

Sender-receiver-segment-based demand analysis for letters

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Three thick, wavy lines in blue and green sweep across the lower half of the slide, creating a dynamic background.

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The aim of the presentation

To clarify why the demand of letters develops differently in different sender and receivers segments

GDP = Gross Domestic Product

Letter demand factors

$$Q_t = Q_t\{T_t, S_t, P_t, K_t, g_t(f_t(y_t)), N_t, L_t\}$$

where

Q = letter volume

T = trend

S = business cycle

P = letter price

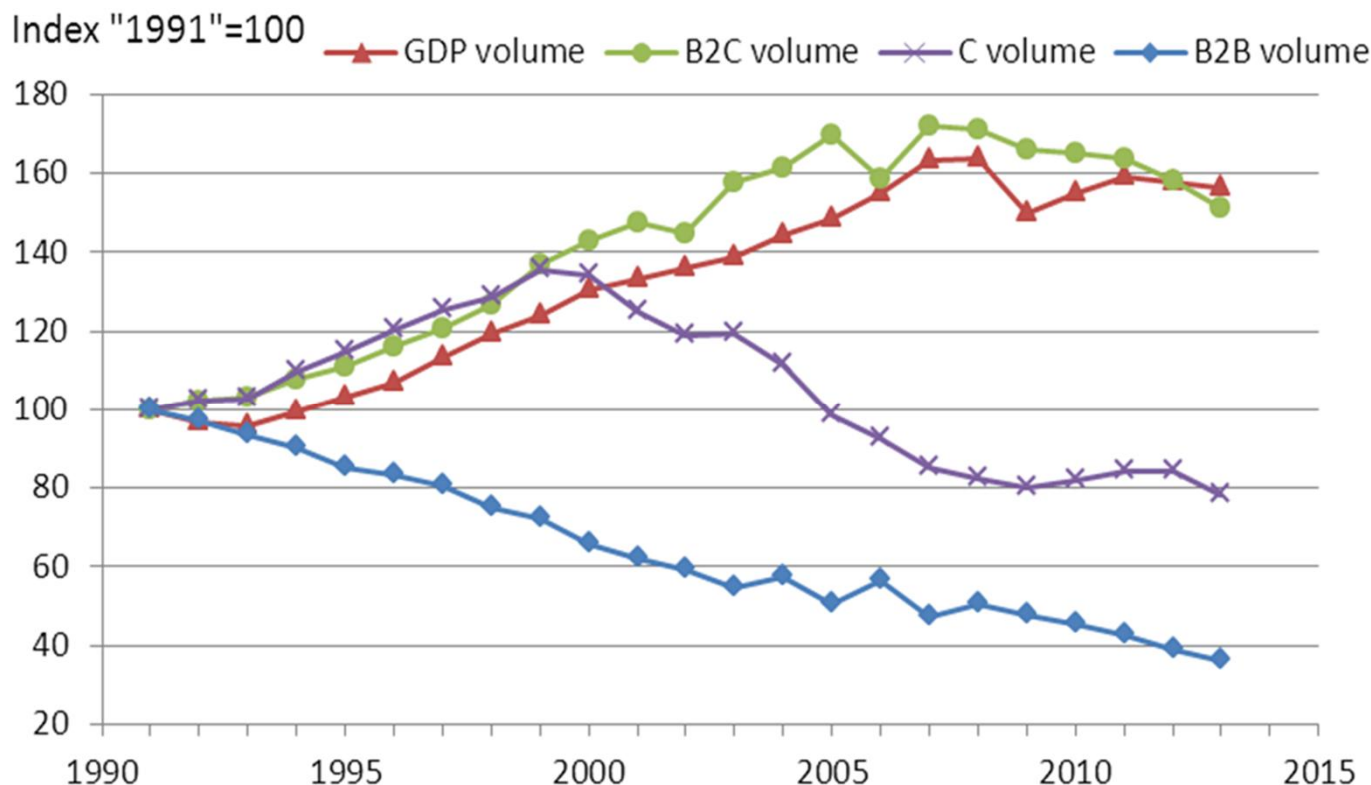
K = price of competitive service,

g = substitution

N = population

L = letter service quality

Correlations between the segment based volumes of 1st and 2nd class letters and GDP in Finland 1991-2013



Correlations:

GDP/B2C = +0.97

GDP/B2B = -0.97

GDP/C

1991-1999 = +0.96

1999-2+13 = -0.94

- Letter demand has followed GDP quite closely during the whole examination period
- The big change happened already in the middle of 1990's
- The relationship changed dramatically at the turn of the millennium

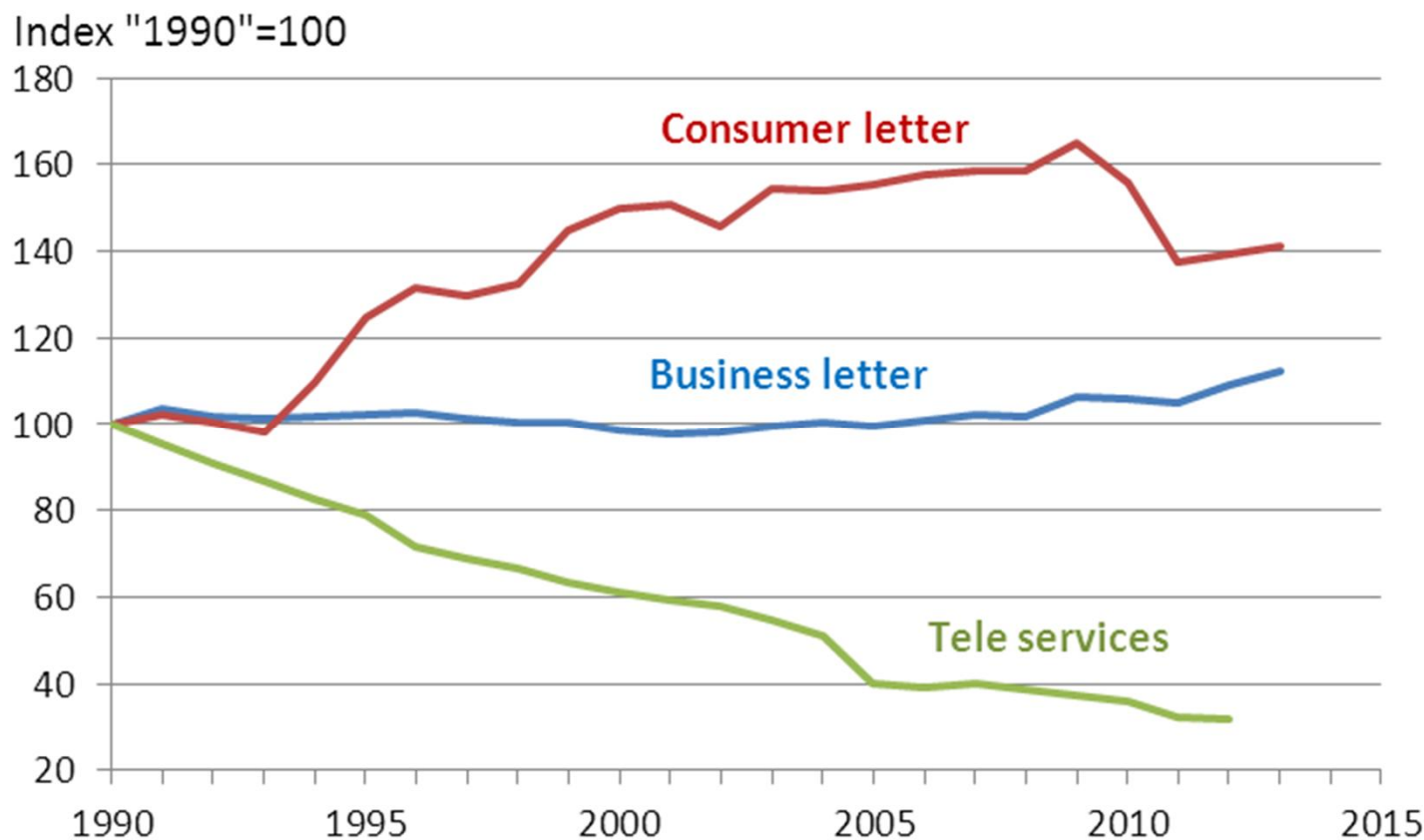
Conclusion on GDP of letter demand

Because letter demand in different sender and receiver segments totally differs each other the analysis must be made segment-oriented

$$Q_t^{X2Y} = Q_t^{X2Y} \{T_t, S_t, P_t^{X2Y}, K_t^{X2Y}, g_t^{X2Y}(f_t(y_t)), N_t, L_t\}$$

Prices

Real prices of letters and telecommunication services in Finland 1990-2013



Correlation between service prices and letter demand

	B2B	B2C	C
Letter own price	-0.38	0.14	-0.17
Telecomm. service price	0.98	-0.94	0.56

Estimated letter's own and gross price elasticity



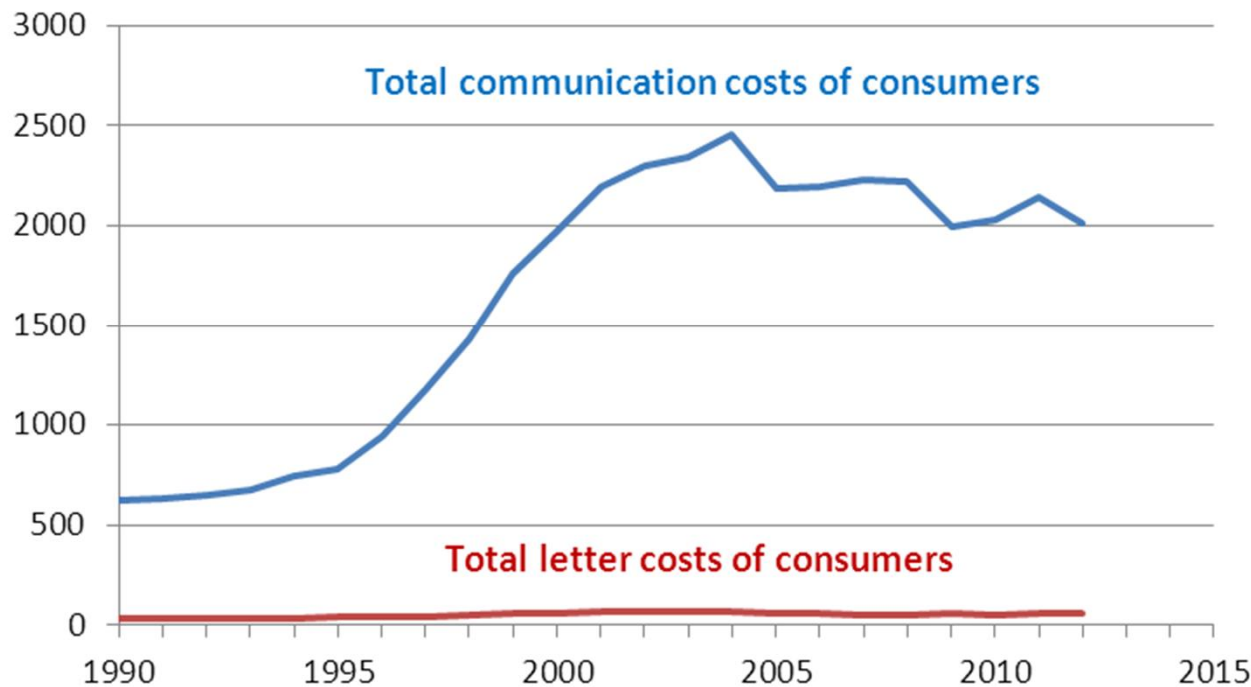
Time period	B2B Cross elasticity with telecommunication services (P/K)	B2C No cross elasticity (K)	C Cross elasticity with telecommunication services (P/K)
1991-2007	-0.37 (t = -6.10)	-1.38 (t = -3.47)	-0.004 (t = -0.05)
1991-2009	-0.37 (t = -8.29)	-0.93 (t = -2.18)	0.12 (t = 1.26)
1995-2013	-0.35 (t = -7.11)	-0.77 (t = -1.09)	0.04 (t = 0.27)

- B2B own price and gross price elasticity (P/K) has been very stable, although the prices of telecommunication services have been all the time on the decrease and therefore the proposition of business letter price to the telecommunication prices has increased
- B2C own price elasticity is diminishing at the same time when the prices have been raised in recent years, after a couple of stable price decades
- Consumer letters do not have any price elasticity, even if the proposition of consumer letter price to the phone service prices has also increased

No price elasticity in C-segment, why?



Million € **Consumers' total communication and letter expenses 1990-2012**



- In average a consumer sends one letter or postcard per month, which means 0.8 € expenditure per month
- A household used 23 € on an average for mail services in 2013
- The average total communication costs of one household were 540 € in 2013
- Letters have only a 4 % share of the total communication costs of households
- ➔ This all means that the letter expenses do not act a big role in the consumers' total costs which implicates a low letter price elasticity

Different price elasticity in B2B and B2C segments even though letter prices are the same, why?

It can be explained by two different phenomena

1. Selection criteria between different communication channels
2. Differences in the volumes

1. Selection factors of communication channels

- Significance order of the factors:
 1. reliable arrival of message
 2. data security
 3. ease of use
 4. price
 5. speed of communication
- If the sender can choose between many channels, price is not the most important selection criteria . This is the situation in C2C and B2B segments
- If the letter is in practice the only useful channel, the price gets much bigger significance. This has been the situation for a long time in B2C segment, now this is changing

2. Volumes and structure of B2B and B2C segments

- B2C segment is used for mass mailings
 - ➔ letter price rises will realize as bigger total cost changes compared to the smaller mailing volumes
- On the other hand
 - the volume discounts should be bigger in the B2C segment
 - the share of cheaper D+2 service is bigger in B2C segment
 - ➔ this all means cheaper average prices in B2C

One cannot say unambiguously that the volume or structural differences would explain the price elasticity differences of B2B and B2C segments

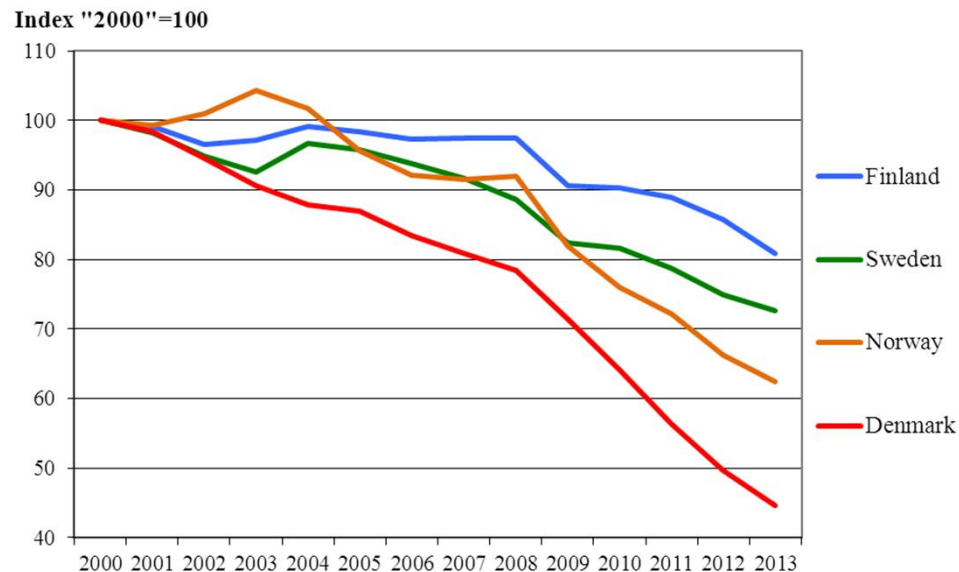
Conclusion on the effect of the price on letter demand

- **Letter demand reacts very differently in regard to the prices in different segments, in spite of the fact that the prices in B2B and B2C segments are in principle the same**
- **It seems that the significance of letter prices is diminishing**

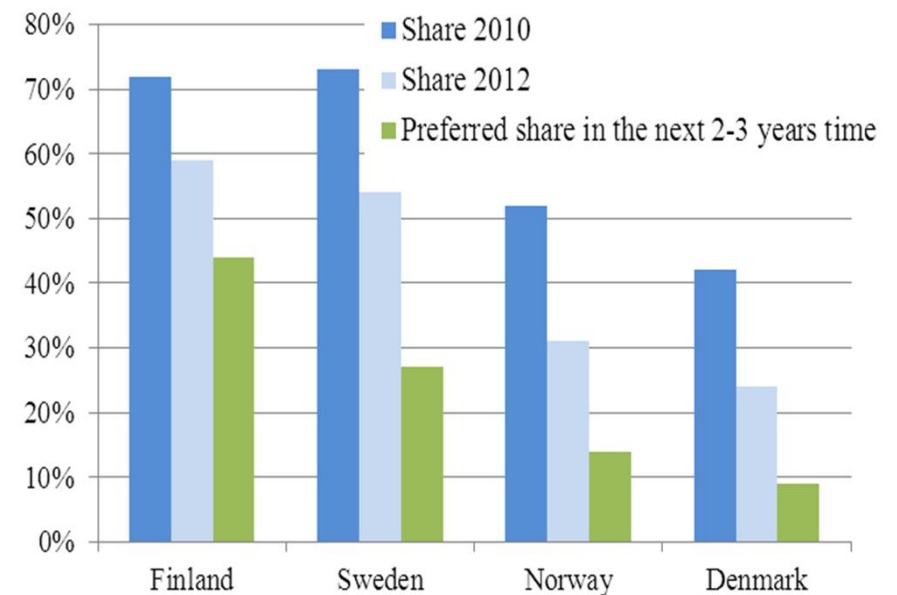
Substitution

Correlation between letter volume and electronification of invoicing process is very strong

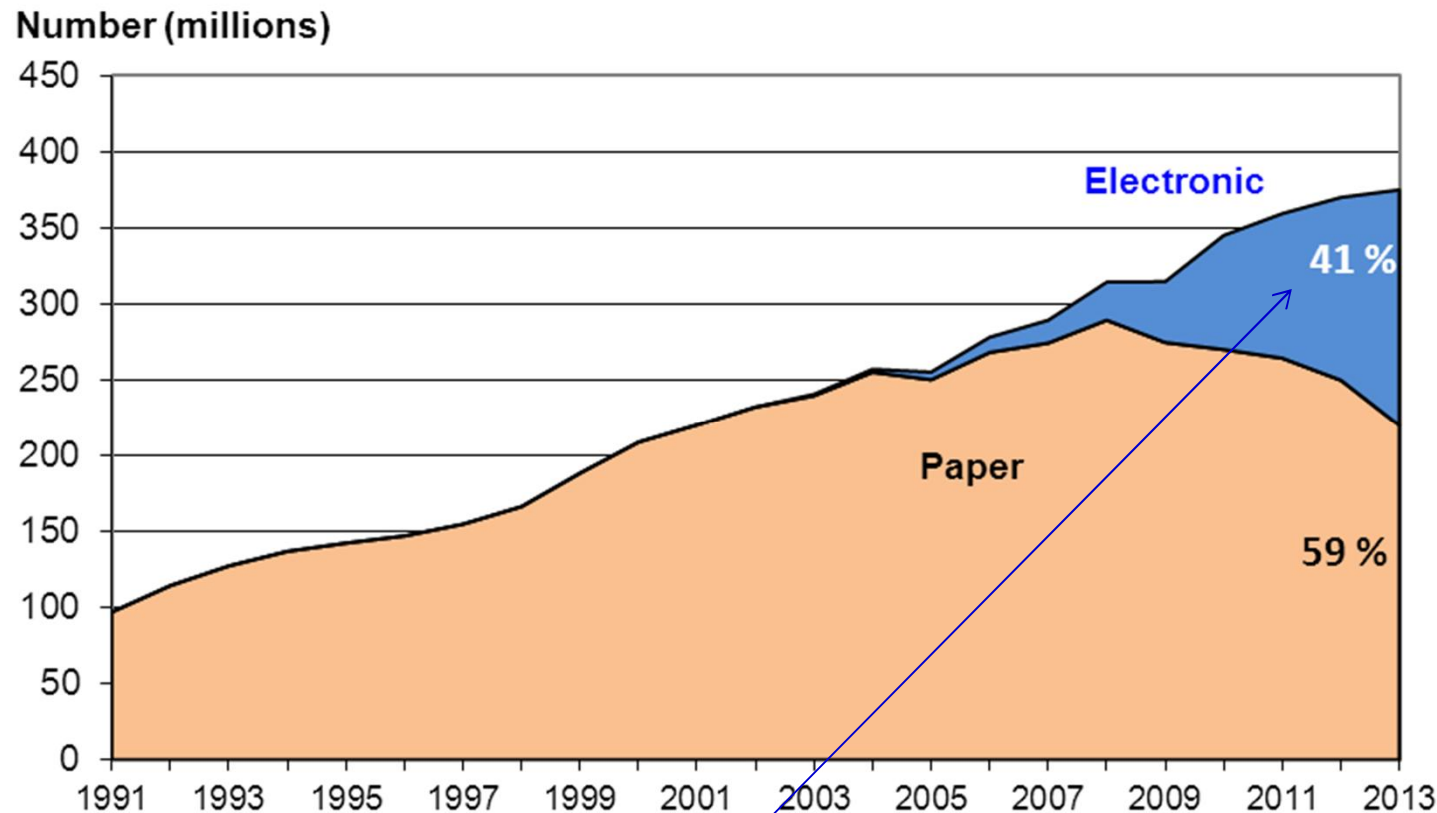
Addressed letter volumes in the Nordic countries



Role of letters in consumer invoicing ¹⁾



Consumer invoice volume in Finland 1991-2013



The share of electronic invoices in B2B segment is about 60% in Finland in 2013

The most important reasons to begin receive invoices electronically have been

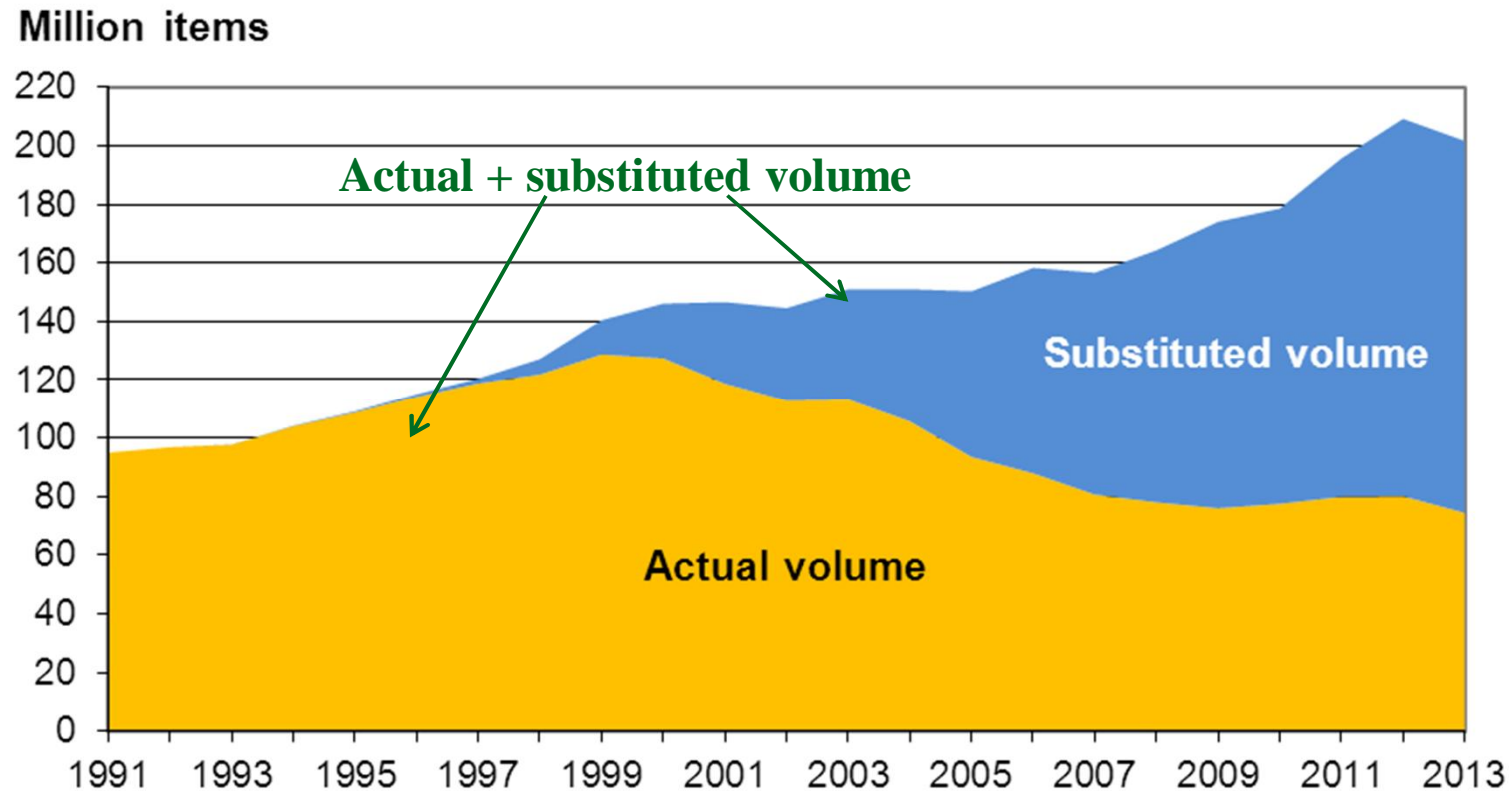
- **surcharge for the paper invoice and offering of the electronic receiving as the only alternative**
- **in addition, to regard electronic invoice as handy and environment responsible**

The form of estimated demand model

$$Q_t^{X2Y} = c * T_t^\alpha * S_t^\lambda * P_t^\beta * K_t^\beta * e^{\delta * G_t^{X2Y}} * N_t^\gamma * L_t^\varphi * \varepsilon_t$$

- Sender-receiver-segment based analysis
- Substitution factor is in an exponential form which means that it measures the stage of substitution at the annual level

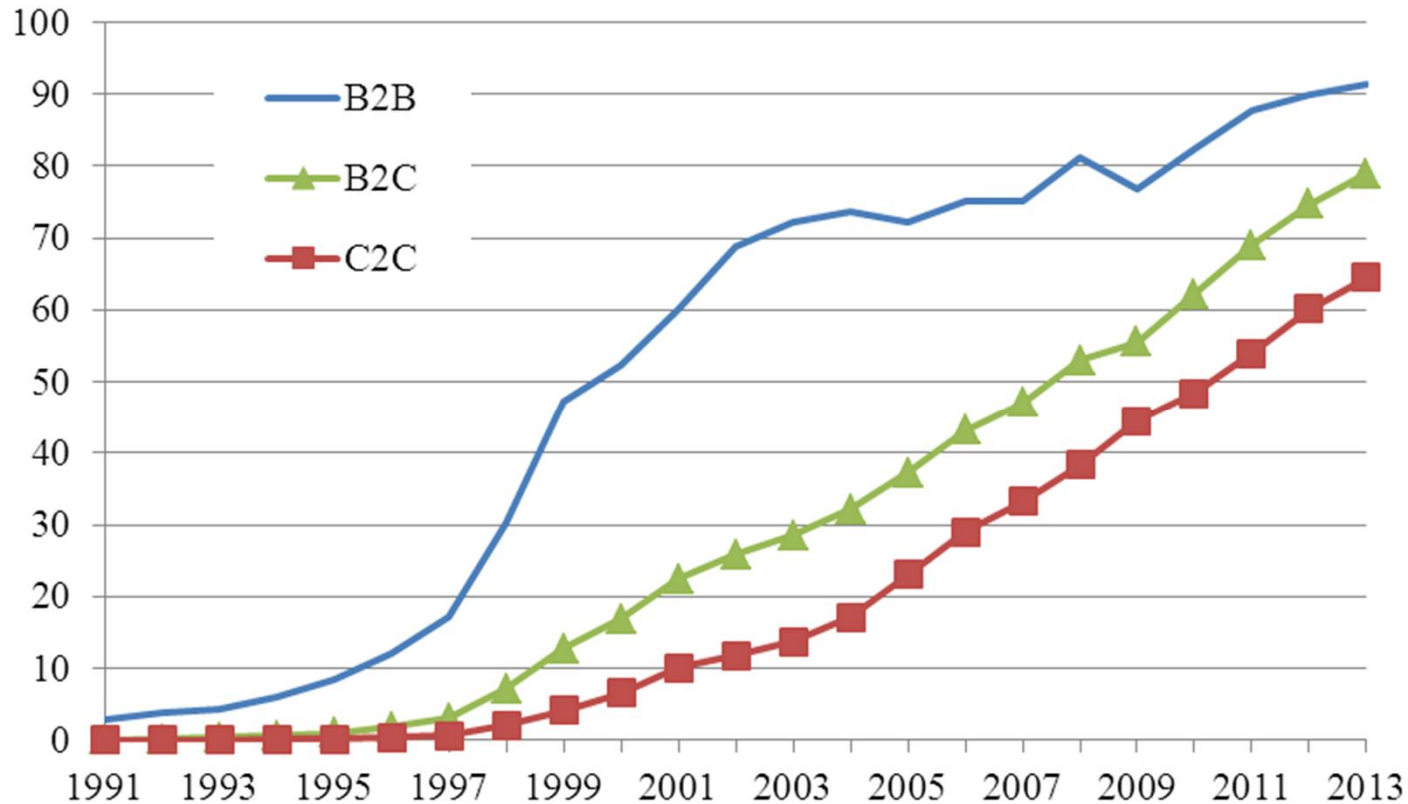
Demand model including the substitution factor for C letters in Finland 1991-2013



$$q_t^C = 0.034 * T_t^{0.92} * S_t^{-0.13} * \left(P_t^C / K_t^C \right)^{0.17} * e^{-0.021 * G_t^C} * \varepsilon_t$$

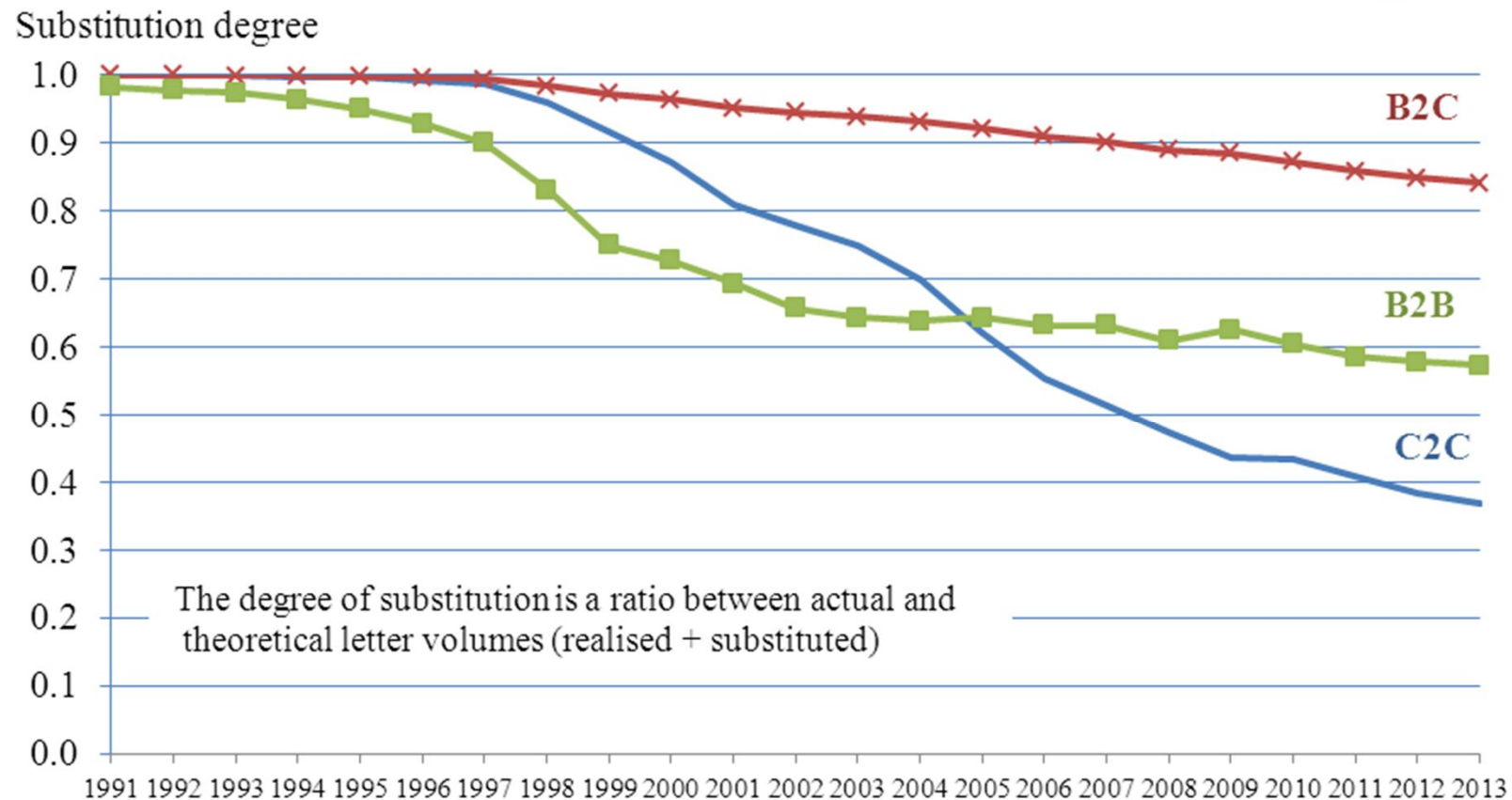
Theoretical volume (actual + substitution volume) can be described
by the demand function without the substitution factor

Substitution factor is a combination of email use penetration and progress of invoicing process electrification



- The factor describes the development of theoretical number of electronic communication possibilities instead of paper letters
- Substitution is a complex phenomenon - how to find a good enough indicator to describe it - this is difficult but crucial!

Substitution degrees for 1st and 2nd class letters in Finland 1991-2013



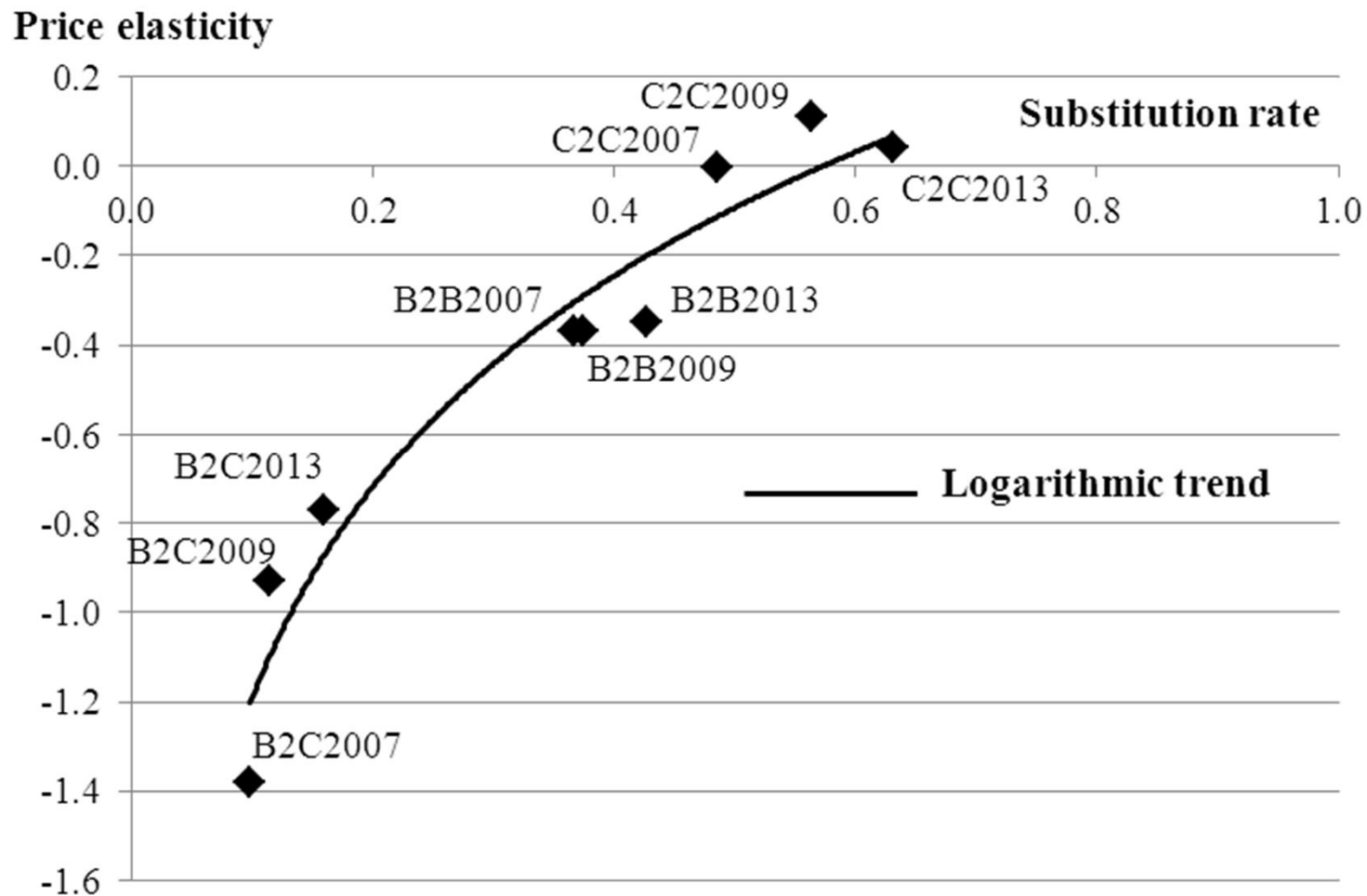
- **B2C: substitution process has been slow but is now accelerating**
- **B2B: different substitution periods**
- **C2C: straightforward substitution**

Total impact of different factors to the 1st and 2nd class letter demand in Finland 2000-2013

Economic activity	+20 %	
Letter price	-11 %	the own price and gross price elasticity
Population	+4 %	
Substitution	-31 %	direct and indirect
Service quality	0 %	
Actual volume	-18 %	

Correlation between price elasticity and letter substitution

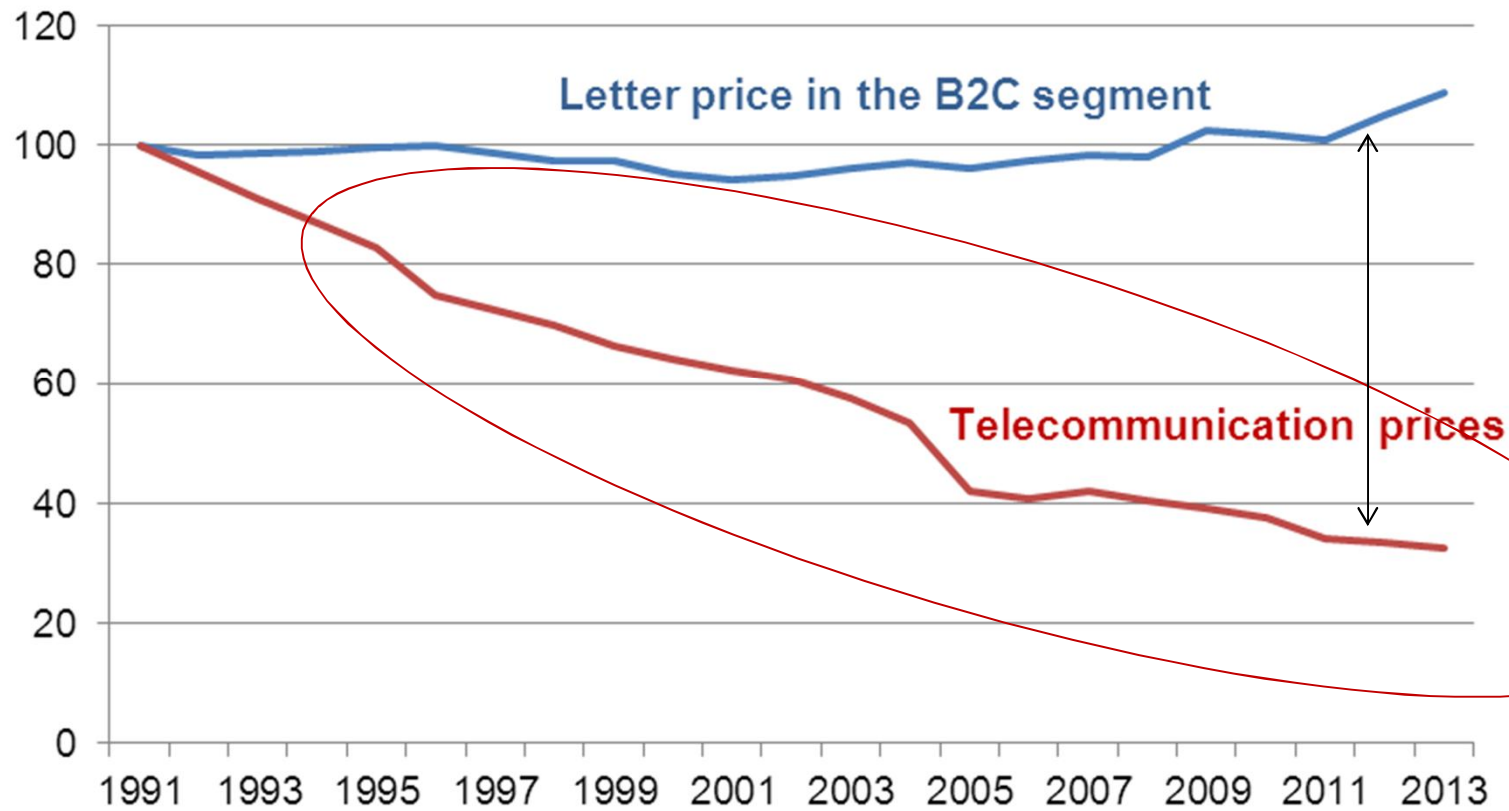
Correlation between letter substitution and price elasticity



Real B2C-letter and telecommunication prices



Index "1991"=100



Telecommunication can not be used, because the message receiver , or consumer doesn't want to use it. Could this have something to do with the high letter price elasticity in B2C segment?

Conclusion on correlation between price elasticity and substitution

- **Letter substitution explains changes in the price elasticity better than price-, volume- and structural changes**
- **However, it is still too early to say what kind of mathematical equation there is between the transformation of price elasticity and the progression of substitution**

Conclusions

Conclusions

- **Substitution has been and will be in the near future the most important demand factor of letters**
- **Letter demand behaviors vary differently in different sender and receiver segments**
- **It seems to be a correlation between letter price elasticity and substitution progress – elasticity is diminishing with the substitution progress**

Thanks for your attention

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