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Transformation and challenges of the digital economy

J. Scott Marcus, Senior Fellow

The opinions expressed are solely my own

Transformation and challenges of the digital economy

- Introduction
- Gains from production versus use of ICTs
- Automation and employment
- Potential welfare gains from increased cross-border e-commerce
- Addressing impediments to cross-border trade
- International Mobile Roaming: A sobering case study
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Gains from *production* versus *use* of ICTs

Gains from *production* versus *use* of ICTs

- Various studies using growth economics or regression.
- "A majority of researchers agreed on the importance of ICT for the US growth resurgence observed from 1995 to 2006.
- Jorgenson et al (2008) estimate that the share attributable to ICT in US growth performance went from 43% for the period 1971-1995 to 59% for the period 1995-2000. …
- For the post-2000 period, Jorgenson et al. (2008) find that the contribution of investment in ICT capital to growth fell and that TFP growth in the ICT producing sector went down (from 0.58 for the 1995-2000 period to 0.38 for the 2000-2006 period). …
- Overall, in the period 2000-2006, it is estimated that ICTs accounted for about 38% of the US output growth."

Federico Biagi (2013), "ICT and Productivity: A Review of the Literature", JRC.

Claims and counter-claims

- Results differ for the US versus the rest of the world.
- “ICTs are an important determinant of long-term GDP growth, and more so for the US than for the EU.”

Federico Biagi (2013), “ICT and Productivity: A Review of the Literature”, JRC.

- There are claims for Europe that “the large gains are to be realized not so much from production of ICT—which will be much more difficult for Europe to achieve in the presence of strong U.S. and Asian competitors — as in its adoption.”

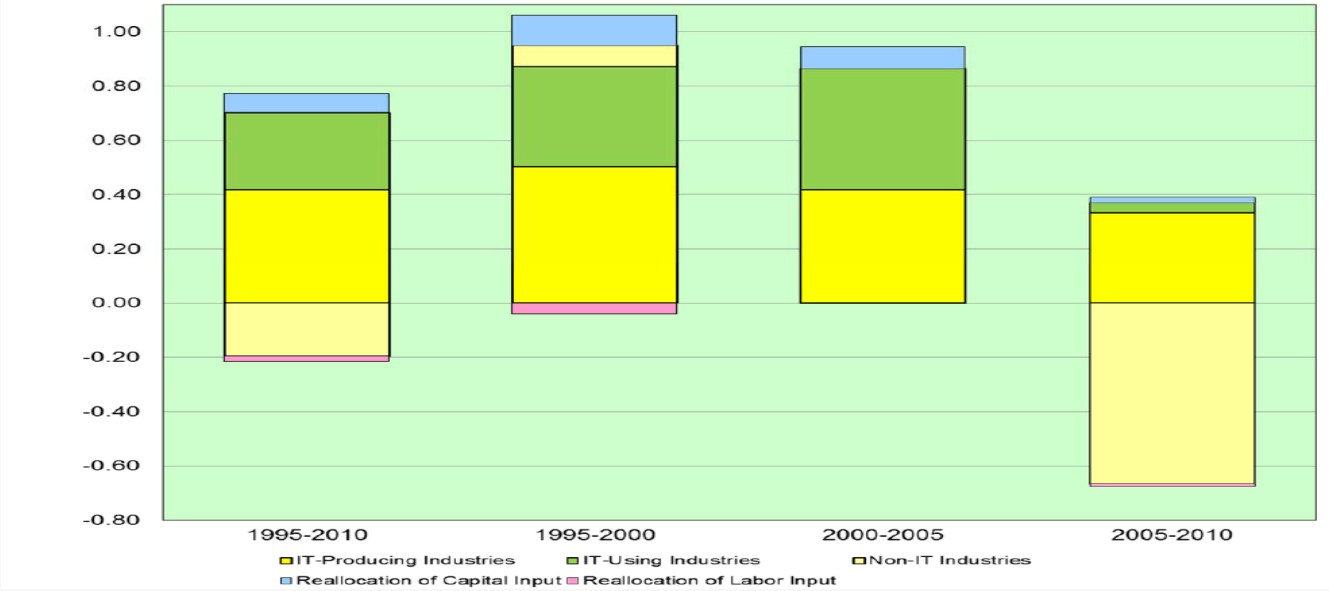
Ben Miller and Robert Atkinson (2014), “Raising European Productivity Growth Through ICT”.

- The European Lisbon agenda goal to invest 3% of GDP in research and development, especially ICTs, is achieved by the best and largest firms, but SMEs tend to fall substantially short.

Gains from *production* versus *use* of ICTs

- In recent years, the US appears to be possibly unique in gaining more from production of ICTs than from use.
- Potential productivity gains from use in Latin America should still be assumed to be large.

Contribution of industry groups to productivity growth in the US (1995-2010).



Jorgenson et al. (2014)

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Automation and employment

Automation and employment

- Concerns with technological innovation leading to unemployment go back hundreds of years (e.g. guild system).
- In the nineteenth and early twentieth centuries, largely a matter of de-skilling jobs, creating assembly lines, mass production.
- John Maynard Keynes (1933) predicted widespread technological unemployment “due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour”.
- A rich societal and cultural history, including:
  - The Luddites
  - Samuel Butler’s *Erewhon*
  - Carel Kapek’s *Rossum’s Universal Robots (R.U.R.)*
- Today, automation is driven by digitisation.

Automation and employment

Fritz Lang (1927), *Metropolis*

How deep can digitsation reach?

- “While computerisation has been historically confined to routine tasks involving explicit rule-based activities …, algorithms for big data are now rapidly entering domains reliant upon pattern recognition and can readily substitute for labour in a wide range of non-routine cognitive tasks ...
- In addition, advanced robots are gaining enhanced senses and dexterity, allowing them to perform a broader scope of manual tasks ...
- This is likely to change the nature of work across industries and occupations.”

Frey and Osborne (2016), “The future of employment:
How susceptible are jobs to computerisation?”

Jobs at risk

- “We distinguish between high, medium and low risk occupations, depending on their probability of computerisation. According to our estimates *around 47% of total US employment is in the high risk category* [i.e. amenable to automatisation]. We refer to these as jobs at risk – i.e. jobs we expect could be automated relatively soon, perhaps over the next decade or two.
- Our model predicts that most workers in transportation and logistics occupations, together with the bulk of office and administrative support workers, and labour in production occupations, are at risk.”

Frey and Osborne (2016), “The future of employment: How susceptible are jobs to computerisation?”

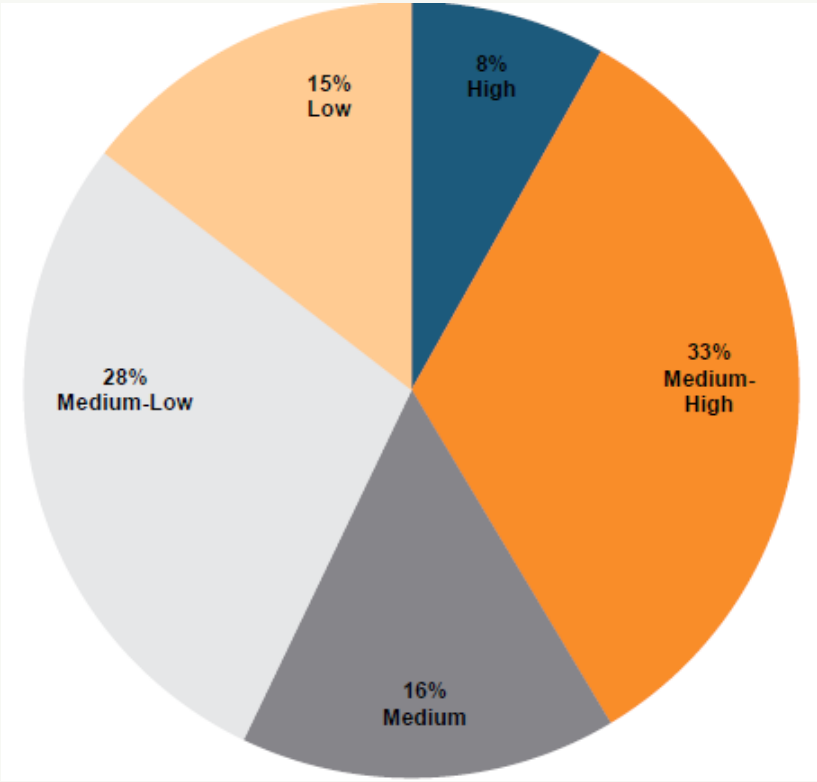
Impacts vary across sector and skill level

- “While nineteenth century manufacturing technologies largely substituted for skilled labour through the simplification of tasks … the Computer Revolution of the twentieth century caused a hollowing-out of middle-income jobs ...
- Our model predicts a truncation in the current trend towards labour market polarisation, with computerisation being principally confined to low-skill and low-wage occupations.”

Frey and Osborne (2016), “The future of employment:
How susceptible are jobs to computerisation?”

Not everyone agrees with the numbers

- One must interpret the Frey and Osborne results with caution.
- They estimate jobs that *might conceivably* be replaced.
- ITIF argues that many of these job categories are in practice quite difficult to automate.
- Instead of 47%, they estimate 8% of jobs to be at high risk.
- Based on tasks rather than occupations, Arntz, Gregory, and Zierahn likewise estimate 9%.



Robert D. Atkinson (2017), "AI, Robotics, and the Future of Work",
ITIF analysis of U.S. Bureau of Labor Statistics Occupational Data.

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Broadband as an enabler to the digitisation of society

Broadband is an enabler to the digitisation of society

- Broadband is unquestionably a key enabler to the digitisation of the broader society, but

➢Most of the literature is seriously biased in ways that make it seriously misleading for developing (e.g. non-OECD) countries.

➢Many developing countries are characterised by:

  - A fixed network that is not fully deployed, and is unlikely to be fully deployed at any time in the foreseeable future.
  - Portions of the national territory that are very challenging to serve.
  - Limited ability / willingness to pay (WTP) for communication services.
  - Access to undersea cables along the coast, but challenges in bringing high bandwidth to the interior.

➢Wireless access plays a crucial role.

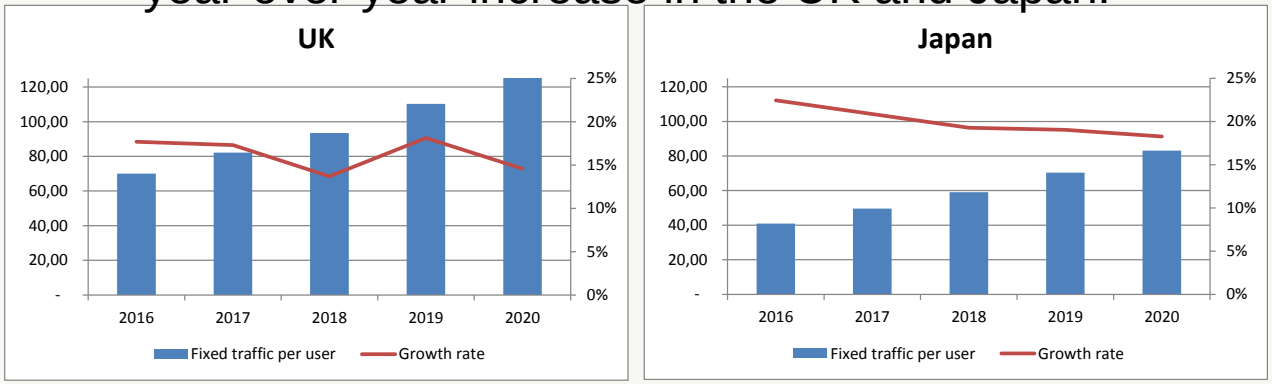
Problems with the published literature

- Excessive emphasis on ultra-fast FTTP/FTTH solutions.
- Ignores perfectly good, cost-effective ultra-fast solutions.
  - Cable (where available)
  - VDSL (with vectoring), G.Fast
- Pays insuffient attention to wireless / mobile solutions, which are *key for most developing countries*.
- Promotes prompt deployment of facilities that are wildly out of sync with actual user demand.
- Ignores demand stimulation measures.

Broadband supply versus demand

- It is sometimes claimed that traffic is growing exponentially, and that it will expand to fill network capacity no matter how great.
- Although Japan has some of the fastest FTTP broadband networks in the world, average traffic per fixed subscriber is less than in the UK (an FTTC/VDSL country), and appears likely to remain so.

Projected fixed broadband data consumption (GB/month) and year-over-year increase in the UK and Japan.



Source: Cisco VNI online database, Bruegel calculations (2017)

Policy imperatives

- Sound policy should reflect an approach
  - that takes proper account of the capabilities of the various available technologies and their relative applicability to different countries and regions
  - that realistically reflects likely demand characteristics, and
  - that is balanced between supply side measures and demand side measures.

➢ The focus should be on achieving *widespread deployment of good broadband* – not on limited deployment of ultra-fast broadband that few consumers want or need.

➢ This is true for all countries, but especially true for developing countries.

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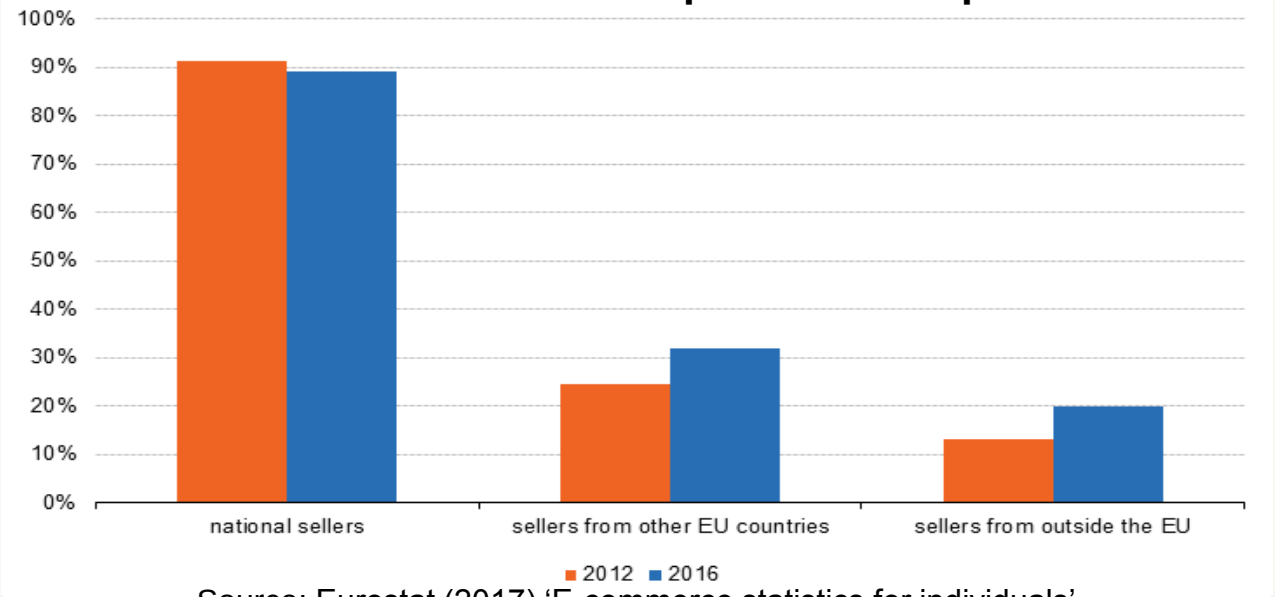
Potential welfare gains from increased cross-border e-commerce

EU cross-border sales continue to lag

- E-commerce in Europe is doing fairly well, but cross-border sales are less than might have been expected or desired.

National and cross-border purchases by e-shoppers, EU-28, 2012 and 2016 (% of individuals who bought or ordered goods or services over the internet for private in the previous 12 months)



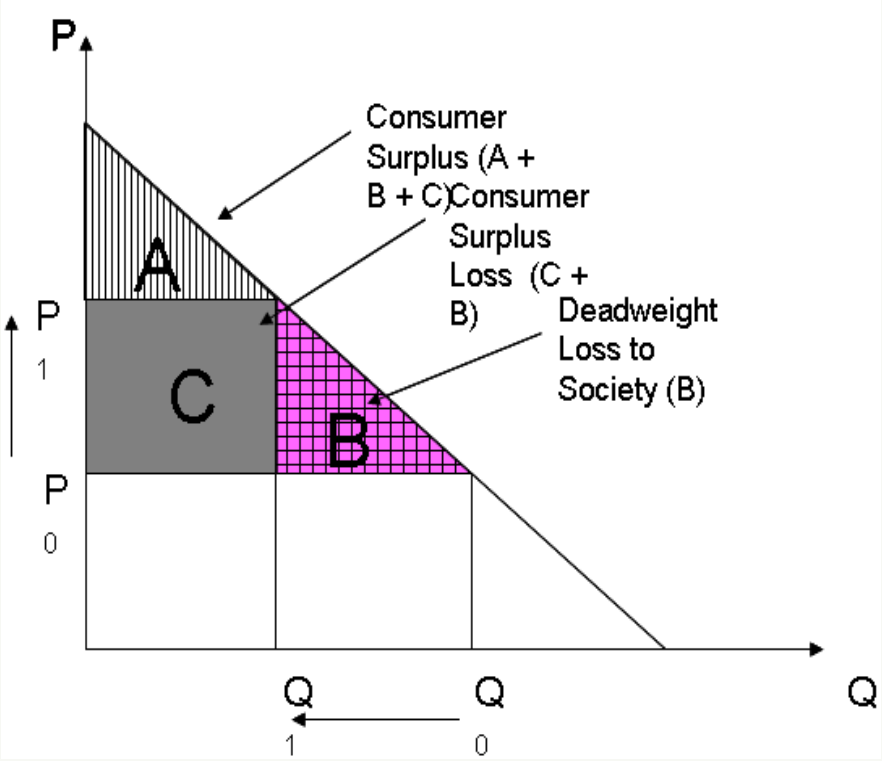
Source: Eurostat (2017) 'E-commerce statistics for individuals'

Welfare gains from increased e-commerce

- The EU has intensively studied challenges to cross-border e-commerce.
- The results are presumably relevant to Latin America.
- Duch-Brown and Martens (2016), a noteworthy study using state-of-the-art analytic techniques, found that if e-commerce sales in the European Union were as easy and cost-effective as domestic sales, retail prices would decrease in all countries.
- The estimated reduction in price is
  - -1% on average for online purchases, and
  - -0.5% on average for offline purchases.
- They found gains in *consumer surplus* and *producer surplus*.

Welfare gains from increased e-commerce

- Societal welfare is generally defined as the sum of consumer welfare and producer welfare.
- Reducing artificially inflated prices can enhance societal welfare.
- The Harberger Triangle distinguishes between *transferring welfare* from producers to consumers versus *reducing deadweight loss* (achieving greater consumption thanks to lower prices), whereby society benefits.
- To what extent do lower prices promote increased consumption? This is the *price elasticity of demand*.
- Lowering artificially inflated prices generally benefits consumers, but usually at some cost to producers.



Welfare gains from increased e-commerce

- If all goods were traded by B2C e-commerce as effectively cross-border as within an EU Member State, Duch-Brown and Martens (2016) estimate that consumer surplus (CS) would increase by 1.2%.
  - This is mainly due to the reduction in the price paid for goods.
  - Secondarily, it relfects the ability of consumers to choose from a wider range of goods and services.
- They also find an increase of producer surplus (PS) of 1.4%.
  - This is partly due to increased consumption (price elasticity of demand).
  - A major factor is *reduced costs of supply* — many purchases would be made online rather than from “brick and mortar” retailers.
  - The cost of producing the goods is unchanged, but the cost of making the sale online is less than the cost of making the equivalent sale offline.

Welfare gains from increased e-commerce

- The gains estimated by Duch-Brown and Martens are *average* gains; in reality, however, not everybody will be better off.
- Formally, increasing cross-border e-commerce
  - is probably not *Pareto positive* (where at least one party is better off, and nobody is worse off);
  - may however be Kaldor-Hicks positive (where some parties are sufficiently better off that they could hypothetically pay off any parties that are worse off).

➢This implies that promoting more e-commerce is, in a global sense, desirable; however, obtaining agreement from parties that fear that they might be disadvantaged could be challenging.

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Addressing impediments to cross-border trade

Strengthening e-commerce in the EU: Opportunities and challenges

- The European Union (EU) strives to achieve a single market with unimpeded movement of goods and services.
- E-commerce is now commonplace in the EU, but relatively little e-commerce takes place (as we have seen) across EU Member State borders.
- The European Union's *Digital Single Market (DSM)* strategy seeks to strengthen cross-border e-commerce by means of:
  - Affordable high-quality cross-border parcel delivery
  - Reducing VAT burdens and obstacles when selling across borders
  - Consistent cross-border e-commerce consumer protection rules
  - Reinforcing trust and security in digital services and in the handling of personal data
  - Prevention of unjustified geo-blocking (with copyright modernisation)

High cross-border parcel delivery prices

- In the EU, about half of e-commerce is for goods.
- Systemic aspects
  - Similar to roaming, international delivery by National Postal Operators (NPOs) is subject to wholesale payments.
  - Unlike roaming, wholesale Terminal Dues (TDs) appear to be *below* actual costs – they lead to distortions, but do not cause high prices.
- Observed behaviour
  - Within Europe, cross-border delivery of small parcels by NPOs for small firms typically costs three to five times as much as domestic.
  - SMEs often depend on the NPOs.
  - Chinese merchants can reportedly ship to consumers in the US or Europe for less than domestic merchants. (China probably benefits from being classified as a developing country under UPU rules.)

Complex, incoherent, or inconsistent taxes applied to goods and services

- Each EU Member State charges different overall VAT rates.
- Each EU Member State decides which goods or services qualify for discounted rates.
  - This often leads to different VAT rates for digital goods versus physical equivalents (e.g. books versus e-books), thus distorting trade.
- The EU exempts small shipments from third countries from VAT, thus disadvantaging EU merchants versus foreign merchants.

➢e-merchants must understand tax rules in each country to which they sell.

➢European approaches (a mini-one-stop-shop for VAT, for instance) appear to have little applicability elsewhere.

➢What country would relinquish sovereign control over taxation?

Consumer protection, product labelling, packaging, and safety rules

- Consumer protection and product safety rules entail complex trade-offs.
  - If too little protection is on offer, consumers may lack confidence.
  - Excessive, needless rules can however impose transaction costs that negatively impact commerce (including e-commerce).
- Product safety rules can serve protectionist purposes.
- In the European Union, current common consumer protection rules generally set *lower* bounds but not *upper* bounds.
- Perceived difficulties with cross-border dispute resolution may also limit consumer confidence in cross-border e-commerce.

Consumer privacy

- Divergent privacy rules likewise impose burdens on e-merchants.
- Transfer of personally identifiable information across national borders is essential to many cross-border transactions.
- Here, the European Union's *General Data Protection Regulation* (*GDPR*) is establishing something of a *de facto* "gold standard", where data must be relevant to its intended purpose, should not be used for other purposes without the user's consent, and should not be retained longer than necessary.
- The US regulates privacy thru sector-specific instruments, rather than by means of an over-arching framework.
- In the EU, privacy is a *right* – this provides powerful protection, but is arguably inflexible.

Consumer privacy

- If they are obliged to do so for the EU, the incremental cost of implementing the same rules for other countries (even if they are not required) is likely to be low.
- Many countries (e.g. Japan) have enacted or can be expected to enact rules similar to those of the EU GDPR in order to be able to more easily conduct e-commerce with EU firms and consumers.
- This might possibly lead to a *de facto* global harmonisation of privacy rules, provided that
  - countries do not exceed the demanding EU standards; and
  - the new EU work on the *e-Privacy Directive* does not go overboard.

Consumer privacy and data transfers

- Meanwhile, *transfers of personally identifiable data* from the EU to third countries are intensively regulated.
- These transfers are important to a wide range of electronic services.
- For transfers to the US, concerns over widespread, indiscriminate US government surveillance (Schrems case) led to *Privacy Shield*.
- Similar concerns are likely to emerge with the post-Brexit UK.

Security of transactions

- Maintenance of suitable network and information security is clearly also essential to consumer confidence.
- Threats today are substantial (cf. *WannaCry* malware).
- Forensics and (international) attribution can pose daunting problems.
- The role of state actors is increasingly of concern, not only as possible offensive actors, but also to the extent that governments hide exposures from the private sector that they wish to exploit.
- The promising Digital Geneva Convention put forward by Microsoft CEO Brad Smith “calls on the world’s governments to come together, affirm international cybersecurity norms that have emerged in recent years, adopt new and binding rules and get to work implementing them … to protect civilians on the internet.”

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International Mobile Roaming: A sobering case study

IMR: A challenge to policymakers

- In many countries of the world, governments have been concerned not only over excessively high international mobile roaming (IMR) charges at the retail level to consumers, but also over payments at the wholesale level between mobile operators.
- The actual underlying cost of e.g. an IMR call made or received bears little relation to the retail charge that the home network charges the consumer for roaming on a visited network.
- Many factors contribute to these high prices, which can be viewed as a form of *double marginalisation*.

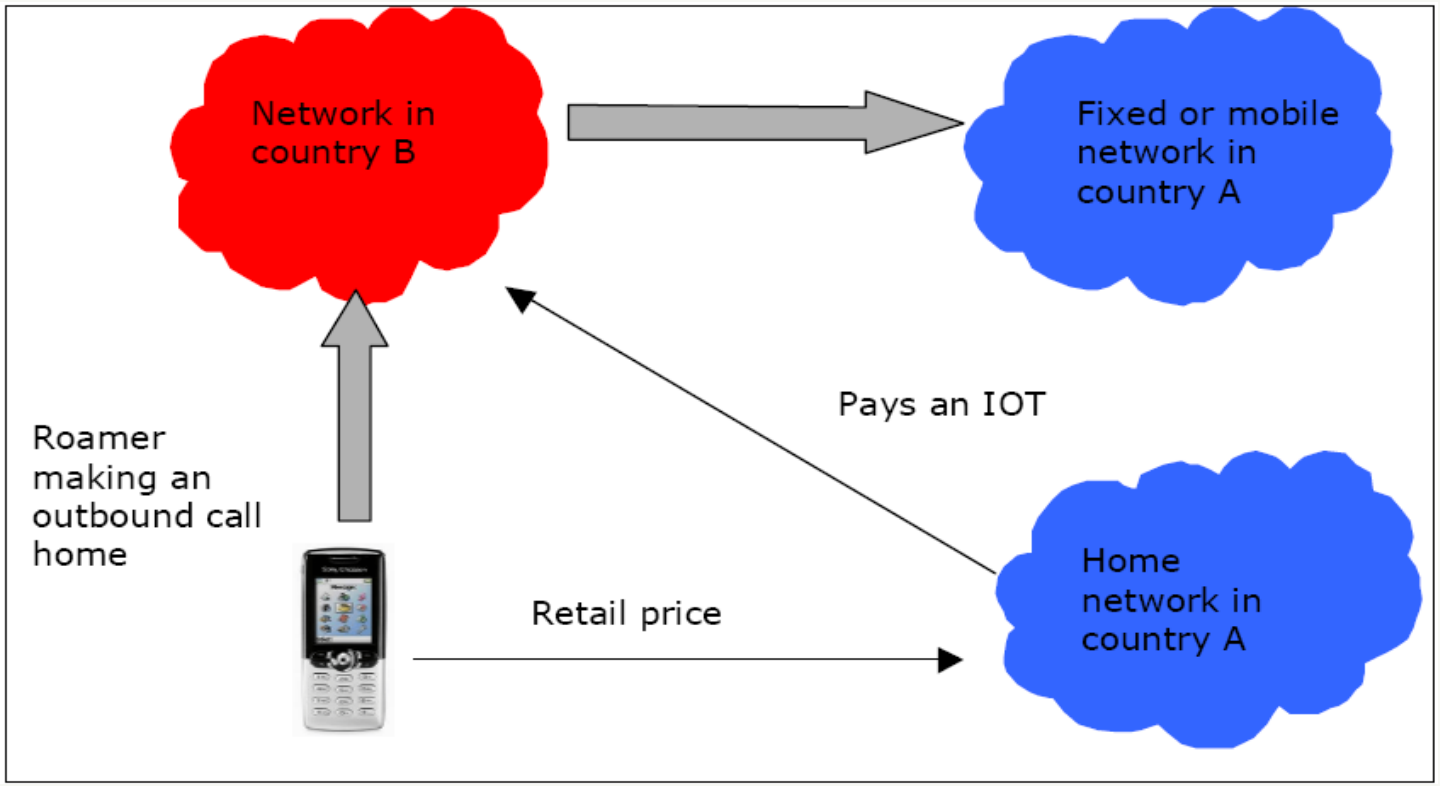
Attempts to drive down IMR costs/prices

- Intensive regulation has been present in the European Union (EU) since 2007, and in the GCC since 2012.
- Studies and actions in many other parts of the world, including the West Balkans, Australia / New Zealand, the SADC region (CRASA), EACO, ECOWAS, Regulatel (Latin America), and more.
- ITU Recommendation D.98, and more work in progress.
- Mixed results from voluntary bilateral or mutlilateral arrangements such as Russia/Poland and Russia/Finland.
- Somewhat better results from voluntary Singapore/Malaysia and Singapore/Brunei bilateral agreements.

Cash flows and traffic flows under IMR

- At least four different services:
  - Calls made
  - Calls received
  - SMS (and MMS)
  - Roaming data
- Different data flows and cash flows for each.
- Roaming data is by far the most important service today, but voice calls are perhaps easiest to understand.

Roaming traffic and payments: calls made



Source: ARCEP, The Market for International Roaming, February 2006

Lessons from Roaming Regulation in Europe

- An important positive feature is that both wholesale and retail prices were regulated in a coordinated way.
- Retail regulation only?
  - Risk that retail prices are less than wholesale prices (which represent costs to MNOs).
  - Risk that some roaming services might no longer be offered.
- Wholesale regulation only?
  - Risk that MNOs would not pass on cost savings to users in the form of lower prices.
  - Potentially alters which MNOs benefit from excessive profits, without however benefitting consumers or the broader society.

➢ Success depends on coodinated multi-national regulation of both.

Post-2012 confusion in the EU

- After several years of successful price controls, European policy entered a period of confusion.
- With the 2012 Roaming Regulation, MNOs were required to implement structural solutions to force competition.
  - Implementation costs to the industry of € 500 – 1,000 million.
  - ***No positive results whatsoever.***
  - A foolish experiment that other regions should not duplicate.
- A 2015 EU Regulation mandates *Roam Like at Home (RLAH)*, where the retail price of roaming may not exceed that of equivalent domestic service (effective as of 15 June 2017).
  - Makes political sense, but makes no economic sense.
  - *If costs are not the same, prices should not be the same.*
  - Will with near certainty reduce EU societal welfare going forward.
  - Another foolish experiment that other regions should not duplicate.

Roaming Regulation in the EU: Likely effects of Roam Like at Home

- Near term static effects:
  - Significant one-time administrative costs as MNOs/MVNOs have to review and adapt every retail plan they have.
  - Immediate increases of from €1 to €3 in the overall mobile plan price (not just roaming) are already visible to cover extra roaming costs.
- Medium term static effects (first visible circa 2020?):
  - Further price increases in the mobile package as consumer preferences respond to take advantage of RLAH.
  - Distributional effects: the poor, who rarely travel, subsidise those with greater disposable income (Robin Hood in reverse).
  - Market exit of many MVNOs and single country MNOs.
  - Further price increases due to more oligopolistic market structure.
- Longer term dynamic effects:
  - Suvivors may have more profits to invest, but less incentive to do so.

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Concluding remarks

Concluding remarks

- On balance, increased use of ICTs promises substantial benefits to the broader society in Latin Amercia (and elsewhere); however, not all impacts are positive.
- Dislocation to labour should be expected, and some job losses.
- Widespread deployment, adoption and use of good broadband is an important enabler; beware, however, the obsessive focus on fixed network FTTP/FTTH that is manifest in the literature.
- E-commerce represents an important opportunity, and cross-border e-commerce tends to be under-developed globally.
- If e-commerce were totally frictionless in the EU, it would generate lower consumer prices, greater choice, and a net gain in both consumer and producter surplus in the EU.

Concluding remarks

- The EU is implementing many measures to encourage cross-border e-commerce, some of which could be considered here.
  - Affordable high-quality cross-border parcel delivery
  - Reducing VAT burdens and obstacles when selling across borders
  - Trustworthy cross-border e-commerce consumer protection rules
  - Reinforcing trust and security in digital services and in the handling of personal data
  - Prevention of unjustified geo-blocking (with copyright modernisation)
- The *Roam like at Home (RLAH)* Regulation enacted in the EU in 2015 shows that even a competent politician system can sometimes blunder badly.

➢There is tremendous potential in Latin America, and much that can be learned from the EU, Japan, and the US; those lessons must, however, be adapted to Latin American circumstances.