Stated preference models of contact decision behaviour in academia

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A Discrete Choice Modelling Approach Using Stated Preference Data

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1. Introduction

In several European countries there is currently a great political debate about 1992, and the structural and economic changes which will have to come about in Europe within the next years. Substantial industrial restructuring is taking place and forward planning in the commerical and financial sectors recognizes the profound changes an open market will bring. All this may force us to ask if the scientific community is undertaking similar efforts to advance cooperation at a European scale and to attempt to achieve the same lack of barriers to thinking and recognition as in the USA (Fischer 1989). One step towards this rather ambitious goal are the Scientific Networks initiated and pushed forward by the European Science Foundation (ESF) located in Strasbourg.

With the ESF Network on European Communication and Transport Activities Research (NECTAR) a successful attempt has been made to mobilize a major part of the scientific potential in Western Europe. Activities of the Network centre around the following four focal points of joint research: Barriers to Communication (core research area 1), Europe 2020 (core research area 2), Behaviour of Transportation and Communication Users and Suppliers (core research area 3), and Transportation and Communication Policy Development (core research area 4). In core research area 1 major emphasis is laid

* *first,* on identifying the **major factors and barriers that affect media choice behaviour and contact decision behaviour in the university setting,**

* *second,* on developing a **conceptual framework for analysing communication behaviour and barriers to communication** in the case of **telephone communication**, and

* *third*, on deepening the **understanding of the role of national borders in economic development.**

For the first field of research, universities have been chosen as focus of research as they play an important role in an information society as the creators and disseminators of knowledge. In addition, a university setting

provides a test-bed for studying differences in communication behaviour due to organisational, social and cultural factors.

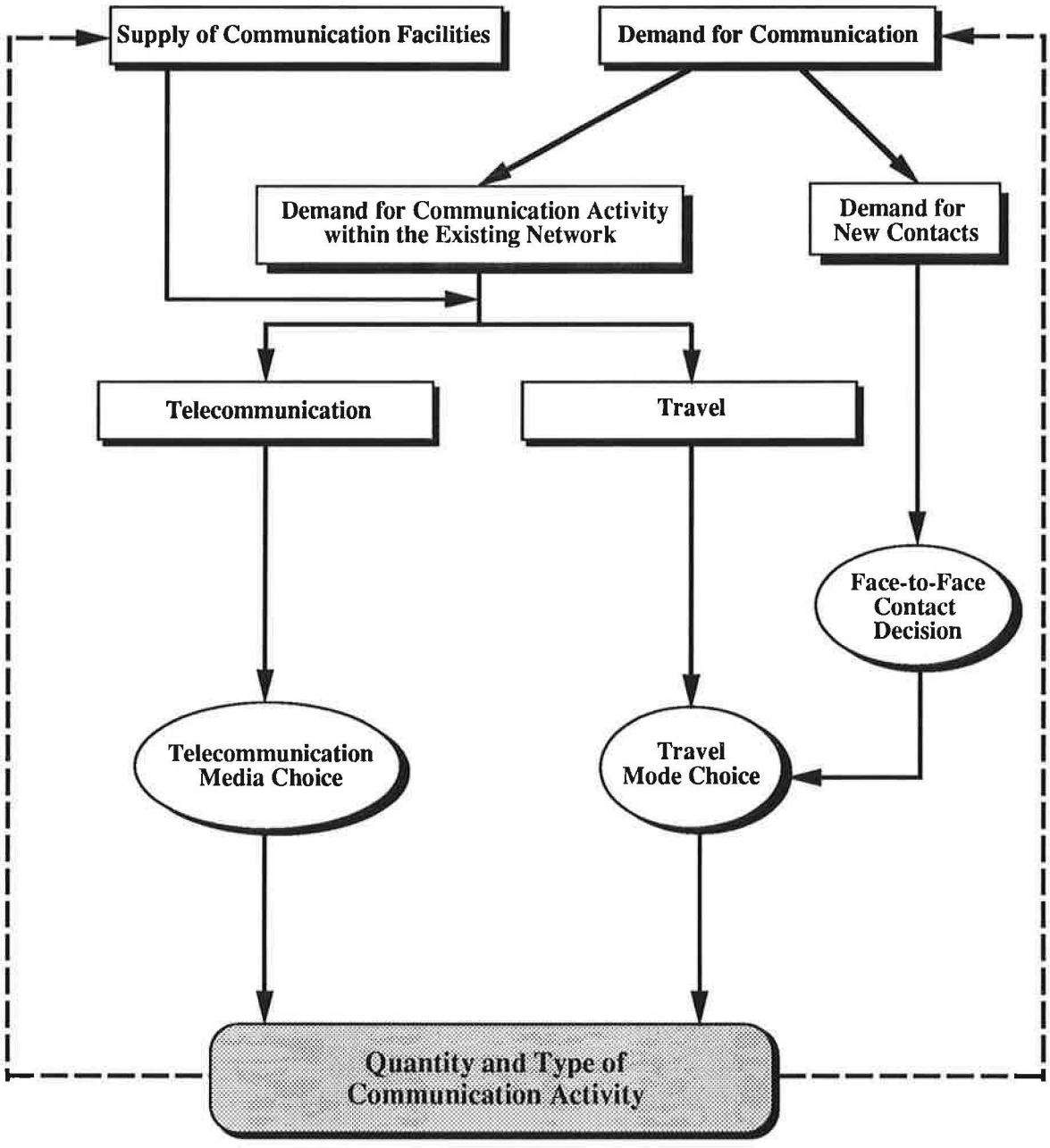
While two earlier papers of the authors focussed on media choice behaviour (see Fischer et al. 1990, 1991), in this paper it is the issue of contact decision behaviour which is being emphasized. The contact decision is conceived as decision to establish a direct or face-to-face contact with a potential contact partner. The main purpose of the present contribution can be summarized as follows: First, to develop a conceptual framework for analysing contact decision behaviour in the university setting; second, to identify the major factors and barriers influencing contact decision behaviour; and, third, to identify cross-national differences in contact decision behaviour.

The outline of the paper is as follows. In section 2 the conceptual framework suggested is sketched, while in section 3 an attempt is made to integrate a stated preference experimental design procedure into a discrete choice modelling framework. The choice modelling approach developed emphasizes the influence of the contact decision context, individual and organisational characteristics of the contact decision maker as well as the existing contact network on the formation of preferences. Section 4 is devoted to test the framework empirically. The analysis relies on face-to-face interviews which were conducted in six major universities in Austria and in Switzerland. Empirical results are presented using stated preference models of contact decision behaviour. In the final section the major conclusions of the study are summarized.

2. The Conceptual Framework

The complexities inherent in the process of communication behaviour led to the development of an integrated framework for communication choice within an university setting outlined in Figure 1 (see Fischer et al. 1990). This figure depicts the interaction of a department´s supply of communication facilities (such as telephone, facsimile, electronic mail, traditional mail, courier mail, etc.) with the demand for communication in a simplified manner. The demand for communication evolves from the organisational structure of the department including the department´s objectives (especially with respect fo research) as well as formal and informal rules governing individual behaviour. Supply and

Figure 1: Integrated Framework for Communication Behaviour within a University Setting



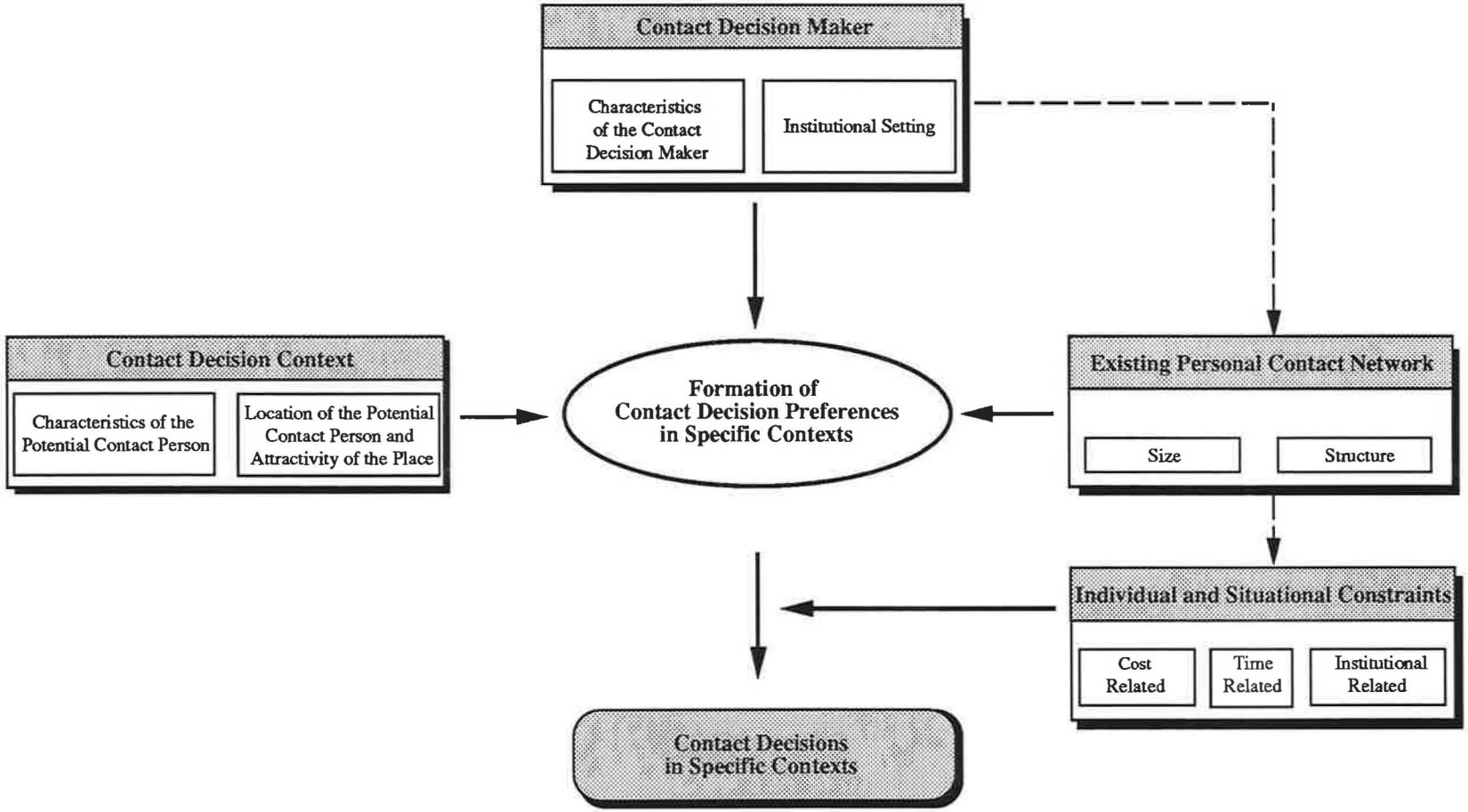
demand result in the need for a certain quantity and type of communication activity. Most of the communication needs are met by communication within the existing contact network, either by using communication media or by travel to face-to-face meetings (conferences, workshops, lectures, etc.), while others may be satisfied only by establishing new direct contacts. An important feature of the conceptual model is the feedback from communication outcomes to both the supply of communication facilities and the demand for communication.

The contact decision segment of the conceptual framework will be expanded in some more detail in the sequel. Contact decision in the context of this paper refers to the situation where an individual (termed contact decision maker) decides on a possible new face-to-face contact which is conceived as a necessary, but not sufficient condition to extend his/her personal (knowledge based) contact network (see Figure 2). The choice process is conceptualized as including the following stages.

First, the contact decision maker becomes aware of a need to cooperate in a specific context and expects a productivity gain from cooperation with a potential contact partner, where awareness and expectations strongly depend upon his/her own stock of knowledge, research activities and ambitions. The decision maker has individual characteristics (such as profession and status, reputation, scientific ambitions, etc.) and works in a specific institutional environment. Two extreme types of institutional environments may be distinguished: Competitive environments with several incentives in which quality of academic output is rewarded, and bureaucratic environments where constraints rather than incentives dominate the scene and where the reward system is only loosely related to the quality of academic output. Thus, not only personal charateristics, but also the institutional setting may have strong implications for the formation of contact decision preferences in specific contexts.

Second, given the academic´s awareness of the contact decision context it is assumed that he/she evaluates the fellow scholar´s knowledge potential in relation to his/her own human capital stock. Consequently, individual characteristics of the potential contact person (such as his/her reputation in the academic field, his/her professional status, but also his/her language skills) as well as the reputation of the institution with which he/she is

Figure 2: A Conceptual Framework for Contact Decision Behaviour



associated, and additionally the attractivity of the city in which the institution is located may be considered as important factors influencing the formation of contact decision preferences.

Third, the contact decision is assumed to depend not only upon the contact decision maker's own knowledge potential, but also upon the knowledge accessible in his/her existing personal contact network. Personal contact networks are conceived as informal immaterial knowledge-based networks where nodes represent academic scholars and links personal relationships.

Finally, the decision maker is subject to restrictions which relate to rules and norms (culture) of the institution in general, refer to time and cost budgets allocated to travel by the decision maker and the academic's level of mobility in particular.

Table 1 presents details of the variables considered to be important for modelling the contact decision behaviour.

Table 1: Important Variables Characterising the Contact Decision Situation

Contact Decision Maker	Contact Decision Context
A. Personal Characteristics * Profession and Status * Age * Reputation and Scientific Ambitions * Language Skills * Degree of Mobility	*A. Characteristics of the Potential Contact Partner* * Professional Status * Reputation * Language Skills
B. Personal Knowledge Based Contact Network * Size (Number of Contact Persons) * Extension of the Network * Orientation and Direction of the Network * Intensity of Network Use	*B. Location of the Potential Contact Person* * Location of the University * Attractivity of the City
C. Institutional Setting * Rules and Norms (Culture of Organisation) * Cooperation and Mobility Incentives * Reputation and International Competitiveness * Travel Budget	

3. Methodology

Testing the conceptual framework is based on a micro-based approach which combines the stated preference data and the discrete choice modelling approaches.

The Stated Preference Data Approach

The stated preference data approach widely used in market research offers an attractive empirical setting (see Bates 1988, Hensher et al. 1988, Wardman 1988) in which individual contact decision behaviour may be analysed within the context of discrete choice modelling. The stated preference data approach to data collection provides an extremely useful framework for empirical studies. In particular, it enables to analyse different contact decision situations while allowing to determine the influence of contextual variables. A key feature of the approach is that individuals are exposed to a set of choice experiments generated by some controlled experimental design procedure so that the independent variables can be made truly independent. The principal drawback of the stated preference data approach is that individuals´ stated preferences may not correspond closely to their actual preferences. They may diverge because of systematic bias in stated preference responses or because of difficulty in carrying out the stated preference task.

Stated preference typically predifines the attributes of the choice alternatives (in this case: a binary choice situation) and seeks behavioural responses from the characteristics of choice alternatives in the form of either a preference ranking/rating or a choice selection (see Hensher et al. 1988). In this study, the technique of choice selection rather than preference ranking/rating was used. Choice selection designs are easiest to complete and the best understood. Choice designs are difficult to control if self-administered, consequently face-to-face interviews have been conducted to ensure that each choice response is an independent assessment.

Survey respondents had to respond to multiple contact decision contexts, each described by carefully chosen independent variables. Behavioural responses were then measured in reference to these experimentally designed contact decision situations. Theoretical reasoning and exploratory analysis revealed that the location of the potential contact partner with a five predefined

Table 2: A Reduced Fractional Design for the Contact Decision

Block	Professional Status	Reputation	Language Skills	Location
Block 1	Full Professor	high	perfect	Munich
Block 2	Assistant Professor	high	perfect	Munich
Block 3	Full Professor	low	perfect	Munich
Block 4	Assistant Professor	low	perfect	Munich
Block 5	Full Professor	high	basic	Prague/Paris
Block 6	Assistant Professor	high	basic	Prague/Paris
Block 7	Full Professor	low	basic	Prague/Paris
Block 8	Assistant Professor	low	basic	Prague/Paris
Block 9	Full Professor	high	perfect	Prague/Paris
Block 10	Assistant Professor	high	perfect	Prague/Paris
Block 11	Full Professor	low	perfect	Prague/Paris
Block 12	Assistant Professor	low	perfect	Prague/Paris
Block 13	Full Professor	high	basic	Lisbon
Block 14	Assistant Professor	high	basic	Lisbon
Block 15	Full Professor	low	basic	Lisbon
Block 16	Assistant Professor	low	basic	Lisbon
Block 17	Full Professor	high	perfect	Lisbon
Block 18	Assistant Professor	high	perfect	Lisbon
Block 19	Full Professor	low	perfect	Lisbon
Block 20	Assistant Professor	low	perfect	Lisbon
Block 21	Full Professor	high	perfect	Los Angeles
Block 22	Assistant Professor	high	perfect	Los Angeles
Block 23	Full Professor	low	perfect	Los Angeles
Block 24	Assistant Professor	low	perfect	Los Angeles
Block 25	Full Professor	high	basic	Tokyo
Block 26	Assistant Professor	high	basic	Tokyo
Block 27	Full Professor	low	basic	Tokyo
Block 28	Assistant Professor	low	basic	Tokyo
Block 29	Full Professor	high	perfect	Tokyo
Block 30	Assistant Professor	high	perfect	Tokyo
Block 31	Full Professor	low	perfect	Tokyo
Block 32	Assistant Professor	low	perfect	Tokyo

attribute level, and his/her reputation, his/her professional status and language skills (each with two predefined attribute levels) were important contextual variables to be used to design the questionnaire contexts (see Table 2). The four variables were incorporated into a reduced fractional design with 32 different choice contexts.

Each questionnaire contained two contact decision contexts presented on a card, in terms of a short description of each context variable. An example of one of these contexts is presented below:

> There is an increasing interest in a rather new field of research which attracted your attention recently. You are looking for potential partners to discuss a first draft of a paper in this exciting area. Your attention has been drawn to one of the **leading American full professors** in the field associated with the **University of California at Los Angeles**. Would you take the opportunity to participate at a Conference to be held in Los Angeles next month in order to exchange point of views and to discuss specific research problems of your interest in a face-to-face meeting with the above mentioned scholar?

The second context in this pair was composed of exactly the opposite set of levels on each of the three 2-level attributes (reputation, professional status and language skills) and an other location. The pairs of contexts were equally distributed throughout the questionnaire and randomly assigned to the interviewees.

The Discrete Choice Modelling Approach

Testing of the contact decision segment of the conceptual framework is based upon the discrete choice modelling approach, with economic random utility theory as the underlying theoretical rationale, using stated preferences. Discrete choice models such as multinominal logit, nested multinominal logit and multinominal probit models are now well established model approaches which are applied in a wide range of fields (see, for example, Ben-Akiva and Lerman 1985, Fischer and Nijkamp 1985, and for recent applications in geography and regional science Fischer et al. 1990a). Thus, it is not

necessary to review the discrete choice modelling approach in detail, except for some specifics of the application in the empirical section of this paper.

The contact decision may be characterised as follows. A scholar i (termed contact decision maker) faces 2 alternatives where alternative *k* might be the option of realizing a face-to-face contact and alternative *l* would be not realizing a face-to-face contact. It is assumed that a contact decision maker's preferences among the two choice options may be described by a utility function and that (s)he selects the alternative with the greatest utility. The utility u_{ia} of an alternative *a* (*a* = *k*, *l*) may be additively separated into a deterministic component v_{ia} and a random component ε_{ia}:

$$u_{ia} = v_{ia} + \varepsilon_{ia} = V(\mathbf{x}_{ia}, \theta) + \varepsilon_{ia} \qquad (1)$$

where $\mathbf{x}_{ia}$ is a vector of observed characteristics of individual i and choice option *a*, θ denotes a vector of parameters. ε_{ia} relates to faulty perceptions of the choice options, idiosyncratic preferences, neglected choice relevant attributes etc.

The probability p_{ia} that contact decision maker i chooses option *a* is given by

$$\begin{aligned} p_{ia} &= \text{Prob}\,(u_{ia} > u_{ia'}\,,\ \text{for}\ a \neq a' \varepsilon \{k,l\}) = \qquad (2) \\ &= \text{Prob}\,(u_{ia} + \varepsilon_{ia} > v_{ia'} + \varepsilon_{ia'}\,,\ \text{for}\ a \neq a' \varepsilon \{k,l\}) \end{aligned}$$

The functional specification of (2) involves two major steps: First, specifying the probability distribution of the random terms; and second, specifying the functional form of the deterministic component of utility. In the current context the following assumptions are made. It is assumed that $\varepsilon_i = \varepsilon_{ik} - \varepsilon_{il}$ is logistically distributed, i.e.

$$F(\varepsilon_i) = \frac{1}{1 + \exp(-\mu\,\varepsilon_i)} \quad \text{with}\ \mu > 0,\ -\infty < \varepsilon_i < \infty \qquad (3)$$

where μ is a positive scale parameter.

Moreover, it is assumed that v_{il} and v_{ik} are linear in their parameters, i.e. the choice structures are postulated to be compensatory in nature

$$V(\mathbf{x}_{ia}, \theta) = \theta' \mathbf{x}_{ia} \qquad (4)$$

of linear-in-parameters utilities, the scale parameter μ cannot be distinguished from the overall scale of the θ's. For convenience, μ is assumed to equal one. This corresponds to the assumption that the variances of ε_{ik} and ε_{il} are both $\pi^2/6$, which implies that var $(\varepsilon_{ik} - \varepsilon_{il}) = \pi^2/3$.

Under the above mentioned assumptions, the choice probability for alternative k is given by

$$p(k \mid \mathbf{x}_{ia}, \theta) = \frac{\exp \theta' \mathbf{x}_{ik}}{\exp \theta' \mathbf{x}_{ik} + \exp \theta' \mathbf{x}_{il}} = \frac{1}{1 + \exp(-\theta' (\mathbf{x}_{ik} - \mathbf{x}_{il}))} \qquad (5)$$

4. Analysis and Results

Scholars associated with the University of Vienna, the Technical University of Vienna, the Vienna University of Economics and Business Administration, the University of Fribourg, the University of Zürich and the Swiss Federal Institute of Technology make up the target population of the study. These classical schools, institutes of technology and the business school may be considered to represent the major types of academic institutions in Austria and Switzerland. So the scholars associated with these universities were targeted for the testing phase of the research. The sample design used relies on exogenous stratification (proportionate stratification). The dimensions for stratification were the type of university, the type of department and the status of the scholar (full professor and assistant professor/docent). The sampling fractions were chosen to be equal to the population shares. Consequentely, the sample likelihood of the stratified sample reduces to that of random sampling (see Ben-Akiva and Lerman 1985, p. 235). The drawing of observations out of each stratum was done randomly and produced a total of 326 questionnaires (188 questionnaires in the Austrian and 138 in the Swiss case).

In order to clarify the effects of context variation on contact decison preferences several context-specific binary choice models were estimated. Börsch-Supan´s HLOGIT program was used to estimate the models. HLOGIT estimates maximum likelihood parameters, utilizing a Marquardt-type modified Newton-Raphson procedure.

Three standard goodness of fit measures were used: Rho-squared (at market shares), adjusted rho-squared (at market shares) and the prediction success. Rho-squared is the standard likelihood ratio index which indicates how well the model explains preferences relative to the market shares model where all parameters in the model except the alternative specific constants are set to zero. Rho-squared (at market shares) ρ^2 is defined as

$$\rho^2 = 1 - L^*(\theta) / L(\mathbf{C}) \qquad (6)$$

where $L^*(\theta)$ denotes the value of the log likelihood function at its maximum and $L(\mathbf{C})$ the value of the log likelihood function when only alternative-specific constants are included. This measure is useful in comparing two specifications. Even if there are no general guidelines for when a ρ^2-value is sufficiently high, McFadden (1979) has suggested that values of between 0.2 and 0.4 can be considered to represent a very good fit. A major shortcoming of this measure, however, lies in the fact that it will always increase or at least stay the same whenever new variables are added to the utility function. For this reason we also use the adjusted rho-squared (at market shares)

$$\bar{\rho}^2 = 1 - (L^*(\theta) - K) / L(\mathbf{C}) \qquad (7)$$

with K denoting the number of parameters. Another informal goodness-of-fit measure refers to the percentage of correct ex-post predictions (the so-called prediction success) which counts those observations for which the model predicted the same contact decision as was actually observed.

Three types of variables are taken into consideration. The **first type** of variables attempts to measure the influence of personal and institutional characteristics of the contact decision maker. Four alternative-specific socioeconomic variables are included: Age and status (value 1: over 50 years and full professor, value 0: otherwise), institutional setting (value 1: Austria, value 0: Switzerland), technical orientation of the university (value 1: school of

technology, value 0: otherwise), and cooperation incentives measured in terms of aggregated contact intensity of the institution. Basically these variables reflect the differences in preferences for establishing a new direct contact as a function of age and status, the institutional setting, the technical orientation and cooperation incentives.

The **second type** of variables measures the influence of the existing knowledge based contact network on the contact decision. The orientation of the personal knowledge based contact network (value 1: international orientation, 0: otherwise) of the contact decision maker is used to represent this type of variable.

The **third type** of variables refers to context specific variables. A first group of these variables relates to personal characteristics of the potential contact person, such as the professional status (value 1: full professor, value 0: otherwise), the reputation (1: high, 0: low) and language skills (value 1: perfect in English, value 0: otherwise). A second group of context specific variables measures locational characteristics. Travel costs and location specific dummies are used. For the five locations (Munich, Prague/Paris, Lisbon, Los Angeles, Tokyo) four location specific dummies (excluding Munich) have been constructed which take the value 0 if the perceived costs are prohibitive for realizing a contact with a scholar at the corresponding location, and the value 1 otherwise. The location specific dummies may be viewed to reflect the perceived attractiveness of the contact place in face of cost considerations.

Finally, the constant is introduced to capture the effects of unobserved factors and individual idiosyncracies influencing the choice decision.

Two types of stated preference contact decision models were estimated:

* the **base model** estimated on the full sample size of 652 observations (326 questionnaires with two choices each),

* two **national split models** relying only on national segments of the data.

Table 3 summarizes the coefficient estimates and the goodness of fit statistics used for the base and the national split models. The adjusted rho-squared (at market shares) values of 0.28 (base model), 0.33 (Austrian model) and 0.27

(Swiss model) show that the models fit reasonably well. The Austrian model fits slightly better than the Swiss one. With the model specifications used 77.5 per cent (base model), 80.3 per cent (Austrian case) and 76.8 per cent (Swiss case) of the positive contact decisions are predicted successfully.

Table 3 indicates clearly the influence of different institutional environments in Austria and Switzerland for the contact decision through varying levels of significance of the variables characterising the contact decision maker and his/her institution. Cooperation incentives is the only variable significant in both, the Austrian and Swiss cases. This variable, however, tends to be much more important in Austrian academia than in Switzerland. This view is also supported by the country specific dummy reflecting country specific differences in the institutional settings, and points to a more favourable institutional academic environment for direct contacts in Austria, a result which calls for further research into the incentives for individual knowledge production in the two countries.

Age interacting with the professional status negatively influences the contact decision behaviour. Full professors older than 50 years are less likely to realize a new contact. International orientation of the personal knowledge based contact network positively affects the contact decision. The association with Institutes of Technology has a negative influence on the contact decision. This may first seem strange, but can be explained by the fact that scholars in the engineering field of these institutions tend to be strongly nationally oriented or internationally primarily towards the German speaking countries.

The contact decision context variables have an important influence on preference formation, across the two countries considered. The context variables appear to be much more important than the above mentioned characteristics of the contact decision maker. The cost variable is highly significant, has the expected negative sign, and appears to be rather robust across the Austrian and Swiss cases. The same is true for the location specific dummies considered where Tokyo tends to be perceived as a more attractive contact place than Los Angeles, Los Angeles as a more attractive place than Lisbon, and Lisbon as a more attractive one than Prague/Paris. The relatively low parameter value for Prague evidently points to the barrier of the iron curtain which was still present at the time of the survey. Surprisingly, the reputation of the potential contact partner is only weakly significant and the

Table 3: Parameter Estimates of the Stated Preference Contact Decision Model: The Base Model and the National Split Models (t-values in parentheses)

Variables	Base Model	Austrian Model	Swiss Model
Personal Characteristics of the Decision Maker			
Age and Status (1 if older than 50 years and full professor, 0 otherwise)	-0.69 (-2.46)*	-0.95 (-2.46)*	-0.39 (-0.83)
Personal Knowledge-Based Contact Network			
Orientation (1 if international, 0 otherwise)	0.83 (3.84)*	1.22 (4.05)*	0.30 (0.88)
Organisational Environment of the Contact Decision Maker			
Institutional Setting (1 if Austria, 0 if Switzerland)	0.47 (2.20)*	-.- (-.-)	-.- (-.-)
Cooperation Incentives (aggregated contact intensity)	0.09 (1.99)*	0.74 (2.24)*	0.21 (2.59)*
Institutes of Technology (1 if school of technology, 0 otherwise)	-0.56 (-2.66)*	-2.52 (-2.59)*	-0.07 (-0.18)
Characteristics of the Potential Contact Person			
Professional Status (1 if full professor, 0 otherwise)	0.23 (1.16)	0.16 (0.59)	0.31 (0.98)
Reputation (1 if high, 0 if low))	0.45 (2.26)*	0.54 (1.91)	0.41 (1.32)
Language Skills (1 if perfect, 0 otherwise)	0.79 (3.37)*	0.65 (2.03)*	0.92 (2.47)*
Location of the Potential Contact Person and Perceived Attractiveness of the Place			
Prague (Austrian subsample)/ Paris (Swiss subsample)	1.83 (5.60)*	0.88 (1.99)*	3.05 (5.09)*
Lisbon	2.93 (7.18)*	5.20 (2.86)*	4.76 (3.21)*
Los Angeles	4.46 (6.45)*	9.99 (2.95)*	6.53 (2.60)*
Tokyo	6.81 (7.14)*	13.73 (2.80)*	11.94 (2.93)*
Travel Costs	-0.32 (-5.72)*	-0.69 (-2.63)*	-0.69 (-2.60)*
Alternative-Specific Constant	-1.72 (-3.60)*	-4.56 (-2.32)*	-1.91 (-2.60)*
Log-Likelihood at Zero	-451.93	-260.62	-191.31
Log-Likelihood at Constant	-443.92	-255.15	-188.68
Log-Likelihood at Convergence	-307.55	-158.48	-124.51
Rho-Squared at Market Shares (adjusted)	0.31 (0.28)	0.38 (0.33)	0.34 (0.27)
Prediction Success (in %)	77.5	80.3	76.8
Observed (Predicted) Positive Contact Decisions	57.8 (71.5)	58.5 (70.2)	56.9 (69.2)
Number of Observations	652	376	276

* Significant at the 0.05 level

professional status does not play a significant role at all. Language skills are found to be important characteristics of the contact person which positively influence the contact decision, especially in Swiss academia.

Finally, it is worth mentioning that the coefficient of the constant is significantly different from zero in the three models which indicates that some choice-relevant influences have not been taken into account.

5. Summary and Conclusions

A general framework to analyse contact decision behaviour in an academic environment has been proposed which integrates a stated preference experimental design procedure into a discrete choice modelling framework. The framework has been empirically tested using hypothetical choice experiments. For this purpose face-to-face interviews were conducted in six universities representing classical schools, business schools and technological schools in Austria and Switzerland. The choice modelling approach developed emphasizes the influence of contact decision context specific characteristics, such as individual and organisational characteristics of the potential contact partner as well as personal and institutional attributes of the contact decision maker on the formation of preferences.

Empirical results are presented using stated preference models of contact decision behaviour. The results clearly indicate the importance of the contact decision context variables in general and the location specific dummies reflecting the perceived attractiveness of specific contact places in different cultural regions, the cost variable as well as the language skills of the potential contact partner in particular. Several cross-national differences in decision behaviour were identified. First, it has been found that the institutional academic environment in Austria is more favourable for contact making than in Switzerland. Second, cooperation incentives tend to influence the contact decision behaviour in Austria more strongly than in Switzerland. Third, international orientation of the personal knowledge based contact network has a positive influence upon the contact decision in Austrian rather than in Switzerland. Finally, the reputation of the potential contact person or in other words the expected increase in the knowledge potential associated with

a new link in the personal contact network appears to have only a weaker influence on the contact decision.

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