

The Impact of ICT on EU Trade

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Background

- Studies generally find that transportation infrastructure has a positive impact on trade (e.g. Nordås and Piermartini 2004)
- Theoretically, ICT positively affects trade by reducing information costs across international borders
- ICT markets are influenced by positive network effects (Wendt and von Westarp 2000)

Methodology

The gravity model

- Commonly applied econometric model to analyse trade related issues.
- Proven consistency with economic theories of trade
- Basic econometric model specification:
Log of real exports from one country to another is explained by:
 - log of both countries' GDP (absorptive capacity)
 - log of distance between the two countries (transportation costs), and
 - several dummy variables such as landlocked, common border, common language or membership of a FTA (variety of trade costs).
- Recent research highlights the importance of controlling for relative trade costs

Two estimation approaches

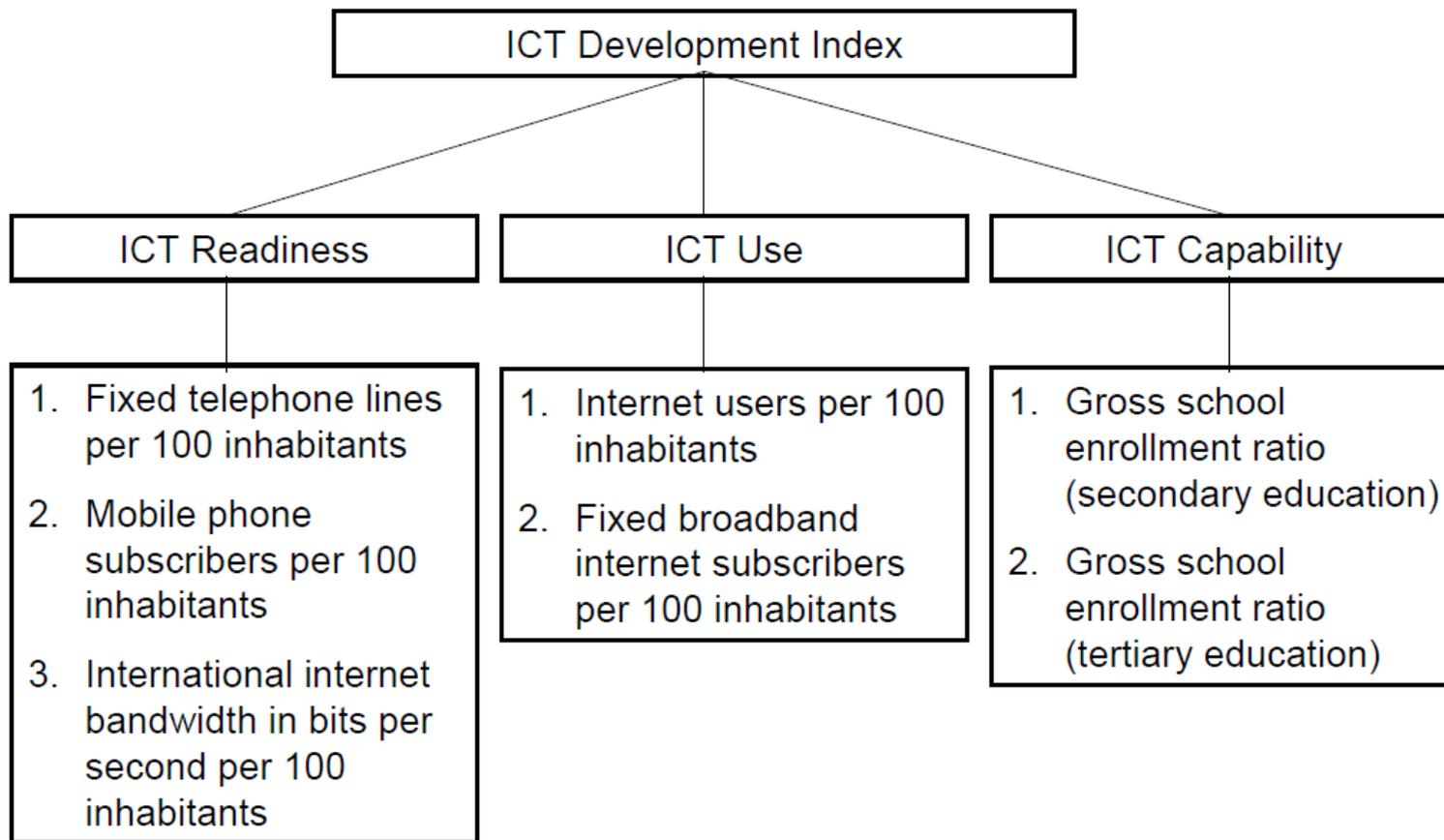
Basic model specification augmented by

- controls for relative trade costs, and
- controls for a time trend

The two model specifications differ by controlling for

- country-specific fixed effects (*first estimation approach*)
- country-pair fixed effects (*second estimation approach*)

The ICT Development Index (IDI)



Source: DIW econ based on International Telecommunication Union

Modelling ICT in the gravity framework

- Including ICT in the gravity model does not change its structural interpretation; ICT is part of the trade cost function
- Estimation approach has to account for the network characteristic of ICT

The two estimation approaches require two modelling alternatives of ICT:

- *First estimation approach:*
ICT is included via a dummy variable (1 if both trading partners have above average quality of ICT development and 0 otherwise)

- *Second estimation approach:*
ICT developments of the exporting and importing countries are included in the regression as well as an interaction term of those two variables.

Data

- 29 countries are included in the sample:
 - EU-27 except for Cyprus, Luxembourg, and Malta
 - 5 Non-EU countries: Australia, Canada, Japan, Korea, and USA

- 13 years time period (1995-2007) leading to a squared panel of 10556 observations

- Data sources are IMF Direction of Trade Statistics, IMF World Economic Outlook Database, World Development Indicators, CEPII, and International Telecommunication Union.

Estimation results of the first estimation approach

Table 1: Results from first estimation approach – marginal effects

Dependent variable: Log of real exports	Exporter and importer specific fixed effects, time fixed effects, and time varying importer and exporter dummies			
	Model 1	Model 2	Model 3	Model 4
Log of distance	-1.404***	-1.395***	-1.399***	-1.394***
Common language	1.209	1.219	1.182	1.192
Common border	1.372**	1.392**	1.37**	1.368**
EU membership	0.865	0.891	0.865	0.872
Transportation infrastructure dummy	1.469***			1.333***
ICT development dummy		1.468***		1.327***
Aggregated dummy			1.547***	
Observations	10556	10556	10556	10556
R-squared	0.916	0.916	0.916	0.917

***, **, and * denote significance at 1%, 5%, and 10% levels

Source: DIW econ

Estimation results of the second estimation approach

Table 2: Results from second estimation approach

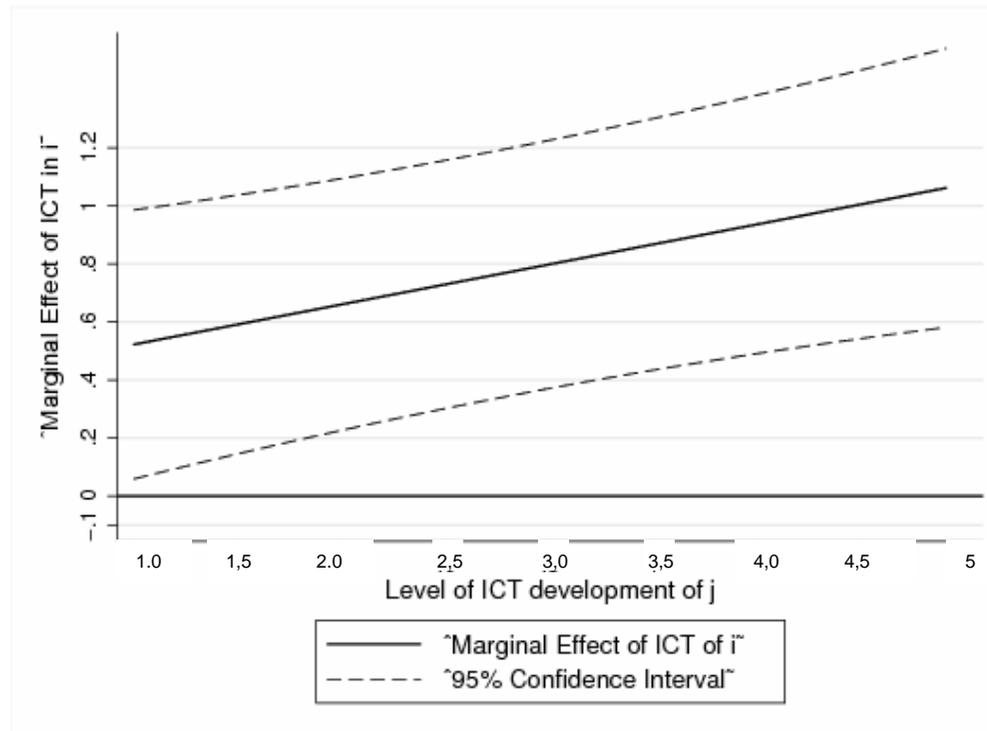
Fixed effects estimation with time fixed effects and time-varying exporter and importer dummies	
Log of real exports as dependent variable	
Log of exporter's ICT development	0.522**
Log of importer's ICT development	-0.056
Interaction of ICT developments	0.346**
Observations	10556
Within R ²	0.81

***, **, and * denote significance at 1%, 5%, and 10% levels

Source: DIW econ

The impact of ICT development on trade in the exporting country

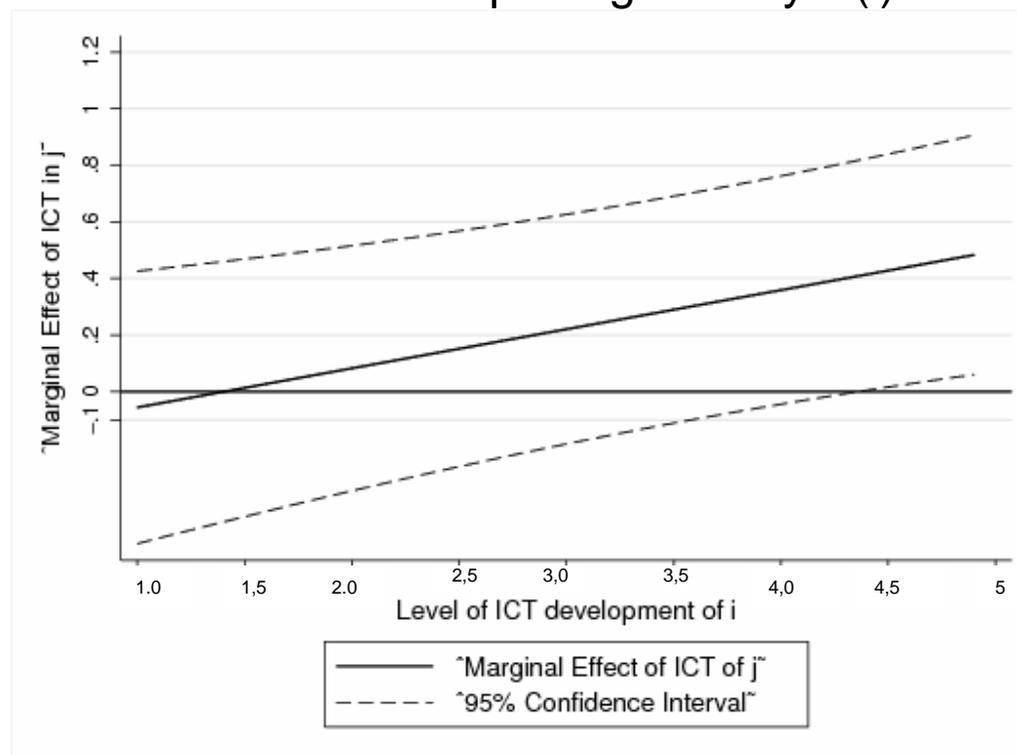
Figure 2: The impact of an exporting country's (i) ICT development on its exports for different levels of importing country's (j) ICT development



Source: DIW econ

The impact of ICT development on trade in the importing country

Figure 3: The impact of an importing country's (j) ICT development on its imports for different levels of exporting country's (i) ICT development



Source: DIW econ

Conclusion

- ICT does have a significant positive impact on EU trade.
- The results support the network characteristic of ICT.
- Good ICT development of both trading partners increases trade by about 33% (after controlling for transportation infrastructure).
- ICT development is particularly important for a country's exports.

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