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A simple mobility game for couples' migration decisions and some quasi-experimental evidence¹

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Abstract

This paper develops a new theoretical model for couples' migration decisions, called the mobility game. The model describes migration decisions as reliant on the strategic interdependence of two partners. The important implications of this model are as follows: first, under complete information, a household move is the 'natural' solution for stable couples; second, incomplete information allows the tied mover to 'blackmail' the partner and thus to avoid the household move; and third, the decision to commute will depend mostly on the preferences of the potential commuter. The hypotheses derived from this theoretical framework are empirically testable, although the necessary information is difficult to measure. The hypotheses are tested employing a quasi-experimental design known as factorial survey, which allows one to vary systematically the incentives for moving. The empirical results confirm the importance of both strategic reasoning and mechanisms for solving problems of cooperation within the partnership.

Keywords

Factorial survey, game theory, household migration, regional mobility

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Mobility of couples

The mobility of households is an important phenomenon to consider both in analysing labour markets and in understanding family dynamics. According to labour market theory, households should be mobile, especially if jobs and wages are unequally distributed across regions, which is typical of modern labour markets (Blien et al., 2006, 2009). In this context, the flexibility of households is considered an essential mechanism for redistributing the workforce, resulting in upward social mobility at the individual level and balancing regional economic disparities at the aggregate level. Thus, if a considerable portion of households exhibit a low tendency toward spatial mobility, labour market processes and the distribution of wealth among households in a society will be (negatively) affected. A dominant framework for analysing the job-related mobility decisions of individuals is human capital theory, which treats migration as a costly investment in an individual's career from which future returns can be expected (Sjaastad, 1962; Speare, 1971). Thus, employment-related characteristics yielding higher returns in the labour market, such as education and work orientation, are usually found to be major determinants of migration (Chiswick, 1999; Greenwood, 1997). As the amount of time before mobility investments pay off is longer for young people, the theory also explains why migrants have a tendency to move earlier in life (Clark and Withers, 2007; Speare, 1971).² However, while the application of human capital theory is straightforward for explaining the regional mobility of single individuals, the moving decisions of entire households (involving more than one person) appear to be far more complex.

In particular, the mobility of couples has always been a special puzzle for researchers (Cooke, 2008; Mincer, 1978). It is well established that families show a considerably lower tendency toward household moves than do singles (e.g., Huinink and Wagner, 1989; Jürges, 2006; Myers, 1999; Nivalainen, 2004; Quigley and Weinberg, 1977; Sandefur and Scott, 1981). In part, this difference can be explained by the characteristics of couples, which are often negatively associated with the likelihood of migration. For example, higher transaction costs due to the presence of children, in particular children of school age, negatively affect the likelihood of moving (Landale and Guest, 1985; McHugh et al., 1990). Other correlates of partnership status, such as the higher proportion of homeownership among couples (Wagner, 1989) and the older age of partnered individuals (Sandefur and Scott, 1981), increase location-specific capital and the costs associated with moving, thereby rendering relocation less attractive. However, even when controlling for these effects, couples are

still found to be less mobile than singles (see e.g. the overview in Kalter, 1998). The reason for this special inertia may be that, even in the absence of such partnership-related constraints to migration, couples still face the problem that they have to either coordinate their migration behaviour or separate as a result of differential migration incentives.

Despite this insight, there remains a dearth of theoretical models that take this mutual dependency in migration decisions into consideration. One of the models most often referred to in the literature about household migration is the classic work by Mincer (1978). Based on human capital theory, Mincer's work recognises that a household move may yield a different level of utility for each of the two partners, because both partners will find optimal employment in the same geographical region only by coincidence. While the person who has received the incentive to migrate (e.g. a better job offer) will find conditions improved at the new location, the partner will, in most cases, encounter disadvantages such as difficulty finding a new job and making new friends. In Mincer's model, family migration will only occur if, in the process of welfare maximisation at the household level, the gains realised by one partner outweigh the losses of the other partner, who then becomes a 'tied mover'.³ Although the model generates a number of testable hypotheses and explicitly takes into account the specific locational coordination problems that arise due to the presence of a partner, it has been criticised for its restrictive assumptions (for a critique, see Kalter, 1998; Ott, 1989). Despite the apparent asymmetry of mobility consequences between partners, Mincer still assumes that migration decisions are made collectively and consensually by the household, ignoring the possibility of conflict and the role of individual interests in the decision process.

In trying to overcome the shortcomings of the Mincerian approach, bargaining models of migration were proposed (Abraham and Auspurg, 2007; Kalter, 1998; Lundberg and Pollak, 2003; Nisic, 2010). In these models, couples decide to relocate not only on the grounds of utility maximisation at the household level, but they also consider the *individual* outcomes associated with a move. The migration decision then becomes subject to a negotiation process in which a 'fair' redistribution of household resources after the move is not taken for granted, and in which partners try to meet their own individual interests in a long-term perspective. Although this approach more adequately and consistently models the decision-making process in the household by drawing attention to the strategic dimension of joint location choice and the role of trust, it still does not, as Kalter (1998) stresses, sufficiently capture the intricate coordination and communication problem that arises within the context of mobility bargaining.

Kalter thus proposes an extension of the bargaining model, in which the mover anticipates the potential conflict resulting from the bargaining and decision-making process in the household, which, by itself, may destabilise the partnership. Thus, if the anticipated costs are too high, the possibility of migration is not even considered. Within this framework, the decision to stay is seen as a stable routine or habit that will be performed without comparing the outcome of this behaviour with those of other potential options. Only if the benefits of another option are exceptionally high will this routine be questioned and will the actor switch to 'normal', rational decision-making behaviour. Although Kalter's approach offers additional insight into the special inertia of couples with respect to migration, it fails to identify a plausible mechanism by which one shifts from a habit to a mode of rational decision making.⁴

While all discussed models have their merits, they disregard two crucial characteristics of migration decisions among couples. First, as we know from the migration literature and family research, couples can try to solve migration conflicts by choosing a third strategy. The mover may decide to commute on a daily or weekly basis, which will allow him or her to enjoy the gains of a new job without imposing the costs of migration on the tied mover. Second, even though all approaches reflect the complications and coordination problems arising within the context of joint migration in one way or another, they still do not take into full consideration the mutual interdependence of individual decisions by both actors. Game theory deals explicitly with this situation; therefore, we propose to use a simple model to describe the logic of migration decisions. Different from existing game theoretical bargaining models, we systematically embed mobility alternatives and the strategic role of information for a couple's mobility decision. The model allows us to formulate new hypotheses that cannot be derived from existing theoretical frameworks, thereby shedding more light on the strategic dimension of migration decisions in households. By using a factorial survey, we are also able to test empirically the implications of our game-theoretical model.

A simple mobility game with incomplete information

The model describes the situation of a couple – EGO and ALTER⁵ – living together in a household at the same location. Both parties are interested in continuing their relationship.⁶ Now let us assume that EGO has an incentive to move to another location – e.g. a better job offer in another town.

Figure 1. Mobility game – extensive form.

Within the model, neither the kind of incentive nor the employment situation of ALTER is specified. Contrary to Mincer's model and the New Home Economic framework, we assume that decisions are made purely by the individual actors and not collectively by the household. This means that EGO has to decide whether to move to the new town or remain at his old job. If he decides to move, ALTER has only two options: to come along or to stay. If EGO decides not to move, he still can accept the new job and perform his duties by commuting. The last option at this point is to decline the job offer and maintain the relationship and the common household in the existing location. Figure 1 shows the structure of this decision tree, which forms the basis of the mobility game.

Looking from left to right, we see four different potential collective outcomes: (1) the household moves to the new location; (2) the relationship dissolves, and two single households are established in different places; (3) the two people maintain the old household, and EGO begins to commute; and finally (4) the status quo is maintained. Each outcome yields an individual payoff for the actors, denoted by M_i , S_i , C_i and 0 and $i \in \{\text{EGO}, \text{ALTER}\}$.

To analyse this game, we have to make assumptions about the preference order of the two actors with respect to these collective outcomes. For both actors, S_i (the break-up) is supposed to be the worst outcome. For EGO, we assume that a move (M_E) is the preferred option. At this point, we will not make any assumptions regarding whether he would prefer to commute or to decline the job offer. For ALTER, the best option is to preserve the status quo, which is standardised as 0 for both cases. Moreover, we assume that a

		ALTER	
		<i>move</i>	<i>stay</i>
EGO	<i>Move</i>	M_E / M_A	S_E / S_A
	<i>Stay/commute</i>	C_E / C_A	C_E / C_A
	<i>Stay/decline</i>	0 / 0	0 / 0

Figure 2. Mobility game – normal form.

commute is preferable to a household move for ALTER because it allows her to keep her network contacts and her job. These assumptions lead to the preference order $M_E > C_E \geq 0 > S_E$ for EGO and $0 > C_A > M_E > S_A$ for ALTER.

At first glance, EGO seems to dominate the game: he can decide whether ALTER has a decision opportunity at all. However, this first impression is misleading, as a closer look at the game shows. For this analysis, we transform the game from the extensive into the normal form, which is displayed in Figure 2.

The matrix shows that ALTER has two (pure) strategies (move or stay), whereas EGO has three strategies (move, stay/commute, stay/decline). One possible way of analysing the game is to look for a dominant strategy that maximises an actor's payoff regardless of how the other player behaves. As can easily be seen, EGO does not have a dominant strategy: if ALTER moves, EGO's best option is to move as well (resulting in the highest payoff, M_E). However, if ALTER stays, EGO will choose not to move but to stay. Due to incomplete assumptions about the payoffs at play, we do not know so far whether he might choose to commute or to decline. Empirically this will depend to a great extent on commuting costs, about which we do not want to make a priori assumptions. Nevertheless, he is not able to choose an optimal solution without taking ALTER's choices into consideration.

With respect to ALTER, we see a different situation. Whether EGO decides to stay and decline the job offer or to stay and commute does not make a difference for ALTER. In both cases, ALTER has only the choice to stay, as ALTER's moving is not a viable option in these situations. In the table, this situation is represented by the pay-offs of ALTER's two options (move/stay), which are the same in both situations. ALTER's two options and the associated pay-offs differ only if EGO decides to move. In this situation, we see a clear preference for moving on ALTER's part, because otherwise ALTER and EGO will realise the worst outcome, S_E . Technically, ALTER has a weak dominant strategy (see e.g. Gintis, 1997: 7), which

means that as a rational actor, she should choose to move in either case simply to avoid the separation. Hence the combination move/Move is a Nash equilibrium, as it represents the pair of strategies in which no partner could do better by changing his decision given the choice of the other partner. Assuming complete information (that is, that all players have perfect knowledge about the preferences and strategies of all players), EGO will anticipate ALTER's choice to move. His best answer will be to move, too⁷; hence, the couple will move, EGO will realise his best outcome, and ALTER will become a 'tied mover' because she would prefer to stay.⁸ However, this outcome only holds under the assumptions made about the preference order for each actor stated above and the existence of complete information. This assumption implies that all players know the preferences and strategies of all players in a game. Of course, the latter in particular is not a realistic assumption; therefore, we will discuss the consequences of incomplete information. By assuming that the players have complete information, we enable the actors to anticipate the (contingent) behaviour of the other actors. However, empirically speaking, preferences regarding the different outcomes are (at least to some extent) the 'private information' of the actors (see Gintis, 1997: 284). Sometimes it is rational to reveal this information – e.g. in situations without conflicting interests, like coordination games. Within the framework of the mobility game, the situation is different: clearly, ALTER has an incentive not to reveal her true preferences to her partner. If ALTER could make EGO believe that she would rather split up than move, EGO would not move but would decide either to commute or to decline the job offer.

Thus, incomplete information enables ALTER to change the outcome of the game. If she can make a credible threat that she will not come along, EGO will choose another option, and the household move will not occur. ALTER does not even have to completely convince EGO that her preferences are $S_A > M_A$; it would be sufficient for EGO to believe that the chances of this being her order of preference are fairly high. Let us thus assume EGO does not know whether ALTER would really prefer to be the tied mover rather than to dissolve the partnership. This uncertainty can be modelled by assuming that EGO will hold probability q that ALTER chooses M_A . Let A_E be the next best option for EGO (that is, either C_E or 0); EGO will choose to move only if

$$\begin{aligned}
 q \times M_E + (1 - q) \times S_E &> A_E \\
 \text{or} \\
 q &> (A_E - S_E) / (M_E - S_E).
 \end{aligned}
 \tag{1}$$

The probability that ALTER's preference is to move must be larger than the ratio of the relative gain associated with the next best option ($A_E - S_E$) and the relative gain associated with moving ($M_E - S_E$). Again, it is only important that EGO believes that this condition holds; ALTER's true preferences do not matter. Hence, ALTER has an incentive not to reveal her preferences. The general hypothesis that follows from these considerations is straightforward: the more successful ALTER is in convincing EGO that she prefers S_A over M_A , the higher is the chance that EGO will stay.⁹ To test this hypothesis empirically, the credibility of ALTER's threat must be operationalised. A common procedure to test hypotheses in game-theoretic models based on underlying concepts such as trust or credibility, which usually cannot be accessed directly in an empirical analysis, is to identify structural conditions that enable actors to appear credible or trustworthy. For our analysis, this procedure means identifying the structural conditions that enable ALTER to credibly convince EGO that she is not going to move. First of all, the duration of the partnership will be a crucial variable. In a long-lasting relationship, the partners will know each other very well; consequently, it will be difficult for either partner to hide his or her true preferences. Moreover, over time, the partners will make relationship-specific investments like buying a house or raising children. As we know from literature on partnership stability, these investments will make a separation more difficult in the context of a longer-lasting relationship, and hence a threat of separation on the part of ALTER will be less credible (see e.g. Waite and Lillard, 1991). As a result, we hypothesise as follows:

H₁: The longer the relationship lasts, the higher the (individual and collective) tendency toward a household move will be when a mobility incentive exists for one partner.

For our second line of argumentation, we assume again that ALTER's past behaviour will serve as information about her "true preferences". In particular, ALTER's migration behaviour will be interpreted by EGO as indicating whether a household move would be tolerable for ALTER in general. If a person has never left his or her hometown, migration to another place will be much more difficult than it would be for a person who has experienced a significant number of moves in the past (see e.g. Myers, 1999). Anticipating ALTER's reluctance to move, EGO's own willingness to move will be lowered, too, as the option to move together becomes quite unlikely. This leads us to our second hypothesis:

- H₂: The longer ALTER has already lived in the community where the common household is located, the lower the (individual and collective) tendency toward a household move will be when a mobility incentive is offered to EGO.

Of course, within the human capital framework, the duration of living in the same region can simply be seen as an indicator for moving costs, as location-specific capital built over time will be lost after migration, thereby reducing the probability of household relocation. However, no effect of ALTER's duration of living in the region on EGO's preference for moving can be deduced from this approach.

One should note that neither hypothesis is derived from the existing models, especially those of Mincer and Kalter. Within the human capital framework, mobility is only dependent on the direct costs and benefits of a new location for the household. Kalter's theoretical concept is considerably closer to our model: he assumes that, in some situations, EGO will not even consider a move because he is anticipating bargaining and conflict costs in the context of the partnership. However, Kalter simply assumes that such a frame – which reduces the strategies open to EGO – exists for 'stable' couples. This may explain why couples are especially immobile, but it does not allow one to derive hypotheses that explain the variance of this effect. Contrary to the frame model, the mobility game allows for both. Within our framework, the idiosyncratic negative effect of partnerships on mobility is simply a consequence of time because relationship-specific investments such as children or homeownership, which hamper migration, increase with the duration of the partnership. Thus, not only do we assume that the negative effect of the partnership will vanish once we have controlled the duration of the private partnership, but our model also implicates that *ceteris paribus* the true effect of the partnership duration is *positive*.

Introducing a third option – commuting

Finally, let us take a look at the possibility of EGO's commuting. The discussion in the previous section showed that EGO will not move if he thinks that the probability of ALTER's staying is too high. In such a case, he has two options: to commute or to decline the job offer and continue to work in the present community. The model does not specify which option is generally preferable to EGO because we do not know the cost of commuting. However, this model has some general implications for the decision structure. First, within this framework, it is EGO's decision to commute or decline the job

offer; ALTER's preferences regarding these outcomes do not matter. At least with respect to a daily commute, this idea seems empirically plausible because EGO will bear most of the costs, such as time invested and stress.¹⁰ However, to suggest that ALTER will not care about the cost of commuting at all would be misleading; indeed, she will also consider EGO's commuting costs, because they will reduce household income, thereby at least partly affecting her own utility.¹¹ Taking this into consideration, we hypothesise the following:

- H₃: The costs of commuting (which, of course, should be negatively correlated with both EGO's and ALTER's acceptance of a commuting arrangement) will have a stronger impact on EGO's preferences regarding the commute than on ALTER's preferences.

Secondly, given the preference order assumed in the game (with $M_E > C_E \geq 0 > S_E$ for Ego and $0 > C_A > M_E > S_A$ for Alter), the game's decision structure has a kind of two-stage setting: if EGO believes that ALTER will come along, he will choose to move regardless of the costs of commuting. If he believes that pressing a household move on ALTER will jeopardise the partnership, the costs of a household move will be of no consequence in his decision to commute or stay. This leads us to our fourth hypothesis.

- H₄: The costs of commuting should not have any effect on individual preferences or the probability of a joint *move*.

A second line of argumentation takes into consideration that the situation is not really a single-shot game. Decisions in the mobility game will have an effect on the actors' opportunities and restrictions in the future. In particular, bargaining power within the partnership will be influenced by the outcome of the mobility game (Abraham et al., 2010; Ott, 1992). Let us assume that EGO chooses to accept the new job and therefore begins a commuting routine. In this situation, the couple can theoretically relocate at any later point in time, and consequently, any time after he has accepted the new job, EGO may start the (implicit) bargaining process that will determine whether the household will eventually relocate. Hence, the commute can have what Kalter (1998) calls a 'transition function' (e.g. Van Ommeren et al., 1997: 416); the arrangement is seen as a temporary fix that will hold until ALTER moves to the new destination or EGO switches back to his former job. However, because of the sunk costs of a job change and the increased income that EGO will enjoy, he will have greater bargaining power. EGO will have a better chance of renegotiating a household move after he has

begun commuting; this will be especially true when ALTER has good job opportunities at the new destination. Consequently, we hypothesise the following:

- H₅: EGO's willingness to commute for a new job will be higher if there are good job opportunities for ALTER at the new destination.

Given ALTER's preference structure, the situation is somewhat more complicated. In anticipation of the 'strategic value' of a commute with respect to prospective bargaining power, ALTER should reject the possibility of EGO's commuting, especially if her job opportunities at the new destination are convenient. However, this would deprive her of the opportunity to resolve the basic conflict regarding 'moving or staying' because if she were to opt against EGO's commuting, she would weaken her position in refusing relocation. Hence, we do not make a prediction for ALTER here.

Although we are not able to explicitly test the following further implications of our theoretical framework, they may be interesting for future research. As equation (1) shows, the utility of the next best option compared to that of moving is negatively related to EGO's decision to migrate. The more options EGO has, the higher is the chance that one will be sufficiently attractive for EGO not to move. Consequently, from a structural point of view, an increased chance of commuting should lead to less likelihood of divorce – at least as long as we neglect or control for the possible destabilising effects of the commute itself.

Empirical evidence

Although testable hypotheses can be derived from our model, there is a general problem when we look for empirical evidence. Based on standard survey methods, it is nearly impossible to detect whether a couple's preferences are those assumed by the mobility game. If ALTER preferred to move along with EGO from the start, our model would no longer be applicable. Moreover, in standard surveys, it is not possible to observe rejected job offers in response to an incentive to move; usually only actual moves are recorded.

With this in mind, we test our hypotheses using a factorial survey design or vignette analysis. This approach combines the advantages of an experimental design with the usual features of a survey study (Hox et al., 1991; Jasso, 2006). The survey participants are presented with several descriptions of hypothetical situations with systematically varying characteristics, termed 'vignettes'. Respondents are then asked to evaluate or judge these vignettes using a specified response scale. In this

case, the hypothetical situations contained a varying set of mobility incentives like income and employment prospects at a potential destination location; respondents had to report on their willingness to move to this location given the described set of conditions. Borrowing from the experimental tradition, the vignette attributes are independently varied (i.e. orthogonalised) following fractional application methods. This makes it possible to separate the influence of factors that are often correlated in the real world. Moreover, because the vignettes are randomly distributed to the respondents, there is also no correlation between respondent characteristics and vignette attributes. Male and female respondents have an equal chance of being offered a better job in the vignettes. Thus, the usual selectivity problems reported in migration and labour market research are methodologically overcome, and theoretically interesting but rare combinations of attributes can be easily investigated.

In this study, the vignettes were presented to dual-earner couples using a mirror-inverted design (for more details see Abraham et al., 2010; Auspurg et al., 2009). The two individuals in each couple received identical descriptions of their situation with the same combinations of attributes, but the descriptions were laterally inverted: one partner (EGO) was in the role of the person obtaining a moving incentive (i.e. a better job offer in another geographical region), while the other (ALTER) was assigned the role of the tied mover whose employment situation would not necessarily improve in the new location. The design also assured equal distribution of male and female partners across EGOs and ALTERs (rendering a gender ratio of 0.5 between EGOs and ALTERs). The vignettes consisted of six varying dimensions creating differently appealing employment situations for the partners. This included variation in the increase in income and in the career prospects of the lead mover (EGO), different employment and career opportunities for the tied mover (ALTER) and varying immediate costs of mobility as indicated by commuting time to the new destination and commuting mode. Taking advantage of the CAPI technology and to render the situations more realistic, income increase was represented as a percentage gain on actual salary. In the vignette description, living conditions and leisure activities were explicitly held fixed for both destinations. Figure 3 displays a vignette applied in this study and the corresponding response scales.

The factorial survey was conducted collaboratively by the Universities of Konstanz and Bern during the period between June 2007 and February 2008 (Abraham et al., 2010; Auspurg et al., 2009). A total of 303 Swiss and German couples were interviewed via snowball recruitment, whereas only

Assume...

You are offered a monthly net salary of 1400 EUR in a new location. In the long run, the new job will provide you with no advancement opportunities. If you don't move, commuting to the new job will take 1½ hours each way. It is reachable only by car.

Your partner's chances of finding a job at the new location are small, but her income prospects are higher there than in the local labour market.

How much would you prefer to take the job and commute to the new location?

Not at all	0	1	2	3	4	5	6	7	8	9	10	Very much
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Not at all	0	1	2	3	4	5	6	7	8	9	10	Very much
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Not at all	0	1	2	3	4	5	6	7	8	9	10	Very much
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Figure 3. Example of a vignette (version for a man, own job offer (=EGO)).

Note: In this example, the inverse situation for the female partner in the role of **Alter** would read as follows: Assume **your partner** is offered a monthly net salary of 1400EUR in a new location. [...]. **Your own** chances of finding a job at the new location are small [...]. (a) How much would you prefer that **your partner** accepts the job and commutes to the new location? (b) How much would you prefer to move to the new location? (c) How likely is it, in your opinion, that you would both move to the new location?

double-earner couples with each partner working at least part-time were selected for interviews.¹² Because the calculus regarding mobility decisions might be quite different for self-employed persons and couples who are already mobile (i.e. those who are ‘living-apart-together’ or commuting), only employees and (immobile) couples living in common households were sampled. Because children are often found to be a substantial obstacle to migration, couples without children were included via a special subsample. Thus, the sample also contains 12% households with children. A set of 10 vignettes was presented to each of the 606 respondents (303 couples), yielding a total sample of 6060 vignette responses. As already mentioned, the two individuals in each pair received the same set of vignettes but played complementary roles (EGOs and ALTERs), creating a data set with 303 EGOs (150 males, 153 females) receiving a job offer and 303 partners acting as ALTER (153 females and 150 males). The two partners responded to the questions independently (which was ensured by the presence of an interviewer).¹³ The personal questionnaire also covered individual background information and

some additional questions regarding partnerships and household situation that were assumed to be relevant in the migration context.

To model the decision-making process accurately by taking into account different mobility alternatives, three response scales were included for each vignette. On the first scale, respondents rated EGO's willingness to commute given the presented job offer and the indicated employment conditions at the new location (For ALTERs this scale represented the willingness to accept EGO's commute). The second scale measured the individual willingness to move. The third response scale measured the individual level of expectation that a joint move would actually take place.¹⁴ All response scales in the questionnaire ranged from 0 to 10, whereby 0 denoted total negation and 10 denoted full assent in response to any given question. (In the analysis, however, the original scales were recoded to range from 1 to 11.) Having taken into account all three scales for our investigation, we were able to explicitly test the implications of our theoretical model (as will be described later).

Results

The upper part of Table 1 provides descriptive results of the response scales and vignette dimensions, while summary statistics on respondents' characteristics are displayed in the lower part of the table. At the top of the table, we find the summary statistics on the three response scales for EGOs and ALTERs, which serve as dependent variables in the multivariate analysis: the willingness/acceptance to commute (first scale), the willingness to move (second scale), and a third scale that was generated from the sum of EGO's and ALTER's expectations regarding a joint move (according to the third response scale). This constructed joint perception of a household move ranges from 2 to 22. At first glance, the descriptive results (Table 1, original sample) reveal that, on average, couples exhibit a very low inclination to move. Despite the high wage gains indicated in the vignettes (up to 70%), the average level of willingness to move is approximately 3.8 and no substantial differences were found between the partners. Approximately 30% of the couples (ALTERs and EGOs in almost equal numbers) even reported total refusal to move on the second scale (results not presented in table). Based on the theoretical literature, this inertia comes as no surprise: mobility rates in general are found to be very low, especially among dual-earner couples (e.g. Jürges, 2006; Myers, 1999; Nivalainen, 2004; Sandefur and Scott, 1981). The average willingness to accept job offers that would entail commuting was somewhat higher among ALTERs (4.8) than among

EGOs (4.2), probably reflecting that EGO's commuting costs would weigh less for ALTER (Table 1, (original sample)).

However, further investigation indicated that in 39% of the cases, ALTER was even more willing to relocate than EGO, revealing a different preference structure than was assumed by our theoretical model. Such results may arise if the composition of the vignette entailed improved circumstances for both partners at the new location or if EGO were to exhibit strong regional attachment and a distaste for moving. Thus, we use this information to select situations that are in accordance with the preferences assumed as a point of departure in our theoretical model. With regard to the second response scale, we note that the only responses included in the analysis are those for which EGO's willingness to move is greater than ALTER's – thereby modelling the initial conflict of our mobility game empirically. This leaves us with our *effective* data set of 2440 vignettes answered by 245 couples (Table 1, (effective sample)).¹⁵

Before we turn to the multivariate analysis, we should consider the respondent characteristics of our effective sample. We distinguish characteristics at the individual and the couple level. We also consider relational variables, thus differentiating between respondents in the role of EGO and those in the role of ALTER. The individual partners in our couples are relatively young (on average 31 years), and consequently, only a third of the couples are married. Nevertheless, the average partnership duration is almost five years. The proportion of homeowners is low, as is the number of couples with children. However, this combination of attributes is very likely to produce exactly the dilemma and conflict situation that is described in our mobility game: these are young couples for whom a move could potentially pay off but who are, at the same time, 'tied' to their partners because they are living in stable, though not fully established, relationships (as most are not married), and who are at the beginning of the family phase of their life courses.

Table 2 displays the results of our analysis. Although all dependent variables are continuous, a conventional OLS regression will yield biased results with respect to standard errors because the multi-level structure of the data is not considered. Because every respondent answered questions associated with up to 10 vignettes, observations will be correlated, which violates the independence assumption that underlies OLS regression. However, we address this dependency problem by estimating a random intercept model that explicitly takes into account the correlation among observations arising from the clustering of the data within individuals. This is done by including a subject-specific intercept that represents the combined effects of personal characteristics on the repeated outcome variable (here the vignette responses)

Table 1. Descriptive characteristics of the vignettes and respondent sample

Vignettes	Original sample			Effective sample* (adapted to model assumption)			
	N	mean	SD	N	mean	SD	min max
<i>Vignette response scales</i>							
EGO's willingness to commute	1209	4.82	3.32	3019	4.17	3.37	1 11
ALTER's willingness to commute	1208	4.56	3.42	3018	4.77	3.38	1 11
EGO's willingness to move	3019	3.89	3.05	1209	3.89	3.05	1 11
ALTER's willingness to move	3018	3.93	2.95	1208	3.93	2.95	1 10
JOINT perception of household move	3007	7.99	5.06	1197	7.99	5.06	2 22
<i>Vignette characteristics</i>							
Gain in income for EGO [10%]	3030	49.92	14.06	1220	49.92	14.06	30 70
Career prospects for EGO (ref. none)	3030	0.34	0.47	1220	0.34	0.47	0 1
Many	3030	0.32	0.46	1220	0.32	0.46	0 1
Commuting time [hours]	3030	1.63	0.79	1220	1.63	0.79	0.75 3
Only reachable by car (ref.: also by train)	3030	1.48	0.50	1220	1.48	0.50	1 2
Employment prospects for ALTER at destination (ref.: little)	3030	0.32	0.47	1220	0.32	0.47	0 1
good	3030	0.33	0.47	1220	0.33	0.47	0 1
Income prospects for ALTER at destination (ref.: smaller in comparison with the actual destination)	3030	0.33	0.47	1220	0.33	0.47	0 1
Better	3030	0.32	0.47	1220	0.32	0.47	0 1

Table 1. (Continued)

Respondents' Characteristics	Original sample			Effective sample* (adapted to model assumption)		
	N	mean	SD	N	mean	SD
Respondents' characteristics						
<i>Individual level</i> **						
Gender (1=female)	606	0.50	0.50	490	0.50	0.50
Age	599	31.15	5.10	484	31.15	5.14
Individual net income (Euros)	603	2080.80	1051.44	487	2170.45	1082.35
<i>Couple level</i>						
Duration of partnership (since living together)	303	4.45	4.32	245	4.50	4.39
Homeownership (1 =owns house or apartment)	303	0.25	0.43	245	0.20	0.40
Married (1=married)	303	0.34	0.47	244	0.33	0.47
Children living in the household (1 =child present)	302	0.10	0.30	245	0.10	0.29
Female partner has the incentive to move (=role of EGO) (1=yes)	303	0.48	0.50	245	0.44	0.50
Interview conducted in Switzerland (1=yes)	303	0.24	0.43	245	0.29	0.45
<i>Relational (EGO/ALTER)</i>						
EGO's acceptance of living apart together (LAT)	302	3.81	2.61	244	4.22	2.64
ALTER's acceptance of living apart together (LAT)	303	3.99	2.79	245	3.94	2.82
EGO's duration of residence at current place of living	302	20.30	11.80	243	19.78	12.11
ALTER's duration of residence at current place of living	301	19.52	12.07	244	18.57	12.26
Differences in income: EGO – ALTER	300	898.42	804.07	242	854.09	765.84
						0
						4700

*Sample restricted only to couples for which the theoretical model applies: couples in a dilemma situation.

**Due to the random assignment of role (EGO/ALTER) to partners, we do not separate respondents by EGO and ALTER here.

which are not captured by individual-specific covariates in the regression. The basic assumption of the model is that this individual-specific component is a random variable rather than a parameter to be estimated. Thus it becomes part of the error term representing unexplained heterogeneity between respondents (Rabe-Hesketh and Skrondal, 2008: 91).

According to this data structure, the first part of the presented table (Table 2) yields information about the actors and their partnerships, while the second part indicates the effects of the vignette characteristics.

The first hypothesis, H_1 , states that the longer the relationship has lasted, the higher are the chances that, in the case of a mobility incentive for one of the partners, a household move will occur. We operationalised the duration of the couple's relationship as the time period beginning with the formation of a joint household and ending at the time of the interview.¹⁶ As can be seen in Table 2, the duration of the partnership is shown to have a positive effect on the probability of a joint household move (model 1). Moreover, both partners' individual willingness to move is positively correlated with the partnership's duration (model 2 and model 3). Hence, our central hypothesis regarding the effect of increasing information on the partner's 'true' preferences finds support here. With respect to our first hypothesis, our data relate an interesting additional finding. The response scales of the vignette study covered only two mobility options: the willingness to move and the acceptance of a daily commute as an alternative to relocation. Theoretically however, the couple could decide to commute on a weekly basis by founding a second household at the location of EGO's new job. Such a 'living-apart-together' (LAT) solution is relatively rare due to its material and immaterial costs (Forsyth and Gramling, 1998; for Germany, see Schneider et al., 2002).¹⁷ Nevertheless, as respondents could have had this possibility in mind when responding to the vignettes, it was important to control for such an option by asking the respondents whether they could accept such an arrangement in general. As Table 2 shows, the answer has an effect only for EGO: general acceptance of such a shuttle arrangement is positively correlated with willingness to move on a 10% level (model 2). This is also in line with our considerations concerning the possible 'transition function' of such mobility arrangements, as stated in H_5 . However, of special interest to us are the interaction effects between partnership duration and the acceptance of a shuttle situation. As can be seen in models 2 and 3, such acceptance reduces EGO's and ALTER's willingness to move. This may be because a weekly commute requires more trust within a partnership, because the partners cannot monitor each other's behaviour as easily as they could in a joint household. However, a long-term partnership builds up trust; hence, we can interpret the negative interaction effects as an indicator that a long-term partnership makes it possible

Table 2. Random-intercept models of JOINT, ALTER's and EGO's mobility preferences

	JOINT willingness of house-hold move (model 1)	EGO's willingness to move (model 2)	ALTER's willingness to move (model 3)	EGO's acceptance of own commute (model 4)	ALTER's acceptance of EGO's commute (model 5)
Respondents' characteristics					
Duration of partnership (since living together)	0.32 *	0.19 *	0.14 *	0.04	-0.07
EGO's acceptance of living apart	0.21	0.15 +	0.08	0.18 *	-0.07
ALTER's acceptance of living apart together (lat)	0.07	-0.02	0.10	-0.04	0.09
partnership duration $\times$ lat (EGO)	-0.04	-0.03 +	-0.01	-0.02	0.01
partnership duration $\times$ lat (ALTER)	-0.04 +	-0.01	-0.03 *	0.02	-0.01
EGO's duration of residence at the current place of living	-0.05 *	-0.02 +	-0.02 +	-0.01	0.01
ALTER's duration of residence at the current place of living	-0.04	-0.03 *	-0.01	0.01	-0.02
homeownership	-2.15 **	-1.38 ***	-0.86 *	-0.36	-0.10
children living in the household	-1.49 +	-0.70	-0.78	-0.24	0.17
female partner has the incentive to move (role of EGO)	-1.11 *	-0.57 *	-0.50 +	-0.90	-0.15
net average income [1,000 euros] ^a	-0.19	-0.15	-0.07	-0.49 *	0.05
differences in income: EGO - ALTER	-0.00	-0.00	-0.00	0.00	0.00
interview conducted in Switzerland	0.68	0.20	0.56	0.29	-0.40

(Continued)

Table 2. (Continued)

	JOINT willingness of house—hold move (model 1)	EGO's willingness to move (model 2)	ALTER's willingness to move (model 3)	EGO's acceptance of own commute (model 4)	ALTER's acceptance of EGO's commute (model 5)
vignette characteristics					
gain in income for EGO [10%]	0.05 ***	0.02 ***	0.03 ***	0.03 ***	0.03 ***
career prospects for EGO (ref. none)					
Some	1.38 ***	0.63 ***	0.74 ***	0.50 **	0.74 ***
Many	1.41 ***	0.74 ***	0.66 ***	1.09 ***	1.19 ***
Commuting time [hours]	-0.01	0.00	-0.02	-2.29 ***	-2.13 ***
Only reachable by car (ref.: also by train)	-0.01	0.11	-0.10	-0.62 ***	-0.48 ***
Employment prospects for ALTER at destination (ref.: little)					
moderate	1.31 ***	0.92 ***	0.42 **	0.27 +	0.17
good	3.68 ***	2.32 ***	1.36 ***	0.30 +	0.15
Income prospects for ALTER at destination (ref.: smaller in comparison with actual destination)					
equal	1.52 ***	1.10 ***	0.43 **	0.36 *	-0.00
better	3.17 ***	2.02 ***	1.15 ***	0.50 **	0.05
constant	3.28 **	2.29 ***	0.78	6.14 ***	7.23 ***
N vignettes	1153	1164	1164	1164	1164
N couples	235	237	236	237	236
Variance component					
Partnership level (σ^2_v)	3.00	1.73	1.69	1.61	1.81
Vignette level (σ^2_e)	2.93	1.83	1.88	2.09	2.24

Random-Intercept-Model (Maximum-Likelihood-Estimation).

Significance-levels: $p < 0.001$ (***), $p < 0.01$ (**), $p < 0.05$ (*), $p < 0.1$ (+).

*Net average income adjusted for differences in purchasing power between Switzerland and Germany.

for a couple to establish a shuttle household, giving them an additional mobility option. Now, taking into account that partnership duration and acceptance of LAT are in fact the main effects of this interaction term, we can return to the previous results and present a more accurate interpretation of the effects of the two variables. A positive impact of partnership duration on the probability of a joint move is actually found among those couples that do not accept a living-apart-together arrangement, whereas individuals (especially EGOs) whose partnership is new are more willing to relocate. This evidence fits well with our theoretical predictions, which emphasise the relevance of partnership duration as a negative indicator for ALTER's ability to threaten EGO with refusal to migrate. First, it seems perfectly plausible that the LAT option is especially attractive for EGOs who are not engaged in a long-established partnership because this is a way for them to reconcile the moving incentive with their private relationship. This can also be seen as a way of preventing separation in a situation in which partnership investments are still low but not too low (given that the couple has already moved in together). Secondly, couples that refuse an LAT arrangement have one less mobility option, which – in accordance with the notion developed in section 3 – enhances the chance that EGO will find his incentive sufficiently attractive to move. This should prove especially true in a long-term partnership where the partners know each other well and where ALTER will have difficulty making EGO believe that she will not come along.

Our second hypothesis focuses on the signals provided by ALTER's past migration behaviour. As can be seen in Table 2, models 1 through 3, ALTER's duration of residence in the current community is negatively related to the chances of a joint household move and to EGO's and ALTER's individual migration tendencies. The effect only becomes significant for EGO, not for ALTER. However, for our model, this makes sense because it is a signal for EGO, who must assess ALTER's q . Consequently, the effect should be the strongest for EGO.

To assess the tendency to commute, we formulated two hypotheses that address the effect of commuting costs. First, these costs should have a stronger impact on EGO's preferences regarding commuting than on ALTER's (H_3). Models 4 and 5 display the effects on EGO's and ALTER's willingness to accept a commuting arrangement for EGO. Commuting costs were represented by two vignette dimensions: commuting time and transport mode. Not very surprisingly, the costs of commuting – that is, commuting time and the absence of public transport – reduce EGO's and ALTER's tendency to choose to establish a commute. Moreover, both coefficients show a stronger influence on EGO than on ALTER (the differences are not

significant, however). Due to the mirror-inverted design (i.e. the two partners received exactly the same vignettes), the coefficients are directly comparable across the two models. Hence, both hypotheses concerning the tendency to accept a commute are supported by our data. Secondly, the costs of commuting should not have any effect on individual preferences or the probability of a joint move (H_4). As can be seen in models 1 through 3, the necessary commuting time and the available means of transportation have no effect on the tendency to move.

Our fifth and final hypothesis states that EGO's willingness to commute for a new job will increase with increasing job opportunities for ALTER at the new destination. We operationalised ALTER's labour market opportunities using two variables within the vignettes: employment prospects and income prospects. As can be seen in model 4, employment prospects show a positive effect on EGO's willingness to commute at a 10% level. Moreover, income prospects have a clear positive and significant effect on the dependent variable. All in all, the data provide evidence that is reasonably in support of our fifth hypothesis.

The other control variables do not really demonstrate any surprising results. Within the vignettes, the income gain and improvement in career prospects for EGO increase the tendency toward mobility, whether this means a household move or a commute. This is valid not only for EGO but also for ALTER due to the prospect of higher household income, which is attractive for ALTER as well. As for the respondent's characteristics, house ownership does reduce the tendency toward a move on a household level (model 1) and on an individual level (models 2 and 3). This result is in accordance with existing research on household moves (see Davies and Pickles, 1985; McHugh et al., 1990) and can be interpreted as an indication that the factorial design produces results that are very similar to those of large datasets obtained by conventional survey methods (see also Nisic and Auspurg, 2009). The existence of children in the joint household reduces the tendency toward a household move, although this effect is only marginally significant. A possible explanation for this result may be the low average age of the children in the sample (most children were pre-school age), given that school-age children in particular have been found to be an obstacle to household migration. Somewhat more surprising is the negative effect of EGOs' gender on the probability of relocating or the willingness to move. According to the theory and because the experimental design of the study assured gender-independent variation among the moving incentives, no strong gender effect was expected. However, because income increase was calculated as a percentage increase in the individual's actual earnings, women's generally lower wages also led to a total lower income increase.

Although this might present a huge relative gain on an individual level, it might not be sufficient to outweigh the possible loss of a male partner when it came time to make decisions about moving together. In such a situation, the female EGO would of course anticipate that the move would not be a realistic option for the couple. Also, plans regarding family formation (considering that most of our couples do not have children yet) might be an obstacle, because women might anticipate the loss of social networks – which are especially important in family formation – as a cost of moving. Average income and the income gap between the partners have no demonstrated effect. The respondent's duration of residence in the current community decreases the tendency to move but has no effect on a commute, which is also in line with findings from the literature (see e.g. Myers, 1999).

In sum, the empirical evidence supports the hypotheses derived from our theoretical model. Of these results, the positive effect of partnership duration on the degree of inclination toward a household move is, in our view, the most noteworthy: no other theoretical model has predicted such a correlation, nor has it been demonstrated (to our knowledge) in any other empirical study. The latter is not surprising because in a non-experimental sample, the duration of the partnership is always associated with various sunk costs that reduce the probability of residential relocation. It is the experimental setting that allows us to isolate the duration's positive effects on mobility.

Conclusion

The aim of this paper was to develop a new model for migration decisions by couples. We discussed a game-theoretical model called the mobility game that describes the migration decision as reliant on the strategic interdependence of two partners. Thereby, we concentrated on dilemma situations in which the preference order of the partners is not congruent, as these are the most interesting cases with respect to mobility decisions. From this starting point, we analysed the determinants of a joint move. The important implications of this model are as follows. First, given complete information, a household move is the 'natural' solution for stable couples; second, incomplete information allows the tied mover to 'blackmail' the partner and thus to avoid the household move; and third, the decision to commute will depend mostly on the preferences of the potential commuter. Of course, this model is not designed to describe the 'real' decision-making and bargaining process in partnerships. A few simplified assumptions are used to derive testable hypotheses from this model. These assumptions are the pure rationality of the actors, the sequential order of the decision-making process and

the absence of an opportunity to bargain over the gains associated with migration. In the future, these points may be included in the model.

The hypotheses derived from this theoretical framework are empirically testable, although the necessary information is hard to measure. For all of these models, we would need to determine the incentive for migration, whereas in most surveys, we can only observe the migration itself. That leads to severe selection problems because we cannot distinguish couples who have never been confronted with an incentive to move from those who have declined such an offer. Consequently, we tested our hypotheses by employing a quasi-experimental design: that of a so-called vignette study (also called factorial survey), which allowed us to systematically vary the incentives offered in exchange for relocation. Moreover, this design allowed us to select situations consistent with our basic assumptions regarding the actors' preferences.

However, it might be argued that such a design is too abstract and therefore cannot provide a 'real' test of the model. To address this possible critique, we would like to discuss some implications of our model that are testable using large 'mass' data. The hypotheses above are based on the assumption that the structural conditions of the partnership (like duration or specialisation) will influence ALTER's ability to produce credible threats and as such will influence EGO's subjective estimation of q . The consequence is variation in mobility for couples with different characteristics. Now we will go a step further to explain variance in commitment, especially for ALTER. For this task, let us assume that at the beginning of a relationship, both partners know that a mobility game may arise in the future. Rational actors now anticipate the effect of commitments that bind them to the partnership. Marriage, children, etc. will force the person in the role of ALTER to become a tied mover when the incentive to move arises for EGO in the future. Such anticipation effects are often the basis of dynamic games like Ott's two-stage bargaining model (Ott, 1992) and offer the possibility of including temporal elements in the game.

However, if couples structurally differ in their chances of receiving a one-sided incentive to become mobile, our model may explain why some show more binding commitments than others. If actors are quite sure that the mobility game will never arise, investments made by ALTER will not lead to a disadvantage. If those investments are otherwise beneficial, *ceteris paribus*, potentially immobile couples will show more investment and hence more commitment than others.

The challenge is to identify persons and/or couples who consider themselves less immobile at the beginning of a partnership. However, if we take into account that the labour market is one important source of mobility

incentives, we may be able to identify the structural heterogeneity of couples with respect to mobility patterns. Let us take a look at two examples, those of self-employed individuals and municipal public servants in Germany (*städtische* and *Kommunale Beamte*). Self-employed persons do not pursue a career by changing jobs. If successful, a self-employed person is tied to his or her business, which is considerably more difficult to move than a private household. As a result, self-employed people and their mates anticipate migration to a considerably lesser degree than do other couples. The same should hold for people working as municipal civil servants in Germany. Civil servants may not be dismissed and are mostly highly specialised; hence, it is difficult to assign them to another job, and they have no incentive to quit their position. Consequently, civil servants – especially in cities or smaller German Federal Lands (*Bundesländer*) – should show very low job mobility.

For couples including at least one self-employed person, there is already empirical evidence that supports this hypothesis. As can be shown (Abraham, 2003; 2006), entrepreneurs and their spouses marry sooner, have children sooner and buy houses sooner than other couples do, because such couples benefit more from a specialised and stable partnership than others do. Successful self-employment is often accompanied by strong family support (Brüderl and Preisendörfer, 2000) and a high level of spousal involvement in the business (Abraham and Funk, 2000). However, this explanation does not contradict our theoretical argumentation in this paper. On the contrary, the low migration tendency of these couples facilitates these beneficial specific investments.

In sum, the presented mobility game and the empirical results indicate the value of considering strategic interdependence within partnerships in explaining couples' mobility decisions. The model, albeit simple, produces several interesting implications – of which, however, only a portion could be tested here. Nevertheless, our work seems a fruitful point of departure for further theoretical analysis.

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Notes

1. The German data used in this paper were collected by our project partners, Katrin Auspurg and Thomas Hinz (University of Konstanz). We thank both for their support and their helpful comments. Our special thanks go to Katrin

Auspurg for programming the CAPI interviews and the data management. Of course, all remaining shortcomings in this paper are our own.

2. For explaining other types of relocation decisions (i.e. housing-related migration), other determinants also become important, like the quality of housing, availability of schools for children, regional consumption possibilities, price of rents, etc. As our study focuses on job-related household migration, we leave this literature aside (e.g. Clark and Huang, 2003; Davies and Pickles, 1985; Wagner, 1989).
3. The lower probability of a couple's migration can then be largely attributed to the difficulty of reaching a positive net return at the household level, as the likelihood that such a gain even arises is considerably higher for singles than for partnered individuals (Mincer, 1978). Additional general conclusions from Mincer's model, widely supported by empirical literature, are gender effects. Because of the prevalence of women as secondary earners, male characteristics weigh more in the work-related mobility decisions of the household. These results are further supported by research on the consequences of regional mobility in the household context. While male partners usually profit from migration, female partners experience economic disadvantages (Boyle et al., 2001, 2003; Cooke, 2001; Cooke and Bailey, 1996; Jürges, 2006; Maxwell, 1988; Mincer, 1978).
4. The particular problem is that the anticipation of high conflict costs, which leads to the neglect of alternative options, actually implies that other alternatives are already taken into account. This, however, means that the rational mode is already employed.
5. For the sake of clarity, EGO shall be male and ALTER female. However, the model is basically gender-neutral, and either partner can become either ALTER or EGO.
6. Under New Household Economics framework, we assume that there is a positive; marriage' or 'cohabitation gain' for both individuals (see Becker, 1991; Daniel, 1995).
7. In the simplest case, the combination of two (pure) dominant strategies of two players always constitutes a Nash equilibrium. In the example presented herein, in which ALTER has a weakly dominant strategy and EGO does not have a dominant strategy, the pair of strategies Move/move is still a Nash equilibrium because no partner can gain unilaterally by deviating from his/her choice given the choice of the partner.
8. To avoid a common misunderstanding of game-theoretical approaches to intra-household decision-making, it is important to mention that the model is primarily analytical. It does not necessarily assume that actors engage in an explicit, empirically observable process of negotiation or conscious evaluation of strategies. Psychological mechanisms and actual interactions between partners are not part of the theory. However, it presents a useful heuristic tool for linking observable outcomes of the interaction process to the structural features of the decision-situation by explicitly conceptualising the inherent strategic dimension of interdependent decisions and taking into account the possibility of structural conflicts.

9. As Kalter (1998: 292) notes, this strategy is risky because it increases the chance of an unwanted separation and – even if successful – may reduce mutual trust and commitment in the future. However, it is not necessary to ‘blackmail’ the partner openly. Within the model, it is sufficient that EGO believes that his decision to move may lead to a separation sooner or later.
10. If a weekly commute is necessary that logic may change because it includes a basic decision about the kind of partnership. However, even here EGO should have a higher bargaining power than ALTER.
11. Of course, the basic assumption of the model is that partners maximise individual welfare. This naturally does not mean that there exists no pooling of resources or cooperation gains within partnerships, gains from which both partners will benefit. However, the essential difference between our approach and a common utility approach, as proposed by Becker (1991), is that the division of gains might be at issue in partnerships because partners still act with self-interest, seeking to obtain the largest possible share of those gains. Actually, the model presented here implies a general bargaining approach to partnerships, but for the mobility question addressed in this paper, there is no need to more deeply explore the concept; for details, see Ott (1992).
12. In all, 325 couples were interviewed in the field period, but responses from only 303 of these couples are used in our analysis because the other 22 couples received somewhat different vignettes for the purpose of methodological investigation. Because this other investigation is not the concern of our study, these couples are not part of our analysis. Anticipating possible concerns about snowball recruitment, it is also important to mention that the study implemented an experimental design, which assures the consistency of estimates in the empirical analysis. Moreover, the reduced variance due to a more homogeneous sample of couples because of snowball recruitment leads to a more conservative analysis, as significance levels are negatively affected.
13. To create the questionnaire with different sets of vignettes, the following procedure was used. A sample of 200 vignettes out of all possible combinations of the six vignettes’ dimensions was created, thereby orthogonalising all main and first-order interactions (based on a so-called ‘resolution III-Design’ with maximising the ‘D-Efficiency’; for the surveys used here, see also the description given in Abraham et al., 2010 and Auspurg et al., 2009; for a general overview see Kuhfeld, 2005). Every respondent was to receive 10 vignettes. Correspondingly, 20 sets of different vignettes were created, which then were adapted to accommodate the mirror-inverted design. This approach yielded four blocks of 20 vignettes: two mover versions (one for males and one for females) and two tied-mover versions (one for males and one for females).
14. The effective sample was somewhat smaller because some respondents did not answer all 10 vignettes on all response scales. However, missingness was only a minor problem because only 23 vignettes (0.38%) contained a response scale that was not completed.
15. The *original* sample consisted of 303 couples, thus 606 individuals. Table 1 indicates results where $N=606$ if we consider individuals and $N=303$ if we consider

couples. However, the total number of observations at the vignette level is the product of respondents $\times$ vignettes ($606 \times 10 = 6060$). The same logic applies for the *effective* sample, in which we only selected couples for which the assumptions of the theoretical model applied (i.e. those who were in a dilemma situation). Therefore, in the effective sample, we have 245 couples, 490 individuals and 2440 responses to vignettes. As the survey design differentiated between respondents in the role of EGO and respondents in the role of ALTER, our role-specific regressions are based on $N=1220$ observations for EGO and ALTER, respectively.

16. Due to the cross-sectional character of our data, we do not have any information on terminated relationships. However, this leads to a stronger test of our model because we underestimate the effect of the partnership's duration and the probability of moving (couples that have broken up cannot make a joint move).
17. Although Forsyth and Gramling (1998) report an increasing number of commuter marriages in the US, including an increase from 0.8% in the years 1985–1993 to 1.3% in 1998, the percentage is still relatively low.

References

- Abraham A and Funk W (2000) Marriage Partners as Co-Workers: Significance and Management of Household Relations for Self-Employment. In: Raub W and Weesie J (eds) *The Management of Durable Relations: Theoretical Models and Empirical Studies of Households and Organizations*. Amsterdam: Thela Thesis, pp. 47–50.
- Abraham M (2003) Die Stabilisierung von Partnerschaften durch bilaterale Investitionen. Das Beispiel der Unternehmensbesitzer. *Zeitschrift für Soziologie* 32(1): 50–69.
- Abraham M (2006) *Berufliche Selbständigkeit: Die Folgen für Partnerschaft und Haushalt*. Wiesbaden: VS Verlag.
- Abraham M and Auspurg K (2007) Die Umzugsentscheidung von Paaren als Verhandlungsproblem. Eine quasi-experimentelle Überprüfung des Bargaining-Modells. *Kölner Zeitschrift für Psychologie und Sozialpsychologie* 59(2): 271–293.
- Abraham M, Auspurg K and Hinz T (2010) Migration decisions within dual earner partnerships: a test of bargaining theory. *Journal of Marriage and Family* 72(4): 876–892.
- Auspurg K, Abraham M and Hinz T (2009) Die Methodik des Faktoriellen Surveys in einer Paarbefragung. In: Kriwy P and Gross C (eds) *Klein aber fein!: Quantitative empirische Sozialforschung mit kleinen Fallzahlen*. Wiesbaden: VS Verlag für Sozialwissenschaften, pp.179–210.
- Becker GS (1991) *A Treatise on the Family*. Enlarged ed. Cambridge, MA: Harvard UP.
- Blien U, Gartner H, Stüber H, et al. (2009) Regional price levels and the agglomeration wage differential in western Germany. *The Annals of Regional Science* 43(1): 71–88.
- Blien U, Kirchhof K and Ludewig O (2006) Agglomeration effects on labour demand. IAB Discussion Paper 28/2006. Institute for Employment Research, Nuremberg.

- Boyle PJ, Cooke TJ, Halfacree K, et al. (2001) A cross-national comparison of the impact of family migration on women's employment status. *Demography* 38: 201–213.
- Boyle PJ, Cooke TJ, Halfacree K, et al. (2003) The effect of long-distance family migration and motherhood on partnered women's labour market activity rates in GB and the US. *Environment and Planning A* 35: 2097–2114.
- Brüderl J and Preisendörfer P (2000) Fast growing businesses: empirical evidence from a German study. *International Journal of Sociology* 30(3): 45–70.
- Chiswick BR (1999) Are immigrants favorably self-selected? *The American Economic Review* (89):181–185.
- Clark WAV and Huang Y (2003) The life course and residential mobility in British housing markets. *Environent and Planning A* 35: 323–339.
- Clark WAV and Withers SD (2007) Family migration and mobility sequences in the United States: spatial mobility in the context of the life course. *Demographic Research* 17: 591–622.
- Cooke TJ (2001) 'Trailing wife' or 'trailing mother'? The effect of parental status on the relationship between family migration and the labor-market participation of married women. *Environment and Planning A* 33: 419–430.
- Cooke TJ (2008) Migration in a family way. *Population, Space and Place* 14: 255–265.
- Cooke TJ and Bailey AJ (1996) Family migration and the employment of married women and men. *Economic Geography* 72: 38–48.
- Daniel K (1995) The marriage premium. In: Tommasi M and Ierulli M (eds) *The New Economics of Human Behavior*. Cambridge, MA: University Press, pp.113–125.
- Davies R and Pickles R (1985) A panel study of life-cycle effects in residential mobility. *Geographical Analysis* 17(3): 199–216.
- Forsyth C and Gramling R (1998) Socio-economic factors affecting the rise of commuter marriage. *International Journal of Sociology of the Family* 28(2): 93–106.
- Gintis H (1997) *Game Theory Evolving. A Problem-Centered Introduction to Modeling Strategic Interaction*. Princeton, NJ: Princeton UP.
- Greenwood MJ (1997) Internal migration in developed countries. In: Rosenzweig M and Stark O (eds) *Handbook of Population and Family Economics*, vol. 1. Amsterdam: Elsevier Science, pp.647–720.
- Hox J, Kreft I and Hermkens P (1991) The analysis of factorial surveys. *Sociological Methods & Research* 19(4): 493–510.
- Huinink J and Wagner M (1989) Regionale lebensbedingungen, migration und familienbildung. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 41(4): 669–689.
- Jasso G (2006) Factorial survey methods for studying beliefs and judgements. *Sociological Methods & Research* 34(3): 334–423.
- Jürges H (2006) Gender ideology, division of housework, and the geographic mobility of families. *Review of Economics of the Household* 4: 299–324.
- Kalter F (1998) Partnerschaft und Migration. Zur theoretischen Erklärung eines empirischen Effekts. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 50(2): 283–309.
- Kuhfeld WF (2005) *Marketing Research Methods in SAS. Experimental Design, Choice, Conjoint and Graphical Techniques*. Cary, NC: SAS Institute.

- Landale NS and Guest AM (1985) Constraints, satisfaction and residential mobility: speare's model reconsidered. *Demography* 22(2): 199–222.
- Lundberg S and Pollak RA (2003) Efficiency in marriage. *Review of Economics of the Household* 1: 153–167.
- McHugh KE, Gober P and Reid N (1990) Determinants of short- and long-term mobility expectations for home owners and renters. *Demography* 27(1): 81–95.
- Maxwell NL (1988) Economic returns to migration: marital status and gender differences. *Social Science Quarterly* (69) 108–121.
- Mincer J (1978) Family migration decisions. *Journal of Political Economy* 86(5): 749–773.
- Myers SM (1999) Residential mobility as a way of life: evidence of intergenerational similarities. *Journal of Marriage and the Family* 61(4): 871–880.
- Nisic N (2010) Mitgegangen-mitgefangen? Die Folgen von Haushaltsumzügen für die Einkommenssituation von Frauen in Partnerschaften. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 62(3): 515–549.
- Nisic N and Auspurg K (2009) Faktorieller Survey und klassische Bevölkerungsumfragen im Vergleich – Validität, Grenzen und Möglichkeiten beider Ansätze. In: Kriwy P and Gross C (eds) *Klein aber fein!: Quantitative empirische Sozialforschung mit kleinen Fallzahlen*. Wiesbaden: VS Verlag für Sozialwissenschaften, pp.211–235.
- Nivalainen S (2004) Determinants of family migration: short moves vs. long moves. *Journal of Population Economics* 17(1): 157–175.
- Ott N (1989) Familienbildung und familiäre Entscheidungsfindung aus verhandlungstheoretischer Sicht. In: Wagner G, Ott N and Hoffmann-Nowotny HJ (eds) *Familienbildung und Erwerbstätigkeit im demographischen Wandel*. Berlin: Springer, pp. 97–116.
- Ott N (1992) *Intrafamily Bargaining and Household Decisions*. Berlin: Springer.
- Quigley JM and Weinberg DH (1977) Intra-urban residential mobility: a review and synthesis. *International Regional Science Review* 2(1): 41–66.
- Rabe-Hesketh S and Skrondal A (2008) *Multilevel and Longitudinal Modeling Using Stata*. College Station, TX: Stata Press.
- Sandefur GD and Scott WJ (1981) A dynamic analysis of migration: an assessment of the effects of age, family and career variables. *Demography* 18(3): 355–368.
- Schneider N, Limmer R and Ruckdeschel K (2002) *Mobil, flexibel, gebunden. Familie und Beruf in der mobilen Gesellschaft*. Frankfurt: Campus.
- Sjaastad LA (1962) The costs and returns to human migration. *Journal of Political Economy* 70: 80–93.
- Speare A (1971) A cost-benefit model of rural to urban migration in Taiwan. *Population Studies* 25(1): 117–130.
- Van Ommeren J, Rietveld P and Nijkamp P (1997) Commuting: in search of jobs and residences. *Journal of Urban Economics* 42(3): 402–421.
- Wagner M (1989) *Räumliche Mobilität im Lebensverlauf. Eine empirische Untersuchung sozialer Bedingungen der Migration*. Stuttgart: Enke.
- Waite L and Lillard L (1991) Children and marital disruption. *American Sociological Review* 96: 930–953.