, Viet Nam, annual wages for Sweden. Results for Sweden and United Kingdom are based on firm-level services trade data, whereas ones for Slovenia are based on firm-level manufacturing data (services sector firms). Results for Viet Nam rely on sectoral services trade data, whereby imports are measured as services import intensity in Viet Nam. For detailed descriptions and results see Annex A and Annex C. NA stands for not available. Stars in parentheses indicate that findings are not throughout significant, or not significant at the same levels.

Results for the United Kingdom (Table A C.11) can provide an example, which puts the findings into context. They suggest that the services imports increase by 76% observed in the data between 2012 and 2017 and given average hourly wages of GBP 16, increased average hourly wages to GBP 16.4-17.9. The corresponding figure regarding exports amounts to GBP 16.5.

Importantly, the results discussed in Section 2.4 point to potential problems for the estimation of the impact of services imports and exports on wages. Enhanced productivity or (foreign) demand for a firm's services could boost both services trade and firm performance at the same time. Neglecting these problems could result in estimates, which have upward bias. Wherever possible, results are thus based on methodologies, which have taken this issue into account.[22]

Summarising evidence for Slovenia, the direct impact of services trade on within-job wages is negative but quantitatively small (Table A C.9). The indirect – including productivity – effect of both exports and imports is not always significant, yet positive. This points to trade-related enhancements of hourly wages through increased productivity boosts. The magnitude of the effects for firms that report their main activity in the services sector is also slightly higher. Overall, evidence for Slovenia is much in line with findings for the United Kingdom.

Given the previous focus on answering the question how firm or sectoral services trade impacts labour market demand quantities and prices, the relevance of services trade policy is solely of implicit nature. Shedding light on the extent to which services trade policy plays a direct role for wages in the United Kingdom, these findings point to the possibility of an important direct role of services trade policy for labour market outcomes.

Overall, the findings point to a negative impact of trade barriers as measured by the composite OECD Services Trade Restrictiveness Index (STRI) and the Intra-EEA STRI on hourly wages as shown in Table A C.12. Higher services trade policy barriers also translate into lower hourly wages on-the-job as

[21] We report worker-level regressions including and excluding firm-level controls. The latter tackles the issue that increased trade affects those variables themselves through productivity shocks, and can be interpreted as an effect, which includes the importing or exporting impact on productivity. The corresponding estimate including firm-level controls can thus be interpreted as a direct (or net) effect of trade on labour market outcomes.

[22] Note, however, that the differences between these causal and more conventional approaches are small in terms of the results (see, for example, Table A C.7.). This may be in part because the latter already account for a rich set of observed and unobserved factors, such as ones specific to an individual job spell.

restrictions to the movement of people, to barriers to competition and to regulatory transparency increase.[23] To give an example, an increase in the index related to the movement of people by one unit is associated with a decrease in hourly wages by about 30-40%. To put this into context, given the actual increase in restrictions to movement of people (0.01 index points), the corresponding effect on wages for this specific case is very low and would amount to just about 0.3-0.4%. Even in the sector subject to the largest increase in those restrictions (architecture, +0.05 index points), this figure is only about 1.5-2%.

4.4. Services trade and worker characteristics

While increased services trade implies changes in aggregate firm-level employment and wages, it also encompasses distributional effects across different types of workers. Those effects are examined by exploiting variation and information available at the level of individual workers and their employers.

Looking at firm characteristics first, results differ according to firm ownership. An increase in sectoral services imports coincides with wages increases in foreign-owned Vietnamese businesses, but plays no significant role for domestic and state-owned businesses.

The export and import measures are furthermore interacted with measures of workers' gender, skill levels or occupation and age. This is particularly interesting in light of potentially differential trade effects across such groups. The empirical work presented here indicates that the relationship between trade and wages varies with individual characteristics, in particular skill levels.

Services trade is associated with a moderate skill bias

The relationship between trade and worker wages varies depending on the skill level and across countries (Table 4.4). However, it remains quantitatively small even when distinguishing between skills.

In Slovenia, increased (manufacturing) imports are negatively correlated with low-skilled workers' wages (Table A C.8). This correlation is positive when including productivity in the estimate, suggesting that imports may positively affect wages in the same job through productivity boosts. There is no significant relationship between imports and high-skilled workers' wages. Looking at exports, a small skill premium is associated with higher exports and increased exports coincide negatively with wages of low-skilled workers.

Table 4.4. Trade and individual wages, by skill

	Slovenia		Sweden	United Kingdom			Viet Nam	
	High-skilled	Low-skilled	High-skilled	Low-skilled	High-skilled	Low-skilled	High-skilled	Low-skilled
Exports	+(***)	-***	+(***)	-(***)	+(***)	+(***)	NA	NA
Imports	0	-(***)	-(***)	+(*)**	+***	+***	+(**)	-***

Note: + indicates a positive sign of the estimated coefficients, whereas – indicates a negative one. *** p<0.01, ** p<0.05, * p<0.1 refer to significance levels. Wages at the level of individual workers: hourly wages for Slovenia, United Kingdom, Viet Nam, annual wages for Sweden. Results for United Kingdom and Sweden are based on firm-level services trade data, whereas ones for Slovenia are based on firm-level manufacturing data. Results for Viet Nam rely on sectoral services trade data, whereby imports are measured as services import intensity in Viet Nam. For detailed descriptions and results, see Annex A and Annex C.
NA stands for not available, 0 for not significant. Stars in parentheses indicate that findings are not throughout significant, or not significant at the same levels.

[23] In the estimations, the STRI varies by firms according to the mix of services trade partner countries of each firm.

Increased services imports in Sweden are estimated to have a negative effect on the wages of high-skilled workers and a positive impact on wages of low- and medium skilled workers in both manufacturing and services firms (Table A C.10). Turning to exports, this pattern is reversed as greater services exports influence the wages of low- and medium-skilled employees in a negative and the ones of high-skilled workers in a positive way. The findings for Sweden seem to be partly driven by an indirect effect of services trade through firm performance.

The high granularity of data for Sweden allows for further insights into the extent to which goods trade affects firms both in the manufacturing and services sector. Estimates suggest that goods imports decrease wages within the same job for workers with all skill levels and in both manufacturing and services firms. At the same time, higher exports of both goods and services increase the wages of low- and medium-skilled and high-skilled employees in manufacturing firms. On the other hand, a rise in exports leads to a reduction in low- and medium-skilled workers' wages in services firms and has no significant influence on the wages of high-skilled workers in such firms.

Findings for both Slovenia and Sweden are consistent with previous evidence on the complementarity between goods and services and the employment linkages thereof (Miroudot & Cadestin, 2017).

In the United Kingdom, increased services imports exports impact workers with both low and high skills in a positive way when looking at overall effects of trade by skill (Table 4.4). As shown in (Table A C.11), the extent to which skilled workers benefit relatively more or less from higher services trade than low-skilled ones depends on the type of trader.[24] In other words, whether the skill premium observed generally in the data is enhanced by trade, differs according to whether the firm is a bi-trader or not. Overall, these differences are again very small.

In Viet Nam, the wages of foreign-business employees with elementary skills are impacted negatively by increased services import intensity (Table A C.13.). In contrast, Vietnamese workers with medium-level skills are impacted positively. It is also positive for ones with high-level skills, but that effect is not significant at conventional levels. This is consistent with the fact that medium-skilled workers represent a higher services employment share in Viet Nam than high-skilled workers (see also Figure 2.3).

Trade effects for women are relatively ambiguous

Differential results according to gender enhance the analysis presented in Section 3. , which has shown that higher exports reduce involuntary part-time employment and job-loss risk for women. Yet, services trade may also affect the wage gap. An increase in imports of Slovenian firms coincides negatively with female wages, while it is associated with a wage increase for men (Table A C.9), although the gap is quantitatively small. There is no such pattern, at least not robustly, when it comes to exports. It is also noticeable that imports affect wages of men positively in an indirect (through productivity) rather than a direct way.

4.5. Services trade and job dynamics

The analysis in the previous subsections has identified very fine-grained elasticities of employment and wages with respect to international trade. In some cases, these effects stem from within job spells, in others

[24] The table refers to firms that report imports in Panel A and to ones that report exports in Panel B. These firms include bi-traders as well, however Panel C solely focusses on bi-traders. Interestingly, when including both imports and exports at the same time, the inverse is the case, as the wages of high-skilled workers exhibit a lower skill premium when services exports increase. The reason for this difference may be due to the fact that these findings only relate to bi-traders (firms that both export and import), which are larger in size than firms that simply export.

from within firms. This part of the analysis summarises how trade and job dynamics are related (Nordås, Lodefalk, & Tang, 2019).

Based on shift-share analysis with regard to gender, skills and occupations, this study finds evidence for a segmentation of the labour market in terms of gender, as firms and sectors, which already exhibit a higher female employment, drive the expansion of employment of women. This suggests that sectoral differences in terms of gender patterns of employment exhibit a high persistence.

Looking at changes in the export status as measured by entry and exit into trade, and the associated labour-market churning, it seems that mobility across sectors is less likely than within sectors, following a change in export status. Surprisingly, this holds for both entry and exit into exporting and importing, as well as for both goods and services. A change in export status also coincides with a positive probability for a change in occupation, or occupation within firms. Looking at dynamics stemming from changes within firms, these results complement the ones in Benz and Johannesson (2019).

5. Concluding remarks and implications for policy makers

To summarise the work presented in this report, employer-employee linked information on the European Union, Brazil, India Italy, Slovenia, Sweden, the United Kingdom and Viet Nam show that there is a moderate and significant role for services trade on labour market outcomes, which varies across firms active in different sectors and with different firm characteristics, and across workers possessing different skill sets and other characteristics such as gender.

Findings from a meta-analysis of the results underlying this report suggest an overall positive importing effect on firm employment in all of the countries but one emerging economy. Regarding average wages paid by firms, a small positive link stemming from higher services trade could be found as well.

Worker-level analyses of wages suggest that the sign of the effect of increased services imports is ambiguous for individuals within job spells, whereas this link is overall positive when it comes to exports. In any case, these effects are small in magnitude and fragile. Corresponding findings according to skills are also ambiguous. This holds in particular when looking at services imports, yet there is some evidence of a skill premium for enhanced services exports. Furthermore, changes in firms' export status are found to be related to amplified labour market churning within sectors.

Considerations of different levels of economic development, sectoral specialisation and geographic variation balance the diversity of the studies underlying this report. The findings summarized here are particularly relevant to domestic economic policy. Such policies can thereby complement trade policy in order to ensure that the gains from trade are broadly shared (OECD, 2012; OECD, 2017).

- Findings suggest that the impact of services trade on employment and wages is overall positive, yet more uncertain in emerging market economies. This is relevant at the nexus between trade and growth and development policies. Thereby, policymakers may consider that the distributional effects of globalisation in low-income countries are specific to individual such countries, as globalisation waves affect them at different times and in different ways (Goldberg & Pavcnik, 2007). In addition, informal employment is more widespread in developing and emerging countries, and as such adverse trade shocks may lead to a substitution between formal and informal employment.
- Services trade tends to boost employment and firm performance. Analysis from several countries, of which some are OECD member countries, suggests that increased trade in services impact firm characteristics such as size, output, and the share of skilled employment, which is most likely related to trade-related boosts in productivity (OECD, 2012). This aspect is highly relevant with respect to trade policy, most of all restrictions to international trade in general, and trade in services

in particular (Benz, 2017). It has further repercussions for domestic policies aiming at enhancing productivity growth.

- Barriers to trade in services and goods should be addressed jointly. In line with servicification trends in manufacturing, the report broadly confirms previous OECD evidence of a complementary role for goods and services trade in shaping labour market outcomes (Miroudot & Cadestin, 2017), both at the sectoral and at the employer-employee linked level. Thus, restrictions to trade in services are not independent of ones for goods. Rather, the impact of trade regimes for services should be evaluated jointly with ones for goods.
- The impact of services trade varies by firm and worker characteristics. Firm-level studies point to a small export-related skill bias (towards high-skilled workers) in Slovenia, Sweden and the United Kingdom, and to a mild skill bias towards mid-skilled workers in Viet Nam. This pattern is consistent with the aggregate skill structure of services observed across countries. Women are found to benefit from services export growth, while increased imports are estimated to exert downward pressure on the wages of women compared to the ones of men.
- Upgrading skills and adapting them to the requirements of a service-based economy should be a policy priority, as also underlined in the revised OECD Jobs Strategy. Education and training policies should take the surge in international trade in services and its redistributive effects into account when targeting the promotion of equal opportunities (OECD, 2017). Such policies could be related to improving skills or putting in place active labour market policies that enhance the matching between employers and skilled employees. This includes the promotion of policies aiming at the inclusion of women. Redistribution policies are most effective when targeting workers instead of specific jobs or industries. Such policies, including welfare and social policies, can aim at attenuating negative effects on displaced workers or workers that experience reductions in wages.

Some of these findings provide insights into the causal relationship between services trade, and employment and wages at a very fine-grained level. These results therefore allow for the evaluation of increased services trade affecting specific groups of the population, as well as specific types of firms. Analysing such distributional effects from trade are among the most important questions related to international trade. With appropriate data, further analytical work could examine differential effects according to various types of services and according to modes of supply.

As a note of caution, this approach is not suited to grasp a full picture of the re-distributional effects of trade across sectors, regions and countries. Furthermore, shedding light on indirect effects of trade on labour markets, for example, through increased competition on wage rates and labour costs, is an interesting field for future research. Finally, there are relevant aspects related to labour markets, such as job quality (see among others, OECD 2019). These are beyond this report's scope but seem pertinent, especially in view of the disruptions to production and labour markets following the stringent containment measures to contain the pandemic.

Policy makers should also bear in mind that labour-market outcomes are impacted by factors related to technology as shown in previous research. According to these lines of research, those factors seem to quantitatively outweigh the contribution from international trade.

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Annex A. Data description

Data from the EU Labour Force Survey (LFS)

Benz and Johannesson (2019) draws on micro-data from the EU Labour Force Survey. The EU LFS is a large household sample survey providing annual results on labour participation and persons outside the labour force. Data used in this study include all 28 members of the European Union (EU), and three members of the European Free Trade Association (EFTA) and cover the period 2008–2016. Each participating country is responsible for the data collection, but the final EU LFS is harmonised so as to ensure comparability across all participating countries. The sample is a yearly cross section, thus individuals are not followed over years. In 2016, the quarterly sample size was around 1.5 million, with an average sampling fraction of 0.74%. Representativeness is achieved by using sampling weights. Although half of the countries have made the survey voluntary, the average response rate was relatively high at around 75.7%, ranging from 48% to 97.4%. All individual-level variables are aggregated to the country-sector-year level analysis using sampling weights and are merged with measures of exports, imports and offshoring from TiVA on the NACE 1-digit level.

Data sources and variables for Brazil

The datasets used for the analysis of employer-employee data for Brazil (Benz & Lassmann, forthcoming) were edited and analysed at the *Instituto de Pesquisa Econômica Aplicada* (IPEA). It combines firm-level trade information using the *Siscoserv* survey on trade in services with registry information on employees from the *Relação Anual de Informações Sociais – Empregados* (RAIS), the Annual Report of Social Information: Employee level, spanning 1996 to 2017. *Siscoserv* data cover information about firm exports and imports according to five size categories of trade between 2014 and 2017: lower than USD 1 million, USD 1 to USD 10 million, USD 10 to USD 50 million, USD 50 to USD 100 million, and more than USD 100 million. RAIS data contain information about the occupation, gender, education, age, job tenure, contractual hours worked, monthly gross wages, an employer identification number, the employer's activity and size class, as well as an employee identification number. Only active employees in the formal sector are observed. A random dataset of 10% for workers aged 18 to 65 is drawn for computational reasons. It contains 11 421 101 workers and 114 356 620 observations. This dataset is merged with *Siscoserv* based on the firm identification number. The time period examined spans 2005 to 2017 when sectoral trade data are exploited, and from 2014 to 2017 when firm-level trade data are exploited. The following firm-level variables for employment are constructed from RAIS data: the total number of employees by firm, the total number of full-time employees per firm, the share of female in total employment, firms' total wage bill calculated as the sum of all workers' real wages, the average wage per worker calculated as the total wage bill divided by the number of employees, and the share of high-skilled (completed university degree) and low-to-medium skilled (no schooling to completed high school) workers in total employment.

Data sources and variables for India

The data used in Johannesson and Nordås (2019) stem from National Sample Surveys (NSS), which collect labour market and personal background information from a large sample of households. The survey is conducted every five years from 1972 and onwards. Four waves were used in this study: the 50th (1993–1994), 55th (1999–2000), 61st (2004–2005), and 68th (2011–2012). The report explores trade aspects of labour market outcomes using the following data sources. First, UNCTAD trade data are used for

descriptive statistics. Second, the NSS are matched with trade data from the World Input-Output Database, WIOD 2016 release (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015).

Data sources and variables for Italy

The datasets used for the analysis of employer data for Italy (Bamieh, Bripi, & Fiorini, 2020) stem from the *Transazioni Trimestrali Non Finanziarie* (TTN-DR) dataset of the Bank of Italy. The TTN-DR survey offers quarterly data on services import and export transactions together with the product traded (EBOPS), the industry (SIC code) and sampling weights from 2008-2017. Mode 3 is excluded, and the survey is representative of the population of Italian firms with annual turnover over EUR 10 million. These data are merged with i) labour market information from the Italian Social Security Agency INPS (*Istituto Nazionale di Previdenza Sociale*), covering the universe of private firms and including information on total firm employment and average monthly gross wages by firm and occupation categories (managers, white collar, blue collar, apprentices, and other); and ii) balance sheet and profit and loss data from the Company Accounts Data Services (CADS), including data of all incorporated firms.

Data sources and variables for Slovenia

The datasets used for the analysis of employer-employee matched data for Slovenia (Lassmann & Spinelli, forthcoming) stem from three datasets examined at the Statistical Office of Slovenia (SURS): INTRASTAT and EXTRASTAT manufacturing trade data, the Structure of Earnings survey and Annual Accounts data on different types of businesses. Manufacturing trade is available monthly for firms in all economic sectors and was aggregated to yearly data. The Structure of Earnings survey contains information on age, gender, gross and net wage, hours worked indicated for social insurance, main activity, citizenship, occupation level and levels of education. Annual accounts data include information on size class, region, firm type, legal form, ownership, capital, material costs, turnover, operating surplus, wage bill and employment. The three datasets are merged by a firm identifier and together cover the years 2009 to 2016. All variables were deflated using the OECD CPI with base 2015=100. The number of observations in the final dataset amounted to 3 075 386 observations, covering 627 800 workers and 72 946 firms, of which 5 730 were exports, 22 771 were importers and 2 996 were bi-traders.

Data sources and variables for Sweden

Nordås, Lodefalk and Tang (2019) combine the following datasets from Statistics Sweden: Structural Business Statistics (SBS), Longitudinal Integration Database for Health Insurance and Labour Market Studies (LISA), Enterprise Group Register (EGR), Foreign Trade Statistics (FTS) and Compensation of Employees and Current Transfers (FTS). These data contain information such as the log total value of imports and exports, and corresponding values for goods and services trade, gender, age, tenure, civil status, the log number of full-time employees, the log value of turnover, and the log of full-time equivalent earnings by skill, where high skill comprises individuals with at least two years of tertiary education, medium skills refers to secondary education or tertiary education less than two years, and low skills, is education lower than secondary. Data on trade in goods covers all extra-EU trade and about 96% of total intra-EU goods trade. Services trade data stem from a stratified survey of approximately 6 000 firms, covering about 80% of the services trade volume, and spanning the period 2003-2015.

Data sources and variables for the United Kingdom

The datasets used for the analysis of employer-employee data for the United Kingdom (Lassmann & Spinelli, forthcoming) stem from the Office for National Statistics (ONS). An establishment-level analysis combines annual structural business statistics in manufacturing, construction, distribution and services from the Annual Business Survey (ABS and its predecessor, ABI), with data on services imports and exports from the International Trade in Services (ITIS) survey. ABS data include variables such as turnover, employment, the total wage bill, the cost of material inputs, and regional and industry affiliation. ITIS data offer quarterly or annual establishment-level information on the countries of destination and origin of exports and imports, as well as on the product traded (EBOPS) and the industry (SIC code) of the firm. These data are aggregated at the firm-year level, and a measure of narrow offshoring by mapping services imports to exports based on the product level is constructed. For this measure, solely the information from mapped import products is used. For analysis at the worker level, information on earnings and hours worked together with information on worker characteristics (e.g. gender, age, occupation, contract type, union affiliation) from the Annual Survey of Hours and Earnings (ASHE) are added based on a firm (not establishment) identifier. The time period examined spans yearly data from 2004 to 2017, and full-time employees aged between 18 and 64 are examined. The ASHE survey is a 1% random sample covering approximately 300 000 workers per year. The survey is not longitudinal. ITIS collects information on about 16 000 trading businesses per year, and ABS covers more than 70 000 businesses per year. All surveys include information on design weights, but not consistently over time. Therefore, the number of firms in a given stratum of the survey, divided by number of firms in the overall registry IDBR in the same stratum was applied as an inverse weight throughout all years. All variables were deflated with the 2015 CPI index (OECD).

Data sources and variables for Viet Nam

Regarding Viet Nam, the empirical analyses in Jaxx and Johannesson (2019) presented in the paper refer to two levels of analysis: the firm-level and the level of workers. The firm-level analysis uses two dependent variables: firm-level employment and average wages (within a given firm). The worker-level analysis concentrates on one dependent variable: the wage earned by the worker under observation. The analyses presented in the paper focused on Viet Nam rely on several data sources.

First, the level of trade exposure was calculated at the sectoral level. Data on services trade were collected from the WTO Trade in Commercial Services dataset. Information on trade in goods was obtained from the OECD Bilateral Trade in Goods by Industry and End-use (BTDIxE) database. As the measure of trade exposure used in the analysis encompasses a normalisation relative to domestic production and a weighting according to backward linkages, information on each Vietnamese sector's total output and on the sale and purchase relationships between different sectors in Viet Nam were obtained from the OECD input-output tables for Viet Nam.

Second, data for the firm-level analysis was obtained from the Vietnamese Enterprise Survey (VES), which provides three-digit sectoral identifiers (ISIC3) for the years 2004–2016. Administered by Viet Nam's General Statistical Office (GSO), the VES includes the universe of formal firms with at least ten employees and a random sample of firms with fewer than ten employees encompasses information on firms' employment, sales, and ownership. A unique tax code allows for the creation of an unbalanced panel dataset. For the purpose of the analysis, the dataset was divided into a services and a manufacturing sample. After dropping firms that do not appear in more than one year as well as firms operating in the primary sector, the remaining dataset includes 351 922 firms operating in services sectors and 65 507 firms in manufacturing industries.

Third, information used for the worker-level analysis includes variables related to individual characteristics, geographical location, workplace characteristics and wages. The corresponding data are obtained from the Vietnamese labour force survey (LFS) starting from 2011, and ends in 2016, also produced by GSO. The LFS sample is a two-stage stratified sample, with the first sampling on province, and the second on household. All individuals, who are over 15 years old, belonging to the household are surveyed. The final sample is also restricted to an upper age of 65, and military personnel is excluded. As the analysis is focused on wages, unpaid family workers were also removed from the final sample. The survey is a 1% random sample covering approximately 300 000 workers per year.

Annex B. Empirical methodology

Firm-level analysis

This part of the regression analysis aims at estimating the effect of importing and exporting of services on different outcomes at the firm level. We denote by *j* the firm, and by *t* the time dimension. Note that we are ignoring the indices for sector *k* and region *r*, as both are specific to the firm. An estimation equation that benchmarks our results takes the following form:

$$lnY_{jt} = \alpha_0 + \alpha_{s,M} lnM^s_{jt} + \alpha_{s,X} lnX^s_{jt} + \alpha_{g,M} lnM^g_{jt} + \alpha_{g,X} lnX^g_{jt} + \mu_j + T_t + \varepsilon_{jt},$$

where lnY_{jt} refers to a log firm-level outcome such as total employment, total wage bill; lnM^s_{jt} measures log services imports; lnX^s_{jt} is the log value of services exports; lnM^g_{jt} and lnX^g_{jt} denote goods exports and imports;[25] μ_j and T_t are firm and time fixed effects; and ε_{jt} is an idiosyncratic error term, which is clustered at the level of *j*.

As the availability of data vary by country, it is not always possible to impose the same regression model. Most importantly, the variables measuring imports and exports may differ at the level of sector and time, and we may be not be able to include firm-specific fixed effects, but rather industry, regional and time fixed effects, or a combination of those. Similar it may not always be possible to cluster the error terms, as we may lose too much precision. In general, we cluster standard errors at the level at which the trade measures of interest vary.

Worker-level analysis

This part of the regression analysis estimates the effect of importing and exporting on worker-level outcomes. We formulate the following regression model:

$$ln\Psi_{ijt} = \beta_0 + \beta_{s,M} lnM^s_{jt} + \beta_{s,X} lnX^s_{jt} + \gamma\Omega_{it} + \delta Z_{jt} + \lambda_{ij} + \theta_{ind,t} + \varphi_r + \epsilon_{ijt},$$

where $ln\Psi_{ijt} = \{lnw_{ijt}, lnh_{ijt}\}$ refers to hourly or annual wage; Ω_{it} is a vector of worker-level and potentially time-varying characteristics such as gender, age, tenure, union and occupational affiliation, education and marital status; Z_{jt} a vector of firm-level control variables, such as exports and imports of goods, output, employment, capital stock, the skilled worker share of employment etc.; λ_{ij} is a job-spell fixed effect; $\theta_{ind,t}$ and φ_r are year-by-industry and region fixed effects; and ϵ_{ijt} is an idiosyncratic error term clustered at the level of *jt*.

Note that variables collected in Z_{jt} may be positively affected by offshoring, which implies that they eliminate a portion of the effect of the latter (Hummels, D., R. Jørgensen, J. Munch, C. Xiang, 2014). We therefore follow their approach and report additional results from a regression excluding those variables. We also report regressions, where we interact variables collected in Ω_{it} (for example gender and skills) with the trade measures. As above, we cluster standard errors at the level of variation of the variables measuring trade exposure.

Conditioning on job spells accounts for factors specific to the individual job spell (for instance job-specific tasks and experience in terms of general know-how required for that given job). This is relevant because firms active in international trade are on average also more productive and may be able to hire a better

[25] We include both services trade and goods trade measures because we may capture effects from goods trade if we focus solely on the former measures.

match for a specific job than other firms. Including such job-spell fixed effects benefits the analysis substantially, and it implies that one can interpret the offshoring and exporting effect on the wages of workers to stem from within the same job in a given firm (Hummels, D., R. Jørgensen, J. Munch, C. Xiang, 2014). Other included sets of fixed effects are also able to capture average wages, average factor prices, and demand and supply shocks specific to an industry at a given time, as well as regional characteristics, which are constant over time. The latter account, for example, for regions being located in the centre versus ones located in the periphery, or for time-constant levels of development.

Simpler specifications replace the job-spell fixed effects by worker and/or firm fixed effects, akin to more traditional estimates based on employer-employee data. However, this ignores the possibility that firms might systematically improve the match quality of their workforce when faced with greater trade exposure (i.e. they hire workers who are a better fit to their firms such as managers with export experience; see (Krishna, Poole, & Senses, 2014).

A methodology for the estimation of causal effects of services trade on labour market outcomes

The previous methodology accounts for a large number of unobserved variables that are jointly determined with services trade and affect labour market outcomes at the same time.[26] However, shocks at the firm level – for example, demand or productivity shocks – may induce an increase in imports and exports on the one hand, and wages or hours worked on the other at the same time. Ultimately, this would imply that we capture a positive correlation between the dependent variable and the independent variables of interest, which is confounded by another unobserved variable.

This issue requires an instrumental variable, which is correlated with the value of imports and exports in a given firm and year, but uncorrelated with other determinants of a firm's productivity and wage structure. Again, we follow Hummels, Jørgensen, Munch and Xiang (2014), who have constructed export supply and import demand instruments, but adapt the methodology to this context.

For exports, the instrumental variable is constructed as $\tilde{X}_{jt}^{s} = \sum_{c,k} s_{jck}^{s} M_{ckt}^{s}$, where s_{jck}^{s} refers to the share of product, or type, *k* in firm *j*'s overall exports of services *s* to country *c* in a pre-sample period (i.e., a period before the start of the analysis); and M_{ckt}^{s} denotes services imports of *k* by country *c* at time *t* to all other countries except the country the firm is located in. For cases where we can solely exploit services trade data at the industry level, this translates to $\tilde{X}_{kt}^{s} = \sum_{c,p} s_{cpk}^{s} M_{ckt}^{s}$, where s_{cpk}^{s} reflects the importance of *k* in the sales of industry *p* as obtained from WIOD (input-output tables). The calculation is analogous for imports, where we now replace world import demand by world export supply.

Note that the instrumental variables resemble the ones used by Autor, Dorn and Hanson (2013) for US imports from China. An intuitive explanation in favour of the choice of this instrumental variable is that as firms export and import a very specific mix of foreign inputs or services, an increase in world market demand and/or supply with respect to these inputs or services influences these firms relatively more. Take for example a firm that extensively exports insurance services. This is reflected in the pre-sample period service type share of the firm. Then, if world market demand for these services rises as reflected in an upward change in world import demand, the firm can export more of these services compared to another firm, which, say, specialises in distribution services. Similarly, each firm has a specific import pattern, hence if world market supply increases in its types, it will benefit more than other firms. At the same time, world market supply and demand are unlikely to be correlated with firm-level determinants of firm- and worker-level outcomes.

[26] These variables are referred to as "confounders" in the literature on the estimation of causal (treatment) effects.

Annex C. Additional material

Firm-level results

Table A C.1. Services trade, firm employment and firm wages in Italy

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Log employment					
Log imports	0.010**		0.009***	0.045***		0.026***
	(0.002)		(0.002)	(0.005)		(0.006)
Log exports		0.004***	0.003**		0.045***	0.032***
		(0.001)	(0.001)		(0.004)	(0.005)
Obs.	15,607	15,607	15,607	15,607	15,607	15,607
R-squared	0.970	0.970	0.970	0.036	0.044	0.052
Number of firms	2,511	2,511	2,511	2,511	2,511	2,511
Firm controls	YES	YES	YES	NO	NO	NO
Sector FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
	Panel B. Log wages					
Log imports	-0.0004		-0.0004	0.011***		0.007***
	(0.0005)		(0.0005)	(0.001)		(0.001)
Log exports		0.0001	0.0001		0.009***	0.006***
		(0.0003)	(0.0003)		(0.0009)	((0.001)
Obs.	15,607	15,607	15,607	15,607	15,607	15,607
R-squared	0.945	0.945	0.945	0.040	0.037	0.050
Number of firms	2,511	2,511	2,511	2,511	2,511	2,511
Firm controls	YES	YES	YES	NO	NO	NO
Sector FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. All regressions include firm fixed effects, year fixed effects, sector fixed effects and province fixed effects. Firm controls are age, goods exports and log capital intensity.
Source: (Bamieh, Bripi, & Fiorini, 2020).

Table A C.2. Effect of manufacturing trade on firm outcomes in Slovenia

	Turnover	Employment	Caplab	Material	Profits	Laprod	Productivity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EU imports	0.085***	0.051***	0.027**	0.046***	0.069***	0.026***	0.030***
	(14.83)	(8.21)	(2.09)	(3.21)	(6.45)	(3.81)	(5.04)
EU exports	0.039***	0.010***	-0.002	0.010	0.047***	0.024***	0.024***
	(7.72)	(2.06)	(-0.25)	(0.74)	(4.89)	(4.47)	(4.80)
Obs.	62,407	53,993	52,086	28,579	61,758	53,981	52,080
F-statistic	856.31	793.99	759.204	342.486	848.01	793.31	759.08
No. clusters	15,920	13,437	12,921	6,710	15,769	13,433	12,919
Firm controls	NO	NO	NO	NO	NO	NO	NO
Firm FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES	YES

Note: *** p<0.01, ** p<0.05, * p<0.1, t-statistics reported in parentheses. The standard errors are clustered at the firm level. Dependent real variables measured at the level of establishments: log turnover (net revenue from sales), log number of employees, caplab (capital labour ratio, measured as tangible fixed assets divided by employment), log material costs, log profits (gross operating returns), laprod (labour productivity, calculated as turnover divided by employment), productivity measured by the Solow residual (residual of a regression of log turnover on log employment, a foreign ownership dummy and log capital, measured with error). All regressions are estimated by way of instrumental variables (IV) regressions with fixed effects (FE). We follow the IV strategy described in (Hummels, D., R. Jørgensen, J. Munch, C. Xiang, 2014). F-statistic refers to the Kleibergen-Paap (rk Wald F) test statistic for weak identification. This work was produced using statistical data from the Statistical Office of the Republic of Slovenia (2009-2017).
Source: (Lassmann & Spinelli, forthcoming).

Table A C.3. Manufacturing trade and firm outcomes in Slovenia

	Turnover	Employment	Caplab	Material	Profits	Laprod	Productivity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A. Log imports						
Manuf	0.087***	0.050***	0.009***	0.057***	0.031***	0.029***	0.030***
	(33.84)	(21.08)	(2.77)	(14.73)	(17.87)	(14.19)	(16.02)
Services	0.098***	0.041***	0.020***	0.038***	0.033***	0.038***	0.035***
	(64.75)	(33.69)	(9.68)	(11.85)	(18.96)	(29.00)	(28.66)
Obs.	200,023	173,787	150,966	73,958	64,292	158,935	150,717
R-squared	0.924	0.936	0.810	0.890	0.851	0.782	0.813
No. clusters	45,109	41,079	33,240	16,852	14,334	35,112	33,173
	Panel B. Log exports						
Manuf	0.102***	0.056***	0.0003	0.053***	0.098***	0.034***	0.038***
	(31.16)	(15.46)	(0.08)	(11.33)	(23.29)	(12.17)	(14.98)
Services	0.095***	0.031***	0.010***	0.016***	0.091***	0.044***	0.040***
	(46.22)	(20.71)	(3.95)	(3.53)	(37.45)	(26.37)	(26.03)
Obs.	109,114	89,785	85,340	42,743	107,355	89,729	85,297
R-squared	0.934	0.923	0.810	0.901	0.891	0.806	0.836
No. clusters	25,043	19,986	18,686	9,068	24,662	19,968	18,828
	Panel C. Log imports and exports						
Manuf (imports)	0.078***	0.046***	0.005	0.049***	0.087***	0.027***	0.031***
	(28.16)	(15.63)	(0.98)	(9.11)	(20.64)	(10.95)	(13.32)
Services (imports)	0.105***	0.049***	0.025***	0.042***	0.099***	0.049***	0.047***
	(43.82)	(22.74)	(6.20)	(6.61)	(31.15)	(20.65)	(21.56)
Manuf (exports)	0.075***	0.042***	-0.002	0.048***	0.064***	0.027***	0.031***
	(26.22)	(12.93)	(-0.55)	(9.40)	(14.82)	(9.98)	(13.20)
Services (exports)	0.064***	0.022***	0.006**	0.011**	0.060***	0.032***	0.030***
	(39.06)	(14.99)	(2.04)	(2.44)	(27.12)	(19.63)	(20.16)
Obs.	81,604	71,006	68,491	35,052	80,827	70,968	68,461
R-squared	0.954	0.940	0.816	0.909	0.902	0.832	0.860
No. clusters	18,446	15,570	14,955	7,540	18,283	15,557	14,944
Firm controls	NO	NO	NO	NO	NO	NO	NO
Firm FE	YES	YES	YES	YES	YES	YES	YES
Year-industry FE	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES	YES

Note: *** p<0.01, ** p<0.05, * p<0.1, t-statistics reported in parentheses. The standard errors are clustered at the firm level. Dependent real variables measured at the level of establishments: log turnover (net revenue from sales), log number of employees, caplab (capital labour ratio, calculated as tangible fixed assets divided by employment), log material costs, log profits (gross operating returns), laprod (labour productivity, calculated as turnover divided by employment), productivity measured by the Solo w residual (residual of a regression of log turnover on log employment, a foreign ownership dummy and log capital, measured with error). All regressions are estimated by way of fixed effects (FE) pooled panel regressions. Manuf refers to firms whose main activity is registered in manufacturing and services to firms active in the services sector. This work was produced using statistical data from the Statistical Office of the Republic of Slovenia (2009-2017).
Source: (Lassmann & Spinelli, forthcoming).

Table A C.4. Services trade and firm outcomes in the United Kingdom

	Turnover	Employment	Productivity	Wage	Output	Profits	Material
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A. Log imports						
Log imports	0.108***	0.086***	0.018***	0.014***	0.122***	0.105***	0.131***
	(26.49)	(27.64)	(5.30)	(6.50)	(29.13)	(16.35)	(15.99)
Obs.	40,552	40,749	38,002	40,604	31,402	30,312	38,451
R-squared	0.853	0.880	0.668	0.769	0.882	0.726	0.808
No. clusters	8,653	8,699	8,186	8,653	7,044	6,814	8,283
	Panel B. Log offshoring						
Log offshoring	0.100***	0.074***	0.014*	0.014***	0.107***	0.096***	0.126***
	(10.39)	(11.51)	(1.90)	(3.64)	(11.51)	(6.64)	(5.27)
Obs.	5,535	5,600	5,274	5,555	4,671	4,342	4,671
R-squared	0.863	0.891	0.732	0.790	0.883	0.759	0.744
No. clusters	1,644	1,662	1,582	1,645	1,550	1,320	1,430
	Panel C. Log exports						
Log exports	0.112***	0.098***	0.020***	0.020***	0.121***	0.132***	0.120***
	(24.97)	(26.00)	(5.57)	(8.32)	(22.66)	(17.26)	(14.36)
Obs.	36,867	37,066	34,820	36,887	26,524	27,761	34,420
R-squared	0.847	0.867	0.673	0.753	0.878	0.716	0.782
No. clusters	8,150	8,189	7,763	8,128	6,344	6,448	7,713
	Panel D. Log imports and exports						
Log imports	0.083***	0.059***	0.016***	0.010***	0.096***	0.078***	0.114***
	(15.65)	(14.88)	(3.68)	(3.39)	(16.70)	(9.05)	(9.31)
Log exports	0.077***	0.070***	0.009**	0.015***	0.077***	0.087***	0.074***
	(14.26)	(15.25)	(1.98)	(5.20)	(12.57)	(8.94)	(6.77)
Obs.	25,991	26,122	24,520	26,029	19,310	19,548	24,218
R-squared	0.860	0.880	0.667	0.754	0.887	0.727	0.789
No. clusters	5,723	5,752	5,443	5,723	4,579	4,530	5,402
	Panel E. Log offshoring and exports						
Log offshoring	0.064***	0.034***	0.007	0.006	0.060***	0.059***	0.081**
	(6.33)	(5.13)	(0.87)	(1.28)	(6.14)	(3.30)	(2.45)
Log exports	0.121***	0.108***	0.039***	0.027***	0.154***	0.142***	0.121***
	(8.31)	(9.44)	(3.66)	(3.53)	(9.44)	(5.44)	(3.32)
Obs.	4,614	4,662	4,429	4,632	4,260	3,698	3,831
R-squared	0.877	0.901	0.753	0.780	0.896	0.767	0.736
No. clusters	1,338	1,351	1,291	1,340	1,256	1,090	1,145
Firm controls	No	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1, t-statistics reported in parentheses. The standard errors are clustered at the firm level. Dependent real variables measured in GBP at the level of establishments: log turnover, log number of employees, labour productivity (gross value added at basic prices divided by number of employees), log wage (total employment costs divided by number of employees), log output (output at basic prices), log profits (gross operating surplus), log material input costs (goods and all raw materials used in the running of the business). All regressions are estimated by way of fixed effects (FE) pooled panel regressions. Variables are weighted by the inverse of the (number of firms in a given stratum, divided by number of firms in the business registry IDBR in the same stratum). Log offshoring refers to firms' services imports stemming from the same sector as the services a firms' services exports. This work was produced using statistical data from ONS (ABS, ITIS, 2004-2017). The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.
Source: (Lassmann & Spinelli, forthcoming).

Table A C.5. Services trade and selected firm outcomes in Brazil

	Employment	Full-time	Wagebill	Average wage	Female	High-skilled	Low-mid
	(1)	(2)	(3)	(4)	(5)	(6)	
	Panel A: Firm-level trade						
Trade (1)	0.006	-0.027**	0.029*	0.030**	0.010***	0.000	0.007***
	(0.015)	(0.012)	(0.016)	(0.012)	(0.003)	(0.004)	(0.003)
Trade (2)	0.019	-0.017	0.051*	0.045**	0.015***	0.009*	0.006
	(0.026)	(0.021)	(0.028)	(0.020)	(0.006)	(0.006)	(0.008)
Trade (3)	0.169***	0.070	0.174***	0.043	-0.004	-0.002	0.007
	(0.056)	(0.049)	(0.063)	(0.043)	(0.011)	(0.010)	(0.012)
Trade (4)	0.009	0.096	-0.037	-0.078	-0.013	0.005	-0.049
	(0.118)	(0.109)	(0.138)	(0.092)	(0.024)	(0.022)	(0.041)
Trade (5)	0.015	-0.158	-0.054	0.062	-0.004	0.048	-0.089
	(0.250)	(0.154)	(0.214)	(0.127)	(0.037)	(0.044)	(0.112)
Obs.	6,432,694	6,330,646	5,059,957	5,059,957	3,948,301	907,984	515,068
R-squared	0.702	0.821	0.723	0.522	0.799	0.819	0.794
	Panel B: Sectoral trade						
Exports	0.040***	0.045***	0.008**	-0.036***	-0.017***	-0.015***	0.004***
	(0.003)	(0.002)	(0.003)	(0.003)	(0.001)	(0.002)	(0.001)
Imports	0.090***	0.071***	0.085***	0.007	-0.019***	-0.001	-0.000
	(0.005)	(0.004)	(0.006)	(0.005)	(0.001)	(0.003)	(0.001)
Obs.	14,868,303	14,491,811	12,615,896	12,615,896	9,160,679	1,592,936	1,592,583
F-test	571,389	560,585	487,851	487,851	412,058	59,165	71,609
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year by Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors (in brackets). Dependent real (CPI-deflated) variables: log total firm employment; log total firm full-time employment; log firms' total wage bill calculated as the sum of all workers' real wages; log average wage per worker calculated as the total wage bill divided by the number of employees; the share of female in total employment; the share of high-skilled (completed university degree); and low-to-medium skilled (no schooling to completed high school) workers in total employment. All regressions include firm and year-by-industry fixed effects. Services trade is measured at the firm level as categorical variables by way of the survey design: 1) up to USD 1 million. 2) between USD 1 and USD 10 million. 3) between USD 10 and USD 50 million. 4) between USD 50 and USD 100 million; and 5) more than USD 100 million. Panel A covers 2014-2017, Panel B covers 2005-2017. In Panel B, all regressions are estimated by way of instrumental variables (IV) regressions with fixed effects (FE). We follow the IV strategy in (Hummels, D., R. Jørgensen, J. Munch, C. Xiang, 2014), but utilise sectoral instead of firm-level pre-sample shares. F-test refers to the Cragg-Donald Wald F statistic (weak identification test).
Source: (Benz & Lassmann, forthcoming).

Table A C.6. The effect of services trade on Vietnamese firms

	Log employment		Log average wage	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Services import intensity	-0.401***	-0.370**	0.376***	0.216*
	(0.113)	(0.170)	(0.127)	(0.113)
Obs.	1,652,077	1,652,077	682,277	682,277
R-squared	0.091		0.235	
Number of firms	351,922	351,922	175,262	175,262
Kleibergen-Paap F		1006		964.4
Firm/sector controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors (in brackets) are clustered at the industry-by-province level. Dependent variable in columns (3) and (4): log average wage per employee. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls. The import measure used refers to services import intensity lagged by one period and normalised by total domestic output of the industry. The measure also reflects input-output tables and thus the intensity of inter-industry supply linkages. The import intensity is specified as a ratio in the unit interval and the effects can therefore be interpreted as semi-elasticities.
Source: (Jaax & Johannesson, 2019).

Worker-level results

Table A C.7. The effect of manufacturing trade on hourly wages in Slovenia

	Log hourly wage					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS		FE		FE-IV	
	Panel A. Log imports					
Log imports	-0.008***	0.007***	-0.0007***	0.004***	-0.001*	0.004***
	(-13.68)	(7.39)	(-2.43)	(12.53)	(-1.71)	(7.02)
Obs.	2,249,947	2,259,638	2,091,707	2,099,995	2,091,710	2,099,998
R-squared	0.413	0.356	0.946	0.945		
No. Clusters	113,664	117,323	102,983	106,073	24,018	24,747
	Panel B. Log exports					
Log exports	-0.004***	0.004***	-0.001***	0.003***	-0.002***	0.001
	(-5.01)	(3.64)	(-4.41)	(8.45)	(2.94)	(0.96)
Obs.	1,822,547	1,829,032	1,684,986	1,690,392	1,684,995	1,690,399
R-squared	0.420	0.364	0.948	0.946		
No. Clusters	70,273	72,438	61,861	63,620	14,083	14,525
	Panel C. Log imports and exports					
Log imports	-0.005***	0.011***	-0.0004	0.007**	-0.0008	0.008***
	(-3.50)	(6.53)	(-0.97)	(13.36)	(-0.69)	(6.23)
Log exports	-0.003***	-0.004***	-0.001***	0.002***	-0.002***	0.0003
	(-2.66)	(-3.20)	(-3.56)	(6.18)	(-2.65)	(0.23)
Obs.	1,737,371	1,741,148	1,611,752	1,614,985	1,611,763	1,614,996
R-squared	0.425	0.375	0.949	0.947		
No. Clusters	56,840	58,063	50,461	51,478	11,481	11,732
Firm controls	YES	NO	YES	NO	YES	NO
Job-spell FE	NO	NO	YES	YES	YES	YES
Worker FE	NO	NO	NO	NO	NO	NO
Firm FE	NO	NO	NO	NO	NO	NO
Year FE	NO	NO	NO	NO	YES	YES
Year-industry FE	NO	NO	YES	YES	NO	NO
Region FE	NO	NO	NO	NO	NO	NO
Occupation FE	NO	NO	NO	NO	NO	NO

Note: *** p<0.01, ** p<0.05, * p<0.1, t-statistics reported in parentheses. The standard errors are clustered at the firm level. Dependent real (CPI-deflated) variable: log of hourly wages. All regressions include worker controls (age, age squared, gender and skill). Columns 1 and 2 are estimated by OLS, columns 3 and 4 by fixed effects (FE), and columns 5 and 6 by fixed effects instrumental variables regression. We follow the instrumental variables (IV) strategy described in (Hummels, D., R. Jørgensen, J. Munch, C. Xiang, 2014). Firm controls (log employment, log turnover, the log capital-to-labour ratio and the share of high-skilled workers) are omitted in even columns. Source: This work was produced using statistical data from the Statistical Office of the Republic of Slovenia (2009-2016).
Source: (Lassmann & Spinelli, forthcoming).

Table A C.8. Manufacturing trade, worker skills and wages in Slovenia

	(1)	(2)	(3)	(4)	(5)	(6)
	Log hourly wage					
Log imports (low skilled)	-0.0009***	0.004***			-0.0007	0.0064***
	(-2.97)	(10.92)			(-1.62)	(11.68)
Log imports (high-skilled)	0.0004	0.0007**			0.0008	0.0007
	(1.45)	(2.28)			(1.52)	(1.10)
Log exports (low skilled)			-0.002***	0.002***	-0.002***	0.002***
			(-5.06)	(6.30)	(-3.80)	(4.71)
Log exports (high-skilled)			0.001***	0.001***	0.0007	0.0007
			(2.68)	(2.78)	(1.52)	(1.50)
Obs.	2 091 707	2 099 995	1 684 986	1 690 392	1 611 752	1 614 985
R-squared	0.946	0.945	0.948	0.946	0.949	0.947
No. Clusters	102 983	106 073	61 861	63 620	50 461	51 478
Firm controls	YES	NO	YES	NO	YES	NO
Job-spell FE	YES	YES	YES	YES	YES	YES
Year-industry FE	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES

Note: *** p<0.01, ** p<0.05, * p<0.1, t-statistics reported in parentheses. Dependent variable: real (CPI-deflated). The standard errors are clustered at the firm level. All regressions are estimated by way of fixed effects (FE) pooled panel regressions.
Source: This work was produced using statistical data from the Statistical Office of the Republic of Slovenia (2009-2017).
Source: (Lassmann & Spinelli, forthcoming)

Table A C.9. Manufacturing trade and hourly wages in Slovenia for services sector firms and according to gender

	Log hourly wage				
	(1)	(2)		(3)	(4)
	Services sector firms		Gender		
	Panel A. Log imports				
Log imports	-0.003*	-0.012***	Men	0.0001	0.009***
	(-1.76)	(-7.50)		(0.12)	(9.56)
			Women	-0.003***	-0.002***
				(-2.53)	(-2.95)
Obs.	1 706 424	1 998 513		1 802 537	2 111 371
R-squared	0.945	0.941		0.951	0.947
No. Clusters	80 683	104 495		82 640	106 958
	Panel B. Log exports				
Log exports	-0.002	-0.011***	Men	-0.002	0.004***
	(-1.25)	(-6.24)		(-1.21)	(3.80)
			Women	-0.001	-0.0008
				(-1.16)	(-1.16)
Obs.	1 410 523	1 633 509		1 466 929	1 697 445
R-squared	0.947	0.943		0.952	0.948
No. Clusters	51 090	63 024		52 310	64 516
	Panel C. Log imports and exports				
Log imports	-0.001	-0.011***	Men	0.0001	0.014***
	(-0.57)	(-4.21)		(0.08)	(8.42)
			Women	-0.002***	-0.002
				(-1.98)	(-1.33)
Log exports	-0.002	-0.007***	Men	-0.002	0.003**
	(-0.97)	(-3.49)		(-1.04)	(2.24)
			Women	-0.001	-0.001
				(-1.36)	(-1.62)
Obs.	1 349 416	1 569 322		1 398 088	1 625 013
R-squared	0.948	0.944		0.953	0.949
No. Clusters	40 298	51 143		41 215	52 285
Firm controls	Yes	No		Yes	No
Job-spell FE	Yes	Yes		Yes	Yes
Worker FE	No	No		No	No
Firm FE	No	No		No	No
Year FE	Yes	Yes		Yes	Yes
Year-industry FE	No	No		No	No
Region FE	No	No		No	No
Occupation FE	No	No		No	No

Note: *** p<0.01, ** p<0.05, * p<0.1, t-statistics reported in parentheses. The standard errors are clustered at the firm level. Dependent variable: log of hourly wages. All regressions include worker controls (age, age squared, gender and skill). Columns 1 and 2 are estimated for firms who report their main activity in the services sector. Columns 3 and 4 report respective results for male and female separately. Firm controls (log employment, log turnover, the log capital-to-labour ratio and the share of high-skilled workers) are omitted in even columns. This work was produced using statistical data from the Statistical Office of the Republic of Slovenia (2009-2016).
Source: (Lassmann & Spinelli, forthcoming).

Table A C.10. The effect of services trade on skilled *vs.* unskilled workers in Sweden

	Log annual wage			
	Panel A. Manufacturing firms			
	(1)	(2)	(3)	(4)
Trade in:	Services		Goods	
Log imports	0.024*	0.063***	-0.025***	-0.004***
	(1.66)	(5.26)	(7.29)	(2.69)
High-skilled * log imports	-0.029	-0.191***	-0.002	-0.021***
	(0.53)	(4.46)	(0.14)	(3.81)
Log exports	-0.008	-0.048***	0.015**	0.014***
	(0.68)	(3.85)	(2.19)	(6.27)
High-skilled * log exports	0.032	0.211***	0.001	0.016***
	(0.54)	(4.25)	(0.09)	(3.06)
Obs.	4 726 678	6 111 141	4 731 981	6 117 054
	Panel B. Services firms			
	(1)	(2)	(3)	(4)
Trade in:	Services		Goods	
Log imports	0.088***	-0.002	-0.039***	-0.028***
	(7.44)	(0.11)	(14.78)	(7.72)
High-skilled * log imports	-0.206***	-0.014	0.004	-0.011*
	(3.16)	(0.25)	(1.25)	(1.94)
Log exports	-0.084***	-0.063***	-0.003	-0.034***
	(4.83)	(6.14)	(1.14)	(8.03)
High-skilled * log exports	0.220***	0.005	-0.007*	0.009
	(3.11)	(0.08)	(1.88)	(1.46)
Obs.	6 309 188	16 731 455	6 319 405	16 742 849
Firm controls	Yes	No	Yes	No

Note: *** p<0.01, ** p<0.05, * p<0.1, t-statistics reported in brackets. The regressions focus on firms that both export and imports, see also (Hummels, D., R. Jørgensen, J. Munch, C. Xiang, 2014). Dependent variable: log of annual full-time equivalent wages. All regressions are estimated by way of (job-spell) fixed effects instrumental variables (IV) regressions including worker controls (tenure, tenure squared, civil status). Firm controls (share of high-skilled employees, log employment and log sales) are omitted in columns (2) and (4). The import instrument is the trading partner export supply to all countries except Sweden, of the product in question. The export instrument is the trading partner's total imports of the product in question less imports to Sweden.
Source: (Nordås, Lodefalk, & Tang, 2019).

Table A C.11. Services trade and hourly wages in the United Kingdom

	Log hourly wage			
	(1)	(2)	(3)	(4)
	Panel A. Log imports			
Log imports	0.154***	0.140***	0.156***	0.142***
	(4.89)	(5.32)	(4.88)	(5.27)
Log imports * high-skilled			-0.010	-0.008
			(-1.23)	(-0.99)
Obs.	125,600	125,620	125,600	125,620
F-test	34.86	43.42	17.77	21.98
	Panel B. Log exports			
Log exports	-0.005	-0.026	-0.017	-0.048
	(-0.39)	(-1.18)	(-0.97)	(-1.52)
Log exports * high-skilled			0. 015*	0.024**
			(1.70)	(1.98)
Obs.	103,362	103,403	103, 362	103,362
F-test	50.87	19.19	16.91	5.99
	Panel C. Log imports and exports			
Log imports	0.053***	0.031***	0.044***	0.026***
	(4.23)	(3.81)	(3.83)	(3.26)
Log imports (high-skilled)			-0.002	-0.001
			(-0.30)	(-0.13)
Log exports	0.056***	0.054***	0.0661***	0.062***
	(5.90)	(6.45)	(5.67)	(5.99)
Log exports (high-skilled)			-0.026**	-0.021**
			(-2.39)	(-2.06)
Obs.	84,710	84,719	103,362	103,403
F-test	48.52	90.96	16.91	5.99
Firm controls	Yes	No	Yes	No
Job-spell FE	Yes	Yes	Yes	Yes
Worker FE	No	No	No	No
Firm FE	No	No	No	No
Year FE25	Yes	Yes	Yes	Yes
Year-industry FE	No	No	No	No
Region FE	No	No	No	No
Occupation FE	No	No	No	No

Note: *** p<0.01, ** p<0.05, * p<0.1, robust t-statistics reported in parentheses. Dependent real (CPI-deflated) variable: log of hourly wages. All regressions are estimated by way of instrumental variables (IV) fixed effects (FE) pooled panel regressions and include worker controls (age, age squared, gender, skill, union affiliation). Firm controls (log employment, log turnover) are omitted in even columns. Variables are weighted by the inverse of the (number of firms in a given stratum, divided by number of firms in the business registry IDBR in the same stratum). Source: This work was produced using statistical data from ONS (ABI and ABS, ITIS, ASHE 2004-2016). The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates. F-test refers to the Kleibergen-Paap rk Wald F statistic for weak identification. Source: (Lassmann & Spinelli, forthcoming).

Table A C.12. Services trade policy and hourly wages in the United Kingdom

	Log hourly wage					
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Overall STRI scores					
Log imports	-0.139**	-0.168**			-0.039**	-0.042***
	(-3.76)	(-3.32)			(-2.89)	(-2.93)
Log exports			0.018***	0.017***	0.024***	0.026***
			(3.06)	(3.03)	(4.79)	(5.20)
STRI score	-0.139**	-0.166**	0.001	-0.004	-0.101*	-0.123**
	(-2.64)	(-2.57)	(0.02)	(-0.07)	(-1.69)	(-1.99)
Intra-EEA score	-0.265*	-0.373**	0.020	0.045	0.291*	0.360**
	(-1.69)	(-1.96)	(0.16)	(0.36)	(1.76)	(2.07)
Digital STRI	0.887***	0.949***	0.317***	0.317***	0.614***	0.603***
	(4.06)	(3.54)	(3.21)	(3.19)	(4.60)	(4.57)
Obs.	26,723	26,723	20,275	20,275	18,081	18,081
F-test	18.95	13.60	208.60	205.40	48.47	45.86
	Panel B. STRI measures					
Log imports	-0.314**	-0.328*			-0.141**	-0.152*
	(-1.97)	(2.33)			(-2.02)	(-1.95)
Log exports			0.020***	0.019***	0.029***	0.030***
			(2.82)	(2.75)	(3.12)	(3.16)
Area 1	-0.499	-0.557	0.225***	0.223***	-0.004	-0.053
	(-1.28)	(-1.29)	(2.78)	(2.75)	(-0.03)	(-0.31)
Area 2	0.034	0.084	-0.302**	-0.303**	-0.409**	-0.412***
	(0.12)	(0.28)	(-3.23)	(-3.25)	(-3.18)	(-3.08)
Area 3	-2.653	-2.698	0.370	0.358	-1.117	-1.277
	(-1.62)	(-1.57)	(1.28)	(1.23)	(-1.20)	(-1.24)
Area 4	2.148	1.999	-0.560**	-0.567**	0.659	0.631
	(1.54)	(1.45)	(-4.00)	(-4.00)	(1.05)	(0.99)
Area 5	4.878*	4.473*	-0.433**	-0.423**	2.862	3.072
	(1.89)	(1.80)	(-2.36)	(-2.33)	(1.62)	(1.59)
Obs.	31,495	31,495	24,363	24,363	21,864	21,864
F-test	4.04	3.73	146.40	140.90	3.05	2.72
	Panel C. Digital STRI measures					
Log imports	0.197**	0.160**			-0.080**	-0.086*
	(1.97)	(2.33)			(-1.97)	(-1.95)
Log exports			0.013	0.014*	0.034***	0.041***
			(1.61)	(1.76)	(2.95)	(2.99)
Area 1	-1.289**	-1.002**	-0.047	-0.046	0.613	0.727
	(-2.14)	(-2.56)	(-0.27)	(-0.26)	(1.49)	(1.58)
Area 2	-1.357*	-0.989	-0.590	-0.683	-1.483**	-2.191**
	(-1.74)	(-1.43)	(-1.03)	(-1.16)	(-2.07)	(-2.49)
Area 3	-8.836**	-6.766**	-2.037**	-2.102**	1.125	0.953
	(-2.05)	(-2.46)	(-2.76)	(-2.90)	(0.55)	(0.48)
Area 4	15.175**	12.919**	4.386***	4.323***	-0.660	-1.757
	(2.67)	(3.32)	(3.78)	(3.72)	(-0.18)	(-0.42)

	Log hourly wage					
	(1)	(2)	(3)	(4)	(5)	(6)
Area 5	-0.608	-0.624	0.597	0.623	2.586**	3.259***
	(-0.82)	(-0.94)	(1.15)	(1.22)	(2.52)	(2.59)
Obs.	36,572	36,579	29,208	29,212	24,551	24,551
F-test	5.19	7.99	122.70	127	5.50	4.89
Firm controls	Yes	No	Yes	No	Yes	No
Job-spell FE	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	No	No	No	No	No	No
Firm FE	No	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-industry FE	No	No	No	No	No	No
Region FE	No	No	No	No	No	No
Occupation FE	No	No	No	No	No	No

Note: *** p<0.01, ** p<0.05, * p<0.1, robust t-statistics reported in parentheses. Dependent real (CPI-deflated) variable: log of hourly wages. All regressions are estimated by way of fixed effects (FE) instrumental variables (IV) pooled panel regressions and include worker controls (age, age squared, gender, skill, union affiliation). Firm controls (log employment, log turnover) are omitted in even columns. STRI for the years 2014-2017 from the OECD. STRI policy areas in Panel B: Restrictions on foreign entry (area 1), restrictions on the movement of people (area 2), other discriminatory measures (area 3), barriers to competition (area 4), regulatory transparency (area 5). Policy areas in Panel C: Infrastructure and connectivity (area 1), electronic transactions (area 2), payment systems (area 3), intellectual property rights (area 4), other barriers affecting trade in digitally enabled services (area 5). Source: This work was produced using statistical data from ONS (ABS, ITIS, 2014-2017). The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.
Source: (Lassmann & Spinelli, forthcoming).

Table A C.13. The effect of services trade on workers in Viet Nam

	Log hourly wage			
	(1)	(2)	(3)	(4)
Occupations	All	Elementary	Medium-skilled	High-skilled
Lagged services import share	-0.432	-0.818	-0.171	0.025
	(0.401)	(1.182)	(0.587)	(0.382)
Lagged import share (final consumption of goods)	-0.002***	-0.002**	-0.001	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
State-owned business	-0.001	0.076***	-0.005	0.005
	(0.018)	(0.022)	(0.022)	(0.023)
Foreign-owned business	0.032***	0.085***	0.021**	0.154***
	(0.009)	(0.015)	(0.010)	(0.034)
State-owned business * lagged services import share	-0.234	-0.745*	-0.015	-0.598**
	(0.256)	(0.426)	(0.273)	(0.241)
Foreign-owned business * lagged services import share	1.081***	-0.991***	0.559**	0.595
	(0.201)	(0.353)	(0.244)	(0.370)
Obs.	550 436	104 135	268 101	178 163
Adj. R-squared	0.50	0.28	0.40	0.45

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets. The regressions are estimated by way of fixed effects regressions (sectoral, year, occupation and province fixed effects), worker controls (gender, tenure, tenure squared and a dummy for being married, as well as five levels of education and labour contracts, and three age groups).
Source: (Jaax & Johannesson, 2019).