

Measuring consumer preferences for postal services

**Charlene Rohr
Urs Trinkner
Alison Lawrence
Chong Woo Kim
Dimitris Potoglou
Rob Sheldon**

Swiss Economics Working Paper 0034

July 2012

ISSN 1664-333X

Published as:

"Measuring Consumer Preferences for Postal Services" (2013). In: *Reforming The Postal Sector In The Face Of Electronic Competition*. Crew, M. A. and Kleindorfer, P. R. (eds), pp. 241-260.

**Swiss Economics SE AG
Stampfenbachstrasse 142
CH-8006 Zürich**

**T: +41 (0)44 500 56 20
F: +41 (0)44 500 56 21**

**office@swiss-economics.ch
www.swiss-economics.ch**

1. INTRODUCTION

Increasing digitalization and the evolution of the Internet have had, and are still having, an impact on the demand for postal service. Letter mail volumes are steadily decreasing in most industrialized countries and there is little doubt that this decline is to be attributed to the substitution of letters by electronic alternatives (“e-substitution”). By contrast, the delivery of physical goods such as small packages and parcels is likely to be of increasingly importance. These trends can be seen in the growing parcel volumes in most countries.

Increases in e-substitution and e-commerce are likely to have an impact on consumers’ needs and preferences for postal services. In the case of regulated postal services, however, such developments in consumer demand are not immediately matched by changes in supply, but must be identified and addressed through policy decisions. Given the significant changes brought about by electronic communication, there is a need for better information on how these developments have affected demand for postal services and on what consumers need from a postal service.

This paper reports on the implementation of stated preference discrete choice experiments (SPDCEs) to measure business and residential consumers’ preferences for specific aspects of postal services in three European member states: Italy, Poland and Sweden. Section 2 sets out the methodology for undertaking the experiments. Section 3 presents the model results; these are discussed in further detail in Section 4.

2. METHODOLOGY

In this study, stated preference discrete choice experiments (Hensher et al, 2005) are undertaken with both business and residential postal consumers to quantify consumers’ preferences for specific aspects of postal services.

A key aspect of such a study is the specification of the attributes and attribute levels to be tested in the choice experiments. Ideally, the choice experiment would include all meaningful attributes that describe postal services. However, in practice the number of attributes that can be tested is limited by sample sizes and the cognitive abilities of respondents. In this study limitation on sample sizes meant that it was necessary for all respondents to evaluate all attributes and therefore the maximum number of attributes considered was 15, which is probably an upper limit from a cognitive perspective because of the need to incorporate vulnerable people, including the elderly, in the survey.

In order to be able to compute consumers’ willingness to pay (WTP) it is essential that cost is included as one of the attributes. In this study, stamp and parcel prices are used to define the cost vehicle. The price ranges tested in the experiments were specified to test consumers’ WTP, and therefore they do not reflect actual costs of providing the services. For realism the prices in the experiments were varied around current prices.

Four sources were used to inform the choice of attributes: (i) a specification of an economic framework for the provision of postal services, and the interaction with consumers, (ii) a review of attributes and levels from other studies, (iii) a review of current minimum levels of the universal service obligation in the EC (USO), and (iv) views on the importance of specific postal service elements from the relevant stakeholders.

Analysis of the underlying needs of postal services suggested that it was important to take account of three issues: that users are both senders and receivers (the two-sidedness of the postal market), the different exposure of letters and parcels to competition from e-substitutes, and that the services examined in the experiments should reflect the services experienced by users (rather than structure oriented features of the postal network, like the number of sorting centers).

It is a challenge to incorporate the two-sidedness of the postal market in the study design. This was done by : (i) ensuring that the preferences of both sides (senders and recipients) were reflected, whilst avoiding double counting, (ii) computing the WTP considering the needs of both senders and receivers, (iii) framing the choices such that respondents viewed themselves simultaneously both as senders and recipients, and (iv) collecting socio-economic information regarding respondents' usage of the postal network both as sender and recipient and to distinguish businesses and private consumers.

Second, digital options are also likely to change the underlying needs of consumers. For example, fast letter services might diminish in value as digital alternatives offer effectively instantaneous delivery. While digital competition may result in less WTP for some services, there may be increases in value for other services; for example the delivery of parcels resulting from to online shopping. Consumers' WTP for postal service elements may therefore depend crucially on the availability and usage of digital alternatives. In the study this issue was addressed by: (i) selecting member states with differing levels of digital penetration and e-commerce usage¹, (ii) distinguishing in choice experiments the delivery of communication (letters, newspapers) and goods (parcels, packages), and (iii) collecting socio-economic information on respondents' Internet availability and usage, to test for the impact of internet usage on WTP.

Third, some attributes such as frequency of delivery may be important to operators providing postal services, but may have less direct relevance to users. The experiments therefore focus on service attributes which are directly experienced by users: "output-oriented" attributes such as speed of delivery rather than "input-oriented" attributes that relate to the provision of postal services such as the number of sorting and collection facilities or the number of collection and delivery days.

Given the growing importance of parcel services (ITA Consulting and WIK Consult, 2009), separate experiments were undertaken to examine the importance of service attributes separately for letter and parcel services. Each quantified the impacts of: speed of delivery, reliability, guaranteed time of latest daily delivery, percentage of lost items, delivery location, and price. The latter was based on current stamp prices (for letters and packets) and an average parcel price for parcels. Guaranteed time of delivery was included on the basis that it could be important to customers and could have an important impact on costs for postal providers (sequencing). However, time of collection was not included because it was likely to be less important to consumers. In turn, greater emphasis has been placed on the speed of delivery attribute, which is a direct indication of the time that it takes for an item to reach the recipient.

A Saturday delivery option was also tested in the pilot survey. However, nearly 20% of respondents in the pilot survey indicated that they found the experiments too complex, and that they contained too much information and too much text. Therefore, the text was reduced for the main surveys. As well Saturday delivery attribute was dropped on the basis that this was less interesting to policy makers.

A third experiment was also undertaken to quantify the importance of the following general service attributes: uniform pricing, proportion of the network covered by postal services, accessibility of postal points of contact (measured as distance), available services, opening hours, and price.

For consistency and comparison of findings, the same attributes were tested in the three member states. The costs were based around current price levels in the respective country and were presented in the local currency. Six price levels were tested in the design to ensure a wide range of costs were tested. Both price reductions (-30%) and increases (up to +150%) were tested.

The SPDCE was set in the context of choosing between two options describing hypothetical postal services, labeled simply as “Alternative A” and “Alternative B”, and described by the relevant attributes in each experiment. Respondents were asked to consider each of the choices and to choose the most preferable option for *their own* postal needs, without considering the needs of others (on the basis that the survey would also include elderly and disabled people, who would provide their own views).

The experimental design for the choice experiments was based on an “efficient” design. In ‘efficient’ designs the set of options (or scenarios) that are generated and presented to respondents are constructed on the basis of estimating parameters for a particular model structure, in this case employing a multinomial logit model.

Postal service preferences and priorities may vary by country and customer type. The study design sought to accommodate the range of different customer types within the survey design.

For businesses, quotas were specified for large businesses and small and medium enterprises (SMEs²) within each member state.

For residents, the survey design aimed to reflect the demographic profile of the member state. Additionally quotas were specified for vulnerable members of society, notably the elderly, disabled and those on low incomes – those who may be more dependent on postal services and likely to be more heavily impacted by any change to postal service provision.

Four-hundred and seventy five (475) interviews were to be undertaken in each member state: 350 surveys with residential consumers (with a target of 100 vulnerable users³) and 125 with business consumers (75 SMEs and 50 large businesses). These were the maximum sample sizes given the project budget. In total 1,438 interviews were undertaken in the three countries; 1,055 among residential consumers and 383 among businesses.

3. ANALYSIS AND RESULTS

Respondents, whom interviewers judged were not able to understand the choice exercises or who did not give the questions much consideration (less than 5% of the data for business and 5.1% for Italian residents, 6.6% for Polish residents and 0.6% for Swedish residents), were excluded from the analysis.

Discrete choice models were developed from the experimental data. Discrete choice modeling provides an analytical framework to analyze and predict how consumers' choices are influenced by the characteristics of the alternatives and the characteristics of the people making the choices. The basic tenet of discrete choice modeling is utility maximization; that is, given a set of alternatives, people choose the alternative which brings them most utility.

Functions describing the utility of each choice alternative available to a consumer are therefore constructed, incorporating explanatory variables like price and service quality, multiplied by coefficients (β) that reflect the relative value of the terms, for example for a specific alternative (labeled j):

$$U_j = \beta x_j + \varepsilon_j.$$

where x is a vector of measured variables influencing the SP decision task; β is a vector of unknown parameters (to be estimated); ε is the unmeasured error. In this study, the utility equations reflect the characteristics of the specific hypothetical postal services as presented in the three choice experiments.

All service variables describing the quality of the alternatives were dummy coded. With such coding it is necessary to constrain the coefficient of one of the levels for each attribute to zero to avoid over-specifying the models. As a result the coefficients that are estimated reflect the value relative to the constrained base level of the variable. For example, the uniform pricing attribute is measured relative to the level of different prices existing for different destinations (which is set to zero). Price was treated as a continuous variable.

Epsilon (ε) is the model error, which is assumed to follow a type I extreme value distribution, with errors distributed identically and independently (iid) for all alternatives and observations. The distributional assumptions of ε permit the derivation of a closed form expression for the choice probability, the logit model (Train, 2003), i.e.

$$P_{ni} = \frac{e^{\beta x_{ni}}}{\sum_j e^{\beta x_{nj}}}.$$

It is the model coefficients (β) that are estimated in the model estimation procedure, which assumes that each respondent chooses the alternative with the highest utility. The estimation can therefore be conducted within the framework of random utility theory, i.e. accounting for the fact that the analyst has only imperfect insight into the utility functions of the responding households and businesses. The standard statistical criterion of Maximum Likelihood is used. Both the values of the coefficients (in utility terms) and the significance of the coefficients are output (Ben-Akiva and Lerman, 1985).

The business model results are presented below in Table 1 (letter and parcel post attributes) and Table 4 (general service attributes). The residential model results are presented in Table 2 (attributes for letter post), Table 3 (attributes for parcel post) and Table 4 (general service attributes). Both the model coefficients and their standard errors are presented; both reflect the results after bootstrapping to take account of repeated observations being collected from a single individual.

The ratio of coefficients quantifies the marginal rate of substitution between the attributes – the trade-off rate between one attribute and another. The ratios of the service coefficients and the cost

coefficient provide an estimation of consumers' WTP for service attributes (see Rohr et al, 2011 for values).

3.1 Business consumers' priorities for letter and parcel service attributes

In all tables, the coefficients for categorical attributes are measured relative to a base level (labeled, and presented with coefficient value 0.00 and t-ratio "n/a"). Greyed in areas reflect attribute levels which do not have coefficients in the model. The base level for each service attribute is shown first (and labeled as base). It is assumed to have a value of zero. The value of all other attributes is measured relative to this base value; positive values indicate a positive improvement in service (and increased likelihood of choosing the service alternative), negative values indicate service deterioration. A zero value indicates that the service level is valued the same as the base service level.

Table 1: Business consumers' model results, letter and parcel service attributes (Experiments 1 and 2)

Attribute and levels	Letters				Parcels			
	SME		BB		SME		BB	
	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio
Number of service classes and speed of service								
One class, delivery by next working day (base)	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a
One class, delivery within 2 working days	0.00	n/a	-0.31	-1.9	-0.09	-0.7	-0.29	-2.0
One class, delivery within 3 working days	-0.29	-2.1	-0.50	-2.3	-0.63	-3.7	-0.43	-3.4
One class, local deliveries by next working day, national deliveries within 3 working days	-0.24	-1.6	-0.20	-1.4	-0.35	-2.0	-0.17	-1.4
Two classes, next working day and within 3 working days	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a
Delivery location								
Delivered to businesses during work hours only (base)	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a
Delivered to secure mail box 100m from business	-0.47	-3.5	-0.35	-4.7	-0.37	-3.5	-0.32	-2.6
Delivered to secure box 1km from business	-0.65	-4.6	-0.38	-2.8	-0.58	-3.2		
Guaranteed time of delivery								
Delivered by 09:00 (base)	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a
Delivered by 13:00	-0.17	-1.2	0.00	n/a	0.00	n/a	0.00	n/a
Delivered by 17:00	-0.39	-2.5	-0.22	-1.7				
Delivered by 17:00 (not advertising material)					0.00	n/a	0.00	n/a
Delivered by 17:00 (advertising material)					-0.42	-2.4	-0.32	-2.1
Percentage of items delivered on time								
80% delivered on time (base)	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a
90% delivered on time	0.10	1.0	0.36	2.1	0.00	n/a	0.00	n/a
95% delivered on time	0.17	1.5	0.42	2.6	0.21	2.0	0.00	n/a
Percentage of items lost								
No lost items (base)	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a
5 out of 100 items lost	-0.53	-4.4	-0.58	-3.7	-0.84	-4.3	-0.72	-3.6
10 out of 100 items lost	-1.34	-5.7					-1.08	-4.4
10 out of 100 items lost (not magazines/newspapers)			-1.41	-5.2				
10 out of 100 items lost (magazines/newspapers)			-0.65	-2.5				
10 out of 100 items lost (visit post office once a year or less)					-1.93	-6.6		
10 out of 100 items lost (visit post office several times a year or more)					-1.21	-5.3		
Stamp / parcel prices	-1.58	-6.2	-0.59	-2.3	-0.09	-3.5	-0.08	-2.6
Scale parameter – Sweden (base)	1.00	n/a	1.00	n/a	1.00	n/a	1.00	n/a
Scale parameter – Poland	0.46	4.0	1.21	3.8	0.92	4.1	1.05	3.7
Scale parameter – Italy	0.61	5.0	0.58	3.0	0.81	4.2	1.01	2.7
Model statistics								
Number of observations		1332		864		1332		864
D.O.F		13		14		13		14
Final log-likelihood		-809.6		-518.0		-778.0		-522.7
Rho ² (c)		0.122		0.131		0.157		0.125

* Coefficient for categorical attributes are measured relative to a base level (labeled, and presented with coefficient value 0.00 and t-ratio "n/a"). Greyed in areas reflect attribute levels which do not have coefficients in the model. The base level for each service attribute is shown first (and labeled as base). It is assumed to have a value of zero. The value of all other attributes is measured relative to this base value; positive values indicate a positive improvement in service (and increased likelihood of choosing the service alternative), negative values indicate service deterioration. A zero value indicates that the service level is valued the same as the base service level.

Firstly, it is observed that the resulting valuations for businesses have substantial standard errors, even though business responses were pooled across countries. The reason for these relatively large standard errors may be manifold, including: (1) the sample size is too small (it is noteworthy that there is 2.75

times more data for residents than for businesses); (2) business preferences for SMEs and large businesses may be more heterogeneous in nature than those of consumers; (3) the cost sensitivity is not well estimated (this may be because stamp costs are a relatively unimportant cost for businesses and therefore larger cost differences could be tested, particularly for big businesses); (4) the values that businesses place on postal service attributes are relatively small – thus requiring more data to estimate the values significantly, or a combination of all of these aspects; (5) importance of other attributes, e.g. lost items, which may have dominated the choices.

In general, big businesses (BB) value letter services more than SMEs or residents. They also are more likely to be senders of large volumes of mail – over 60% of businesses in the sample send over 500 pieces of mail per month compared with 14% of SMEs. Thus they appear to have a stronger interest in good letter services and are willing to pay for those services. Differences in parcel sending between big businesses and SMEs are much less marked, with 15% of SMEs and 17% of big businesses sending over 100 parcels per month, with much more similar valuations of specific service attributes.

For specific service attributes related to letters (see the first columns in Table 2), the results indicate the following.

Big businesses appear to be more time sensitive, preferring a next day delivery option, or the two-class alternative, with a next day option. They also prefer a single next day service over a non-uniform delivery option. SMEs appear to place less value on speed of delivery, with no observable difference in value between next day or two-day service delivery options, but they do require compensation for a three-day service. They also prefer a single next day service over a non-uniform delivery option, where they would require half of the value required by big businesses.

Both big businesses and SMEs prefer to have their post delivered to their work location, with increasing dislike for delivery options 100m or 1km from their work – again, SMEs have lower levels of dislike for these options than big businesses.

Both big businesses and SMEs prefer to have their post delivered by 9:00 with increasingly lower levels of preferences for deliveries at 13:00 or 17:00 for SMEs and big businesses disliking delivery at 17:00, although the relative compensation levels for these service reductions is relatively low.

Big businesses are also willing to pay for increased reliability of delivery; SMEs place a much lower value on reliability of delivery.

Both big businesses and SMEs place a high value on reducing loss of letters, with big businesses being willing to pay substantial amounts to reduce letter loss. Again, these values reflect values for extreme levels of loss. Higher levels of compensation are required for higher levels of loss for items which are not newspapers and magazines. SMEs also view letter loss importantly and are willing to pay to avoid lost letter items.

For service attributes related to parcels (see the second set of columns in Table 2) absolute valuations are much higher than for letters (even larger proportionally when considering the costs of the parcels), as well as more consistent for SMEs and big businesses.

Compared to letter services, there is a stronger preference for next day delivery options (and two-class services with a next day delivery option), compared with two or three-day or non-uniform delivery options, by SMEs and big businesses.

There is also a preference for delivery of advertising material by 17:00, but do not a need for compensation for delivery by 13:00 compared with 9:00.

There is no preference for higher levels of delivery reliability, but there is a substantial, very high WTP to avoid parcel loss by SMEs and big businesses, particularly for those who rarely visit post offices (with compensation of around nine PPS units required for a 5% loss of parcels and between 13 and 21 PPS units for a 10% loss).

3.2 Residential consumers' priorities for letter and parcel service attributes

In Tables 2 and 3 the valuations for residential consumers are presented. Differently from the business analysis, it was not appropriate to pool together the residential data across member states and therefore separate values are presented for each attribute level for each member state.

Again, there are quite large standard errors for the resulting values, particularly for responses from Italy. In general they are not as large as for businesses. Again, the reasons are manifold, including sample sizes (although the sample sizes for residents were larger for residents than for businesses) and the measure of cost sensitivity, which suggested that larger cost differences could have been tested.⁴ These relatively large standard errors may explain why significant differences in valuations across different market segments, for example by age, are not observed.

For letters the following trends from the outputs from the first experiment are observed (see Table 2 for the detailed values).

Table 2: Residential consumers' model results, letter service attributes (Experiment 1)

Attribute and levels	Letters					
	Sweden		Poland		Italy	
	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio
Number of service classes and speed of service						
One class, delivery by next working day (base)	0.00	n/a	0.00	n/a	0.00	n/a
One class, delivery within 2 working days	0.00	n/a				
One class, delivery within 2 working days (non-vulnerable)			0.00	n/a		
One class, delivery within 2 working days (vulnerable)			-0.13	-0.7		
One class, delivery within 3 working days	-0.30	-2.8				
One class, delivery within 3 working days (non-vulnerable)			-0.19	-1.8		
One class, delivery within 3 working days (vulnerable)			-0.62	-3.7		
One class, delivery within 2-3 working days					-0.13	-1.1
One class, local deliveries by next working day, national deliveries within 3 working days	0.20	2.1	0.01	0.1	0.03	0.4
Two classes, next working day and within 3 working days	0.00	n/a	0.00	n/a	0.00	n/a
Delivery location						
Delivered to home during work hours only (base)	0.00	n/a	0.00	n/a	0.00	n/a
Delivered to secure mail box 100m from home			-0.35	-4.8	-0.35	-2.5
Delivered to secure mail box 100m from home (non-vulnerable)	-0.55	-3.0				
Delivered to secure mail box 100m from home (vulnerable, age ≤ 44 years)	0.00	n/a				
Delivered to secure mail box 100m from home (vulnerable, age > 44 years)	-0.63	-4.6				
Delivered to mail box between 1km from home			-0.58	-4.2	-0.35	-2.5
Delivered to secure mail box 1km from home (non-vulnerable)	-1.24	-4.1				
Delivered to secure mail box 1km from home (vulnerable, age ≤ 44 years)	0.00	n/a				
Delivered to secure mail box 1km from home (vulnerable, age > 44 years)	-1.23	-9.0				
Guaranteed time of delivery						
Delivered by 09:00 (base)	0.00	n/a	0.00	n/a	0.00	n/a
Delivered by 13:00	0.17	2.6	0.19	2.2	0.00	n/a
Delivered by 17:00	0.00	n/a	0.31	3.2	0.00	n/a
Percentage of items delivered on time						
80% delivered on time (base)	0.00	n/a	0.00	n/a	0.00	n/a
90% delivered on time	0.22	2.0				
95% delivered on time	0.32	5.2				
> 90% delivered on time			0.37	3.7	0.20	2.0
Percentage of items lost						
No lost items (base)	0.00	n/a	0.00	n/a	0.00	n/a
5 out of 100 items los (non-vulnerable)	-0.89	-3.7			-0.57	-1.9
5 out of 100 items los (non-vulnerable, sent letters)			-0.48	-2.4		
5 out of 100 items los (non-vulnerable, never sent letters)			0.00	n/a		
5 out of 100 items los (vulnerable)	-0.43	-3.6	-0.24	-1.6	-0.41	-1.9
10 out of 100 items los (non-vulnerable)	-1.67	-4.2			-0.78	-1.8
10 out of 100 items los (non-vulnerable, sent letters)			-1.10	-3.1		
10 out of 100 items los (non-vulnerable, never sent letters)			0.00	n/a		
10 out of 100 items los (vulnerable)	-0.91	-6.9	-0.32	-2.0	-0.83	-3.7
Stamp / parcel prices						
Scale parameter – vulnerable	1.00	n/a	1.00	n/a	1.00	n/a
Scale parameter – non-vulnerable	0.80	4.4	1.11	3.99	1.68	0.71
Model statistics						
Number of observations	2112		1968		1992	
D.O.F	15		15		11	
Final log-likelihood	-1192.0		-1186.7		-1258.4	
Rho ² (c)	0.186		0.128		0.088	

Resident consumers are not as sensitive to speed of delivery for letter products, although there is some evidence that Polish respondents have higher levels of dissatisfaction with two-day and three-day service levels, particularly vulnerable respondents who are dissatisfied with a three-day service, compared with a single-class next day service. Generally, the non-uniform delivery option is not considered worse than the next day delivery service. These results are generally consistent with qualitative findings from background questions in the survey. There is less consistency in the results for Italy, where only a small WTP for faster services (or WTA compensation for two- or three-day services) is observed compared with the qualitative findings where 37% of residents indicated that they would like faster delivery. It may be that the Italian respondents were much more concerned with lost letters attribute in the experiment, which they valued very highly.

Home delivery is important to resident consumers, and there is a surprisingly level of consistency in values across the three member states. In Sweden there is some evidence that delivery location matters to vulnerable people over 44 years of age and non-vulnerable people, although vulnerable people less than 44 years of age did not see this as an important issue.

The findings indicate that residents in Sweden and Poland prefer later time deliveries – which is opposite from what was found for businesses. Perhaps residential consumers prefer to be at home when their post is delivered. Later time deliveries do not seem to matter to Italian residents.

Resident consumers in all countries valued improvements in reliability (percentage of mail delivered on time), although the relative valuations are fairly small and with residents in Poland and Italy not differentiating between the 90% and 95% levels.

As with businesses, residential consumers in all countries were willing to pay substantial amounts to reduce the levels of lost letters. There is some evidence that non-vulnerable residents may be more sensitive to the level of lost letters (for example in Sweden and Poland), although this doesn't seem to be the case in Italy.

There is a similar pattern, but with higher valuations for the parcels market from the outputs of the second experiment (see Table 3 for the detailed values).

Again, residential consumers are not so sensitive to speed of delivery for parcel products and there is a preference for delivery for parcels directly to the home. In Sweden, there is some evidence that vulnerable consumers place a higher value on home delivery.

The findings indicate that residential consumers in Poland and Italy prefer later time deliveries for parcels – again opposite to what was found for businesses. Time of delivery of parcels does not seem to be important to Swedish residents.

As with businesses, reliability is not so important for parcels for Swedish and Polish residential consumers, with vulnerable consumers placing a lower value on reliability compared with non-vulnerable consumers. Italian resident consumers do, however, value reliability for parcels.

Again, residential consumers in all countries place a high value on low levels of lost parcels. In Sweden those under the age of 60 seem to place a higher value on lower levels of lost parcels; it can also be seen that vulnerable consumers returning goods place a higher value on lower levels of lost parcels. In Poland, the results indicate higher valuations for non-vulnerable consumers compared with vulnerable consumers.

Table 3: Residential consumers' model results, parcel service attributes (Experiment 2)

Attribute and levels	Parcels					
	Sweden		Poland		Italy	
	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio
Number of service classes and speed of service						
One class, delivery by next working day (base)	0.00	n/a	0.00	n/a	0.00	n/a
One class, delivery within 2 working days			-0.17	-1.2	0.00	n/a
One class, delivery within 3 working days			-0.38	-2.4	-0.13	-1.3
One class, delivery within 2-3 working days	-0.19	-1.6				
One class, local deliveries by next working day, national deliveries within 3 working days			0.00	n/a		
One class, local deliveries by next working day, national deliveries within 3 working days (non-vulnerable)	0.22	1.2			0.00	n/a
One class, local deliveries by next working day, national deliveries within 3 working days (vulnerable)	-0.24	-1.4			-0.74	-3.1
Two classes, next working day and within 3 working days			0.17	1.5	0.08	1.1
Two classes, next working day and within 3 working days (non-vulnerable)	0.20	1.3				
Two classes, next working day and within 3 working days (vulnerable)	-0.24	1.8				
Delivery location						
Delivered to home during work hours only (base)	0.00	n/a	0.00	n/a	0.00	n/a
Delivered to secure mail box 100m from home			-0.15	-1.2		
Delivered to secure mail box 100m from home (non-vulnerable)	0.00	n/a				
Delivered to secure mail box 1 km from home (non-vulnerable)	-0.27	-1.7				
Delivered to mail box between 100m and 1km from home					-0.22	-2.2
Delivered to mail box between 100m and 1km from home (vulnerable)	-0.44	-3.9				
Delivered to secure box 1km from home			-0.51	-4.1		
Guaranteed time of delivery						
Delivered by 09:00 (base)	0.00	n/a	0.00	n/a	0.00	n/a
Delivered by 13:00	0.00	n/a	0.06	0.5	0.10	1.3
Delivered by 17:00	0.00	n/a	0.38	3.4	0.19	2.5
Percentage of items delivered on time						
80% delivered on time (base)	0.00	n/a	0.00	n/a	0.00	n/a
90% delivered on time					0.23	2.5
90% delivered on time (non-vulnerable)			0.00	n/a		
90% delivered on time (vulnerable)			0.00	n/a		
95% delivered on time					0.30	2.9
95% delivered on time (non-vulnerable)			0.34	1.9		
95% delivered on time (vulnerable)			0.00	n/a		
> 90% delivered on time (non-vulnerable)	0.24	2.1				
> 90% delivered on time (vulnerable)	0.10	0.90				
Percentage of items lost						
No lost items (base)	0.00	n/a	0.00	n/a	0.00	n/a
5 out of 100 items lost					-0.59	-5.0
5 out of 100 items los (non-vulnerable)			-1.44	-5.2		
5 out of 100 items los (vulnerable)	-0.83	-7.3	-0.46	-2.9		
5 out of 100 items lost (non-vulnerable, age ≥ 60)	-0.49	-1.6				
5 out of 100 items lost (non-vulnerable, age < 60)	-1.25	-3.9				
10 out of 100 items lost					-1.08	-5.5
10 out of 100 items los (non-vulnerable)			-2.24	-4.7		
10 out of 100 items los (vulnerable)			-0.70	-5.8		
10 out of 100 items lost (non-vulnerable, age ≥ 60)	-0.57	-1.1				
10 out of 100 items lost (non-vulnerable, age < 60)	-2.32	-4.1				
10 out of 100 items lost (vulnerable, do not use service to return goods)	-0.87	-5.2				
10 out of 100 items lost (vulnerable, use service to return goods)	-1.93	-7.5				
Stamp / parcel prices	-0.24	-6.1	-0.20	-6.8	-0.06	-4.3
Scale parameter – vulnerable	1.00	n/a	1.00	n/a	1.00	n/a
Scale parameter – non-vulnerable	0.85	3.15	0.52	5.76	1.05	3.96
Model statistics						
Number of observations		2112		1968		1992
D.O.F		18		14		12
Final log-likelihood		-1146.8		-1179.9		-1180.9
Rho ² (c)		0.217		0.135		0.145

3.3 Consumers' priorities for general service characteristics

Table 4 presents the model results for the third experiment quantifying consumers' priorities for general service characteristics.

Table 4: Residential and business consumers' model results, general service attributes (Experiment 3)

Attribute and levels	Residents						Businesses			
	Sweden		Poland		Italy		SME		BB	
	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio
Accessing postal services										
Distance to travel										
- 1 km from home / business (base)	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a
- 3 km from home / business	-0.59	-5.8	-0.51	-4.4	-0.23	-1.8	-0.19	-1.7	-0.29	-2.0
- 5 km from home / business	-0.95	-9.1	-0.72	-4.2	-0.55	-2.6	-0.47	-4.1	-0.90	-2.0
- 10 km from home / business	-1.54	-10.6	-1.15	-5.5			-1.15	-7.6	-0.90	-4.1
- 10 km from home / business (non-vulnerable)					-0.79	-2.9				
- 10 km from home / business (vulnerable)					-1.08	-4.7				
Opening hours										
- Open 2 hours per day (base)	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a
- Open 4 hours per day	0.60	8.8	0.51	6.4			0.57	5.7	0.63	3.2
- Open 4 hours per day (non-vulnerable)					0.56	3.8				
- Open 4 hours per day (vulnerable)					0.37	1.9				
- Open 8 hours per day	1.31	16.6	0.96	7.9					1.17	5.4
- Open 8 hours per day (non-vulnerable)					1.23	3.6				
- Open 8 hours per day (vulnerable)					0.85	4.0				
- Open 8 hours per day (no Internet access at home)	0.57						1.42	8.0		
- Open 8 hours per day (Internet access at home)							1.05	8.0		
Services										
- Basic postal services available (base)	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a	0.00	n/a
- Full range of postal services available			0.23	3.1	0.12	1.4			0.19	2.9
- Full range of postal services available plus financial services	0.30	5.5	0.29	3.6	0.21	2.4	0.30	3.4		
- Full range of postal services available plus financial services (visit post office once a fortnight or less)									0.50	3.6
- Full range of postal services available plus financial services (visit post office once a week or more)									0.00	n/a
Postal network										
Delivery to 100% of addresses (base)	0.00	0.00	n/a	0.00	n/a	0.00	n/a	n/a	0.00	n/a
Delivery to 99% of addresses	-0.36	-5.0	-0.21	-2.2	-0.34	-3.4	-0.33	-3.7	-0.19	-1.4
Delivery to 95% of addresses	-0.50	-5.0			-0.49	-4.1	-0.69	-4.9	-0.44	-2.8
Delivery to 95% of addresses (non-vulnerable)			-0.64	-4.3						
Delivery to 95% of addresses (vulnerable)			-0.43	-3.0						
Pricing										
Different prices to deliver to different destinations (base)	0.00	0.00	n/a	0.00	n/a	0.00	n/a	n/a	0.00	n/a
Same price to any destination in the country	0.23	3.9			0.09	1.9	2.0	2.6	0.19	1.7
Same price to any destination in the country (non-vulnerable)			-0.19	-2.0						
Same price to any destination in the country (vulnerable)			0.18	1.3						
Stamp prices										
Scale parameter – vulnerable (base)	-1.05	-10.6	-0.73	-6.3	-0.49	-3.2	-0.82	-4.8	-0.67	-2.7
Scale parameter – non-vulnerable	1.00	n/a	1.00	n/a	1.00	n/a				
Scale parameter – Sweden (base)	1.06	8.3	0.90	5.9	1.25	2.8				
Scale parameter – Poland							1.00	n/a	1.00	n/a
Scale parameter – Italy							0.94	5.8	0.77	2.7
							1.09	5.7	1.23	3.6
Model statistics										
Number of observations	2112		1968		1992		1332		864	
D.O.F	11		14		15		13		12	
Final log-likelihood	-1110.9		-1164.5		-1128.4		-740.5		-507.0	
Rho ² (c)	0.236		0.140		0.182		0.196		0.153	

Generally, there were surprising levels of consistency between the business and residential consumer valuations for general service characteristics.

Both businesses and residential consumers prefer to have post office services located near their home or business location. For residential customers, there was surprising levels of consistency in the estimates for Swedish and Polish consumers. For Italy similar values are observed, but with higher valuations for vulnerable consumers compared with non-vulnerable consumers.

Both businesses and residential customers also prefer longer opening hours – and again, there is a surprising level of consistency in the values for Swedish and Polish residents and evidence of differences between vulnerable and non-vulnerable consumers in Italy (with non-vulnerable consumers valuing longer opening hours more). Interestingly respondents from SMEs with no Internet access at home place a higher value on longer opening hours than those with Internet access, which may mean that opening hours may be less important in future with higher levels of Internet access.

All consumers place a small but positive value on having both a full range of postal services available as well as financial services (respondents from big businesses who visit post offices less frequently place a value on additional financial services).

All consumers value 100% coverage of addresses in the postal network and require compensation for reductions in coverage. There is some evidence that non-vulnerable residential consumers place more value on coverage than vulnerable consumers at the 95% level of coverage.

Both SMEs and big businesses, residential consumers in Sweden and Poland and vulnerable consumers in Poland place a small value on having uniform pricing; however, non-vulnerable consumers in Poland do not see value in uniform pricing (and have a small preference for a system with different pricing).

4. DISCUSSION

Generally, the study has found high WTP (and WTA) values for the individual elements of postal services. The values exhibit the expected sign, however with rather large confidence intervals. In important aspects, consumer preferences overlap among customer segments and countries.

On the sender side, it is very important for all customers to be reached within a reasonable distance (not more than 3 km) and to have a postal contact point with opening hours of at least four or, even better, eight hours. This is despite the fact that most customers agree with the statement that they rarely go to a postal contact point. To a lesser extent, customers care about the scope of services offered in these contact points and prefer having a full range of postal services (as compared to basic services only). Financial services are valued from some big businesses as well as from households in Poland and Italy.

On the recipient side, businesses and residential consumers clearly dislike postal services that do not deliver letters or parcels to the doorstep. All customer groups also dislike services that do not deliver to all addresses in the country. Businesses prefer delivery to take place during office hours (before 17:00), whereas households in Italy and Poland favor the latest delivery option, suggesting that households prefer to be at home when delivery takes place (after office hours).

For the service connecting the sender and recipient side, customers value first and foremost a service where no letters or parcels are lost. The attribute can be interpreted as a proxy for the value of the information or goods that are handed over to the postal operators. The very high estimates (up to over 500% of base price in Sweden and Poland) highlight the importance of postal services and indicate that customers indeed trust postal services in delivering valuable items. Moreover, customers reveal

important preferences for services that include a next day delivery option (same WTP as long as a next day service is offered). This is in line with the qualitative questions where respondents suggested faster delivery services in countries with slower services (Italy, Poland). The WTP for a next day service is, in absolute and relative terms, generally higher for parcels than for letters. For the latter, a next day option seems to be predominantly important for big businesses. Businesses, and in particular businesses, expect uniform delivery standards throughout the country for letters and parcels, whereas households prefer a priority (J+1) treatment of local letters only. SMEs exhibit an important WTP for uniform prices. To a lesser extent, Swedish and Italian households favor uniform prices. Big businesses care more about reliability (percentage delivered on time) of letters than parcels; small businesses place a higher value on reliability for parcel services. For residents, the WTP for on-time delivery seems to be higher where the actual service levels are lower (Italy, Poland).

Figure 1 summarizes the importance of the attributes tested, on the sender and recipient sides of the services, as well as for the service itself.

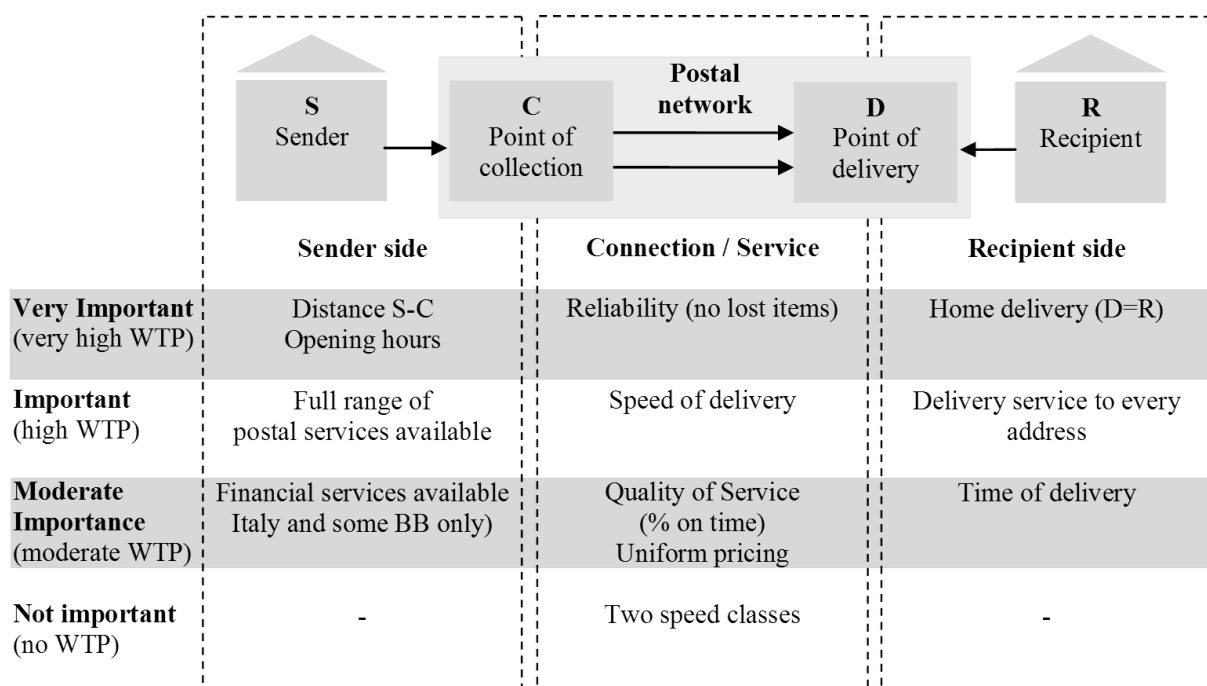


Figure 1: Importance of key postal service attributes for consumers

An objective of the study was to examine WTP for senders and receivers of postal services and to take account of the different exposure of letters and parcels to competition from e-substitutes.

The findings from this study suggest that WTP appears to be independent of sending and receiving patterns within consumer groups; net senders have about the same preferences as net recipients. This underpins the view that postal markets are two-sided and that network externalities are very important in this industry. Senders do care about the service provided on the recipient side, and the services offered on the sender side are important to recipients. Otherwise, net-senders would set higher priorities for service attributes that are relevant on the sender side and vice versa with net-recipients.

To account for the different degree of intermodal competition between letters (against electronic communication, “e-substitution”) and parcels (no alternatives) separate experiments were presented to respondents examining preferences for letter (Experiment 1) and parcel (Experiment 2) services. In

absolute terms, the WTP is much higher for parcels than for letters. In relative terms (against the price of the baseline product), there are still significant differences, albeit not that accentuated. As highlighted above, traditional letter service attributes such as speed and on-time delivery remain important for big businesses. This may indicate that SMEs and consumers already use different channels compared to big business to satisfy their most important communication needs. It is noteworthy that in the survey sample only 2% of business respondents and 6% of consumers did not have any Internet access. The highest figures are 19% for vulnerable people and 22% for ages over 65. Hence, a very large majority of every consumer group in the survey sample had access to electronic substitutes. Against these rather high Internet penetration rates, the result that big business still exhibit relatively high WTP for letter services is somewhat surprising. If this valuation persists, then this may be interpreted as good news for postal operators, as the substitution potential for sending information to households is limited.⁵

People under 35 from Sweden and living in rural regions are most likely to buy goods online. This is consistent with Internet penetration rates (99% under 35, 97% in Sweden) and the high opportunity cost of shopping for domestic residents living in rural regions. Italians are least likely to purchase goods online, which may be because of their relatively low WTA for lost items (low trust in domestic parcel services, see above). Based on the results and anticipated generational shifts, further growth in Internet purchases and hence parcel flows is likely.

As noted, standard errors for the WTP estimates are large. The aim of this study was to develop a methodology for quantifying consumers' postal preferences and testing it in three Member States. For future studies informing policy interventions in the postal sector, two improvements to the methodology are recommended. First, one may consider larger sample sizes, and the standard errors reported in this study can provide useful information to guide practitioners on this issue. Second, the significance of the measures would be improved with better measures of cost sensitivity and therefore larger cost differentials may be tested.

NOTES

- ¹ As part of the study we selected the three member states for testing the study methodology. We aimed to choose countries that provided a wide range of variation across key background characteristics that might influence postal services and consumers' preferences for postal services, e.g. size of country, letter volume, degree of urbanization, market experience, digital penetration, state ownership, and so on. For further information, please see Rohr et al. (2011).
- ² Small and medium (business) enterprise (less than 250 employees)
- ³ Vulnerable people were defined as those aged over 65 years, or those with a long term illness or disability or those from a low-income household.
- ⁴ The larger standard errors for Italy are probably explained by the larger confidence intervals on the cost sensitivity attribute, implying that respondents in Italy did not focus on cost levels or that larger cost differences could have been tested in Italy, particularly for the experiments using letter stamp prices (Experiments 1 and 3). More generally, larger cost differences could have been tested in all countries, which could improve the estimate of cost sensitivity and resulting WTP valuations. Larger sample sizes, more generally, to reductions in standard errors, and it is noteworthy that the Accent (2008) study contained around 550 domestic resident interviews and 350 business interviews.
- ⁵ A somewhat surprising side result is that e-substitution has not eroded the WTP for next day letter services. This could have been expected since electronic delivery takes place instantaneously. The results are confirmed by the background questions where faster delivery was suggested as a service improvement in the first place, with respondents under 35 being most likely to suggest faster deliveries. It remains open, however, whether respondents had letters or parcels in mind. An interpretation may still be that people who are used to instantaneous electronic delivery expect the same for physical deliveries.

REFERENCES

Ben-Akiva, M. and S. Lerman (1985) *Discrete Choice Analysis: Theory and Application to Travel Demand*, MIT Press Series in Transportation Studies, 1985.

Hensher, D., J. Rose, and W. Greene (2005) *Applied Choice Analysis - A Primer*, New York: Cambridge University Press.

ITA Consulting and Wik Consult (2009) *The Evolution of the European Postal Market Since 1997: A Study for the EC, DG Internal Market and Services*.

Rohr, C., U Trinkner, A. Lawrence, P. Hunt, C. Woo Kim, D. Potoglou, and R. Sheldon (2011) *Study on Appropriate Methodologies to Better Measure Consumer Preferences for Postal Services: Final Report*, Report for Internal Market and Services DG, available at: http://www.rand.org/pubs/technical_reports/TR1140.html

Train, K. (2003) *Discrete Choice with Simulations*, Cambridge University Press, Cambridge.