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Family Migration and Relative Earnings Potentials

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ABSTRACT

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A unitarian model of family migration in which families may discount wives' private gains is used to derive testable predictions regarding the type of couples that select into migrating. The empirical tests show that gender neutral family migration cannot be rejected against the alternative of husband centered migration. Couples are more likely to migrate if household earnings potential is disproportionally due to one partner, and families react equally strongly to a male and a female relative advantage in educational earnings potential. These results are driven by households with a strong relative advantage to one of the partners while results are less clear for small dissimilarities within the couple, suggesting that gender identity norms may play a role when the opportunity costs of adhering to them are small.

JEL Classification: F22, D19, J16, J61

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1 Introduction

Female labor force participation rates have risen in most developed countries since the 1960s and dual-earner households have become the norm. Economic rationality prescribes that the dual-earner households consider the earnings potentials of both partners in migration decisions whereas single-earner households naturally follow the earnings prospects of the breadwinner. The early studies of the 1970s and the 1980s document that working wives inhibit the mobility of families, consistent with the idea that job opportunities of both partners matter.[1] Many studies using education or occupation as a measure of the potential return to migration have, however, found substantial asymmetries with respect to partners' characteristics in family migration equations, thereby inferring asymmetric weigthing by gender in families' location decisions.[2]

Social costs (embarrassment) associated with the husband earning less than the wife or traditional gender role beliefs within the couple could make couples value an additional dollar brought in by the man more than an additional dollar brought in by the woman. This paper provides a micro-economic model of families' location decisions incorporating the possibility that families discount women's private returns. I assume that the return to migration is proportional to the earnings potential of the individual and predict how migration propensities vary with the relative earnings potential in the household, conditional on overall household earnings potential. Migration propensities are lowest in couples with equal earnings potential and increase symmetrically in the intra-household dissimilarity if couples are gender neutral when making location decisions. The least migratory couples are instead those where the husband has the lowest earnings potential if couples discount women's private returns.

For the empirical analysis, I construct an education-specific earnings potential by predicting the mean earnings for men and women in 566 distinct education categories adjusted for age, small children and employment. The empirical earnings potential accounts for more heterogeneity than the broad education categories often used in the literature and is allowed to differ between men

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[1]For example Long (1974); Sandell (1977); Mincer (1978) and Lichter (1980, 1982).

[2]Examples include Duncan and Perrucci (1976); Lichter (1982); Shihadeh (1991); Bielby and Bielby (1992); Nivalainen (2004); Compton and Pollak (2007); McKinnish (2008); Shauman (2010); Tenn (2010).

and women since such differences could reflect discrimination in the labor market and pre-marital sorting by gender into subfields which should be distinguished from gender bias in the household. On the one hand, this approach carries detailed information on the earnings potential of the individual and at the same time it is more exogenous than actual earnings or occupation that may reflect decisions within the household and local labor market shocks correlated with migration. On the other hand, it excludes information on innate ability and motivation as well as the scope for mobility within occupations that also matter for migration decisions.

The theoretical model emphasizes the importance of capturing the combination of characteristics in the household, as opposed to only including absolute characteristics of husband and wife. The important paper by Compton and Pollak (2007) captured the joint education profile by focusing on a simple distinction between college and noncollege and including the interaction, both college. This approach becomes less tractable with more detailed categorical data and the earlier literature has therefore focused on absolute characteristics of the partners. The methodology of this paper makes progress on this issue by creating a one-dimensional measure of the potential return to migration and using quadratic and more flexible functions of husband's share to capture the joint migration potential of the household.

I find that the human capital model of family migration cannot be rejected against the alternative of husband centered migration, neither for internal nor for international migration of couples. The results are driven by families with a clear education difference between the partners. Households seem to favor the career of the husband when differences in earnings potentials are small. This could be because forgone household earnings associated with adhering to the norm that husbands are breadwinners are low for these households or because the difference in educational earnings potential is not big enough if households foresee future career interruptions for the woman due to childbearing.

The empirical analysis is based on husband-wife matched data from Danish registers. Denmark is an interesting case. First, it is a highly gender equal country with a female education level and a labor force participation rate among the highest in developed countries and other developed

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countries show trends in this direction. Second, Danes are relatively unhindered in their international mobility and thus the kind of international migrants we would like to study not to confound self-selection with the impacts of migration policies. Denmark is also relative unique in having data on international migration of its citizens. This allows me to link family migration to the literature on cross-border migration. The only other paper looking at emigration of families is Junge, Munk, and Poutvaara (2013, 2014). I show that the same type of selection characterizes internal and international migration of couples but internationally migrating couples are more intensively selected on the intra-household earnings asymmetry, presumably due to worse prospects for the trailing spouse in foreign labor markets. Applying specifications from prior literature, I also show that internal and international migration appear husband centered using these approaches.

Migration policies prohibiting dependents from working will tend to intensify the selection of asymmetric couples in terms of the intra-household earnings potential.[3] Whether that is beneficial to the destination country is a complicated question beyond the scope of this paper. But the high share of accompanied migrants in the international skill flows suggests that this is a relevant question for further research. More than half of international labor migrants from Denmark are in a relationship.[4]

Section 2 contains the theoretical contribution of the paper and derives testable predictions that guide the empirical analysis. Section 3 and 4 describe the data and the construction of educational earnings potentials. Results from prior empirical work are replicated and discussed in section 5.1 before the results of this paper are presented in section 5.2 and 5.3. The final section concludes.

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[3]More than two thirds of pre-migration household income are due to one partner in 38 percent of Danish households emigrating to the US and 34 percent of households emigrating to other countries. US, UK, Greenland, Sweden and Germany are the five top destination countries for the Danish couples studied in this paper; together they attract 46 percent of the emigrating couples. US and UK alone stand for 22 percent of the emigration.

[4]Labor migrants are defined as those who have completed their education and been in the labor force at least two years prior to migrating.

2   Theory

2.1   The general framework and existing theories

Human capital theory suggests that an individual migrates if improvements to lifetime earnings exceed migration costs (Sjaastad, 1962), and families are expected to migrate whenever the total gains to the household outweigh migration costs (Sandell, 1977; Mincer, 1978). An alternative explanation of family migration is founded in gender role theory and argues that women are socialized to forgo own career opportunities in location decisions. The husband is the provider and families make location decisions with no or little regard to the job opportunities of the wife (Shihadeh, 1991; Bielby and Bielby, 1992; Tenn, 2010).[5] The model presented in this section captures behavior influenced by gender identity norms as a lower relative weight on the returns of the wife. Gender neutral households, to the contrary, maximize the net gain to the household attaching equal weights on the returns of the household members. The paper is the first to incorporate the idea of non-equal weighting by gender in a micro-economic model of migration decisions.

The following main features of the decision problem follow the literature: the marriage decision is given, the possibility of family dissolution is ignored, and couples behave like a single unit.[6] Beyond the weights that allow me to encompass the human capital theory and the gender role theory of family migration in a tractable unified framework, it is the specification of returns to migration as a function of earnings potentials that distinguishes this model from related models (Sandell, 1977; Borjas and Bronars, 1991; Junge, Munk, and Poutvaara, 2013). Migration costs are less interesting; they simply shift the extent of migration and do not determine the type of selection in any of the models.

I could have obtained similar predictions from a collective bargaining model where the trailing

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[5]The idea that gender identity norms affect economic outcomes has gained increasing attention in economics since Akerlof and Kranton (2000). They define identity as the sense of belonging to a group, and disutility associated with deviations from norms prescribing the behavior of the group make individuals adhere to social norms. A norm that "a man should earn more than his wife" can therefore explain why couples may abstain from economically beneficial relocations that favor the career of the woman and migrate for men's job opportunities even when the net economic gain to the household is negative.

[6]Mincer (1978) discusses the possibility of family dissolution. Gemici (2011) departs from the unitarian approach and builds a structural model in which location and marital status are jointly determined in a Nash-bargaining game.

partner can be compensated. The important assumption in unitatian models is that partners maximize joint utility and externalities arising from family location decisions can be internalized by transfers within marriage (Coase Theorem). Inefficient outcomes may arise when couples cannot make binding intertemporal commitments which is very likely the case for major decisions like migration that affect future bargaining power e.g. through changes in future earnings (Lundberg and Pollak, 2003). A strong positive correlation between the intra-household difference in potential earnings and the risk that negative externalities cannot be internalized would threaten the theoretical prediction of this paper. Overall, the predicted U-shape is confirmed in the empirical analysis, across different specifications and with a varying set of controls. For that reason, I found that the unitarian model is a satisfactory description of the data for the purpose of this paper.

Borjas and Bronars (1991) and Junge, Munk, and Poutvaara (2013) both consider cross-border migration. The source of income gains differs between the two models. The income gain to each spouse is determined by the position of the spouse in the income distribution at origin and the difference in income distributions across countries in Borjas and Bronars (1991). Hence, the selection of couples into migrating is fully characterized by the income distributions in the sending and receiving country, and partners with more similar earnings are more likely to agree in migration decisions due to the one-dimensional sorting on earnings levels.[7]

Junge, Munk, and Poutvaara (2013) specify earnings in the destination country as a product of the pre-migration earnings level and a rate of return, which can be positive or negative. This is quite similar to the specification of returns to migration in this paper. Such a formulation of gains means that the absolute gains are higher for individuals with higher earnings consistent with the higher mobility among more educated and higher earning individuals and consistent with the "favorable selection" hypothesis in the international migration literature due to Chiswick (1978).[8]

Junge, Munk, and Poutvaara (2013) do not consider the correlation of gains between partners

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[7]Borjas (1987) shows the emigrants from countries with a relative narrow income distribution are selected from the upper end of the income distribution provided that earnings are sufficiently correlated across countries. Borjas and Bronars (1991) study family migration ("chain-migration") and find that family ties 'dilute" the type of selection characterizing single migrants, assuming that individual earnings are perfectly correlated across counties.

[8]Larger geographic labor markets (Sandell, 1977) and better access to information in distant labor markets (Bowles, 1970) for high skilled have been offered as possible explanations for this.

and describe migration decisions based on the income level of each partner. They show that emigration is increasing in the earnings of the primary earner, while the effect of a small increase in the earnings of the secondary earner is negative if the income difference between the partners is initially large and ambiguous if the income difference is initially small. This paper investigates the importance of the correlation of gains across household members and focuses on the *relative* earnings potential of the partners (not the actual pre-migration earnings).[9] More importantly, I incorporate the idea that families may be influenced by gender identity norms and therefore discount wife's private returns in migration decisions and use the model to assess directly potentially asymmetric weighting by gender.

2.2 Family migration and possible asymmetric weighting by gender

The specific formulation of my model is as follows. Y_i denotes the lifetime earnings potential of individual i at origin. The rate of return to geographic mobility for individual i is a random variable, r_i. We can think of the distribution as being potential job offers across multiple destinations or aggregate all potential destinations into one and think of the distribution as a distribution of potential job offers at this alternative location. Individuals are in the beginning of their working life when job offers are realized.

The model may describe internal or international migration. Cultural and linguistic differences across countries constitute extra costs for international compared to internal migrants, and direct moving costs are most likely increasing with the distance moved. Hence, we can think of international migration as being characterized by higher migration costs, C, compared to internal relocations. It implies that international migration propensities are shifted downwards compared to internal migration propensities. Table 1 confirms this. About one percent of couples migrate to another region in Denmark and 0.2 percent emigrate from Denmark every year.

A single individual only migrates if $Y_i r_i - C > 0$, and $\mathrm{E}[Y_i r_i - C]$ must be negative since the

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[9]This is made easy by the assumption that gains follow a bivariate normal distribution. Junge, Munk, and Poutvaara (2013) assume that the gain to each partner follows a uniform distribution.

majority do not migrate. It is also clear that international migrants must be more positively selected from the population since costs are higher. The more intense selection of international migrants is confirmed in section 5 (Table 5).

In order to focus on selection based on the intra-household dissimilarity, define the total earnings potential of the household, $Y = Y_h + Y_w$, where subscripts h and w refer to the husband and the wife. The contribution of the husband to the total earnings potential is denoted $s = \frac{Y_h}{Y_h + Y_w}$. Costs of family migration are simply the sum of the individual costs (no economies of scale in moving). A family consisting of husband and wife then migrates if the net gain to the household, X, is positive, possibly discounting the returns of the wife

$$X = Ysr_h + Y(1-s)\delta r_w - 2C > 0 \tag{1}$$

where $0 \leq \delta \leq 1$ is the relative weight attached to the returns of the wife. A partner whose private return is negative is a tied mover or tied stayer in the family migration decision as defined by Mincer (1978). The likelihood that the realized return of the wife is negative increases as lower weight is put on her return in the family migration decision.

Each individual draws the private return to geographic mobility, r_i, from a normal distribution with mean μ and variance σ^2, and the correlation between spouses' returns is given by $-1 < \rho < 1$. The migration probability for a family with potential earnings at origin, Y, and husband's share, s, of the total earnings potential is then given by

$$\Pr(X > 0) = 1 - \Phi\left(\frac{-\mu_X}{\sigma_X}\right) = 1 - \Phi\left(\frac{2C - \mu Y(s(1-\delta) + \delta)}{\sigma Y z_s}\right) \tag{2}$$

Φ is the standard normal distribution function, μ_X and σ_X^2 are the mean and variance of the net gain to households, and to ease exposition I define $z_s = \sqrt{\delta^2 - s2(\delta^2 - \delta\rho) + s^2(1 + \delta^2 - 2\delta\rho)}$.[10] Family migration is decreasing in the costs of migrating (C), and increasing in the expected rate

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[10]Notice that $\delta^2 - s2(\delta^2 - \delta\rho) + s^2(1 + \delta^2 - 2\delta\rho)$ is positive for $\rho > -1$ (or $\delta = 0$). This is because $\delta^2 - s2(\delta^2 - \delta\rho) + s^2(1 + \delta^2 - 2\delta\rho) > 0 \Rightarrow \frac{\delta^2(1 - 2s + s^2) + s^2}{2\delta(s^2 - s)} < \rho$ and the left-hand side is concave and has -1 as its maximum.

of return (μ), the total earnings capacity of the household (Y) as well as the dispersion of returns to migrating (σ) since more couples pass the threshold where migration becomes optimal.

Figure 1 shows how the probability of family migration, $Pr(X > 0)$, relates to the intra-household dissimilarity in earnings potential, s, depending on the weight on the return to the wife. The mean net gain to migration for a household does not depend on s when migration decisions are gender neutral ($\delta = 1$) and the U-shape is therefore driven by the dispersion of the net gain to households, σ_X.[11] The higher variance of households' net returns to migration for larger differences among the partners (conditional on overall earnings potential) generates higher migration because households' gains more often pass the fixed migration costs.

Family migration is increasing in husbands' share, s, and the correlation of returns to migration within the household, ρ, becomes irrelevant to migration propensities when the return to the wife is disregarded ($\delta = 0$).[12] Moderate husband centered migration ($0 < \delta < 1$) places the least migratory family in between the two extreme cases, as illustrated in Figure 1.

Figure 1: Gender neutral versus husband centered migration

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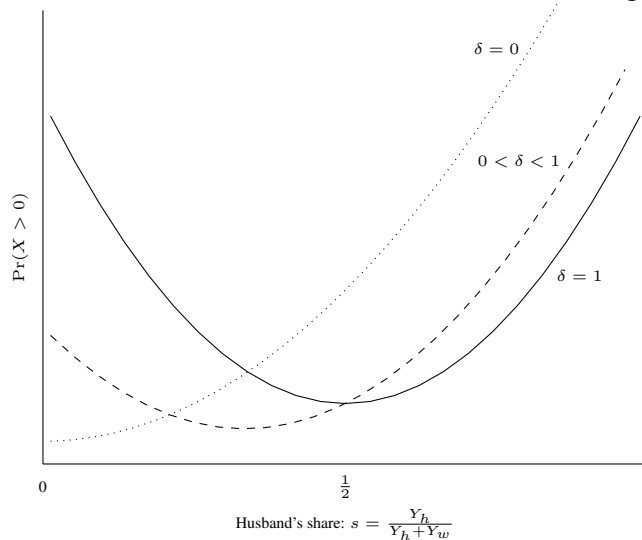
[11]The variance and the migration probability are minimized at $s = 1/2$ and increase symmetrically with the dispersion in earnings potentials within the household if $\delta = 1$. (Note: $X \sim N\left(\mu Y(s(1-\delta) + \delta) - 2C, \sigma^2 Y^2 z_s^2\right)$)

[12]Equation (2) does not depend on ρ and the first derivative of the family migration probability with respect to s is positive.

2.3 Family migration and labor market outcomes

The effect family migration has on the intra-household earnings dispersion depends on the relative weight families attach to the returns of the wife. To see this let subscripts r_h, r_w and X on ϕ indicate their respective Gaussian density functions, derive the return to men and to women in households who migrate and compare[13]

$$
\begin{aligned}
\mathrm{E}(r_h|X > 0) &= \int_{-\infty}^{\infty} r_h \phi_{r_h}\left(r_h|X > 0\right) \mathrm{d}r_h \\
&= \int_{-\infty}^{\infty} r_h \frac{\int_0^{\infty} \phi_{r_h}\left(r_h|X = x\right) \phi_X(x)\mathrm{d}x}{\mathrm{P}\left(X > 0\right)} \mathrm{d}r_h \\
&= \frac{1}{\mathrm{P}\left(X > 0\right)} \int_0^{\infty} \left[\int_{-\infty}^{\infty} r_h \phi_{r_h}\left(r_h|X = x\right) \mathrm{d}r_h\right] \phi_X(x)\mathrm{d}x \\
&= \frac{1}{\mathrm{P}\left(X > 0\right)} \int_0^{\infty} \left[\mu + (x - \mu_X)corr(X, r_h)\frac{\sigma}{\sigma_X}\right] \phi_X(x)\mathrm{d}x \\
&= \mu + corr(X, r_h)\sigma \frac{\phi\left(\frac{-\mu_X}{\sigma Y z_s}\right)}{1 - \Phi\left(\frac{-\mu_X}{\sigma Y z_s}\right)}
\end{aligned}
$$

Likewise, the return to women in migrating households

$$
\mathrm{E}(r_w|X > 0) = \mu + corr(X, r_w)\sigma \frac{\phi\left(\frac{-\mu_X}{\sigma Y z_s}\right)}{1 - \Phi\left(\frac{-\mu_X}{\sigma Y z_s}\right)}
$$

Since $corr(X, r_h) = \frac{s(1-\delta\rho)+\delta\rho}{z_s}$ and $corr(X, r_w) = \frac{s(\rho-\delta)+\delta}{z_s}$ we have

$$
\mathrm{E}(r_h|X > 0) > \mathrm{E}(r_w|X > 0) \Leftrightarrow s > \frac{\delta}{1 + \delta} \tag{3}
$$

Expression (3) shows that the partner with the highest earnings capacity gains the most from migration when migration decisions are gender neutral ($\delta = 1$), whereas husband centered migration favors the husband ($\delta = 0$). Overall, the model shows that the intra-household dispersion in earnings potentials is an important determinant for migration and migration propensities of families

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[13]The last step rearranges terms and uses integration by substitution. Details are available from the author upon request.

react similarly to larger male and female earnings capacity under symmetric weighting by gender, implying that family migration magnifies initial earnings asymmetries within the household. Family migration has a larger positive effect on men than on women if the return to the wife is discounted. The next section describes the employed data and section 4 explains the educational earnings potential that I use in the empirical analysis as a measure of the return to migration.

3   Data

The empirical analysis requires husband-wife matched data for multiple periods, socio-economic variables and information on the geographic location of the couples. This information can be extracted from administrative registers in Denmark.

I restrict my sample to opposite sex couples where both partners are Danish born, prime-age wage earners. Specifically, each partner is between 25 and 39 years old when observed in year t, has completed his/her education before year $t-1$ and has two years of working history (t and $t-1$). These restrictions are important to exclude mobility associated with the completion of studies and focus on dual-earner couples with at least two years of earnings information. Married as well as cohabiting couples are included in the analysis as long as they have been together for at least two years (t and $t-1$). The panel used in the analysis consists of the years 1985 to 2005.[14]

I define internal migration as a relocation between two commuting zones in Denmark (between t and $t+1$) and international migration as an emigration from Denmark (in year $t+1$). Table 1 shows that 1.2 percent of men and women in the couples sample move to another commuting region in Denmark and 0.3 percent migrate internationally.[15] Out of those, 1.0 percent and 0.2 percent represent joint migration of both partners (the same year and to the same destination). This is the definition of family migration I use (last row of Table 1). Migration of one partner with

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[14]Appendix A.1 shows each of the sampling reducing choices starting from the population residing in Denmark in the years 1984-2006 and aged 18-65, migration rates over time and duration abroad for international migrants.

[15]I categorize migrants to Greenland and the Faroe Islands among the international migrants. Technically, these destinations are part of the Danish Kingdom but geographically and culturally they are further away from Denmark than the neighboring countries. Results are similar if emigrants to Greenland and the Faroe Islands are reclassified as internal migrants, although the prevalence of international family migration falls from 0.21 to 0.19 percent.

no subsequent mobility of the other (within the next three years) could indicate family dissolution (row 2 and 5). Situations where one partner migrates and the other follow (within the next three years) are very rare, especially for international migrants. The wife or the husband relocates to another commuting zone in Denmark and the partner relocates one of the following years in 3 out of 10,000 households (row 3 and 6 in Table 1). For international migrants the numbers are 0-2 out of 10,000, and this is before conditioning on the destination being the same (which is only done in the last row of Table 1) so these couples include sequential movers as well as couples who dissolve.

Migration is slightly procyclical as suggested by Saks and Wozniak (2011). Figure 2 shows that migration propensities were low in the early 1990s when unemployment peaked. International migration has increased a bit over the analysis period, 1985-2005, but it does not show a clear trend. 70 percent of the international migrants have returned within 5 years from the emigration date and more than 80 percent have returned after 10 years (see Figure 3). The median duration abroad for couples emigrating from Denmark is 3 years.

I combine several registers to have information on the composition of the household; the age of children present in the household; and the age, employment, earnings, occupation, and education of each partner; as well as information on municipality of residence and emigration from Denmark. Earnings are the annual income from labor, and employment is measured as a fractional value of a full working year.

The educational earnings potential is based on detailed information on the exact education of the individual. The analysis sample contains about 1400 distinct education categories according to the Danish classification of education. Some are tiny and have to be merged to reduce noise in the calculated earnings potential. Appendix A.2 describes the algorithm I constructed to combine categories with few individual-year observations. The resulting list has 566 distinct education categories. It distinguishes different levels and types of primary and secondary education. The number of vocational education and training programmes is especially large, containing for instance six types of gardeners. Short higher education, medium higher education, Bachelor's degree, Master's degree and PhD are distinguished by detailed fields of study.

4   Educational earnings potential

The education-specific earnings potential is calculated from estimated age-earnings profiles. The earnings of individual i in year t are estimated separately for men and women and by the nine major education categories in the Danish classification system using the following specification:[16]

$$Y_{it} = \sum_e \mathbb{1}\left(Educ = e\right)\left(\gamma_{e,1}Age_{it} + \gamma_{e,2}Age_{it}^2\right) + \gamma_3 Empl_{it} + \gamma_4 Child_{it} + v_t + u_i + \varepsilon_{it} \quad (4)$$

The quadratic function of age differs across each of the 566 education categories in the sample. The variables $Empl_{it}$ and $Child_{it}$ measure employment as a fractional value of a full working year and the presence of children under the age of three. v_t is a year fixed effect, and u_i is an individual fixed effect. All parameters differ by each of the major education categories and gender because equation (4) is estimated separately for each of them.

The average earnings of men or women with education e at age 35, in full employment and with no small children can then be calculated using the following formula:

$$Y^{educ} = \hat{\gamma}_{e,1}35 + \hat{\gamma}_{e,2}35^2 + \hat{\gamma}_3 \quad (5)$$

I refer to the 2×566 predictions from equation (5) as the "educational earnings potential". It is the empirical counterpart of the theoretical earnings potential in section 2. Earnings predictions including the individual specific component ($Y^{adj} = \hat{\gamma}_{e,1}35 + \hat{\gamma}_{e,2}35^2 + \hat{\gamma}_3 + \hat{u}_i$) are called "adjusted earnings" and included in quintiles as a control variable in the regressions.[17]

Actual earnings could be affected by behavior within the family correlated with migration, and migrants may relocate in response to adverse labor market shocks for one partner which could boost the U-shape. Predictions based on (5), therefore, adjust for employment and small children

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[16]The major education categories are: primary education, general upper secondary, vocational upper secondary, vocational education and training, short higher education, medium higher education, Bachelor's degree, Master's degree, and PhD or equivalent. The 566 education categories are nested within these nine major groups.

[17]I obtain similar conclusions controlling for quintiles of the educational earnings potential.

and exclude the idiosyncratic component of earnings.[18] The drawback is that $\hat{u}_i$ contains potentially important information on unobservables such as ability.[19] Earnings are predicted at age 35 since at this age earnings are a relative good proxy for lifetime earnings.[20]

5 Empirical analysis

5.1 Main findings from the literature

Appendix B provides a comprehensive overview of the empirical literature on determinants of family migration and the related literature on the labor market outcomes of migrating husbands and wives. Negative labor market outcomes for married women and positive outcomes for married men after the family has relocated have been widely documented in papers looking at internal mobility.[21] Foged (2014) reports similar evidence for internationally migrating couples. These findings are consistent with migration being husband centered.

A considerable prior literature finds an asymmetric response of family migration to husband's and wife's characteristics. This section replicates the main findings from this literature. First, using education and occupation characteristics as measures of the potential return to migration. Second, looking at absolute and relative measures of the earnings in the household. The dependent variable is either joint migration of both spouses to another commuting region within Denmark or joint emigration from Denmark throughout the empirical analysis.

Specification 1 in Table 2 mirrors Compton and Pollak (2007, Table 2, column B). The variables of interest are indicators for whether only the husband has university degree (husband power), only the wife has university degree (wife power), or both partners have university degree (both

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[18]Results are similar if predictions are instead adjusted to the mean employment of the education (not full employment), acknowledging that structural employment differs across the 566 education groups, and if a richer formulation of equation (4) is used, allowing the coefficients on $Empl_{it}$ and $Child_{it}$ to differ by education.

[19]International migration appears husband centered and internal migration appears wife centered, using pre-migration earnings instead of the educational earnings potential.

[20]Research on the association between current and lifetime earnings shows that earnings from age 35 measure permanent earnings relatively well (Haider and Solon, 2006; Böhlmark and Lindquist, 2006).

[21]E.g. Sandell (1977); Grant and Vanderkamp (1980); Lichter (1980, 1983); Spitze (1984); Shihadeh (1991) for internal mobility.

power). Commuting region fixed effects and an indicator for whether the couple lives in the same commuting region as one or more of their parents are included to control for the findings that migration rates vary by the size of the local labor market and that residence in the home region of (at least) one of the partners reduces mobility. I also analyzed standard demographic family characteristics. They are consistent with the literature (e.g. Long, 1974) and do not influence the coefficients reported in the table.[22]

Wife's education has a smaller effect than husband's education, and the effect of power couples is indistinguishable from the effect of male power for both internal and international migration, as found in Compton and Pollak (2007). Ignoring the combination of education in the household, many papers find that the education of the wife has a small and insignificant effect on family migration once the education of the husband has been controlled for (e.g. Lichter (1982), Nivalainen (2004), Swain and Garasky (2007) and Compton and Pollak (2007, Table 2, column C)).

The occupational mobility rate, added in specification 2 of Table 2, has a significantly larger effect for the male partner than the female partner. This is in line with several papers including the original study by Duncan and Perrucci (1976) that documents asymmetric responses of family migration to occupational mobility and occupational prestige. Compton and Pollak (2007, Table 4, column F) use a measure of the concentration of an occupation in large metropolitan areas and find that urban concentration of husband's occupation has a positive effect on family migration whereas urban concentration of wife's occupation has no effect on family migration.[23] Benson (2014), to the contrary, shows that family migration is symmetrically increasing in the geographical clustering of the occupations of husband and wife.

Using the same data as this paper, Junge, Munk, and Poutvaara (2013) find that international migration of couples is increasing in male earnings but unrelated to earnings of the female partner. The first two columns of Table 3 reproduce this result for emigration from Denmark and show a similar result for migration between commuting areas in Denmark. The effect of the wife's

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[22]Mobility is decreasing with the age of the partners and the presence of children in the household, especially school age children.

[23]Their coefficients on power types are largely unaffected by these occupational controls while controlling for occupational mobility places male power couples as the most mobile ahead of power couples in Table 2.

earnings is consistently smaller than the effect of the husband's earnings starting from a model with no additional explanatory variables and gradually adding the controls used in the specification in Table 3. Hence, the rejection of symmetry is very robust looking at the level of earnings. Turning to the educational earnings potential in the last two columns of Table 3, we can no longer reject that the coefficients of the husband and the wife are the same. This is especially true for international migration. For internal migration, symmetric effects of earnings only occur once occupational mobility has been controlled for.

Duncan and Perrucci (1976) and Shauman (2010) include wife's percent of family income in their regressions, and Jacobsen and Levin (2000) have specifications including the ratio of the predicted earnings gain from migration. All three papers include their relative measure linearly and find it is insignificant. The lower part of Table 3 shows that family migration is increasing in husband's share of total earnings and of total educational earnings potential, indicating that families may place larger weight on husbands' private gains from migration. Junge, Munk, and Poutvaara (2014) split their sample in male and female primary earner couples and find that migration is increasing in the earnings of the primary earner. The next sections use quadratic and flexible functions of husband's share consistent with the theory in section 2 and investigate directly the propensity to migrate along the distribution of family types defined by relative earnings potentials.

5.2 Descriptive analysis

Figure 4 plots the mean of a family migration indicator by half percentiles of the intra-household dissimilarity in educational earnings potential and earnings. The educational earnings potential (panel A) produces less noisy predictions of the migration propensity compared to earnings prior to migration (panel B) and a clear positive correlation between the dissimilarity and migration even in the tails of husband's share.

The distribution of husband's earnings share is more compressed than the distribution of husband's share of the total educational earnings potential, implying that partners with very different educational earnings potentials have more similar earnings than their education predict. The left

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tails in panel B are particular thin, with 0.3 percent of the sample and only 17 out of the 5404 internationally migrating couples located to the left of 0.2.[24] A partner who currently receives a lower pay may face higher lifetime earnings and higher returns to migrating. Annual earnings of women aged 25-39 likely underestimates their earnings capacity due to childbearing, contributing to the thin data in the left tail of husband's earnings share. Migration in response to unemployment could also distort the picture based on earnings. The educational earnings potential is more likely pre-determined and exogenous to the migration decision.

Table 4 reports the shares of families in three categories of husband's share of the total educational earnings potential of the couple. As a percent of all families twenty four percent are in 0-0.4, forty one percent of families are in 0.4-0.6, and thirty five percent of families are in 0.6-1. When this distribution is shown by quintiles of (adjusted) family earnings we see that male educational advantages are most prevalent among the richest households, female educational advantages in the middle, and similarly (low) educated couples in the bottom.

The two rightmost columns of Table 4 report the migration rates. Migration rates are increasing in family earnings, adjusted for age, employment and children (as explained on page 12). International migration is ten times more frequent in the top quintile compared to the bottom quintile of family earnings. Family migration increase less steeply in the total educational earnings potential, perhaps because ability and motivation that influence both earnings and migration propensities are disregarded.

Table 5 shows that cross-border migrants have higher household earnings than internal migrants, and families with male educational advantage are richer than families with female educational advantage. Husband's share of the total educational earnings potential is higher in columns further to the right, by construction. Husband's share of pre-migration earnings (and adjusted earnings not shown in the table) is following the same pattern but with much less dispersion. This is because men in the 0-0.4 (0.6-1) group on average have higher (lower) residual earnings than women in this category.

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[24]The moving average is not drawn for the tails where one partner contributes more than 80 percent because of large confidence intervals.

The table also shows that women with an educational earnings advantage more often have a university educated partner than men with an educational earnings advantage. On one hand, this could disproportionately create obstacles for migration in households with a female educational advantage. On the other hand, university educated men could be more egalitarian and willing to follow the wife, creating selection of highly educated men into the category of migrating couples with female educational earnings advantage.

5.3   Tests for symmetry

This section uses simple regression models to formally test whether family migration is gender neutral or husband centered. Equation (6) relates family migration M to husband's share s of the educational earnings potential of the household and variables contained in the vector X. The calculation of husband's share is the same as the one used in panel A of Figure 4.

$$M = X'\beta_0 + \beta_1 s + \beta_2 s^2 + \varepsilon \tag{6}$$

Equation (6) includes a quadratic function of relative educational earnings potential and we expect $\beta_1 < 0$ and $\beta_2 > 0$. X contains a constant and possible confounding factors to be discussed below. The human capital model of family migration ($\delta = 1$ in the theoretical model of section 2) predicts that the vertex of the convex parabola in husband's contribution is located in $s = \frac{1}{2}$. Husband centered migration ($\delta < 1$) would imply that it is located to the left of $\frac{1}{2}$, and migration is simply an increasing function of s if the family attaches zero weight to the return of the wife ($\delta = 0$). This amounts to the following testable predictions ($\frac{-\beta_1}{2\beta_2} = \frac{1}{2} \Rightarrow \beta_1 + \beta_2 = 0$):

$$
\begin{aligned}
\text{H}_0 \quad &: \quad \beta_1 + \beta_2 = 0 \quad \text{(symmetry)} \\
\text{H}_1 \quad &: \quad \beta_1 + \beta_2 \neq 0 \quad \text{(asymmetry)} \\
\text{or} \\
\tilde{\text{H}}_1 \quad &: \quad \beta_1 + \beta_2 > 0 \quad \text{(husband centered)}
\end{aligned}
$$

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The quadratic function restricts slopes to be identical around the axis of symmetry. Alternatively, we might ask whether the migration propensities respond equally strongly to increasing male and increasing female relative advantages by allowing for different changes in migration propensities for an increase in the intra-household dissimilarity going towards higher male or higher female educational earnings advantage. I use two alternative specifications to investigate this. One allows different linear slopes at each side of $s = \frac{1}{2}$ and the most flexible specification uses indicator variables by intervals of husband's share.

Table 6 and Table 7 report parameter estimates and tests for symmetry based on equation (6). The columns represent different models with successively larger sets of controls. Model 1 is the simplest model with a quadratic function of husband's share and fixed effects by quintiles of the adjusted family earnings. The age of husband and wife and the presence of children are included in Model 2. Model 3 adds commuting region fixed effects and an indicator for proximity to parents to the list of explanatory variables. The occupational migration potential is controlled for in Model 4. The U-shape is highly significant and robust to inclusion of known predictors of family migration, for regional mobility and international migration of couples.

The F-statistic and corresponding p-value for the test of symmetry in equation (6) are reported in the bottom of Table 6 and Table 7 together with t-tests using the one-sided alternative that migration is husband centered. Internal migration is insignificantly skewed towards female advantage in Model 1, 2 and 4 (negative t-statistics) implying strong evidence in favor of gender neutral family migration if the alternative being tested is husband centered migration. The F-tests show clear evidence of gender symmetry for internal as well as international migration; the minimum never differs from $s = \frac{1}{2}$ at any conventional level of significance neither in Table 6 nor in Table 7. The positive t-statistics for international migration indicate weak, insignificant husband centered migration.

Figure 5 shows the predicted relationship between the probability of family migration and husband's share of the total educational earnings potential for each of the models in Table 6 and Table 7, fixing the influence of other control variables at their means. These graphs confirm the

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results of the formal tests: symmetry cannot be rejected against the alternative of husband centered migration, neither for internal nor for international migration. This conclusion is insensitive to successive inclusion of possible confounding factors and the U-shape is very robust. Figure 6 shows similar results using instead the specification allowing for different linear slopes at each side of $s = \frac{1}{2}$. Model 0 in Figure 5 and 6 does not control for any confounding factors, this creates a steeper U- or V-shape and a slight bias towards the husband centered migration as the households with a male advantage are known to be richer and migration is strictly increasing in (adjusted) income. The response to increased dispersion of educational earnings potentials within the household is stronger in percent of the baseline probability for international migration. Using the piecewise linear specifications, a 20 percentage points increase the relative educational earnings advantage towards the man or the women increases the probability of internal migration by 10-25 percent and the probability of emigration by 20-40, relative to the sample mean.

Figure 7 shows model predictions using a specification with indicator variables by intervals of husband's share. Overall, the U-shape prevails in these flexible specifications. Migration rates are very high for households with a clear educational earnings advantage to one of the partners, and generally decrease for smaller educational earnings differences among the partners. For households with relative similar educational earnings potentials (0.4-0.6), most specifications points towards discounting of wives' private returns to migration. It could indicate that couples adhere to the norm that "women should follow the career of the husband" when the opportunity costs (foregone earnings) are small. Alternatively, future childbearing could make it rational not to follow the woman when differences are small since the woman has shorter time to reap the return to the relocation if households foresee labor market interruptions for her.

The dip in international migration rates for a small female advantage (0.4-0.45) in all specifications (while only in two specifications for internal migration) could also suggest that discrimination in foreign labor markets makes it suboptimal for households to follow women with small relative educational earnings advantages abroad.[25] Hence, the flexible specifications lend some support to

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[25]International migration is also slightly more responsive to male than female educational advantages in the quadratic and piecewise specifications. The difference is insignificant however.

previous findings that long distance moves are husband centered while the parametric tests supported symmetry as the dominating pattern in data.

6 Conclusion

This paper provides a theoretical model relating migration propensities of couples to their relative earnings potential and shows empirical evidence that regional as well as international migration of Danish couples are consistent with a unitarian household setting in which couples are gender neutral when maximizing the gains from migrating. The finding suggests that women have become increasingly important in location decisions as their relative intra-household earnings potential has increased, which in turn can contribute to the declining gender wage gap (Frank, 1978).

The theoretical model predicts that migration is a U-shaped function of husband's share of the total earnings potential if couples attach equal weight to the returns to migration of each partner, and migration would instead be an increasing function of husband's share if couples disregard women's return. Raw correlations between family migration and the relative educational earnings potential exhibit a clear U-shape, and this pattern prevails in econometric specifications accounting for confounding factors and using different measures of husband's share.

The selection of couples where household earnings potential is disproportionately due to one partner is stronger for international migrants than internal migrants. An increase in the intra-household asymmetry from 65 to 75 percent of the total educational earnings potential increases migration between commuting zones in Denmark by 10 percent and international migration by close to 20 percent.

The finding that migration is gender neutral is not driven by a peculiarity of the Danish data; findings that migration is husband centered were replicated using specifications from the literature before proceeding to the empirical methodology of this paper. The prior literature has used education, earnings and occupation to measure the potential return to migration of husband and wife. This paper uses earnings predictions within 566 detailed education categories and argues that it

reduces concerns for selectivity bias compared to broad education categories. The approach is also less vulnerable to concerns that endogeneity may contaminate the effect because idiosyncratic earnings variation and employment choices possibly correlated with migration are eliminated from the predictions.

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Table 1: Migration rates 1985-2005

	Internal	International
Wife	1.18	0.25
Wife only	0.14	0.04
Wife first, husband later	0.03	0.00
Husband	1.15	0.30
Husband only	0.12	0.07
Husband first, wife later	0.03	0.02
Both	1.01	0.21
Joint (same location)	0.99	0.21
Observations	2623653	2623653

Notes: Migration rates are in percent. Family migration is defined as the joint migration of both partners in the same calendar year to the same destination (commuting region or country).

Figure 2: Family migration 1985-2005
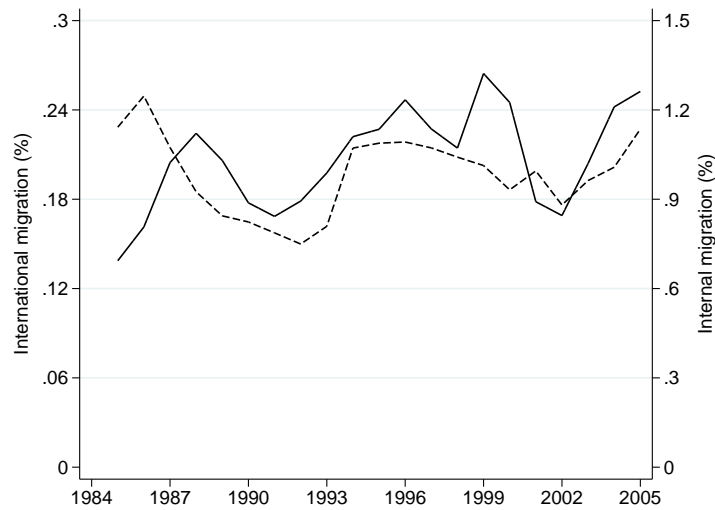
Notes: International family migration (solid line) is a couple emigrating from Denmark and internal family migration (dotted line) is a couple relocating between commuting zones in Denmark.

Figure 3: Duration abroad for international family migrants
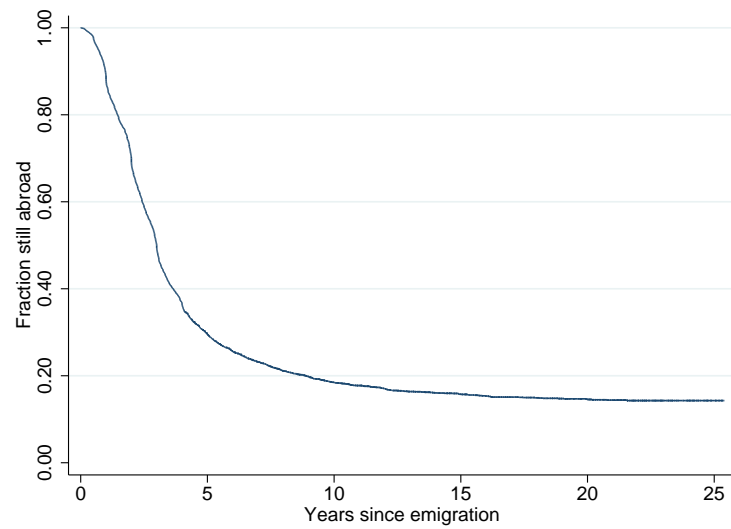
Notes: Emigrated couples who are non-censored at time t contribute to the estimate of the stay-abroad rate in period t (Kaplan-Meier survival estimate). Duration is measured as the difference between the emigration and return date of the husband.

Table 2: Education or occupation as a measure of the potential return to migration

	Internal		International	
	1	2	1	2
Husband power: only husband	1.072***	0.642***	0.652***	0.495***
has university degree	(0.041)	(0.042)	(0.025)	(0.026)
Wife power: only wife	0.802***	0.483***	0.207***	0.127***
has university degree	(0.052)	(0.053)	(0.024)	(0.025)
Both power: both partners	1.061***	0.437***	0.587***	0.399***
have university degree	(0.052)	(0.055)	(0.031)	(0.033)
Residing close to parent(s)	-1.931***	-1.866***	-0.121***	-0.106***
of at least one partner	(0.020)	(0.020)	(0.007)	(0.007)
Husband's occupational mobility		52.621***		30.045***
		(1.633)		(1.218)
Wife's occupational mobility		33.928***		10.011***
		(1.939)		(1.848)
Constant	2.926***	1.000***	0.363***	0.138***
	(0.032)	(0.056)	(0.012)	(0.015)
Family characteristics	Yes	Yes	Yes	Yes
Commuting region FEs	Yes	Yes	Yes	Yes
Observations	2623653	2623653	2623653	2623653
P-values from *F*-tests				
Husband power = Wife power	0.000	0.016	0.000	0.000
Both power = Husband power	0.867	0.002	0.098	0.016
Both power = Wife power	0.000	0.529	0.000	0.000

Notes: * p<0.05, ** p<0.01, *** p<0.001. Coefficients and standard errors (in parentheses) are scaled by a factor 100. Standard errors are adjusted for clustering on household identifier. Family characteristics are FEs by five year intervals of husband's age and of wife's age as well as indicators for the presence of children by age groups (1-2, 3-6 and 7-17 years old). Occupational mobility is the gender-specific average mobility rate of the occupation across commuting regions in Denmark (internal migration) or out of Denmark (international migration). *P*-values from *F*-tests of equal coefficients similar to the tests in Compton and Pollak (2007) are reported below each regression.

Table 3: Earnings and the functional form of the potential return to migration

	Earnings		Educational earnings potential	
	Internal	International	Internal	International
Husband's (log)	0.278***	0.320***	0.073***	0.052***
	(0.022)	(0.011)	(0.009)	(0.004)
Wife's (log)	-0.034	0.010	0.042***	0.052***
	(0.017)	(0.008)	(0.013)	(0.006)
P-value (H_0: symmetry)	[0.000]	[0.000]	[0.054]	[0.944]
Husband's share	0.247***	0.434***	0.117**	0.053**
	(0.066)	(0.030)	(0.038)	(0.018)
Controls	Yes	Yes	Yes	Yes
Observations	2623653	2623653	2623653	2623653

Notes: * p<0.05, ** p<0.01, *** p<0.001. Coefficients and standard errors (in parentheses) are scaled by a factor 100. Standard errors are adjusted for clustering on household identifier. P-values from F-tests of equal coefficients are reported in square brackets. Columns and space between rows indicate a separate regression. All regressions include FEs by five year intervals of husband's age and of wife's age, indicators for the presence of children by age groups (1-2, 3-6 and 7-17 years old), commuting region FEs, indicator for residence close to parents, occupational mobility of husband and of wife and a constant. Regressions with husband's share also include quintiles of adjusted family earnings.

Table 4: Family earnings, relative educational earnings potential and migration

	Husband's share			Migration	
	0-0.4	0.4-0.6	0.6-1	Internal	International
1st quintile	17.46	54.40	28.14	0.60	0.06
2nd quintile	23.89	48.07	28.04	0.69	0.07
3rd quintile	27.11	42.50	30.40	0.85	0.11
4th quintile	26.71	35.60	37.68	1.16	0.21
5th quintile	24.57	26.39	49.04	1.63	0.59
All	23.95	41.39	34.66	0.99	0.21
Observations	628330	1085948	909375	2623653	2623653

Notes: Each row of the table shows distribution according to husband's share of the total educational earnings potential and family migration rates. The rows are quintiles of family earnings adjusted for age, employment and small children. All table entries are in percent.

Figure 4: Family migration, earnings and the educational earnings potential

<div align="center">Internal   International</div>

Panel A: Educational earnings potential

Panel B: Earnings
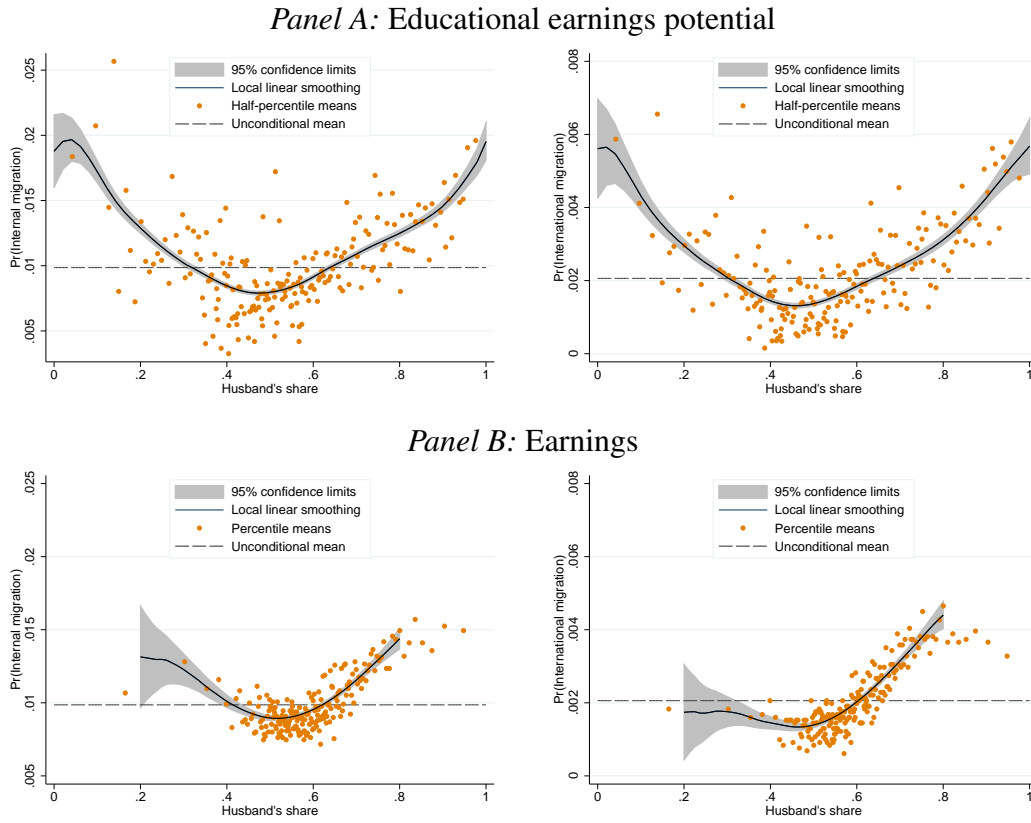
Notes: Weighting function: Epanechnikov kernel. Width of smoothing: 0.15. Dots are means of the family migration indicator for each half percentile of husband's share. Husband's share is $s = \frac{Y_h^{educ}}{Y_h^{educ} + Y_w^{educ}}$ (Panel A) or $s = \frac{Y_h}{Y_h + Y_w}$ (Panel B).

Table 5: Family migrants' characteristics and relative educational earnings potential

	Husband's share					
	0-0.4		0.4-0.6	0.6-1	
	All					
Family earnings	67.86	***	63.02	70.47	***
Husband's share of actual earnings	0.57	***	0.59	0.61	***
Husband's share of educational earnings potential	0.30	***	0.50	0.75	***
Husband power: only husband has university degree	0.06	***	0.03	0.08	***
Wife power: only wife has university degree	0.04	***	0.02	0.03	***
Both power: both partners have university degree	0.04	***	0.02	0.04	***
Observations	628330		1085948	909375	
	Internal migration					
Family earnings	69.69	***	65.11	70.85	***
Husband's share of actual earnings	0.58	***	0.60	0.62	***
Husband's share of educational earnings potential	0.28	***	0.50	0.77	***
Husband power: only husband has university degree	0.16	***	0.06	0.12	***
Wife power: only wife has university degree	0.06	***	0.04	0.05	**
Both power: both partners have university degree	0.09	***	0.06	0.07	**
Observations	6812		8270	10791	
	International migration					
Family earnings	82.29		80.88	86.83	***
Husband's share of actual earnings	0.60	***	0.62	0.64	***
Husband's share of educational earnings potential	0.26	***	0.51	0.78	***
Husband power: only husband has university degree	0.28	***	0.15	0.22	***
Wife power: only wife has university degree	0.06		0.05	0.05	
Both power: both partners have university degree	0.14		0.12	0.12	
Observations	1406		1361	2637	

Notes: Each row of the table is the variable mean by intervals of husband's share of the total educational earnings potential. Significance levels (* $p<0.05$, ** $p<0.01$, *** $p<0.001$) of a t-test of the difference in means (allowing for unequal variances) between the middle group and the tails of husband's share are reported next to the mean for the respective primary-earner type. Family earnings are in 1000 Euro (2000 prices).

Table 6: Linear probability model of internal family migration

	Model 1	Model 2	Model 3	Model 4
Husband's share	-2.947***	-3.113***	-1.940***	-1.358***
	(0.183)	(0.183)	(0.178)	(0.179)
Husband's share (squared)	2.907***	3.053***	1.981***	1.355***
	(0.163)	(0.163)	(0.159)	(0.161)
2nd quintile	0.076***	0.013	0.200***	0.161***
	(0.016)	(0.017)	(0.017)	(0.017)
3rd quintile	0.214***	0.113***	0.371***	0.293***
	(0.018)	(0.018)	(0.018)	(0.018)
4th quintile	0.499***	0.367***	0.649***	0.495***
	(0.019)	(0.020)	(0.020)	(0.020)
5th quintile	0.919***	0.754***	1.051***	0.720***
	(0.023)	(0.023)	(0.024)	(0.026)
Residing close to parent(s)			-1.973***	-1.901***
of at least one partner			(0.020)	(0.020)
Husband's occupational mobility				44.170***
				(1.699)
Wife's occupational mobility				29.546***
				(1.920)
Constant	1.278***	2.006***	2.853***	1.221***
	(0.051)	(0.056)	(0.059)	(0.077)
Family characteristics	No	Yes	Yes	Yes
Commuting region FEs	No	No	Yes	Yes
Observations	2623653	2623653	2623653	2623653
F-statistic	0.9	2.1	1.0	0.0
P-value (H$_0$: symmetry)	0.337	0.144	0.318	0.935
t-statistic	-0.960	-1.463	0.998	-0.082
P-value ($\tilde{H}_1$: husband-centered)	0.831	0.928	0.159	0.533

Notes: * p<0.05, ** p<0.01, *** p<0.001. Coefficients and standard errors (in parentheses) are scaled by a factor 100. Standard errors are adjusted for clustering on household identifier. Family characteristics are FEs by five year intervals of husband's age and of wife's age as well as indicators for the presence of children by age groups (1-2, 3-6 and 7-17 years old). Occupational mobility is the gender-specific average emigration rate of the occupation.

Table 7: Linear probability model of international family migration

|	Model 1	Model 2	Model 3	Model 4
Husband's share	-0.828***	-0.813***	-0.754***	-0.573***
	(0.087)	(0.087)	(0.088)	(0.088)
Husband's share (squared)	0.855***	0.840***	0.783***	0.574***
	(0.078)	(0.079)	(0.079)	(0.079)
2nd quintile	0.007	0.002	0.006	-0.005
	(0.005)	(0.005)	(0.005)	(0.005)
3rd quintile	0.041***	0.032***	0.033***	0.007
	(0.006)	(0.006)	(0.006)	(0.006)
4th quintile	0.129***	0.117***	0.110***	0.054***
	(0.007)	(0.007)	(0.008)	(0.008)
5th quintile	0.492***	0.473***	0.450***	0.328***
	(0.011)	(0.011)	(0.011)	(0.012)
Residing close to parent(s)			-0.142***	-0.121***
of at least one partner			(0.008)	(0.007)
Husband's occupational mobility				29.887***
				(1.249)
Wife's occupational mobility				7.492***
				(1.895)
Constant	0.238***	0.247***	0.402***	0.201***
	(0.024)	(0.026)	(0.027)	(0.029)
Family characteristics	No	Yes	Yes	Yes
Commuting region FEs	No	No	Yes	Yes
Observations	2623653	2623653	2623653	2623653
F-statistic	2.0	2.1	2.4	0.0
P-value (H_0: symmetry)	0.154	0.147	0.121	0.964
t-statistic	1.425	1.452	1.552	0.045
P-value ($\tilde{H}_1$: husband-centered)	0.077	0.073	0.060	0.482

Notes: * p<0.05, ** p<0.01, *** p<0.001. Coefficients and standard errors (in parentheses) are scaled by a factor 100. Standard errors are adjusted for clustering on household identifier. Family characteristics are FEs by five year intervals of husband's age and of wife's age as well as indicators for the presence of children by age groups (1-2, 3-6 and 7-17 years old). Occupational mobility is the gender-specific average emigration rate of the occupation.

Figure 5: Predicted family migration rate, quadratic specification
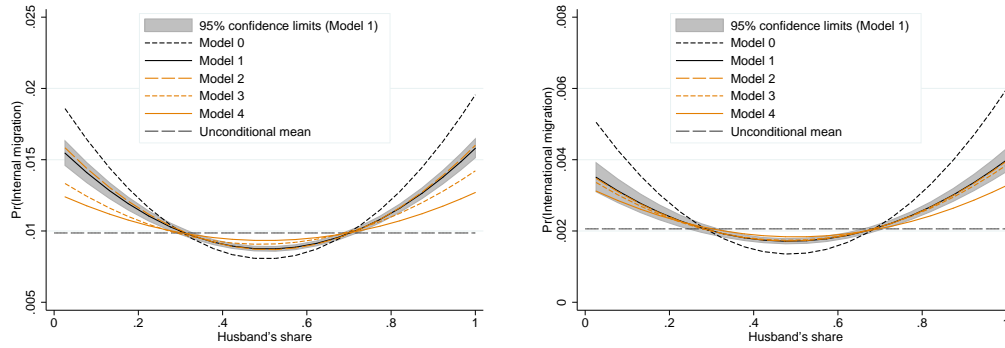
Notes: Each graph plots the predicted migration rate against husband's share fixing the influence of other control variables at their means. Model 0 contains only a quadratic function of husband's share. Model 1-4 sequentially include additional control variables correponding to the models listed in Table 6 and Table 7.

Figure 6: Predicted family migration rate, piecewise linear specification
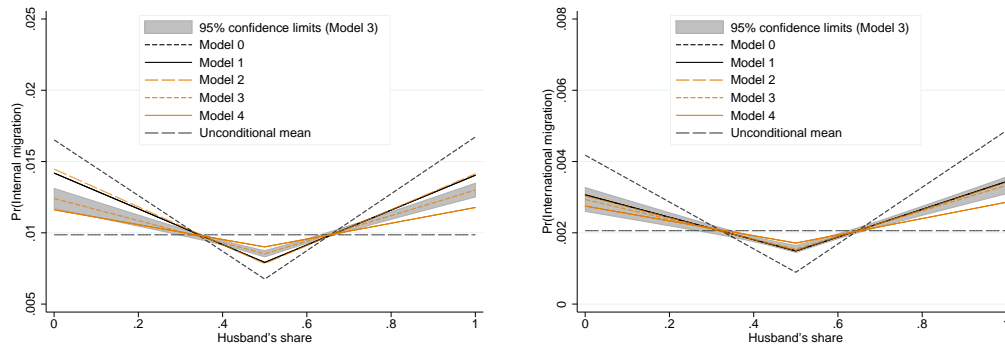
Notes: Each graph plots the predicted migration rate against husband's share fixing the influence of other control variables at their means. Model 0 contains only a piecewise linear function of husband's share. Model 1-4 sequentially include additional control variables correponding to the models listed in Table 6 and Table 7.

Figure 7: Predicted family migration rate, flexible specification
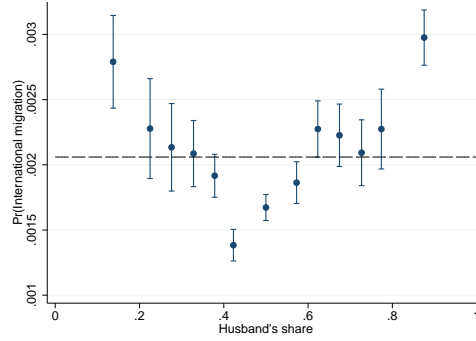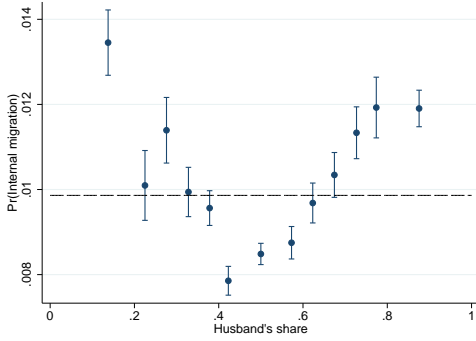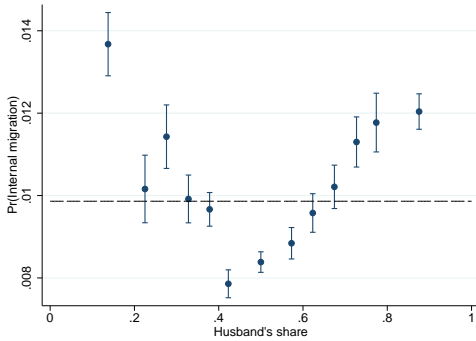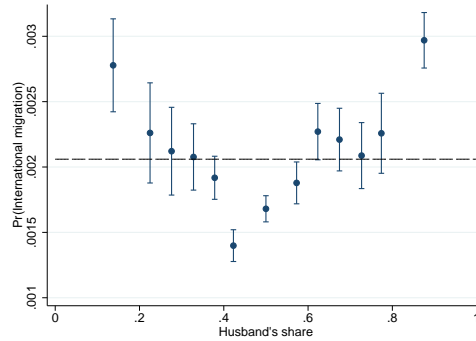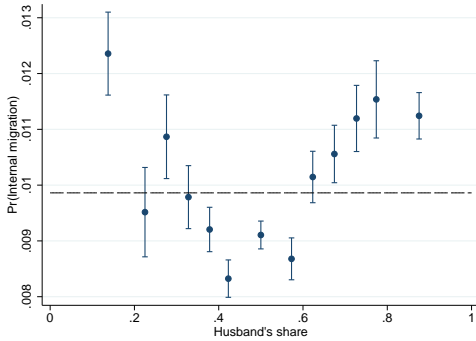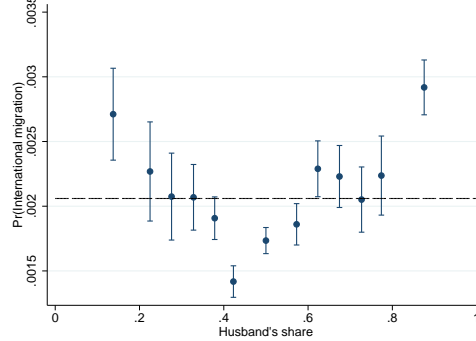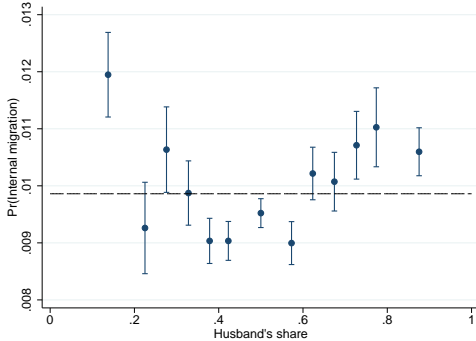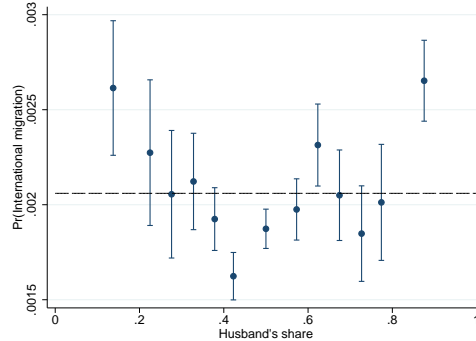
Notes: Each graph plots the predicted migration rate and 95% confidence limits against husband's share fixing the influence of other control variables at their means. Model 1-4 include indicator variables by intervals of husband's share and control variables correponding to the models listed in Table 6 and Table 7.

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Appendix A

A.1   Sample selection

The starting point is all individuals aged 18-65 in the Danish registers in year 1984 to 2006. A major reform of the Danish municipalities implemented December 31, 2006 means that I cannot consistently define commuting areas based on information on municipality of residence after that. I define internal migration using information on the municipality of residence of the individual in year t and $t + 1$ and eliminate 2006 from the panel afterwards such that migrants are defined for every year. International migration is defined in year t as an emigration from Denmark in year $t + 1$, using information from the Migration Register. 1984 will be deleted later in the sample selection process as I also require lagged values of some variables for my analysis. The final sample, therefore, contains the 21 years from 1985 to 2005. Each of the sample reducing-choices are explained below starting from the 1984-2005 panel with basic variable definitions.

The restrictions imposed going from panel A to panel B in Table A.1 ensure that individuals only enter the panel when they have left the education system.[1] This step reduces the population of singles by 33 percent and the population with a partner by 11 percent. Migration rates are considerably lower without the students.

68 percent of the 18-65 year old nonstudents are wage earners and observed at least two years. The restriction to wage earners (panel C) with at least two years of data (panel D) barely affects the overall migration rates. I now construct my earnings measures on the subsample aged 24 to 39 with at least two years of data before reducing my sample further. That way I have two years of earnings information (t and $t - 1$) even for a 25 year old worker in my analysis sample of 25 to 39 year old workers.[2]

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[1]I eliminate individual-year observations prior to and including the year the individual obtains his/her highest completed education. Individuals who are still enrolled in an education that they may not complete are dropped using information on state study grants that Danish residents above the age of 18 are eligible for.

[2]Compton and Pollak (2007) use the same age restriction on husbands to study location decisions of college educated couples in the US. Their age restriction for wives is shiftet down by two years relative to men. I did not do this since the age-difference between partners has been declining over time (ending at a one year age-difference) and it could impose an asymmetry in the couple sample towards more couples with an older man.

Migration rates are generally higher among the 25-39 year old workers who enter the sample in panel E from the second year I observe them as wage earners.[3] This step excludes the first observation for each individual and effectively eliminates 1984 from the analysis sample. Higher migration among the young is consistent with the human capital model of migration - and earlier empirical findings - predicting that individuals migrate early in their career in order to reap the full return to their investment.

Non-Danish born are eliminated in panel F to exclude international migration that is driven by the return migration of one or both partners. Moreover, information on the education of immigrants is not accurate in register data since the primary source of information is automatic reporting by Danish education institutions. For those with a partner, panel G and H now use information on the partner to determine whether *both* partners are prime-age workers and Danish born. Both partners are Danish born in 96 percent of the prime-age, dual-earner couples. Finally, I exclude a few same sex couples from the analysis as it is unclear how the hypothesis tested in the paper apply to them (panel I).

Cohabitation is widespread in Denmark. 69 percent of the couples in panel I are married and 95 percent have been together two years or more when observed, I refer to the latter group as "same partner (as the year before)" in Table A.1. The latter group is my unit of analysis. Hence, couples enter the analysis sample from their second year together and I have 2,623,653 couples (5,247,306 individuals) in the sample. Compton and Pollak (2007), whose main findings I replicate in section 5.1, use married plus unmarried who have been together at least one year.

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[3]Results including observations with no lag earnings are similar to those reported in the paper and available online together with other robustness checks of the specifications shown in the paper.

Table A.1: Migration rates, population size and sample restrictions

	Internal	International	Observations
Panel A: 18-65 years old			
Single	4.77	1.06	25075
New partner	4.53	1.29	3541
Same partner	1.13	0.29	45137
Panel B: Completed education			
Single	2.93	0.65	16751
New partner	3.67	0.88	2348
Same partner	0.94	0.22	40898
Panel C: Wage earner			
Single	3.01	0.67	10236
New partner	3.28	0.77	1693
Same partner	0.93	0.23	28916
Panel D: At least two years of data			
Single	3.01	0.67	10229
New partner	3.28	0.76	1691
Same partner	0.93	0.23	28912
Panel E: 25-39 years old			
Single	3.34	0.78	3437
New partner	3.06	0.65	739
Same partner	1.34	0.34	9682
Panel F: Danish born			
Single	3.36	0.71	3326
New partner	3.08	0.60	714
Same partner	1.35	0.31	9359
Panel G: Both partners meet restriction A-E			
New partner	2.57	0.52	299
Same partner	1.16	0.31	5462
Panel H: Both partners meet restriction A-F			
New partner	2.58	0.48	288
Same partner	1.17	0.28	5250
Panel I: Partner is opposite sex			
New partner	2.58	0.48	287
Same partner	1.16	0.28	5247

Notes: Migration rates are in percent and observations in thousand. Each panel (A-I) gradually imposes additional restrictions on the population. The rows within each panel split the sample into singles, those having a new partner, and those having the same partner as the year before.

Figure A.1 shows migration rates over time for each of the samples in panel A-I in Table A.1 of Appendix A.1 in the paper, grouping singles and individuals with a new partner together (grey lines) as these two groups have relative similar migration rates and they are not our primary interest. I do not show sample H to save space; the graphs are indistinguishable from those based on sample I due to the small number of same-sex couples. Panel A-F include all individuals while panel G and H show migration rates over time for individuals with a partner only. Migration rates are generally lower among individuals who have been with their partner two years or more (black lines).

Panel A and B confirm the finding from Appendix A.1 that migration rates are lower once students are excluded from the sample. International migration rates (the solid lines) drop less in the last years of the panel and look slightly procyclical with relative little emigration during the high unemployment in the 1990s. A similar pattern preveals among the wage earners (with at least two years of data / two years in the Danish labor market) in panel C-D. The trend in international mobility has flattened compared to panel A.

Panel E of Figure A.1 shows a bit of an upward trend for international migration among the young, and it is the same when restricting to those with a partner in panel G. Some of the upward trend seems to be driven by outmigration of foreign born since the trend flattens again when the restriction to Danish born is imposed in panel F and H-I.

The median duration abroad for emigrants from Denmark is 2-3 years. Figure A.2 has the same structure as Figure A.1 but plots instead the fraction still abroad against time since emigration measured as the exact difference between the reported emigration date and return date. Less than 20 percent of the couples who emigrate from Denmark (panel G and I) are still abroad after 25 years. Singles generally have lower return rates, the exception being singles who emigrate the year they complete their studies or earlier (included in panel A but excluded from panel B onwards).

Figure A.1: Migration 1984-2005
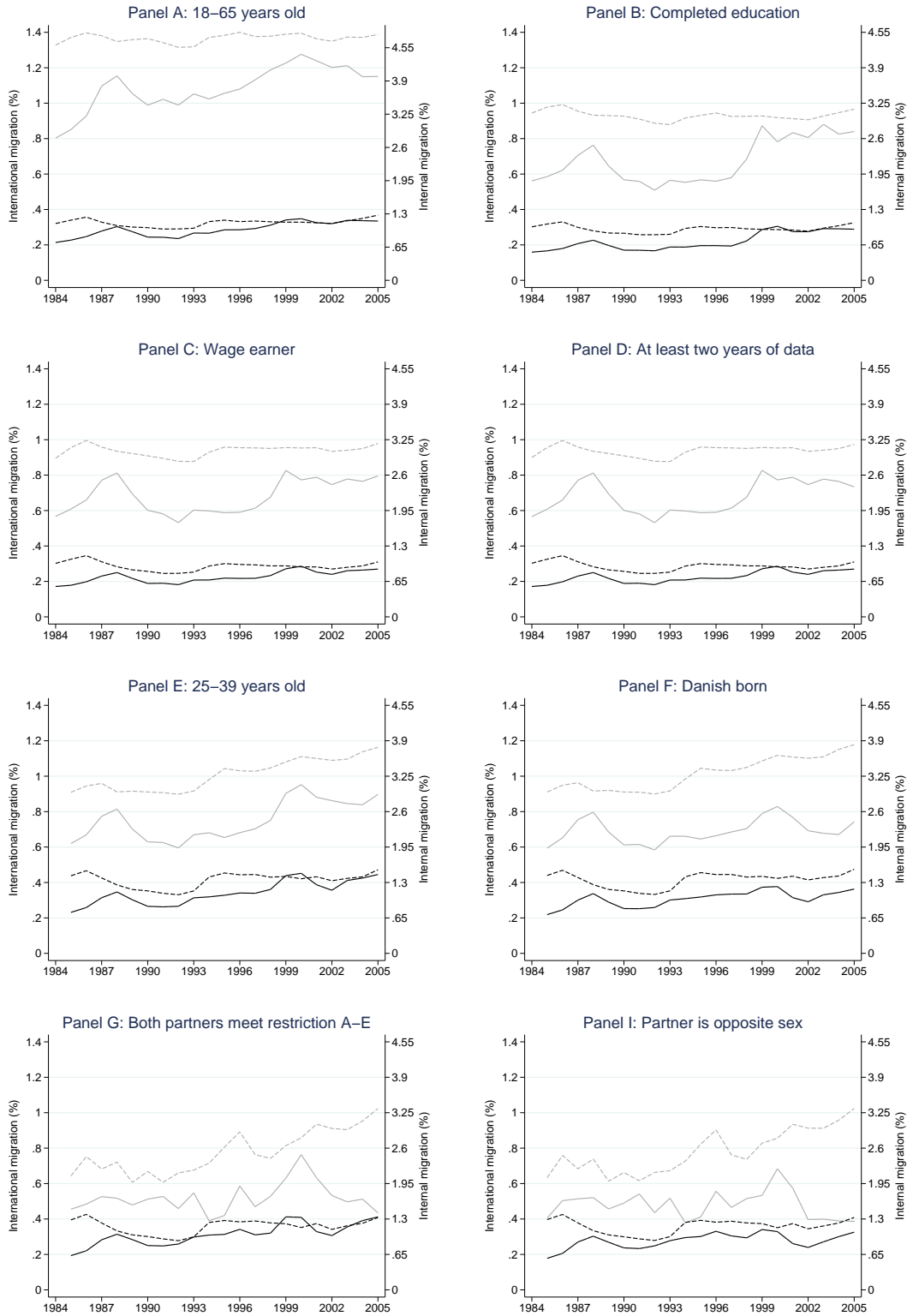
Notes: Each panel shows emigration from Denmark (solid lines) and relocation between commuting zones in Denmark (dotted lines) for singles and individuals with a new partner (grey lines) and individuals who have been with their partner two years or more (black lines). 1984 is not in panel E-I as these panels only contain observations with lagged values.

Figure A.2: Duration abroad for international migrants

Panel A: 18-65 years old

Panel B: Completed education

Panel C: Wage earner

Panel D: At least two years of data

Panel E: 25-39 years old

Panel F: Danish born

Panel G: Both partners meet restriction A-E

Panel I: Partner is opposite sex
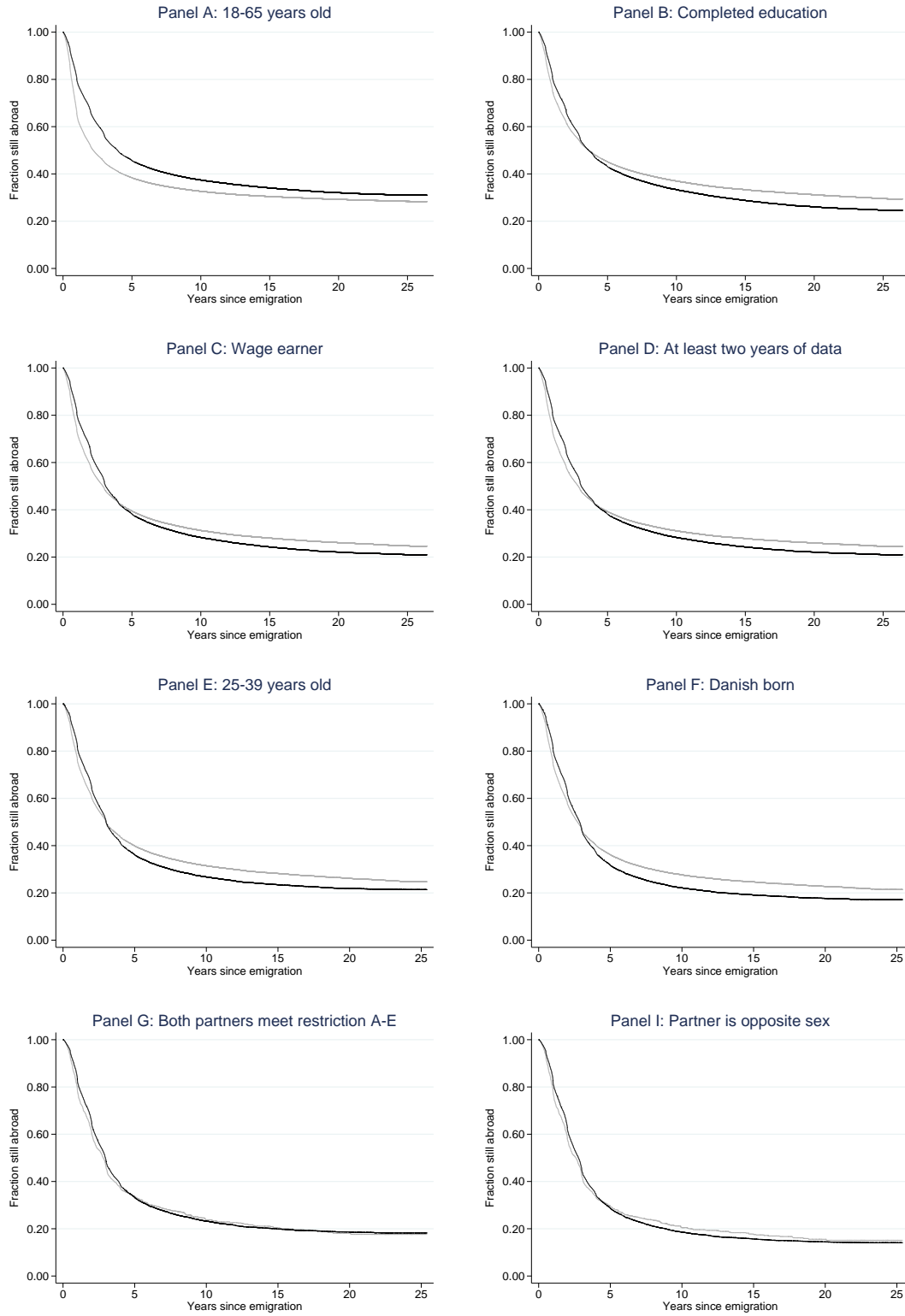
Notes: Each panel shows singles and/or individuals with a new partner (grey lines) and individuals who have been with their partner two years or more (black lines). Emigrants who are non-censored at time t contribute to the estimate of the stay-abroad rate at time t (Kaplan-Meier survival estimate). Duration on the x-axis is the difference between the emigration date and return date.

A.2 Detailed education data

The detailed education data contain some very rare education categories. I therefore construct an algorithm that identifies education categories smaller than 200 individual-year observations, according to the 8-digit Danish classification of education.

1. Small education categories (< 200) are *either* collapsed to the 6-digit education group (4-digit in second round) if that education group has less than 2000 observations or only 2 education categories,

2. *or* combined with other education categories smaller than 2000 observations within the 6-digit education group (4-digit in second round).

3. If the combined education is still less than 200 individual-year observations and there is only one other education within the 6-digit education group (4-digit in second round) then they are combined.

This procedure leaves a few small 4-digit education categories after the two iterations. They were manually examined and then combined with the most related 4-digit category if possible.[4] I combine PhDs in Pedagogy, Humanities and Theology ("Humanistisk, teologisk og pædagogisk) and five rare Bachelor programmes are put into two groups related to health and technology/science ("Sundhed, levnedsmiddel og ernæring" and 'Teknisk og naturvidenskabelig"), respectively. Two high school programmes for students with special needs were also combined ("Studenterkurser og adgangskurser"). The final list of education categories is shown in Table A.2.

Educations that have been combined using the algorithm have the label of the category in the next level of the classification system if all educations within that category have been combined or the label of the category in the next level followed by the Danish word "iøvrigt" ("other" in English) if only a subset within the category have been combined.

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[4]I did not want to aggregate to the next level of the classification system (2-digit) which is the nine major education categories of the Danish classification system.

It is rare to end with a Bachelor degree in Denmark. Hence, many Bachelor programmes have been combined by the algorithm (e.g. within the social sciences, "Samfundsvidenskabelig, iøvrigt") while we have more Master programmes in the final list of educations shown below in Table A.2. The first column lists the nine major education categories of the Danish classification system, the second column lists the educations used to calculate the educational earnings potential and the third row shows the number of observations at this step (between sample D and E as described in Appendix A.1). Unfortunately, the education titles from the Danish classification of educations in the second row are all in Danish but should still give the reader a sense of the level of detail in the education data. I translated the nine major categories in the classification system into English.

Table A.2: Educations

Major education category	Education (in Danish)	Observations
Primary school (Subtotal=3939656)	Ingen uddannelse Indv.udd.	1730
	1-6 år Indv.udd.	34097
	6. klasse	1566
	7-8 år Indv.udd.	25456
	9-10 år Indv.udd.	45705
	7. klasse	554495
	8. klasse	325143
	1. real	7211
	8. klasse, efterskole	5660
	9. klasse	989526
	2. real	29077
	9. klasse, efterskole	46359
	10. klasse	1196355
	3. real	473347
	10. klasse, efterskole	203929
General upper secondary (Subtotal=586768)	Gymnasiet	421646
	HF	139018
	Studenterkurser og adgangskurser	26104
Vocational upper secondary (Subtotal=332521)	Adgangseksamen - ingeniøruddannelsen	3826
	Hhx højere handelseksamen 1-årig	93929
	Hhx højere handelseksamen	227601
	Htx højere teknisk eksamen	7165
Vocational education	Pædagogisk	4450

Education category	Education (in Danish)	Observations
and training	Generelt	36138
(Subtotal=7582229)	Grafisk, iøvrigt	1931
	Keramik og porcelæn	1975
	Glas	545
	Anden service	401
	Tjener mv.	49076
	Bøger	28597
	Papir	5313
	Foto	16352
	Isenkram, værktøj	16534
	Isenkram, glas og porcelæn	63949
	Sport og camping	26027
	Guld og sølv	13645
	Tv og radio	35635
	Kolonial (detailhandel)	316348
	Viktualie	8629
	Farve og tapet	24510
	Materialist	21577
	Blomster	17771
	Sæbe og parfume	8956
	Sko og læder	43965
	Tekstil	154834
	Møbler og boligudstyr	21405
	El-installation	5498
	Legetøj og hobby	7781
	Vin og tobak	3364
	Hårde hvidevarer	3344
	Byggemarked	9797
	Dameekvipering	20326
	Herreekvipering	33240
	Kædebutik	4353
	Salgsassistent	187481
	Detailhandel, iøvrigt	5434
	Dekoratør	10720
	Korn og foderstof	8335
	Kolonial (engroshandel)	3340
	Manufaktur	6574
	Trælast	23486
	Værktøj og maskiner	9531
	Jern og stål	16208
	Automobiler og reservedele	52395
	Landbrugsmaskiner	8107

Education category	Education (in Danish)	Observations
	Vvs branchen	2454
	Isenkram	3701
	Engroshandel med detail	90262
	Engroshandel med kontor	13125
	Engroshandel, iøvrigt	1057
	Kontor all round	1087534
	Kontor, regnskab og revision	52955
	Kontor, korrespondance	7852
	Kontor, rejsebranche	11819
	Spedition og shipping	51791
	Kontor, kommune og amtskommune	109475
	Kontor, stat	22950
	Kontor, administration	16371
	Lægesekretær	45184
	Advokatsekretær	6102
	Informatikassistent	18087
	Postelev	7561
	Teleelev	2570
	Kontor generelt, iøvrigt	1424
	Toldfunktionær mv.	10780
	Bank	336427
	Forsikring	21726
	Finans, iøvrigt	649
	Edb-assistent	76238
	Bygge/anlæg Indv.udd. erhvervsfaglig	11581
	Murer	116911
	Brolægger	3570
	Brolægger mv., iøvrigt	3618
	Stenhugger	1214
	Tømrer	275221
	Tømrer mv., iøvrigt	1975
	Bygningssnedker	74410
	Møbelsnedker	31288
	Maskinsnedker	28019
	Snedker mv., iøvrigt	2986
	Vvs-/tag-/facademontør	90741
	Rustfast industriblikkenslager	18105
	Vvs-montør	3050
	Vvs- og energimontør	3973
	Gas- og vvs-teknik, iøvrigt	1635
	Bygningsmaler	94301
	Skiltetekniker	4611

Education category	Education (in Danish)	Observations
	Vognmaler	31745
	Elektriker, installationsteknik	266594
	Elektriker, styrings- og reguleringsteknik	13006
	Elektriker, iøvrigt	714
	Glarmester	12170
	Skorstensfejer	9067
	Bygge og anlæg i øvrigt, iøvrigt	275
	Jern/metal Indv.udd. erhvervsfaglig	15319
	Vvs-rørsmed	42874
	Industriel rørsmed	2047
	Plade- og konstruktionssmed	23801
	Skibsbygger	12623
	Grovsmed	17620
	Skibsmontør	12776
	Bygnings- og landbrugssmed	46901
	Klejnsmed	188976
	Klejnsmed, rustfast	5444
	Svejser	4428
	Karrosserismed	33889
	Karetmager og karrosseribygger	8098
	Smedeuddannelser, iøvrigt	2724
	Guldsmed	4099
	ædelsmed, iøvrigt	415
	Bådebygger, træ	2404
	Træskibstømrer	5613
	Skibstømrer mv., iøvrigt	1675
	Maskinarbejder	276709
	Skruestikarbejder	4445
	Værktøjstekniker	24662
	Værktøjsmager	14195
	Køletekniker	3572
	Industrioperatør	3085
	Maskinarbejder mv., iøvrigt	4967
	Automekaniker	412513
	Autoelektromekaniker	13611
	Cykelmekaniker	3420
	Motorcykelmekaniker	2211
	Flymekaniker	6224
	Lastvognsmekaniker	57285
	Landbrugsmaskinmekaniker	50304
	Traktormekaniker	16346
	Finmekaniker	15398

Education category	Education (in Danish)	Observations
	Mekaniker, iøvrigt	4261
	Radio- og tv fagtekniker	46007
	Kontorservicetekniker	5745
	Elektronikfagtekniker	63516
	Stærkstrømsmekaniker	2831
	Elektronik, iøvrigt	753
	Automatiktekniker	15658
	Elektrotekniker	21912
	Datatekniker	4893
	Automatik- og datamekaniker, iøvrigt	681
	Plastmager	2573
	Plast og proces, iøvrigt	1992
	Typotekniker	36328
	Grafiker, layout og montage	2599
	Litograf	12515
	Reprofotograf	5612
	Reprokopist	6010
	Grafiker, iøvrigt	372
	Grafisk tekniker	14724
	Tryktekniker	20878
	Håndbogbinder	9361
	Serigraf	2649
	Grafisk i øvrigt, iøvrigt	386
	Fotograf	7385
	Pressefotograf	1507
	Teknik/industri iøvr. Indv.udd. erhvervsfagl.	27317
	Teknisk tegner	47671
	Teknisk designer, industriel produktion	67706
	Teknisk designer, bygge og anlæg	45242
	Assistent indenfor teknik, iøvrigt	250
	Beklædningsoperatør	4208
	Skrædder	12962
	Serviceskomager	2281
	Beklædning, iøvrigt	4954
	Konfektionsassistent	4605
	Møbelpolstrer	2117
	Tekstil, iøvrigt	4860
	Service Indv.udd. erhvervsfaglig	20268
	Urmager	4131
	Frisør	93116
	Kosmetiker	323
	Optometrist	14421

Education category	Education (in Danish)	Observations
	Laboratorietandtekniker, fast protetik	5720
	Sundhedshjælpemidler, iøvrigt	1281
	Levnedsmid./hush. Indv.udd. erhvervsfaglig	8494
	Mejerist	13698
	Butiksslagter	70908
	Pølsemager	13392
	Industripølsemager	2509
	Slagter, privat mester	4929
	Bacontilvirker	2030
	Svineslagter	19324
	Kreaturslagter	2593
	Tarmrenser	9622
	Slagter mv., iøvrigt	1539
	Bager	91067
	Konditor	6445
	Bager mv., iøvrigt	424
	Ernæringsassistent	62934
	Ernærings- og serviceassistent mv., iøvrigt	3129
	Kok	88745
	Skibskok, afslutningskursus	10657
	Smørrebrødsjomfru	10901
	Kok mv., iøvrigt	171
	Køkkenleder 2	26541
	Levnedsmiddel og husholdning i øvrigt	1366
	Jordbrug/fiskeri Indv.udd. erhvervsfaglig	6124
	Veterinærsygeplejerske	1239
	Dyrepasser u.n.a.	5055
	Dyrepasser og landbrug i øvrigt, iøvrigt	2392
	Landmand faglært modul 2	33350
	Landbrug driftslederkursus, saml.fagl.tekn.	19277
	Driftslederkursus udvidet 5 mdr.	14187
	Driftsleder grønt diplom/bevis	64896
	Landmand, efteruddannelse	3517
	Landbrugskurser, andre	3329
	Agrarøkonom	4098
	Landmand efteruddannelse, iøvrigt	131
	Væksthusgartner	44913
	Planteskolegartner	6269
	Anlægsgartner, anlægsteknik	11687
	Gartneri, iøvrigt	2682
	Gartnerskolekursus, væksthus	4600
	Gartner efteruddannelse, iøvrigt	4741

Education category	Education (in Danish)	Observations
	Skovbruger	4868
	Skovbrug, iøvrigt	719
	Herregårdsskytte	760
	Skovbrug, efteruddannelse	264
	Kyst-, fiske- og sætteskipper	8307
	Fiskeri, iøvrigt	314
	Transport mv. Indv.udd. erhvervsfaglig	6523
	Skibsassistent befaren, modul 3	3986
	Maskinist	5075
	Matros befaren, afslutningskursus	4240
	Motormand befaren, afslutningskursus	609
	Søfartsskole u.n.a.	600
	Radiotelegrafist	3794
	Kommunikationsoperatør, søværnet	745
	Chauffør, all round	2061
	Eksportchauffør	2834
	Redder	5480
	Chauffør og redder, iøvrigt	5444
	Lager- og transportoperatør	10090
	Transport og lager i øvrigt, iøvrigt	3557
	Social/sundhed Indv.udd. erhvervsfaglig	3810
	Social- og sundhedshjælper	100875
	Sygehjælper	135572
	Beskæftigelsesvejleder	10337
	Plejehjemsassistent	22583
	Plejer	16814
	Barneplejerske	7827
	Social- og sundhedsassistent	54457
	Tandklinikassistent	34160
	Klinisk tandtekniker	1213
	Defektrice	5085
	Audiologiassistent	954
	Neurofysiologiassistent	245
	Fodterapeut	2117
Short higher education	Pædagogisk	93
(Subtotal=843188)	Kunstnerisk, iøvrigt	319
	Samfundsfaglig, iøvrigt	2931
	Teknisk, iøvrigt	970
	Jordbrug og fiskeri, iøvrigt	1667
	Logistik	1198
	Formidl./erhv.sprog Indv.udd. kort vidg.	5115
	Multimediedesigner, iøvrigt	3802

Education category	Education (in Danish)	Observations
	Erhv.sproglig korrespondent, engelsk	43794
	Erhv.sproglig korrespondent, fransk	4826
	Erhv.sproglig korrespondent, tysk	4422
	1 sprog, iøvrigt	2872
	Tresproglig korrespondent	5911
	Korrespondent	2109
	Erhv.sproglig grundstudium, engelsk-tysk	2447
	Flere sprog, iøvrigt	1540
	Kunstnerisk Indv.udd. kort vidg.	2951
	Ejendomsmægler	6200
	Markedsøkonom	22008
	Akademiøkonom, eksport	4189
	Akademiøkonom, international markedsføring	3077
	Markedsføringsøkonomi, iøvrigt	5698
	Akademiøkonom, detailhandel	5757
	Akademiøkonom, international handel	3057
	Akademiøkonom, udenrigshandel	3608
	Eksporttekniker	5506
	Handelsøkonomi, iøvrigt	4341
	Finansiel videreuddannelse	4799
	Finansøkonomi, iøvrigt	671
	Datamatiker	30706
	IT, iøvrigt	1293
	Merkonom, markedsføring	9463
	Merkonom, regnskabsvæsen	8391
	Merkonom, personaleudvikling	2149
	Merkonom, økonomistyring	4263
	Merkonom, iøvrigt	13135
	Akademiøkonom, turisme	2470
	Serviceøkonomi, iøvrigt	2037
	Teknisk Indv.udd. kort vidg.	5060
	Maskintekniker u.n.a.	5486
	Maskintekniker, værktøjskonstruktion	5046
	Maskintekniker, konstruktion	35167
	Maskintekniker, driftsteknik	20475
	Kvalitets- og måletekniker	2864
	Trætekniker	4670
	Produktionsteknologi, iøvrigt	1880
	El-installatør	52332
	Installatør, stærkstrøm	7499
	Installatør, vvs	8319
	Gas- vand- og sanitetsmester	4219

Education category	Education (in Danish)	Observations
	Installationsteknologi, iøvrigt	676
	IT- og elektronikteknolog	229
	Elektroniktekniker	55429
	Laborant	111666
	Miljøtekniker	2195
	Byggetekniker	26610
	Anlægstekniker	1095
	Kort- og landmålingstekniker	4586
	Konfektionstekniker	2180
	Designteknologi, iøvrigt	6187
	Levnedsmid./hush. Indv.udd. kort vidg.	855
	Fødevareteknolog	8649
	Mejeriteknolog	6926
	Procesteknolog, kemoteknik	3049
	Laboratorietekniker, kemi	2916
	Procesteknologi, iøvrigt	2051
	Husholdningstekniker	1002
	økonoma	24612
	Landbrugstekniker, regnskab	2885
	Landbrugstekniker, husdyrbrug	2995
	Landbrugstekniker, planteavl	2114
	Landbrugstekniker, landbrug diplomudd.	5021
	Jordbrugsteknologi, iøvrigt	5901
	Transport mv. Indv.udd. kort vidg.	623
	Søfart, iøvrigt	3027
	Social/sundhed Indv.udd. kort vidg.	5113
	Farmakonom	50454
	Forsvar/politi Indv.udd. kort vidg.	6467
	Polititjenestemand	86174
	Fængselsfunktionær	21035
	Fængsel, iøvrigt	1648
	Officer (kort vidg. udd.), hæren	4675
	Officer (kort vidg. udd.), søværnet	819
	Officer (kort vidg. udd.), flyvevåbnet	522
Medium higher education (Subtotal=2466270)	Naturvidenskabelig	1005
	Folkeskolelærer	493176
	Bibliotekar	36507
	Formidling og erhvervssprog, iøvrigt	137
	Kunstnerisk, iøvrigt	2030
	Samfundsvidenskabelig, iøvrigt	1062
	Elektroteknik-IT	94449
	Bygnings- og anlægsteknik	74320

Education category	Education (in Danish)	Observations
	Bygningskonstruktør	41305
	Teknisk, iøvrigt	666
	Maskinmester	61509
	Sygeplejerske	400576
	Sundhed, iøvrigt	1249
	Pædagogik Indv.udd. mellemlang vidg.	11459
	Pædagog, prof.bach.	544290
	Omsorgsassistent ved åndsvageforsorgen	18968
	Socialpædagogik, videregående udd.	3881
	Pædagog, iøvrigt	2190
	Tekstile fag og formidling, prof.bach.	16207
	Formidl./erhv.sprog Indv.udd. mellemlang vidg	6463
	Journalist, prof.bach.	34636
	Journalist, iøvrigt	351
	Engelsk, erhv.sproglig diplomprøve ED	7650
	1 erhverssprog, iøvrigt	4339
	Designer grafisk, grundudd.	4360
	Designer beklædning, grundudd.	2811
	Designer indretning	3077
	Kunsthåndværk/Design, iøvrigt	4431
	Klassisk musik, musikpædagog	5370
	Musikkonservatorie, iøvrigt	1602
	Skuespiller	4020
	Skuespil, iøvrigt	516
	Samfundsvidensk. Indv.udd. mellemlang vidg.	9007
	HD-2.del u.n.a.	2127
	Afsætningsøkonomi, HD-2.del	18717
	Finansiering, HD-2.del	14801
	Organisation, HD-2.del	9867
	Regnskabsvæsen, HD-2.del	61965
	Udenrigshandel, HD-2.del	7016
	Informatik, HD-2.del	3434
	økonomi/Ledelse, iøvrigt	1962
	Socialrådgiver (socionom), prof.bach.	56031
	Socialrådgivning og -formidling, iøvrigt	1079
	Diplomingeniør prof.bach. u.n.a.	8883
	Teknisk Indv.udd. mellemlang vidg.	8696
	Eksportingeniør, diploming. prof.bach.	6359
	Skov- og landskabsingeniør	5512
	Maskin, diploming. prof.bach.	107201
	Kemi, diploming. prof.bach.	22133
	Medieproduktion og ledelse, prof.bach.	3500

Education category	Education (in Danish)	Observations
	Grafisk kommunikation, prof.bach.	3028
	Levnedsmid./hush. Indv.udd. mellemlang vidg.	360
	Ernærings- og husholdningsøkonomi, prof.bach.	13914
	Ernæring, iøvrigt	1295
	Jordbrug/fiskeri Indv.udd. mellemlang vidg.	2215
	Transport mv. Indv.udd. mellemlang vidg.	829
	Skibsfører, prof.bach.	20781
	Social/sundhed Indv.udd. mellemlang vidg.	3150
	Bioanalytiker, prof.bach.	62651
	Sygepleje, ledelse-undervisning, diplomeksam.	6648
	Afdelingssygeplejerske	5749
	Sundhedsplejerske, diplomeksamen	7901
	Danmarks sygeplejerskehøjskole 1.-2. del	249
	Radiograf, prof.bach.	10082
	Ergoterapi, prof.bach.	30574
	Fysioterapi, prof.bach.	36803
	Jordemoder, prof.bach.	7378
	Jordemoder, ledende og undervisende	310
	Tandplejer, prof.bach.	11602
	Forsvar Indv.udd. mellemlang vidg.	2066
	Officer (mellemlang vidg. udd.), hæren	2896
	Officer, iøvrigt	2887
Bachelor degree (Subtotal=154329)	Jordbrugsvidenskabelig	274
	Humanistisk, iøvrigt	5689
	Museum	754
	Teknisk og naturvidenskabelig	3477
	Samfundsvidenskabelig, iøvrigt	4620
	Sundhed, levnedsmiddel og ernæring	118
	Engelsk-fransk, erhv.spr.bach.	17423
	Engelsk-spansk, erhv.spr.bach.	8551
	Engelsk-tysk, erhv.spr.bach.	19090
	Fransk-tysk, erhv.spr.bach.	3631
	Erhvervssprog kombineret, iøvrigt	4607
	Erhvervsøkonomi HA, bach.	67602
	HA informatik, bach.	2421
	HA erhvervsanalytiker, bach.	4118
	HA erhvervsret, bach.	3298
	HA sprog, bach.	5772
	Erhvervsøkonomi HA, iøvrigt	2884
Master degree (Subtotal=1022445)	Pædagogisk, iøvrigt	3751
	Humanistisk og teologisk, iøvrigt	12023

Education category	Education (in Danish)	Observations
	Instrumentalist og sanger	9591
	Kunstnerisk, iøvrigt	1917
	Fysik	6476
	Kemi	8237
	Geofysik	926
	Idræt	2505
	Musikterapi	473
	Kemiteknik	14867
	Bygge- og anlægsteknik	29771
	Gartnerividenskab	5251
	Sundhed, iøvrigt	1154
	Humanistisk/teologisk Indv.udd. lang vidg.	6606
	Humanistisk og teologisk u.n.a., iøvrigt	3326
	Teologi, cand.theol.	12042
	Teologi og religion, iøvrigt	1534
	Filosofi, iøvrigt	2021
	Historie, mag.art.	229
	Historie, cand.mag.	13875
	Historie, cand.phil.	4128
	Historie, overbygn.	391
	Arkæologi og oldtidskultur, iøvrigt	2088
	Litteraturvidenskab, iøvrigt	2996
	Musikvidenskab, cand.mag.	4502
	Musikvidenskab, cand.phil.	2335
	Musikvidenskab, iøvrigt	216
	Massekommunikation, iøvrigt	4519
	Dansk, cand.mag.	3894
	Dansk, cand.phil.	5884
	Norrøn filologi, cand.mag.	14635
	Dansk-nordisk, iøvrigt	3566
	Engelsk, cand.mag.	11046
	Engelsk, cand.phil.	2535
	Engelsk, iøvrigt	583
	Tysk, cand.mag.	5136
	Germansk i øvrigt, iøvrigt	954
	Fransk, cand.mag.	4690
	Romansk, iøvrigt	4289
	Engelsk, cand.ling.merc.	3846
	Fransk, cand.ling.merc.	2023
	Erhvervssprog 1 sprog, cand.ling.merc., iøvrigt	3823
	Engelsk, cand.interpret.	2733
	Fransk, cand.interpret.	1028

Education category	Education (in Danish)	Observations
	Spansk, cand.interpret.	461
	Tysk, cand.interpret.	965
	Engelsk, cand.negot.	2288
	Fransk, cand.negot.	2075
	Cand.negot., iøvrigt	2165
	Kunsthåndværk/Design, iøvrigt	3340
	Almen musikpædagogik AM, kand.	2271
	Musikpædagogik i ensemble/korledelse, kand.	1492
	Naturvidenskab Indv.udd. lang vidg.	8236
	Naturvidenskabelig u.n.a., iøvrigt	2283
	Matematik, cand.scient.	8140
	Matematik-økonomi, cand.scient.oecon.	3235
	Matematik, iøvrigt	217
	Datalogi, cand.scient.	11785
	Datalogi-IT, iøvrigt	1089
	Statistik , cand.scient.	857
	Forsikringsvidenskab, cand.act.	1571
	Astronomi, cand.scient.	602
	Geografi, cand.scient.	3839
	Kulturgeografi A, cand.scient.	2309
	Geografi, iøvrigt	1071
	Geologi, cand.scient.	4383
	Geologi, iøvrigt	1116
	Biologi, cand.scient.	19720
	Biologi, iøvrigt	4037
	Samfundsvidensk. Indv.udd. lang vidg.	5871
	Samfundsvidenskabelig u.n.a., iøvrigt	742
	Miljøplanlægning, kand.	5666
	Forvaltning, cand.scient.adm.	10037
	Administration, iøvrigt	3277
	Erhvervsøkonomi, cand.merc.	99388
	Datalogi, cand.merc.	2465
	Erhvervsret, cand.merc.	5451
	Interpret, cand.merc.	2489
	Revisorkandidat, cand.merc.aud.	33293
	Erhvervsøkonomi og ledelse, iøvrigt	3021
	Statsvidenskab, cand.polit.	27390
	økonomi, cand.oecon.	25053
	Jura, cand.jur.	93375
	Statskundskab, cand.scient.pol.	18040
	Samfundsfag, cand.mag.	5623
	Samfundsfag, cand.phil.	2231

Education category	Education (in Danish)	Observations
	Politologi, iøvrigt	994
	Sociologi, iøvrigt	2629
	Antropologi og kulturanalyse, iøvrigt	2303
	Psykologi, cand.psych.	17110
	Psykologi, iøvrigt	602
	Civilingeniør kand. u.n.a.	31318
	Teknisk Indv.udd. lang vidg.	5351
	Teknisk u.n.a., iøvrigt	231
	Maskin, civiling.kand.	21109
	Elektro, civiling.kand.	42491
	Elektroteknik-IT, iøvrigt	1790
	Arkitekt, cand.arch.	32596
	Landinspektør, kand.	6439
	Levnedsmiddelvidenskab, cand.brom.	3924
	Mejeribrugsvidenskab, cand.lact.	3241
	Levnedsmiddel og ernæring u.n.a., iøvrigt	387
	Jordbrugsvidenskab Indv.udd. lang vidg.	211
	Veterinærvidenskab, cand.med.vet.	11617
	Landbrugsvidenskab, cand.agro.	18592
	Jordbrugsøkonomi, cand.agro.øk.	627
	Skovbrugsvidenskab, cand.silv.	2922
	Social/sundhed Indv.udd. lang vidg.	2258
	Læge, cand.med.	88448
	Tandlæge, cand.odont.	25417
	Farmaci, cand.pharm.	21723
	Forsvar Indv.udd. lang vidg.	725
	Officer (lang vidg. udd.), hæren	7825
	Officer (lang vidg. udd.), søværnet	3175
	Officer (lang vidg. udd.), flyvevåbnet	4855
	Officer, iøvrigt	161
Doctoral degree	Humanistisk, teologisk og pædagogisk	2370
(Subtotal=51740)	Musik	2624
	Teknisk u.n.a.	18527
	Naturvidenskab, ph.d.scient.	11895
	Samfundsvidenskabelig u.n.a., iøvrigt	3808
	Veterinær- og jordbrugsvidenskab, ph.d.	4073
	Veterinærvidenskab, ph.d.med.vet.	515
	Lægevidenskab, ph.d.med.	5603
	Odontologi, ph.d.odont.	653
	Farmaceut, ph.d.pharm.	1672
Total		16979146

Education category	Education (in Danish)	Observations

Notes: First column lists the nine major education categories of the Danish classification system (2-digit education). The second column lists the 566 educations (4-8 digit) obtained after merging small educations using the algorithm described in the text. The educations have the Danish value labels; when aggregating to next category it is the label of that category when combining within a category it is the label of that category followed by the Danish word "iøvrigt" ("other") and for the 4 manual combinations I simply typed the combination of labels.

Appendix B

Table B.1: Family Migration Literature.

Author(s)	Type	Method	Finding	Remark
		Internal		
Axelsson and Westerlund (1998)	Sweden (30 km)	Family *income-change equation* with *correction* for selectivity of migrants. (Correction for selectivity not significant)	No effect on family disposal income. Usual predictors of migration like education and age are insignificant	Generally, noisy estimation of migration and family-income growth
Benson (2014)	US (county)	*Logit model* of relocation for work on measures of the geographic dispersion of husband's and wife's occupation	Married couples are more likely to relocate for work when either spouse is in geographically clustered occupations	Occupational sex segregation prior to marriage as explanation for the tendency to relocate for men's career
Bielby and Bielby (1992)	US (100 miles)	*Probit model* of expressed reluctance to move for a better job due to family considerations	Potential losses for the spouse deter wives from pursuing job opportunities, not husbands	*Gender-role theory*. Use the coefficient on gender as test for symmetry
Cooke (2003)	US (county)	*Lagged-variable model* in husband's, wife's and pooled income (two data waves)	No effect on wife's income, positive effect for high-income husbands	Migration maximizes husband's income, income effects are a function of gender
Compton and Pollak (2007)	US (different sized MSAs)	*Probit model* of migration and *multinomial logit* of migrating to small, medium or large MSA. (Correction for selectivity not significant)	Education of husband and not of the wife affects the propensity to migrate to a large MSA	Part-power couples are the most likely to migrate, this is driven by male power couples. Power types are defined by Costa and Kahn (2000)
Costa and Kahn (2000)	US (different sized cities)	*Triple-dif* in location propensities. Defines high (low) power couples as those where both (neither) are college graduates	Power couples increasingly locate in large cities controling for the growing urbanization of the college educated and trends for low-power couples	Worsening of the colocation problem (increasing female labor force participation) leads to increased location of power couples in large cities

Author(s)	Type	Method	Finding	Remark
Duncan and Perrucci (1976)	US (state)	*Linear probability model* of migrant status on indices of occupational prestige, migration posibility and compatibility	Migration responds positively to occupational prestige and occupation-specific migration rates of husbands, not of wives	Focus on occupational determinants of family migration. Include wife's percent of family income linearly (insignificant)
Guler and Taşkın (2013)	US (state)	*Joint search model* of dual earner couples calibrated to aggregate US statistics	Lower gender wage gab can explain 35 percent of the decline in interstate migration	Documents a U-shape similar to Foged (2016) but based on pre-migration earnings
Gemici (2011)	US (census division /grouping of states)	*Structural dynamic model* where partners decide each period whether to relocate and whether to stay together	Family ties deter migration and dampen wage growth of both men and women. Colocation problems increase divorse rates	Decisions are repeated, contrary to the one-time decisions of the classical *human-capital model* (e.g. Mincer, 1978)
Grant and Vanderkamp (1980)	Canada (100 miles)	*Lagged-variable model* in earnings by sex and marital status	Negative earnings effects for married women and positive effects for married men	The estimated earnings effects are too low to rationalize migration for most groups
Green (1997)	GB (varying distances are mentioned)	*Interviews* 30 dual career couples, i.e. both partners are in managerial, professional and associate professional occupations	The better paid, most location-constrained or least insecure career takes precedence in location decisions	It is the husband who has these job characteristics in most cases but it does not rule out rationality / gender-neutrality
Jacobsen and Levin (2000)	US (states)	*Probit model* of migrant status on net earnings gain predicted from earnings equations by state and gender	Wife's gain has no explanatory power once the total gain to the household has been included; indicating couples disregard the source of the expected gain	Another specification include the ratio of the potential gains to husband and wife linearly (insignificant)
Lichter (1980)	US (state)	*Contingency tables* by migrant status	The effect of wife in labor force is negative on average, but wives in professional positions enhance mobility	Lower employment of wives post migration confirms earlier findings (e.g. Mincer, 1978)
Lichter (1982)	US (county or SMSA)	*Logit model* of migrant status on education, labor force attachment and occupational prestige	Employment and job tenure of wives deter migration. Small positive but insignificant effect of wife's education	Effect of wife's education is positive and large when husband's education is left out, author suggest due to assortative mating

Author(s)	Type	Method	Finding	Remark
Lichter (1983)	US (county or SMSA)	*Lagged-variable model* in wife's earnings	Temporary negative effect, more severe (often not significant) for higher education and occupational prestige	On the duration and the heterogeneity of the effects for wives
Long (1974)	US (county or state)	*Migration probabilities* by age, marital status and employment status of wife before and after a move	Working wives deter long distance moves but increases short distance mobility. Housing considerations account for 2/3 of intra-county family migration	Upgrading of family housing is an important motivation for working for married women. Tied mover status of wives help explain the gender wage gap
McKinnish (2008)	US (MSA or similar)	*Logit model* of migrant status and *earnings equations*, focussing on the effect of the occupational level migration rate	Husband's occupational characteristics matter more then wife's, irrespectively of the power types defined by Costa and Kahn (2000)	Duncan and Perrucci (1976) too have occupational level mobility measures
Mincer (1978)	US (county or state)	*Migration probabilities*, repeats Long (1974) and adds probabilities by employment and unemployment rates	Show family migration is associated with increase in wife's unemployment and labor force withdrawal	Defines "*tied movers*" and "*tied stayers*" and shows descriptive evidence consistent with his *human-capital theory*
Nivalainen (2004)	Finland (municipality or province)	*Multinomial logit* comparing staying, short and long distance moves	Wife's education insignificant; working wife deters migration; larger intra-household income inequality increases migration	Income inequality is included as the absolute difference between partners' income normalized by total family income
Rabe (2011)	GB (Local Authority Districts)	*Endogenous swiching model* of wage effects corrected for selection into migration and employment. 2nd stage probit of migration on predicted wage returns	Women suffer a temporary wage penalty, no wage effect for men. Predicted wage effects for husband and wife are both positively correlated with migration	The results indicate that couples attach a positive weight to both partners in migration decisions. (Wife's expected gain actually has the largest postive effect)
Sandell (1977)	US (county or SMSA)	*Earnings-change equation* for husband's, wife's and family (with lagged earnings)	Positive effect for husbands, negative or insignificant for women and family earnings goes up.	Earnings gains of husbands are large enough to offset their wives' losses

Author(s)	Type	Method	Finding	Remark
Shauman (2010)	US (county or MSA)	*Logit model* of migrant status on education, labor force attachment, occupation-level variables and measures of the comparative advantage in each variable	Occupational variables do not eliminate the gendered effects of usual controls, effects of occupational variables and educational advantage differ by gender	Adds occupational determinants to usual controls (education, employment and income). Includes wife's percent of family income linearly (insignificant)
Shihadeh (1991)	Canada (province)	*Logit model* of reason for migrating (in sample of migrants). *Logit model* of being employed after move	Family income and husband reporting job-reasons increase the odds that the wife is accompanying in the migration decision	4% of husbands and 74% of wives state they are accompanying in the migration decisions
Spitze (1984)	US (county or SMSA)	*Lagged-variable model* in wife's employment and earnings	Temporary negative effects on wives' employment and earnings that do not depend on age	On the duration and the age-distribution of the effects for wives
Swain and Garasky (2007)	US (county and SMSA)	*Two-level logit model* of family migration decisions. First individual characteristics, second neighborhood characteristics	Change is husband's earnings has no effect, increase in wife's earnings makes migration less likely. Wife' education insignificant	Mixed evidence on the importance of husband's and wife's characteristics
Tenn (2010)	US (state)	*Probit model* of migrant status and *variance decomposition* to examine the relative predictive power of husband's and wife's characteristics	Wife's education and occupation characteristics have lower explanatory power than husband's and this has been has been stable over 40 years, 1960-2000	Migration follows husband's potential return, i.e. families attach lower weight on wife's private return
International				
Junge, Munk, and Poutvaara (2013)	Emigration of Danes	*Probit model* of migrant status for all couples and subgroups defined by children and education of couples	International migration is increasing in husband's earnings but the effect of wife's earnings is zero (small insignificant estimates that bounce around zero)	High power couples (as defined by Costa and Kahn, 2000) are most likely to emigrate, followed by male power couples, then female power couples.
Junge, Munk, and Poutvaara (2014)	Emigration of Danes	*Probit model* of migrant status splitting their sample by singles/couples, duration of stay, and male/female primary earner	Migration is increasing in the pre-migration earnings of the primary earner	Revises and extends Junge, Munk, and Poutvaara (2013)

4

Author(s)	Type	Method	Finding	Remark
Foged (2014)	Emigration of Danes	*Matching DID*, employment and earnings effects abroad and after return. Stated reasons behind emigrating	Men gain and women lose abroad and after 1-2 years back in the home country, both experience dip in employment and earnings 1st year after return	International migration increases the intra-household earnings asymmetry. Men migrate for job-related reasons, women are often tied movers

Notes: "Type" refers to type of migration (location) and migration is either defined by distance or by being across geographic borders.

Costa and Kahn (2000) study location choices, while the remaining papers study migration decisions and/or labor market effects of family migration.

All concidered migration is family migration, i.e. joint migration of husband and wife.