


Inconsistent Regulation, Market Structure and Broadband Adoption in the EU: A Dynamic Model

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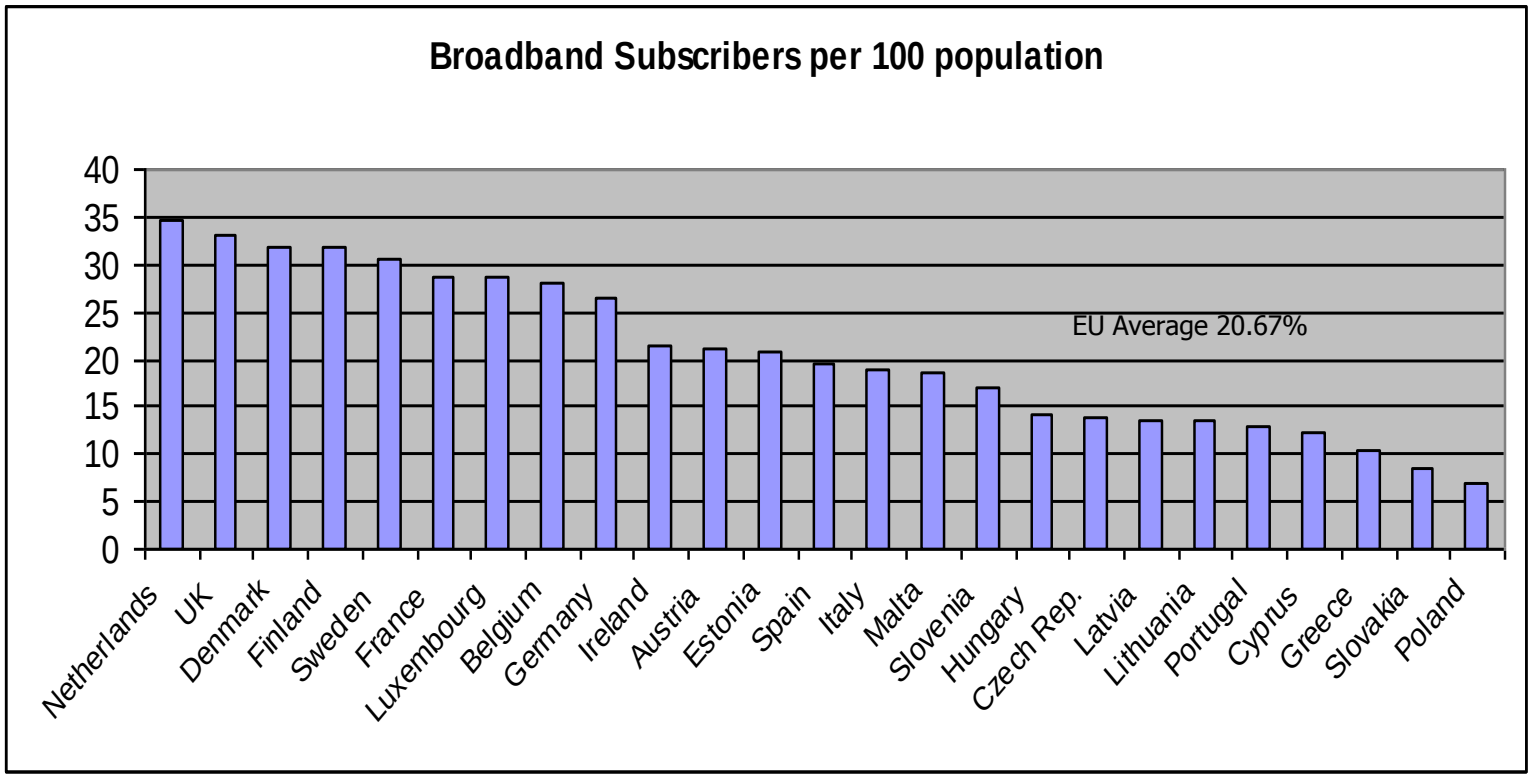
SPC Network

Rigorous analysis:
exceptional advice


Agenda

- Motivation
- Hypotheses
- The Models
- Results

Motivation


Broadband Subscribers per 100 population
40
35
30
25
20
15
10
5
0
EU Average 20.67%
Netherlands
UK
Denmark
Finland
Sweden
France
Luxembourg
Belgium
Germany
Ireland
Austria
Estonia
Spain
Italy
Malta
Slovenia
Hungary
Czech Rep.
Latvia
Lithuania
Portugal
Cyprus
Greece
Slovakia
Poland


Motivation

Cluster	Countries	Predominant competition to incumbent
1	AT, BE, DK, HU, MT, NL, PL, PT, SV, ES, SE	Cable
2	CY, FI, LU	None
3	CZ, ET, LV, LI, SI,	Other
4	FR, DE, IT	LLU
5	EL, IE, UK	Bitsream


Motivation

- Countries have started at different places and have adopted different approaches to promoting competition
  - Netherlands has developed cable TV sector which serves 90% of homes and was easily upgraded to broadband
  - Sweden has promoted city fibre networks often owned by local authorities
  - France introduced aggressive pro-LLU policy
  - UK promoted cable as competition but has moved towards LLU though bitstream plays a major role in the market


Motivation

Framework Directive: Article 1

"This Directive establishes a harmonised framework for the regulation of electronic communications services, electronic communications networks, associated facilities and associated services. It lays down tasks of national regulatory authorities and establishes a set of procedures to ensure the harmonised application of the regulatory framework throughout the Community."

Framework Directive: Article 8.2

The national regulatory authorities shall promote competition in the provision of electronic communications networks, electronic communications services and associated facilities and services

Motivation

First let me stress that in the electronic communications sector, two decades after we started to open national markets formerly dominated by state-owned monopolies to competition, we still do ***not*** *have an internal market for telecoms. The reason for this is mainly a regulatory one: the fragmentation of the internal market into 27 different regulatory systems. (her emphasis)*
(Reding, Speech to ERG, 2007)


Hypotheses

State Ownership → Price of LLU → Market Structure → Adoption

Hypothesis 1: In countries where the state retains any ownership in the incumbent operator prices of unbundled local loops will tend to be higher. This is because the state has no incentive to lower the price of unbundled local loops to encourage market entry by competitors to its own, at least partially, incumbent operator.

Hypothesis 2 Higher prices of unbundled local loops tend to result in more concentrated markets. This is because entrants will be discouraged from market entry by the high price of local loops.

Hypothesis 3 Less concentrated markets stimulate broadband adoption. Further, both the current level of market concentration and the change in market concentration are expected to have strong effects on the level of broadband adoption. I expect that less concentrated, more competitive, markets incentivise suppliers to sell broadband connections through both price and non-price activities.


Hypothesis 1

Country	State Ownership	Mean Weighted Average Price of LLU
Denmark	0	€8.88
Spain	0	
Ireland	0	
Italy	0	
Netherlands	0	
UK	0	
Austria	1	€10.81
Belgium	1	
Germany	1	
Finland	1	
France	1	
Luxembourg	1	
Portugal	1	
Sweden	1	

Difference between the means is significantly different from zero at 8.1%


Hypothesis 2

Pooled time-series cross-section model (2002 – 2007) shows significant relationship between the price of LLU and market concentration of technologies.

Dependent Variable = HHI	Linear Model	Log Model
PLLU	85.799 (4.8)	0.26 (5.5)
Adjusted R^2 (unweighted)	0.63	0.70
Durbin Watson	1.03	1.25

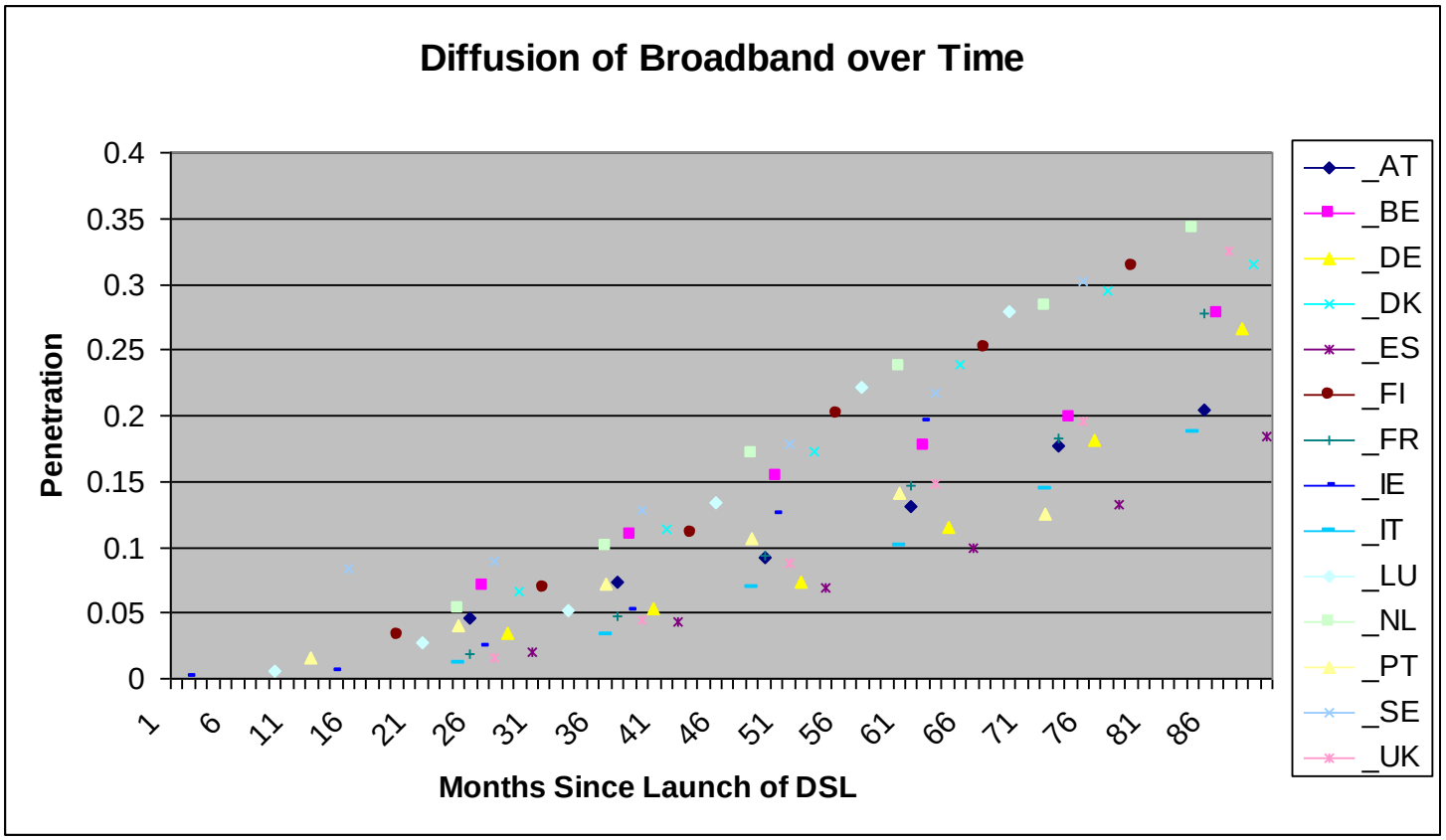
Hypothesis 3

- What might affect broadband penetration?
  - Own Price
  - Price of Substitutes, Price of complements
  - Existing number of subscribers
  - Competition
  - Wealth
  - Period since launch

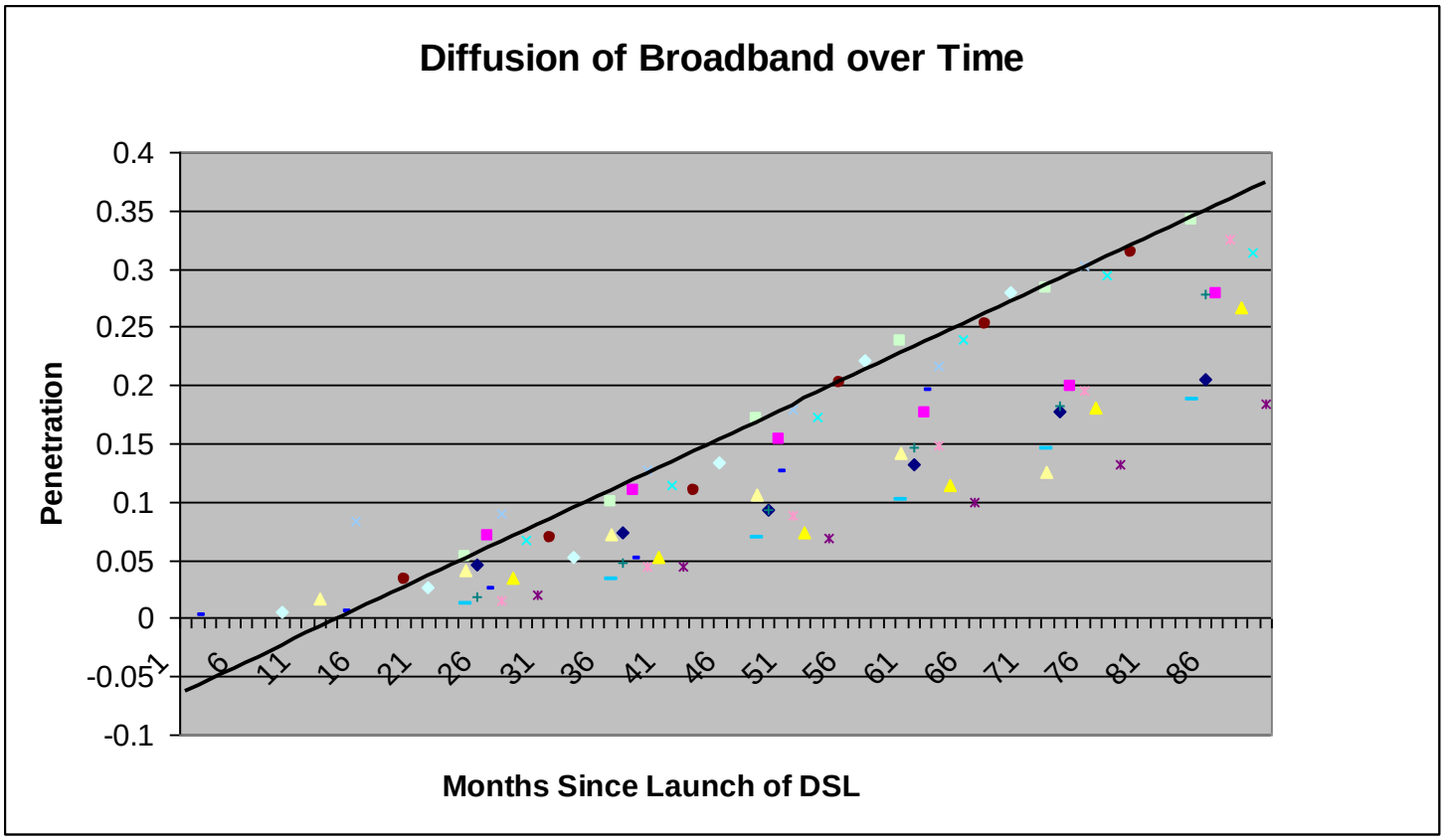

Hypothesis 3

- Competition
  - Ideally measure at firm level, but data are not available
- Therefore measure at modal level
  - Incumbent's own retailer
  - Bitstream based wholesale by incumbent
  - Local Loop Unbundling (LLU)
  - Cable
  - Other
    - FttH
    - Satellite
    - Wireless

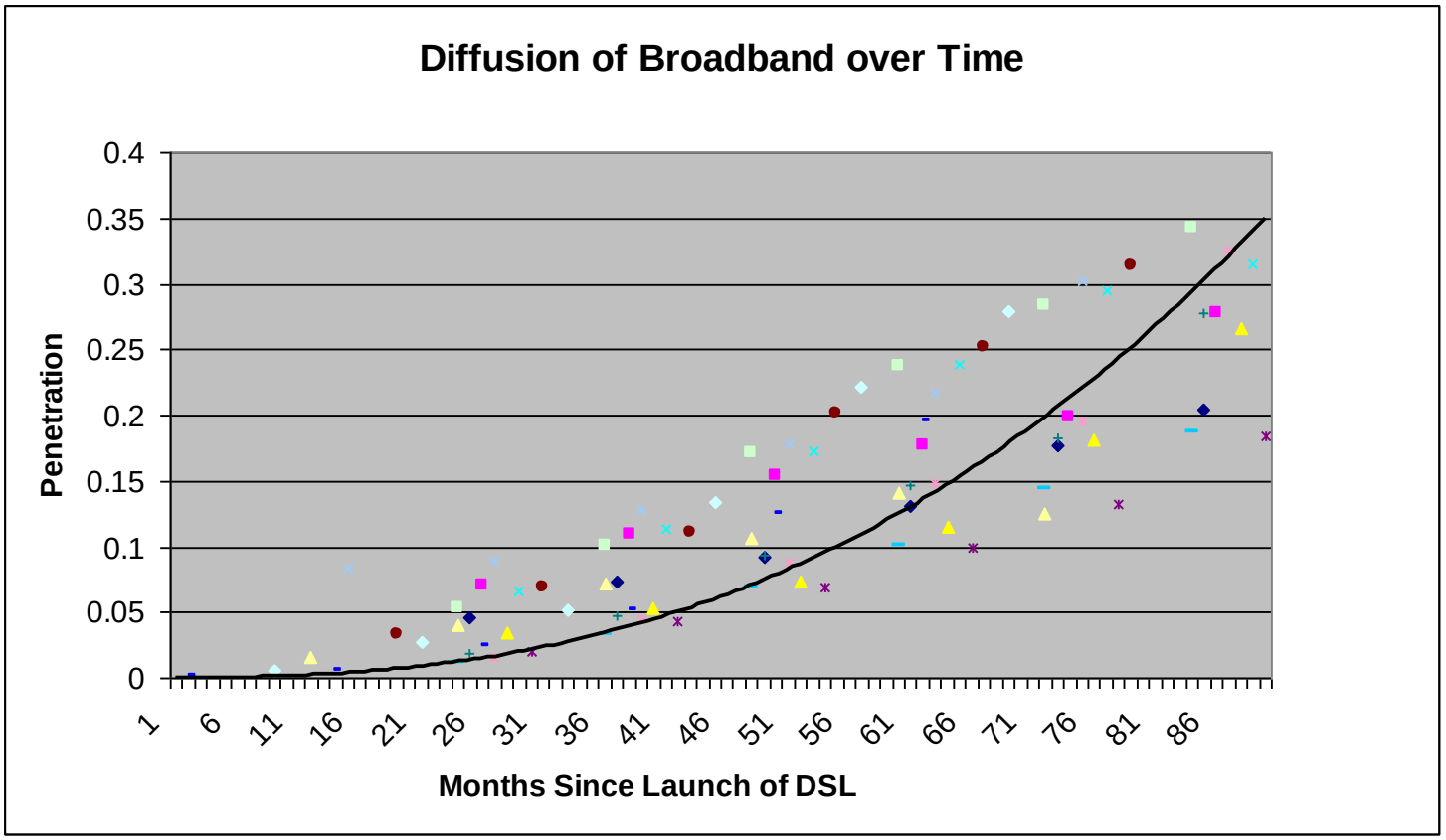
Hypothesis 3



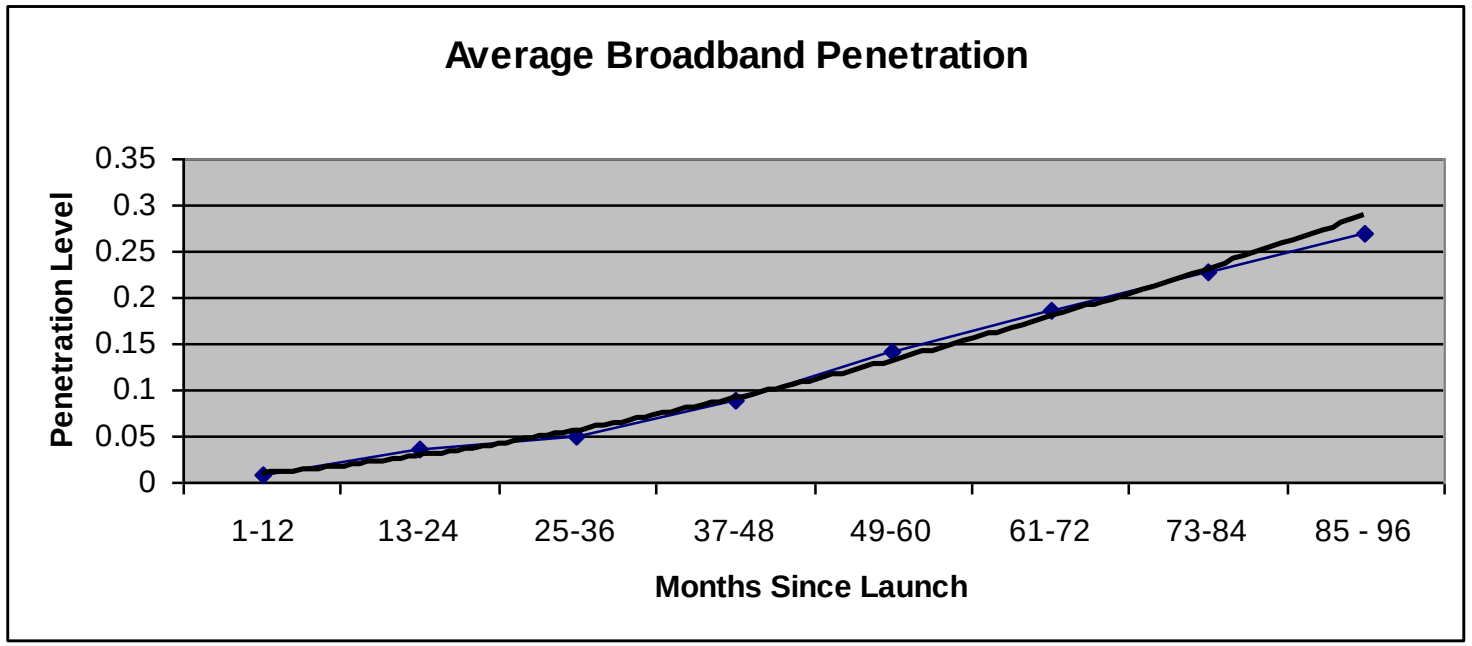
Hypothesis 3



Hypothesis 3



Hypothesis 3




Hypothesis 3

Pooled time-series cross-section Lagged Dependent Variable model

$$Log(BBPEN) = \alpha + \beta LOG(BBPEN - 1) + \chi LOG(HHI) + \delta LOG(GDPCAP) + \phi LOG(LAUNCH) + e$$

BBPEN = broadband penetration per 100 population
HHI = market concentration of technologies – incumbent, bitstream, LLU, cable, other
GDPCAP = GDP per capita (2000 prices)
Launch = months since launch of commercial DSL


Hypothesis 3

	2003 – 2007	2003 – 2006
Variable	Coefficient	Coefficient
Constant	-1.29	0.01
LogBBPEN-1	0.65**	0.67**
LogHHI	-0.18**	-0.20**
LogGDPCAP	0.33**	0.25**
LogLaunch	0.14*	0.05
R2	0.97	0.96
Durbin-h	1.53*	0.8*

** significant at 1%, * significant at 5%


Hypothesis 3

Elasticities

LTE = $\beta/(1-LDV)$

Variable	Short term elasticity	Long term elasticity
HHI (2006)	-0.20	-0.62
GDPCAP (2006)	0.25	0.76
HHI (2007)	-0.18	-0.53
GDPCAP (2007)	0.33	0.95


Discussion

Hypothesis 1	Some evidence of a significant difference in LLU prices where state retains ownership. However, the sample is very small and significance only at 8%. Need larger sample
Hypothesis 2	Evidence that the price of LLU, regardless of the price of substitutes, affects market structure. Lower LLU prices are associated with less concentrated markets.
Hypothesis 3	Degree of competition between fixed broadband technologies is significantly associated with increased BB penetration. Increased in GDP per capita are also associated with increased penetration Relationship with time since launch appears to be strengthening Results are consistent with the addition of extra year's data


Further work

- The model could be improved by
  - More granular data on firm level market shares
  - Data on the cost of alternative infrastructures
  - Data on consumer prices and prices of substitutes/complements
  - Data on mobile broadband which is reportedly being used in some countries as a substitute for fixed broadband