Geography, joint choices and the reproduction of gender inequality*

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Abstract: We examine the extent to which the gender wage gap may depend on the fact that dual-earner couples jointly choose places to live and work. If couples systematically locate in places better suited for the advancement of the husband's career than to the wife's, those choices would then tend to depress the wages of married women relative to married men. Examining data from Denmark, our results suggest (i) that Danish couples tend to move to places that offer greater potential wage gains to the husband than to the wife, (ii) that these location choices may account for as much as 36% of the gender wage gap in Denmark, and (iii) that, ultimately, these biases appear to reflect gender roles, to a large extent inherited from the wife' parents. We therefore demonstrate that the allocation of people to places contributes to gender inequality.

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Despite a substantial narrowing of the gender wage gap over the last half century, women still earn less than men (Blau and Kahn 2000). That's true in the United States, as well as in every other country in the world (Hausmann et al. 2010). Though the most overt forms of gender discrimination have become less common in Europe and North America, sociologists have identified a number of subtle mechanisms that contribute to the persistence of this gap.

One central theme in this research has been that the sorting of men and women into jobs contributes substantially to ongoing gender inequality. Some of this allocative inequality stems from the actions of employers: Even within industries, for example, different organizations tend to hire primarily men or women and those organizations, in turn, differ in what they pay (England et al. 1988; Petersen 1995); and employers systematically assign men to job titles that carry richer rewards (Bielby and Baron 1986; Fernandez and Sosa 2005). Some of it stems from the actions of the employees themselves: Men and women pursue different occupations and, even when coming from similar backgrounds, apply for different kinds of jobs (Tam 1997; Correll 2004; Fernandez and Friedrich 2011).

Here, we call attention to and explore another form of allocation that could contribute to gender inequality: the sorting of people to places. Individuals can earn more when they reside in regions that value their abilities and attributes (Sørensen 1996; Sørensen and Sorenson 2007). Men and women, particularly married men and women, may nonetheless vary systematically in the degree to which they find themselves in regions where potential employers value their abilities and attributes. Mincer (1978) brought early attention to the possible effects of household location choices on gender inequality. He built a formal theoretical model to demonstrate that couples might rationally choose to relocate to regions that brought wage gains to husbands but wage losses to wives if the husbands' gains outweighed the wives' losses. A substantial stream of research has found evidence consistent with this

idea: Dual-earner couples move less frequently than single-earner couples (Mincer 1978), a direct implication of the model. And, among dual-earners, husbands' earnings increase, on average, after moves, while wives' earnings decrease after them (Sandell 1977; Cooke 2003).

But location choices could also contribute to the gender wage gap even if couples do not choose places of residence to maximize their household income. Bielby and Bielby (1992) notably argued that couples may place greater emphasis on husbands' careers than on wives' careers in their relocation decisions because they associate the husband with the role of being the provider for the family. A series of studies showing that measures of the husband's human capital have more predictive power on the decision of whether to move than measures of the wife's human capital provide indirect evidence consistent with this second story (Duncan and Perrucci 1976; Shauman 2010; Tenn 2010).

These studies nevertheless have two limitations. First, it has been difficult to distinguish between the two accounts.[1] On the one hand, within-couple asymmetry in the valuation of husbands' versus wives' careers could also produce wage gains for men but losses for women when couples move. On the other hand, the fact that couples predominantly factor husband's human capital into their relocation decisions need not imply a gender bias in this decision. If, for example, the occupations in which men work vary more in pay across regions than the ones in which women work, then, to maximize household income, couples should focus on the husband's job prospects in their migration decisions.

Second, it has been difficult to assess the extent to which these processes might contribute to the gender wage gap. Studies of the decision to move generally do not allow one to translate choices into levels of earnings. Meanwhile, those studies that do directly examine earnings

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[1]Bielby and Bielby (1992) had some leverage for disentangling these effects. Using attitudinal measures, they demonstrated that the reported reluctance to relocate for family reasons depended on beliefs about gender roles. But they lacked the data to demonstrate that these attitudes translated into action and to connect them directly to gender inequality.

compare movers to stayers, even though these groups probably differ on multiple dimensions.

We address these limitations by using data from Denmark to estimate whether dual-earner couples appear to place greater emphasis in their choices of where to live and work on the potential income gains to the husbands relative to the wives (as opposed to inferring this bias from the demographic predictors of the decision to move). In essence, we ask: How does the potential for income gain appear to influence a married couple's propensity to move and their choice of location? Earnings of similar others – those with similar attributes and levels of human capital – in other regions provide couple-specific measures of what each member of the couple might earn if they moved to another place (Dahl and Sorenson 2010b). In order to ensure that an adequate number of similar others exist across regions, we restricted our analysis to couples employed in blue-collar or lower-level white-collar occupations.

Our estimates suggest that blue-collar and lower-level white-collar Danish couples primarily focus on the potential benefits to the husband's career when choosing where to live and work; wives' potential income gains, by contrast, have no apparent effect on place of residence. Our calculations indicate that the location choices stemming from these asymmetric joint decisions could account for as much as 36% of the gender wage gap among blue-collar and lower-level white-collar employees in Denmark. In other words, if couples made their decisions of whether and where to move only on the basis of maximizing household income, one would expect the gender wage gap in Denmark to decline by roughly one-third.

But though this asymmetry in location choice provides an explanation for the gender wage gap, it represents only a proximate one. What are the ultimate causes underlying it? In other words, why do couples place greater emphasis on husbands' careers when choosing where to live? A number of possibilities exist. One is that men work in occupations that have steeper wage trajectories than women (a "shadow of the future" effect). Couples then

might want to account for these expected future gains to maximize long-run household income (Shauman 2010). Another – a "gendered geographic preferences" effect – is that men and women bargain on different dimensions in their decisions of where to locate. For example, wives might place greater emphasis on living near loved ones than their spouses do, leading them to prefer places that do less to promote their careers. A third is that couples anticipate that the woman will reduce her participation in the labor force to start a family (a "motherhood penalty"). They may then place heavier emphasis on the earnings of the spouse who expects to remain in the labor force (Mincer and Polachek 1974; Clark and Withers 2009). A fourth – a "devaluation of wives' wages" effect – is that couples emphasize the husband's potential earnings because they have been socialized to assign the role of breadwinner to the man (Hood 1983; Bielby and Bielby 1992).

Our analyses suggest that the third and fourth possibilities – the motherhood penalty and the devaluation of wives' wages – appear most consistent with the data. Neither expected raises (the shadow of the future) nor the locations of loved ones (gendered geographic preferences) can account for any of the asymmetry in the predictive power of husbands' and wives' expected incomes for location choice. Couples with young children, however, behave as if they place less value on wives' earnings (a motherhood penalty). Consistent with a devaluation of wives' wages, couples whose parents had more traditional gender roles also exhibited greater asymmetry in the influence of husbands' versus wives' potential wage gains on the choice of where to live. Interestingly, our analyses suggest that the primary channel for this intergenerational transmission of gender roles occurs through the wife's side. Differences in the apparent importance of men's versus women's wages to location choice occur most strongly among couples in which the wife's father earned substantially more than her mother. By contrast, the relative earnings of the husband's parents did not matter.

This paper offers at least three contributions to the literature. First, it provides a methodology for examining directly whether couples appear to maximize household income in their decisions of whether and where to move. We find that blue-collar and lower-level white-collar Danish households do *not*, on average, choose the locations that would optimize their household incomes. Rather, they systematically place undue emphasis on husbands' potential income gains in their choices of where to live and work. We therefore provide some of the most direct evidence to date against the neoclassical model of family migration. Second, it demonstrates that these intra-couple decisions contribute importantly to the persistence of gender inequality. In particular, we calculate that this allocative mechanism might account for as much as 36% of the gender wage gap in Denmark. Third, it presents evidence that this allocative asymmetry stems in part from expectations that wives will provide child care, a motherhood penalty, and in part from values transmitted from the couples' parents, a devaluation of women's wages.

Geography and joint choices

Mobility, particularly from one place to another, has long been an important process for increasing individual income and wealth. International migration, for example, has allowed minorities to escape religious and political persecution that has blocked their economic and professional success in their home countries. Jews, for instance, have migrated *en masse* from Europe to Israel, Canada and the United States in search of better lives (e.g., Shumsky 1962; Weinberg 2001). Migration, both within and across countries, can similarly allow individuals to increase their earnings by escaping impoverished areas or by moving to places with employers better fit to their abilities and attributes (Quillian 1999; Clark et al. 2007; Dahl and Sorenson 2010b).

But individuals do not all have equal access to these opportunities. Immigration policies, for example, often explicitly discriminate against those from certain countries, of particular ethnicities or religions, or those with less education. Even in the absence of these legal restrictions, the availability of social support and social connections to other regions can restrict who can actually move and where they can consider as future residences (Massey and Espinosa 1997). Given the potential economic value of geographic migration, differential access to these opportunities could therefore contribute to systematic inequality between groups of individuals.

Here, we examine the potential for one such constraint on mobility – the fact that married couples generally choose to live in the same place – to contribute to income inequality between men and women. Two types of motivations, one economic, the other sociological, have been offered as explanations for why such a connection might exist.

Household income maximization: In the tradition of neoclassical economics, building on the idea that couples should maximize their joint income, Mincer (1978) forwarded the idea that these joint choices might lead couples to favor places that would increase husbands' incomes at the expense of their spouses' incomes.[2] Following his notation, let G_i denote the net income gain from migration for each member of a household (the returns to moving minus the costs). In a dual-earner household, income-maximizing couples should rationally choose to move if $G_1 + G_2 > 0$.[3] Obviously, if both the husband and the wife stand to gain from the move ($G_1 > 0$ and $G_2 > 0$), the couple will move and, if neither stands to gain ($G_1 < 0$ and $G_2 < 0$), they will not. The interesting action comes from cases in which one

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[2]Sandell (1977) appears to have developed a nearly equivalent model independently. My notation and argumentation, nevertheless, follows Mincer (1978), the more developed of the two models.

[3]Mincer (1978) offers a highly simplified model. In a continuous time format, one would want to think of G_i as representing a discounted flow of income and the threshold to move should include the cost of moving. But the simplified model still illustrates the underlying logic of the neoclassical model.

member of the couple gains while the other loses ($G_1 > 0$ and $G_2 < 0$). If the gains from the winner exceed the losses of the spouse, the income-maximizing couple should still move. If the gains do not exceed the losses, then they should stay (even though one of the members of the couple could have earned more by moving). Depending on the outcome, Mincer (1978) referred to the individual who sacrifices his or her own outcome for the joint good as either the "tied mover" or the "tied stayer"; in either case, couples earn less than similar pairs of single – and therefore independent – men and women would.

Mincer's model actually operates symmetrically with respect to men and women. That is, couples might as easily forgo increases in husbands' earnings to enjoy even greater gains in wives' wages as vice versa. Yet, Mincer noted that a number of factors conspire to ensure that women will, on average, be the ones sacrificing their careers in these decisions. Most notably, the fact that women often experience a gap in their participation in the labor force when starting a family means that men, on average, have more human capital and therefore more to gain from changing employers (and regions). Similarly, to the extent to which demand-side gender discrimination exists – that is, on the part of employers – these household decisions will tend to exacerbate this discrimination because it means that a proportional gain in the husband's income will translate into a greater absolute gain for the household than the same proportional gain in the wife's income.

Two kinds of evidence have primarily been marshaled to support this model. The first has to do with the geographic mobility of couples relative to individuals. Mincer's model predicts that couples should move less frequently than single men and women. Consistent with this expectation, a number of studies across roughly four decades, perhaps beginning with Long (1974), have confirmed that dual-earner couples have lower migration rates than single men and women (for a review, see, Cooke, 2008; for evidence specific to Denmark, see

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Dahl and Sorenson, 2010b).

The second, which has received far more empirical attention, concerns the effects of migration. Here, Mincer's model predicts that moves should tend to increase husbands' incomes but to decrease wives' incomes. Sandell (1977) provided some of the first evidence supporting this expectation. For American families that moved between 1967 and 1971, he found that husbands' incomes increased by an estimated $832 while wives' incomes *decreased* by $372 in the year following a move. Since then, numerous studies have replicated this result using different data sources and in additional countries (for a review, see McKinnish 2008). Subsequent studies, moreover, have found that migration not only decreases wives' wages following the move, but also that it reduces their probability of participating in the labor force (e.g., Morrison and Lichter 1988) and the number of hours that they work (e.g., Spitze 1984). Some studies nonetheless suggest that a portion of these effects may stem from temporary underemployment during the period in which tied movers must look for work in their new places of residence (Spitze 1984).

Gender asymmetry in joint choices: But do these effects really stem from couples maximizing household income? Sociological studies of family migration suggest that other factors may account for these decisions. Most notably, society tends to have differing expectations of the roles that men and women should play in families. These gender roles have a number of consequences. For example, numerous studies have found that couples tend to see the husband as the "provider" for the family and the wife as being responsible for the household and child care (for reviews, see Thompson and Walker 1989; Shelton and John 1996). Because of these beliefs, households give greater support to male earners. For example, even among dual-earner couples, women generally do the majority of the housework (Presser 1996; Hook 2010; Offer and Schneider 2011; Craig and Mullan 2011).

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Bielby and Bielby (1992) argued that these gender roles might also influence the geographic mobility of couples. In particular, if couples view the man as the provider then they may emphasize his potential career gains when considering potential moves. Returning to the notation in the neoclassical model, they essentially posited that couples implicitly evaluate $\beta_1 G_1 + \beta_2 G_2 > 0$, where β_1 and β_2 respectively represent the weightings of the husband's and the wife's gains and where $\beta_1 > \beta_2$—in other words, that couples undervalue women's work outside the home. Empirically, Bielby and Bielby (1992) found support for this hypothesis: When they asked American men and women a hypothetical question about whether they would move for a better job, women more frequently said that they would be reluctant to move for family reasons. But men and women with nontraditional beliefs about gender roles differed less in their reluctance to move for family reasons, though nontraditional women still reported a greater reluctance than nontraditional men.

The primary line of empirical research supporting this asymmetry, however, comes not from attitudinal questions but from examinations of the correlates of couples' moving decisions. In particular, study after study has demonstrated that the human capital characteristics of husbands – such as their levels of education and work experience – have much more explanatory power than those of wives on decisions of whether to move (Duncan and Perrucci 1976; Compton and Pollak 2007; Shauman 2010). Indeed, Tenn (2010) reported that there has been little change in the importance of wives' human capital to couples' migration decisions from 1960 to 2000 in the United States, despite the rapid rise of women's participation in the labor force over this period.

Interestingly, these beliefs about gender roles also offer an alternative interpretation of most of the existing evidence that has been offered as support for the neoclassical model. If couples systematically emphasize husbands' careers in their migration decisions, then that

too could lead to increases in husbands' incomes but decreases in wives' earnings following moves. One place where the predictions of the two theories diverge, however, comes from cases in which the husband stands to gain less in income than the wife would lose ($G_1 > 0$ but $G_1 + G_2 < 0$). In those cases, the neoclassical model suggests that the couple should stay while couples who valued the husbands' careers more than the wives' might move. Following this reasoning and consistent with the idea that gender roles influence geographic choices, Jacobsen and Levin (1997) reported that – once one accounts for selection in who moves – the losses to wives exceeded the gains to husbands in the United States and therefore that these effects cannot simply represent rational household income maximization.

But the evidence to date remains largely inconclusive. In most studies, the neoclassical model appears consistent with the differential returns to migration for husbands and wives. It also offers an alternative interpretation of the greater influence of husbands' human capital characteristics on migration, the main result forwarded as evidence in support of the influence of gender roles: For instance, if a couple expected the wife to leave the labor force – even temporarily – then they might want to focus on the potential gains to the husband in choosing a place to live (Mincer and Polachek 1974; Clark and Withers 2009). Or, if the husband works in an occupation that varies more in its wages across regions or that has a steeper wage trajectory than that of his wife, then the couple might focus on the husband's prospective earnings to maximize household income (McKinnish 2008). Hence, the importance of husbands' human capital to migration decisions could arise from the couple's desire to maximize their joint income.

We address these limitations by estimating directly whether prospective gains in husbands' incomes versus in wives' incomes appear more influential to the choices of places of residence. In other words, we directly estimate β_1 and β_2 above. Our approach therefore

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does not rely on inferring the implied relative importance of projected income gains from other evidence (such as the predictive power of human capital measures).

The gender wage gap in Denmark

Although Denmark historically has had relatively low income inequality and continues to have a strong social safety net, on many dimensions, its employment system operates quite similarly to the United States. A series of reforms in the 1980s have given employers a substantial degree of freedom in setting wages (Sørensen and Sorenson 2007). These same reforms have also made it relatively easy for Danish firms to hire and hire. In fact, according to most indicators, Denmark has one of the most flexible labor markets in Europe, on par with the United Kingdom and the United States (Bredgaard et al. 2005).

Like every other country in the world, Denmark has a gender wage gap—men earn more than women. Gupta and Rothstein (2005), for example, reported that an average full-time female employee in Denmark earned a little more than 80% of the average earned by a male employee from the mid-1980s to the mid-1990s. By comparison, the average female employee in the United States during that period would have made 65% (mid-1980s) to 75% (mid-1990s) of her male counterpart (U.S. Department of Labor 2001).

This wage gap exists despite the fact that Denmark, overall, enjoys a relatively high level of gender equality.[4] Danish women participate in the labor force at 92% of the rate of men (versus 85% for the United States), and they account for 38% of the members of parliament (versus 20% in the United States), more than half of the country's professional

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[4]As a member of the European Union, Denmark conforms to the principles of the Treaty of Rome and has enacted an Equal Pay Act (in 1976). Despite these legal protections, women in all European countries still earn less than men on average. The Act primarily protects women against the most obvious forms of discrimination, such as lower pay than men with the same job title, working for the same employer.

and technical workers (52% compared to 57% in the United States), and nearly 60% of all college and university students (Hausmann et al. 2010). Overall, the World Economic Forum ranked Denmark 7th in the world in terms of gender equality (Hausmann et al. 2010); by comparison, the United States ranked 19th.

Although the sources of this inequality have received far less research attention in Denmark than they have in the United States, it seems reasonable to expect that many of the same mechanisms operate in both places. For example, researchers have found that the sorting of individuals to occupations and job titles accounts for a large share of gender income inequality in the United States (Bielby and Baron 1986; England et al. 1988; Groshen 1991). Also, differences in human capital – particularly in experience, due to gaps in women's participation in the labor force – have also been found to account for a substantial share of the gender wage gap in America (Mincer and Polachek 1974; Kim and Polachek 1994). Gupta and Rothstein (2005) similarly found both of these mechanisms at play in Denmark: Occupational sex segregation could account for more than half of the gross gender wage gap; human capital differences could explain roughly one-quarter of it; and together they could account for nearly 60% of the gap.[5]

Though these and other mechanisms deserve further investigation, our purpose here is to examine the extent to which another allocative mechanism – within-household decisions about where to live and work – might account for the remaining gender wage gap.

The geography of gender inequality: Because relatively little research has examined within-country geographic variation in the magnitude of the gender wage gap, we began

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[5]Note, however, that Gupta and Rothstein (2005) included location (province) as a measure of human capital. The variance explained in their decomposition may therefore overlap somewhat with the mechanisms explored here.

by examining some descriptive statistics on the geography of gender inequality.[6] Though a systematic investigation of the sources of these differences falls beyond the scope of this paper, regional variation does exit. Figure 1 maps the geographic variation in the wage gap across Denmark, with each region shaded according to the proportion earned by the average female full-time employee relative to the average male full-time employee in 2005 (darker shadings indicating greater income inequality). Interestingly, the largest gaps appear both in the center of Jutland, an agricultural area, and in and around Copenhagen, the largest urban area. Gender inequality, therefore, does seem to stem simply from the depth or diversity of the labor market.

But perhaps these regional differences simply reflect compositional differences in the human capital of those working in the regions? Figure 2 therefore maps the residual differences in men's and women's wages by region after accounting for the age, education and work experience of those working there.[7] Though this adjustment reduces the estimated gender income inequality somewhat in central Jutland, the agricultural region, it has relatively little effect overall on the geographic distribution of the gender wage gap.

To some extent, these regional differences seem surprising. Why do women not move from the regions with larger gaps to those with smaller ones? One possibility is that women are relatively more attached to the places that they live than men. But research on migration has generally found just the opposite: Women move more frequently and further than men (Pedraza 1991). Another possibility – the one examined in detail here – is that women, in this case married women, are constrained in their choices of where to move. They therefore cannot simply arbitrage these differences across regions.

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[6]For a notable exception, see McCall's (1998) research on gender wage inequality in the United States.

[7]Using all Danish employees in 2005, we estimated a separate wage equation for each region, regressing logged individual income on age, education, experience and gender. We label the coefficient for gender in these equations as residual gender wage inequality.

Joint geographic choices

How does the potential for income gain affect a married couple's propensity to move and their choice of where to move? We began our analysis by estimating directly the degree to which potential gains in husbands' and wives' incomes appeared to influence their choices of where to live. A standard statistical framework for evaluating location choices has been to consider the actor's preference – in this case, couple i – for living in a particular region, j, a function of the features available in that region—such as the potential income available there and the other benefits of living in that region. Our baseline estimation assumes that – net of differences in potential earnings – couples consider all regions equivalent in terms of their net advantages and disadvantages. One can then represent a couple's preferences as:

$$u_{ij} = \beta_m W_m + \beta_f W_f + \epsilon_{ij}, \tag{1}$$

where β_m and β_f, respectively, represent the influence of the husband's and wife's potential incomes (W_m and W_f) on the couple's joint preference for a region, and ϵ_{ij} allows for error in the couple's projections of these benefits. Whereas the neoclassical model implies that β_m and β_f should have equivalent values, sociological perspectives suggest that $\beta_m > \beta_f$—that couples care more about husbands' potential earnings than wives' potential earnings.

If couples choose locations in accordance with their preferences and if we assume that the errors arise from independent and identically distributed draws from an extreme value distribution, then couple i chooses region j with probability:

$$P(y_i = j) = \frac{e^{\beta_m W_m + \beta_f W_f}}{\sum e^{\beta_m W_m + \beta_f W_f}}. \tag{2}$$

We can estimate these weights using the conditional logit (McFadden 1974). Note that by

including the couple's current location as one of the options available to them, we avoid either assuming a sequentiality to the choice – for instance, that couples first decide to move and then decide where to go – or selecting on a subset that decides that they prefer another place to their current location.[8]

Data. We estimated the correlates of location choice using data from the Integrated Database for Labor Market Research (referred to by its Danish acronym, IDA), an employee-employer database that sociologists have just begun to exploit (e.g., Sørensen and Sorenson 2007). This database, compiled from a variety of public registers, contains detailed, longitudinal information on the characteristics and employment history of every resident of Denmark. To a large extent, prior empirical research on geographic mobility and the gender wage gap has been limited by the fact that researchers often do not know to where couples move or do not have sufficient individual-level data to calculate counterfactual wages (discussed in detail below). The high quality and comprehensiveness of the Danish data allow us to avoid most of these limitations.

Although the database includes roughly 25 years of data on each individual in the population, we restricted the analysis to moves that occurred between one particular year and the next: from 2004 to 2005. Restricting the sample to a single year dramatically reduces variation (over time) in the attractiveness of regions and helps to ensure that region fixed effects can effectively absorb the remaining differences across regions. We chose the most recent year available to us to maximize the number of individuals for whom we could observe parents' participation in the labor force (more below).

We defined as "couples" those legally married and cohabiting in both 2004 and 2005.

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[8]Our setup does, however, assume that couples would at least consider employment in another region if they received an offer there. But, by including an indicator variable for their current place of residence, we do allow couples to have a preference for staying put.

From this overall population, we excluded a number of couples from our analysis. To eliminate cases of mobility due to parents' choices, we restricted the analyses to those over age 18, and to exclude cases in which location choices might reflect retirement, we excluded couples with either member over age 55. A total of 191,343 couples met this age screen.

From this population, only those 142,450 couples where both the man and the woman worked full-time in both 2004 and 2005 entered our sampling frame. Our research design required such an approach because one logically cannot estimate the importance of the woman's expected wage to the choice of residence if she intends to leave the labor force. We also restricted our study to Danes employed in blue-collar or lower-level white-collar occupations (87,057 couples). Although this subset represents only about two-thirds of the labor force in Denmark, it has an important advantage for our purposes: Notably, our calculation of expected income, described below, relies on the availability of others with similar characteristics working in similar jobs but in different regions. In the more specialized occupations found among mid- to upper-level white-collar workers, similar others do not always exist in all regions.

From this sampling frame, we extracted a simple random sample of 10,000 couples (primarily to manage the computational demands of our estimation).[9] Of these 10,000 couples, we had to drop 80 cases because IDA did not have data on one or more variable of interest. Our final sample for estimation therefore represents roughly 11% of the sampling frame. Since our analyses use the conditional logit to estimate the determinants of location choice, our data set contains one observation per couple per region. For regions, we have chosen

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[9]Although we have data on the entire population, the servers available at Statistics Denmark do not have sufficient power to run conditional logit models on the entire population. In unreported analyses, we drew multiple alternate samples of 10,000. Each sample yielded qualitatively equivalent results, thereby raising our confidence that our results do not reflect the idiosyncrasies of one particular group of 10,000 couples. Because we use a simple random sample, we do not need weights to extrapolate from our results to the sampling frame as a whole.

the 268 unique and mutually exclusive administrative townships ("kommune" in Danish) as our areal units.[10] Our dataset for estimation therefore contains 2,658,560 couple-region observations.

Place of residence: Our dependent variable is whether the couple chose to reside in a particular township in 2005. As an alternative, one might consider the choice of work location as the dependent variable. But with couples, the choice of work location poses a problem as a dependent variable. Husbands and wives might commute to different regions; if so, the couple would have different values on the dependent variable and one could not connect their choices to the implications for the earnings of the spouse.

To account for commuting and effective labor market catchments, we defined counterfactual expected incomes according to the residences of employees (as opposed to the locations of their places of work).Despite the fact that Danes rarely commute far – Dahl and Sorenson (2010a), for example, determined that almost no blue-collar Danish employees commuted more than 10 km (6 miles) – nearly half (52%) of the men and women in our sampling frame work in a different township from the one in which they reside. These cases generally represent people living in a suburban residential community but commuting to the neighboring urban center for work.

Expected income: The incomes that men and women expect in a particular region serve as the key independent variable in our analyses. Past studies of location choice have usually relied on the average wage in a region as a proxy for the income that an individual might expect from moving there (Dahl and Sorenson 2010b). The use of an average wage here, however, would have a number of disadvantages. Most importantly, husbands and wives would appear to expect identical wages in every region and therefore one could not determine

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[10]We excluded the island of Christiansø, which had only 55 residents.

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whether the prospective income gains for husbands and wives differed in their influence on where couples chose to live.

Our approach here therefore follows that of Dahl and Sorenson (2010b), who proposed that one could use the wages of similar others to create individual-specific counterfactual wages for what a person might earn in another region. In particular, we calculated person-specific expected income in two stages. In the first stage, using information on the full population of Danish blue-collar and lower-level white-collar employees, we estimated standard wage equations for men and women separately for each township (to allow the values of abilities and attributes to vary across regions), regressing the logged wage of each married employee living in the region in 2004 on age, age squared, number of years in the labor force, number of years in the labor force squared, tenure at the current firm, months of education, and indicator variables for education, occupation level, moving to a new region, and changing employers.[11] Estimating these equations separately for husbands and wives allows men and women to experience differential returns to equivalent human capital (e.g., Castilla 2008; Fernandez-Mateo 2009).

As noted above, to attach wages to regions, we used locations of residence rather than locations of employment (cf. Dahl and Sorenson 2010b). Doing so has the advantage of accounting for the possibility of commuting. Since our wage equations predict expected wages on the basis of where a person lives they essentially incorporate not just jobs in the focal region but also those in all surrounding regions to which residents of the focal region currently commute.

In estimating these wage equations, we only included married individuals for two rea-

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[11]We coded education into three categories: *Folkeskole* (primary education ending around age 15), *Gymnasium* (three years of secondary schooling) and college. For occupations, the IDA includes two classifications for blue collar workers, corresponding roughly to skilled and unskilled, and three for white collar workers (only one of which, lower-level white collar, occurs in our subsample).

sons: Firstly, the average married employee is older and more experienced than the average single employee. Though we included controls for both age and experience, extrapolating from the wage equations for single individuals to married men and women would require us to adopt rather strong assumptions about the functional forms of these factors on wages. Secondly, individuals select into marriage and therefore the composition of singles, both on observed and unobserved dimensions, may differ in meaningful ways that influence these wage equations.

Table 1 reports summary statistics for the coefficients from these 268 regressions (one for each township).[12] Overall, the coefficients produced by these regressions appeared stable and consistent with prior research. For example, in the average region, having a college degree increased expected income by roughly 9%. The returns to higher education nevertheless varied greatly, ranging from roughly zero in many regions to more than 30% in others.[13]

We then used those coefficients, combined with the actual characteristics of each person in our sample, to construct individual-specific *expected wages* for each township.[14] In particular, for each couple, we calculated separate expected wages for the husband and for the wife. We also assigned this expected income as the amount that couples could anticipate if they remained in their current locations.[15]

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[12]Because of insufficient observations in one region, we could only estimate wage equations for women in 267 regions. That region therefore drops out of the choice set.

[13]Note that the second and fourth columns report the dispersion on the estimated point estimates for the region-specific wage equations. One cannot use them to assess the significance of a factor overall. For example, nearly every one of the 268 regions showed a significant return to a college education at the $p = .05$ level but the returns varied more across regions than within them.

[14]We set firm tenure to zero and the mover and job change indicators to one for townships other than the individual's current township of employment.

[15]Alternatively, one might use their actual income for what they could expect to earn if they did not move, but actual income captures both the returns to gender, education, experience and the returns to unobserved characteristics. Mixing actual income with potential income could therefore bias the comparisons of the current place of residence to other locations (Dahl and Sorenson 2010b). Effectively, however, this choice had no real implications here as estimates using actual income for the current location produced statistically-equivalent results.

Since the theory concerns couples' consideration of *absolute* changes in income rather than of percentage changes, we exponentiated the predicted incomes before entering them into the location choice models. The coefficients can therefore be interpreted in terms of the implicit weighting of a unit (kroner or dollar) gain in expected income to the husband versus a unit gain in the expected income to the wife.

The models include three additional controls. *Current residence* is an indicator variable with a value of one for the region in which the couple currently resides. This variable captures both the financial and social costs of moving. *Distance to home*, meanwhile, measures the logged distance in kilometers between each couple's home address in 2004 and the centroid of each labor market to which they might move in 2005. Finally, *City size* captures the (logged) number of people residing in each municipality. Descriptive statistics for these variables appear in Table 2.

Results. Table 3 reports the results of our estimation. Model 1 represents our baseline model. Positive coefficients indicate factors that increase the odds that a couple chooses to live in a location. So, the results indicate (i) that couples have a tendency not to move, (ii) that, conditional on moving, they strongly prefer places closer to their current place of residence, and (iii) that higher expected wages for husbands attract couples.

Somewhat surprisingly, wives' expected wages actually have a negative coefficient, though the standard error indicates that one cannot reject the possibility that this coefficient does not differ from zero. Note also that this result does not stem from collinearity between men's and women's expected wages; entering the husband's and the wife's expected income independently produced roughly identical coefficients. This result also does not simply reflect differences in the predictive validity of the expected income measures (i.e. measurement error). In fact, the wage equations used to create these measures capture more of the

variation in women's wages than in men's. If anything, then, measurement error should bias our estimates of the importance of husbands' expected incomes downward more than our estimates of the importance of wives' expected incomes. Danish couples therefore do not appear to weigh wives' prospective wages in their choices of whether to move and where to live. We can also reject the neoclassical hypothesis that couples weight men's and women's wages equally ($t_{\beta_m = \beta_f} = 2.3$, $p < .05$).

After estimating this baseline model, we relaxed the assumption of the equivalent attractiveness of regions in three ways. First, we introduced a control for one of the most basic features of the region, its population (Model 2). Not only does this factor not appear to influence location choice but also it has no meaningful effect on the covariates for the other coefficients. Next, we introduced fixed effects for each labor market (Model 3).[16] These fixed effects flexibly allow couples to prefer some regions over others. For example, these fixed effects should capture differences in the attractiveness of regions due to variation in the cost of living. Controlling for these fixed region-specific factors nevertheless has little effect on the estimated importance of husbands' and wives' expected wages on location choice.

Despite the addition of these controls, however, the conditional logit still assumes that, net of these covariates, couples equally prefer all regions—the independence of irrelevant alternatives (IIA) assumption. Although the fact that the labor market fixed effects are jointly insignificant in Model 3 suggests that this assumption likely holds, couples might differ in the regions that they find attractive. To determine whether this assumption might influence our results, we therefore re-estimated the models in a random coefficients framework using the mixed logit, which does not assume IIA (Train 2003). The mixed logit produced essentially equivalent results to the conditional logit suggesting that – net of observables –

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[16]For labor markets, we use the 21 labor markets that Andersen (2000) defined on the basis of Danish commuting patterns.

Danish couples vary relatively little in their preferences for places.

Contribution to the gender wage gap

The effect that these asymmetric weights have on the gender wage gap depends on three additional parameters: (i) the variance in husbands' potential earnings across regions, (ii) the variance in wives' potential earnings across regions, and (iii) the correlation between husbands' and wives' potential earnings. If regions differ little in the potential earnings that they offer individuals, then asymmetry in the importance assigned to husbands' versus wives' earnings will have little effect on the gender wage gap because location choices have little effect on income. Also, even if regions vary substantially in the wages that they offer, if husbands and wives can generally expect the biggest gains to their individual earnings in the same places, then even an asymmetric weighting of these potential gains would do little to increase gender inequality.

But moving from the parameters in Table 3 to a calculation of the extent to which these implicit weightings contribute to the gender wage gap would involve a number of complex calculations. Most importantly, to the extent that households attempt to optimize, and therefore choose extreme values of the distributions, the calculations would have wide error bands. We therefore turned to an indirect method, estimating the importance of location choices off of the observed choices of single men and women and of couples.

To begin, let us decompose the overall gender wage gap along two dimensions: On the one hand, we want to distinguish the portion of the gender wage gap due to the choices of single men and women from that due to the joint choices of married couples. On the other hand, for each of these groups, we want to isolate the effects of the choice of location from systematic differences in earnings across all regions. The following equation can help us to

decompose the overall gender wage gap along these two dimensions:

$$Gap = p_{sm}(Opt_{sm} \times W_{sm}^{Max}) - p_{sf}(Opt_{sf} \times W_{sf}^{Max}) + \frac{p_c}{2}(Opt_{cm} \times W_{cm}^{Max} - Opt_{cf} \times W_{cf}^{Max}), \quad (3)$$

where p_{sm}, p_{sf} and p_c, respectively, refer to the proportion of the labor force represented by male single-earner households, female single-earner households and by dual-earner households, W^{Max} denotes the expected wage available in the region with the highest average wage for each man or woman, and Opt represents the degree to which each group effectively optimizes income in their location choice (calculated as the average expected wage in the region chosen relative to the region with the highest average wage).

Thus, the first term in the equation, $p_{sm}(Opt_{sm} \times W_{sm}^{Max})$, amounts to the proportion of single-earner male households times their average wage (because W^{Max} appears in the denominator of Opt it cancels out). The second term captures the proportion of single-earner female households times their average wage. The difference between these two terms therefore captures the proportion of the overall gender wage gap attributable to single men and women. The final term in the equation, meanwhile, calculates the proportion of the gender wage gap stemming from the differential earnings of husbands and wives. Some of this differential stems from the fact that husbands and wives differ systematically in their maximum potential earnings, captured by W_{cm}^{Max} and W_{cf}^{Max}; some of it stems from the fact that husbands and wives also achieve varying levels of these maximum potential earnings, captured by Opt_{cm} and Opt_{cm}.

Assuming that single and married individuals have hypothetically equivalent maximum earnings in each region, conditional on their human capital, allows us to rearrange the terms from this equation in a way that relates them more clearly to the mechanisms that the

represent. Consider the following algebraic rearrangement:

$$Gap = Opt_{sm} \times (p_{sm}W_m^{Max} - p_{sf}W_f^{Max}) + Opt_{cm} \times \frac{p_c}{2}(W_m^{Max} - W_f^{Max}) \quad (4)$$

$$+(Opt_{sm} - Opt_{sf}) \times p_{sf}W_f^{Max} + (Opt_{cm} - Opt_{cf}) \times \frac{p_c}{2}W_f^{Max} \quad (5)$$

The top line of this equation (4) represents the portion of the gender wage gap that accrues from processes that limit the earnings of women relative to men across all regions, including blatant discrimination, the sorting of women into particular industries and occupations with lower pay, and differentials in the accumulation of human capital. The second line (5), meanwhile, captures the portion of the gender wage gap that stems from systematic variation in the degree to which men versus women reside in regions where employers value their abilities and attributes.

Table 4 reports the components of this equation and the calculated amount and proportion of the gender wage gap that one can attribute to the choice of where to live as compared to other factors. The p_{sm}, p_{sf} and p_c in this table report the proportions of the blue-collar and lower-white-collar labor force represented, respectively, by single men, by single women and by couples. We used as the maximum wage for each individual the 90th percentile expected wage for a single man or woman with equivalent characteristics (W_m^{Max} and W_f^{Max} correspond to the average of these "maximums" for all blue-collar and lower-white-collar men and women). Using the 90th percentile reduces the sensitivity of our decomposition to outliers.[17] Using the wage equation coefficients from single individuals to calculate these maximum values, moreover, ensures that our calculated maximums for couples – most importantly, for wives – do not depend endogenously on couples' migration decisions. The Opt

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[17]Decomposition calculations using the 75th or 95th percentile as the maximum nevertheless generated nearly equivalent results.

values report the average percentage of this theoretical maximum wage actually achieved by each segment of the population. Overall, our decomposition indicates that the asymmetric importance of husbands' and wives' potential incomes to the choice of where to live can account for roughly 36% of the gender wage gap among blue-collar and lower-level white-collar employees.

Proximate versus ultimate causes

Though the evidence to this point suggests that the undue weight placed on the husband's versus the wife's expected earnings in the choice of where to live can account for a substantial portion of the gender wage gap in Denmark, this mechanism represents a proximate cause but not an ultimate one. Indeed, it begs the question of why couples would differ in the value that they placed on a dollar depending on who earned it. We explore four potential possibilities: (i) a shadow of the future effect: men working in occupations with steeper wage trajectories, (ii) a gendered geographic preferences effect: men and women bargaining on different dimensions in the migration decision, (iii) a motherhood penalty: the anticipation of the wife allocating more of her time to child care, and (iv) the devaluation of women's wages resulting from the intergenerational transmission of traditional gender roles.

Shadow of the future: One reason why even household-income-maximizing couples might not weight husbands' and wive's wages equivalently would be if the two differed in their implications for future streams of earnings because they had differing prospective wage trajectories. Gender inequality has been found to increase with age and with job tenure in a number of settings (Blau and Kahn 2000; Fernandez-Mateo 2009; Esteves-Sorenson and Snyder 2012). In other words, over time, men appear to receive larger raises than their fe-

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male counterparts. Though economists have suggested that women choose occupations with flatter income trajectories because they penalize mothers less for leaving the labor force (Polachek 1981), these diverging income trajectories may also reflect various forms of discrimination. Regardless of the the source of these differences, however, income-maximizing couples would respond to such a system by placing greater emphasis in their decisions on the husband's job prospects since, over time, the benefits of doing so would compound.

To examine whether differing wage trajectories might account for the greater importance of husbands' wages to location choice, we interacted the predicted wage for husbands and wives with a measure of their expected industry wage trajectories. Industries vary in the degree to which employees tend to receive wage increases over time. Our analysis essentially examines whether couples in which the husband works in an industry with a steeper wage trajectory weigh the husband's wage more heavily in their location choices. As a measure of the *wage trajectory*, we calculated the five-year earnings increase for all blue-collar and lower-white-collar employees in the same two-digit industry as the focal individual—income in 2004 divided by income in 1999. Since even within industries men and women probably segregate into different jobs with differing wage trajectories (Bielby and Baron 1986; England et al. 1988), we calculated these wage trajectories separately for men and for women.

Table 5 reports the result of a model including these interaction terms. Note that these models do not include the "main" effects of industry wage trajectories; the conditioning in the conditional logit acts much like a couple-specific fixed effect and therefore purges from the estimates any variables that do not vary within couples across regions. The coefficients suggest that differences in expected wage trajectories cannot explain the asymmetry in the importance of men's and women's wages in choosing places to live.

Gendered geographic preferences: Another possible explanation for this asymmetry is that men and women differ in the dimensions that attract them to particular places and therefore also over the dimensions on which they choose to bargain in intra-household decisions. Prior research, for example, suggests that women find it more difficult than men to separate their work and social lives and that they may place greater value on living near family and friends (e.g., Curran and Rivero-Fuentes 2003; cf. Beine and Salomone 2010). When choosing a place to live, they may therefore sacrifice moving to the best place for their career in order to live closer to loved ones.

To assess this possibility, we constructed several variables to capture the potential draw of husbands' and wives' family and friends. We began by constructing measures of *distance to husband's parents* and *distance to wife's parents*. We located both parents of each member of the couple in 2004 and calculated separate logged distances in kilometers from each possible township to these locations.[18] We also developed three pairs of measures to assess the importance of friends. First, since people often form strong bonds during childhood and therefore maintain strong preferences for living near their hometowns (Dahl and Sorenson 2010b), we constructed measures for the *distance to husband's hometown* and *distance to wife's hometown*.[19] Second, since people also form friendships in other places that they have lived, we created a second pair of measures: *distance to husband's prior residences* and *distance to wife's prior residences*. To do so, we identified every place that each member of the couple had lived from 1980 to 2004, calculated the logged distance between each of these prior locations and every township, and then averaged these distances. Third, we developed a measure of (probable) high school friends (*Husband's friends* and *Wife's friends*). Following

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[18]If the parents lived at different addresses, we averaged their distances.

[19]We do not always have complete information on where children lived from birth. We therefore used the location of the person's secondary school as a proxy for his or her hometown.

Dahl and Sorenson (2010b), we calculated, separately for the husband and the wife, the proportion of former classmates from the same graduating year and secondary school living in each township, j, in 2004, and divided this proportion by the proportion of individuals from the same school in each labor market that graduated either one year before or one year after the focal individual (to control for other factors that might influence the movement of individuals educated in one township to another township):

$$friends_{ij} = \frac{hs_{j\tau}}{(hs_{j\tau-1} + hs_{j\tau+1})/2},$$

where $hs_{j\tau}$ denotes the proportion of former students of a high school that graduated in year τ currently employed in region j.

The results of adding these factors to the model appear in the second column of Table 5. Couples apparently weigh three of these four factors in their decisions, showing a preference for living near places that they have lived in the past, for living near friends and for living near parents. However, couples appear to place roughly equal weighting on proximity to the husband's and to the wife's family and friends; in none of the pairs of measures, can we reject the null of equal coefficients (weights). Though these factors do help to explain the locations that couples choose, they cannot account for the asymmetry in couples' weightings of husbands' and wives' prospective wages.

Motherhood penalty: The greater tendency for women to leave the labor force and therefore to accumulate less human capital has often been cited as an important contributor to the gender wage gap (e.g. Mincer and Polachek 1974; Light and Ureta 1995; Bertrand et al. 2010). Traditional gender roles place the burden of child care on women and therefore wives frequently leave the labor force or reduce their participation in it during the period

surrounding the birth of a child. This fact might also influence location choices as income-maximizing households would want to weight wives' wages less heavily in their decisions if they thought that the wife might leave the labor force or reduce her participation in it and therefore contribute less to household income. Consistent with this idea, prior research has also found that geographic moves increase in frequency in the six months leading up to and the year following the birth of a child (Clark and Withers 2009).

To assess the extent to which differential expectations with respect to child care might influence couples' relative importance of husbands' and wives' potential wage gains to their location choices, we interacted two indicator variables with the expected wage variables. *Children* is an indicator variable for whether the couple has a child under 18 years of age in 2004. *Pre-school children*, meanwhile, takes a value of one for couples with a child under the age of six (and zero otherwise).

The results of these regressions appear in the third and fourth columns of Table 5. Once again, these models do not include the "main" effects since the variables do not vary within couples across regions. Although the presence of children in the household does not have a significant effect on the importance of husband's and wive's wages to location choice, the presence of pre-school children does. Notably, couples with pre-school children place significantly lower implicit weights on wives' wages in their choices of locations ($t_{\beta_m = \beta_f} = 2.35$, $p < .01$).

But it's not clear that this factor can completely account for the asymmetry in the importance of men's and women's potential wages to the attractiveness of regions. Note that with these interaction effects, the "main" effects for expected wages essentially capture the relative importance of expected wage gains for couples without pre-school children. Even among this set, the point estimates suggest that these couples may implicitly weight hus-

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band's wages as much as five times as heavily as wive's wages in their migration decisions, though the size of the standard errors suggests a high probability that the differences in these coefficients may also arise from chance ($t_{\beta_m = \beta_f} = 0.60$, $p = .28$).

Devaluing wives' wages: Finally, the greater importance of husband's potential wage gains to location choice may stem from within-couple beliefs about appropriate gender roles. In particular, couples may consider the role of generating income as more of the man's role (Thompson and Walker 1989; Shelton and John 1996). If so, then they may choose locations primarily for the benefit of the husband's career (Duncan and Perrucci 1976; Bielby and Bielby 1992; Shauman 2010).

Connecting this possibility to the data, however, is not without difficulty. Most studies have simply assumed that asymmetric weightings of husbands' and wives' human capital reflected such gender roles. But, as noted above, the neoclassical economics model, which assumes no such gender roles, could also account for those results. Bielby and Bielby (1992), by contrast, made a connection between self-reported intentions to move and gender roles through the use of survey data that included attitudinal questions about gender roles. Though useful in their setting, our longitudinal census data do not include any subjective questions that would allow us to asses couples' beliefs about gender roles.

Our approach to assessing the possible influence of gender roles stems from the idea that children may learn about these norms from the interactions of their parents. Psychologists have argued that children learn gender roles by observing their parents' behaviors (Bandura 1977). Consistent with this idea, studies have found that the gender roles parents display during the early years of their children's lives have a profound influence on the gender roles that those children assume as adults (Cunningham 2001; Fernandez et al. 2004; van Putten et al. 2008).

To assess whether the gender roles observed among parents might influence couples de-
cisions, we interacted expected wages with two indicator variables, one for the husband's
parents and a second for the wife's. Each of these variables, *husband's parent inequality* and
wife's parent inequality took a value of one if the father earned more, on average, than the
mother during the last five years, prior to age 60, in which both participated in the labor
force.[20] As one would expect given the gender wage gap, fathers generally earned more than
mothers. But substantial variation exists. Even among this earlier generation of parents,
the wife earned more than the husband in 20% of cases.

The final column of Table 5 reports the results of including these interaction terms.
Interestingly, the only significant coefficient is the interaction between the income differential
of the wife's parents with the weighting of the husband's expected wage. Given that the
"main" effect of the husband's expected wage falls to essentially zero, this interaction suggests
that the preferential weighting for husband's potential wage gains occurs only among couples
in which the wife's father had substantially higher income than her mother. Couples where
the wife's mother earned as much or more than her father, by contrast, appeared to weigh
husband's and wive's wages equally. The results therefore suggest (i) that beliefs about
gender roles matter to couples' location choices, and (ii) that the intergenerational transfer
of these beliefs to women appears most critical to couples' behavior.[21]

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[20]Because this variable requires information on five years of labor force participation for all four parents,
the inclusion of these variables requires us to exclude a number of cases in which one of the parents exited
the labor force before 1985, less than five years after the beginning of the IDA data.

[21]Though one might worry that men and women might marry those with similar backgrounds, limiting
our ability to distinguish the influence of intergenerational transmission through the husband's versus the
wife's side, gender inequality across the two sets of parents only correlated at $r = .13$.

Discussion

Social scientists have long suspected that the location decisions of couples might contribute to the gender wage gap, with couples systematically giving greater weight to husbands' careers in their choices (Mincer 1978; Bielby and Bielby 1992). Research to date has nonetheless been equivocal on whether this asymmetry might represent a rational response to the labor market, a maximization of household income, or might result from biased beliefs about gender roles and the relative importance of husbands' versus wives' employment. Extant research has also been largely silent on the proportion of the gender wage gap that this allocative asymmetry might explain.

We revisited these questions using the extensive data registries maintained by Statistics Denmark. By calculating individual-specific counterfactual wages for each region (on the basis of the income of others with similar observable characteristics), we could estimate directly the degree to which couples implicitly valued prospective wage gains for husbands and for wives in their choies of where to live. On average, Danish couples placed much greater weight on husbands' expected wages than on wives'. A decomposition of these effects suggests that this asymmetry could account for as much as 36% of the gender wage gap in Denmark.

Our results therefore suggest that the allocation of people to places supply side of the labor market contributes importantly to gender inequality. In trying to understand better the ultimate sources of these asymmetric geographic allocations, our analyses pointed to two prime suspects, both related to gender roles. First, we identified a motherhood penalty. Couples with young children placed less weight on wive's potential earnings. Interestingly, this effect exists despite the fact that Denmark has some of the more generous policies for providing state assistance in child care (Craig and Mullan 2010). Since our calculations

estimated the influence of absolute dollar gains and since our analyses excluded couples in which the wife did not maintain full-time employment, this differential weighting seems inconsistent with household income maximization. A more plausible explanation is that the presence of small children increases the salience of the wife's role as a caretaker and of the husband's role as an income provider.

Second, we observed a devaluation of wives' wages, particularly among couples where the wife had been exposed to more traditional gender roles in her childhood. Couples in which the wife's parents – but not the husband's – had greater gender equality in terms of their relative earnings weighted potential income gains equally. Asymmetric weighting therefore appeared primarily among couples where the wives' parents themselves had had more traditional gender roles. Recall that our analyses focused on blue-collar and lower-level white-collar employees. We therefore think it unlikely that this effect stems from a compositional difference in the kinds of jobs that these couples have. Rather, it appears that gender roles – at least in Denmark – pass from parents to daughters.

Though research on the intergenerational transmission of gender roles remains at an early stage, our results have interesting parallels with a number of prior studies. Cunningham (2001), for example, reports that the amount of time that fathers spend on housework at age one positively predicts sons participation in household chores at age 31 and that mothers participation in the labor force at age one has a negative relationship to the amount of time that daughters spend on housework at age 31. van Putten et al. (2008) similarly finds that Dutch women whose mothers participated in the labor force tend to work more hours. In all of these cases, as in ours, the transmission of non-traditional roles appears to run primarily from parents of the same gender to the child, consistent with some psychological theories that suggest that children model their beliefs about gender roles on what they observe their

same-sex parents doing (Johnson 1975).

More broadly, though useful in terms of empirical precision, our focus on a subset of the Danish population nevertheless raises at least two questions about the extent to which the results might generalize. First, would these joint geographic decisions also account for a similar proportion of income inequality among higher-level white collar workers, such as professionals? On the one hand, one might expect less asymmetry in the importance of men's and women's' careers to the location choices of the highly educated for at least two reasons. First, those with the most traditional gender roles might not even pursue higher education (Vella 1994). Second, exposure to alternative beliefs through college may influence the college-educated to adopt more gender-egalitarian beliefs (Funk and Willits 1987). On the other hand, the consequences of locating in the right region matters much more for these individuals. Professionals and other highly educated individuals have typically invested in highly specific skills and therefore their expected earnings vary much more from one region to the next (Dahl and Sorenson 2010a). As a consequence, even small asymmetries in the relative importance of husbands' and wives' careers to the location choices of these power couples could produce large levels of gender inequality in income. It therefore remains an interesting open question for future research.

Second, would one expect to see larger or smaller effects in other countries? Though again an open empirical question, we can at least say something about the factors that should determine the relative importance of these geographic decisions to the gender wage gap: First, one would obviously expect the importance of these joint decisions to increase with the asymmetry in the relative weightings placed by couples on husbands' and wives' wages. On this dimension, one would probably expect larger differences in other countries, as Denmark – relative to the rest of the world – has relatively low levels of gender segregation and gender

inequality (Craig and Mullan 2010; Hausmann et al. 2010). Second, the importance of these decisions should increase with the propensity of people to move in general. As populations become more mobile, location choices contribute more strongly to differences across individuals in earnings. Denmark, relative to its small size, has high levels of geographic mobility, on par with the United States (Dahl and Sorenson 2010b). By contrast, many other countries have lower levels of geographic mobility and therefore these joint choices may have less power for explaining gender inequality in those places. Finally, the importance of geographic choices should also increase with the degree of geographic variation in labor markets. On this dimension, one would probably expect much larger differences in most other countries. Denmark is relatively small and homogenous, about the size of Massachusetts, Rhode Island and Connecticut combined. The United States as a whole, or even countries like Italy or the United Kingdom, have much greater geographic scale and variation and therefore much larger opportunities for location to matter.

Though additional research remains to determine the extent to which these joint decisions influence gender inequality in other contexts, our results nonetheless contribute to the literature in a number of ways. First, we have introduced a critical test for discriminating between the gender-neutral neoclassical model and gender-biased migration, as well as a method for examining more directly the implicit weights that couples use in their joint choices of places to reside. Crucial to this method is an approach to specifying counter-factual wages for what each member of the couple might earn in another region. Second, we have devised a decomposition that allows researchers to connect these joint choices to the gender wage gap and to estimate the proportion of the gap that stems from the systematic mismatching of married women to regions that would most highly value their abilities and attributes. Finally, our analyses explore the ultimate mechanisms underlying these asymmetric weightings and find

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that – at least among Danish blue-collar and lower-level white-collar workers – they appear to stem from the combination of a motherhood penalty and the devaluation of women's work (outside the home).

Our results call additional attention to the role of allocative processes in the production of gender inequality. They therefore bolster the literature on gender sorting, which finds that men and women pursue different kinds of careers (e.g. Tam 1997), find themselves employed by different organizations and in different job titles (Petersen 1995; Fernandez and Sosa 2005, e.g.), and even apply to different sorts of jobs within organizations (e.g., Fernandez and Friedrich 2011). Here, the joint decisions of couples, prioritizing the man's earnings, creates a matching process that results in husbands being systematically better suited for their jobs than their wives.

As with other supply-side mechanisms, our results also suggest that public policies for eliminating gender income inequality may face a fundamental limit if they focus only on the discriminatory actions of employers. Even if all organizations operated in a completely gender-blind manner, if couples decide to locate in a manner such that married men sort systematically into labor markets better suited to them than their wives, then gender income inequality would still persist. That's not to say that public policy could not help to alleviate these disparities. But the policies to do so would need to focus either on education, which appears to move people away from traditional gender roles, or on promoting a more diverse set of employers in all regions, which decreases the likelihood that any individual has difficulty finding a well-matched employer in any particular place (Sørensen and Sorenson 2007).

Table 1: Wage equation coefficients

	Husbands		Wives	
	Mean	SE	Mean	SE
Age	0.003	0.036	0.014	0.255
Age^2 (/100)	-0.010	0.042	-0.018	0.030
Experience (Yrs since 1980)	0.011	0.025	0.022	0.018
Experience^2 (/100)	0.007	0.067	0.012	0.052
Months of education	0.001	0.001	0.001	0.001
Gymnasium	0.081	0.122	0.071	0.076
College	0.087	0.094	0.007	0.060
Firm tenure	0.002	0.003	0.001	0.003
In firm before 1980	-0.244	0.085	-0.046	0.080
Skilled blue collar	0.259	0.066	0.180	0.090
Lower white collar	0.064	0.049	0.057	0.084
Job change	-0.019	0.047	-0.014	0.051
Mover	-0.098	0.068	-0.103	0.063
Constant	5.343	0.681	4.606	0.526
R^2	0.227	0.060	0.265	0.058
N	678.2	855.4	808.4	1,075.3

Summary of the results of 268 regressions of 2004 wage
(267 for wives), one per township

Table 2: Descriptive statistics for the choice models

|	Chosen		Alternate	
	Mean	SE	Mean	SE
Expected wage (husband) (1000s)	329.9	54.9	323.0	51.82
× wage trajectory	400.5	96.16	392.0	131.8
× children	259.3	145.5	253.5	141.7
× pre-school children	110.7	158.4	108.0	154.4
× husband's parent inequality	138.5	167.8	134.8	163.2
× wife's parent inequality	144.9	168.6	141.2	163.9
Expected wage (wife) (1000s)	245.7	38.07	242.0	37.91
× wage trajectory	314.4	71.36	309.3	93.54
× children	190.7	106.1	187.8	104.6
× pre-school children	77.61	110.6	76.31	108.7
× husband's parent inequality	100.3	121.3	98.2	118.9
× wife's parent inequality	106.0	122.8	103.9	120.4
Current residence	0.981	0.137	0.000	0.008
Ln (Distance to home)	0.063	0.464	4.904	0.701
Ln (City size)	10.02	1.172	9.176	0.800
Ln (Distance to husband's parents)	2.195	1.872	3.745	2.153
Ln (Distance to wife's parents)	2.393	1.861	3.890	2.059
Ln (Distance to husband's hometown)	1.441	1.863	3.531	2.289
Ln (Distance to wife's hometown)	1.844	1.907	4.170	1.876
Ln (Distance to husband's prior residences)	1.189	1.192	4.902	0.688
Ln (Distance to wife's prior residences)	1.265	1.188	4.901	0.687
High school friends H	0.620	0.680	0.055	0.277
High school friends W	0.742	0.718	0.067	0.306
N	9,920		2,648,908	
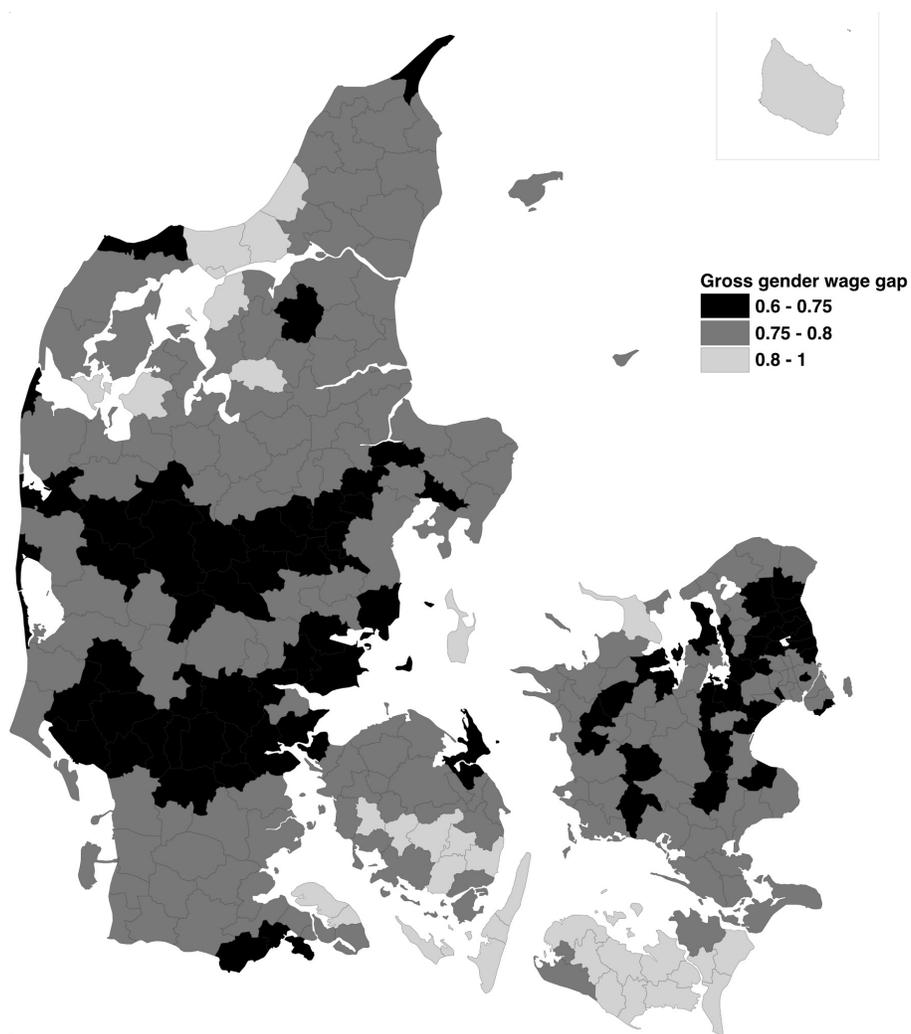
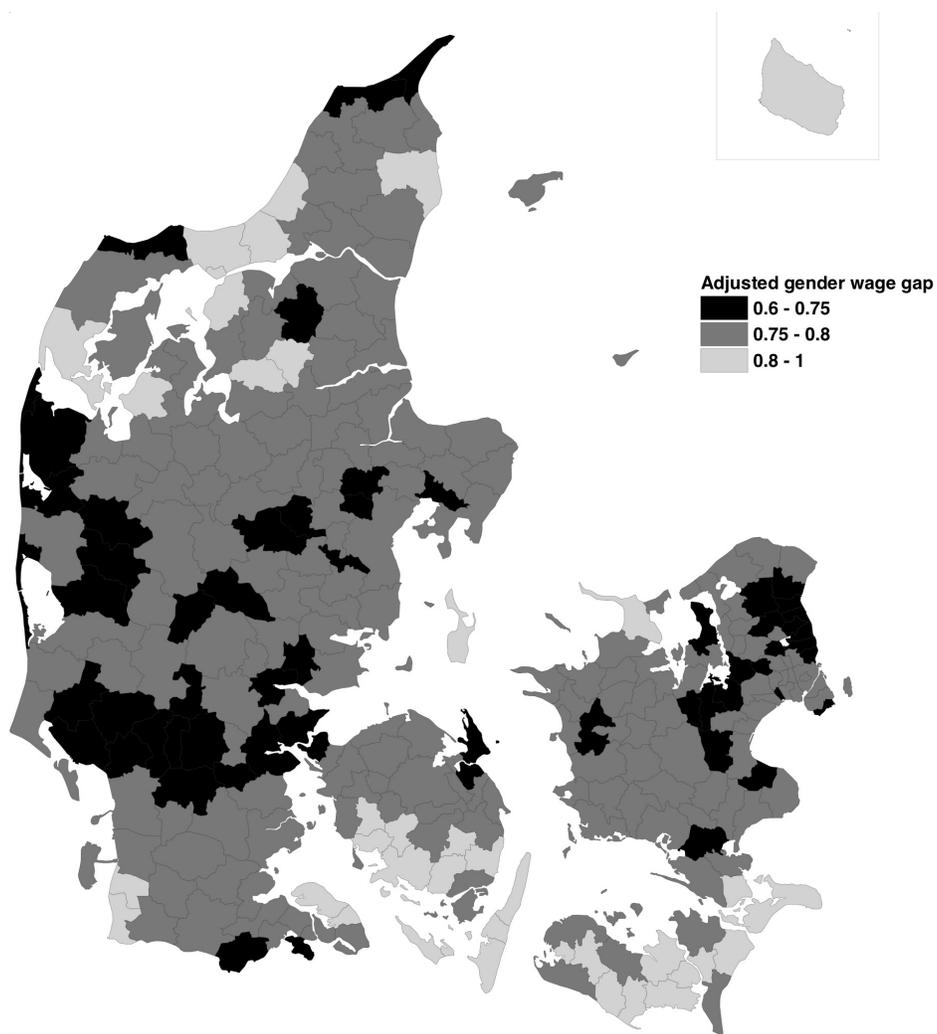Figure 1: Danish municipalities (kommuner) shaded by the gross gender wage gap

Figure 2: Danish municipalities (kommuner) shaded by the adjusted gender wage gap

Table 3: Conditional logit estimates on location choice

	(1)	(2)	(3)
Expected wage (husband)	0.006**	0.006**	0.006**
	(0.002)	(0.002)	(0.002)
Expected wage (wife)	-0.004	-0.004	-0.005
	(0.004)	(0.004)	(0.005)
Current residence	1.925**	1.912**	1.893**
	(0.246)	(0.248)	(0.250)
Ln (Distance to home)	-1.815**	-1.813**	-1.837**
	(0.071)	(0.071)	(0.073)
Ln (City size)		0.026	
		(0.054)	
Labor market fixed effects (21)	No	No	Yes
Log-likelihood	-1,679	-1,679	-1,670
Chi-squared	107,567	107,567	107,585
N	9,920	9,920	9,920

Table 4: Wage gap decomposition

Opt_{sm}	82.6%	
Opt_{cm}	94.1%	
Opt_{sf}	83.1%	
Opt_{cf}	84.1%	
p_{sm}	21.3%	
p_{sf}	23.8%	
p_c	54.9%	
W_m^{Max}	340,488	
W_f^{Max}	291,217	
Gap (structural)	28,017	64.1%
Gap (location choice)	15,709	35.9%

Table 5: Conditional logit estimates on location choice

	(4)	(5)	(6)	(7)	(8)
Expected wage (husband)	0.006*	0.006**	0.008†	0.005†	-0.005
	(0.003)	(0.002)	(0.004)	(0.003)	(0.006)
$\times$ wage trajectory	-0.000				
	(0.001)				
$\times$ children			-0.003		
			(0.005)		
$\times$ pre-school children				0.003	0.002
				(0.004)	(0.005)
$\times$ husband's parent inequality					0.001
					(0.005)
$\times$ wife's parent inequality					0.011†
					(0.006)
Expected wage (wife)	-0.008	-0.007	-0.002	0.001	0.008
	(0.006)	(0.005)	(0.010)	(0.006)	(0.014)
$\times$ wage trajectory	0.001				
	(0.001)				
$\times$ children			-0.006		
			(0.011)		
$\times$ pre-school children				-0.021*	-0.020†
				(0.009)	(0.010)
$\times$ husband's parent inequality					0.005
					(0.010)
$\times$ wife's parent inequality					-0.010
					(0.013)
Current residence	2.009**	2.673**	2.677**	2.663**	2.426**
	(0.299)	(0.266)	(0.266)	(0.265)	(0.317)
Ln (Distance to home)	-1.779**	-1.064**	-1.063**	-1.074**	-1.221**
	(0.088)	(0.090)	(0.090)	(0.090)	(0.112)
Ln (Distance to husband's parents)		-0.137†	-0.136†	-0.137†	-0.152†
		(0.076)	(0.076)	(0.076)	(0.091)
Ln (Distance to wife's parents)		-0.179*	-0.179*	-0.179*	-0.125
		(0.078)	(0.078)	(0.078)	(0.091)
Ln (Distance to husband's hometown)		0.039	0.039	0.039	-0.015
		(0.063)	(0.063)	(0.063)	(0.077)
Ln (Distance to wife's hometown)		-0.096	-0.095	-0.096	-0.146†
		(0.065)	(0.065)	(0.065)	(0.076)
Ln (Distance to husband's prior residences)		-0.387**	-0.389**	-0.383**	-0.248†
		(0.108)	(0.108)	(0.108)	(0.130)
Ln (Distance to wife's prior residences)		-0.372**	-0.372**	-0.368**	-0.197
		(0.113)	(0.113)	(0.113)	(0.136)
Husband's friends		0.598**	0.598**	0.600**	0.676**
		(0.058)	(0.058)	(0.058)	(0.071)
Wife's friends		0.577**	0.578**	0.577**	0.581**
		(0.061)	(0.061)	(0.060)	(0.067)
Labor market fixed effects (21)	Yes	Yes	Yes	Yes	Yes
Log-likelihood	-1,068	-1,511	-1,511	-1,509	-1,038
Chi-squared	77,023	107,903	107,903	107,908	59,247
Observations	44895	9,920	9,920	9,920	5,484

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