Don’t tell him too much - A simple mobility game for migration decisions of couples and some quasi-experimental evidence

Martin Abraham
University of Nuremberg-Erlangen

Natascha Nisic
FAU Erlangen-Nürnberg / IAB

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Correspondence to:
Prof. Dr. Martin Abraham, Findelgasse 7/9, 90402 Nürnberg, D, Email: martin.abraham@wiso.uni-erlangen.de.
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 quasieperimental design known as factorial survey, which allows one to vary systematically the incentives for moving. The empirical results confirm the importance of both the strategic reasoning and the mechanisms for solving problems of cooperation within the partnership.

Keywords: regional mobility, household migration, game theory, factorial survey
1. Mobility of couples

The mobility of households is an important phenomenon to consider both in analyzing labor markets and in understanding family processes. According to labor market theory, households should be mobile, especially if jobs and wages are unequally distributed across regions—which is characteristic of modern labor markets (Blien et al. 2006; Blien et al. 2009). In this context, the flexibility of households is conceived of as 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, this should (negatively) affect labor market processes and the distribution of wealth among households in a society. Within family research, it is well known that there exists a mutual influence of regional mobility and crucial family events (Clark and Withers 2007; Davies and Pickles 1985; Huinink and Wagner 1989). Usually, people tend to be more mobile earlier in life because the amount of time before mobility investments pay off is longer for young people (Clark and Withers 2007; Speare 1971). Also, family investments like children or homeownership increase the costs of mobility, making regional relocation less attractive (Landale and Guest 1985; McHugh et al. 1990).

However, within the migration literature, the mobility of couples has always been a special puzzle for researchers. It is well established that families show a considerably lower tendency toward household moves than do singles (e.g., Jürges 2005; Myers 1999; Nivalainen 2004; Sandefur and Scott 1981; Quigley and Weinberg 1977; Wagner 1989). This can be explained only partially by the increasing transaction costs associated with having children. Of course, children make household relocation decisions in particular more complicated. However, even when controlling for this effect, couples are still found to be less mobile than singles (see, e.g., the overview in Kalter 1998). This may be because even if children are not present, couples will still have to either coordinate their migration behavior or split up as a result of differential migration incentives.

Despite this insight, there is still a dearth of theoretical models that take this mutual dependency of migration decisions into consideration. One of the models mostly referred to in

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1 The German data used in this paper were collected by our project partners Katrin Auspurig and Thomas Hinz (University of Konstanz). We wish to thank both for their support and their helpful comments. Our special thanks go to Katrin Auspurig for programming the CAPI interviews and the data management. Of course any remaining shortcomings or data errors in this paper are our own.
the literature about household migration is the classical work by Mincer (1978). Based on human capital theory, Mincer recognizes 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—probably including difficulty finding a new job and new friends. Despite this apparent asymmetry of mobility consequences, Mincer still assumes that migration decisions are made collectively by the household. In the process of welfare maximization at the household level, the couple is moving if the gain realized by the mover outweighs the losses of the other partner, who then becomes a “tied mover”.

Another theoretical model for explaining couples’ migration decisions is proposed by Kalter (1998). In this model, the mover anticipates the potential conflict resulting from the bargaining and decision-making process in the household, which by itself might destabilize 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 behavior with those of potential other 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 behavior. Although this model can explain 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.¹

Although both models have their merits, they disregard two crucial characteristics of migration decisions among couples. First, as we know from migration literature and family research, couples can try to solve migration conflicts by choosing a third strategy instead of either moving or staying. 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. Secondly, the existing theoretical models 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.
2. A simple mobility game with incomplete information

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

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 into 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.

Figure 1: Mobility game – extensive form
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 $i \in \{\text{EGO, ALTER}\}$.

To analyze 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 worse outcome. For EGO, we assume that a move ($M_E$) is the most preferred option. At this point, we will not make any assumptions regarding whether he prefers commuting or declining the job offer. For ALTER, the best option is to preserve the status quo, which is standardized as $0$ for both cases. Moreover, we assume that a 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 $M_E > C_E$, $0 > S_E$ 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.

**Figure 2: Mobility Game, Normal Form**

<table>
<thead>
<tr>
<th>EGO</th>
<th>ALTER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Move</strong></td>
<td>$M_E / M_A$</td>
</tr>
<tr>
<td><strong>Stay/commute</strong></td>
<td>$C_E / C_A$</td>
</tr>
<tr>
<td><strong>Stay/decline</strong></td>
<td>$0 / 0$</td>
</tr>
</tbody>
</table>

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 analyzing the game is to look for a dominant strategy that maximizes 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
(of course, empirically this will depend to 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.

Looking at ALTER, we see a different situation. ALTER’s two options differ only if EGO
decides to move, and here we see a clear preference on ALTER’s part for moving (because
otherwise ALTER and EGO will realize the worst outcome, Si). Technically, ALTER has a
weakly 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. 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, too; hence, the couple
will move, EGO will realize his best outcome, and ALTER will become a “tied mover” because
she would prefer to stay.

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) behavior 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 really prefers to be the tied mover rather than to dissolve the partnership. This
uncertainty can be modeled 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

$$q \cdot M_E + (1-q) \cdot S_E > A_E$$

or

$$q > (A_E - S_E) / (M_E - S_E).$$

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. In other words, “Don’t tell him too much”!

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. The crucial question now is what kind of structural conditions will enable ALTER to do this. First of all, the duration of the partnership will be an important 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 relation-specific investments like buying a house or raising children. 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. As a result, we hypothesize as follows:

$H_1$: 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 behavior will serve as information about her “true preferences”. In particular, ALTER’s migration behavior 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 will be for a person who has experienced a significant number of moves in the past (see, e.g., Myers 1999). 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 one of the partners.

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, it is simply assumed 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 effect of partnerships on mobility is simply a consequence of time and will vanish if we control for the duration of the private partnership.

3. Can you have your cake and eat it, too? - 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 old 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. However, to suggest that ALTER will not care about the cost of commuting at all would be misleading; indeed, she will be interested in EGO’s well-being and the effects of commuting costs on household income because both will affect her own utility at least partly. Taking this into consideration, we hypothesize 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 $M_E > C_E$, $0 > S_E$ 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 jeopardize the partnership, the costs of a household move will be of no consequence for 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. 2009; 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 hypothesize the following:

(H5): EGO’s willingness to start a commute for a new job will increase with increasing 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 good. 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 it 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 divorce—at least as long as we neglect or control for the possible destabilizing effects of the commute itself.

4. 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 has the preferences assumed by the mobility game. If ALTER preferred to come 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., orthogonalized) 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 labor 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. 2009; 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 at the new location. 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. A total of 303 Swiss and German couples were interviewed via snowball recruitment, whereas only double-earner couples with each partner working at least part-time were selected for interviews. 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, and they responded to the questions independently (which was ensured by the presence of an interviewer). 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.
Assume, …
You are offered a net salary of 1400,- EUR at the 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 1 ½ hours each way. It is reachable only by car.

Your partner’s chances of finding a job at the new location are small and her income prospects are higher there compared to the local labor market.

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

Not at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Very much

How much would you like to take the job and move to the new location?

Not at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Very much

How likely is it in your opinion that you both will move to the new location?

Not at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Very much

Note: The inverse situation for the female partner in this example would read: Assume, your partner is offered a net salary of 1400,- EUR at the new location. […] Your own chances of finding […] How much would you like to move to the new location?

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 their willingness to commute given the presented job offer and the indicated employment conditions at the new location, whereas the second scale measured willingness to move. The third response scale measures the individual level of expectation that a joint move would actually take place. All response scales ranged from 1 to 11, whereby 1 denoted total negation and 10 denoted full assent in response to any given question. 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).

5. Results

At first glance, the descriptive results (Table 1, full sample) reveal that a substantial portion of the interviewed couples exhibit a very low level of inclination to move. Despite the high wage gains indicated in the vignettes (up to 70%), about 30% of the couples (ALTERs and EGOS in almost equal numbers) declined to move—i.e., reported total refusal to move on the second
scale. 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 (see the literature review above). 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. The average level of willingness to move was lower, as could be expected, at about 3.8—but as noted, without substantial differences between the partners. 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 might 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 modeling the initial conflict of our mobility game empirically. This leaves us with 1197 vignettes of 242 couples in our data set. For our dependent variable, we generate the sum of EGO’s and ALTER’s expectations regarding a joint move (according to the third response scale); this serves as a proxy for the probability of a household move.

Because these figures are constructed from the sum of the response scales of the two partners, the results range from 2 to 22. Additionally, we examine the individual willingness of EGO and ALTER to relocate (based on the second scale) and both partners’ willingness to accept a commuting arrangement for EGO (first scale).

Before we turn to the multivariate analysis, we should consider the characteristics of our effective sample. Our couples are relatively young, and consequently, only a third of the respondents are married. Nevertheless, the average partnership duration is almost 5 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 can 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 (because most are not married) and who are at the beginning of the family phase of their life courses.
<table>
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<th>Vignette’s response scales</th>
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<th>FULL SAMPLE</th>
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<tr>
<td></td>
<td>N</td>
<td>mean</td>
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<tr>
<td>EGO’s willingness to commute</td>
<td>1209</td>
<td>4.82</td>
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<tr>
<td>ALTER’s willingness to commute</td>
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<td>Joint perception of household move</td>
<td>1197</td>
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<th>Vignette’s characteristics</th>
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<tr>
<td>Gain of income for EGO [10 percent]</td>
<td>1220</td>
<td>50.40</td>
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<tr>
<td>Career prospects for EGO (ref. none)</td>
<td>1220</td>
<td>0.35</td>
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<tr>
<td>Only reachable by car (ref.: also by train)</td>
<td>1220</td>
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<tr>
<td>Employment prospects for ALTER at destination (ref.: little)</td>
<td>1220</td>
<td>0.31</td>
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<tr>
<td>Only reachable by car (ref.: also by train)</td>
<td>1220</td>
<td>1.47</td>
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<td>Income prospects for ALTER at destination (ref.: smaller in comparison with the actual destination)</td>
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<td>0.35</td>
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<td>better</td>
<td>1220</td>
<td>0.30</td>
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<tr>
<td>Gender (1=female)</td>
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<tr>
<td>Age</td>
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<tr>
<td>Individual net income (Euros)</td>
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<td>Duration of residence at current place of living (month)</td>
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<td>Household</td>
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</tr>
<tr>
<td>Children living in the household (1=child present)</td>
<td>1216</td>
<td>0.10</td>
</tr>
<tr>
<td>Female partner got the incentive to move (1=role of EGO) (1=yes)</td>
<td>1220</td>
<td>0.44</td>
</tr>
<tr>
<td>Interview conducted in Switzerland (1=yes)</td>
<td>1220</td>
<td>1.29</td>
</tr>
<tr>
<td>Relational (EGO – ALTER)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EGO’s acceptance of living apart together (LAT)</td>
<td>1220</td>
<td>3.94</td>
</tr>
<tr>
<td>ALTER’s acceptance of living apart together (LAT)</td>
<td>1210</td>
<td>4.22</td>
</tr>
<tr>
<td>EGO’s duration of residence at current place of living</td>
<td>1214</td>
<td>19.78</td>
</tr>
<tr>
<td>ALTER’s duration of residence at current place of living</td>
<td>1213</td>
<td>18.57</td>
</tr>
<tr>
<td>Difference of incomes EGO - ALTER</td>
<td>1200</td>
<td>854.09</td>
</tr>
</tbody>
</table>
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 ten 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) 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: 91pp.).

According to this data structure, the first part of the presented table (Table 2) indicates the effects of the vignette characteristics, while the second part of the variables yields information about the actors and their partnership. The first hypothesis, H₁, 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 operationalized 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.¹⁰ 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. 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. Our vignette design included only a daily commute as an alternative to a household move. Theoretically, 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)¹¹.
Table 2: Random-Intercept Models

<table>
<thead>
<tr>
<th>Vignettes’ characteristics</th>
<th>joint household move (model 1)</th>
<th>Move EGO (model 2)</th>
<th>Move ALTER (model 3)</th>
<th>Commute EGO (model 4)</th>
<th>Commute ALTER (model 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain of income for EGO [10 percent]</td>
<td>0.05 ***</td>
<td>0.02 ***</td>
<td>0.03 ***</td>
<td>0.03 ***</td>
<td>0.03 ***</td>
</tr>
<tr>
<td>Career prospects for EGO (ref. none)</td>
<td>1.38 ***</td>
<td>0.63 ***</td>
<td>0.74 ***</td>
<td>0.50 **</td>
<td>0.74 ***</td>
</tr>
<tr>
<td>Career prospects for ALTER</td>
<td>1.41 ***</td>
<td>0.74 ***</td>
<td>0.66 ***</td>
<td>1.09 ***</td>
<td>1.19 ***</td>
</tr>
<tr>
<td>Commuting time [hours]</td>
<td>-0.01</td>
<td>0.00</td>
<td>-0.02</td>
<td>-2.29 ***</td>
<td>-2.13 ***</td>
</tr>
<tr>
<td>Only reachable by car (ref.: also by train)</td>
<td>-0.01</td>
<td>0.11</td>
<td>-0.10</td>
<td>-0.62 ***</td>
<td>-0.48 **</td>
</tr>
</tbody>
</table>

| 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 |

| Respondents’ characteristics | Duration of Partnership (since living together) | 0.32 * | 0.19 * | 0.14 * | 0.04 | -0.07 |
| EGO’s acceptance of living apart together (LAT) | 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 |
| Duration partnership x LAT (EGO) | -0.04 | -0.03 + | -0.01 | -0.02 | 0.01 |
| Duration partnership x LAT (ALTER) | -0.04 + | -0.01 | -0.03 * | 0.02 | -0.01 |
| Homeownership | -2.15 ** | -1.38 *** | -0.86 * | -0.36 | -0.10 |
| 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 |
| Net average income [1.000 Euros] | -0.19 | -0.15 | -0.07 | -0.49 * | 0.05 |
| Difference of Incomes EGO - ALTER | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| Children living in the household | -1.49 + | -0.70 | -0.78 | -0.24 | 0.17 |
| Female partner got the incentive to move (role of Ego) | -1.11 * | -0.57 * | -0.50 + | -0.90 | -0.15 |
| Interview conducted in Switzerland | 0.68 | 0.20 | 0.56 | 0.29 | -0.40 |
| constant | 3.28 ** | 2.29 *** | 0.78 | 6.14 *** | 7.23 *** |

Random-Intercept-Modelle (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

Nevertheless, we tried 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. This is also in line with our considerations concerning
the possible “transition function” of such mobility arrangements as stated in H5. However, of
special interest to us are the interaction effects between 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 behavior as easily as 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
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 (and especially EGOs) whose
partnership is new are more willing to relocate. This evidence fits well with our theoretical
predictions. 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 (to have their cake and eat it
too). 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 behavior.
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 (H3). Models 4 and 5 display the effects on EGO’s and
ALTER’s willingness to accept a commuting arrangement for EGO. 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 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 (H4). 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 operationalized ALTER’s labor 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 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 the review in section 5.1).

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.

6. Conclusion

The aim of this paper was to develop a new model for migration decisions by couples. We discuss a game-theoretical model called the mobility game that describes the migration decision as reliant on the strategic interdependence of two partners. 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 the 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 specialization) 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 couples 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 labor 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 specialized; 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 with 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 specialized 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.
Notes

1 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.

2 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.

3 Under New Household Economics framework, we assume that there is a positive “marriage” or “cohabitation gain” for both individuals (see Becker 1991; Daniel 1995).

4 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 believe that his decision to move may lead to a separation sooner or later.

5 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.

6 Of course, the basic assumption of the model is that partners maximize 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).

7 Actually, 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 is not the concern of our study, these couples are not part of our investigation.

8 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 orthogonalizing all main and first-order interactions (based on a so-called “resolution III-Design” with maximizing the D-Efficiency”; for the surveys used here, see also the description given in Abraham 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 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). We thank Katrin Auspurg for designing this set of vignettes for this project.

The effective sample was somewhat smaller because some respondents did not answer all ten 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.

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).

Although (Forsyth & Gramling 1998) reports 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


