

Empirical analysis of ICT in international trade of cut flowers: A gravity approach

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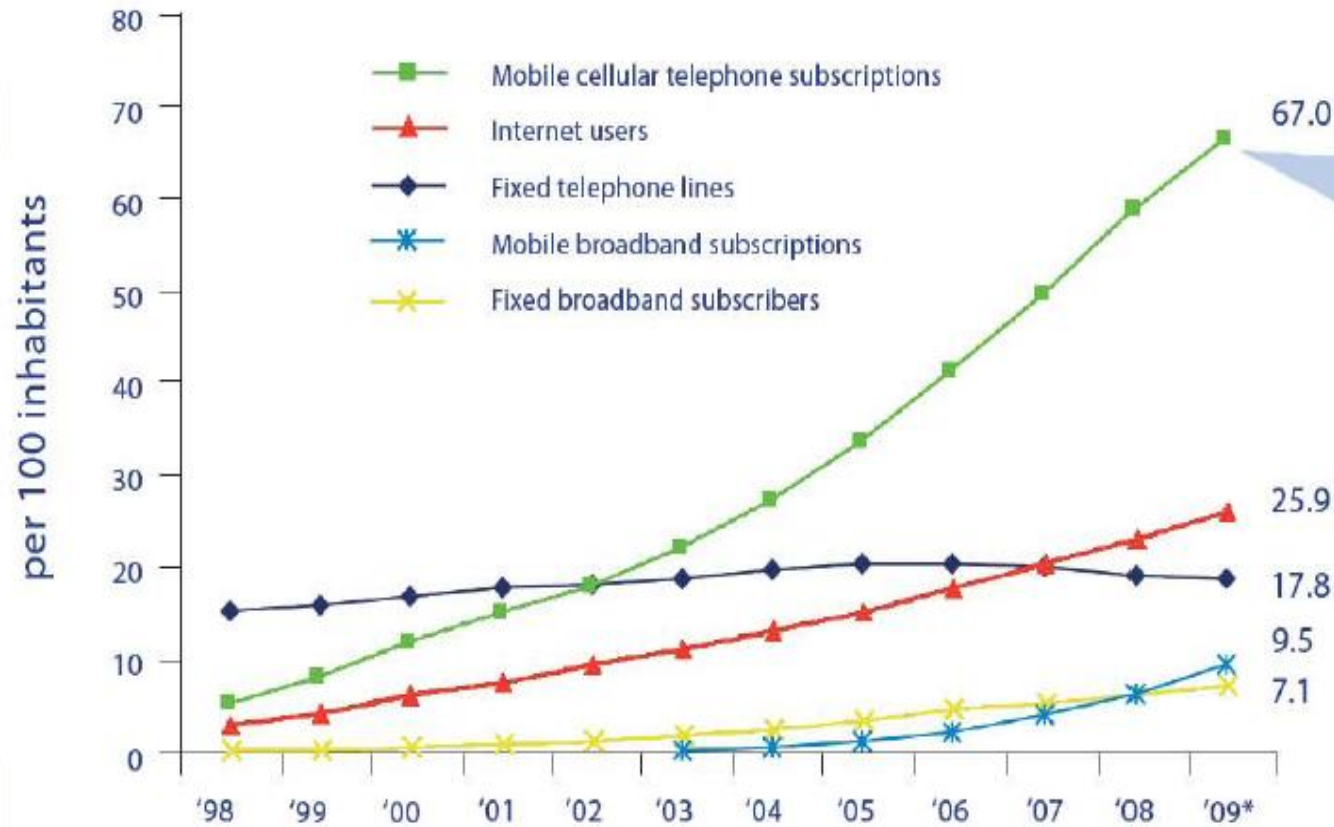
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Motivation

- What impact does ICT have on the volume of international trade in cut flowers?
- What impact do have specific ICT elements have on the volume of international trade in cut flowers?

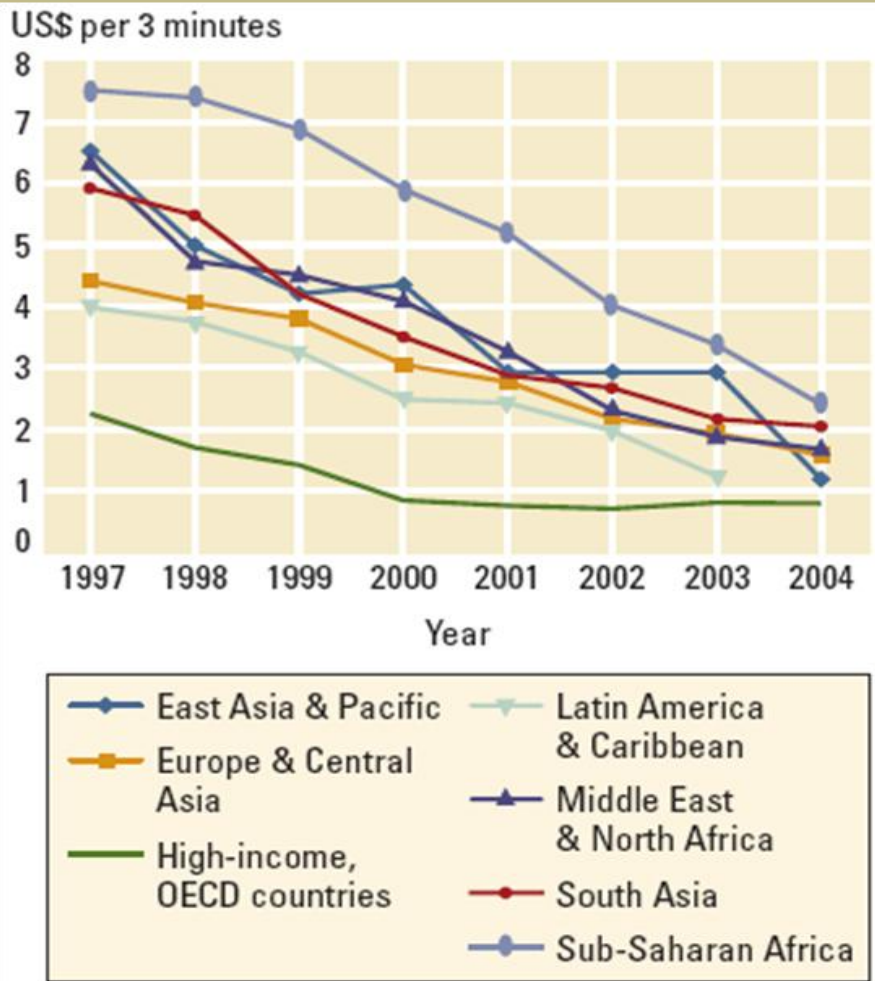
ICT growth



An estimated 4.6 bn subscriptions globally by the end of 2009

Source: The World in 2009: *ICT Facts and Figures* ITU TELECOM WORLD 2009 Press Briefing 6 October 2009

ICT costs



Source: World Bank 2007j.

- **Results from a World Bank study:**
 - communication cost influences international trade significantly
 - the impact is larger with differentiated goods than with homogeneous goods
- **A reduction by half of the costs of a telephone call**
 - from the importing country to the exporting country
 - increases bilateral trade by 43%

Related research

Summary - earlier research

Author(s)	Year of publication	Period		Countries			IT			Product			
		from	to	Total	Developing countries	Bottom-Billion-	Fixed line telephone	Mobile telephone	Internet	Agriculture	Food	others	Rauch-categories ⁽¹⁾
Freund & Weinhold	2004	1995	1999	56					✓			✓	
Wheatley & Roe	2005	1996	2003	Trade partners of the USA					✓	✓	✓		
Bojnec & Fertő	2009	1995	2003	OECD-countries			✓	✓	✓	✓	✓		
Fink, Mattoo & Neagu	2005		1999	107			✓					✓	✓
Clarke & Wallsten	2004		2001	93	✓				✓			✓	
Clarke	2008	1999	2005	Eastern Europe; Central Asia					✓			✓	✓
Tang	2006	1975	2000	103 trade partners of the USA			✓	✓	✓			✓	✓

(1) Distinction following Rauch (1999) between homogeneous and differentiated good on the basis of whether goods are traded on commodity exchanges and whether reference prices are available.

1. ICT stimulates a country's export
2. Export stimulation is larger for heterogeneous than for homogeneous goods
3. Internet stimulates exports from developing countries but not from developed countries
4. Mobile phones stimulate international trade in all countries
5. No consensus on the differences in impact of ICT on imports and exports



Cut flowers

- Highly perishable
- Highly differentiated
- Air freight used for international trade
- delivery to close markets
 - LA → NA
 - SSA → EU
 - SA, SEA, Aus → Japan, HK
- EU: > 50% passes through Dutch auction markets
- vertically integrated supply chains connect unsophisticated small farmers in SSA with highly sophisticated retail chains in EU
- market not closely monitored and poorly documented



Data set



- Period: 1995 – 2006 (10,421 observations)
- 58 exporting countries, 64 importing countries (92 in total)
- Compiled by different sources

UN Comtrade

**Trade data
(HS code 063)**

**International Telecommunication Union
(ITU)**

**ICT-data
(codes 13130, 29969 and 13110)**

World Development Indicators (WDI)

GDP, Population

**Centre D'Etudes Prospectives et
D'Informations Internationales (CEPII)**

Distance

**CIA-Factbook, Historical Atlas of the
World, Fischer Weltalmanach Länderatlas**

Colonial links, languages

**U.S. Energy Information Administration
EIA**

**Fuel data
(Singapore Kerosene-Type
Jet Fuel Spot Price FOB)**



Gravity Model



Classical model according to Newton:

$$T_{ij} = a^{\beta_0} Y_i^{\beta_1} Y_j^{\beta_2} d_{ij}^{-\beta_3}$$

$$\ln T_{ij} = \beta_0 \ln a + \beta_1 \ln Y_i + \beta_2 \ln Y_j - \beta_3 \ln D_{ij} + \varepsilon_{ij}$$

T_{ij} : trade value between country i and country j

a : constant

Y_i, Y_j : size of the economy of countries i and j
(measured as GDP)

D_{ij} : distance between country i and country j

ε_{ij}

error term

Gravity Model

Model extension via other explanatory variables

$$\ln T_{ij} = \beta_0 \ln A + \beta_1 \ln Y_i + \beta_2 \ln Y_j - \beta_3 \ln D_{ij} + \delta_1 \ln Z_1 + \dots + \delta_L \ln Z_L + \varepsilon_{ij}$$

Z: vector of other explanatory and control variables

- ICT-variables



- fuel price
- common language (dummy)
- adjacent countries (dummy)



Problems

- zero trade-values
 - no trade
 - incorrect data collection
 - rounding errors

$T_{ij} = 0$
→ ln is not defined

- Solutions

- delete zero-values
- add a small number (e.g. 1) $\ln(1)=0$
- estimate Poisson model (→log-linear)

} not state
of the art



estimations

- Hausman-Test FE vs. RE
- → fixed effects model is preferred

- Poisson Model
- → run a Negative binominal regression

- bootstrap option for standard errors (250 replications)



results



	Observed Coef.	z	P>z
In-internet-X	-0.0110492	-0.9	0.368
In-internet-M	-0.0045426	-0.21	0.835
In-mobilephone-X	0.0692113	3.93	0.000
In-mobilephone-M	-0.0252937	-0.84	0.403
In-telephone-X	0.2486428	2.14	0.032
In-telephone-M	0.088864	0.38	0.702
In-fuel	-0.0913088	-1.64	0.101

X = eXporter

M= iMporter



Conclusion and Outlook

- ICT currently is one of the most dynamic technologies influencing international trade
- ICT variables influence trade flows in cut flowers
- The impact varies across
 - communication technologies
 - importing and exporting countries
- Outlook (~ more work needed)
 - Fusion of mobile phones and internet (smart phones)
 - Eliminate countries with substandard trade
 - Other agri-food products



close



Thanks for listening!