Technical Report

Deriving experimental estimates of digital trade

OECD

Deriving experimental estimates of digital trade

(Preliminary version)

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1 Executive summary

1. Digital technologies are transforming what and how we trade, fostering unprecedented interconnectedness that is reshaping our global economic landscape. As a result, the speed at which goods, services, people and data flow across international borders is accelerating and the nature of international trade transactions is changing. Today's trade involves not only more traditional trade arising from lower trade costs, but also growing trade in digitally ordered parcels, more digitally delivered services and increases in cross-border data flows. However, due to a lack of visibility about how much trade is digitally ordered or delivered, accurate estimates of the value of digital trade remain elusive. In the context of fast-evolving digital trade policy discussions, measuring digital trade has become increasingly important to support evidence-based policymaking.

2. The concepts needed to measure digital trade have been established in the *Handbook for Measuring Digital Trade*. In short, digital trade is defined as the sum of digitally ordered trade and digitally delivered trade, net of any 'double counting' where transactions fall into both categories. However, measurement frameworks need to adapt, and it will be some time before official statistics on digital trade become widespread and comparable across countries. Until official statistics are available, experimental estimates can help fill an important gap to inform trade policymaking.

3. Producing experimental estimates of digital trade is complex, in part because of a lack of underlying data availability for some important aspects of digital trade. As a result, assumptions, imputations and modelling are required. In this context, this technical paper presents two methodologies for deriving experimental estimates of digital trade with a view to developing statistically robust estimates of digital trade to support evidence-based policymaking and with the following "guiding principles" in mind.

4. First, the approach should align with the statistical definition of digital trade as set out in the *Handbook for Measuring Digital Trade*. Second, estimates should be produced for as many OECD Member countries as possible, with prospects to extend the methodology to other countries as appropriate. Third, the approach should yield a time series and be as up to date as possible. It should also be updated ideally on a yearly basis.

5. The first approach, so-called the "international e-commerce" approach, examines digital ordering through the lens of international e-commerce, defined as the share of turnover that is digitally ordered. The first step in this approach involves collecting data on e-commerce turnover (i.e. web sales + EDI sales = total e-commerce turnover). The second step involves estimating the share of international e-commerce sales, and the third step is comprised of computing digitally ordered trade.

6. The second approach, so-called the "international trade" approach, examines digitally ordered trade through the lens of international trade. It combines information from ICT surveys on the share of e-commerce sales in total turnover and on exports.

7. In both approaches, estimates of digitally ordered trade are combined at the sectoral level with estimates of digitally delivered trade from the World Trade Organisation to derive total digital trade. In this framework, all trade identified as digitally delivered is allocated to the 'digitally delivered' category, regardless of whether it was also digitally ordered. Those transactions are added to digitally ordered trade from non-digitally deliverable services and goods industries to compute digital trade. Such a computation ensures that transactions which are both digitally ordered and delivered are not double counted.

8. Each approach focuses on estimating the digitally ordered component of digital trade. Both approaches have advantages and disadvantages, and their use may be predicated on a country's particular context and data availability. They are also envisaged to be refined and revisited in the future, as more information becomes available and statistical offices publish official estimates of digital trade on a regular basis. While they are both useful inputs to policymaking, it should be underscored that cross-country comparability is only robust when using the same approach.

9. Going forward, the OECD will compile a database of experimental digital trade estimates using the international e-commerce approach. This database will include 24 countries and 7 sectors of the period 2010-23 in the first instance, with plans to include Canada and the United Kingdom in due course. Other countries will be added as appropriate. To complement the international e-commerce approach, the OECD will also use the international trade approach, which requires fewer input variables, to derive experimental digital trade estimates. These estimates will include 29 countries over the period 2010-22.

10. Looking ahead, strengthening data collection on the value of e-commerce – particularly through survey modules that distinguish between domestic and international sales – is key to improving the evidence base for digital trade and enriching both approaches. The OECD could support this effort by working with Member countries, interested non-Members, Eurostat and other partners to develop a model "digital trade module" for inclusion in ICT Access and Usage surveys. This would enable more consistent and comparable estimates across a wider set of countries in the medium term, supporting efforts to enhance digital trade measurement globally. Improving the completeness of statistics at the industry level would also help to gain a more complete and more accurate estimate of digital trade as would collecting information on imports, on business-to-consumer transactions and digital intermediation platforms.

2 Introduction

11. Digital technologies are transforming what and how we trade, fostering unprecedented interconnectedness that is reshaping our global economic landscape. As a result, the speed at which goods, services, people and data flow across international borders is accelerating and the nature of international trade transactions is changing. Today's trade involves not only more traditional trade arising from lower trade costs, but also growing trade in digitally ordered parcels, more digitally delivered services and increases in cross-border data flows.

12. However, due to a lack of visibility about how much trade is digitally ordered or delivered, accurate estimates of the value of digital trade remain elusive. In the context of fast-evolving digital trade policy discussions, which include the rapid growth in digital trade provisions in trade agreements, emerging Digital Economy Agreements (DEAs) and advanced discussions under the plurilateral Joint Initiative on e-commerce at the WTO, measuring digital trade has become increasingly important to support evidence-based trade policymaking.

13. The foundations for measuring digital trade have been laid in the inter-agency *Handbook for Measuring Digital Trade* ("the Handbook") (IMF et al., 2023[1]), which was endorsed by the United Nations Statistical Commission in 2024. The Handbook offers insights on the concepts and data sources needed to compile internationally comparable statistics on digital trade.

14. According to the Handbook, digital trade is broken down into digital ordering and digital delivery and it lies at the intersection between e-commerce and international trade. Building on the OECD's statistical definition of e-commerce, "the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders" (OECD, 2025[2]), digital ordering is defined as international e-commerce. Digital delivery is defined as "all international trade transactions that are delivered remotely over computer networks."

15. While the concepts needed to measure digital trade have been established, measurement frameworks need to adapt, and it will be some time before official statistics on digital trade become widespread and comparable across countries. Until official statistics are available, experimental estimates can help fill an important gap to inform policymaking.

16. The objective of this work is to cast light on aspects of digital trade for which information is currently missing. This is a field in constant evolution, and the aim is to provide estimates that are as robust as possible, given the existing set of information. The approach could be refined and revisited in the future, as more information becomes available.

17. Producing experimental estimates of digital trade is complex in part because of a lack of underlying data availability for some important aspects of digital trade. As a result, assumptions, imputations and modelling are required. In this context, this paper examines two approaches for deriving experimental estimates of digitally ordered trade, which combined with estimates of digitally delivered trade at the sectoral level can yield estimates of digital trade. Each approach has advantages and disadvantages, and their use may be predicated on a country's particular context and data availability. This work was undertaken with a view to developing the most statistically robust estimates as possible and the following "guiding principles" in mind:

- **Conceptual underpinning:** The approach should align with the statistical definition of digital trade as set out in the Handbook (IMF et al., 2023[1]).
- **Country coverage:** Estimates should be produced for as many OECD Member countries as possible, with prospects to extend the methodology to other countries as appropriate.
- **Timeliness:** The approach should yield a time series and be as up to date as possible, it should also be updated ideally on a yearly basis.

18. This technical paper is structured in four parts. The first section discusses the concept of digital trade and presents a brief overview of the literature on measuring digital trade. The second section presents the approach to and the corresponding results from measuring digitally ordered trade using international e-commerce as a starting point. This approach will be used to develop an OECD database of experimental estimates of digital trade. The third section presents an alternative approach, which looks at digital ordering from an international trade perspective. This approach could be used when data are not available in the OECD database of experimental estimates of digital trade, keeping in mind the lack of comparability between the two approaches. The fourth section compares the two approaches.

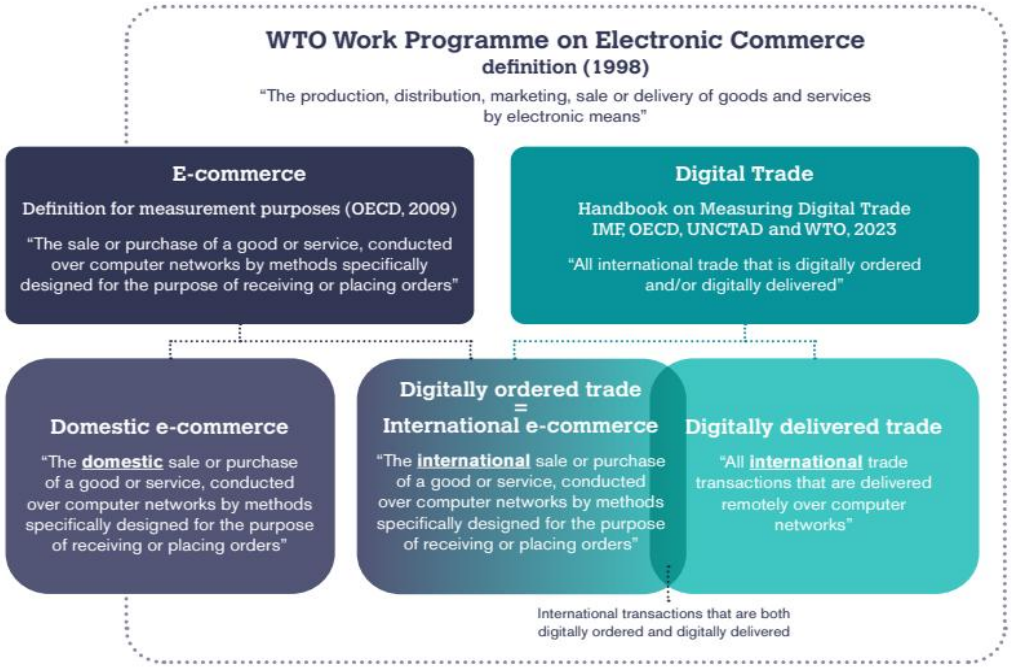
3 What is digital trade?

19. As digital technologies have diffused widely throughout the economy and society, the trade landscape has become increasingly dynamic. New players have emerged while established actors have taken on new roles; some barriers to e-commerce at the firm, individual and country levels have been overcome, while new barriers have emerged. New business models have transformed buyer-seller relationships and pushed out the frontier of what is possible to buy and sell online, leading to more and new forms of trade. This section discusses the conceptual underpinnings of digital trade and reviews the literature on measuring this important phenomenon.

20. Digital trade is defined in the Handbook as "all trade that is digitally ordered and/or delivered" (Figure 3.1). That is, digital trade is a subset of total international trade in goods and services. The Handbook also clarifies that digitally ordered trade is equivalent to international e-commerce using the OECD definition (OECD, 2025[2]). In turn, digital delivery is defined as "all international trade transactions that are delivered remotely over computer networks."

21. One key challenge in calculating total digital trade is addressing the overlap in these concepts. Some trade that is digitally delivered will have also been digitally ordered and some trade that is digitally ordered will have also been digitally delivered. For instance, an e-book can be ordered online and then downloaded from the Internet. Simply adding up existing estimates of digitally ordered trade and digitally delivered services would lead to a digital trade figure that includes trade that is double counted.

Figure 3.1. Digital trade and e-commerce: Fundamental concepts and statistical definitions



Sources: (IMF et al., 2023[1]).

22. While existing trade statistics should cover, in principle, all digital trade transactions, two issues arise. First, digital trade remains largely invisible in official statistics. For example, a digitally ordered book will be captured in trade statistics under the relevant customs code, but this code will not distinguish whether imported books have been digitally ordered or not.

23. Second, digital ordering and delivery exacerbate certain existing challenges associated with the recording of international trade transactions. Digital technologies increase the involvement of small firms and households in international trade in both goods and services, and this activity may not be adequately captured by traditional data sources, often reliant on large firms. Similarly, the rise of international e-commerce has led to an increase in low-value goods crossing borders, which may elude traditional tracking methods if higher value thresholds are used.

24. These challenges are compounded by the rapid adoption of digital intermediation platforms (DIPs), which facilitate transactions for a fee, without taking ownership of the goods or rendering the services being intermediated. The identification of these platforms in business registers and the treatment of the transactions they facilitate – including which parts should be recorded as being cross-border, and with which partner country – pose significant empirical challenges.

25. National statistical offices (NSOs) are making significant efforts to address these challenges and to improve the coverage of their international trade statistics. Surveys are being expanded and new data sources, such as payment card information, administrative records, postal data, are being explored, including to better quantify small value trade. Despite these advances, no country has currently published comprehensive estimates of total digital exports or imports. Until better measures for digital trade are available, analysis must proceed carefully, using existing statistics to shed light on particular aspects of trade in the digital era. In that context, the OECD has just reviewed the OECD definition of e-commerce under the auspices of the Working Party on Digital Economics, Measurement and Analysis (WPDEMA) (OECD, 2025[2]).

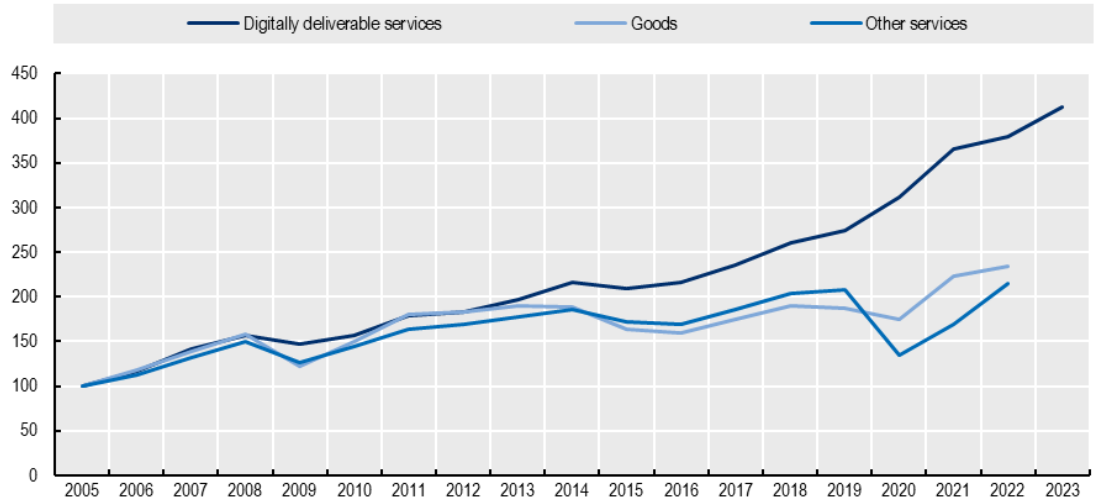
Digital trade measurement efforts to date

26. In the absence of comprehensive and comparable official digital trade statistics, measures of different elements of digital trade are increasingly being developed (Table 3.1). For example, the WTO digitally delivered services trade dataset (WTO, 2025[3]) covers over 200 countries and regions for the period 2005-2023. The data is obtained by exploiting the quasi equivalence between Mode 1 service supply (cross-border) and digital delivery for digitally deliverable services. A conversion coefficient, often very close to 100%, is applied to total trade values to estimate how much of this trade might be digitally delivered. Coefficients are country-specific, when possible, while plausible averages are used for all other countries, and broadly stable over time, although some variation is visible in the aftermath of the COVID-19 pandemic.

27. The data underscores the growing importance of digitally delivered services – growing at an annual average rate of 8%, nearly twice as fast as goods trade (Figure 3.2). In 2023, trade in digitally delivered services was around USD 4 trillion. UN Trade and Development (UNCTAD) also published data on international trade in digitally deliverable services in December 2024 (UNCTAD, 2024[4]).[1]

Figure 3.2. Digitally delivered services are growing faster than trade in goods and other services

World, Index =100 in 2005



Sources: Authors' calculations using (United Nations, 2025[5]) and (WTO, 2025[3]).

28. One critical challenge is identifying digitally ordered trade. López-Gonzalez, Sorescu and Kaynak (2023[6]) use the TiVA database (2025[7]) to provide some preliminary proxies for total digital trade. They use digitally deliverable services as proxies for digitally delivered trade (under the assumption that all that is digitally deliverable is digitally delivered) and digital inputs into non-digital sectors as proxy measures for digitally ordered trade.[2]

29. Those proxy measures, updated in OECD (2023[8]), suggest that digital trade has been growing faster than non-digital trade and that it could represent around 25% of trade, or USD 5 trillion in 2020 (Figure 3.3, Panel A). The results also suggest that digitally delivered trade represented around 60% of total digital trade in 2020 (Figure 3.3, Panel B). However, the precision of these estimates is difficult to ascertain in the absence of official statistics on digitally ordered trade.

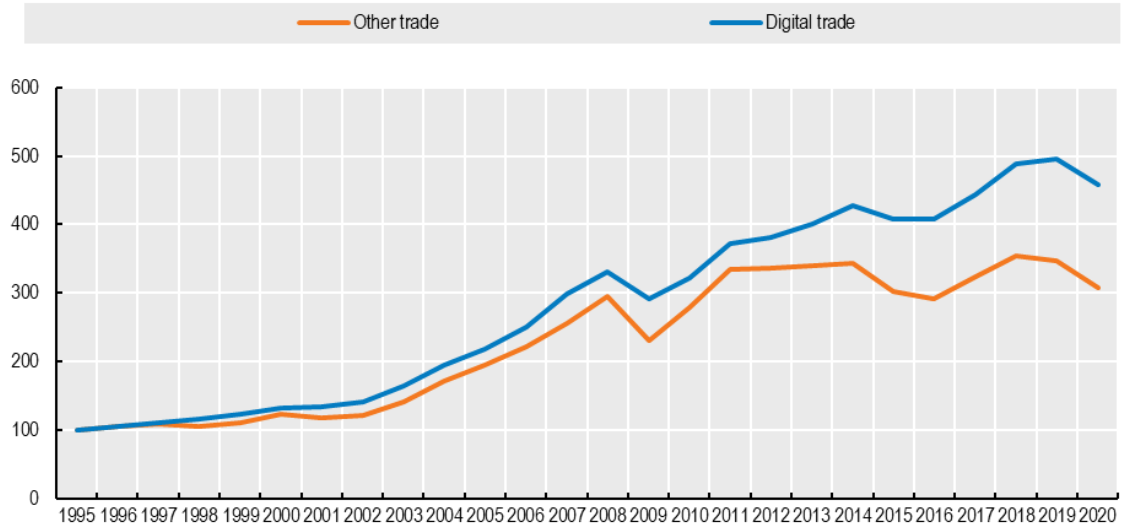
30. Analysis by UNCTAD (2024[4]) provides new estimates of digitally ordered trade for 43 large economies. They use information from business ICT surveys from Eurostat and NSOs which provide information on total e-commerce sales and, partially, a breakdown into domestic and international. Data gaps were filled in by imputation, assuming that the international shares reported for web sales apply to international Electronic Data Interchange (EDI)-type sales which, together, add up to total international e-commerce sales. The results suggest that 12-14% of goods and services exports are digitally ordered.

31. Existing estimates of digitally delivered trade and digitally ordered trade cannot be simply added to derive measures of total digital trade, given the overlap between digital ordering and delivering. To date, no estimates of this overlap have been published. According to a joint OECD-IMF-UNCTAD-WTO questionnaire (2024[9]) undertaken in Summer 2024, 35 countries indicated they have started some work in this area.

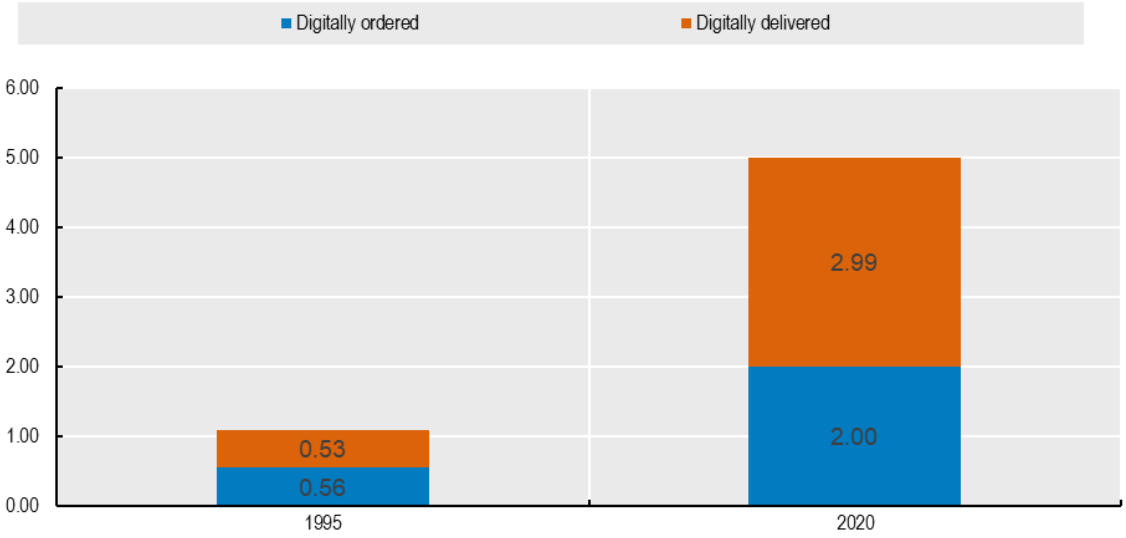
32. Recent work by Fajgelbaum and Khandelwal (2024[10]) estimate *de minimis* trade in the United States using shipment data from global carriers. They argue that such imports totalled USD 54.5 billion in 2023, growing 100-fold since 2012 to represent around 7.2% of US imports of consumer goods and 19.2% of e-commerce sales. Although only for one country, this work shows the potential size of the value of trade that is not being recorded.

Figure 3.3. Preliminary proxies for digital trade

Panel A. Digital trade is growing faster than "other trade", World, Index=100 in 1995



Panel B. Digitally delivered trade represents 60% of total digital trade, World, USD trillion



Note: While digitally delivered trade can be calculated using traditional statistics (assuming that all trade that is digitally deliverable is digitally delivered), digitally ordered trade is instrumented using input output tables and calculating the value-added content of exports.
Source: López González, Sorescu ad Kaynak (2023[6]).

33. In parallel, creative and experimental methods for estimating digital trade have emerged. A notable example is Stojkoski et al. (2024[11]) who use corporate revenue data to estimate bilateral exports and imports of large digital firms. Rather than capturing all digital trade, the work focuses on "digital products" which include "digital goods, productised services and digital intermediation fees." They find that trade in digital products is close to USD 1 trillion in 2021 and that it is growing rapidly, at an annual average rate of nearly 25% between 2016 and 2021.

34. While there are recent and ongoing efforts to better capture different aspects of digital trade, they are not without shortcomings and should all be considered as experimental estimates (Table 3.1).

In particular, it is difficult to understand the accuracy of such estimates in the absence of official statistics of the "true" value of the various components of digital trade.

Table 3.1. Existing experimental estimates of digital trade

Source	Main results	Observations
WTO digitally delivered services trade dataset (2025[3])	Digitally delivered services represented around 55% of services in 2022 and grew at an annual rate of 8.1% between 2005 and 2023.	Data covers total exports across eight services categories from 2005-23 for 200 economies. Data are planned to be updated every year.
López-Gonzalez, Sorescu and Kaynak (2023[6]) and OECD (2023[8])	Digital trade represents 25% of global trade (USD 5 trillion) the lion's share of which, 60%, are digitally deliverable services.	Analysis uses OECD TiVA data which covers 77 economies from 1995 to 2020. Digitally deliverable services are taken as proxies for digitally delivered trade and digitally ordered trade is estimated.
UNCTAD (2024[4])	12-14 % of goods and services exports are digitally ordered.	Data largely derived from Eurostat ICT usage surveys and national surveys for a handful of non-EU countries. Estimates using international trade statistics have been developed for the United States.
UN Trade and Development (2025[12])	Digitally deliverable services grew at an annual rate of 9.3% between 2022 and 2023.	Digitally deliverable services are those which can be delivered remotely. This does not mean that they have effectively been delivered remotely, which implies that digitally deliverable services trade will be larger than digitally delivered trade.
Fajgelbaum and Khandelwal (2024[10])	US de minimis imports totalled USD 54.5 billion, growing 100-fold since 2012 to represent around 7.2% of US imports of consumer goods and 19.2% of e-commerce sales.	Data for the United States only using shipment data from global carriers. Although only for one country, this work shows the potential size of the value of trade that is not being recorded.
Stojkoski et al. (2024[11])	The value of digital products is close to USD 1 trillion in 2021 and that it is growing rapidly, at an annualised rate of nearly 25% between 2016 and 2021.	They use Large Language Models and corporate revenue data to estimate bilateral exports and imports of large digital firms. The data is based on large firm activities and captures only a segment of digital trade.

Source: Authors' compilation.

A stepwise approach to estimating digital trade

35. Digital trade is estimated using a stepwise approach, with a special focus on digitally ordered trade (Figure 3.4). The objective is to identify a method that provides useful information for policymaking, whilst meeting statistical quality requirements, being transparent and easy to update.

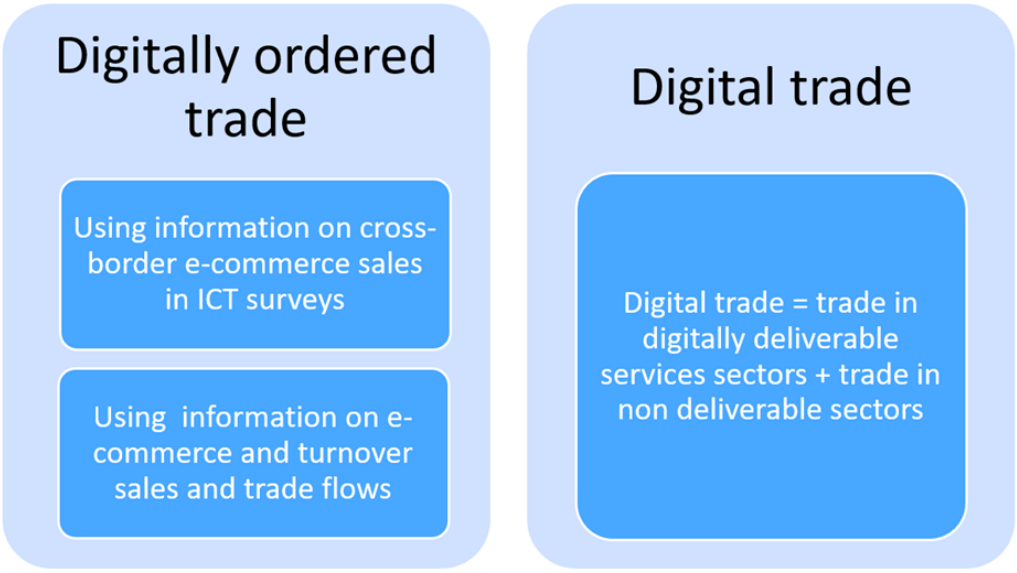
36. In the first step estimates of digital ordering are derived by exploiting the close relationship existing between digital ordering and e-commerce, and the share of cross-border e-commerce sales is measured using ICT surveys. An alternative approach, which exploits the link between digital ordering and international trade, can be used to shed light on digital ordering in countries where ICT surveys lack detailed information on cross-border ecommerce sales or on uncertainties around estimates, in countries where it is possible to compute estimates using the two perspectives. Estimates are computed at the aggregate business sector level together with some industry breakdown.

37. In a second step, digital trade is computed from sector-based estimates, which allows to by-pass the estimation of the overlap between digital ordered trade and digital delivered trade (Figure 3.5). The idea is to identify digitally deliverable services sectors from non-digitally deliverable sectors (in first approximation goods, transport and travel). More specifically, all trade that is identified in digitally delivered sectors, falls under the digitally delivered category irrespective of whether some of this trade has been digitally ordered or not. In turn, digitally ordered trade only takes place in non-digitally deliverable services sectors and goods industries. Data on digitally delivered trade are coming from the WTO.

$$Digital\ trade_i\ (t) = \sum_{k\in\{dds\}} DDT_{ik}(t) + \sum_{k\in\{ndds\}} DOT_{ik}(t)$$

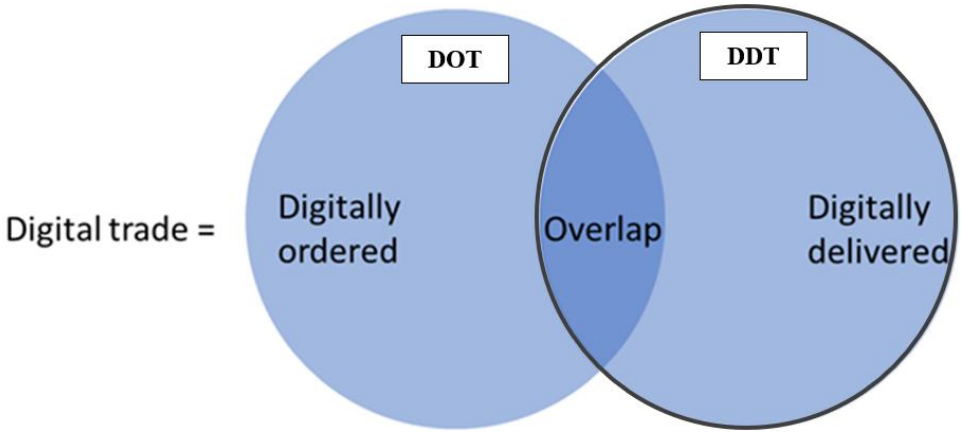
Where: i stands for country, k for sector, DDT stands for digitally delivered trade, DOT digitally delivered trade, dds : list of digitally delivered sectors, and $ndds$: list of non-digitally delivered sectors.

Figure 3.4. A stepwise approach to estimate digital trade



Source: Author's compilation.

Figure 3.5. Overlap between digitally ordered trade and digitally delivered trade



Source: (IMF et al., 2023[1]).

4 Measuring digitally ordered trade from an international e-commerce perspective

38. The approach to measuring digitally ordered trade, the "international e-commerce" approach, examines digital ordering through the lens of international e-commerce. The first step involves collecting data on e-commerce turnover (i.e. web sales + EDI sales = total e-commerce turnover). The second step involves estimating the share of international e-commerce sales, and the third step is comprised of computing digitally ordered trade.

39. According to the Handbook, digitally ordered trade can be obtained as follows:

$$DOT\ (t) = \alpha(t) * e_{COM}(t) \qquad (1)$$

Where e_{COM} represents the total value of e-commerce sales (in millions of USD) and $\alpha(t)$ denotes the share of international e-commerce sales.

40. The OECD definition of e-commerce (OECD, 2025[2]), which forms a part of the Handbook, defines an e-commerce transaction as the "sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders." E-commerce can be further disaggregated into those orders placed through webpages (i.e. websites, apps, and online marketplace) and those placed via EDI. It can thus be represented as follows:

$$e_{COM}(t) = web(t) + EDI(t) \qquad (2)$$

41. By expressing international e-commerce sales as a proportion of e-commerce sales and its components in time (t), digitally ordered trade can then be rewritten as follows:

$$DO(t) = \alpha(t) * e_{COM}(t) = \beta_{web}(t) * web(t) + \beta_{EDI}(t) * EDI(t) \qquad (3)$$

Where β_{web} is the share of international e-commerce sales sold through webpages and β_{EDI} is the share of EDI e-commerce sales exported internationally. Each share is modelled separately because web sales and EDI-based sales may not necessarily evolve in tandem. Thus, $\alpha(t)$ is derived using estimates of $\beta_{web}(t)\ and\ \beta_{EDI}(t)$ using (4).

$$\alpha(t) = (\beta_{web}(t) * web(t) + \beta_{EDI}(t) * EDI(t))/e_{COM}(t) \qquad (4)$$

(4) can be computed for specific industry – for which data are available in the ICT surveys.

42. To derive estimates of digital trade and account for the overlap in equation (1), total DOT needs to be calculated net of digitally delivered trade. This can be done using a bottom-up approach (starting at the sector level and summing up across digitally ordered sectors) or a top-down approach (which takes national level business totals and subtracts digitally ordered trade in digitally delivered sectors). A top-down approach has been preferred as it offers better country coverage and requires less imputation. More specifically, the method uses Business Total (TOT) and excludes sectors for which trade is by assumption

classified as digitally delivered (Information and Communication (J) and Administrative and Support Service Activities (N) in this study – see below).

$$DOT(t) = \alpha_{TOT}(t) * ecom_{TOT}(t) - \sum_{i\in(J,N)} \alpha_i(t) * ecom_i(t) \quad (5)$$

Overview of the data

43. This methodology has been applied to 24 countries. Further estimates for Canada and the United Kingdom will be included in the revised version of the database. Where sector level data for digitally delivered data (sectors J and N) is unavailable, they are treated as 0 for purposes of subtraction (3 countries). The median share of sectors J and N combined is about 4% of business total.

44. Data on ***web, EDI and total e-commerce sales*** are taken from the OECD ICT Access and Usage Database (OECD, 2025[13]) and expressed as a percentage of total turnover. Before 2016, e-commerce turnover values are based on the share of e-commerce sales (in % of total turnover) and the total turnover (in national currency). As from 2016, e-commerce turnover in millions of EUR has been sourced from Eurostat's ICT Usage in Enterprises Database (2025[14]). The data from both sources are typically disaggregated by industry, enterprise size, and year and refer to enterprises with ten or more employees. Both sources exclude financial and insurance activities (ISIC K) for EU countries and Norway, and the ICT Access and Usage Database does not cover agriculture, forestry and fishing (ISIC A) or mining and quarrying (ISIC B). Overall, coverage is very good at the national level and for breakdowns at high level by industry (NACE Rev. 2).[3]

45. ***Total turnover*** in millions of EUR is computed by dividing total e-commerce by e-commerce as a share of total turnover. Data is sourced from Eurostat's ICT Usage in Enterprises Database (2025[14]) when possible, and complemented by the OECD Structural and Demographic Business Statistics Database (SDBS) (2025[15]).

46. Annual data on ***international e-commerce sales*** – often broken down broadly by region (i.e. intra or extra EU) and required to compute $\alpha(t)$, $\beta_{web}(t)$ and $\beta_{EDI}(t)$ – are partially available in Eurostat's ICT Usage in Enterprises Database (2025[14]) for the period 2008-23. This includes national- and industry-level breakdowns. Data availability in survey questions on international e-commerce sales varies across countries and over time. Specifically, differences arise in the reporting of the percentage of turnover by sales channel (e.g. web or EDI).

47. While data on total international e-commerce sales are available broadly by region for 2008, these values do not differentiate between sales conducted via web and EDI channels. Data on web sales by export destination are available only from 2016 onwards, while information on EDI sales by export destination is more limited, with some countries reporting for only a subset of years. From 2010 to 2015, no systematic reporting of international e-commerce sales by export destination is available.

48. From 2016 onwards, international e-commerce data have become more widely available, though some gaps remain. For web sales specifically, data are available biennially for most EU countries. However, data on international EDI sales continue to be scarce, except for Denmark (2017-19) and Spain (2016-21). The variations outlined in Table 4.1 reflect the ongoing development of statistical collection efforts and the complexities of capturing detailed data on e-commerce.

Table 4.1. Availability of data on international e-commerce sales

By country and in time

Time period	International share of e-commerce: $\alpha(t)$	International share of web-sales: $\beta_{web}(t)$	International share of EDI: $\beta_{EDI}(t)$
2008-10	Most European countries in 2008	Not collected	Not collected
2010-15	Not collected	Not collected	Not collected
2016-23	Denmark (2017-18) Spain (2016-21)	Biennial for most EU countries Denmark (2017-18) Spain (2016-21)	Denmark (2017-18) Spain (2016-21)

Source: Authors' elaboration based on (Eurostat, 2025[14]), Statistics Denmark[4] and the Spanish Statistical Office (INE).[5]

Addressing missing data through imputation and modelling

49. Due to data limitations, it is necessary to address missing values through imputation and modelling. Table 4.2 provides an overview of the indicators used, the sparsity at both national and industry levels, and the corresponding imputation and modelling approaches.

Table 4.2. Imputation and modelling methods for the main indicators

Indicator	Imputation method	Sparsity (business total)	Sparsity (industry level)
Turnover from e-commerce sales, % of total turnover	Linear interpolation	4.5%	22.2%
Turnover from web sales, % of total turnover	Linear interpolation	6%	23.2%
Turnover from EDI-type sales, % of total turnover	Linear interpolation	6%	25.1%
Total turnover, national currency (2016-23)	Structural and Demographic Business Statistics rescaled	6 countries imputed – average ratio is used	ICT – 47.1% SDBS - 7.4%
Total turnover, national currency (2010-15)	Structural and Demographic Business Statistics rescaled	All countries – country specific ratios utilised when available, else average ratio is used	ICT – 100% SDBS - 10.7%
Share of international e-commerce, % of total turnover	EU average	18.8%	25.0%
Share of international web sales, % of total turnover	Sigmoid fit	22.9%	36.9%
Share of international EDI sales, % of total turnover	Constant	Initialised for 2010	Initialised for 2010

Note: Sparsity refers to the % of missing aggregate values for given breakdown (over all countries and years for chosen indicator, national level and by industry).
Sources: Authors' elaboration.

Turnover values

50. Total e-commerce, web and EDI shares as a percentage of turnover were imputed using linear interpolation. With respect to turnover values, two different data sources are used – Eurostat's ICT Usage in Enterprises Database (2025[14]) and Structural and Demographic Business Statistics (SDBS) database (OECD, 2025[15]). To ensure comparability across years and countries, a conversion methodology is applied. This involves computing the ratio of turnover from Eurostat to turnover reported in SDBS for overlapping years and using these ratios to estimate missing ICT turnover figures. Separately, an average ratio for each country-industry was computed for the periods 2010-20 and 2021-23 to impute missing

values.[6] These ratios are applied at the country and industry levels where available, with sample averages used for missing country-industry combinations. Turnover values are available up to 2023 for most countries, while for some they are available up to 2022.[7]

International e-commerce sales: Web, EDI and total

51. The approach for estimating international e-commerce sales – covering web-based, EDI-based, and total sales – was driven by data availability, which resulted in estimates for three distinct periods: 2008-10, 2011-15, and 2016-23. Between 2008-10, the total share of international e-commerce (α) is assumed to remain constant at the country level, using the value referring to 2008 as a reference point. This assumption is necessary due to the lack of annual data between 2008 and 2010. For countries for which this data point is not available, the EU average is used. Thus:

$$\alpha_{2010} = \alpha_{2009} = \alpha_{2008}$$

52. For 2010, the share of international EDI exports (β_{EDI}) is computed by rearranging Equation (4) and inserting the assumed value for α:

$$\beta_{EDI\_2010} = \frac{\alpha_{2010} * e_{COM\_2010} - \beta_{web\_2010} * web_{2010}}{EDI_{2010}}$$

53. From 2010 onwards, β_{EDI} is kept constant and equal to β_{EDI_2010}, and β_{web} is modelled using a sigmoid function, and α can be computed as a result. These methodological choices are explained below.

54. The literature on the international share of EDI sales is sparse with respect to trends and absolute values. Estimates from UN Trade and development assume equality between β_{EDI} and β_{web}. In the absence of additional insights, and in view of the need to create a point estimate in 2010, the approach in this report uses a constant function, with initial validation against Spain for which a time series on international EDI sales is available (see below). Future work may explore alternative approaches to estimating β_{EDI}.

Exploring the assumption that β_{web} follows a sigmoid function

55. For the period 2016 to 2023, the share of web-based e-commerce sales sold abroad (β_{web}) is assumed to follow a sigmoid function.[8] A sigmoid function is a common method of modelling percentages because it reflects natural bounds. It is parameterised to constrain the share within the range of 0 to 1, ensuring that the proportion of web sales exported abroad can neither be negative nor exceed 100%.

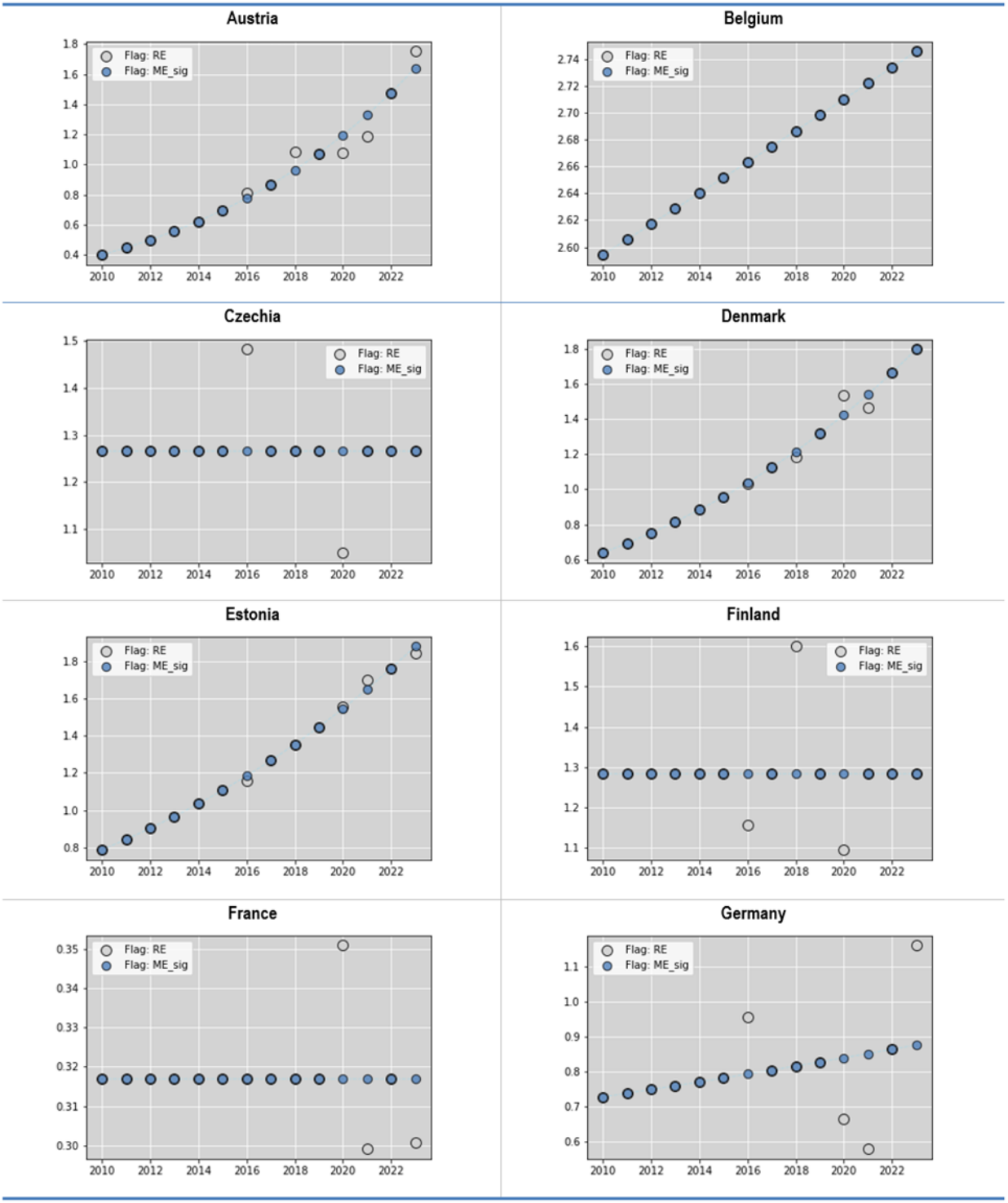
56. The sigmoid function is estimated by fitting a curve to the available data from 2016 to 2023. More specifically, β_{web} is derived from:

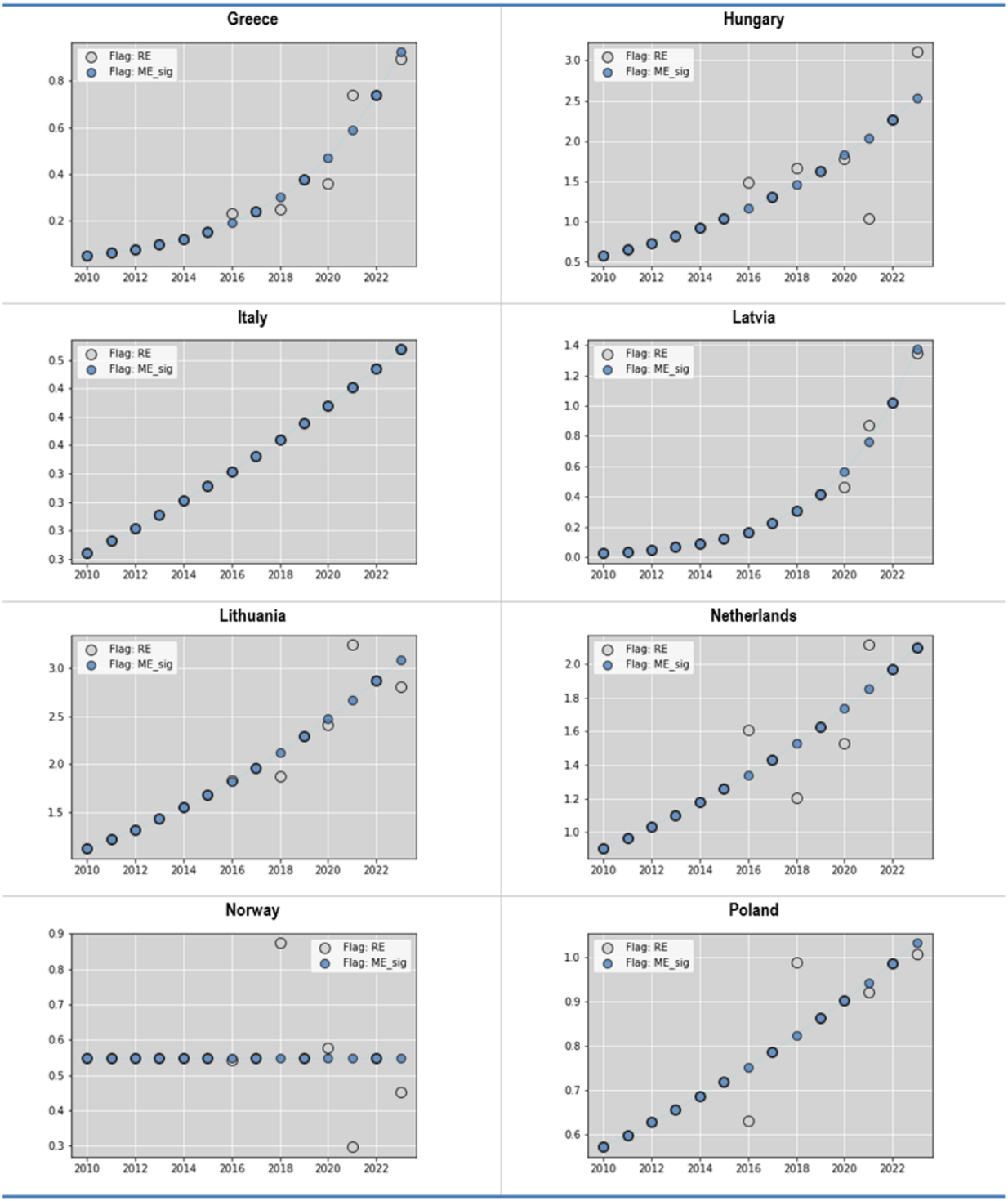
$$\beta_{web}(t) = L_{web}/(1 + \exp(-k_{web} * (t - t0_{web})) + b_{web} \quad (6)$$

57. L_{web} represents the maximum value β_{web} can reach (inferior or equal to 100% by definition), and b_{web} is its minimum value (>= 0% by definition). To reflect the plausible range of values for international share of web sales (i.e. domestic web sales will be non-negligible to say the least), L_{web} is fixed at the highest observed value across all countries. The remaining parameters, k_{web}, which determines the slope of the sigmoid curve, and $t0_{web}$, which represents the midpoint of the transition, are estimated using *Python's SciPy* curve-fitting library[9] for each series. The starting point for these parameters is set as (k_{web}, $t0_{web}$)$_{\text{initial}}$ = (1, median of available data years), ensuring a data-driven approach to refining the model. The sigmoid function effectively models the evolution of web sales export shares for most countries (Figure 4.1), with flat curves modelled when reported data does exhibit positive trends over time (Czechia, Finland, France, Norway, Portugal, Sweden, Romania).

Figure 4.1. The sigmoid function effectively captures the evolution of web sales export shares

Share of web sales exported to other EU countries as a percentage of total turnover, business total, 2010-23




Greece
Flag: RE
Flag: ME_sig
Hungary
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Italy
Flag: RE
Flag: ME_sig
Latvia
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Flag: ME_sig
Lithuania
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Netherlands
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Norway
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Poland
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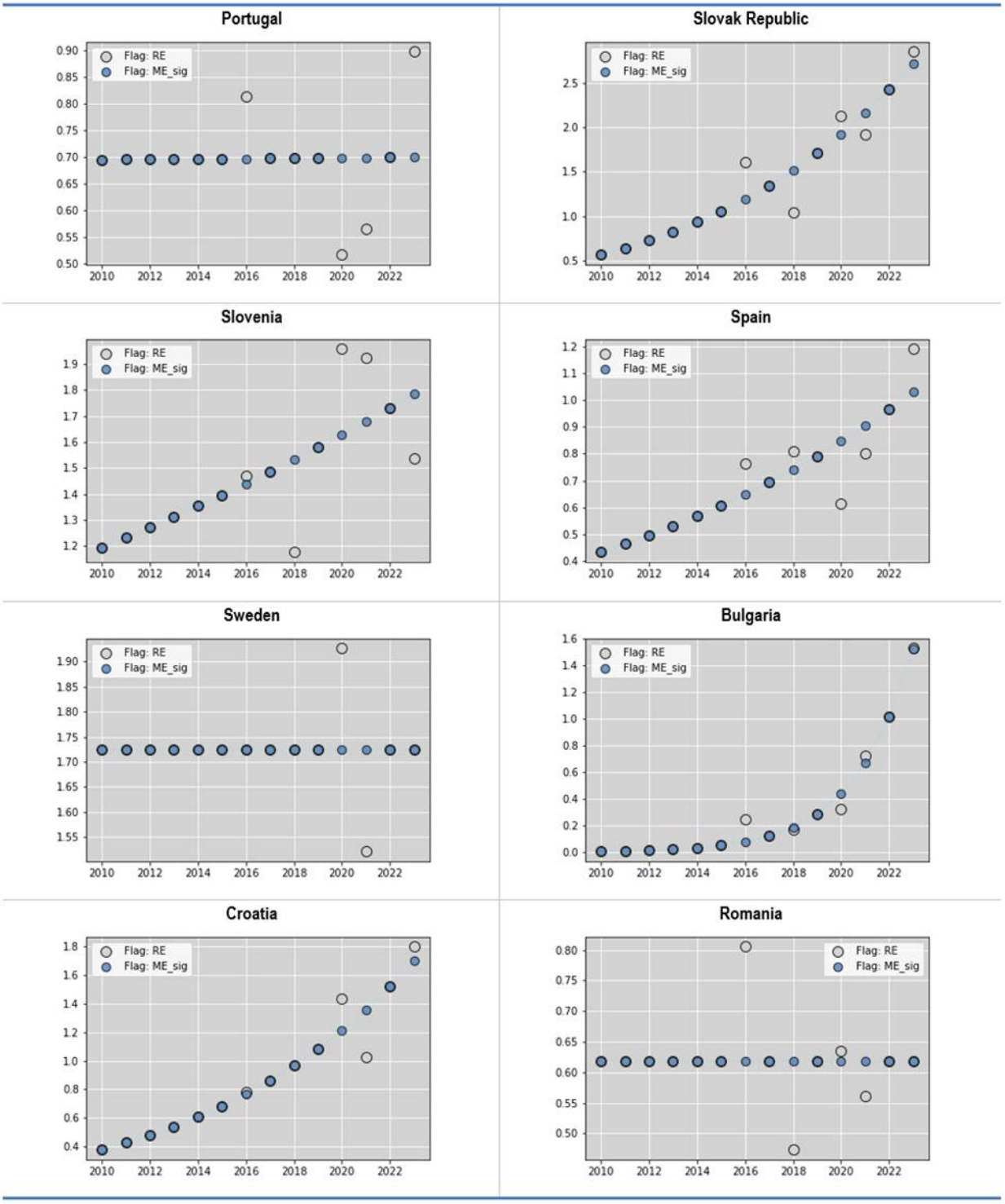


Note: The grey dots ("Flag: RE") depict reported data, while blue dots ("Flag: ME_sig") show model estimated (ME) data with the sigmoid function. Black circle markers indicate chosen values – reported data is selected over model estimates. Sigmoid models were also fitted for web sales exports to the rest of the world, but they are not presented in the figure because the results showed an equally good fit. These results can nonetheless be made available upon request.

Sources: Author's elaboration based on (Eurostat, 2025[14]) and (OECD, 2025[15]).

Estimates of digitally ordered trade using an international e-commerce approach

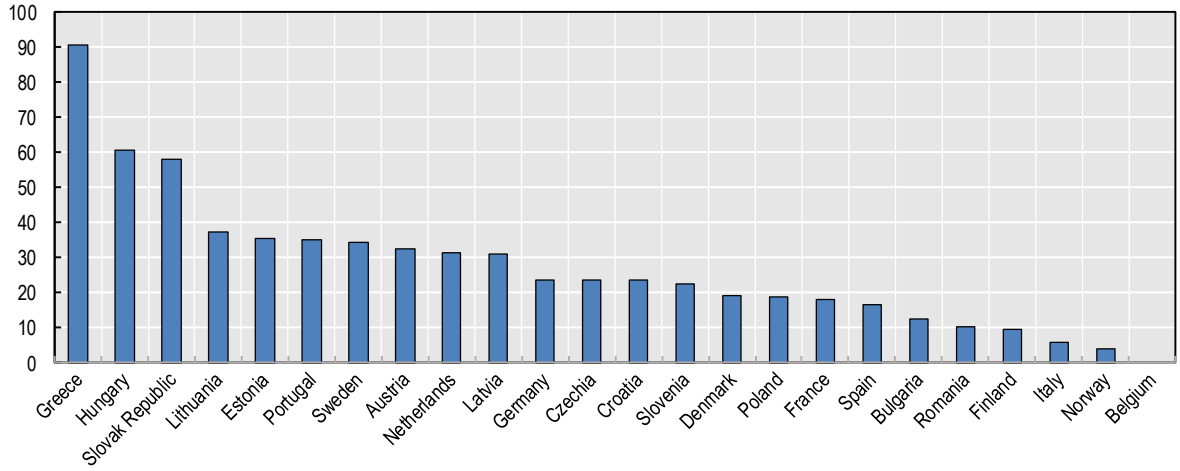
58. This section presents the estimates derived from the international e-commerce approach. It first reports estimates of international EDI and web sales, before presenting estimates of total digital ordered trade.

EDI and web sales export as a percentage of total sales

59. Although the shares of EDI exports are assumed constant over 2010-23, they vary significantly across countries ranging from almost 4% in Norway to 90% in Greece (Figure 4.2).

Figure 4.2. EDI export shares vary significantly across countries

Estimates of EDI exports percentage of EDI sales by country, business total, 2010

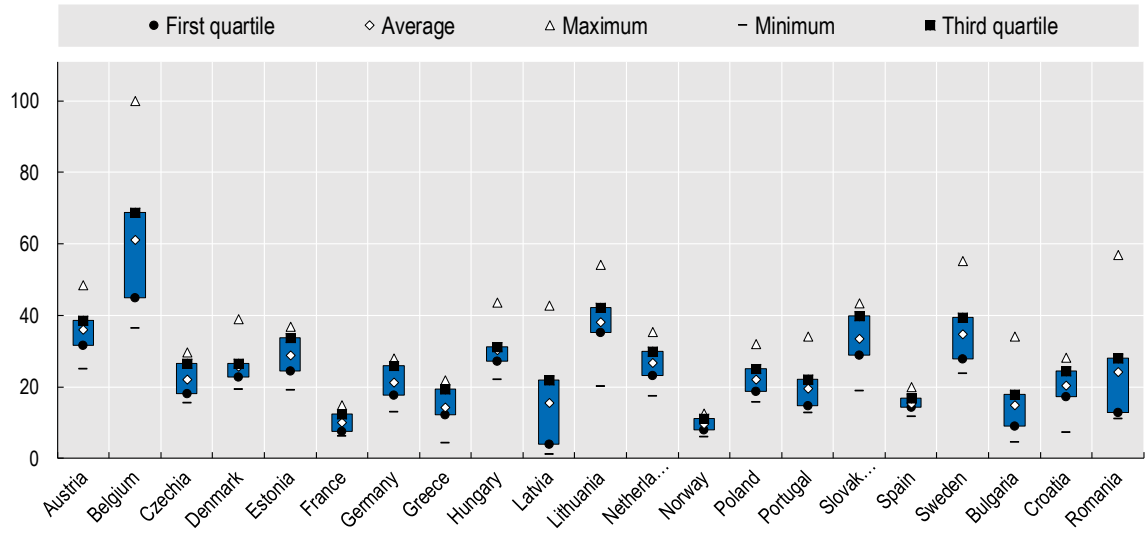


Note: The estimated share of international EDI sales for Belgium is null.
Sources: Author's elaboration based on (Eurostat, 2025[14]) and (OECD, 2025[15]).

60. The distribution of estimated exports via web sales as a share of total web sales across countries from 2010-23, reveals significant variation both across countries and over time (Figure 4.3). Some countries, such as Belgium and Lithuania, exhibit higher median and upper quartile values, suggesting a greater share of web sales directed toward exports. In contrast, Greece and Latvia show lower web sales export shares, as reflected in their lower quartiles and medians.

Figure 4.3. Web sales export percentage of web sales vary significantly across countries

Distribution by country, business total, 2010-23



Sources: Author's elaboration based on (Eurostat, 2025[14]) and (OECD, 2025[15]).

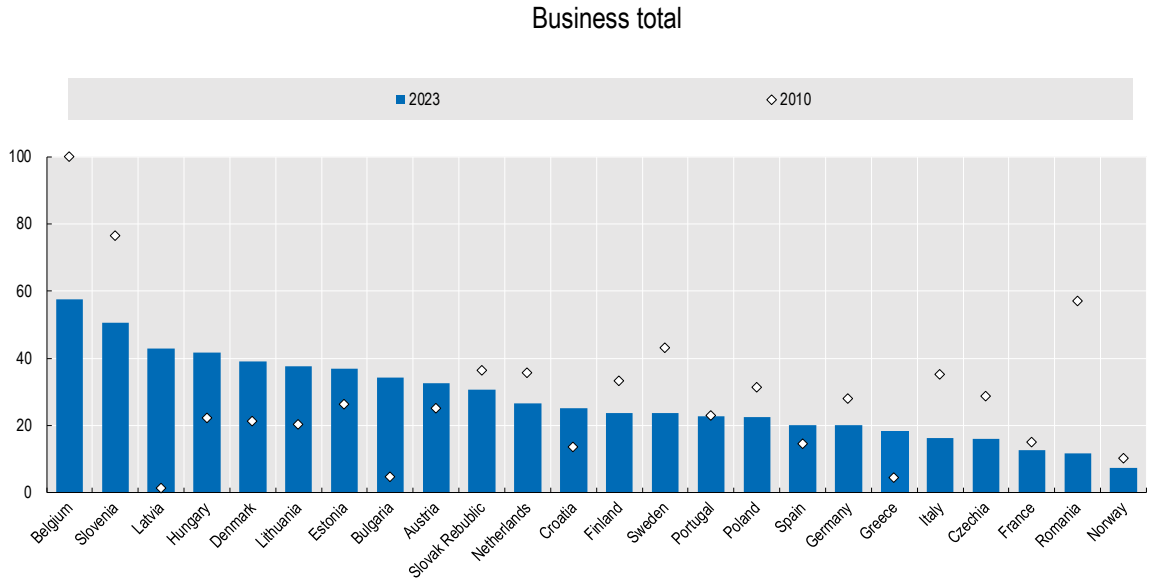
61. The dispersion of web sales export shares also varies across countries. Austria, Belgium and Lithuania display a wider interquartile range (the difference between the 75th and 25th percentiles), indicating greater fluctuations over time, whereas Norway and the Netherlands exhibit a more stable distribution with a smaller interquartile range. Some countries, such as Latvia and Romania, present high maximum values, implying occasional peaks in web sales exports. The average web sales export share across countries is highly heterogeneous.

62. Over time, the share of estimated exports via web sales over total web sales has evolved unevenly across countries between 2010 and 2023 (Figure 4.4). Several countries, including Belgium, Romania, and Slovenia experienced a marked decline in the share of web sales exports. In contrast, some countries saw an increase, such as Latvia, where the share rose from a low of 1.2% in 2010 to 42.9% in 2023, and Bulgaria, which increased from 4.5% to 34.2% during the same period.

63. These shifts suggest significant changes in the digital trade landscape, potentially reflecting variations in firms' internationalisation strategies and e-commerce practices. While some countries have expanded their web-sales export engagement, others have seen a relative decline in the export intensity of web sales.[10]

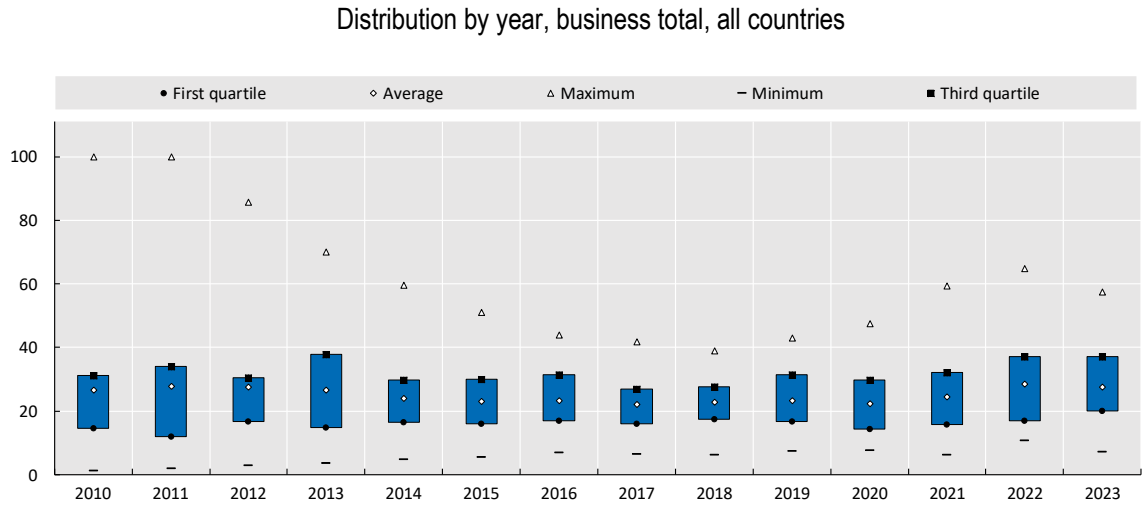
64. Significant variation in web sales exports across countries and over time is also evident (Figure 4.5). While the median and interquartile range remain relatively stable, the early years exhibit high maximum values, indicating that some countries reported particularly high shares. The distribution becomes more balanced during the pre-COVID period, with a gradual increase in the first and third quartiles. The decline in maximum values suggests reduced extremes. Heterogeneity across countries has been increasing since the COVID crisis.

Figure 4.4. Web sales export percentage of web sales have evolved unevenly across countries



Sources: Author's elaboration based on (Eurostat, 2025[14]) and (OECD, 2025[15]).

Figure 4.5. Web sales export percentage of web sales vary significantly in time



Sources: Author's elaboration based on (Eurostat, 2025[14]) and (OECD, 2025[15]).

Estimates of total digitally ordered trade

65. Most countries covered by the international e-commerce approach show an upward trend between 2010 and the latest available years (2022 or 2023), except for France and Norway (Figure 4.6). Bulgaria and Latvia are the countries exhibiting the strongest growth in digital ordering during that period (14.5 and 9.6 times respectively), followed by Denmark and Lithuania for which the growth is more moderate in comparison (3.8 and 3.2 times). In contrast and despite some volatility on a yearly basis, digital ordering in France and Norway was on average, broadly stable.

Figure 4.6. Total digitally ordered trade has been growing in most countries

Business total (less communication and administrative services), million USD


France
120,000
110,000
100,000
90,000
80,000
70,000
2010
2012
2014
2016
2018
2020
2022
Greece
10,000
7,500
5,000
2,500
2010
2012
2014
2016
2018
2020
2022
Germany
350,000
300,000
250,000
200,000
2010
2012
2014
2016
2018
2020
2022
Hungary
40,000
30,000
20,000
2010
2012
2014
2016
2018
2020
2022
Italy
50,000
40,000
30,000
2010
2012
2014
2016
2018
2020
2022
Latvia
2,000
1,000
2010
2012
2014
2016
2018
2020
2022
Lithuania
8,000
6,000
4,000
2,000
2010
2012
2014
2016
2018
2020
2022
Netherlands
80,000
70,000
60,000
50,000
40,000
30,000
2010
2012
2014
2016
2018
2020
2022


Norway
7,000
6,000
5,000
4,000
3,000
2010
2012
2014
2016
2018
2020
2022
Poland
50,000
40,000
30,000
20,000
2010
2012
2014
2016
2018
2020
2022
Portugal
20,000
15,000
10,000
2010
2012
2014
2016
2018
2020
2022
Slovak Republic
25,000
20,000
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Slovenia
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Spain
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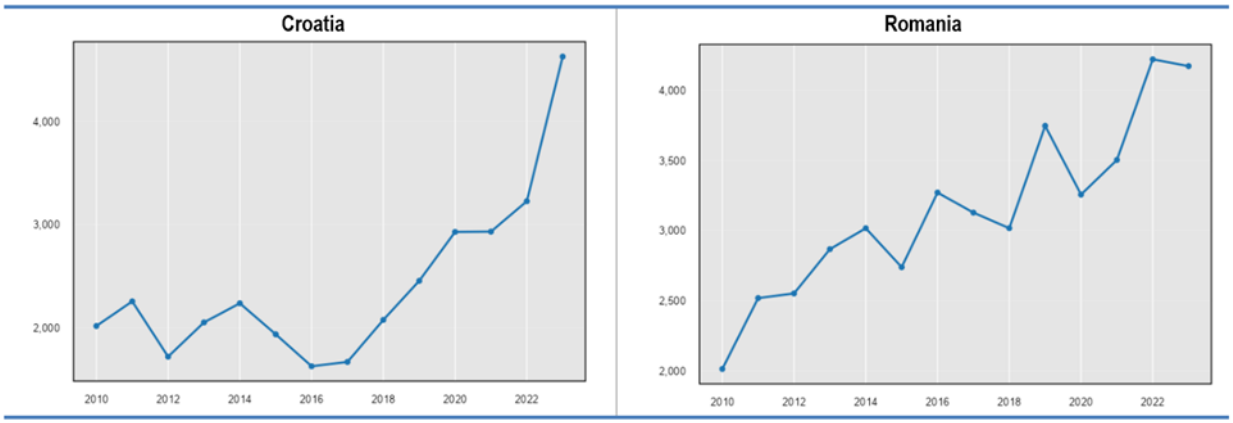


Sources: Authors' elaboration based on (Eurostat, 2025[14]) and (OECD, 2025[15]).

66. Estimates of digitally ordered trade using the international e-commerce approach were computed using a "top-down" methodology. This involved subtracting turnover from digitally deliverable services industries – specifically, Information and Communication (J) and Administrative and Support Service Activities (N) – from the Business Total. The "top-down" method, based on the more comprehensively reported Business Total, offers broader country coverage and greater reliability compared to a "bottom-up" approach (i.e. summing up sector-specific estimates). The latter often faces limitations of sparse or missing data for individual sectors due to e.g. confidentiality, necessitating more extensive imputations that could compromise data quality. For Professional, Scientific, and Technical activities (M), data on sales by destination started in 2020 meaning that sectoral estimates cannot currently be computed on the data points available; as more data becomes available it will be possible to compute this sector, and thus to subtract this to improve digitally ordered estimates.

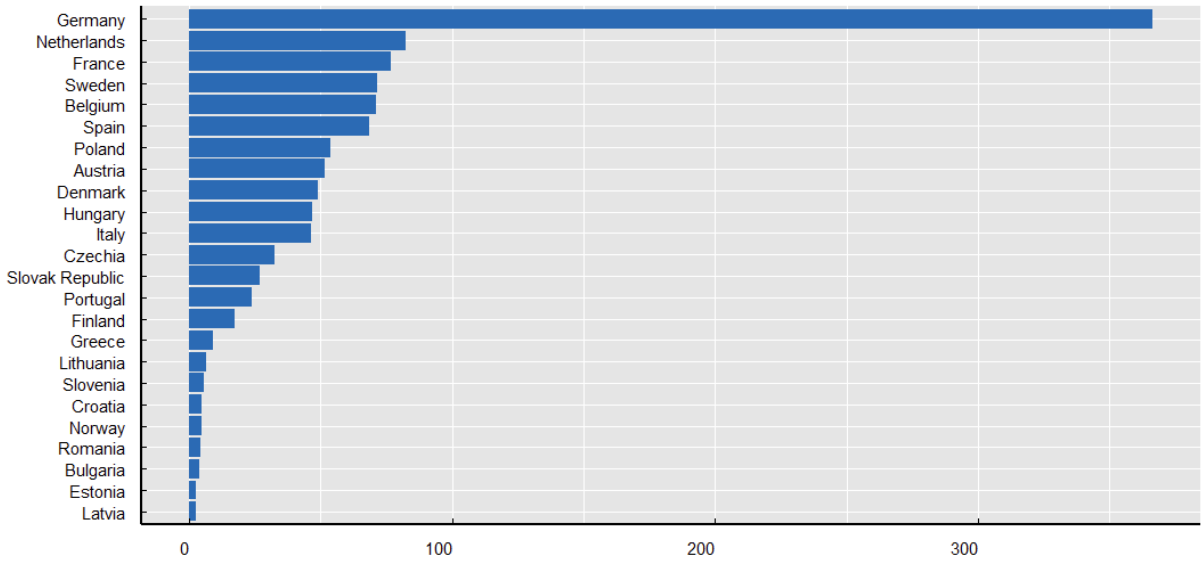
67. For three countries (Finland, Italy and Slovenia), missing sectoral data for J and N led to estimates using Business Total only, whilst for four countries (Bulgaria, Latvia, Poland and Sweden), partial sectoral estimates were available. For these countries, digitally ordered estimates are likely to be slight overestimates given the median share of these sectors relative to Business Total is low across other countries (see Paragraph 43).

68. Figure 4.7 reports country-specific estimates of digitally ordered trade in the year 2023. Germany records the highest value, at USD 366 billion, reflecting both the scale of its economy and its role as a central hub in European and global trade networks. The next largest estimates are observed for the Netherlands (USD 82 billion), and France (USD 77 billion). At the other end of the distribution, the lowest estimates are observed for Latvia (USD 3 billion), Estonia (USD 3 billion), and Bulgaria (USD 4 billion).

69. While the "top-down" approach provides aggregate estimates of digitally ordered trade, examining the underlying sectoral composition can also offer valuable insights into its dynamics within non-digitally deliverable sectors. Table 4.3 presents the yearly share of total digitally ordered trade accounted for by the top five industries. Manufacturing consistently represents the largest share, although its dominance has decreased since 2016 when the share of digitally ordered trade in e-commerce sales reached almost 90% to around 60% in 2023. Concurrently, Retail trade (except motor) has shown a remarkable increase in its share, rising from just over 1% in 2010 to more than 13% by 2023, highlighting the growing importance of digital ordering in direct-to-consumer sales. Wholesale trade (except motor) also holds a significant share, albeit with some year-to-year fluctuations, reflecting its foundational role in supply chains. Transport and storage, and Accommodation and food service, while holding smaller shares, demonstrate the increasing digitisation of logistics and service delivery, respectively. These trends underscore a gradual diversification of digitally ordered trade beyond traditional industrial sectors, with consumer-facing and logistics-related services progressively contributing a larger proportion.

Figure 4.7. Digitally ordered trade by country, 2023

Billion USD, Business Total less communication and administrative service sectors



Sources: Authors' elaboration based on (Eurostat, 2025[14]) and (OECD, 2025[15]).

Table 4.3. Retail and logistics sectors show rising shares in digitally ordered trade

Top 5 industry average shares as a percentage of total e-commerce turnover, average across countries

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Manufacturing	66.6	75.0	76.3	79.1	88.9	88.2	89.8	80.0	81.1	87.2	80.1	84.3	73.1	60.5
Retail trade (except motor)	1.2	1.8	1.8	1.9	2.3	4.0	4.1	2.5	2.7	2.9	4.7	5.7	8.6	13.2
Wholesale trade (except motor)	18.5	18.4	18.3	17.6	14.5	14.4	13.6	15.4	13.6	14.0	13.3	14.8	15.5	12.6
Transport and storage	5.5	8.64	8.9	10.9	8.5	8.0	6.6	6.3	6.1	5.3	5.3	5.5	6.2	6.4
Accommodation and food service	1.1	1.6	1.7	2.0	1.9	2.2	2.3	2.6	3.1	3.0	1.4	1.5	2.5	3.2

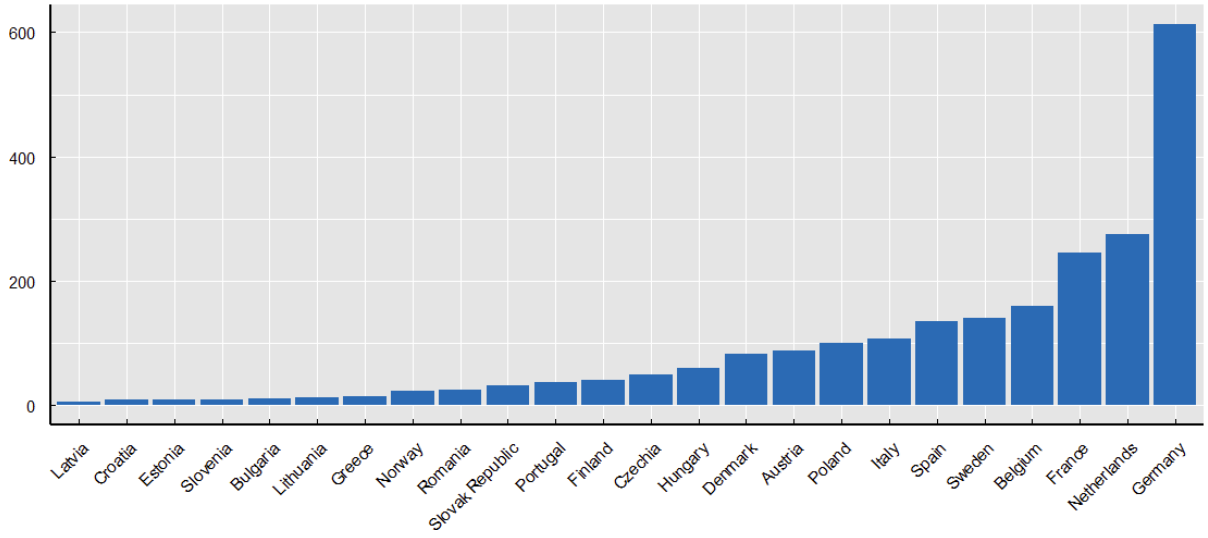
Sources: Authors' elaboration based on (Eurostat, 2025[14]) and (OECD, 2025[15]).

Estimates of digital trade using an international e-commerce approach

70. When estimates of digitally ordered trade are combined with those of digitally delivered trade, they yield measures of total digital trade. Figure 4.8 presents these estimates for 2023, with Germany recording the largest value (USD 614 billion), followed by the Netherlands (USD 276 billion) and France (USD 246 billion). On average, across the sample of 24 countries in 2023, digitally ordered trade accounts for almost 50% of total digital trade (Figure 4.9). Slovak Republic registered the highest proportion of digitally ordered trade within total digital trade (83.8%), followed by Hungary (78.6%) and Czechia (65.3%).

Figure 4.8. Estimates for total digital trade

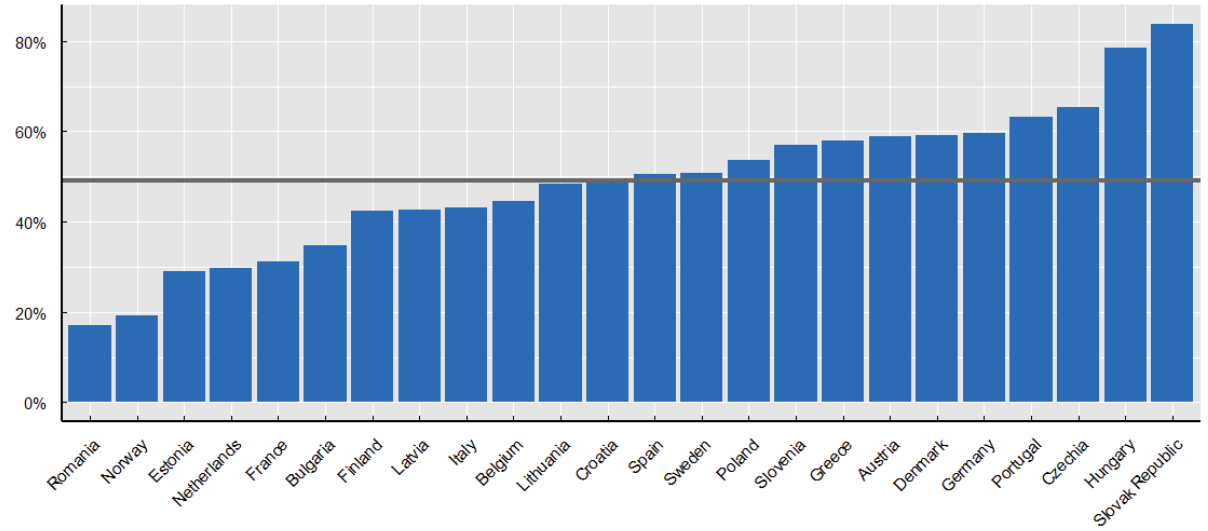
Billion USD, 2023



Sources: Authors' elaboration based on (Eurostat, 2025[14]), (OECD, 2025[15]), and (WTO, 2025[3]).

Figure 4.9. Share of digitally ordered in total digital trade

Per cent, 2023

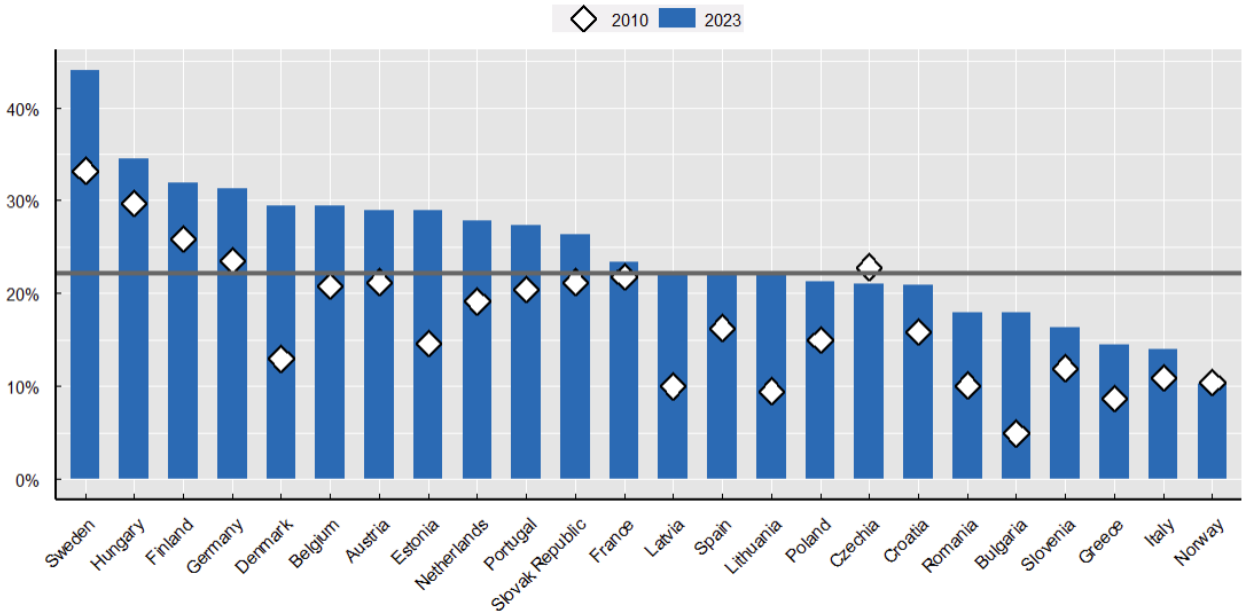


Note: The grey line depicts the average across countries in 2023.
Sources: Authors' elaboration based on (Eurostat, 2025[14]), (OECD, 2025[15]), and (WTO, 2025[3]).

71. Both the share of digital trade in exports and its evolution show considerable heterogeneity across countries. Figure 4.10 shows the evolution of digital trade's share in total exports, based on OECD Annual National Accounts Database (OECD, 2025[16]). In 2023, Sweden and Hungary exhibited the highest digital trade shares in the sample of countries covered, at approximately 44% and 35% respectively, significantly above the 2023 average indicated by the grey line. Conversely, Norway, Italy, and Greece registered the lowest shares, all below 20%. Comparing 2010 and 2023, a general upward trend in digital trade share is evident across most countries, with notable increases in nations like Denmark and Estonia.

72. While some countries, such as Germany and Belgium, also saw their digital trade share rise, others, including Spain and Czechia, showed more modest growth or even slight decreases relative to the overall trend.

Figure 4.10. Share of total digital trade in country's exports



Note: The grey line depicts the average value in 2023 across the sample of countries.
Sources: Authors' estimates based on (OECD, 2025[13]), (OECD, 2024[17]) and (WTO, 2025[3]).

5 Measuring digitally ordered trade from an international trade perspective

73. A second approach to measuring digitally ordered trade is the "international trade" approach, which takes international trade as a starting point against which to measure digitally ordered trade. The intuition is to carve out all exports that were ordered digitally, i.e. via computer networks.

Methodology

74. DOT refers to the value of trade in goods (G) and non-digitally deliverable sectors (NDDS) that is digitally ordered. For a given country *i* at time *t*, DOT can be calculated as the product of the share of digitally ordered exports, denoted as $\gamma_i(t)$, and the value of exports:

$$DOT_i\ (\mathrm{t}) = \frac{\text{digitally ordered exports}_i(\mathrm{t})}{exports_i(\mathrm{t})} * \text{exports}_i(\mathrm{t}) \qquad (7)$$

75. Using a top-down approach,[11] DOT can be derived from the product of the share of digitally ordered exports of the total business economy (TOT), denoted as $\gamma_{TOT,i}(\mathrm{t})$, and the value of exports of the total business economy (TOT), denoted as $exports_{TOT,i}(\mathrm{t})$, covering sectors $k_{TOT} \in (C:N)$, and subsequently subtracting the value of digitally ordered exports of digitally deliverable services (DDS) $k_{dds} \in (J:N)$, encompassing information and communication (ISIC J), financial and insurance services (ISIC K), professional activities (ISIC M), and administrative services (ISIC N):

$$DOT\ _i(\mathrm{t}) = \gamma_{i,TOT}(\mathrm{t}) * exports\ _{i,TOT}(\mathrm{t}) - \sum_{k\in(J:N)} \gamma_{ik}(t) * exports_{ik}(t) \qquad (8)$$

where:

$$\gamma_{i,TOT}(\mathrm{t}) = \frac{digitally\ ordered\ exports_{i,TOT}(\mathrm{t})}{exports_{i,TOT}(\mathrm{t})}$$

$$exports_{i,TOT}(\mathrm{t}) = \sum_{k_{TOT}\in(C:N)} exports_{i,k_{TOT}}(t),$$

$$\gamma_{i,k_{dds}}(\mathrm{t}) = \frac{digitally\ ordered\ exports_{i,k_{dds}}(\mathrm{t})}{exports_{i,k_{dds}}(\mathrm{t})},$$

$$exports_{i,k_{dds}}(\mathrm{t}) = \sum_{k_{dds}\in(J:N)} exports_{i,k_{dds}}(t)$$

76. In the absence of data on $\gamma_{TOT,i}(\mathrm{t})$ and $\gamma_{ik}(\mathrm{t})$, they can be approximated using observable parameters $\tilde{\gamma}_{TOT,i}(\mathrm{t})$ and $\tilde{\gamma}_{ik}(\mathrm{t})$, which represent the share of e-commerce in turnover of TOT or DDS, respectively[12]: $\tilde{\gamma}_i(t) = \frac{e-commerce_i(\mathrm{t})}{total\ turnover_i(\mathrm{t})}$.[13] This approximation assumes that the proportion of digitally ordered exports in total exports ($\gamma_i(t)$) is equal to the share of e-commerce in total turnover ($\tilde{\gamma}_i(t)$), such that $\tilde{\gamma}_i(t) \sim \gamma_i(t)$.[14]

77. It is difficult, a priori, to identify the implications of this assumption. That said, the economic literature suggests that exporting firms are more productive (Melitz (2003[18]); Wagner (2007[19])). There is also growing evidence that more digitalised firms are more productive (Gal et al., 2019[20]). This could imply that using the share of overall e-commerce sales in total turnover, which includes smaller and less productive firms, might underestimate the share of international e-commerce sales in exports given that the exporting space is dominated by larger and more productive firms.[15] That said, further work is needed to compare $\tilde{\gamma}_i(t)$ or resulting measures with other existing estimates. This includes comparing findings from the two different methods used to calculate digitally ordered trade in the context of this paper (see Chapter 6).

78. Furthermore, due to data limitations on $\tilde{\gamma}_{i,M}(t)$, representing the e-commerce share of digitally deliverable services sector "Professional activities" (ISIC M), equation (8) is adjusted to indirectly address the issue related to double-counting of ISIC M by excluding M from total business exports, denoted as $exports^{adj}{}_{i,TOT}(\mathrm{t})$, by keeping $\tilde{\gamma}_{i,TOT}(\mathrm{t})$ unadjusted, such that:

$$DOT_i(\mathrm{t}) = \tilde{\gamma}_{i,TOT}(\mathrm{t}) * exports^{adj}{}_{i,TOT}(\mathrm{t}) - \sum_{k\in(J,K,N)} \tilde{\gamma}_k(t) * exports_{ik}(t) \quad (9)[16]$$

where

$$exports^{adj}_{i,TOT} = \sum_{k^{adj}\in(C:L,N)} exports_{i,k^{adj}}(t)$$

79. Although ISIC M cannot be excluded from $\tilde{\gamma}_{i,TOT}(\mathrm{t})$ it is unlikely to strongly bias the results since it accounts for only a small share of total e-commerce activity in the sample countries (see Table 6.3).

Overview of the data

80. Both the e-commerce parameter, $\tilde{\gamma}_i(t)$ and exports should be as consistent as possible in terms of scope (regional and sectoral coverage, time) and concept. In the context of the international trade approach, this means paying particular attention to ensuring that both $\tilde{\gamma}_i(t)$ and exports either capture product-based measures or industrial activity-based measures (an issue that often arises in the context of comparing international merchandise statistics and national accounts statistics). This will be discussed in subsection Identifying country-level exports: the choice of SUTs in purchaser prices".

81. This section provides further details on the databases used for the estimation of digitally ordered trade using the international trade approach and the imputation methods applied to address missing observations.

Sources and descriptive statistics

82. The international trade approach combines observations on the share of e-commerce in total turnover from OECD ICT Access and Usage Database (OECD, 2025[13]) with export data from OECD's Supply and Use Tables (OECD, 2024[17]). The final sample covers 29 economies over a 13-year period from 2010 to 2022, representing around 45% of global GDP in 2023.

Table 5.1. Description of data sources

Data source	Variables selection	Country selection	Industry selection	Time coverage
OECD ICT Access and Usage Database (OECD, 2025[13])	Orders received over computer networks (= e-commerce) as percentage of total turnover	31 countries	11 industries, and total business sector based on NACE	2008-23
		Australia, Austria, Belgium, Bulgaria, Colombia, Croatia, Czechia, Denmark, Estonia, *Finland*,* France, Germany, Greece, Hungary, *Iceland*, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom, United States	**11 Industries:** - one goods' sector (manufacturing). - four digitally deliverable services sectors (ICT services, financial services (for Australia and the United States), professional activities, administrative services). - six non-digitally deliverable services sectors (construction, wholesale except of motor vehicles, retail except of motor vehicles, transport, accommodation, real estate). **Total business sector:** - EU countries' and Norway's aggregate comprises manufacturing (ISIC C), electricity (D), water (E), construction (F), wholesale (G46) & retail (G47), transport (H), accommodation (I), ICT services (J), real estate (L), professional services (M), and administrative services (N). - Australia and the United States additionally cover financial services (K). - Columbia and the United States do not cover construction (F).	
OECD Supply and Use tables (SUT) (OECD, 2024[21])	Exports in million USD (current purchaser prices)	30 countries	11 industries based on ISIC Rev. 4.	2010-22
		Same countries as in survey, excluding Iceland	Industries are the same as for the OECD ICT Access and Usage Database, as listed above.	
Final sample		**29 countries**	**Total business sector and four digitally deliverable services sectors** (i.e. accommodation, financial services (for Australia, the United States), professional activity, administrative services).	**2010-22**

Note: *Missing observations of $\tilde{\gamma}(i,t)$ for digitally deliverable services for Finland in the OECD ICT Access and Usage Database require significant imputation of digitally deliverable services sectors for the implementation of the top-down approach, see equation (9).
Source: Authors' elaboration.

Information about e-commerce shares

83. OECD ICT Access and Usage Database (OECD, 2025[13]) provides information about the share of e-commerce in total turnover at the NACE industry-level by country over time. The survey's indicator "Orders received over computer networks" (D2_B)" are taken for the parameter $\tilde{\gamma}(it)$.

84. The top-down approach requires knowledge about $\tilde{\gamma}_i(t)$ for the total business sector (_T) and four digitally deliverable industries, which include ICT services (ISIC J), financial activities (ISIC K), professional services (ISIC M)[17], and administrative services (ISIC N). Missing observations for the total sample amount to around 14% and range at the country-level from 2% – such as for the nine countries Austria, Czechia, Hungary, Ireland, Lithuania, Norway, Romania, Slovak Republic, and Spain – to 44%, such as for Colombia and Luxembourg (Table 5.2).

Table 5.2. Missing observations for e-commerce shares ($\tilde{\gamma}$)

By country and industry required for the top-down approach (equation 9), over 2008-23

Activity	_T	J	K	M	N	Missing $\tilde{\gamma}$	Notes
Description of activity	Total - all business	Information & communication	Financial & insurance	Professional, scientific […]	Administrative & support services	In % of total observations	
		Digitally deliverable services				Whole sample: 14%	
Australia	2	2	2	2	2	13%	
Austria	1	0	*	12	0	2%	
Belgium	3	3	*	12	3	19%	
Bulgaria	1	2	*	12	3	13%	
Colombia	7	7	*	7	7	44%	^
Croatia	2	1	*	12	2	10%	
Czechia	1	0	*	12	0	2%	
Denmark	4	4	*	12	4	25%	
Estonia	1	1	*	12	1	6%	
Finland	*4*	*16*	*	*16*	*16*	*75%*	
France	1	0	*	16	2	6%	
Germany	1	3	*	12	3	15%	
Greece	3	7	*	12	5	31%	
Hungary	1	0	*	12	0	2%	
Iceland	*13*	*13*	*	**	*13*	*81%*	
Ireland	1	0	*	12	0	2%	
Italy	2	1	*	13	1	8%	
Latvia	2	2	*	12	1	10%	
Lithuania	1	0	*	12	0	2%	
Luxembourg	7	8	*	16	6	44%	
Netherlands	2	1	*	13	1	8%	
Norway	1	0	*	12	0	2%	
Poland	1	5	*	16	4	21%	
Portugal	2	4	*	12	1	15%	
Romania	1	0	*	12	0	2%	
Slovak Republic	1	0	*	12	0	2%	
Slovenia	2	8	*	16	8	38%	
Spain	1	0	*	12	0	2%	
Sweden	1	4	*	12	4	19%	
United Kingdom	5	5	*	**	4	29%	
United States	4	2	3	2	2	17%	~

Note: * Business total (_T) does not include K. ** Business total (_T) does not include M. ^Business total (_T) does not include construction sector (F) and financial services (K). ~ Business total (_T) does not include construction sector (F). This table shows the number of missing observations over the sample period (16 years) for the share of e-commerce in turnover ($\tilde{\gamma}$) across countries (i) and industrial activities in ISIC (k) including business total (_T). Grey highlighted table entries indicate that these data points are excluded from the estimation, as outlined in equation 9.
Source: Authors' elaboration based on (OECD, 2025[13]).

85. For Australia and the United States, total business activities (_T) include financial services (ISIC K), which is one of the digitally deliverable service sectors. For these countries, the top-down estimates need to be corrected for this sector to account for the overlap (equation 9). All other sample countries, this means 27 out of 29 countries, do not report on ISIC K in their business total and therefore do not need to be corrected to avoid double-counting.

86. Furthermore, the estimation of $\tilde{\gamma}$ of the digitally deliverable service sector "professional services" (ISIC M) is challenging due to the large number of missing observations on $\tilde{\gamma}$ (Table 5.2, grey highlighted column on "M"). As these services account for only a small share of e-commerce activity (as discussed in Table 6.3) – hence, it will not significantly affect the total business' e-commerce shares ($\gamma_{TOT,i}(t)$) – excluding "Professional services" (ISIC M) directly from exports of total business activities ($exports_{TOT,i}(t)$ in equation 9) will help address double counting of M in digitally ordered/delivered trade

Table 5.3. Summary statistics of e-commerce share in turnover ($\tilde{\gamma}$) for business total (_T)

By country, Business Total (_T), 2008-23 (or latest available year)

Country	No. of observations	Mean	Standard deviation	Minimum	25th percentile	Median	75th percentile	Maximum
Australia	14	12	5	4	9	11	15	22
Austria	15	15	2	12	13	14	16	19
Belgium	13	26	7	13	25	28	31	33
Bulgaria	15	5	2	2	3	5	6	8
Colombia	9	8	1	6	8	8	9	10
Croatia	14	13	3	9	12	13	15	19
Czechia	15	28	4	19	25	30	30	32
Denmark	12	24	4	17	21	24	28	30
Estonia	15	14	2	10	13	14	16	16
France	15	16	4	11	13	15	22	23
Germany	15	17	2	13	14	17	18	21
Greece	13	5	2	2	4	4	6	8
Hungary	15	20	3	16	19	20	23	24
Ireland	15	31	7	17	24	33	35	44
Italy	14	10	4	5	7	10	13	18
Latvia	14	8	2	6	7	7	10	12
Lithuania	15	13	3	7	11	13	16	18
Luxembourg	9	19	5	14	15	17	23	26
Netherlands	14	15	3	11	13	14	17	20
Norway	15	21	3	18	19	21	23	26
Poland	15	14	3	8	11	15	17	18
Portugal	14	16	3	11	12	17	19	20
Romania	15	8	3	3	6	8	11	12
Slovak Republic	15	19	4	11	16	21	22	24
Slovenia	14	15	3	9	13	17	17	18
Spain	15	16	3	11	14	16	19	20
Sweden	15	22	4	14	19	21	26	26
United Kingdom	11	19	1	16	18	19	20	21
United States	12	22	2	18	21	22	24	25

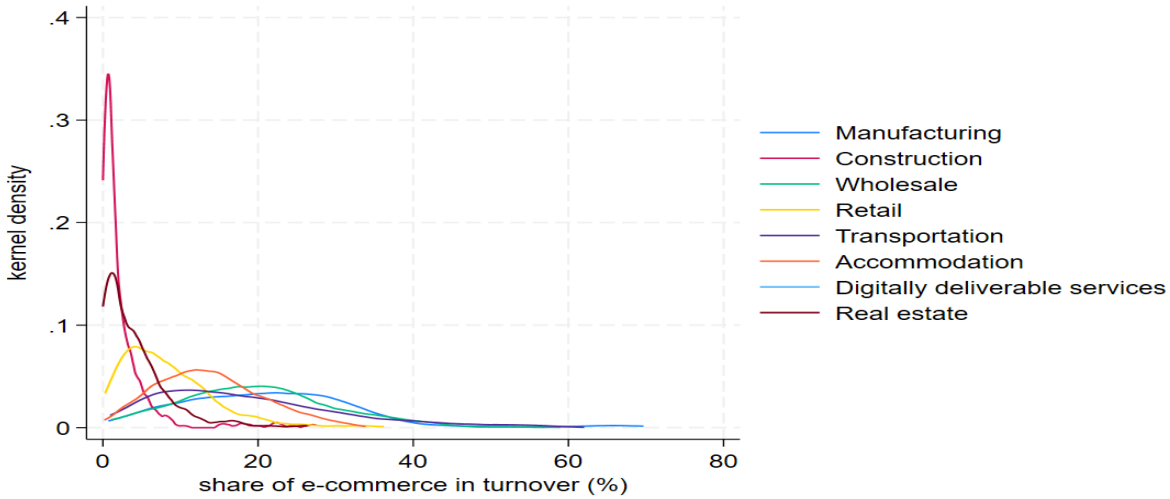
Source: Authors' elaboration based on (OECD, 2025[13]).

87. The summary statistics of the e-commerce shares of total business activity (_T) across countries are reported in Table 5.3., underscoring a strong heterogeneity in e-commerce turnover shares across countries – Ireland and Czechia report the two highest average shares on average over 2008-23 with 31% and 28% respectively, while Bulgaria and Greece show with 5% the lowest e-commerce shares as the average of their total business activities (_T) across the sample period.

89. E-commerce shares are highest in the manufacturing and wholesale industries, lowest in construction and real estate services, and fall in the middle for administrative, accommodation and transport services (Figure 5.1).

Figure 5.1. Density of e-commerce shares in turnover ($\tilde{\gamma}$)

By industry, all countries, 2008-23 (or latest year available)



Note: The graph shows a kernel (*Epanechnikov* - parabolic) density estimated on the observations for e-commerce shares by industry, visualising the distribution of $\tilde{\gamma}$ in the sample.
Source: Authors' elaboration based on (OECD, 2025[13]).

Exports data

90. Exports data based on the ISIC Rev. 4 industry classification was sourced from Supply and Use Tables in purchaser prices (SUT pp) (OECD, 2024[17])[18] This choice ensures consistency with the survey-based e-commerce parameter, $\tilde{\gamma}_i(t)$, which takes into consideration industry output rather than product-based measures, which tend to be used in international merchandise trade statistics. The subsection entitled "Identifying country-level exports: the choice of SUTs in purchaser prices" provides additional information about different data sources for exports and the criteria used to ensure alignment with $\tilde{\gamma}_i(t)$.

91. Export data from SUTs cover all industries required to implement the top-down approach, including manufacturing (ISIC C), construction (F) (except for Colombia), wholesale (G46), retail (G47), transport (H), accommodation (I), real estate (L), ICT services (J), financial services (K) (only for Australia and the United States), administrative (N), electricity (D), and water supply (E)) (see Table 5.2 for an overview of sectors by country that are required for the top-down approach). Export data is reported for most sample countries (Table 5.4). Challenges remain for Bulgaria where sectoral exports are not available from 2015 onwards, and for Colombia prior to 2014. The sub-section "Addressing missing data through imputation and modelling" describes in more detail the methods used to impute for missing observations.

Table 5.4. Number of missing observations for exports

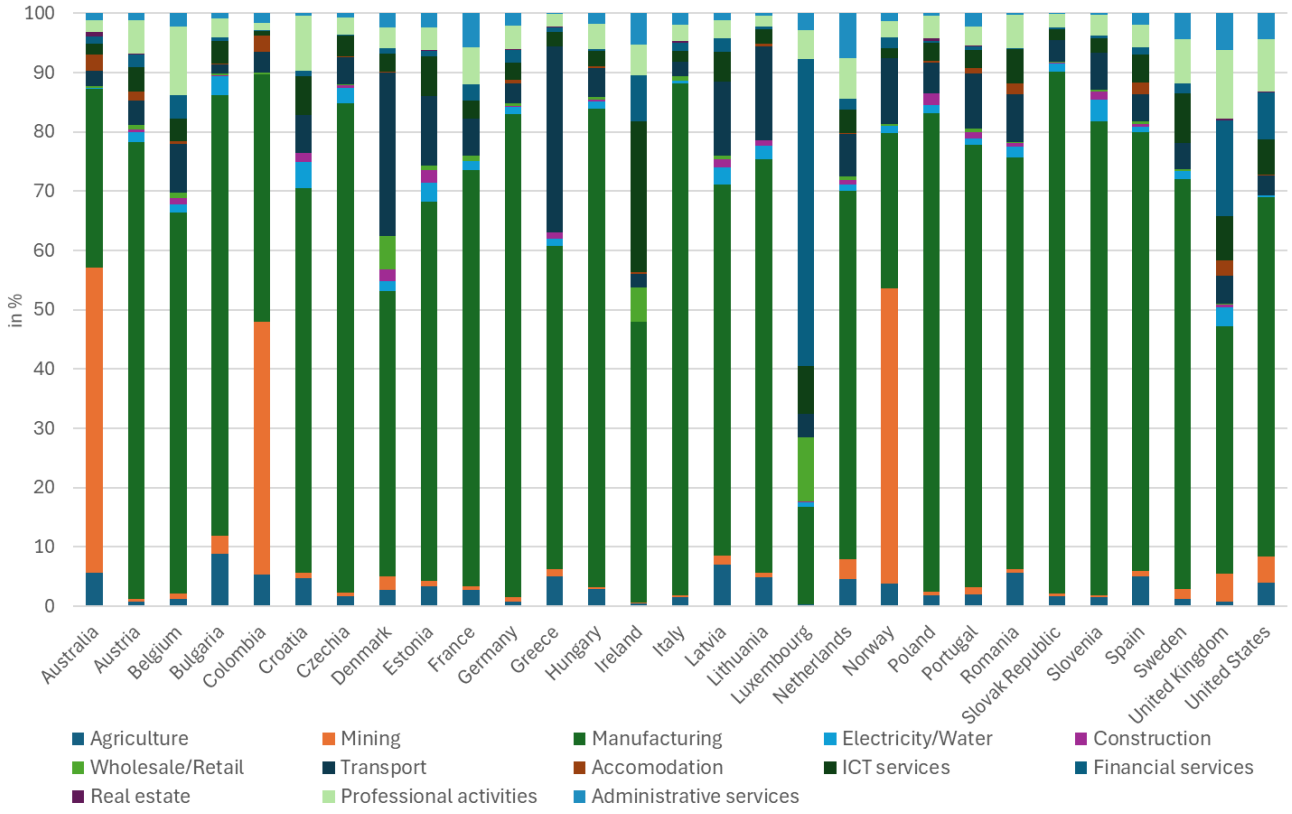
By country over sample period, 2010-2022

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AUS	12	12											
AUT													12
BEL													12
BGR						12	12	12	12	12	12	12	12
COL	12	12	12	12	2	2	2	2	2	2	2	2	2
CZE													
DEU	1												12
DNK												12	12
ESP													
EST	2	2	1	1	1	1	1	1	1				12
FRA													12
GBR												12	12
GRC													12
HRV				4	4					4	4	4	12
HUN													
IRL											1	1	12
ITA													12
LTU	2	3	3	3	3	4	4	4	3	3	3	3	12
LUX													12
LVA													
NLD													
NOR													12
POL													12
PRT													
ROU													12
SVK													12
SVN													
SWE	7	7	5	5	4								
USA	1	1	1	1	1	1	1	1	1	1	1	1	12

Note: This table shows the number of missing observations over the sample period from 2010 to 2022 (13 years) for exports across countries (i). The implementation of the top-down approach requires export data for 12 sectors, which are manufacturing (ISIC C), construction (F), wholesale (G46), retail (G47), transport (H), accommodation (I), real estate (L), ICT services (J), financial services (K), administrative (N), electricity (D), water supply (E). A number indicating three for a given country and year means that export data for three sectors are missing.
Source: Supply and Use Tables from OECD (2024[17]).

92. Industry exports are predominantly concentrated in the manufacturing sector across countries during the sample period (Figure 5.2). However, Denmark and Greece also export a significant share of transport services, reflecting their status as leading shipping nations in terms of vessel ownership. In contrast, mining accounts for the largest share in exports in Australia, Colombia, and Norway, although this share has declined in the latter two countries over time. Financial services stand out in Luxembourg and the United Kingdom as the largest exporting sector.

Figure 5.2. Share of industry exports in total exports, average across 2010-22



Notes: This graph shows exports of each industry as a share of a country's total exports as an average across the sample period 2010-22. For instance, Austria's manufacturing exports accounted for around two-thirds of its exports, on average over the sample period. For a better understanding of the sample countries' export activity, this graph is based on the final dataset including imputed export values, as discussed in section "Addressing missing data through imputation and modelling".
Sources: Authors' elaboration based on OECD (2024[17]).

Identifying country-level exports: the choice of SUTs in purchaser prices

93. The OECD Supply and Use Tables (SUT) in purchaser prices (OECD, 2024[17]) are the preferred source of export data over international merchandise trade statistics (IMTS), such as UN Comtrade+ for goods (United Nations, 2025[5]) or OECD Balanced International Merchandise Trade Statistics (BIMTS) Dataset (2025[22]), and over Balance of Payments (BOP) data for services or the WTO-OECD Balanced Trade in Services dataset (WTO; OECD, 2025[20]). There are five major reasons for this choice.

94. First, SUT data is an industry rather than a product-based measure. This is important to ensure alignment with the survey-based e-commerce parameter, $\tilde{\gamma}_i(t)$, which is recorded at the level of industry activity and not the product level. Activity-based measures capture sales of both goods and services in a particular sector. For example, these measures will capture the sales of cars but also of credit or insurance

services in the motor-vehicle sector. By contrast, product-based measures for the motor-vehicle sector would only capture sales of cars.

95. Second, SUTs measure both goods and services by using a similar approach that is consistent across both goods and services based on “change of ownership of goods” and “supply of a service from a resident to a non-resident”. By contrast, merchandise trade statistics like UN Comtrade+ are based on customs records and track goods crossing international borders. In turn, Balance of Payments (BOP) data for services are based on the national account’s concept of supply of services from a resident to a non-resident.[19] These are two different concepts, and corresponding data cannot be combined.[20]

96. Third, SUTs contain information on re-exports, which can represent a substantial share of exports for major trading hubs, such as the Netherlands and for the United States. Such re-exports are unlikely to be covered in the ICT survey questionnaire and should therefore be netted out for consistency.

97. Fourth, $\tilde{\gamma}_i(t)$ is based on turnover in the context of the OECD ICT Access and Use survey,[21] excluding VAT and including transport margins. Purchaser prices in SUT also exclude VAT and include transport charges.[22]

98. Fifth, SUTs cover all ICT survey’s industries, while services statistics datasets, such as BaTiS, do not distinguish real estate exports (ISIC L) from other services industries, including digitally deliverable services, such as professional (ISIC M) and administrative activities (ISIC N), and do not report wholesale and retail trade (ISIC G).

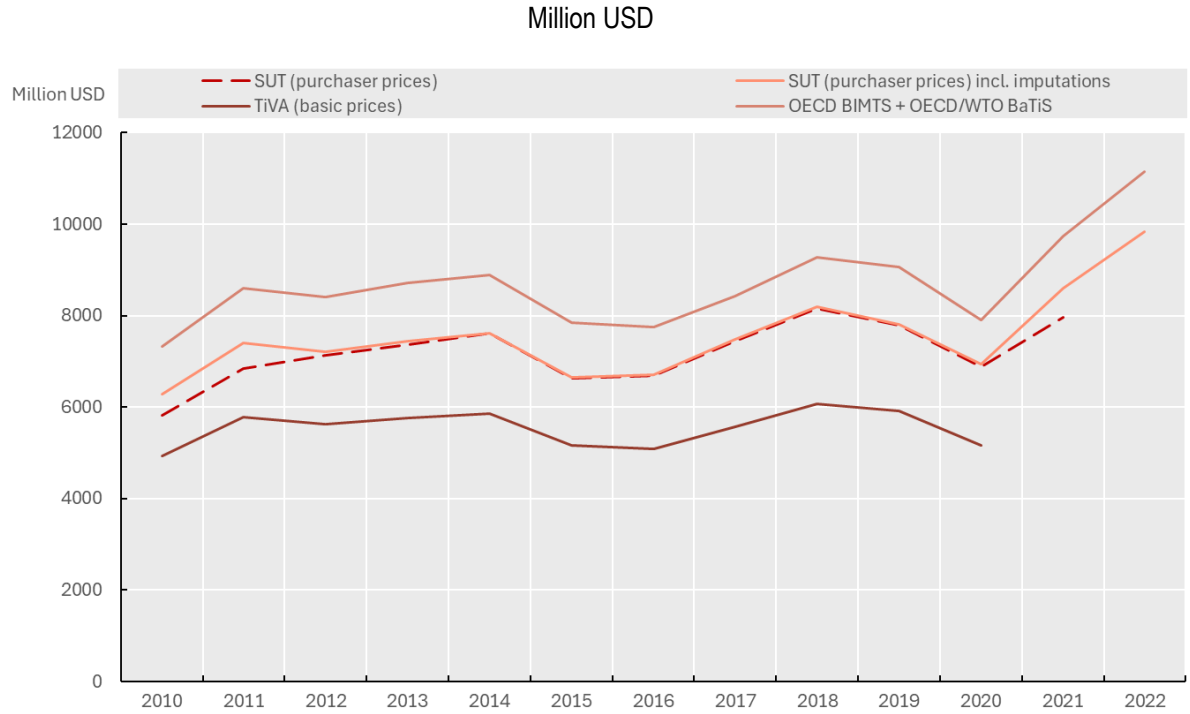
99. Table 5.5 provides an overview of the four different export datasets across various dimensions. A comparison of estimates of digitally ordered trade based on the different datasets is available upon request. Although these differences of concepts lead to a gap in export values, the pattern of exports for goods in COMTRADE and SUT goods, as well as for services in BOP and SUT are very similar (Figure 5.3). Furthermore, imputation have a visible impact only in 2010-12 in line with the descriptive statistics provided in Table 5.4.

Table 5.5. Overview of export data based on different concepts

	TiVA	OECD BIMTS (goods) + BaTiS (services)		SUT (use tables)	
		OECD BIMTS (2025[22])	BaTiS		
Concept	National accounts [Change of Ownership]	Int'l merchandise trade [Change in stock of a country's material resources based on customs records]	Balance of Payments [Supply from a resident to a non-resident]	National accounts [Change of Ownership]	
prices	basic	free-on-board	N/A	basic	purchaser
years	1995-2020	1995-2023	2005-2023	2010-2022/23	
ISIC sectors	A	A		A	A
	B	B		B	B
	C	C		C	C
	D_E	D_E (merged)		D_E (merged)	D_E (merged)
	F		F	F	F
	G			G	G
				G45	G45
				G46	G46
				G47	G47
	H		H	H	H
	I		I	I	I
	J	*J*	*J*	*J*	*J*
	K		*K*	*K*	*K*
	L		LMN	L	L
	M			*M*	*M*
	N			*N*	*N*
	O to T		cannot be assigned to a specific ISIC	O to T	O to T
				U	U
		cannot be assigned to any ISIC: between 0.1 and 2.8% of total value			
Re-exports	yes	yes	N/A	yes	yes

Note: Light-grey and cursive industries, notably J, K, M, N, are defined as digitally deliverable services industries.
Source: Authors' elaboration.

Figure 5.3. Comparison of exports: IMTS and BOP versus SUTs



Note: This graph shows aggregate export figures for the total economy, covering ISICs A, B, C, D_E, F, (G for Colombia), G46, G47, H, I, L (no L for OECD Balanced International Merchandise Trade Dataset (2025) plus BaTiS (2025)) of the 29 sample countries (see Table 5.4) over time. SUT purchaser prices raw data indicates exports in purchasers' prices of the raw OECD Supply and Use Tables without any imputation. SUT purchaser prices incl. imputations indicate the exports in purchasers' prices of the OECD Supply and Use Tables including the imputations following the steps outlined in this section. TiVA basic prices (2023) indicate gross exports in basic prices from OECD TiVA version 2023.
Sources: Authors' elaboration based on TiVA (2023) for TiVA gross exports, WTO and OECD (2025[23]) for BaTiS, OECD Balanced International Merchandise Trade Dataset (2025[22]), and OECD (OECD, 2024[17]) for SUT in purchaser prices.

Addressing missing data through imputation and modelling

100. To address missing values and construct a longer time series across sectors, the ICT survey and the export data require imputation. The methods and steps are outlined in the following subsection.

Parameter of e-commerce

101. Missing values of $\tilde{\gamma}_i(t)$ are imputed based on a log-linear time trend at the country-industry level to fill in gaps over the sample period.[23] An overview of the imputation results for the e-commerce share of the total business sector ($\widetilde{\gamma_{TOT,i}(t)}$) are shown for each sample country in Annex C.

Industry-level exports

102. Missing industry-level observations of exports by country (Table 5.4) are addressed following a four-step procedure. First, growth rates from the OECD BIMTS database for goods and from the OECD BaTiS database were applied to fill gaps at the country-industry level across years in the SUT database. Although these datasets differ conceptually from the SUTs, their export growth patterns were found to be highly aligned (see Figure 5.3). Second, missing values for "wholesale trade" (ISIC G46) and "retail trade" (ISIC G47) were filled using growth rates from "wholesale and retail trade" (ISIC G) in the TiVA (2023) dataset as this sector is not covered in BaTiS (Table 5.5). Third, missing values for real estate (L) were imputed using country-industry specific growth rates in the TiVA (2023) dataset for the same sector as this

sector is not separately covered in BaTiS (Table 5.5). Fourth, missing values for 2021 and 2022 were imputed using 2020 growth rates from TiVA.

Experimental estimates of digitally ordered trade and digital trade using the international trade approach

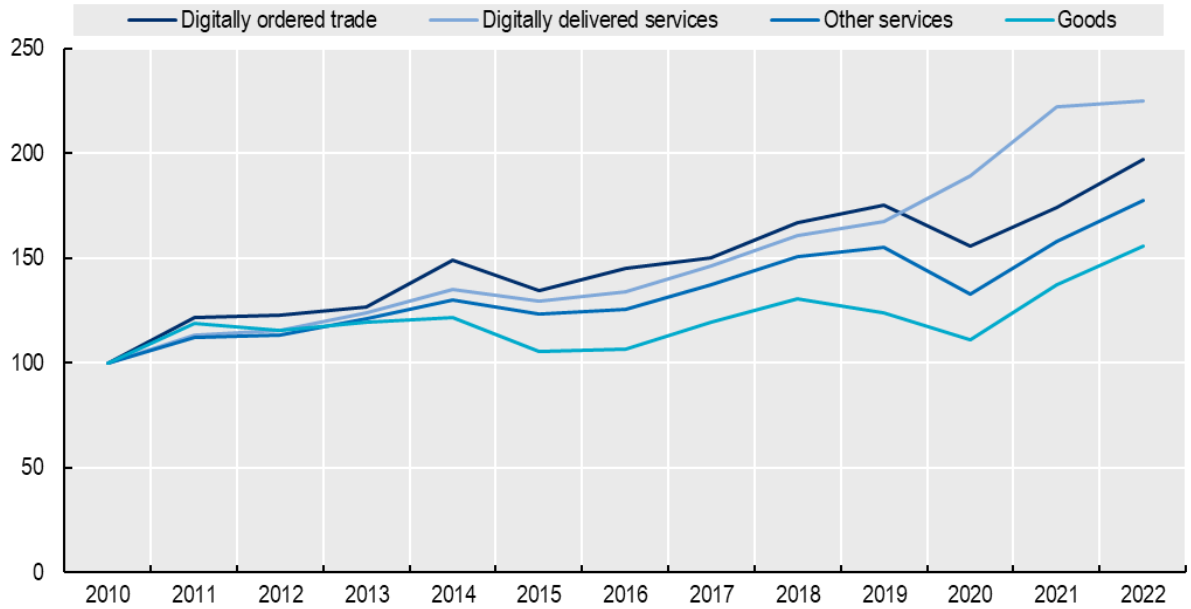
103. This section presents Digitally Ordered Trade ($\widehat{DOT_{it}}$) estimates based on the international trade approach as calculated following equation (9). It then combines this information with the WTO Digitally Delivered Services Trade dataset (2025[3]) to obtain estimates of total Digital Trade ($\widehat{DT_{it}}$).

Digitally ordered trade

104. Overall, total digitally ordered trade (DOT) across the 29 countries[24] covered is growing at approximately 5.5% per year since 2010. While this is smaller than the growth of digitally delivered services (DDS), which, for the same sample, averaged 7% annually, DOT's annual growth is higher than other services exports (around 5% p.a.) or goods exports (almost 4% p.a.). Unlike DDS, however, DOT as well as goods and other services experienced a decline in 2020 during the COVID-19 outbreak but recovered in the following years (Figure 5.4). This is an important finding suggesting that digitally ordered trade is the second fastest growing segment in international trade next to digitally delivered services (WTO, 2025[3]).

Figure 5.4. Digitally ordered trade appears as an important driver of growth

Unweighted average of sample countries, Index =100 in 2010

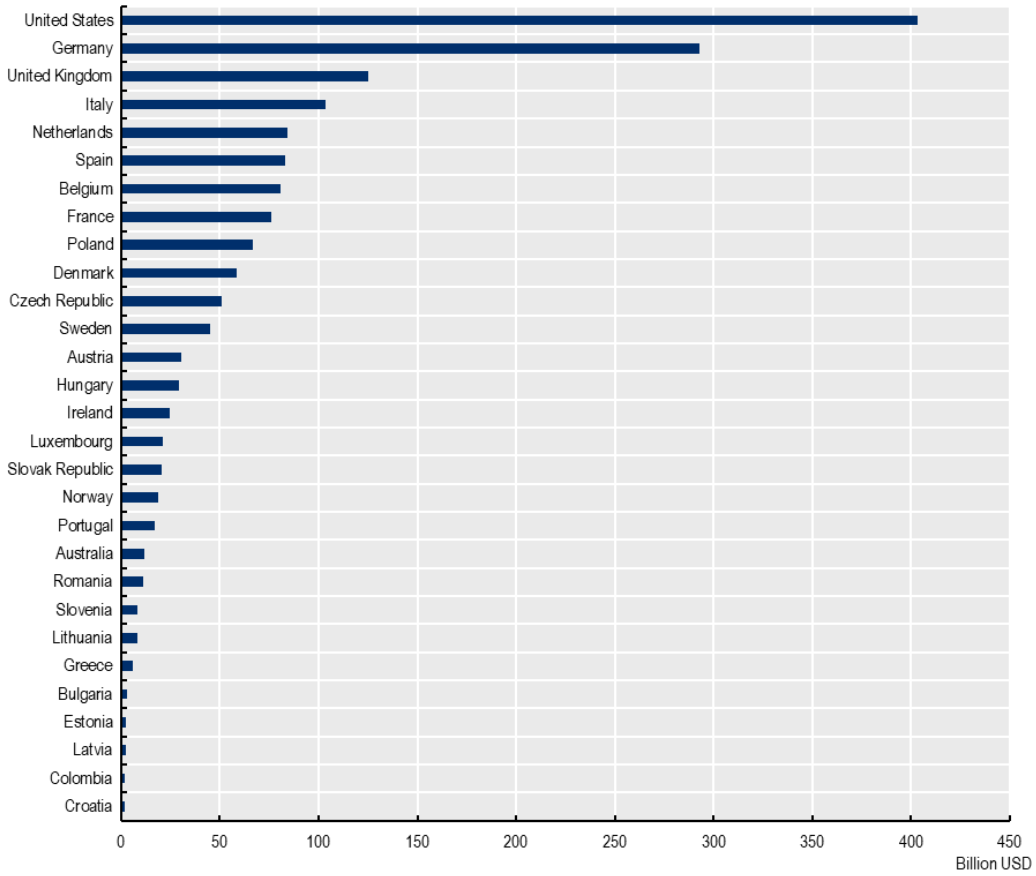


Notes: Estimates of DOT are based on the log-linear model, covering sample countries of the international trade approach as listed in Table 6.1. Values of other services is calculated as the difference between total services exports and digitally delivered services (WTO estimates).
Sources: Authors' estimation based on OECD SUT (2024[17]) and OECD (2025[13]). Goods exports come from OECD SUT (2024[17]). Digitally delivered services estimates are from WTO (2025[3]). Other services exports are from WTO-UNCTAD Services statistics (2025[24]).

105. Country-specific estimates show that the United States had in 2022 the highest value of estimated DOT, which stood at more than USD 400 Billion, followed by Germany (almost reaching USD 300 Billion), the United Kingdom (USD 125 Billion), and Italy (around USD 100 Billion) (Figure 5.5).

Figure 5.5. Country-level estimates of digitally ordered trade

Business Total excluding Digitally Deliverable Services, 2022

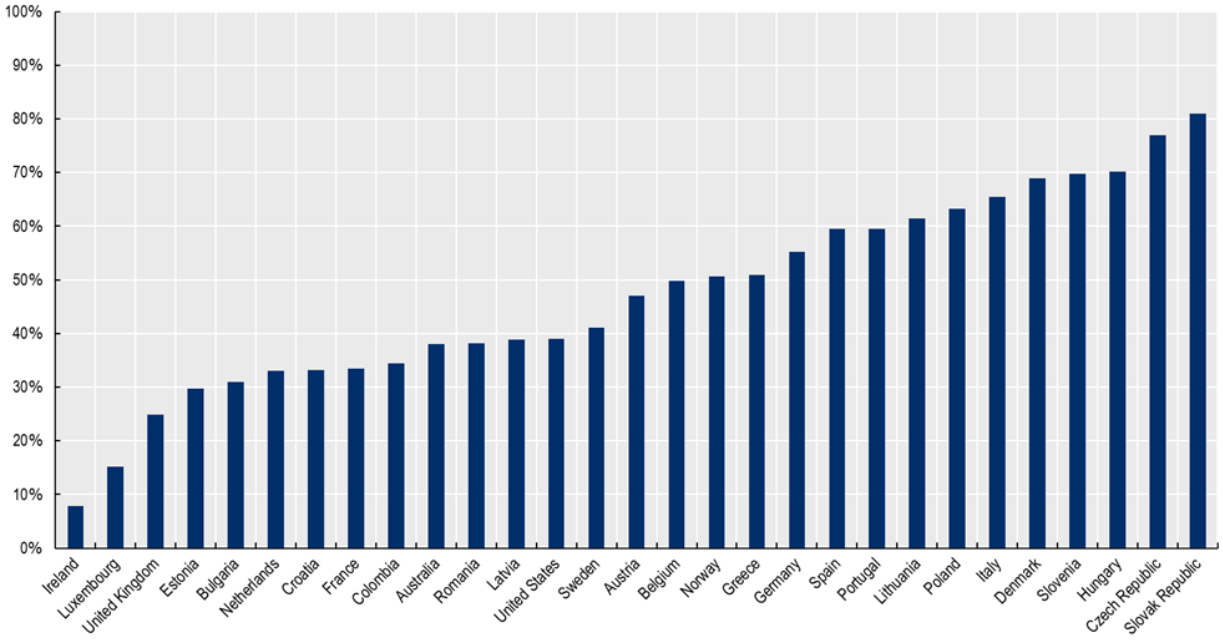


Notes: Estimates of DOT are based on the log-linear model via the top-down approach. Estimates for Colombia are based on the "wholesale and retail trade" (ISIC G) sector instead of the subsectors "wholesale trade" (ISIC G46) and "retail trade" (ISIC G47) due to data availability.
Sources: Authors' estimation based on OECD SUT (2024[17]) and OECD (2025[13]).

106. In 2022, around 40% of digital trade was digitally ordered, on average across the sample countries. Digitally ordered trade accounted for a significant share of total digital trade in the Slovak Republic (more than 80% of total digital trade), the Czech Republic (around 75%), and Hungary (about 70%) in 2022 (Figure 5.6). These findings are in line with those of the estimates derived via the international e-commerce approach (Figure 4.9).

Figure 5.6. Share of digitally ordered trade in total digital trade

Business Total excluding Digitally Deliverable Services, 2022



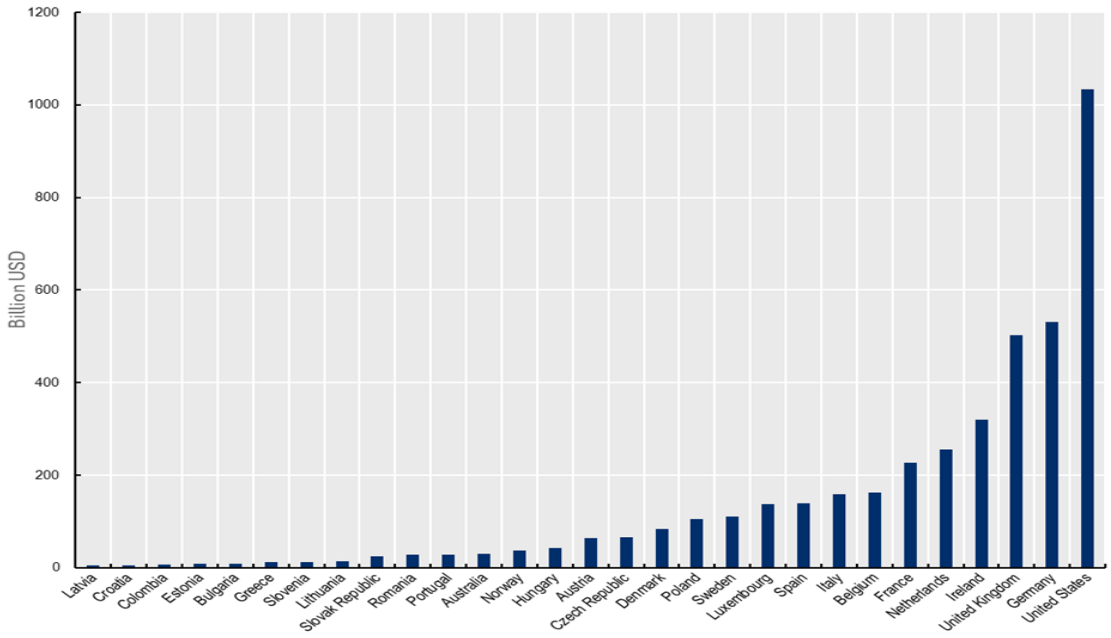
Note: Estimates of DOT are based on the log-linear model. Estimates for Colombia are based on the "wholesale and retail trade" (ISIC G) sector instead of the subsectors "wholesale trade" (ISIC G46) and "retail trade" (ISIC G47) due to data availability.
Sources: Authors' estimates based on OECD SUT (OECD, 2024[17]) and OECD (2025[13]) for digitally ordered trade using the log-linear model, and WTO (2025[3]) for digitally delivered services exports.

Digital trade

107. Estimates of total digital trade are obtained by combining estimates of digital ordering and delivery. In the United States, total digital trade stood at more than USD 1 trillion in 2022, followed by Germany and the United Kingdom, each with around USD 500 billion (Figure 5.7).

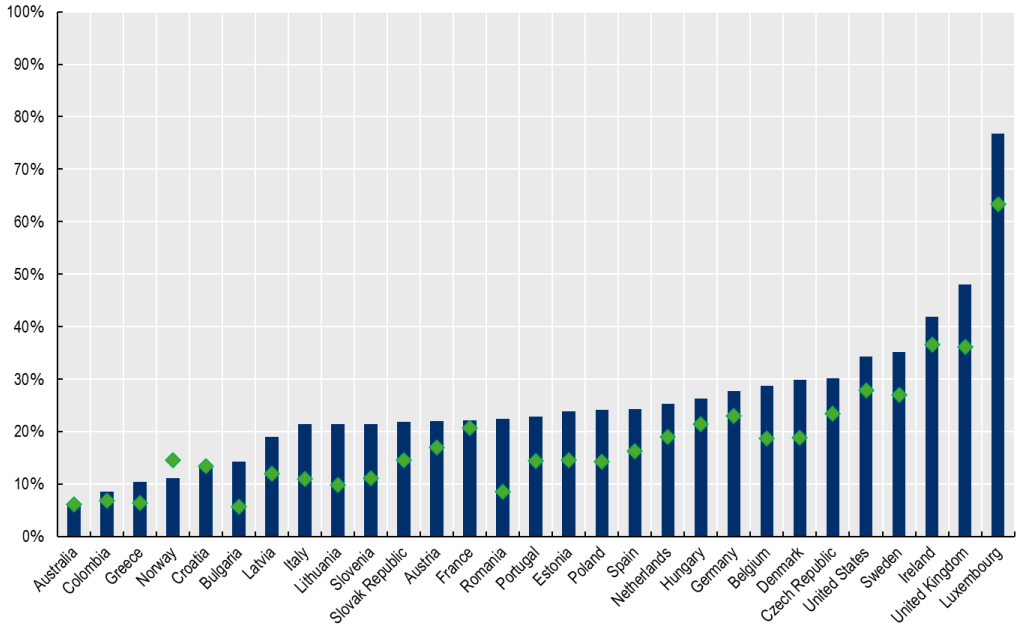
108. The importance of digital trade in total exports has increased for most countries since 2010 (Figure 5.8). On average over the 29 sample countries, digital trade accounted for around 29% of total exports in 2022. Luxembourg stands out with the highest share, which is recorded at almost three-quarters of the country's exports in 2022. In contrast, Australia and Colombia – both countries with a large share of mining exports (Figure 5.2), show the smallest share of digital trade in overall exports.

Figure 5.7. Estimates of digital trade by country, 2022



Notes: Estimates of DOT are based on the log-linear model. Estimates for Colombia are based on the "wholesale and retail trade" (ISIC G) sector instead of the subsectors "wholesale trade" (ISIC G46) and "retail trade" (ISIC G47) due to data availability.
Sources: Authors' estimates based on OECD SUT (OECD, 2024[17]) and OECD (2025[13]) for digitally ordered trade using the log-linear model, and WTO (2025[3]) for digitally delivered services exports.

Figure 5.8. Share of total digital trade in country's exports, 2010 and 2022



Note: Estimates of DOT are based on the log-linear model. Estimates for Colombia are based on the "wholesale and retail trade" (ISIC G) sector instead of the subsectors "wholesale trade" (ISIC G46) and "retail trade" (ISIC G47) due to data availability.
Source: Authors' estimates based on (OECD, 2025[13]), (OECD, 2024[17]) and (WTO, 2025[3]). Total exports of goods and services (denominator) are based on OECD National Accounts (OECD, 2025[16]).

6 Comparison of the two approaches to measuring digital ordered trade

109. This section compares the two approaches to measuring digital ordered trade, accounting for differences in country and industry coverage (Table 6.1). The international e-commerce approach is applied to 24 countries (21 OECD Member countries and 3 non-Members), and it is possible to extend it to countries with detailed ICT surveys (e.g. Canada and the United Kingdom). The international trade approach is applied to 29 countries (26 OECD Member countries and 3 non-Members). With respect to timeliness, estimates can be produced with currently available data for the period 2010-23 for the international e-commerce approach and for the period 2010-22 for the international trade approach.

Table 6.1. Comparing the country coverage for total digitally ordered trade between methods

Country	International e-commerce approach	International trade approach
Australia	N	Y
Austria	Y	Y
Belgium	Y	Y
Canada	N*	N*
Chile	N	N
Colombia	N	Y
Costa Rica	N	N
Czechia	Y	Y
Denmark	Y	Y
Estonia	Y	Y
Finland	Y	N
France	Y	Y
Germany	Y	Y
Greece	Y	Y
Hungary	Y	Y
Iceland	N	N
Ireland	N	Y
Israel	N	N
Italy	Y	Y
Japan	N	N
Korea	N	N
Latvia	Y	Y
Lithuania	Y	Y
Luxembourg	N	Y
Mexico	N	N
Netherlands	Y	Y
New Zealand	N	N
Norway	Y	Y
Poland	Y	Y
Portugal	Y	Y
Slovak Republic	Y	Y
Slovenia	Y	Y
Spain	Y	Y
Sweden	Y	Y
Switzerland	N	N
Türkiye	N	N
United Kingdom	N*	Y
United States	N	Y
Bulgaria	Y	Y
Croatia	Y	Y
Romania	Y	Y

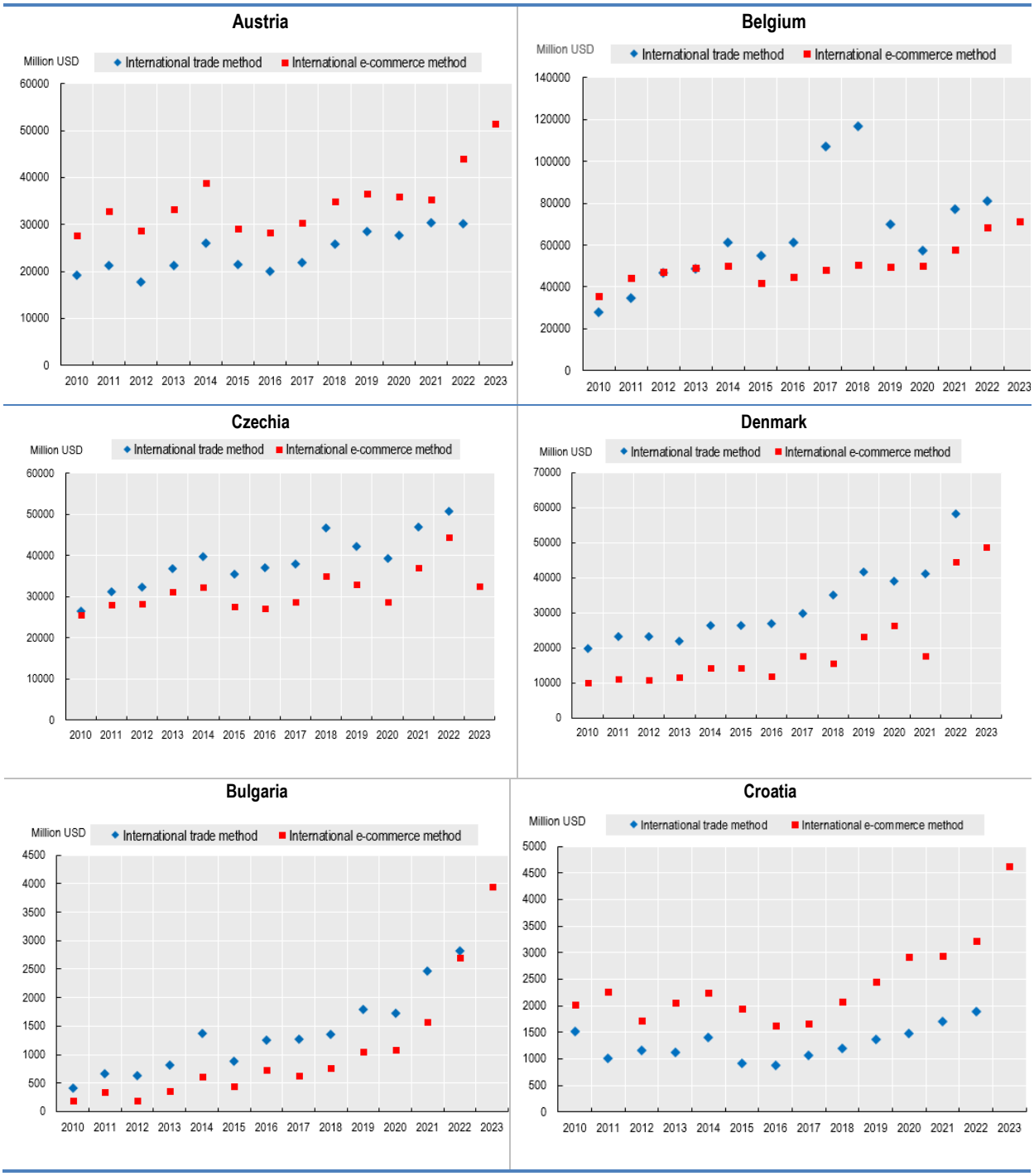
Note: “Y”: covered, “N”: not covered, “N*”: not covered in this paper, but data are available to potentially extend the estimates to this country.
Source: Authors’ compilation.

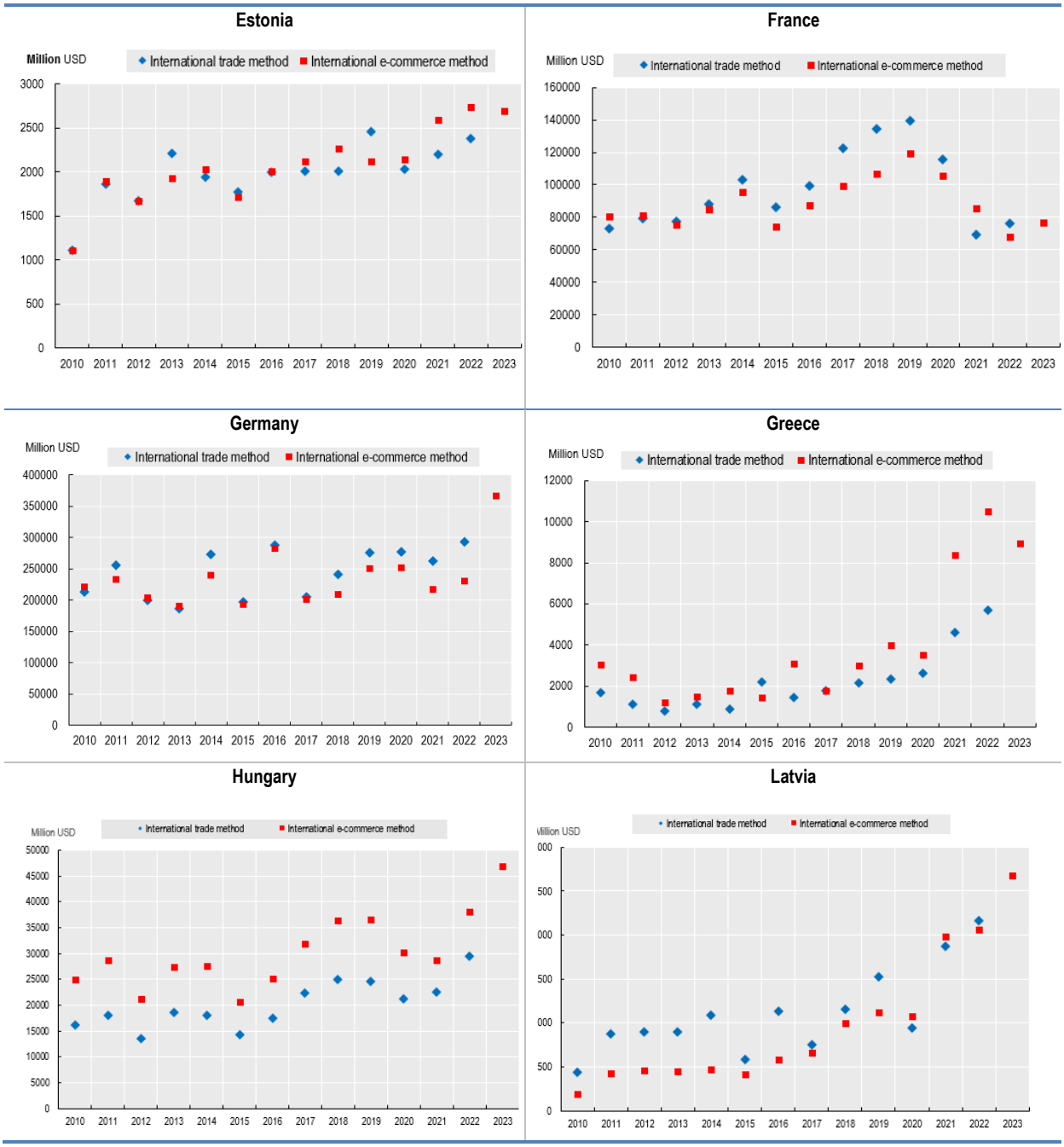
Comparing estimates of digitally ordered trade

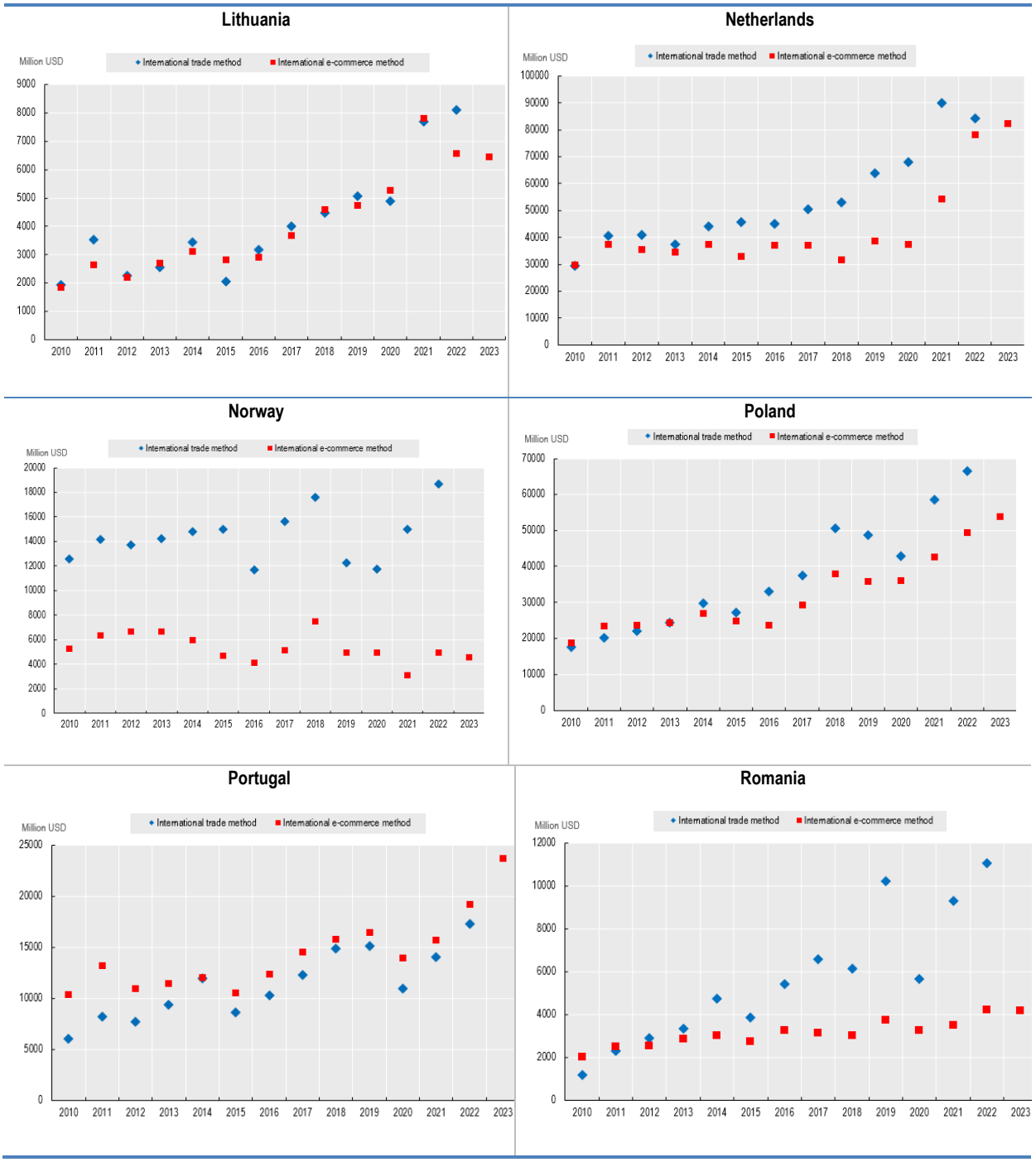
110. Estimates of digitally ordered trade were computed over the same industry and country scope using the international trade approach and the international e-commerce approach. (Figure 6.1).

Figure 6.1. Comparing the two methods: estimates of digitally ordered trade

Business Total (excluding Digitally Deliverable Sectors), USD million




Estonia
Million USD
International trade method
International e-commerce method
France
Germany
Greece
Hungary
Latvia


Lithuania
Million USD
International trade method
International e-commerce method
Netherlands
Million USD
International trade method
International e-commerce method
Norway
Million USD
International trade method
International e-commerce method
Poland
Million USD
International trade method
International e-commerce method
Portugal
Million USD
International trade method
International e-commerce method
Romania
Million USD
International trade method
International e-commerce method

Notes: Data cover enterprises with ten or more employees, the business total excluding "Information and communication", "Administrative and support service activities., and "Financial and Insurance activities", which are all digitally deliverable services. Section M "Professional, scientific and technical activities", classified as a digitally deliverable services sector, is included in the estimates of the international e-commerce approach but excluded in the international trade approach (see equation 9). More information can be found in Table 6.3.
Sources: Authors' elaboration based on (OECD, 2025[13]), (Eurostat, 2025[14]) and (OECD, 2025[15]).

111. Both approaches point to an upward trend in most countries in digital ordering over the 2010-22 period, although the scale and patterns of growth vary across countries (Figure 6.1). This trend continues for the year 2023 for the estimates using the international e-commerce approach. Both approaches lead to very similar estimates for Estonia, France, Greece, Germany, Lithuania, Portugal, and the Slovak Republic. For other countries, although the trends are broadly similar, one approach tends to show higher estimates than the other. For instance, this is the case for the international trade approach for Norway, or Belgium[25] over the 2017 to 2018 period and for the international e-commerce approach for Austria or Croatia.

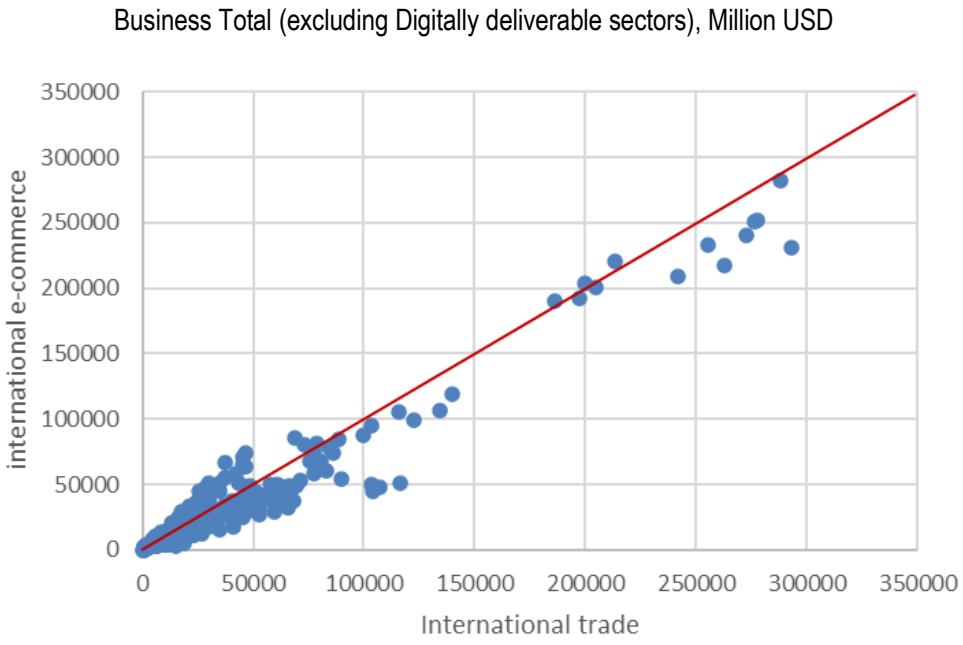
112. Overall, the estimates are highly correlated, with a correlation coefficient of 0.97 for the countries and years included in this comparison exercise, highlighting that most of the sample countries exhibit strong correlation although Belgium and Norway are exceptions (with correlation coefficients of 0.50 and 0.24, respectively). Marked differences between the international e-commerce and international trade approaches are visible over time in a few countries such as Belgium and Italy (Figure 6.4).

113. Comparing both approaches shows strong alignment in estimates with smaller values of digitally ordered trade under the international e-commerce approach in general (see Figure 6.2). One reason for higher estimates under the international trade approach can be that exports also cover trade by households while e-commerce values included in the ICT survey include only business activity.

114. Among larger economies, Germany stands out with significant and sustained levels of international e-commerce sales. Both methods suggest steady growth, with values surpassing USD 200 billion in recent years. A similar upward trajectory is observed in Spain with both approaches, where digital ordering seems to expand over the years (see for a comparison Spain's reported international e-commerce sales as part of the validation exercise in the following section). Other European countries, such as Austria, Belgium, and Czechia, also exhibit a marked increase, albeit at different scales under each approach. Belgium, in particular, shows steady increases in digital ordering, with a marked rise between 2015 and 2019 under the international trade approach owing to a spike in e-commerce activity observed over this period.

115. Overall, digitally ordered trade is found to play an increasing role in international trade across a range of countries, with notable growth in many European countries. While methodological differences yield some variation in estimates, both approaches reinforce the broader trajectory of increasing digital ordering over the past decade.

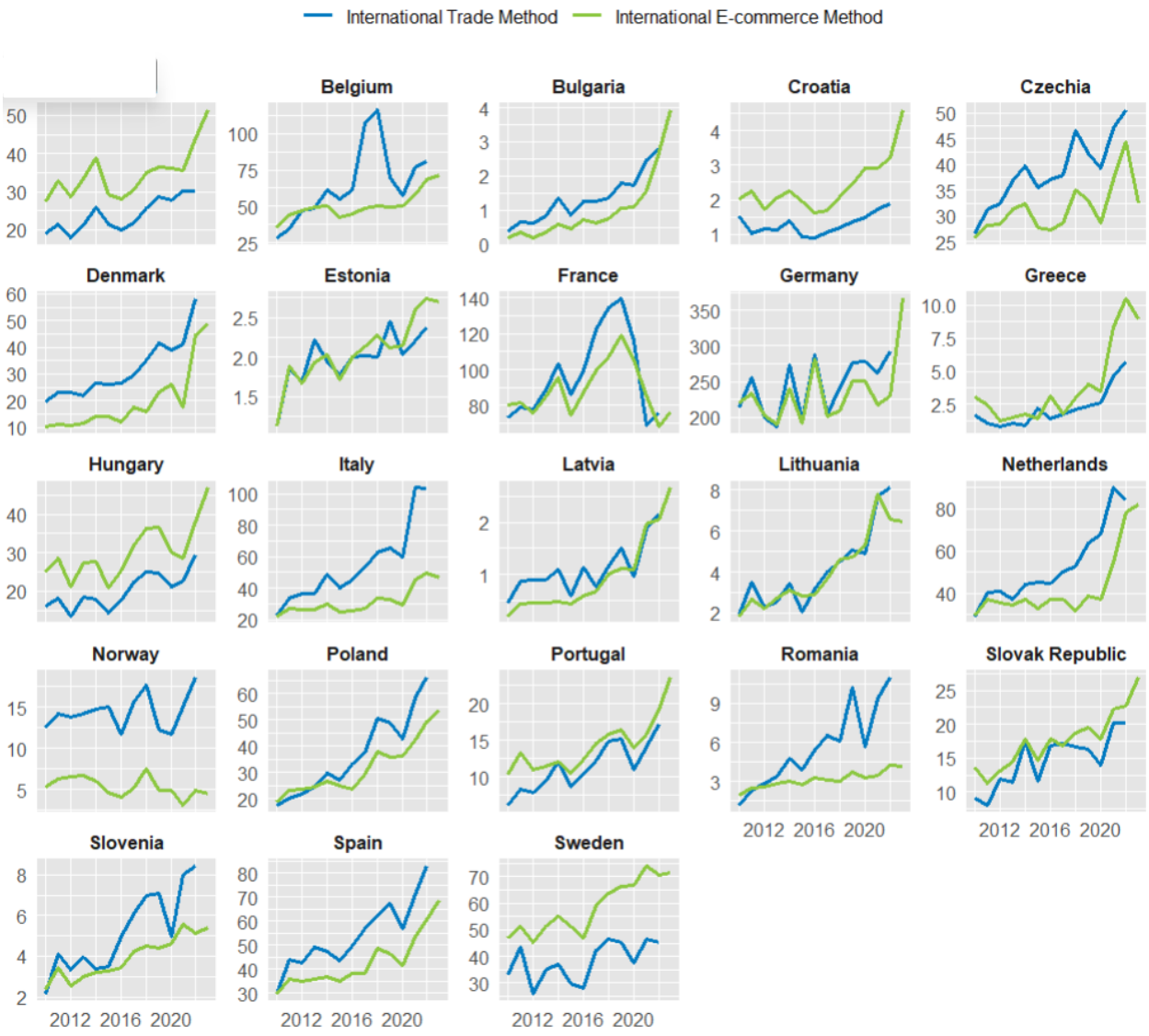
Figure 6.2. Estimates of digitally ordered trade of international e-commerce approach vs. international trade approach



Notes: Data cover enterprises with ten or more employees, the business total excluding "Information and communication", "Administrative and support service activities., and "Financial and Insurance activities", which are all digitally deliverable services. Section M "Professional, scientific and technical activities", classified as a digitally deliverable services sector, is included in the estimates of the international e-commerce approach but excluded in the international trade approach (see equation 9). More information on this choice can be found in Table 6.3.
Sources: Authors' elaboration based on (OECD, 2025[13]), (Eurostat, 2025[14]) and (OECD, 2025[15]).

Figure 6.3. Comparison of digital ordered trade estimates by country

USD billion

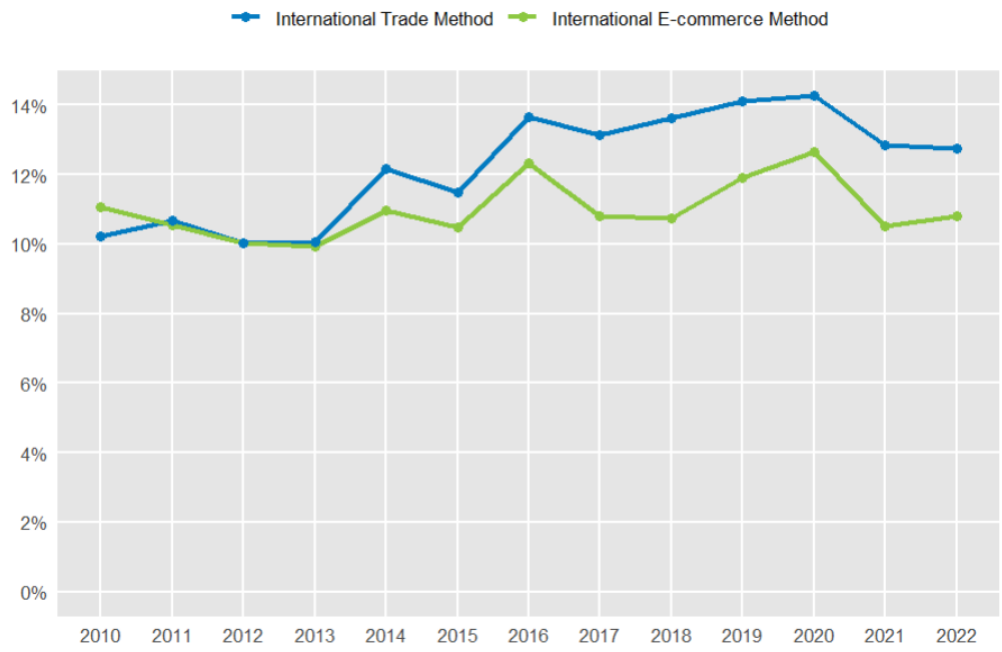


Notes: Data cover enterprises with ten or more employees, the business total excluding "Information and communication", "Administrative and support service activities., and "Financial and Insurance activities", which are all digitally deliverable services. Section M "Professional, scientific and technical activities", classified as a digitally deliverable services sector, is included in the estimates of the international e-commerce approach but excluded in the international trade approach (see equation 9). More information can be found in Table 6.3.
Sources: Authors' elaboration based on (OECD, 2025[13]), (Eurostat, 2025[14]) and (OECD, 2025[15]).

116. While estimates of both approaches reveal very close shares of digital ordering in countries' exports in the beginning of the sample period (2010-13), the share derived from the international trade approach is higher than of the international e-commerce approach until the end of the period, although the difference is modest (Figure 6.4). Estimates highlight a general upward trend in digitally ordered trade exports across both measures, with the gap between the two estimates remaining relatively stable over time.

Figure 6.4. Estimates of digitally ordered trade in exports are on average higher under the international trade approach, though the difference is small

Share of total digitally ordered trade in country's exports, average across countries



Notes: This graph shows the average share of digital ordered trade in exports of the sample countries, which both approaches have in common (see Table 6.1). Data cover enterprises with ten or more employees, business total excluding "Information and communication", "Administrative and support service activities., and "Financial and Insurance activities", which are all digitally deliverable services. Section M "Professional, scientific and technical activities", classified as a digitally deliverable services sector, is included in the estimates of the international e-commerce approach but excluding in the international trade approach (see equation 9). More information can be found in Table 6.3.
Sources: Authors' elaboration based on (OECD, 2025[13]), (Eurostat, 2025[14]), (OECD, 2025[15]), (OECD, 2024[17]) and (WTO, 2025[3]).

117. One potential difference between the two approaches lies in the treatment of "Professional, scientific, and technical activities (Sector M). As this is a digitally deliverable service sector, it should be in theory excluded from the computation of digital ordered trade that will then be combined with digital delivered trade to get estimates of digital trade. The international e-commerce approach does not exclude the sector because of the large number of missing observations. In addition, the sector accounts for a negligible share of total e-commerce turnover, with a mean of just 1.4% of total e-commerce turnover and a maximum of 5.8% (Table 6.3). In the international trade approach, this issue is easier to deal with because the sector can be excluded from the export data so that the overlap is indirectly excluded from the estimates. That said, sector M cannot be easily excluded from the $\tilde{\gamma}_{TOT}(\text{it})$ but since it accounts for only a small share of total e-commerce activity in the sample countries, it is unlikely to strongly bias the results. Overall, the sector M is unlikely to contribute much to digital ordering, and thus the difference in treatment of this sector in the two approaches should not explain differences in digital ordering estimates.

Table 6.2. Comparing industry coverage of estimates of digitally ordered trade under both approaches

NACE Rev. 2

	International e-commerce approach	International trade approach	Type of industry
Agriculture, forestry and fishing (A)	N	N*	Goods
Mining and quarrying (B)	N	N*	Goods
Manufacturing (C)	Y	Y	Goods
Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities (D_E)	Y	Y	Goods
Construction (F)	Y	Y	Non-digitally deliverable sectors
Wholesale and retail trade except repair of motor vehicles and motorcycles (G46 & G47)	Y	Y	Non-digitally deliverable sectors
Transportation and storage (H)	Y	Y	Non-digitally deliverable sectors
Accommodation and food service activities (I)	Y	Y	Non-digitally deliverable sectors
Information and communication (J)	N	N	Digitally deliverable services
Financial and insurance activities (K)	N	N	Digitally deliverable services
Real estate activities (L)	Y	Y	Non-digitally deliverable services
Professional, scientific and technical activities (M)	Y	N	Digitally deliverable services
Administrative and support service activities (N)	N	N	Digitally deliverable services

Notes: "Y": included, "N": not included, * can be estimated. The comparison reflects the underlying sectors covered by the data sources used in each method.
Source: Authors' compilation.

118. Estimates of both approaches suggest that the share of digital trade (i.e. the combined value of digitally ordered and digitally delivered trade) in overall exports has increased over the sample period, from around 20% in 2010 to 25% in 2022 (Figure 6.5). The difference in percentages between both approaches amounts to around 1 percentage point, on average over the sample period. At the country levels, differences will by construction reflect difference in digital ordered trade estimates and vary over time. In 2022, sizeable differences were visible in Italy, Norway, and Denmark.

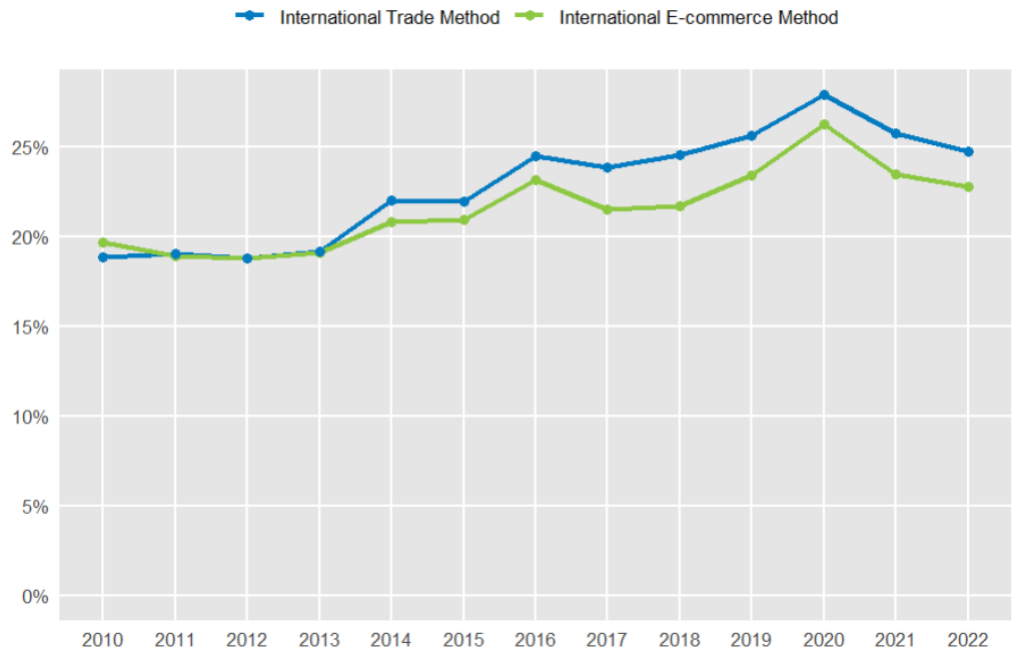
Table 6.3. Professional, scientific and technical activities represent a marginal share of e-commerce

Industry shares as a percentage of e-commerce turnover (business total), 2010-23

	Manufacturing	Construction	Wholesale trade (except motor)	Retail trade (except motor)	Transport and storage	Accommodation and food service	Information and communication	Admin and support service	Real estate	Professional, scientific and technical
Observations	116	111	109	118	122	122	121	122	104	46
Mean	40.66	0.9	24.4	6.7	7.5	2.0	3.7	2.2	0.2	1.4
Standard deviation	17.0	1.6	9.5	4.3	4.3	2.4	2.6	2.0	0.2	1.0
Min.	6.0	0.0	8.3	0.2	1.8	0.2	0.3	0.07	0.0	0.07
First quartile	27.4	0.2	17.0	4.3	4.7	0.7	2.0	1.0	0.07	0.8
Median	38.2	0.5	22.7	6.0	6.7	1.1	3.1	1.6	0.1	1.1
Third quartile	54.4	1.03	31.1	8.0	9.2	2.2	4.9	2.8	0.3	1.6
Maximum	74.6	10.3	48.0	26.8	31.7	12.6	15.9	13.2	0.9	5.8

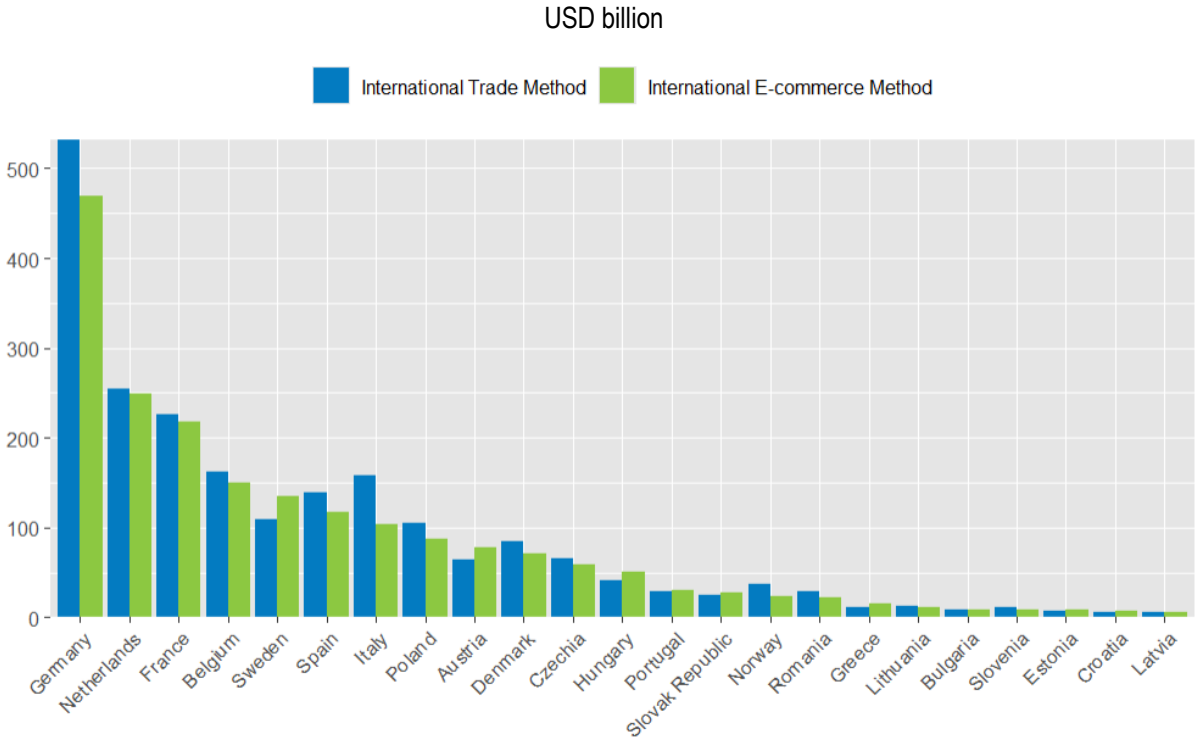
Source: Authors' compilation based on (Eurostat, 2025[14]).

Figure 6.5. Share of digital trade in total exports, common sample countries in both approaches



Notes: Data cover enterprises with ten or more employees, total business sectors excluding "Information and communication", "Administrative and support service activities., and "Financial and Insurance activities", which are all digitally deliverable services. Section M "Professional, scientific and technical activities", classified as a digitally deliverable services sector, is included in the estimates of the international e-commerce approach but excluding in the international trade approach (see equation 9). More information can be found in Table 6.3.
Sources: Authors' elaboration based on (OECD, 2025[13]), (Eurostat, 2025[14]), (OECD, 2025[15]), (OECD, 2024[17]) and (WTO, 2025[3]).

Figure 6.6. Digital trade in selected countries, 2022



Notes: Data cover enterprises with ten or more employees, the business total excluding "Information and communication", "Administrative and support service activities., and "Financial and Insurance activities", which are all digitally deliverable services. Section M "Professional, scientific and technical activities", classified as a digitally deliverable services sector, is included in the estimates of the international e-commerce approach but excluding in the international trade approach (see equation 9).
Sources: Authors' elaboration based on (OECD, 2025[13]), (Eurostat, 2025[14]) and (OECD, 2025[15]).

Validation exercise for Spain

119. A validation exercise leveraging data from the Spanish Statistical Office (INE) assesses the accuracy of both the international e-commerce and international trade estimation methodologies. The analysis covers international turnover values for web and EDI-based sales over the period 2016-21, allowing for a direct comparison between estimated and reported figures.

120. On average, the international e-commerce approach underestimates the international share of e-commerce by approximately 14% compared to reported values (Table 6.4).

121. Similarly, the international trade approach can be validated against the same Spanish data. This method tends to yield higher estimates, with international digitally ordered trade exceeding reported values by approximately 14% on average over the period 2016-21.

Table 6.4. International e-commerce shares align closely with reported data for Spain

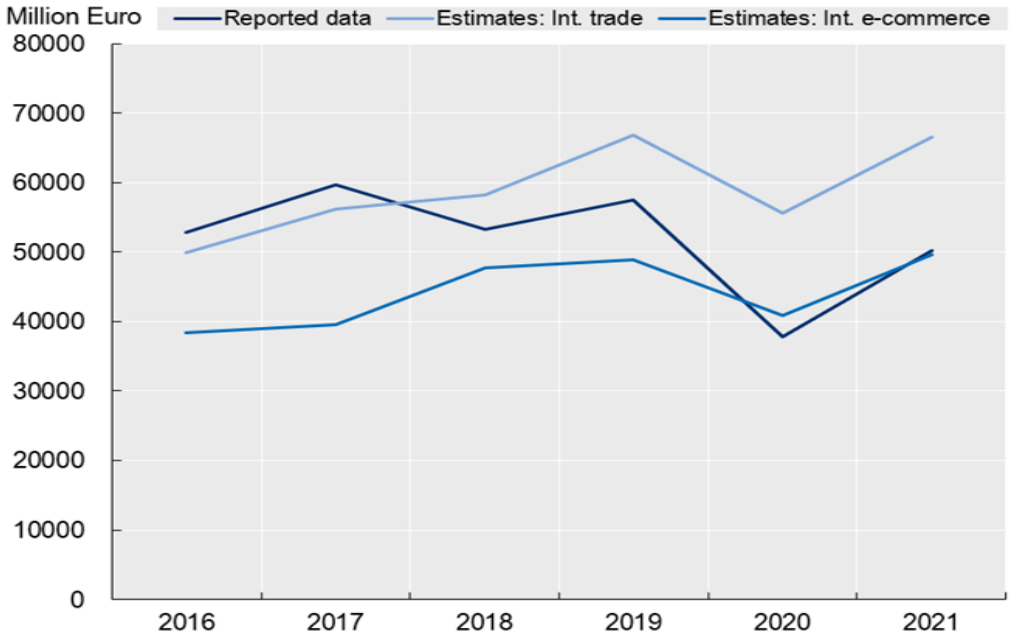
International e-commerce approach, 2016-21

	2016	2017	2018	2019	2020	2021
Reported international share of e-commerce $\alpha(t)$	23.1	23.0	18.9	18.7	13.7	16.0
Reported international share of web sales $\beta_{web}(t)$	17.0	22.0	17.4	18.0	12.0	14.5
Reported international share of EDI-type sales $\beta_{EDI}(t)$	26.8	23.7	19.8	19.2	14.8	17.1
Estimated for international share of e-commerce $\alpha(t)$	16.7	15.1	16.9	15.8	14.8	15.7
Estimated international share of web sales $\beta_{web}(t)$	16.8	13.0	17.3	14.5	11.9	14.4
Estimated international share of EDI-type sales $\beta_{EDI}(t)$	16.7	16.7	16.7	16.7	16.7	16.7
Ratio estimated over reported: $\alpha(t)$	-27.7	-34.1	-10.5	-15.7	7.8	-1.8

Sources: Author's elaboration based on data from the Spanish Statistical Office (INE),[26] (Eurostat, 2025[14]), and (OECD, 2025[15]).

Figure 6.7. Comparing estimated digitally ordered trade from both approaches against reported data from Spain

Business Total, million EUR, 2016-21



Notes: For comparison reasons, this exercise adjusts the estimates of digital ordered trade to the sample industries covered in Spain's survey reporting international e-commerce sales for 2016-2021 for the following sample industries (ISIC): C, D, E, F, G, H, I , J, L, M, N. Estimates of both the international e-commerce and the international trade approach therefore include the overlap of digitally deliverable sectors (ISIC): J, M, N in their estimates.
Sources: Author's estimates based on data from the Spanish Statistical Office (INE),[27] (OECD, 2025[13]), (Eurostat, 2025[14]) and (OECD, 2025[15]).

122. Overall, the international e-commerce method tends to underestimate digital ordering in Spain on average over the period 2016-21, whereas the international trade method tends to overestimate it

(Figure 6.7). The e-commerce approach derives very close estimates at the end of the period (2020-21), while the international trade approach derives close estimates at the beginning of the sample period (2016-17). Importantly, while reported international e-commerce sales for Spain declined by around 1% p.a. cumulatively from 2016 to 2021, the international e-commerce and the international trade methods both predict an increase between 2016 and 2021, respectively of around 5.3% and about 5.9%. Overall, this validation exercise underscores the importance of further refining assumptions to enhance accuracy in measuring cross-border digital transactions.

Comparison summary

123. The international e-commerce approach offers an incremental approach aligned with e-commerce figures reported by countries, providing a clear distinction between different types of ordering channels, with assumptions introduced when imputing missing data points for e-commerce sales and respective international shares. This approach also has the advantage that the data it uses is timely (i.e. 2023 in most cases). While testing the assumption that EDI-based international shares of e-commerce sales is constant is challenging, some validation has been performed for Spain and can be undertaken for others (e.g. Denmark and the United Kingdom). Using this method, digitally ordered trade is estimated to be 14% lower than what is observed for the period 2016-21 for Spain.

124. A downside to this approach is the sparsity of data especially in the early part of the estimation period (2010-15), the limited short-term prospects for reported values on EDI-based international e-commerce sales (which require the assumption that international EDI sales are constant), and for industry-level breakdowns. This also means that estimates can only be made when countries have an established framework for collecting and reporting e-commerce data – thus estimates presented are dominated by Eurostat countries which have more data available. The extension to countries outside of the EU statistical system is possible but contingent on data availability.

125. With respect to the international trade approach, advantages include its reliance on relatively fewer input variables, which as a result lowers the data collection burden and allows its application to more countries (29 versus 24 for the international e-commerce approach). Expanding the coverage to non-OECD countries is also somewhat easier because data on e-commerce sales over total turnover is more readily available (UNCTAD, 2024[4]).

126. However, the international trade approach relies on the assumption that the proportion of digitally ordered exports over total exports is equivalent to the proportion of digitally ordered sales over total turnover. And although this yields relatively similar numbers to the e-commerce approach on average, it is unclear how valid this assumption is and difficult to test the direction of potential biases. That said, analysis for Spain suggests the estimates are relatively well aligned, identifying digitally ordered trade around 14% higher than what is observed for the period 2016-21.

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WTO-UNCTAD (2025), *Services (BPM6): Exports and imports by service-category, trade-partner World*, https://unctad.org/. [24]

Annex A. Bottom-up method of the international trade approach

127. Digitally ordered trade (DOT) under the international trade approach refers to the value of trade (UNCTAD, 2023[25]) in goods (G) and non-digitally deliverable sectors (NDDS) that is digitally ordered. For a given country *i* at time *t*, DOT can be calculated as the product of the share of digitally ordered exports, denoted as $\gamma_i(\mathrm{t})$, and the value of exports:

$$DOT_i(\mathrm{t}) = \gamma_i(\mathrm{t}) * exports_i(\mathrm{t}) \quad (11)$$

where:

$$\gamma_i(\mathrm{t}) = \frac{digitally\ ordered\ exports_i(\mathrm{t})}{exports_i(\mathrm{t})}$$

128. In the absence of data on $\gamma_i(\mathrm{t})$, it can be approximated using an observable parameter $\tilde{\gamma}_i(t)$, which represents the share of e-commerce in turnover: $\tilde{\gamma}_i(t) = \frac{e-commerce_i(\mathrm{t})}{total\ turnover_i(\mathrm{t})}$. This approximation assumes that the proportion of digitally ordered exports in total exports ($\gamma_i(\mathrm{t})$) is equal to the share of e-commerce in total turnover ($\tilde{\gamma}_i(t)$), such that $\tilde{\gamma}_i(t) \sim \gamma_i(\mathrm{t})$.

129. Substituting $\tilde{\gamma}_i(t)$ into equation (1) gives:

$$DOT_i(\mathrm{t}) = \frac{e-commerce_i(\mathrm{t})}{total\ turnover_i(\mathrm{t})} * exports_i(\mathrm{t}) \quad (22)$$

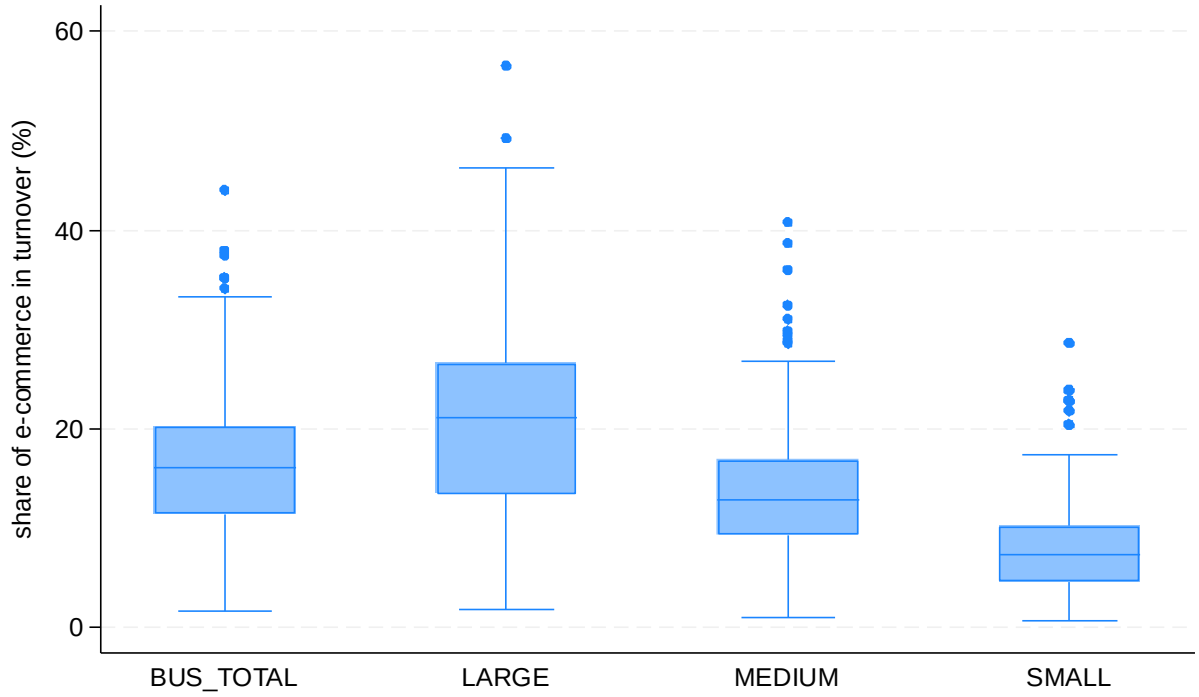
130. A bottom-up approach incorporates industry *k*, which includes all goods and non-digitally delivered services sectors, such that estimates of DOT for country *i* at time *t* can be defined as:

$$DOT_i(\mathrm{t}) = \sum_{k=1}^{K} \left(\frac{e-commerce_{ik}(\mathrm{t})}{total\ turnover_{ik}(\mathrm{t})} * exports_{ik}(\mathrm{t}) \right) \quad (33)$$

Annex B. Heterogeneity of the share of e-commerce ($\widetilde{\gamma}$) in turnover across firm size

Figure A B.1. Large firms tend to have a higher share of e-commerce in their turnover compared to small firms

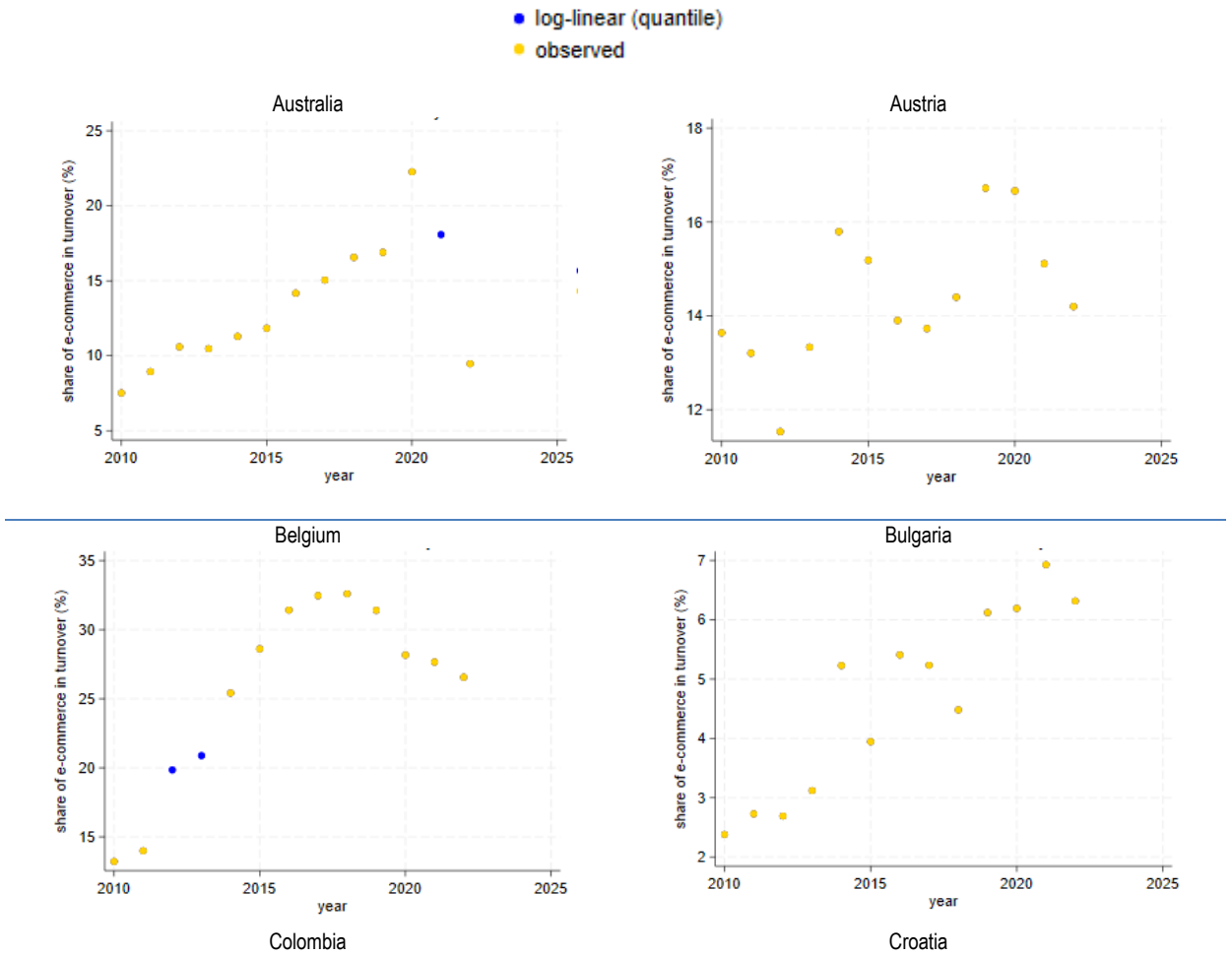
29 sample countries, 2008-2023

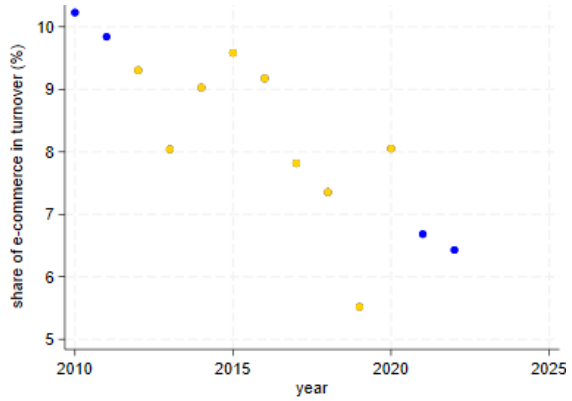


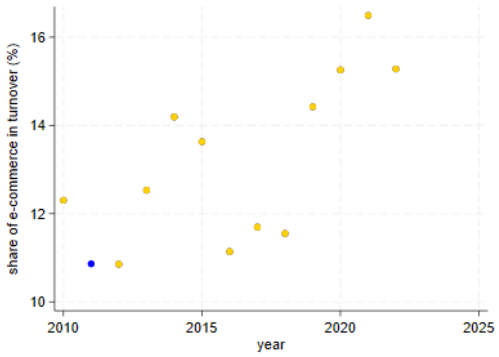
Notes: This graph shows the distribution of the share of e-commerce turnover in total turnover by firm size (large, medium, small) and the business total (BUS_TOTAL) across 29 sample countries (Table 5.3) and the period 2008-23 based on the raw data, of the ICT business survey i.e. without imputations.
Source: Authors' elaboration based on (Eurostat, 2025[14]).

Annex C. Comparison of observed and imputed e-commerce shares in turnover

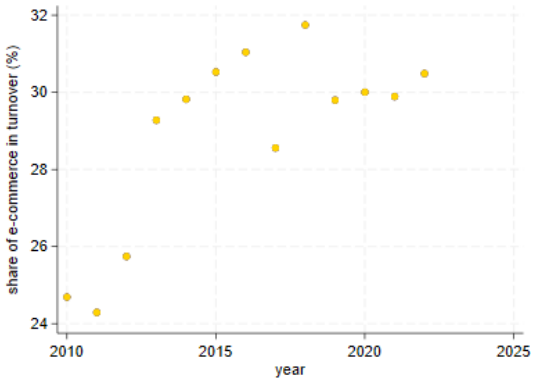
Figure A C.1. Observed and imputed e-commerce shares in turnover ($\widetilde{\gamma_{TOT}}$) for total business activity



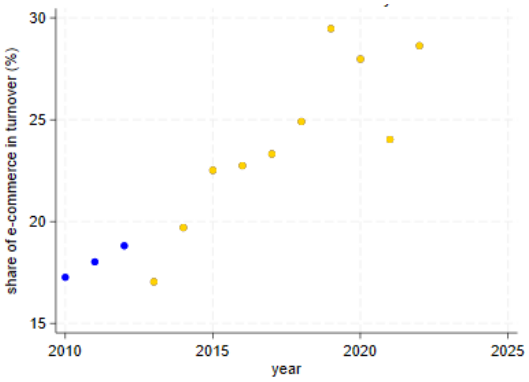




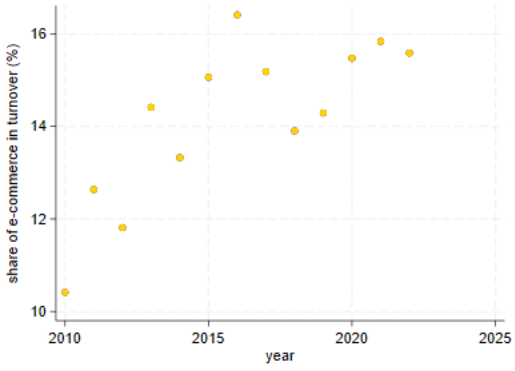
Czechia



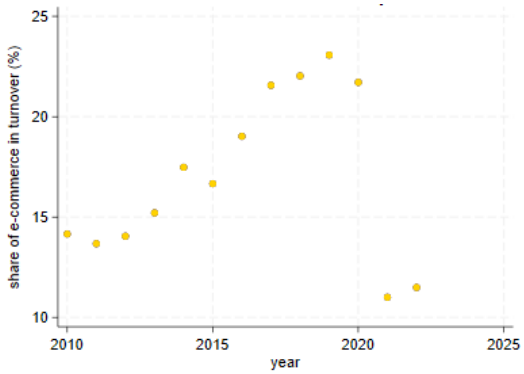
Denmark



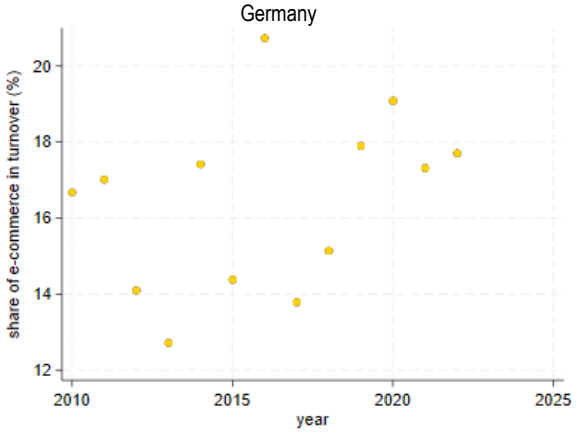
Estonia



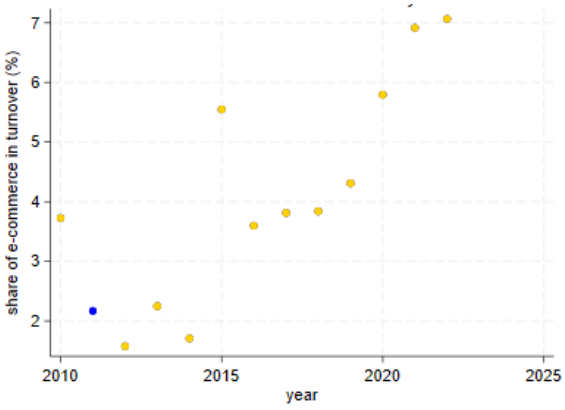
France

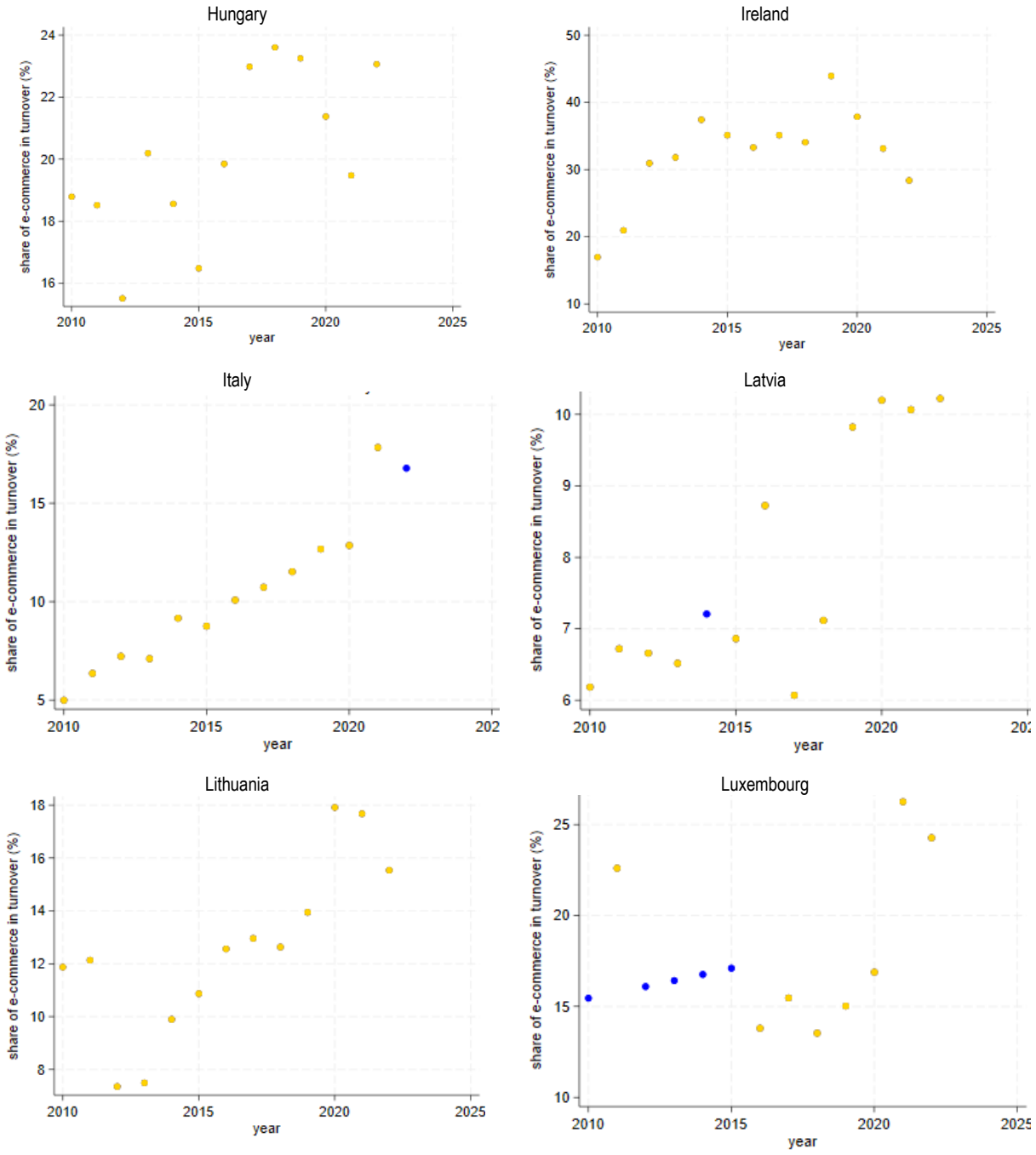


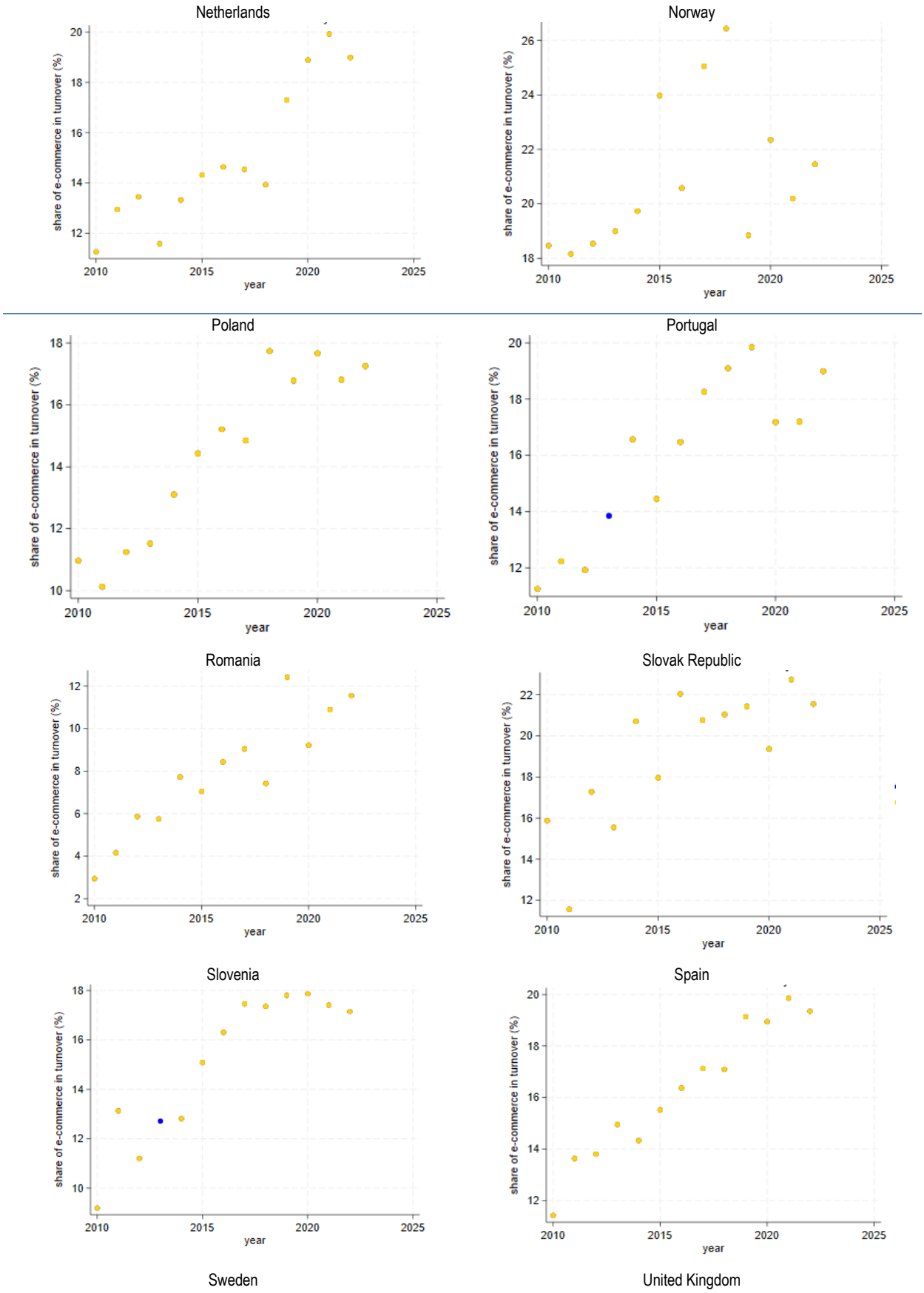
Germany

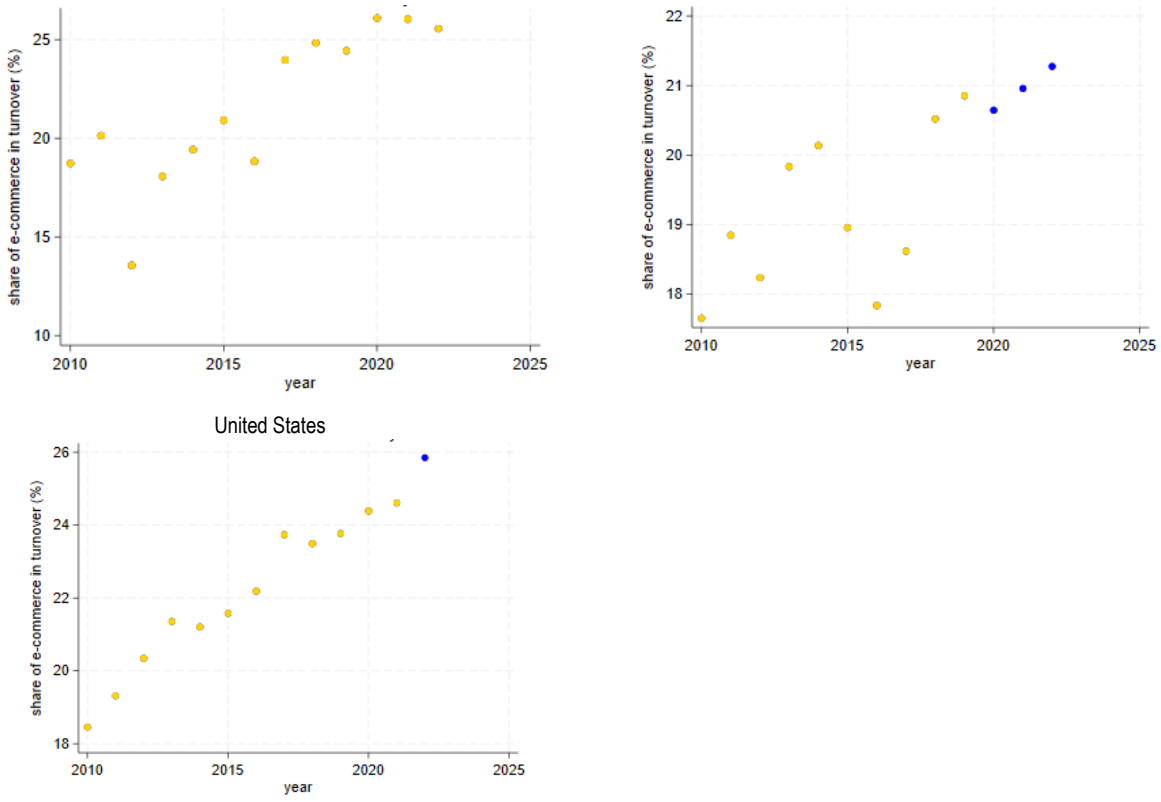


Greece




Hungary
share of e-commerce in turnover (%)
year
Ireland
share of e-commerce in turnover (%)
year
Italy
share of e-commerce in turnover (%)
year
Latvia
share of e-commerce in turnover (%)
year
Lithuania
share of e-commerce in turnover (%)
year
Luxembourg
share of e-commerce in turnover (%)
year


Netherlands
Norway
Poland
Portugal
Romania
Slovak Republic
Slovenia
Spain
Sweden
United Kingdom
share of e-commerce in turnover (%)
year
2010
2015
2020
2025



Notes: Missing observations were imputed using a log-linear time trend estimation based on the following equation for each ik-combination: $\ln((\gamma_{ikt}) = \beta_0 + \beta_1 T)$, where T is a time trend ranging from 1 (year=2008) to 16 (year=2023).
Source: Authors' estimation based on (OECD, 2025[13]).

Notes

[1] "Digitally deliverable services comprise those services which can be delivered remotely over computer networks. It is important to note that a product being digitally deliverable does not mean that it is always digitally delivered when traded internationally. Digitally deliverable trade will therefore be greater than trade that is actually digitally delivered."

[2] Digitally ordered trade is identified as the domestic value added of ICT goods, ICT services and other digitally deliverable services which are embodied in exports of non-digitally delivered sectors.

[3] Until survey year 2020, the coverage of SDBS in terms of economic activities was broader as it covered B to N and S95, while the ICT usage survey covered sections C to N, except section K and M75 veterinary activities, and from S95 only S95.1. With entry into force of Regulation (EU) 2019/2152, SDBS covers B to N and P to S, while from 2021 onwards the ICT usage survey covers sections C to N except K. More information can be found here: https://ec.europa.eu/eurostat/cache/metadata/en/isoc_e_esms.htm.

[4] Part of the data used in this table was obtained through the following links to NSOs' websites:

- Statistics Denmark: www.statbank.dk/ITAV13 (accessed on 10 February 2025).
- Statistics Canada: www150.statcan.gc.ca/n1/daily-quotidien/220913/dq220913b-eng.htm
- The UK's Office for National Statistics: www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/datasets/ictactivityofukbusinessese-commerceandictactivity (accessed on 10 February 2025).

[5] More information can be found here: www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica_C&cid=1254736176743&menu=resultados&idp=1254735576692 (accessed on 10 February 2025).

[6] Ratios are different in the two time periods to reflect differences in the way in which the SDBS data is reported.

[7] The following countries present estimates up to 2022 as turnover values are not available: Belgium, Bulgaria, Italy, Latvia, Netherlands, Romania, Sweden.

[8] Eurostat asked survey respondents to report separately their sales to other EU countries and to the rest of the world. Using these reported values, intra-EU and extra-EU web sales are modelled separately, and they are then summed up to obtain a measure of the share of international web sales. These estimates were calculated at the economy wide (i.e. business total) and at the industry level for all countries covered.

[9] More detail can be found at: https://docs.scipy.org/doc/scipy/reference/generated/scipy.optimize.curve_fit.html.

[10] There is potentially a substitution taking place between EDI based international e-commerce sales and web-based international e-commerce sales.

[11] Annex A describes the bottom-up approach of the international trade approach.

[12] For simplicity, the subscripts TOT and DDS are dropped in the following.

[13] Digital ordering and e-commerce activity is used interchangeably in this work.

[14] Using exports as a proxy for international turnover, equation (7) can be rewritten as: $DOT_i\ (\mathrm{t}) = \frac{e\text{-}commerce\ turnover_i\ (\mathrm{t})}{total\ turnover_i\ (\mathrm{t})} * \mathrm{international\ turnover}_i\ (\mathrm{t})$ or $\mathrm{DOT}_i(\mathrm{t}) = e - commerce\ turnover_i\ (\mathrm{t}) * \frac{international\ turnover_i(\mathrm{t})}{turnover_i(\mathrm{t})}$, implying that the share of international turnover is the same for both e-commerce and non-e-commerce sales.

[15] Annex B shows descriptive statistics of the share of e-commerce in total turnover ($\tilde{\gamma}_i(t)$) of large, medium, or small enterprise, highlighting that $\tilde{\gamma}_i(t)$ is on average higher for larger firms, which tend to engage more in international trade.

[16] Please note that the digitally deliverable sector "Financial services activities" (ISIC K) is only part of total business activities in Australia and the United States and therefore needs to be subtracted only for these two sample countries.

[17] See equation 9 for a description of the treatment of professional services (ISIC M) in case of missing data for $\tilde{\gamma}_i(t)$.

[18] Export values were converted from national currency into millions of USD using OECD's exchange rates (average).

[19] See the manuals BPM7 for Balance of Payments (BPM7, 2023[34]), IMTS for international merchandise trade statistics (IMTS, 2011[35]), and MSITS for international services trade statistics (MSITS, 2010[33]).

[20] For instance, as services transactions are part of the BOP statistical framework and are measured with trade in goods on a change of ownership basis, they can be summed as services and goods do not overlap when they follow the same concept (OECD - Statistics Blog, 2025[32]). As IMTS and BOP follow different concepts, it is not straightforward to consistently combine IMTS and BOP.

[21] The ICT survey states that it draws on turnover defined as in the Structural Business Statistics (SBS), see "Turnover, in the context of structural business statistics (SBS), comprises the totals invoiced by the observation unit during the reference period: this corresponds to the total value of market sales of goods and services to third parties. Turnover includes:

- all duties and taxes on the goods or services invoiced by the unit with the exception of the value-added tax (VAT) invoiced by the unit vis-à-vis its customer and other similar deductible taxes directly linked to turnover;
- all other charges (transport, packaging, etc.) passed on to the customer, even if these charges are listed separately on the invoice."

Source: Eurostat Glossary: Turnover - SBS at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Turnover_-_SBS#:~:text=Turnover%2C%20in%20the%20context%20of,and%20services%20to%20third%20partie.

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

purchaser to take delivery at the required time and place". Source: Eurostat Glossary: Purchaser price at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Purchaser_price

[23] Precisely, the log-linear time trend estimation is based on the following equation for each *ik*-combination: $\ln(\gamma_{ikt}) = \widehat{\beta_0} + \beta_1 T$, where T is a time trend ranging from 1 (year=2008) to 16 (year=2023). Further imputation methods that have been explored include a linear interpolation similar to a compounded annual growth rate between observed values, and a linear time trend estimation truncated to zero for negative estimated values. Imputation results can be obtained upon request.

[24] Sample countries include Australia, Austria, Belgium, Bulgaria, Columbia, Croatia, Czechia, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom, United States.

[25] One reason for the increase in digital ordering in Belgium over 2017-18 might be related to the reform and modernisation of the trade statistics method, shifting to the community concept instead of the national concept, see at https://www.nbb.be/doc/dq/e/dq3/iee.pdf. The difference between the two concepts is sometimes referred to as the "Rotterdam-Antwerp effect", see at: https://unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.20/2009/11.e.pdf.

[26] More information can be found at: www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica_C&cid=1254736176743&menu=resultados&idp=1254735576692 (accessed on 10 February 2025).

[27] More information can be found here: www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica_C&cid=1254736176743&menu=resultados&idp=1254735576692 (accessed on 10 February 2025).