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# Estimating demand for quadruple-play tariffs

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# Motivation

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- Quantitative customer demand estimation via discrete choice models is an emerging economic instrument for policy decision
- We estimate consumer's valuation for triple play component ADSL and FTTH within a quad, fixed-mobile services interaction using micro-level data of consumer tariff choices
- For regulatory policy, it seems interesting to track changes on the market from consumers' perspective

# Empirical model

Linear utility function of a customer

$$U_{ijt} = V_{ijt} + \varepsilon_{ijt}$$

$$\begin{aligned}
 U_{ijt} = & \alpha_{ij} \text{ Price} + \beta_r \text{ SwitchingR} + \beta_n \text{ SwitchingN} && \rightarrow \text{negative sign} \\
 & + \beta_2 \text{ Voice} + \beta_3 \text{ Unlimited} + \beta_4 \text{ DataMobile} + \beta_5 \text{ TerminalSub} + \beta_6 \text{ tripleplay} && \rightarrow + \text{ sign} \\
 & + \beta_{\text{fmsv}} \text{ Voice} * \text{tripleplay} + \beta_{\text{fmsu}} \text{ Unlimited} * \text{tripleplay} + \beta_{\text{fmsdata}} \text{ DataMobile} * \text{tripleplay} && \rightarrow + \text{ or } - \\
 & + \beta_{\text{month*area}} X_{ijt} * \text{month} * \text{area} + \varepsilon_{ijt} && \rightarrow + \text{ or } -
 \end{aligned}$$

- $U_{ijt}$  is the utility for individual  $i$  of choosing mobile plan  $j$  in month  $t$ ,  $V_{ijt}$  is observed utility,  $\varepsilon$  is the logit error term which is i.i.d. distributed
- Consumer's decision is based on the maximisation of utility among all available alternatives at a given month

## data base & choice set

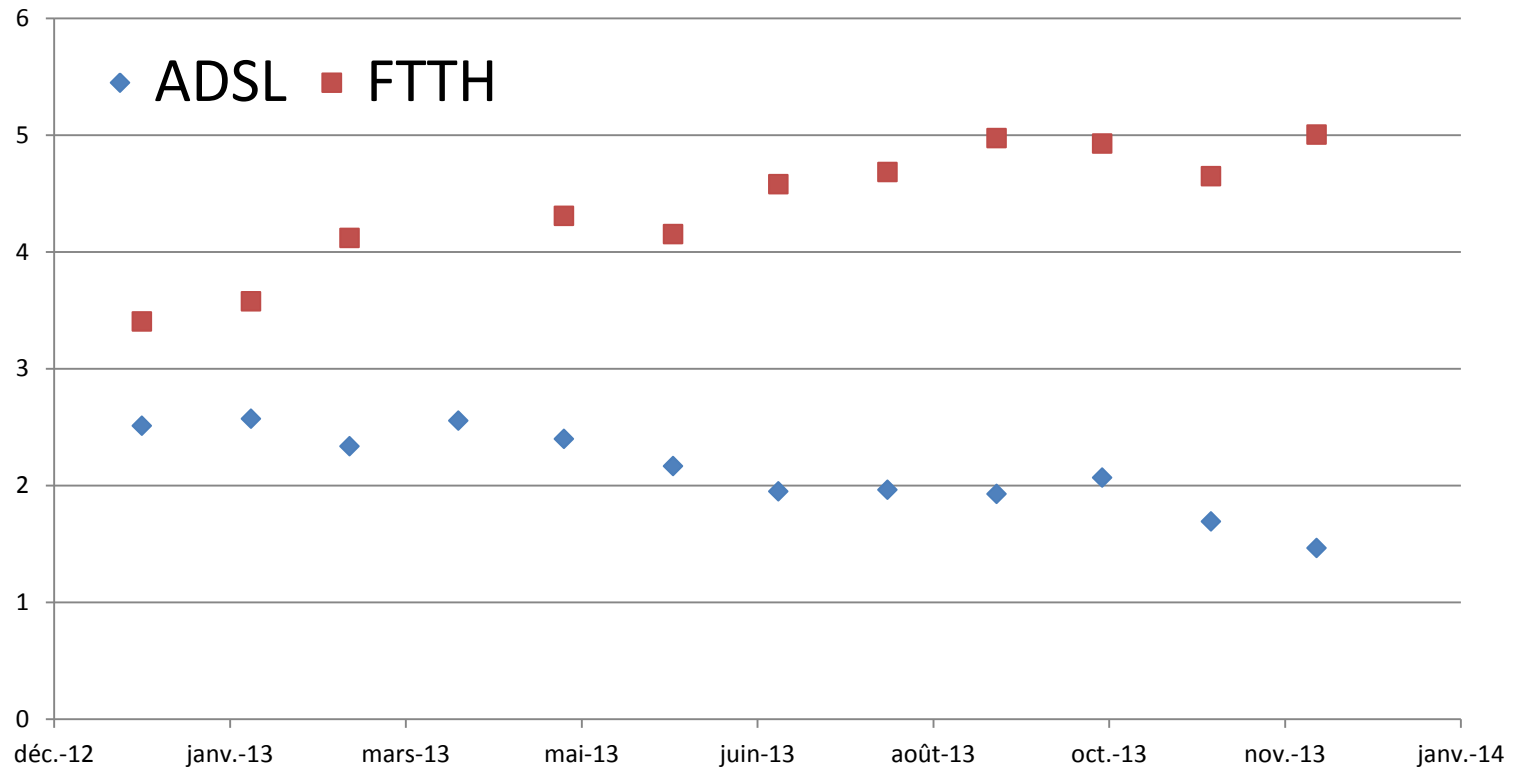
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- ❑ **4326 consumers** in a single town of an European country where FTTH is fully covered: their **mobile plan fee** and its **switching behavior**, remaining duration of commitment, attributes of mobile plan such as **mobile voice and data allowance**, commitment length (0/12/24 months), Terminal subsidy, **TriplePlay** (ADSL or FTTH) options ...
- ❑ **12 monthly observations** from Jan. 2013 to Dec. 2013
- ❑ choice set is constructed with **exhaustive and mutually substitutable** alternatives: around ~30-40 alternatives for each month (available mobile plans)

# mixed logit regression

Variables	Estimates	Months	ADSL	FTTH	Outside good
Price	-0.080*** (0.002)	January	2.510*** (0.213)	3.404*** (0.330)	-5.864*** (0.264)
Terminal subsidy	1.129*** (0.059)	February	0.061 (0.212)	0.174 (0.342)	-0.484 (0.407)
Web only tariffs dummy	2.643*** (0.128)	March	-0.174 (0.214)	0.715** (0.325)	-0.812* (0.457)
Mobile data	0.300*** (0.041)	April	0.044 (0.198)	-0.292 (0.349)	-0.565 (0.437)
Unlimited voice dummy	2.996*** (0.072)	May	-0.113 (0.197)	0.904*** (0.295)	-1.761** (0.752)
Voice volume	0.011*** (0.000)	June	-0.345* (0.191)	0.748*** (0.282)	1.286*** (0.300)
Mobile data + unlimited	0.043 (0.041)	July	-0.560*** (0.189)	1.175*** (0.269)	1.605*** (0.291)
Mobile data + broadband	0.147*** (0.029)	August	-0.547*** (0.197)	1.278*** (0.275)	1.429*** (0.301)
Unlimited voice + broadband	-0.937*** (0.156)	September	-0.583*** (0.194)	1.569*** (0.270)	1.906*** (0.288)
Voice volume + broadband	-0.002 (0.002)	October	-0.443** (0.210)	1.524*** (0.273)	2.045*** (0.288)
Switching tariff	-7.122*** (0.049)	November	-0.817*** (0.200)	1.243*** (0.272)	1.851*** (0.292)
Switching tariff with contract	-0.376*** (0.063)	December	-1.047*** (0.203)	1.600*** (0.265)	2.022*** (0.290)
Switching tariff with time left	-0.060*** (0.003)				

# Local time evolution of valuation for ADSL/FTTH



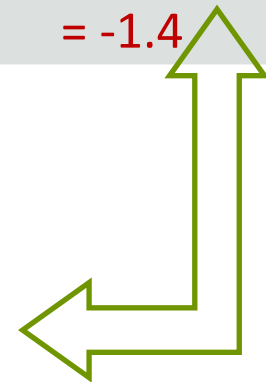
Migration from ADSL to FTTH is still low due to the switching costs

# Fixed mobile **substitution** for voice

	tripleplay=0	tripleplay=1
unlimited mobile voice=0	valuation=0	valuation for <b>tripleplay</b> =3.4
unlimited mobile voice=1	valuation for <b>unlimited</b> =3.5	$\Delta$ valuation for <b>tripleplay+unlimited</b> = -1.4

- valuation for triple play is 3.4
- valuation for unlimited mobile voice is 3.5
- valuation for tripleplay+ unlimited is  $3.4+3.5-1.4$

→ **triple play** and **unlimited mobile voice** are substitute

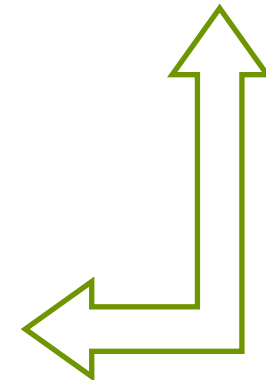


# Fixed mobile **complement** for data

Oct 2013	tripleplay=0	tripleplay=1
datamobile=0	valuation=0	valuation for <b>tripleplay</b> =3.4
datamobile=1 GByte	valuation for <b>1GB</b> =0.5	$\Delta$ valuation for <b>tp+1GB</b> = +0.2

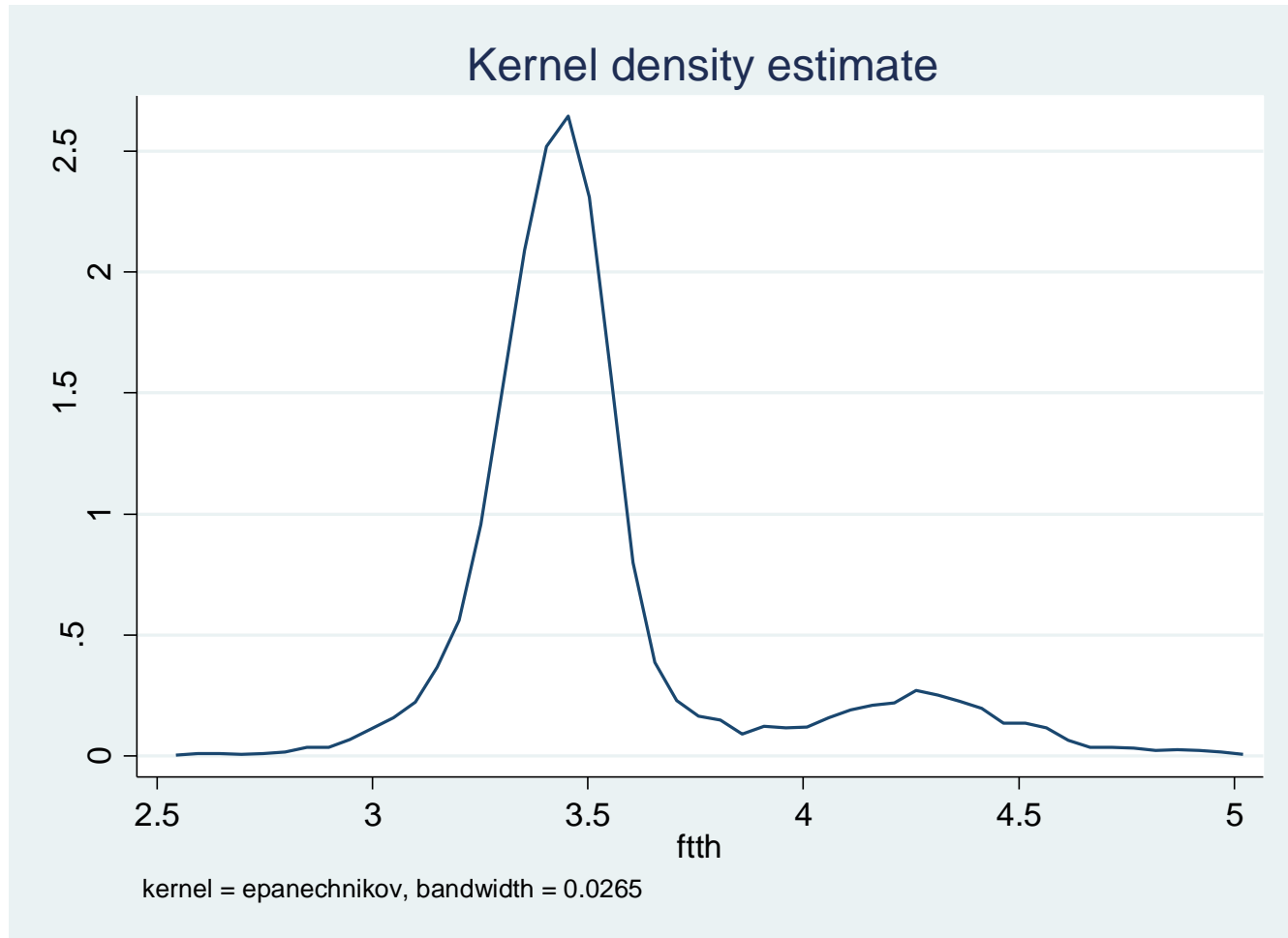
- valuation for triple play component is 3.5
- valuation for 1Gbyte is 0.5
- valuation for tripleplay+1GByte is  $=3.5+0.5+0.2$

→ **triple play** and **data mobile** are **complement**





# individual-level parameter: valuation for FTTH



# Difference in average consumer surplus

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Month	No FTTH	No ADSL	No ADSL & FTTH	No web only	No switching costs
January	-0.6	-4.6	-5.3	-9.0	54.0
February	-0.8	-4.4	-5.3	-9.7	53.0
March	-1.1	-4.1	-5.4	-10.2	52.7
April	-0.9	-3.5	-4.5	-9.5	52.7
May	-1.3	-3.4	-4.8	-10.4	52.1
June	-1.7	-2.9	-4.8	-10.1	50.9
July	-2.4	-2.3	-4.9	-10.3	52.2
August	-3.4	-2.1	-5.7	-11.0	50.5
September	-4.3	-1.9	-6.4	-10.7	49.0
October	-5.6	-1.9	-7.8	-11.3	46.1
November	-6.1	-1.5	-7.8	-11.4	47.5
December	-7.4	-1.1	-8.8	-11.4	47.1

Difference between current base case and counterfactual situation: (1) without quadruple play offers with FTTH; (2) without quadruple play offers with ADSL; (3) without quadruple play offers with FTTH and ADSL; (4) without web only offers; (5) with zero switching costs.

# Conclusion

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- We have developed a method to estimate **customer demand** from individual level data
- WTP gap (FTTH/ADSL) is increasing for eligible customers
- Fixed and mobile voice are **substitutable**
- Fixed data and mobile data are **complement**
- Some **simulations** are possible: such as the impact on the demand (% of customer) of price increasing (or decreasing), forecasting the demand if a new offer introduction, impact of terminal subsidy change...