# Of bytes and trade

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DIGITAL TRADE: BUILDING A COMPETITIVE REGULATORY ENVIRONMENT FOR LATIN AMERICA AND THE CARIBBEAN

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# Aim

Although it is widely acknowledged that digital connectivity and digital trade policies matter for trade, their quantitative importance has been difficult to capture.

→Overlap between policy measures and trade data has been poor

It is important to strengthen the evidence-base in this area with a view to enabling more informed digital trade policy discussions.

OECD work on digital trade contributes to:

1. A better understanding of the evolving nature of digital trade and digital trade policies (including in the context of measures affecting data flow); and
2. A quantification of the impact of digital connectivity and digital trade policies on trade and trade costs

# What do we learn from existing data on the nature and evolution of Digital trade?

# Measuring digital trade is difficult

For measurement purposes, digital trade is defined as:

*digitally ordered or delivered trade*

*(OECD-WTO-IMF Handbook for measuring digital trade, 2020)*

Measurement challenge not about underestimation (although de minimis trade is likely less well covered). It is about visibility (what trade has actually been digitally ordered or digitally delivered).

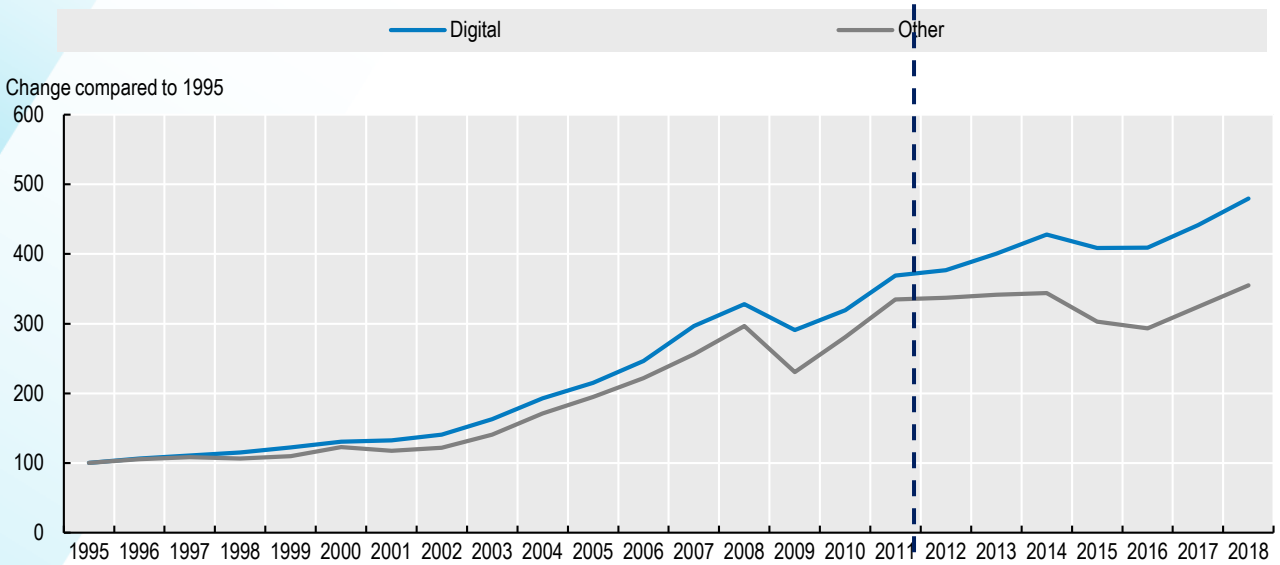
In the absence of official statistics, proxy variables can be useful:

- **Digitally delivered trade** → ICT services (ISIC 61, 62, 63) and digitally delivered services (ISIC 58 to 60, 64 to 66 and 69 to 82)
- **Digitally ordered trade** (more difficult) → digital inputs into non-digital sectors (domestic value added – to minimize issues of double counting)

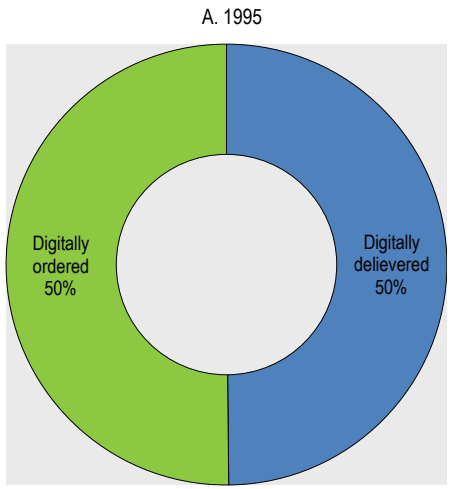
Important caveat – Mode 3 likely to be important and not captured

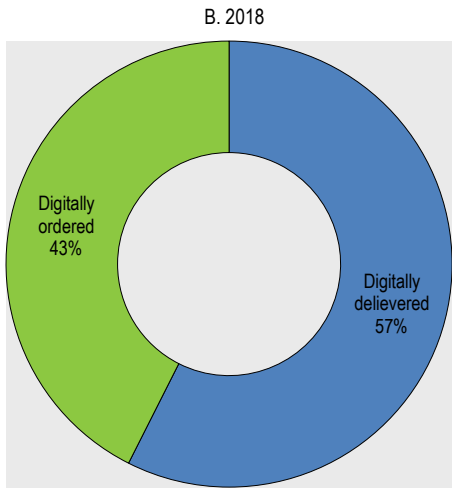
# Preliminary estimates suggest that digital trade is growing and changing

## Digital trade is growing and represents about a fourth of global trade



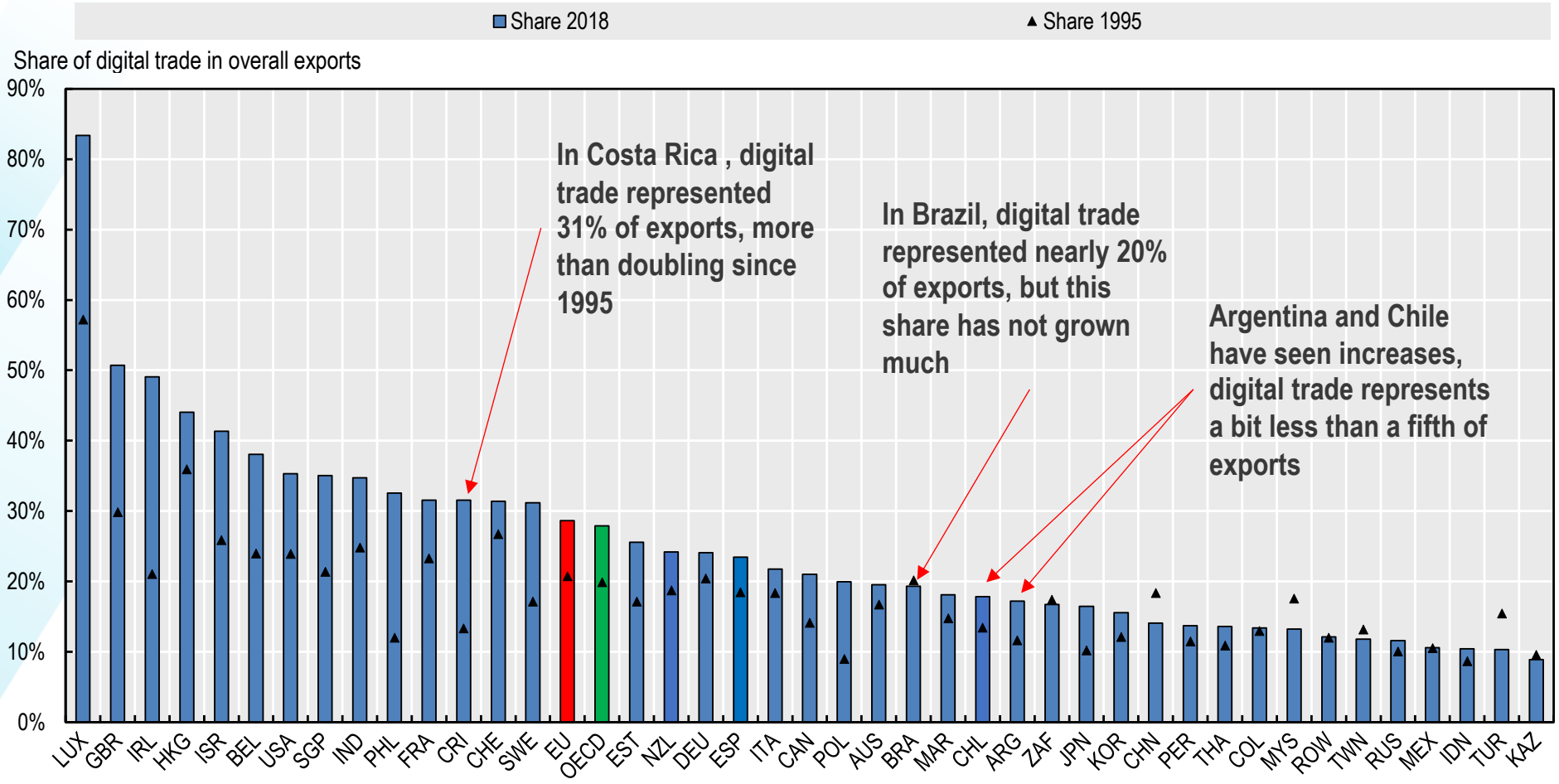

## Digital trade is changing, becoming more services oriented




Source: López-González, Sorescu & Kaynak (2023) “of bytes and trade: quantifying the impact of digitalisation on trade”, OECD Trade Policy Papers N. 273

# Digital trade represents a growing share of country exports, although progress slow in Latin America

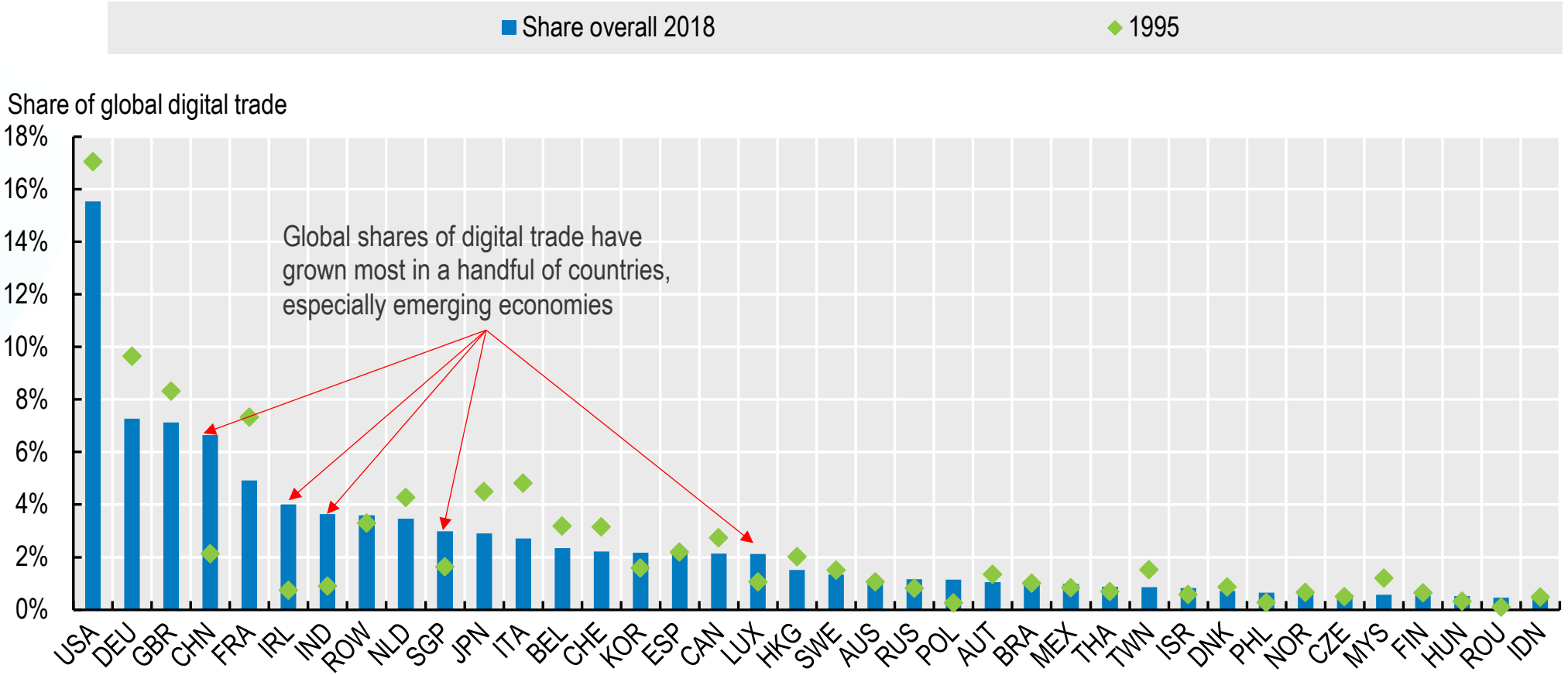



In relative terms, digital trade represents a lower share of Latin American country exports

This, does not mean they do not benefit from digital trade

Source: López-González, Sorescu & Kaynak (2023) "of bytes and trade: quantifying the impact of digitalisation on trade", OECD Trade Policy Papers N. 273

# The geography of digital trade is changing (slowly) but largely towards Asia Pacific

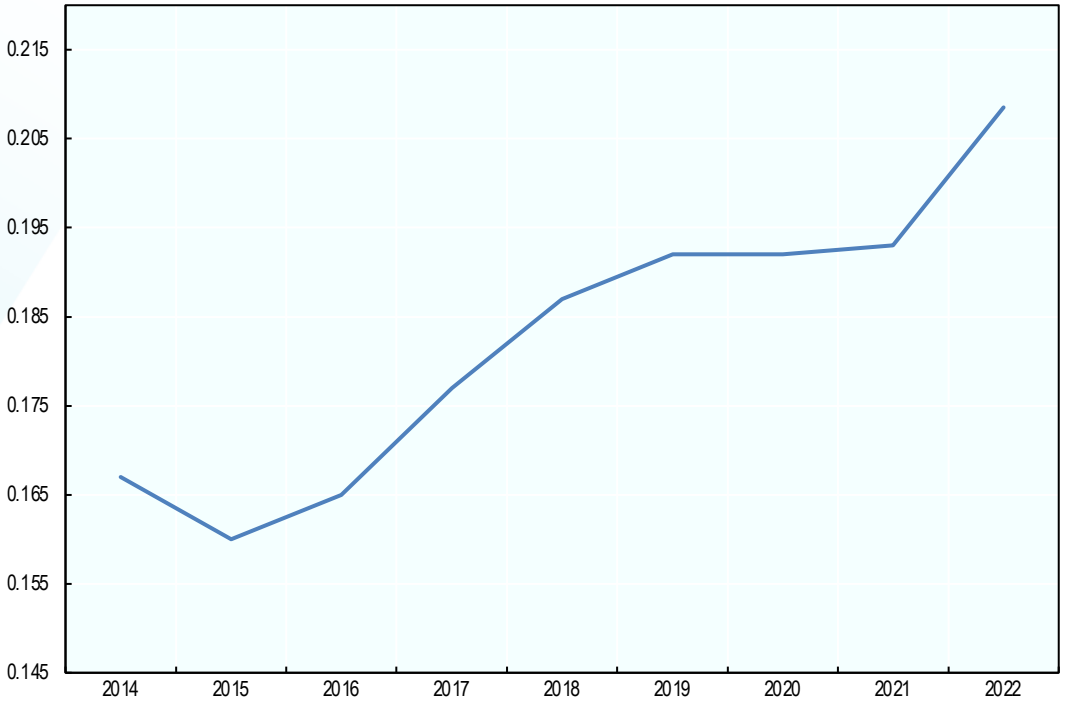



Source: López-González, Sorescu & Kaynak (2023) "of bytes and trade: quantifying the impact of digitalisation on trade", OECD Trade Policy Papers N. 273

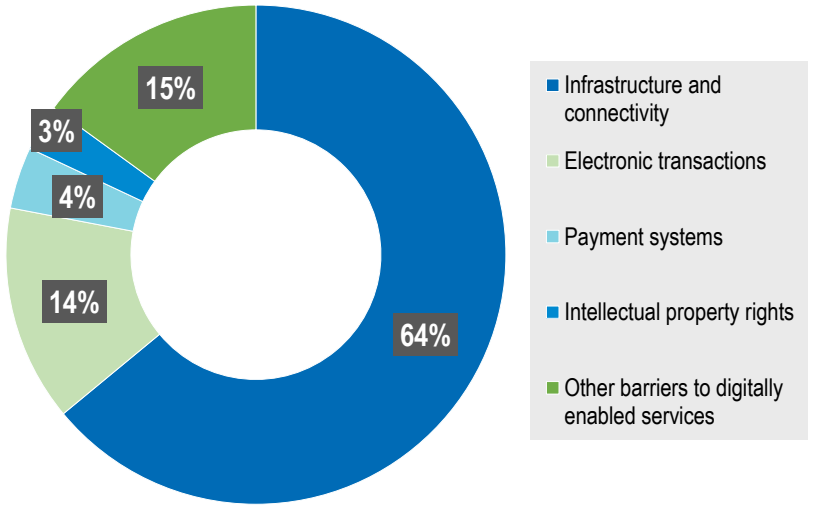
# What about the regulatory landscape?

# Barriers to digital trade are growing, especially around connectivity

- **Digital Services Trade Restrictiveness Index** (DSTRI) tracks cross-cutting barriers that affect trade in digitally enabled services since 2014.
- With wide differences across regions




Contribution of different policy areas to overall DSTRI (2021)




Source: OECD Digital Services Trade Restrictiveness Index 2023

# But there is also a push for greater international cooperation
# … At the WTO (e-commerce JSI)

**1. Enabling Digital Trade/E-commerce**

Facilitating electronic transactions (electronic transactions frameworks; electronic authentication and electronic signatures; electronic contracts; electronic invoicing)

Digital trade facilitation and logistics (paperless trading)

**2. Openness and Digital Trade/E-commerce**

Customs duties on electronic transmission

Access to internet and data (open government data; access to and use of the internet for electronic commerce/digital trade)

**3. Trust and Digital Trade/E-commerce**

Consumer protection (online consumer protection; unsolicited commercial electronic messages)

Privacy (personal information protection/ personal data protection)

Business trust (source code; ICT products that use cryptography)

Cybersecurity

**4. Cross-cutting Issues**

Flow of information (cross-border transfer of information by electronic means/ cross-border data flows; location of computing facilities; financial information/ location of financial computing facilities for covered financial suppliers)

Transparency, domestic regulation and cooperation (transparency; cooperation; cooperation mechanism)

Capacity building (options for capacity building and technical assistance)

Implementation periods for developing and least developed country members

Special and Different Treatment Provisions for Developing Country Members and Least Developed Country Members (options for capacity building and technical assistance)

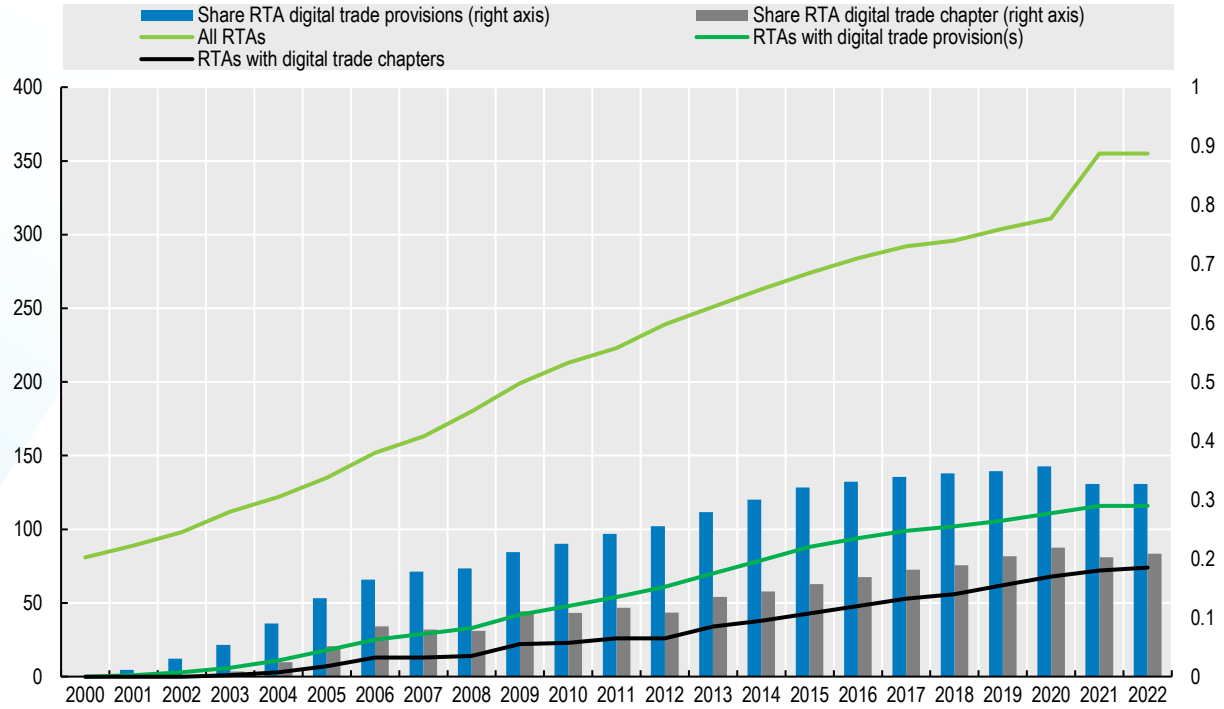
**5. Telecommunications**

Disciplines relating to Telecommunications Services (scope; definitions; competitive safeguard; interconnection; universal service; licencing and authorization; telecommunications; regulatory authority; allocation and use of scarce resources; essential facilities; resolution of disputes transparency)

**Annex**

Logistics services, Enhanced trade facilitation for cross border e-commerce, Use of technology for the release and clearance of goods, [Electronic payments services/Electronic payments], Single windows data exchange and system interoperability/Unique Consignment Reference Numbers, Non-Discriminatory treatment of digital products, Access to online platforms/ Competition, Domestic regulation, Electronic commerce- related network products , Services market access , Temporary Entry and Stay of Electronic Commerce-Related Business Persons, Goods market access

# … In RTAs

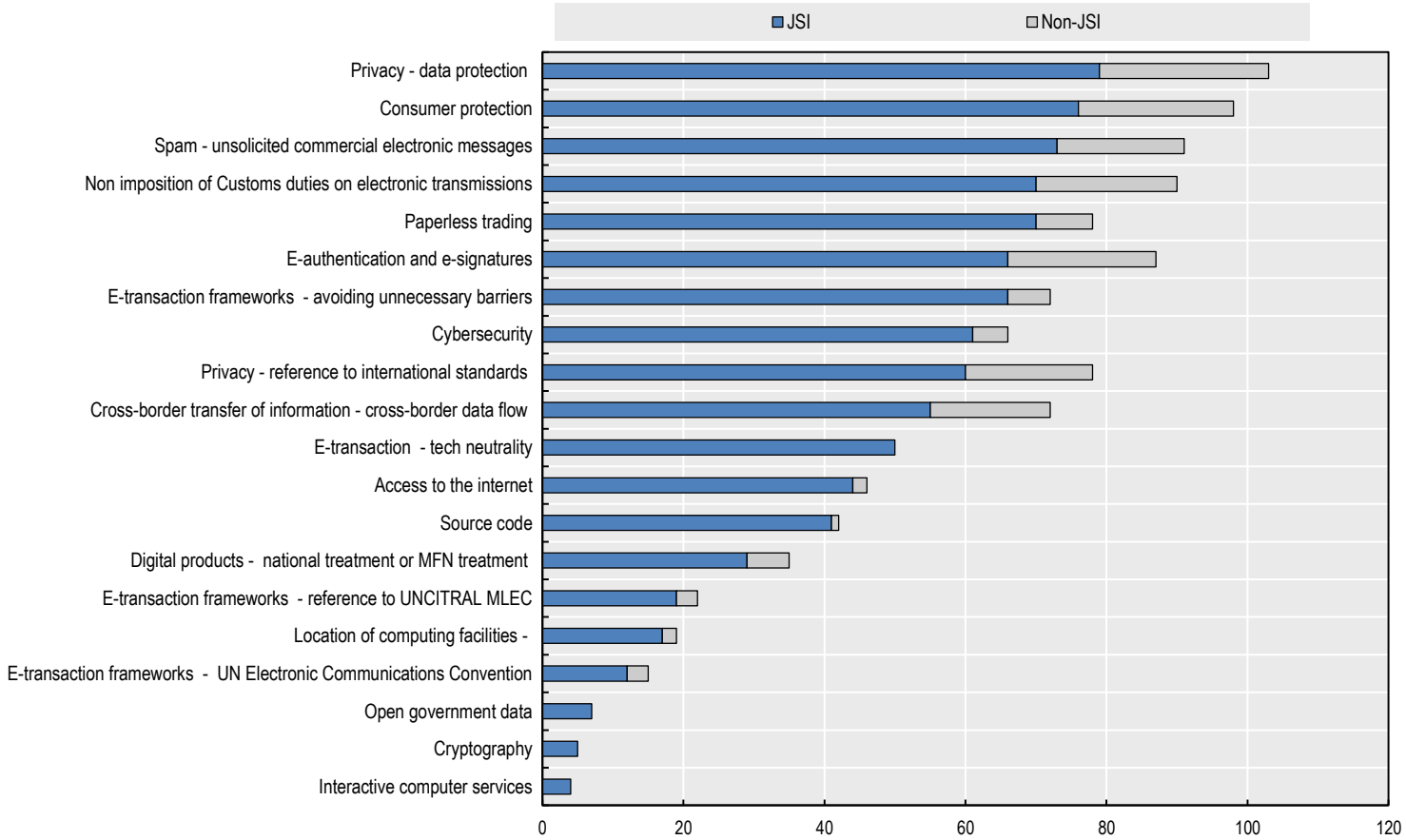



In 2022, 33% of existing agreements had a digital trade provision (21% a chapter).

Since 2000, nearly 1 in 2 agreements have a digital trade chapter

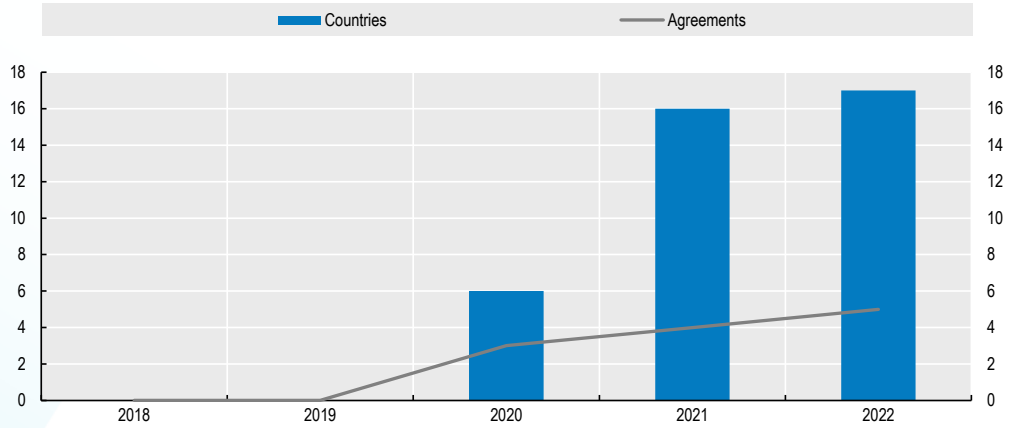
Source: López-González, Sorescu & Kaynak (2023) "of bytes and trade: quantifying the impact of digitalisation on trade", OECD Trade Policy Papers N. 273

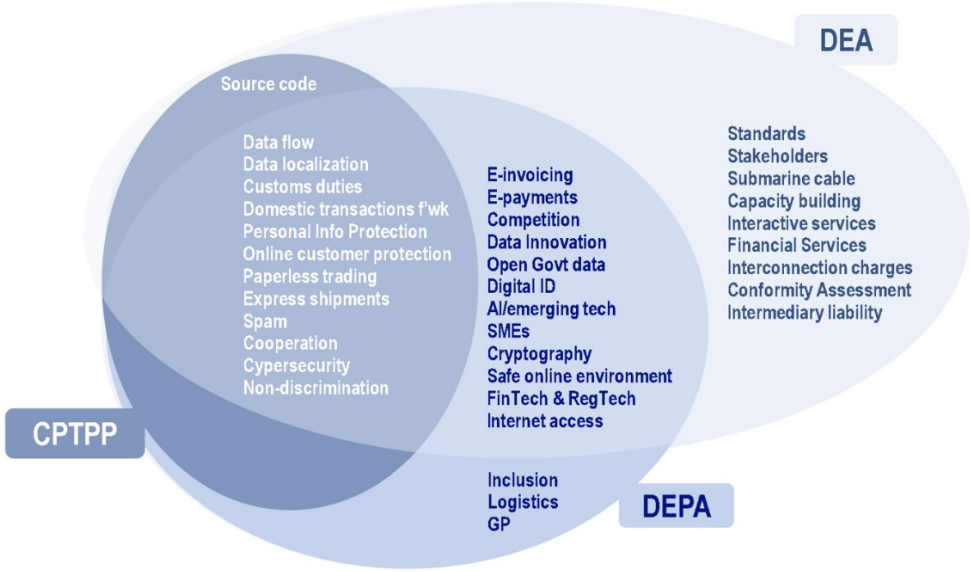
# Which already cover many of the issues being discussed at the WTO




Source: Nemoto, T. and J. López González (2021), "Digital trade inventory: Rules, standards and principles", *OECD Trade Policy Papers*, No. 251, OECD Publishing, Paris, https://doi.org/10.1787/9a9821e0-en.

# … and in new Digital Economy Agreements…




By beginning 2022, there were 5 digital economy agreements involving 17 economies (underpinned by existing RTAs)

Source: López-González, Sorescu & Kaynak (2023) "of bytes and trade: quantifying the impact of digitalisation on trade", OECD Trade Policy Papers N. 273

# Estimating the impact of digital connectivity and digital trade policies on trade

# Econometric analysis can help better identify the drivers of change

- Structural gravity model
  - Trade costs (based on Egger and Nigai, 2015 with elasticities from Egger, Francois and Nigai, forthcoming); and
  - Trade flows (Yotov, 2022).

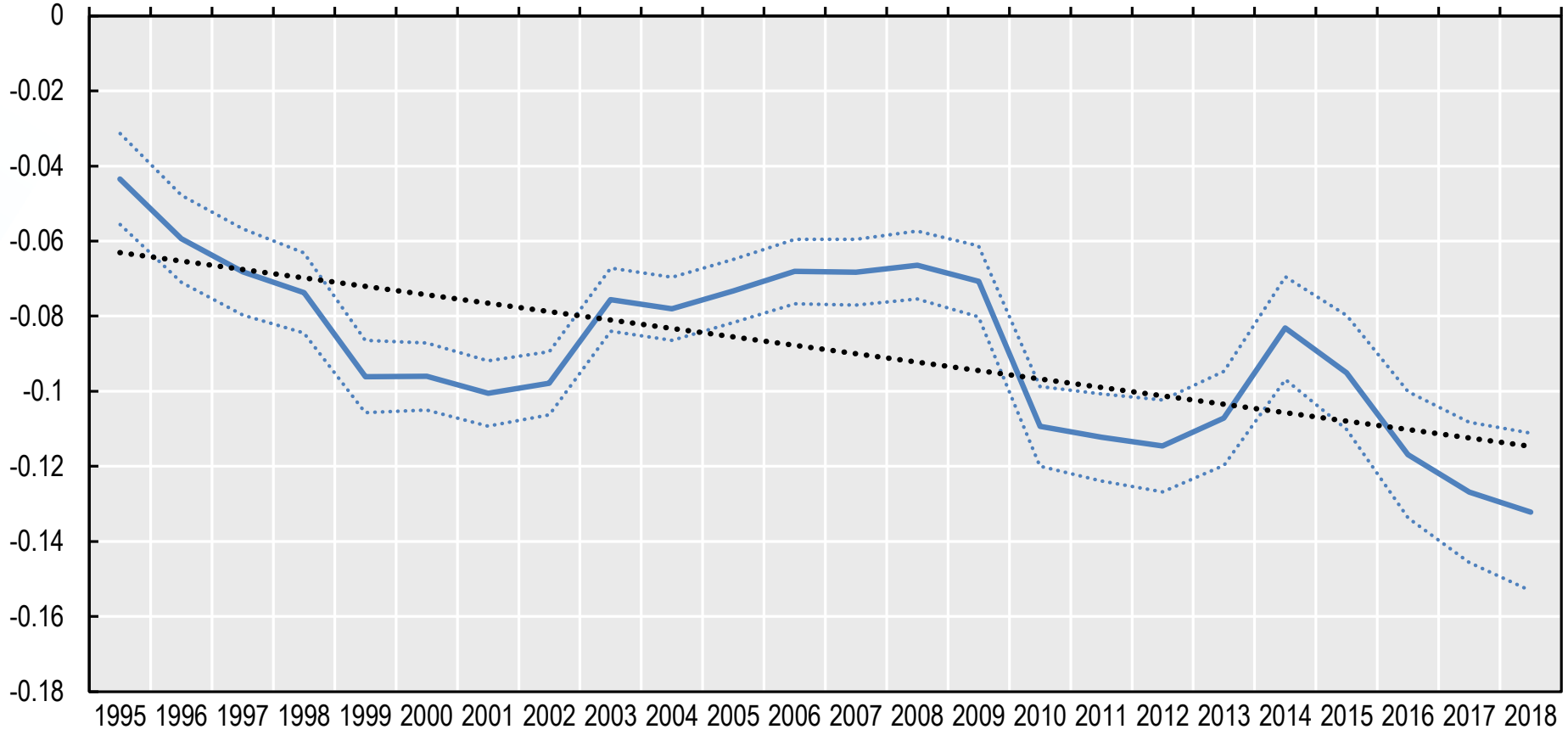
- Analysis includes, domestic flows and relies on reporter-sector-year and partner-sector-year fixed effects.

- International and domestic trade data: TiVA for 1995-2018 and ITPDE
- Gravity variables: CEPII
- Digital connectivity: minimum of the share of individuals connected to internet (ITU)
- Digital trade policies: DSTRI (2014-2018), RTAs e-commerce chapter from TAPED database (universe till 2022)

# Existing literature largely focused on impact of digital connectivity

- Freund and Weinhold (2004[11]): 10 percentage point increase in growth of *web hosts* → 0.2 percentage point increase in export.
- Choi (2010[13]): doubling of Internet usage → 2% and 4% increase in trade in services.
- Lin (2015[12]): 10% increase in the number of Internet users increased international trade by 0.2%-0.4%.
- López-González and Ferencz (2018[2]): 10% increase in 'bilateral digital connectivity' → 2% rise in goods trade and 3% rise in services trade.
- López-González and Sorescu (2021[14]): 10% increase in bilateral digital connectivity → 4% increase in *trade in parcels*.

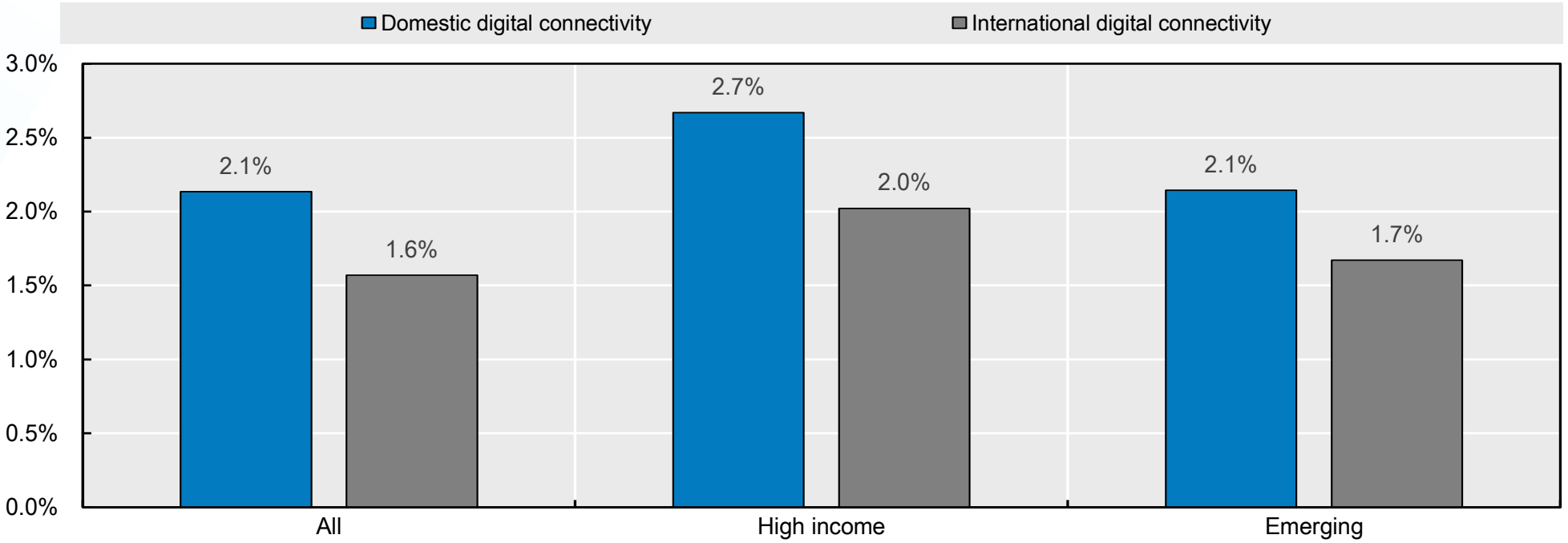
# The trade cost reducing impact of digital connectivity is three times higher now than it was in 1995




Source: López-González, Sorescu & Kaynak (2023) “of bytes and trade: quantifying the impact of digitalisation on trade”, OECD Trade Policy Papers N. 273

# The double dividend of digital connectivity

$$X_{ijt}^{k} = \exp\left(lndist_{ij} + \boldsymbol{bminlndigi_{ijt}} + \boldsymbol{dminlndigi_{ijt}} + RTA_{ijt} + RTA\_ecomm\_chapter_{ijt} + contig_{ij} + comlang_{ij} + colony_{ij} + \eta_{it}^{k} + \mu_{jt}^{k}\right) * \varepsilon_{ijt}^{k}$$

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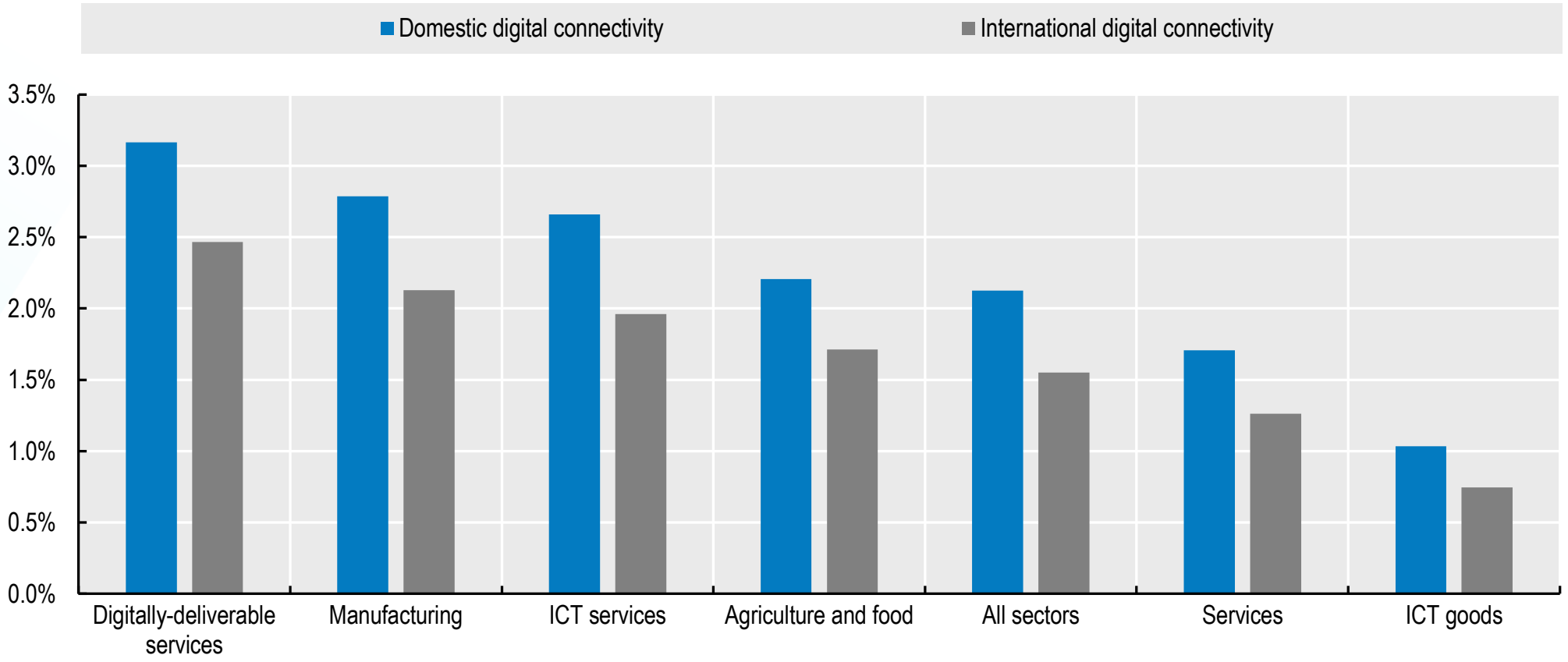
# Digital trade matters for all sectors




Source: López-González, Sorescu & Kaynak (2023) “of bytes and trade: quantifying the impact of digitalisation on trade”, OECD Trade Policy Papers N. 273

# Digital trade provisions matter (but..)

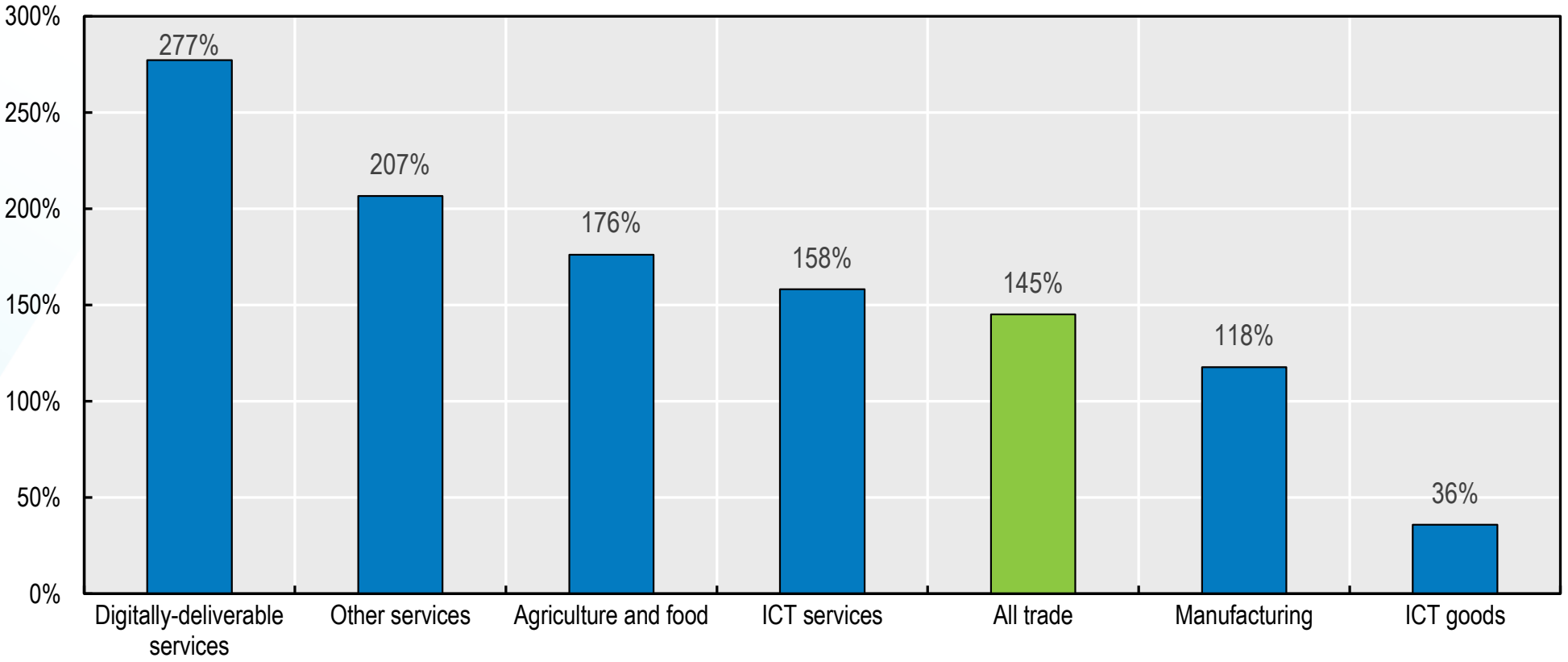
$$X_{ijt}^{k} = \exp\left(minlndigi_{ijt} + EU_{ijt} + RTA\_no\_ecomm\_chapter_{ijt} + RTA\_ecomm\_chapter_{ijt} + RTA\_depth_{ijt} + \eta_{it}^{k} + \mu_{jt}^{k} + \nu_{ij}\right) * \varepsilon_{ijt}^{k}$$

| | All | High income | Emerging |
|---|---|---|---|
| Log of minimum bilateral digital connectivity | 0.172*** | 0.0701*** | 0.285*** |
| | (16.55) | (4.09) | (13.63) |
| EU | 0.346*** | 0.343*** | 0.701*** |
| | -15.63 | -16.13 | -10.71 |
| No e-commerce RTA | 0.0635*** | 0.0404** | 0.197*** |
| | -4.28 | -2.35 | -10.02 |
| RTA with an e-commerce provision | 0.0969*** | 0.0983*** | 0.156*** |
| | -3.83 | -4.51 | -3.09 |
| Constant | 10.85*** | 11.24*** | 10.59*** |
| | -287.47 | -168.67 | -164.8 |
| N | 4 650 388 | 3 007 349 | 1 597 170 |

Note: Results from a gravity model for the period 1995-2018 using PPML and reporter-partner, reporter-sector-year and partner-sector-year fixed effects.

Source: López-González, Sorescu & Kaynak (2023) "of bytes and trade: quantifying the impact of digitalisation on trade", OECD Trade Policy Papers N. 273

# Impact of digital trade restrictiveness on trade by broad sector (2014-2018)

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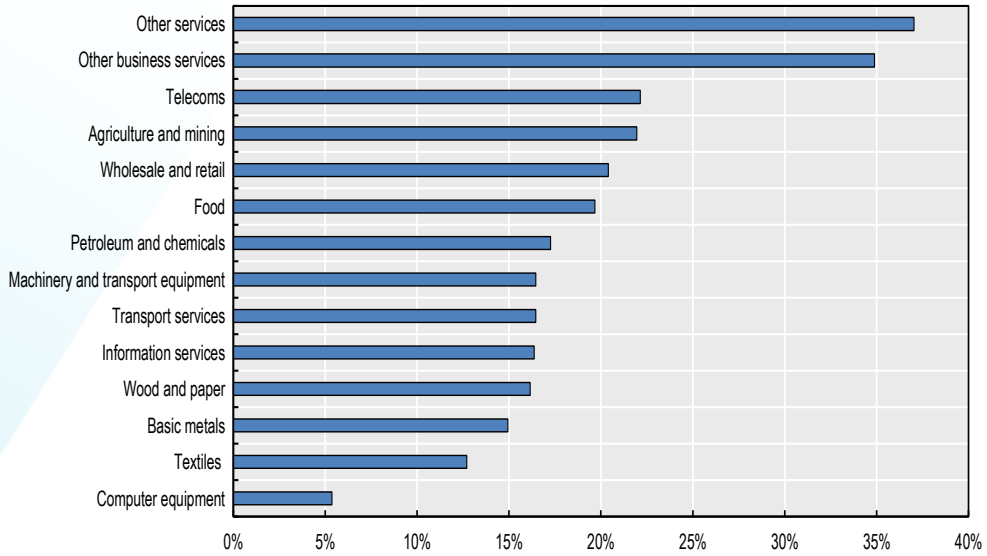
# Simulating the potential implications of data flow prohibitions – Size of shock

**Trade cost increase arising from a 0.1-point increase in the domestic DSTRI**




Step1: Calculate elasticity of trade wrt changes to DSTRI

Step 2: simulate policy change using DSTRI simulator (how much would DSTRI increase if data flows prohibited)

Step 3: calculate AVE (Benz and Jaaz, 2020)

$$AVE_i = \exp\left(-\frac{\Delta DSTRI_i * \beta_{DSTRI\_k}}{(\sigma_k - 1)}\right) - 1$$

# Potential increase in export costs arising from a scenario where countries prohibit the flow of data

| | Australia | Brazil | Canada | China | EU* | India | Indonesia | Japan | UK | USA |
|---|---|---|---|---|---|---|---|---|---|---|
| Agriculture and mining | 68% | 43% | 81% | 0% | 55% | 27% | 22% | 68% | 68% | 81% |
| Food | 60% | 38% | 71% | 0% | 48% | 24% | 20% | 60% | 60% | 71% |
| Textiles | 36% | 24% | 43% | 0% | 30% | 15% | 13% | 37% | 36% | 43% |
| Wood and paper | 48% | 31% | 57% | 0% | 39% | 19% | 16% | 48% | 48% | 57% |
| Petroleum and chemicals | 51% | 33% | 61% | 0% | 42% | 21% | 17% | 52% | 51% | 61% |
| Basic metals | 44% | 29% | 52% | 0% | 36% | 18% | 15% | 44% | 44% | 52% |
| Computer equipment | 15% | 10% | 17% | 0% | 12% | 6% | 5% | 15% | 15% | 17% |
| Machinery and transport equipment | 49% | 32% | 58% | 0% | 40% | 20% | 17% | 49% | 49% | 58% |
| Wholesale and retail | 62% | 40% | 75% | 0% | 50% | 25% | 21% | 62% | 62% | 75% |
| Transport services | 49% | 32% | 58% | 0% | 40% | 20% | 17% | 49% | 49% | 58% |
| Telecoms | 68% | 44% | 82% | 0% | 55% | 27% | 22% | 69% | 68% | 82% |
| Information services | 48% | 32% | 58% | 0% | 40% | 20% | 17% | 49% | 48% | 58% |
| Other business services | 118% | 72% | 145% | 0% | 93% | 43% | 35% | 118% | 118% | 145% |
| Other services | 127% | 77% | 157% | 0% | 100% | 45% | 37% | 128% | 127% | 157% |

Note: Values show *ad valorem* equivalents of moving from current stance to prohibition of data flows. *Digital STRI data for Germany.
Source: Own calculations using TiVA 2021 database.

# Caveats from analysis

- Indicators of digital connectivity do not capture quality of connection
- Low variance of digital trade variables (DSTRI)
- Impact of e-commerce chapters difficult to ascertain

  - Need to better tease out impact of e-commerce chapter (unobserved heterogeneity) in the presence of slow-moving variables (DSTRI) – difficult to use pairwise FE.
  - Can this be used to understand impact of specific digital trade provisions? Issues about what these change on the ground (e.g. implement your own).
  - Need to do better job at capturing impact across countries at different levels of development (ITPD-E database?).

We also need more work on how greater digital trade translates into more inclusive outcomes.

  - Impacts on poverty reduction
  - Inequality?
  - Channels of transmission?

# What do we learn

# Opportunities are there, but benefits not automatic

- Benefits of digitalisation for trade, and trade for digitalisation, are apparent.
- They go beyond ICT goods and services, extending to all economic activities.
- Digitalisation raises a range of new and difficult issues for trade (data flows, customs duties on electronic transmissions, cybersecurity, national security, IPR…)
- Need to continue mapping evolving regulatory environment and undertaking empirical analysis to feed into ongoing discussions, at WTO, in trade agreements but also in terms of domestic choices.

# Contact us

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