# Occupational Characteristics, Occupational Sex-Segregation and Family Migration Decisions

## 1 - Introduction

The literature linking employment and migration has shown that human capital factors such as education, skills, earnings, and career prospects motivate individual and family migration (Mincer, 1978; Van Ham, 2002; Huinink *et al.*, 2010). However, evidence on how the distribution of these factors within couples affects the roles of husbands and wives in family migrations is still inconclusive. Some authors have suggested that occupations may be important in promoting or deterring different types of migration and may explain why husbands and wives cast different roles in family moves (Boyle *et al.*, 1999; Shauman, 2010). While recent research has begun to explore these relationships, it has not yet considered the sex-composition of occupations.

Men and women differ widely in their choice of occupation (Hakim, 1994; Anker, 1998; Charles and Grusky, 2004). The gender-composition of occupations has important consequences for pecuniary outcomes, career prospects, and working conditions, and workers in occupations in which women predominate are disadvantaged in these and other labour market aspects (Glass, 1990; England *et al.*, 1994; Perales, 2010). Occupational feminization is also strongly related to part-time work (Hakim, 2000; Blackwell, 2001), which in the British labour market is associated with poor career prospects and low rewards (Connolly and Gregory, 2008; Manning and Petrongolo, 2008). While some maintain that poor returns to working in female-dominated occupations emerge from low investments in human capital (Polachek, 1981; Tam, 1997), others argue that these can be explained by the devaluation of 'women's work' in modern societies (England, 1992; England *et al.*, 2007). The relative economic standing of the husband and the wife affects their share of decision-making power within the couple (Pahl, 1983) and this applies to the decision to migrate (Mincer, 1978). Hence, if society devalues female-dominated lines of work, spouses in these occupations may have less bargaining power and their career prospects may be evaluated less favourably in the decision-making process preceding family migration. Thus, we would expect that partnered individuals working in female-dominated occupations will be more likely to move for the career of their spouse and less likely to move for their own, all else (including unobserved heterogeneity, socio-economic, and occupational characteristics) being equal.

This article adds to the existing literature by theorising and testing the effects of occupational sex-segregation on couples' decisions to move using panel data and panel data methods. The addition of occupational characteristics to models of family migration is also a novelty among studies on Britain. Results suggest that the sex-composition of the occupations of husband and wife is associated with family migration, but this association is almost entirely mediated by socio-economic and occupational characteristics. However, other occupational-level factors such as the potential for wage growth and for career advancement are significantly related to different types of moves.

## 2 – Previous empirical literature

Research into the links between family migration and occupational sex-segregation is scarce, although these have been recognised in the literature for many years. The first article to hypothesise a relationship is Long (1974), one of the most widely referenced pieces of work in the migration literature. In its concluding paragraph the author states that:

> *"[i]t might even be argued that the husband's migration influences not only the career development of the wife but also the initial choice of occupation. Such occupations as elementary school teaching, nursing and secretarial work are traditional occupations for women. They are also fairly readily transferrable from one area to another and can be practiced in almost any part of the country* [US]. *It may be that the geographical transferability of these occupations has played a part in their perpetuation as favourite career choices for women."* (Long, 1974, p.348, brackets added)

Later studies such as Mincer (1978), Morrison and Lichter (1988), Halfacree (1995), Cooke (2003), and Cooke *et al.* (2009) have echoed this claim, placing occupational sex-segregation in the 'to do list' of migration research.

To our knowledge, few articles have tested the influence of occupational characteristics on migration empirically, and none has focused on the sex-composition of occupations. However, some previous literature provides relevant background for our research. Hanson and Pratt (1995) examine the relationship between occupational sex-segregation and willingness to relocate over a long distance for career advancement using data from open-ended interviews, and find that 17% of coupled women working in female-dominated occupations are willing to do so, compared to 26% in gender-integrated and 35% in male-dominated occupations. This suggests that the characteristics of workers and/or jobs in differently segregated occupations are related to migration intentions. Gordon (1995) uses UK data from the Labour Force Survey and finds that job (rather than occupational) feminization is positively associated with the probability of being an unsponsored job-related mover (sponsorship is defined as working for the same employer after migration). This suggests that female-dominated jobs are located in secondary labour markets in which vacancies tend to be filled through local hiring practices. Finally, Shauman (2010) uses US panel data from the PSID to explore the effect of different occupational characteristics on family migration, including the prevalence of migration in the occupation, its potential for earnings growth, its geographic ubiquity, and its specific unemployment rate. Although results show that occupational characteristics cannot explain gender differences in family migration, the effects of several occupational factors on the propensity to move are economically and statistically significant.

Taking the challenge posited by Long (1974) we complement this research and explore the effect of the occupational characteristics of husbands and wives on geographic relocation, with an emphasis on sex-segregation, to provide a holistic

explanation of the family migration process.

## 3 – Why do families move?

Exploring the role of occupational characteristics on family migration requires reviewing existing migration theories. Two sets of theories which make different assumptions on the origins of gender-differences in migration roles coexist within this literature. Gender-symmetrical theories assume that these result from gender-differences in career investments, while gender-asymmetrical theories argue that they are due to different rates of return by gender to such investments (Cooke, 2008).

Gender symmetry takes place when career investments (e.g. education, training, or work experience) pay equally for husband and wife. That is, husbands and wives with similar characteristics are equally likely to initiate a geographical move. The decision to move does not depend on the gender of the advantaged spouse but on the extent of the difference in career investments between the spouses. The most well-established gender-symmetrical theory of household migration is human capital theory. This argues that family migration decisions are based on the perceived positive difference in family income between moving and staying (Polachek and Horvath, 1977; Mincer, 1978). Geographic moves would occur even when one spouse suffers personal losses, provided these are counterbalanced by the gains of the other spouse. Mincer (1978) coins the term tied migrant to refer to the spouse that, at the expense of hindering his/her own occupational aspirations, follows the partner for the sake of the family. Conversely, the spouse with better prospects for advancement through migration becomes a tied stayer when his/her gains cannot compensate for the losses of the disadvantaged partner and migration does not occur.

Gender asymmetry occurs when women experience a reduced pay-off for the same conditions, thus explaining lower rates of lead migration among wives even when they enjoy a better labour market position than their husbands. Gender-role theory is the most established gender-asymmetrical theory of household migration. It argues that husbands' career prospects dominate over wives' and that couples' gender-role attitudes towards the provider role mediate the decision to move geographically. Empirical evidence supports these assertions showing that married women are less willing to move for their own occupational advancement than their husbands (Markham and Pleck, 1986), families move in response to economic motivations on the part of the husband even when wives have higher educational or occupational attainment (Shihadeh, 1991), and husbands with traditional views seem indifferent to wives' potential migration-related job losses (Bielby and Bielby, 1992).

The contradictions between these theoretical perspectives and the existence of mixed empirical evidence highlight the need to further explore the determinants and gender symmetry of family migration decisions. Differences in the occupational choices of men and women may explain why husbands and wives tend to be assigned different roles in family moves. This is known as the structural explanation of family migration (Shauman, 2010). In principle, the structural

explanation presupposes neither gender-symmetry nor gender-asymmetry. Instead, it proposes that analyses of family migration processes are incomplete without taking into account the extreme degree of occupational sex-segregation in modern labour markets. In Britain, despite a continuous fall during the first seven decades of the 20th century (Hakim, 1994) and a more pronounced fall since (European Commission, 2009), such segregation remains high. The Duncan and Duncan (1955) Index of Dissimilarity for 2007 indicated that an estimated 51% of workers needed to change occupations for the occupational distribution to become gender-neutral (European Commission, 2009). This reinforces the idea that differences in the occupations of men and women should be considered in models comparing their roles in family migration.

## 4 - The effects of occupational sex-segregation on family migration

In this section we formulate testable hypotheses on the impact of occupational sex-segregation on the migration behaviour of couples. We separate effects into two types. Indirect (or mediated) effects are driven by occupational and individual characteristics asymmetrically distributed across different occupational sex-types prior to a move or by the selection of certain women into female-dominated occupations. Direct (or causal) effects are intrinsic to the sex-composition of the occupation and a product of distinct treatment of individuals working in different occupational sex-types prior to a move in the intra-couple negotiation preceding migration.

Occupational sex-segregation may have a causal effect on family migration if the femininity of the work itself plays a part in family migration decisions. Sociologists have long discussed the existence of a sex-bias in the social construction of the value of work, which is produced by the traditional patriarchal order of modern industrialized societies. Higher subjective value is attributed to 'male' activities, skills, occupations, etc. while traditionally 'female' lines of work are undervalued. Discrimination does not [only] take place against individuals but against types of jobs defined primarily by the demographic characteristics of their incumbents (Maume, 1999). The empirical literature on comparable worth has found penalties for those employed in female-dominated occupations in both pecuniary and non-pecuniary employment outcomes net of objective measures of individual skills and occupational skill demands (e.g. Glass, 1990; England *et al.*, 1994). Research has also demonstrated the existence of a double standard in the evaluation of the work done by men and women, through which equal job tasks are more highly appraised when done by men than when done by women (Bose and Rossi, 1983; McArthur, 1985; Foschi, 1996). If the work commonly performed by women is undervalued with respect to the work commonly performed by men, individuals working in female-dominated occupations will have less power in the bargaining process which precedes household migration *ceteris paribus*. Hence, we hypothesise that:

> *H1: Individuals working in female-dominated occupations are less likely to be lead migrants and more likely to be tied migrants, all else being equal.*

However, there are three sets of factors other than the devaluation of female-dominated lines of work which may explain any observed impacts of the sex-composition of occupations on family migration. First, such effects could be explained by occupations with different sex-compositions having particular characteristics which promote or deter job mobility as a means for occupational achievement and facilitate or impede job relocation as a tied migrant. Female-dominated occupations have been argued to be easily transferrable geographically and to have flatter wage-tenure profiles (Long, 1974; Mincer, 1978; Gordon, 1995; Cooke, 2003). Therefore, there are few incentives for workers in these occupations to initiate a geographical move, as the probability of benefiting from doing so is low. Also, the job costs associated with tied migration are lower for people in these occupations, as they are easy to retain after migration. Consequently, occupational sex-segregation would only capture other occupational properties influencing migration.

Second, the literature illustrates that individuals working in occupations with different sex-compositions tend to have different socio-economic characteristics. Some studies find that people in more feminized occupations have characteristics that are likely to deter lead migration and to promote tied migration. For example, they earn less (England *et al*., 1994) and have low levels of education (Polachek, 1981), labour market experience (Duncan and Hoffman, 1979), job specialization and on-the-job training (Tam, 1997), and high rates of part-time work (Blackwell, 2001). Therefore, any effects of the sex-segregation of occupations on family migration may be caused by compositional differences in the personal endowments of workers in different occupational sex-types.

Third, empirical research has found that migrants are a selected sample of the population (Borjas *et al.*, 1992) and that long-distance migration is often the result of extended job search and a desire for upward social mobility (Mincer, 1978). Consequently, less committed, motivated, and career-oriented individuals are less likely to initiate a geographic move, and also more likely to become tied migrants. Such individuals are most often found either out of employment or employed in occupations which require low commitment to the labour market. Female-dominated occupations may be disproportionately among the latter, as they offer more flexible work arrangements (Filer, 1989) and better opportunities to reconcile domestic and paid work (Polachek, 1981), and require shorter commuting distances (Hanson and Pratt, 1995). Thus, working wives with unobserved characteristics which make them less committed towards their careers may select into female-dominated occupations (Hakim, 2000). If so, the choice to work in these occupations would be endogenous in the family migration decision (Mincer, 1978) and selection mechanisms would explain any effects of occupational sex-segregation on migration.

Considering these alternative explanations of the effect of occupational sex-segregation on family migration, we formulate a second hypothesis:

*H2: Individuals working in female-dominated occupations are as likely as*

*those in other types of occupations to be tied or lead migrants, controlling for socio-economic and occupational characteristics and for the selection of women with little career prospects into these occupations.*

## 5 – Data and variables

Our analyses use data from the British Household Panel Survey (BHPS), a nationally-representative panel survey in which the same respondents have been interviewed on an annual basis since 1991. This contains important information in studying migration, such as distance moved and reported reasons for the move. Besides, its longitudinal nature and time span are helpful to study events such as residential mobility which have an inherent time element (Buck, 2000). Information about the characteristics of occupations is derived from the Labour Force Survey, a quarterly survey that retrieves work-related information from individuals in about 60,000 households in Britain, and subsequently matched to respondents in the BHPS by their occupational codes. We use the most detailed occupational classifications available: the 3-digit SOC90 containing 371 occupations from 1991-2000 and the 4-digit SOC2000 containing 353 occupations from 2001-2007.

Our units of analysis are couple-year pairs. We use seventeen waves of the BHPS covering the period 1991-2007 which provide a sample size of around 2,500 couples and just over 14,000 couple-year pairs. This includes heterosexual couples which *at time t-1* (i.e. before migration) comprise married or cohabitating dual-earners of working age.[1] As is typical in the literature (see Andrews *et al*., 2011 for a recent example), we exclude couple-year pairs in which *at time t-1* either spouse is in full-time education, self-employed, retired, disabled, or in the armed forces, to avoid confusing power asymmetries emerging from these situations with those due to inter-spousal differences in employment conditions. We also exclude moves to separate primary residences and moves in which partnership dissolves, as these are processes competing with family migration.

In the BHPS, all individuals who change residence are asked: *"Did you move for reasons that were wholly or partly to do with your own job, or employment opportunities?"*. Responses to this question allow us to identify work-related residential moves (see Taylor, 2007; Boyle *et al.*, 2003, 2009). Combining responses from husbands and wives, we can identify moves motivated by the husband's job exclusively, moves motivated by the wife's job exclusively, and moves motivated by the jobs of both spouses simultaneously, which is important for testing gender-symmetry in family migration decisions. Using this information, we derive three migration variables to be used as dependent variables in regression models. Our first migration variable captures husband-led work-related moves. This is a binary variable which takes the value 1 if the husband reports moving for reasons related to his own job and the wife does *not* report moving for

[1] For simplicity, we refer to the male and female members of the couple as husband and wife, although they may not be legally married. Our definition of dual-earner couples is based on employment status prior to a potential move (time t-1) irrespective of employment status after the move (time t).

reasons related to her own job, and value 0 if the couple moves for reasons unrelated to labour or does not move.[2] Our second migration variable captures wife-led work-related moves. This is a binary variable which takes the value 1 if the wife reports moving for reasons related to her own job and the husband does *not* report moving for reasons related to his own job, and value 0 if the couple moves for reasons unrelated to labour or does not move. Our third migration variable captures co-led work-related moves. This is a binary variable which takes the value 1 if both the husband and the wife report moving for reasons related to their jobs, and value 0 if the couple moves for reasons unrelated to labour or does not move. Unfortunately, we do not observe sufficient wife-led and co-led migration episodes. Therefore, in estimation we combine these into a single migration variable denoting moves which benefit the wife's job exclusively *or* the jobs of both spouses, which we label wife-(co)led (see Boyle *et al*., 2009). Table 1 illustrates how these work-related migration variables are derived.

The BHPS also includes information on the distance between current and previous residence, which we use to construct a fourth migration variable independent from the above (Boyle *et al.*, 1999, 2001). This is a binary variable which takes the value 1 if the household moves at least 50 km. and value 0 if the household moves less than 50 km. or does not move.[3] Reason-based and distance-based migration variables offer complementary insights into family migration processes and allow for comparisons with past studies following either strategy. While the reason-based variables capture which spouse initiates household moves and which spouse follows, the distance-based variable denotes moves which are likely to involve workplace changes (i.e. the tied migrant will lose its job). Unfortunately, we do not observe enough migration episodes among dual-earner couples to define work-related family migration as moves reported to be for work-related reasons *and* which cover a long distance.

Table 2 summarises the prevalence of different types of moves within our sample.[4] This shows a predominance of husband-led work-related migration and limited incidence of wife-led work-related migration among dual-earner couples. Each year, an average of 0.9% of all couples move further than 50 km., 0.8% move for reasons related to the husband's job exclusively, 0.4% move for reasons related to the jobs of both spouses, and only 0.3% move for reasons related to the wife's job exclusively. In a given year, fewer than 2% of couples move over a long distance or for work-related reasons. Over the sample period, 5.7% of couples moved further than 50km., 5.1% for the job of the husband, 2.5% for both jobs, and just 1.5% for

[2] As in Boyle *et al.* (2003) our comparison group combines migrants who move for reasons unrelated to labour and non-migrants. Also, in subsequent regression models exploring reason-based migration variables (i.e. husband-led and wife-(co)led migration), couples which experience a different type of work-related migration are excluded from analysis (i.e. set as missing).

[3] Results were similar when using a 30 km. cut-off point.

[4] This table uses a common denominator for all migration variables (14,251) to better illustrate the proportion of all couples which undertake each type of move. Two points must be noted here. First, percentages do not add up to 100 because moving over a long distance and moving for work-related reasons are not mutually exclusive. Second, in subsequent regression models for each work-related migration variable couples experiencing a different type of work-related move are set as missing.

the wife's job. Around 90% of couples were never observed to move over a long distance or for work-related reasons.

Our key independent variable is the sex-segregation of the occupations of husbands and wives. To derive this we first calculate the proportion of workers in each detailed occupation who are women each year using data from the Labour Force Survey and merge this with individual-level information from the BHPS. Second, we divide occupations into three 'occupational sex-types' using their gender-composition. Occupations in which less than 35% of workers are women are male-dominated, occupations in which between 35% and 65% of workers are women are gender-integrated, and occupations in which more than 65% of workers are women are female-dominated.[5] Finally, we compare the sex-types of the occupations of the husband and the wife to identify couples in which: (a) the wife works in a female-dominated occupation and the husband works in a male-dominated occupation (50% of couple-year pairs); (b) the wife works in a female-dominated occupation and the husband works in a gender-integrated occupation (13%); (c) the wife works in any occupational sex-type and the husband works in a female-dominated occupation (11%); and (d) neither spouse works in a female-dominated occupation (26%).

We construct occupational level variables similar to those in Shauman (2010) using a large dataset of working-age employees resulting from pooling all quarterly Labour Force Surveys from 1992 to 2007. We use six occupational characteristics in addition to sex-composition. The first captures occupation-specific inflow rates into unemployment, as we expect workers in occupations with high unemployment rates to move speculatively less often to reduce the risk of becoming unemployed. This is defined as the number of individuals entering unemployment from a given occupation as a proportion of the number of workers employed in that occupation. The second measures how the occupation is distributed across the 13 standard British regions. Workers in occupations which are more uniformly distributed will have fewer constraints to migrate for reasons related to their spouses' jobs, since it should be easier for them to find a similar job at destination. This is based on the Index of Dissimilarity, and ranges from 0 (absolute geographic concentration) to 1 (absolute geographic evenness). The third variable is a measure of occupation-specific regional migration rates, defined as the proportion of workers in the occupation who change residence across regional boundaries per year.[6] We expect workers in occupations with higher regional migration rates to have a higher propensity to migrate. The fourth and fifth occupational characteristics refer to different aspects of career advancement. We expect employees in occupations with greater scope for career progression to

[5] Rather than simply dividing occupations into male- and female-dominated we also include a category for gender-integrated occupations. This is important, as recent evidence indicates that gender-integrated occupations have replaced male-dominated occupations as the highest paid (Perales, 2010) and most prestigious (Magnusson, 2009) occupations. We would like to thank an anonymous referee for bringing this to our attention.

[6] This is an imperfect proxy for long-distance migration, as interregional moves may be over a short distance across localities which belong to different administrative regions. However, unlike the BHPS, the LFS does not provide information on the distance covered in household moves.

have more incentives for work-related lead migration. The occupation's potential for earnings growth is measured as the ratio of the 75th to the 25th percentile of the distribution of occupation-specific hourly wages. The measure of career advancement is the only occupational-level variable calculated from the BHPS, pooling information for years 1991 to 2007. This is the proportion of individuals in each occupation who answer yes to the following question: *"In your current job, do you have opportunities for promotion?"*. This captures the likelihood career progression across rather than within occupations. Finally, we include an ordinal variable capturing occupational skill levels (see Elias and McKnight, 2001) to allow for any correlation between the sex-composition and the skill requirements of occupations.

Individual- and household-level control variables include age, education, a scale of gender-role attitudes (see Swaffield, 2000), pre-school and school-age children, house ownership, and monthly earnings.[7] The latter variable captures the joint effect of hourly wages and hours of work, which is important given that women are more likely than men to work part-time and consequently bring fewer resources to the household. Age, education, gender-role attitudes, and monthly earnings are included as values for the wife and as differences between the values for the husband and the wife to capture intra-couple power asymmetries. Occupational characteristics are measured independently for either spouse and, with the exceptions of sex-composition and skill requirements, are standardized. Demographic controls are measured after migration (time t) to capture moves motivated by anticipated family situations such as having a baby, while education, house ownership, and job- and occupation-related covariates are measured before migration (time t-1) to identify the bargaining conditions prevailing prior to the move. Gender-role attitudes are time-invariant by construction.

## 6 - Estimation

We estimate the impact of occupational characteristics on different types of family migration using logistic random-effects panel data specifications which allow us to control for the effect of time-invariant couple-specific unobserved heterogeneity which may influence the propensity to migrate, such as motivation, preferences, and unmeasured productivity. If not suitably allowed for, these can bias the coefficients of interest through omitted variable bias. We then test whether the selection of wives uncommitted to the labour market into female-dominated occupations affects our parameters of interest by estimating a second equation for the wife working in a female-dominated occupation in a simultaneous equations methodological framework similar to that in Lillard and Panis (1998). This exploits the multivariate normal distribution and allows for the correlation between the random terms in the structural and selection equations, capturing any unobserved

[7] Controlling for earnings is essential to capture household resources. However, the literature shows that earnings in female-dominated occupations are lower than in other occupations due to devaluation (England *et al.*, 2007; Perales, 2010). This implies that our earnings variables may be absorbing part of the direct (i.e. causal) effect of occupational sex-composition on family migration and that our estimates are downward-biased.

heterogeneity which affects both outcomes and minimizing the role of selectivity. Identification is achieved through the exclusion of an instrumental variable from the structural equation for family migration. In our analyses this is a dummy variable denoting whether the wife works in public administration which fulfils the usual requirements: it has a correlation of 0.21 ($p>0.01$) with the endogenous regressor (i.e. the wife working in a female-dominated occupation) and is uncorrelated with the dependent variables (correlations are always non-significant and below 0.01). More details on our estimation strategy can be found in a technical addendum in Appendix A.

## 7 – Results

Table 3 shows the incidence of migration by the occupational sex-types of husbands and wives. Results in this table suggest that spouses working in female-dominated occupations rarely lead or co-lead moves and tend to be tied movers. For example, husband-led moves occur more frequently when the husband works in a gender-integrated occupation and the wife works in a female-dominated occupation (1.2%) and wife-led moves when the husband works in a female-dominated occupation (0.5%). Co-led moves are least prevalent among couples in which at least one spouse works in a female-dominated occupation (0.3%). In contrast, when neither spouse works in a female-dominated occupation we observe high rates of mobility. These results offer preliminary support for Hypothesis 1 by suggesting that working in a female-dominated occupation reduces the chances of being a lead migrant and increases the chances of being a tied migrant.

Table 4 describes the occupational characteristics of husbands and wives by type of migration. Overall, most occupational characteristics are distributed across movers and stayers in the predicted manner, offering descriptive support for our expectations on their effect on migration behaviour. The proportion of wives employed in female-dominated occupations is higher for non-moving couples (72%) than for couples which move. Among movers, wives work more often in female-dominated occupations when migration is led by the husband (69%) and less often when migration is co-led (54.4%). The proportion of husbands working in female-dominated occupations is relatively high when couples do not move (10.8%) and highest when moves are wife-led (16.2%), but this relationship is not statistically significant at conventional levels due to small sample sizes. These figures provide some support for Hypothesis 1, as the degree of feminization of the spouses' occupations (especially wives') seems to be associated with different types of migration. Consistent with the structural explanation, we see that husbands' occupations have characteristics which promote lead migration, such as higher skill requirements, potential for wage growth, and potential for career advancement. In contrast, wives' occupations have characteristics which promote tied migration, such as being more equally distributed geographically. This is consistent with Hypothesis 2.

We now test whether the relationships between occupational feminization and family migration that emerge in the raw data are direct or indirect using

multivariate regression models. We first estimate base models of the effect of occupational sex-segregation on household migration without controls, and progressively add occupational characteristics, socio-economic characteristics, and a correction for the selection of wives into female-dominated occupations. Table 5 shows estimates for random-effects logistic regressions for the propensity of a move occurring each year analysing three migration variables. For ease of interpretation, coefficients have been transformed into odds ratios.

Estimates from base models which include only combinations of occupational sex-types for the husband and the wife are presented in columns (1). Couples in which the wife works in a female-dominated occupation and the husband works in a male-dominated occupation are used as the reference category. These models indicate that working in a female-dominated occupation reduces the odds of being a lead migrant, especially when it is the husband who works in such occupations, and increases the odds of being a tied migrant. In models of long-distance and wife-(co)led migration the odds of moving for couples in which neither spouse works in a female-dominated occupation are around two times those of the reference category. In long-distance and husband-led migration models, couples in which the husband works in a gender-integrated occupation and the wife works in a female-dominated occupation are significantly more likely than the reference category to move, with odds 69% and 64% higher respectively. The effect works in the opposite direction in wife-(co)led models, in which the odds of moving for couples in which the husband works in a gender-integrated occupation and the wife works in a female-dominated occupation are 46% of those for the reference category (although this is not statistically significant at conventional levels).

Specifications in columns (2) add occupational characteristics to base models. In these models, differences in family migration between couples with different combinations of occupational sex-types are no longer statistically significant. This contradicts Hypothesis 1, which predicts a direct effect of the sex-composition of occupations on family migration and provides support for Hypothesis 2, expecting no relationship after other occupational variables are added. The exception are couples in which the husband works in a gender-integrated occupation and the wife works in a female-dominated occupation, which undertake wife-(co)led moves significantly less often than the reference category (an associated odds ratio of 0.39).

As predicted by the structural explanation, some occupational characteristics have a direct effect on family migration. The odds ratios of making a long-distance move increase by about 25% with a one standard deviation increase in the occupation-specific regional migration rate, the potential for wage growth, and the potential for career advancement for the husband. For the wife, only the specific regional migration rate has a positive and statistically significant effect, with a one standard deviation increase raising the propensity to migrate by 17%. These results suggest that long-distance migration occurs more often when the husband has opportunities for career advancement. In the husband-led migration model, the occupation-specific regional migration rates of both spouses have a positive and statistically significant impact, increasing the odds of a residential move occurring by 41% and 22% for husbands and wives respectively. In the wife-(co)led

migration model, the wife's occupation-specific migration rate increases the odds of a residential move by around 41%, while her occupation-specific unemployment rate decreases the odds by a factor of 0.69.

Estimates in columns (3) are from fully-specified models which add socio-economic characteristics. Estimates on the occupational sex-composition variables remain qualitatively unchanged and mostly statistically insignificant. This is consistent with Hypothesis 2 and reaffirms the finding that occupational sex-segregation has very few direct effects on migration. As before, the exception are the lower rates of wife-(co)led migration for couples in which the wife works in a female-dominated occupation and the husband works in a gender-integrated occupation. This hints at the existence of advantageous characteristics in gender-integrated occupations which are not captured in our models. A likely candidate would be prestige or perceived social standing, as recent research has demonstrated that these are higher in gender-integrated than sex-segregated occupations (Magnusson, 2009). The magnitude and significance of the impacts of some occupational characteristics change after controlling for socio-economic characteristics. The loss of statistical significance for parameters on occupational properties suggests that the effects of the former were a product of the distribution of personal characteristics across individuals who work in occupations with those properties. Conversely, for those occupational characteristics which remain statistically significant in the presence of such a comprehensive set of control variables, we have strong evidence that they have a net impact on the migration behaviour of couples.

Table B1 in Appendix B shows the estimated parameters on socio-economic control variables. These are generally consistent with expectations. For example, younger couples and couples where the spouses are more highly educated are more likely to move over a long distance. Having pre-school age children increases the odds of husband-led migration by 70% and reduces the odds of wife-(co)led migration by 50%. This suggests that a high proportion of tied-mover and tied-stayer wives are primary carers. The odds of moving for couples which have children aged 5 to 16 are about 50% those of couples which do not have children, which is possibly related to parents' reticence to disrupt the upbringing of the child through geographic mobility. Owning a house strongly deters all moves, reducing the odds by as much as 75%, arguably because it increases the associated costs. Consistent with gender-role theory, traditional gender-role attitudes considerably increase the odds of husband-led migration (by 10% per each one-unit increase in our 36-point scale). Wives' earnings have a positive and statistically significant impact on long-distance migration, reflecting the need for a high income for couples to be able to afford such moves.[8]

Our key results indicate that the sex-composition of the occupations of husbands and wives has few direct effects on family migration, since the odds ratios on these

[8] In robustness checks we re-estimated all models using separate control variables for hourly wages and part-time work rather than a single variable on monthly earnings to test whether this made any difference to our results. The coefficients on the new variables were mostly statistically insignificant and the estimates on the key independent variables remained unchanged. We therefore decided to retain the more parsimonious model using monthly earnings.

variables tend to be statistically insignificant after controlling for mediating factors. Table B2 in Appendix B shows results obtained when specifying occupational sex-segregation in alternative ways, which allows us to test the robustness of our findings. In these specifications, sex-segregation is included as that in the wife's and the husband's occupations separately and as two different combinations. Again, results indicate that occupational sex-composition has few direct effects on family migration.

Hypothesis 2 predicted results to vary in models which control for the selection caused by wives with low or no commitment to the labour market choosing to work in female-dominated occupations. Key results from such models are presented in Table 6. While in base models some parameter estimates change, results in fully-specified models are similar to those previously reported. Only couples in which the wife works in a female-dominated occupation and the husband works in a gender-integrated occupation are significantly less likely (by a factor of 0.36) than the reference category to undertake wife-(co)led moves. The correlations between the random-effects in the main and selection equation offer further insights into the relationships between selectivity and migration roles. In base long-distance and wife-(co)led models such correlations are negative and statistically significant (–0.42 and –0.44), which indicates that wives working in female-dominated occupations have unobserved characteristics which do not favour such moves. In contrast, there is a statistically significant correlation of 0.41 for husband-led migration, suggesting that wives in female-dominated occupations have unobserved characteristics which predispose them to be tied migrants. In fully specified models, the significance of the correlations between the random terms of the main and the secondary equations fall, indicating that the socio-economic and occupational controls capture the sources of selection (i.e. the sources of selection are observable rather than unobservable). The exception is the wife-(co)led migration model, in which such correlation remains negative and statistically significant (–0.41). This suggests that certain characteristics still not captured in the model predispose couples in which wives work in female-dominated occupations to avoid geographic moves which benefit the wife's job.

## 8 – Conclusion

Although the idea that the characteristics of men's and women's occupations may affect the family migration process has appeared repeatedly in academic articles on migration for the past three decades, few empirical analyses have tackled this issue. In this article we have explored the role of occupational characteristics and occupational sex-segregation as determinants of household migration using panel data from Britain. Our results initially suggest that individuals working in female-dominated occupations have lower propensities to move and to lead moves. Additionally, wives working in such occupations are more likely to be tied movers when matched to husbands working in gender-integrated occupations. The inclusion of occupational and socio-economic characteristics to our models yields a more direct effect of the sex-composition of occupations on family migration and, in fact, makes most of its impacts disappear. This indicates that the sex-segregation of occupations has only an indirect effect on family migration.

We have shown that the characteristics of female-dominated occupations (e.g. lower opportunities for wage growth or career advancement) and of individuals working in such lines of work (e.g. lower earnings or skills) are less favourable to both work-related and long-distance migration than those of other workers and occupations. Therefore, the effect of occupational feminization as a catalyst for tied migration and a deterrent for lead migration observed originally seems to be the product of these tangible inequalities rather than of a process of structural devaluation of the work predominantly done by women. Individuals working in female-dominated lines of work do not lead household moves less often because their occupations are deemed unimportant due to their femininity, but because such occupations have objective characteristics which make individuals working in them less likely to progress in their careers by means of geographic mobility. This finding can be read in a positive light, as it signals that the consequences of working in female-dominated occupations *per se* on labour market outcomes demonstrated in previous research do not extend to other areas of social life such as family migration. However, at the individual-level the situation is different, as we find clear advantages for men in the family migration process even after controlling for occupational-characteristics. Husbands are rarely tied migrants, and the best predictors of husband-led migration are traditional gender-role attitudes and the presence of pre-school age children.

Consistent with the structural explanation and as for the US labour market, we find some evidence of an effect of other occupational characteristics on household migration in Britain. In this respect, our results show that the regional migration rates of the occupations of both spouses, the unemployment rate of the occupation of the wife, and the geographic ubiquity, potential for wage growth, and potential for career advancement of the occupation of the husband have independent effects on different types of household migration. The finding that the potential for wage growth and for career advancement of occupations are only important determinants of lead migration for husbands hints at the existence of gender asymmetrical mechanisms benefiting men in the way in which occupational characteristics affect family migration.

There have been recent policy concerns over the fall in work-related internal migration in developed countries, as this is a mechanism which compensates for skill deficits and surpluses across regions, results in improved employee-job matches, and usually benefits movers and their families. Our findings demonstrate that the lack of consideration to the career prospects of wives in family migration decisions is a factor constraining geographic mobility. While wages, labour market participation, and hours of work of husbands and wives are becoming more equal, gender-roles are still embedded in the characteristics of male- and female-dominated occupations. Families are more likely to migrate when wives and husbands have similar labour market positions than when they do not, but such moves are motivated by husbands' careers. Therefore, measures aimed at changing the distribution of men and women across occupations and social re-education campaigns to sensitize families on the centrality of both spouses' careers are appropriate policy levers to promote higher levels of internal migration.

With regard to theory, our results stress the need to consider the characteristics of

the occupations of the wife and the husband when analysing their roles in family migration processes. Future research on this area may wish to reproduce our analyses using a dataset which collects information from a higher number of movers. This would prevent parameters from being economically but not statistically significant, allow for the estimation of separate models of wife-led and co-led migration, and facilitate analyses of the effects on migration of all potential permutations of occupational sex-types within couples. Given known differences in the characteristics of male- and female-dominated occupations, it is also important to explore whether internal migration has consequences for the sex-composition of the occupations taken up by lead and tied migrants. Furthermore, migrant wives usually take up part-time employment and receive low wages at destination, and it is plausible that moves into female-dominated occupations after tied migration play a part in this.[9]

[9] As hinted by an anonymous referee, exploring the sequencing of tied and lead migration roles for husbands and wives in cumulative migration episodes would also provide useful new insights into family migration processes. For example, migration decisions favouring a spouse may strengthen his/her bargaining power in subsequent moves, producing cumulative disadvantage for the other spouse. Alternatively, husbands and wives may follow gender-egalitarian family migration practices by taking-turns as lead and tied migrants. Methodologically, these phenomena could be investigated using event-history models within a competing-risks framework which take into account duration dependence, recurrent events, and different types of family moves. However, this would require large samples of migrant couples as well as information on place of residence, employment, and life-course events for the full duration of the partnership. As this is currently unavailable, this line of research will have to wait until longer (and larger) panel surveys become available.

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## Tables

**Table 1**. Work-related migration variables

| Husband reports the move was motivated by his own job | Wife reports the move was motivated by her own job | Type of work-related migration inferred | |
|---|---|---|---|
| No | No | None | |
| Yes | No | Husband-led | |
| No | Yes | Wife-led | Wife-(co)led |
| Yes | Yes | Co-led | |

**Table 2**. Migration prevalence among dual-earner couples

| | Each year | All years |
|---|---|---|
| Long-distance migration | 0.9% | 5.7% |
| Co-led migration | 0.4% | 2.5% |
| Husband-led migration | 0.8% | 5.1% |
| Wife-led migration | 0.3% | 1.5% |
| Did not move | 98.2% | 90.1% |
| N (Couple-year pairs) | 14,251 | |
| N (Couples) | 2,474 | |

Notes: Percentages do not add up to 100 because moving over a long distance and moving for work-related reasons are not mutually exclusive.

**Table 3**. Number of geographic moves by occupational sex-type combination

| | Long-distance | Husband-led | Wife-(co)led | |
|---|---|---|---|---|
| | | | Wife-led | Co-led |
| Wife in FD occupation & husband in MD occupation *(n=7,088)* | 46 (0.7%) | 49 (0.7%) | 19 (0.3%) | 18 (0.3%) |
| Wife in FD occupation & husband in GI occupation *(n=1,851)* | 21 (1.1%) | 23 (1.2%) | 0 (0.0%) | 5 (0.3%) |
| Wife in any occupation & husband in FD occupation *(n=1,551)* | 10 (0.6%) | 11 (0.7%) | 7 (0.5%) | 4 (0.3%) |
| Neither in FD occupation *(n=3,761)* | 49 (1.3%) | 35 (0.9%) | 17 (0.5%) | 31 (0.8%) |
| All observations *(n=14,251)* | 126 (0.9%) | 118 (0.8%) | 43 (0.3%) | 58 (0.4%) |

Notes: Couple-year pairs. Row percentages. MD = Male-dominated; GI = Gender-integrated; FD = Female-dominated.

**Table 4**. Means of socio-economic and occupational characteristics by sex and migrant status

| | Wives | | | | | Husbands | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | WCL | | | | | WCL | |
| | NM | LD | HL | WL | CL | NM | LD | HL | WL | CL |
| Male-dominated occupation | 0.09 | 0.14 | 0.14 | 0.19 | 0.19 | 0.69¥ | 0.60 | 0.64 | 0.67 | 0.66 |
| | (0.29) | (0.35) | (0.34) | (0.39) | (0.40) | (0.46) | (0.49) | (0.48) | (0.47) | (0.48) |
| Gender-integrated occupation | 0.19 | 0.25 | 0.18 | 0.23 | 0.34 | 0.20 | 0.32 | 0.27 | 0.16 | 0.28 |
| | (0.39) | (0.44) | (0.38) | (0.43) | 0.48) | (0.40) | (0.47) | (0.45) | (0.37) | (0.45) |
| Female-dominated occupation | 0.72 | 0.60 | 0.69 | 0.58 | (0.47 | 0.11¥ | 0.08 | 0.09 | 0.16 | 0.07 |
| | (0.45) | (0.49) | (0.47) | (0.50) | 0.50) | (0.31) | (0.27) | (0.29) | (0.37) | (0.26) |
| Monthly earnings | 578 | 776 | 657 | 785 | 817 | 675 | 825 | 760 | 646 | 776 |
| | (413) | (532) | (415) | (671) | (466) | (444) | (383) | (366) | (325) | (354) |
| Occupation's skill level | 2.42 | 2.86 | 2.68 | 2.81 | 2.98 | 2.86 | 3.33 | 3.23 | 2.95 | 3.24 |
| | (0.86) | (0.94) | (0.95) | (0.82) | (0.95) | (0.89) | (0.76) | (0.86) | (0.82) | (0.78) |
| Occupation's geographic ubiquity | 0.91 | 0.91 | 0.91 | 0.91 | 0.89 | 0.87¥ | 0.88 | 0.87 | 0.89 | 0.88 |
| | (0.06) | (0.05) | (0.06) | (0.05) | (0.06) | (0.07) | (0.06) | (0.06) | (0.07) | (0.06) |
| Occupation's unemployment rate | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.06 | 0.04 | 0.05 | 0.05 | 0.05 |
| | (0.03) | (0.03) | (0.03) | (0.02) | (0.02) | (0.05) | (0.03) | (0.04) | (0.04) | (0.03) |
| Occupation's regional migration rate | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 | 0.03 | 0.02 | 0.03 |
| | (0.01) | (0.01) | (0.02) | (0.01) | (0.02) | (0.01) | (0.02) | (0.02) | (0.01) | (0.02) |
| Occupation's potential wage growth | 1.53 | 1.59 | 1.56 | 1.57 | 1.63 | 1.60 | 1.68 | 1.67 | 1.60 | 1.66 |
| | (0.16) | (0.17) | (0.18) | (0.15) | (0.21) | (0.16) | (0.20) | (0.21) | (0.15) | (0.21) |
| Occupation's potential career adv. | 0.50 | 0.54 | 0.51 | 0.52 | 0.57 | 0.52 | 0.59 | 0.57 | 0.56 | 0.58 |
| | (0.16) | (0.14) | (0.15) | (0.17) | (0.15) | (0.16) | (0.17) | (0.21) | (0.17) | (0.19) |
| N (Couple-year pairs) | 12,462 | 126 | 118 | 43 | 58 | 12,462 | 126 | 118 | 43 | 58 |

Notes: Standard deviations in parentheses. NM = Never moved; LD = Long-distance migration; CL = Co-led migration; HL = Husband-led migration; WL = Wife-led migration; WCL = Wife-(co)led migration. ¥ = F-test comparing means across categories of movers and non-movers (LD excluded) not statistically significant at the 90% level.

**Table 5**. Determinants of migration

| | Long-distance | | | Husband-led | | | Wife-(co)led | | |
|---|---|---|---|---|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(1)* | *(2)* | *(3)* | *(1)* | *(2)* | *(3)* |
| *Ref. = Wife in female-dominated occ., husband in male-dominated occ.* | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wife in female-dominated occ., husband in gender-integrated occ. | 1.69 [1.05,2.73] | 1.23 [0.76,1.99] | 1.13 [0.70,1.83] | 1.64 [1.03,2.61] | 1.30 [0.82,2.06] | 1.19 [0.75,1.91] | 0.46 [0.20,1.05] | 0.39 [0.17,0.90] | 0.36 [0.15,0.82] |
| Wife in any occ., husband in female-dominated occ. | 0.99 [0.53,1.84] | 1.17 [0.60,2.27] | 1.01 [0.52,1.96] | 0.99 [0.55,1.79] | 1.12 [0.59,2.11] | 1.04 [0.55,1.96] | 1.33 [0.72,2.46] | 1.15 [0.58,2.25] | 0.95 [0.48,1.86] |
| Neither in a female-dominated occ. | 2.01 [1.37,2.94] | 1.26 [0.77,2.06] | 1.21 [0.74,1.97] | 1.29 [0.86,1.94] | 0.95 [0.57,1.59] | 0.93 [0.55,1.58] | 2.35 [1.57,3.52] | 1.68 [0.98,2.87] | 1.53 [0.90,2.61] |
| Wife's occ. skill level | | 1.16 [0.89,1.52] | 1.06 [0.80,1.41] | | 1.11 [0.84,1.45] | 1.13 [0.84,1.52] | | 0.98 [0.72,1.33] | 0.96 [0.70,1.32] |
| Wife's occ. geographic ubiquity | | 1.16 [0.96,1.41] | 1.21 [1.00,1.46] | | 0.91 [0.76,1.10] | 0.94 [0.78,1.14] | | 1.02 [0.85,1.23] | 1.04 [0.86,1.25] |
| Wife's occ. unemployment rate | | 1.01 [0.80,1.26] | 1.08 [0.86,1.35] | | 1.07 [0.87,1.32] | 1.06 [0.86,1.31] | | 0.68 [0.51,0.90] | 0.67 [0.50,0.89] |
| Wife's occ. regional migration rate | | 1.17 [1.01,1.36] | 1.11 [0.96,1.28] | | | 1.18 [1.02,1.37] | | 1.41 [1.21,1.65] | 1.35 [1.16,1.57] |
| Wife's occ. potential for wage growth | | 1.07 [0.89,1.29] | 1.05 [0.87,1.26] | | 1.06 [0.93,1.41] | 0.90 [0.74,1.10] | | 1.06 [0.87,1.30] | 1.04 [0.85,1.27] |
| Wife's occ. potential for career adv. | | 1.07 [0.88,1.31] | 1.03 [0.84,1.27] | | 0.94 [0.77,1.15] | 0.94 [0.77,1.16] | | 1.03 [0.83,1.28] | 1.01 [0.82,1.26] |
| Husband's occ. skill level | | 1.23 [0.95,1.58] | 1.17 [0.90,1.52] | | 1.08 [0.84,1.39] | 1.08 [0.83,1.40] | | 1.12 [0.86,1.46] | 1.13 [0.86,1.49] |
| Husband's occ. geographic ubiquity | | 0.99 [0.82,1.20] | 1.03 [0.85,1.24] | | 0.95 [0.79,1.15] | 0.97 [0.80,1.17] | | 1.26 [1.00,1.59] | 1.28 [1.02,1.62] |
| Husband's occ. unemployment rate | | 0.78 [0.57,1.07] | 0.82 [0.60,1.12] | | 0.78 [0.59,1.04] | 0.80 [0.60,1.07] | | 1.05 [0.80,1.38] | 1.06 [0.80,1.39] |
| Husband's occ. regional migration rate | | 1.22 [1.06,1.41] | 1.14 [0.98,1.31] | | 1.41 [1.24,1.61] | 1.31 [1.14,1.49] | | 0.94 [0.76,1.16] | 0.88 [0.72,1.08] |
| Husband's occ. potential for wage growth | | 1.22 [1.03,1.45] | 1.24 [1.04,1.47] | | 1.12 [0.94,1.34] | 1.14 [0.95,1.37] | | 1.14 [0.92,1.40] | 1.17 [0.95,1.44] |
| Husband's occ. potential for career adv. | | 1.26 [1.04,1.53] | 1.30 [1.07,1.58] | | 1.19 [0.99,1.44] | 1.27 [1.05,1.55] | | 1.19 [0.96,1.47] | 1.25 [1.01,1.54] |

| Other controls | No | No | Yes | No | No | Yes | No | No | Yes |
|---|---|---|---|---|---|---|---|---|---|
| N (couple-year pairs) | 14,251 | 14,251 | 14,251 | 14,150 | 14,150 | 14, 150 | 14,133 | 14,133 | 14,133 |
| Log likelihood | -702 | -674 | -644 | -666 | -640 | -609 | -577 | -559 | -529 |
| Likelihood ratio test (p-value) | 0.01 | 0.00 | 0.00 | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Notes: Odds ratios for random-effects models for all observed moves. Columns labelled (1) show results from models including only occupational sex-segregation variables, columns labelled (2) show results from models including occupational sex-segregation variables and other occupational characteristics, and columns labelled (3) show results from models including occupational sex-segregation variables, other occupational characteristics, and socio-economic characteristics. Other control variables include wife's socio-economic characteristics (age, education, gender-role attitudes, and monthly earnings); within-couple differences in socio-economic characteristics; and household variables (pre-school-age children, school-age children, and house ownership). 90% confidence intervals in brackets. Likelihood ratio tests compare the fit of the estimated model and that of a constant-only model.

**Table 6**. Selectivity corrected determinants of migration

| | Long-distance | | Husband-led | | Wife-(co)led | |
|---|---|---|---|---|---|---|
| | *(1)* | *(3)* | *(1)* | *(3)* | *(1)* | *(3)* |
| Main equation | | | | | | |
| *Ref. = Wife in FD occupation, husband in MD occupation* | 1 | 1 | 1 | 1 | 1 | 1 |
| Wife in FD occupation, husband in GI occupation | 1.70 [1.11,2.61] | 1.14 [0.66,1.97] | 1.83 [1.25,2.68] | 1.20 [0.70,2.02] | 0.49 [0.22,1.09] | 0.36 [0.14,0.94] |
| Wife in any occupation, husband in FD occupation | 0.87 [0.46,1.56] | 1.05 [0.49,2.25] | 1.08 [0.95,2.70] | 1.05 [0.50,2.13] | 1.10 [0.62,1.93] | 0.81 [0.43,1.95] |
| Neither in a FD occupation | 1.46 [0.99,2.16] | 1.36 [0.69,2.70] | 1.64 [1.02,2.52] | 1.02 [0.49,2.15] | 1.45 [0.95,2.21] | 0.92 [0.41,2.04] |
| Selection equation | | | | | | |
| Public administration (instrument) | 3.63 [3.24,4.08] | 4.72 [3.83,5.79] | 3.65 [3.25,4.11] | 4.73 [3.85,5.80] | 3.64 [3.23,4.08] | 4.72 [3.82,5.81] |
| Correlation of couple-specific residuals | -0.42 [-0.44,-0.40] | 0.08 [-0.06,0.22] | 0.41 [0.39,0.43] | 0.07 [-0.08,0.22] | -0.44 [-0.46,-0.42] | -0.41 [-0.52,-0.30] |
| Log likelihood | -6628 | -4231 | -6553 | -4196 | -6500 | -4122 |
| Likelihood ratio test (p-value) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| N (Couple-year pairs) | 14,251 | 14,251 | 14,150 | 14,150 | 14,133 | 14,133 |

Notes: Odds ratios for random-effects simultaneous equations models to correct for wives' selection into female-dominated occupations. Columns labelled (1) show results from models including only occupational sex-segregation variables and columns labelled (3) show results from models including occupational sex-segregation variables, other occupational characteristics, and socio-economic characteristics. MD = Male-dominated; GI = Gender-integrated; FD = Female-dominated. Control variables in both equations include wife's occupational characteristics; husband's occupational characteristics; wife's socio-economic characteristics (age, education, gender-role attitudes, and monthly earnings); within-couple differences in socio-economic characteristics; and household variables (pre-school-age children, school-age children, and house ownership). 90% confidence intervals in brackets. Likelihood ratio tests compare the fit of the estimated model and that of a constant-only model.

## 12 – Appendices

### Appendix A - Technical addendum

We estimate random-effects panel data models to control for time-invariant couple-specific unobserved characteristics which may influence the propensity to migrate such as motivation, preferences, and unmeasured productivity-related factors. We use the logistic distribution to account for the fact that our dependent variable has a non-linear binary nature, thus estimating random-effects logit models. Unlike the linear probability model, this method ensures that predicted probabilities lie between 0 and 1 and that the regression assumptions of normality and homoskedasticity are not violated. The full model can be expressed as:

$$\ln\left(\frac{\hat{M}_{t-1,t}}{1-\hat{M}_{t-1,t}}\right) = \beta_0 + \beta_1 X_{t-1c} + \beta_2 C_{tc} + \beta_3 H_{t-1c} + \beta_4 G_f + \beta_5 (G_f - G_m) + \beta_6 S_{t-1f} + \beta_7 (S_{t-1f} - S_{t-1m}) + \beta_8 O_{t-1f} + \beta_9 O_{t-1m} + \upsilon_c + \varepsilon_{ct} \quad (1)$$

where subscripts t, c, f and m designate time, couple, female partner, and male partner; $\hat{M}$ is the underlying propensity that a binary migration indicator M takes value 1; X represents occupational sex-composition within the couple; C is a vector of two variables capturing the presence of pre-school and school-age children in the household; H is an indicator of house ownership; G represents gender-role attitudes; S and O are vectors of other observable socio-economic and occupational characteristics; $\upsilon$ is the couple-specific time-constant unobservable effect; and $\varepsilon$ is the usual cross-sectional stochastic error term. $\beta_0$ is the model intercept and $\beta_1$-$\beta_9$ are coefficients or vectors of coefficients to be estimated.

In our selection-corrected analyses we jointly estimate a random-effects selection equation for the wife being employed in a female-dominated occupation (2) and the family migration equation (3). This simultaneous equations approach allows for the correlation between the two randomly distributed couple-specific effects, capturing any unobserved heterogeneity affecting both outcomes. The two equations can be formally written as:

$$\ln\left(\frac{\hat{M}_{t-1,t}}{1-\hat{M}_{t-1,t}}\right) = \beta_0 + \beta_1 X_{t-1c} + \beta_2 C_{tc} + \beta_3 H_{t-1c} + \beta_4 G_f + \beta_5 (G_f - G_m) + \beta_6 S_{t-1f} + \beta_7 (S_{t-1f} - S_{t-1m}) + \beta_8 O_{t-1f} + \beta_9 O_{t-1m} + \upsilon_{c1} + \varepsilon_{ct1} \quad (2)$$

$$\ln\left(\frac{\hat{F}_{t-1}}{1-\hat{F}_{t-1}}\right) = \beta_0 + \beta_1 C_{tc} + \beta_2 H_{t-1c} + \beta_3 G_f + \beta_4 (G_f - G_m) + \beta_5 S_{t-1f} + \beta_6 (S_{t-1f} - S_{t-1m}) + \beta_7 O_{t-1f} + \beta_8 O_{t-1m} + \beta_9 P_{t-1f} + \upsilon_{c2} + \varepsilon_{ct2} \quad (3)$$

where $\hat{F}$ is the underlying propensity for the wife to work in a female-dominated occupation; P is an instrumental binary variable needed for identification indicating whether or not the wife works in public administration; and the terms $\upsilon_1$ and $\upsilon_2$ are the couple-specific correlated random-effects for the main and selection equation respectively. The couple-specific residuals for each equation are drawn from a joint bivariate normal distribution with mean 0. The estimated

variance-covariance matrix contains the variance of the residual for each outcome in the diagonal and the covariance in the extremes:

$$\begin{pmatrix} v_1 \\ v_2 \end{pmatrix} \sim N\left( \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma^2_{v_1} & \rho_{v_1 v_2} \\ \rho_{v_2 v_1} & \sigma^2_{v_2} \end{pmatrix} \right) \quad (4)$$

For more information about the properties of this modelling strategy see Lillard and Panis (1998).

## B - Other results

**Table B1**. Estimated coefficients on the socio-economic control variables

| | Long-distance | Husband-led | Wife-(co)led |
|---|---|---|---|
| Wife's age | 0.96 [0.94,0.98] | 0.97 [0.95,0.99] | 0.95 [0.92,0.97] |
| Within-couple difference in age | 1.01 [0.97,1.05] | 0.97 [0.93,1.01] | 0.99 [0.95,1.03] |
| Wife's education = A-Level or equivalent | 1.83 [1.12,2.99] | 1.43 [0.88,2.31] | 0.96 [0.56,1.63] |
| Wife's education = Degree | 2.97 [1.53,5.79] | 1.70 [0.84,3.45] | 1.63 [0.80,3.32] |
| Within-couple difference in education | 1.18 [0.97,1.43] | 1.22 [0.99,1.50] | 1.09 [0.87,1.35] |
| Wife's gender-role attitudes | 1.04 [0.98,1.10] | 1.09 [1.03,1.15] | 1.00 [0.94,1.07] |
| Within-couple difference in gender-role attitudes | 1.02 [0.97,1.07] | 1.00 [0.95,1.06] | 1.02 [0.96,1.08] |
| Child aged 0-4 | 1.07 [0.73,1.55] | 1.70 [1.15,2.52] | 0.56 [0.35,0.90] |
| Child aged 5-16 | 0.56 [0.34,0.91] | 0.61 [0.38,1.00] | 0.44 [0.25,0.78] |
| Couple owns house | 0.34 [0.23,0.51] | 0.26 [0.17,0.39] | 0.29 [0.19,0.45] |
| Wife's monthly earnings (in hundreds) | 1.03 [1.00,1.07] | 1.02 [0.98,1.07] | 1.01 [0.96,1.07] |
| Within-couple difference in monthly earnings | 1.02 [1.00,1.04] | 1.01 [0.98,1.04] | 1.01 [0.96,1.05] |

Notes: Odds ratios for random-effects models in columns labelled (3) in Table 5. 90% confidence intervals in brackets.

**Table B2**. Determinants of migration: alternative specifications of occupational sex-segregation

| *Occupational sex-segregation included…* | Long-distance | Husband-led | Wife-(co)led |
|---|---|---|---|
| *…for both spouses separately* | | | |
| Wife works in MD occ. | 0.99 [0.56,1.73] | 1.37 [0.73,2.57] | 0.90 [0.51,1.58] |
| Wife works in FD occ. | 1.01 [0.62,1.65] | 1.35 [0.77,2.36] | 0.69 [0.40,1.19] |
| Husband works in MD occ. | 0.88 [0.61,1.28] | 1.03 [0.69,1.54] | 1.37 [0.85,2.19] |
| Husband works in FD occ. | 0.85 [0.44,1.66] | 1.04 [0.53,2.03] | 1.12 [0.55,2.28] |
| *…for both spouses combined (I)* | | | |
| Both spouses work in FD occ. | 1.17 [0.55,2.47] | 1.28 [0.58,2.80] | 0.97 [0.46,2.07] |
| Only wife works in FD occ. | 0.92 [0.58,1.47] | 1.18 [0.71,1.96] | 0.60 [0.35,1.01] |
| Only husband works in FD occ. | 0.27 [0.05,1.50] | 0.79 [0.22,2.81] | 0.14 [0.02,0.80] |
| *…for both spouses combined (II)* | | | |
| Absolute difference in proportion female in the occ. (a) | 0.88 [0.42,1.84] | 0.56 [0.27,1.17] | 0.92 [0.41,2.08] |
| Husband has higher proportion female in the occ. (b) | 0.68 [0.29,1.58] | 0.41 [0.15,1.12] | 1.47 [0.68,3.17] |
| Interaction (a) * (b) | 1.40 [0.06,34.44] | 5.82 [0.17,195.96] | 0.04 [0.00,1.40] |

Notes: Odds ratios for random-effects models. Control variables as in columns labelled (3) in Table 5. 90% confidence intervals in brackets. MD = Male-dominated; FD = Female-dominated.