The Geography of Jobs and Couple Migration*

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Abstract

This paper studies how joint geographic constraints induced by partners' occupations influence couples' migration decisions. Using novel measures of geographic concentration and overlap of occupations, I find that highly concentrated occupations significantly limit couples' ability to relocate, although this is mitigated by the geographic overlap of partners' occupations. Additionally, I explore gender differences in occupational choices, showing that women, particularly college educated women, have increasingly selected into more geographically concentrated occupations. A shift-share decomposition reveals that the sharp decline in couple migration over the last few decades is primarily due to changes in migration patterns within different couple types rather than shifts in their composition.

Keywords: Labour mobility, economic geography, occupational segregation, couple migration

JEL Codes: J24, J61, J16

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1 Introduction

Couples face unique challenges when it comes to geographic mobility, especially when both partners are in the labour force (Mincer, 1978). In single-earner households, migration decisions are driven by the working partner's job opportunities. In dual-earner couples, instead, the ability to relocate depends not only on one partner's job prospects, but also on whether the other partner can accommodate the move and find suitable employment in the new location (Foerster and Ulbricht, 2023; Rueda and Wilemme, 2021). This ability is heavily influenced by the geographic concentration of the partner's occupation. The fewer the locations where their job can be performed, the more restricted the couple's mobility. Additionally, the feasibility of relocation depends on the overlap between the set of locations where both partners can work: higher overlap increases the likelihood that a job offer for one partner will be in a location where the other can also find employment.

This paper studies how the geographic concentration and overlap of partners' occupations influence couples' migration decisions. Over the last few decades, the increased participation of women in the labour force and the narrowing of gender differences in occupational choices have significantly influenced the types of couples that have formed. While most couples in the 1970s were single-earner households, there has since been a shift towards a majority of dual-earner households, who face the additional challenge of securing employment for both partners when considering relocation (Braun et al., 2021). Furthermore, as men's and women's occupational choices have become increasingly similar, the composition of dual-earner couples in terms of the occupations that partners hold has also changed (Blau and Kahn, 2013; Cortes and Pan, 2018). As a result, the location of occupations and the geographic overlap between them have become crucial factors in understanding aggregate migration trends.

I construct two measures to investigate how these two factors influence couple migration. The first is a measure of the geographic concentration of occupations, using a generalized version of Duncan's Dissimilarity Index (DDI) (Benson, 2014). This measure is based on the relative employment of an occupation in a given location compared to its total employment across all locations. The DDI can be interpreted as the proportion of workers in an occupation who would need to relocate to achieve an even distribution of employment across locations. Occupations that are more evenly distributed geographically have lower DDI values, indicating less concentration. Conversely, occupations with employment concentrated in fewer locations have higher DDI values. The DDI is calculated using data from the United States Decennial Census, using commuting zones as the geographic unit. For example, occupations such as cashiers or primary school teachers exhibit low geographic concentration, while miners or aerospace engineers have high concentration. I document that the average level of concentration has remained stable over time and that high-concentrated occupations typically employ smaller shares of the labour force.

The second measure focuses on the geographic compatibility of partners' occupations, which I capture through a geographic overlap index. For each occupation, I construct a vector containing the share of employment in each location relative to the total employment in that occupation across the United States. The degree of correlation between these vectors for any two occupations serves as the measure of their geographic overlap. This measure reflects the potential for partners in different occupations to co-locate. The index ranges from minus one to one, where one indicates perfect positive correlation, zero indicates no correlation, and negative one indicates perfect negative correlation. I find that there is generally a positive correlation between most pairs of occupations, suggesting that employment in an occupation in a location is often proportional to total employment in that location. Additionally, the overlap is lowest between occupations that are highly concentrated geographically.

In the first part of the analysis, I examine how the geographic concentration and overlap of occupations influence couple migration decisions. I argue that occupations that are more geographically concentrated offer larger potential gains from migration, which can incentivize relocation acting as a *push* factor. However, the limited geographic availability of these occupations also acts as a *brake* to migration, since couples must accommodate both partners' employment needs.

To isolate the influence of *push* factors on migration, I analyse single individuals, who do not face the co-location challenges that dual-earners do and, thus, respond more directly to the benefits of migration. Using data from the Current Population Survey (CPS), I find that individuals in more concentrated occupations are more likely to migrate for job-related reasons and experience larger earnings gains after moving. In contrast, among dual-earner households, a higher DDI in partner's occupation is associated with a lower likelihood of migration, which is indicative of *brake* factors kicking in. Additionally, couples where both partners work in high-concentrated occupations are more likely to experience occupation changes or unemployment following a move. This suggests a trade-off between the potential gains from migration and the constraints imposed by the need to find suitable employment for both partners, raising the question of which force ultimately prevails in couple migration decisions.

I shed light on this by directly studying the link between cross-county couple migration and the concentration levels of partners' occupations. Couples are categorized into five groups based on the geographic concentration of their occupations: single-earner households; low concentration couples, where both partners work in low-concentrated occupations; mixed concentration couples; high concentration couples with different occupations; and high concentration couples with the same occupation. Single-earner households migrate at higher rates than any other couple type, while high concentration couples with different occupations migrate the least. In this type of couples, both partners face significant geographic constraints, and the lack of geographic overlap further reduces their likelihood of relocating. Conversely, high concentration couples with the same occupation exhibit higher migration rates, highlighting the importance of overlap in mitigating the constraints imposed by geographic concentration. Explicitly studying the role of geographic overlap as a continuous variable, I confirm that this measure is associated with higher migration probabilities, reinforcing the idea that geographic compatibility between partners' occupations is a key determinant of couple migration.

As a next step, I will examine the causal relation between the geography of occupations and couple migration decisions by leveraging the staggered introduction of state-level occupational licensing requirements. Occupational licenses are government-issued credentials that workers must obtain to legally perform tasks within an occupation's defined scope of practice. These licenses have expanded significantly over the second half of the 20th century, with the share of workers affected more than doubling since 1970 (Carollo, 2025). Today, approximately one fifth of the United States labour force (over 30 million workers) is subject to occupational licensing. I propose to use the introduction of licensing requirements in new states as a source of variation that constrains the geographic scope of an occupation. This approach treats licensing as a shock to the location flexibility of certain occupations, allowing me to identify the causal impact of occupational geography on couples' migration decisions.

In the second part of the analysis, I turn to the evolving gender differences in occupational choices in relation to geographic concentration. First, I examine how men and women have historically selected into occupations with different levels of concentration. I find that traditionally male-dominated occupations, those employing more men at the beginning of the observation period in 1970, tend to be more geographically concentrated. However, I find that changes in the DDI of an occupation over time are independent of the initial gender composition of that occupation.

Second, I study the evolution of occupational concentration levels for men and women separately. To account for potential changes in the concentration of specific occupations, I set the DDI to its value in 1990. This allows focusing on shifts in the types of occupations chosen by men and women over time, keeping the geographic concentration of those occupations constant. The findings indicate that while the average concentration level of occupations chosen by men remains relatively stable throughout the observation period, the concentration level of occupations chosen by women increases steadily. This increase is driven primarily by college-educated women, who experience a steep increase in the concentration of their chosen occupations.

As a final exercise, I decompose the evolution of internal couple migration rates into two components: changes in the share of each couple type and changes in the migration patterns within each couple type, using a shift-share decomposition. The internal couple migration rate more than halved over the observation period, dropping from 6% in the early 1960s to nearly 2% by 2010, and stabilizing after the Great Recession. The decomposition reveals that this decrease is primarily driven by changes in the migration patterns of the different couple types rather than shifts in the composition of couple types.

I aim to extend this decomposition of couple migration choices to a simplified setting which features two representative cities that differ in the occupations that are available in each. There are three different occupations: a general occupation, which is present in both locations, and two specialized occupations, which are each only available in one city. Households differ in the occupations that the couple members have and make mobility decisions. I use the model to quantify the relevance of each of these factors in explaining the decline in migration rates and construct counterfactual scenarios of labour force participation.

Related literature. This paper contributes to the relatively small but growing literature on couple migration. First introduced by Mincer (1978), previous work has primarily focused on empirically documenting and theoretically assessing the co-location problem faced by dual-earner households (e.g., Alonzo, 2022; Costa and Kahn, 2000; Compton and Pollak, 2007; Foerster and Ulbricht, 2023; Rueda and Wilemme, 2021; Xing et al., 2022). Two key findings from this literature are the earnings penalties associated with tied migration, where one partner moves for the other's job, and the fact that men are often the initiators of moves (Blackburn, 2010; Burke and Miller, 2018; Boyle et al., 2001; Cooke et al., 2009; Gemici, 2007; Lundberg and Pollak, 2003; Nivalainen, 2004; Rabe, 2011; Taylor, 2007). As a result, tied migration has been shown to be a significant factor contributing to the gender wage gap (Blackburn, 2010; Jayachandran et al., 2023; Venator, 2022). A common explanation for the gender imbalance in migration initiation is the asymmetrical valuation of women's earnings, influenced by gender norms (Foged, 2016; Jayachandran et al., 2023). I propose that differences in potential gains from migration inherent to the occupations of men and women play a critical role in inducing gendered couple migration decisions.

Related research has examined the factors which make some couples more likely to migrate than others. Notably, couples where both partners are college-educated migrate more frequently (Costa and Kahn, 2000; Mariotti et al., 2017; Simon, 2019). However, subsequent research indicates that it is the husband's education that primarily drives this behaviour (Compton and Pollak, 2007; Kooiman and Das, 2022). Given the limitations of education as a differentiating factor, recent studies have shifted focus toward the role of occupations in determining couple migration behaviour, highlighting non-negligible heterogeneity in migration patterns even among similarly educated individuals (Alonzo, 2022; Benson, 2014, 2015; Mckinnish, 2008; Rueda and Wilemme, 2021; Venator, 2024). Building on Benson (2014), this paper studies how the geographic concentration of occupations influences couple migration decisions, suggesting that varying levels of concentration can drive different migration patterns, even within the same education categories. I extend this framework to consider the role of joint geographic constraints imposed by both partners' occupations.[1]

[1]Contemporaneous work by Venator (2024) also examines joint geographic constraints but focuses on their implications for earnings.

This paper also contributes to our understanding of occupational gender segregation and its impact on labour market outcomes. Although occupational segregation by gender has decreased over the last few decades (Blau et al., 2012; Cortes and Pan, 2018; Sloane et al., 2021), significant differences persist, continuing to drive the gender earnings gap (Goldin, 2014; Blau and Kahn, 2017). A key difference highlighted in the literature is that women tend to prioritize non-pecuniary job characteristics more than men, such as shorter commutes, flexible schedules, or lower earnings risk (e.g., Goldin, 2014; Le Barbanchon et al., 2021; Liu and Su, 2022; Mas and Pallais, 2017; Wiswall and Zafar, 2018; Zhang and Zou, 2023). This paper introduces a novel dimension in which preferences for occupations may differ by gender — namely, the geographic availability of occupations — and documents how sorting into occupations based on this dimension has changed over time.

Finally, this paper offers a new perspective on the decline in internal migration in the United States over the past few decades. While previous research has primarily attributed this trend to rising housing costs, declining location-based wage premia, and decreasing job changes (Ganong and Shoag, 2017; Jia et al., 2023; Johnson and Schulhofer-Wohl, 2019; Kaplan and Schulhofer-Wohl, 2017; Kennan and Walker, 2011; Molloy et al., 2011, 2017; Olney and Thompson, 2024), recent studies have highlighted the role of increasing female labour force participation in slowing couple migration rates (Braun et al., 2021; Guler and Taskın, 2018).[2] I posit that the observed decline in migration is not only due to the growing prevalence of dual-earner households but also to the changing composition of these households, with respect to their occupational characteristics.

Roadmap. Section 2 describes the data and the construction of the measure of geographic concentration and overlap of occupations. Section 3 presents evidence on the association between the geography of jobs and migration patterns. Section 4 describes occupational sorting based on geographic concentration across genders. Section 5 provides a decomposition of the decrease in couple migration rates. Section 6 concludes.

2 Data and Measures

2.1 Distribution of Employment across Locations

To analyse the spatial distribution of occupations, I make use of occupational employment data from the Decennial Census. I employ the largest available samples for each census year: the 1% sample for 1970 and 5% samples for 1980-2010. This extensive data set allows estimating the

[2]Studies based in other countries have also related internal migration patterns to other factors, such as the location of origin (Diaz et al. (2023) in Spain), local employment opportunities (Costa Dias et al. (2021) and Amior and Manning (2023) in the United Kingdom), or the introduction of the minimum wage (Dustmann et al. (2022) in Germany).

total number of individuals employed in each occupation across different locations at a given year.[3] Occupational classifications are standardized across census years using the Autor-Dorn crosswalks (Dorn, 2009; Autor and Dorn, 2013; Autor, 2015), which categorize occupations based on the 1990 Census classification, resulting in a balanced panel of 330 occupations.

The geographic units considered are the 1990 Commuting Zones (CZs). CZs are employment areas defined by commuting patterns, characterized by significant commuting flows within CZs and minimal commuting across CZ boundaries. The smallest geographic units identified in the Decennial Census are counties with populations exceeding 100,000 inhabitants. I use the crosswalks developed by Dorn (2009) and Autor and Dorn (2013) to construct CZs from county definitions across all census years, yielding a total of 741 CZs.

Figure 1 illustrates how employment in two different occupations is distributed across CZs, depicting the share of individuals employed in each occupation relative to the total employment in that occupation across the United States. Formally, let $n_{j,l}$ denote the number of individuals employed in occupation j and CZ l, and let n_j represent the total number of individuals employed in occupation j nationwide. These figures plot: $s_{j,l} = \frac{n_{j,l}}{n_j}$. Darker areas on the map indicate higher employment shares, while lighter areas denote lower shares.

Figure 1 (a) presents the spatial distribution of primary school teachers. While there is variation in employment shares across locations, with larger CZs exhibiting higher shares, this occupation is present in nearly all locations.[4] In contrast, Figure 1 (b) shows the spatial distribution of astronomers and physicists, who are concentrated in coastal areas and CZs with universities, with many CZs having no employment in this occupation. Hence, primary school teachers are relatively evenly distributed across locations, whereas astronomers and physicists exhibit high spatial concentration.

I use this metric to investigate how the spatial distribution of occupations affects couple migration decisions, constructing two measures: a measure of geographic concentration of occupations, which provides a notion of the difficulties that an individual in a specific occupation may encounter to find employment in any given location, and a measure of geographic overlap, expressing the compatibility of the set of locations where two partners with specific occupational combinations can find employment.

2.2 Measure of Geographic Concentration of Occupations

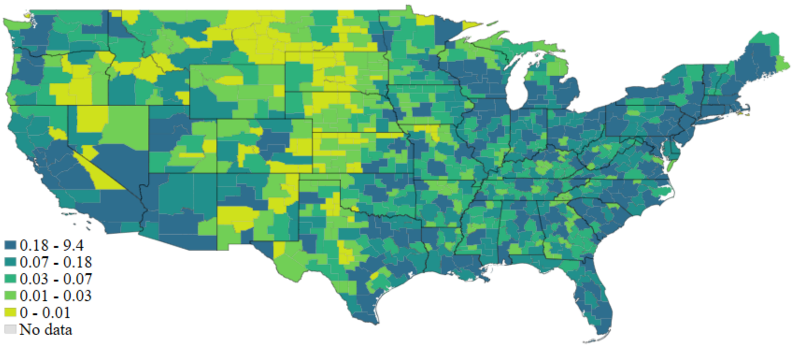
The measure of geographic concentration of occupations captures the differences in the spatial distribution of employment across various occupations in a parsimonious way. I use a gen-

[3]Since the aim is to proxy for total employment in an occupation within a location, I do not impose age restrictions to the individuals considered to construct this metric. I use all respondents with available information on location and occupation.

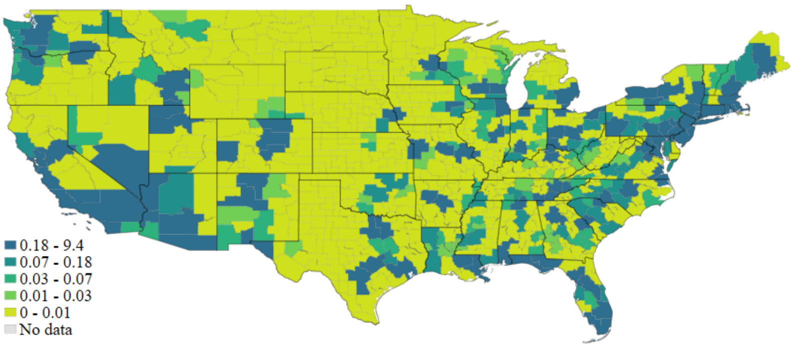
[4]Figure A.1 displays total employment shares across CZs. Employment shares are the highest in the Atlantic and Pacific regions, and it is most sparse in West Central and Mountain areas.

Figure 1: Share of total U.S. employment in each commuting zone by occupation.

(a) Primary school teachers



(b) Astronomers and physicists



Notes: This figure displays the share of total U.S. employment in each commuting zone for two occupations. Panel (a) presents the distribution for primary school teachers, and panel (b) does so for astronomers and physicists. Occupations are classified using the Autor-Dorn classification based on the 1990 Census. Commuting zones are defined using the Autor-Dorn crosswalk from counties to commuting zones. Employment shares are calculated using data from the 1990 U.S. Decennial Census.

eralized version of Duncan's Dissimilarity Index (DDI), as proposed by Benson (2014). This index builds upon the metric depicted in Figure 1. The pre-normalized DDI for occupation j is defined as:

$$DDI_j^* = \frac{1}{2} \sum_{L}^{l=1} \left| \frac{n_{jl}}{n_j} - \frac{n_l - n}{n - n_j} \right|$$

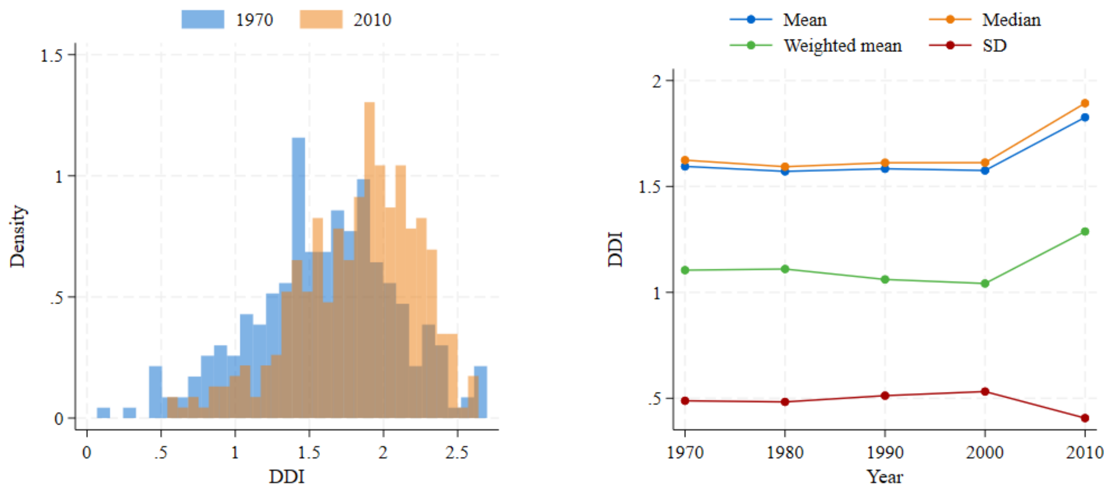
where $n_{j,l}$ denotes employment in location l and occupation j, n_j is the total employment in occupation j, n_l denotes total employment in location l, and n is total employment.

This measure can be interpreted as the share of individuals that would have to relocate to achieve an equal distribution of employment in occupation j across all locations. For example, the DDI* for primary school teachers is 0.067, who constituted 2.4% of the US labour force in 1990. This measure indicates that 6.7% of primary school teachers would need to relocate to ensure that they make up 2.4% of the labour force in each CZ. In contrast, the DDI* of astronomers and physicists is 0.307, who comprised 0.02% of the US labour force in 1990. Thus, 30.7% of astronomers and physicists would need to relocate to achieve a 0.02% employment share in each CZ.

The measure is then normalized computing the log of DDI_j^* and setting its lowest value to zero. Higher values indicate that employment in a given occupation is more concentrated in fewer locations, while lower values indicate a more equitable distribution across locations. Figure 2 (a) plots the distribution of the final DDI measure in 1970 and 2010, showing significant overlap with a slight shift towards higher concentration values in 2010. Figure 2 (b) displays the evolution of the measure over time across different Census years. The average concentration of occupations remains relatively stable, with a slight increase in 2010.[5] When weighted by total employment in the occupation, the average measure shifts downwards, indicating that more concentrated occupations tend to employ fewer workers on average.

Figure 2: Characterization of Duncan's Dissimilarity Index.

(a) Distribution (b) Evolution



Notes: This figure characterizes the distribution and evolution of Duncan's Dissimilarity Index (DDI), which measures the geographic concentration of occupations (Benson, 2014). The index is constructed using the Autor-Dorn occupational classification and commuting zone definitions, using data from the 1990 U.S. Decennial Census. Panel (a) displays the distribution of DDI across occupations in the 1970 and 2010 Census years. Panel (b) presents different moments of the DDI distribution across all available Census years, including the mean, the employment-weighted mean (using total occupation employment as weights), the median, and the standard deviation.

To further test the stability of this measure over time, Figure A.2 plots the ranking of occupations by their DDI percentile in 1970 against their rank in 2010. Despite some dispersion, the relative ranking of occupations remains largely consistent. I formally test the similarity between these two orderings computing Spearman's rank correlation. The resulting coefficient $\rho = 0.83$ confirms that the ranking of occupations is preserved over time.

Taking advantage of the stability of DDI over the observation period, I classify occupations into two groups based on their concentration levels in 1990. The top tercile of occupations in terms of concentration (110 occupations) are classified as high-concentrated. The remaining

[5] This increase coincides with the Great Recession, when unemployment peaked and was unevenly distributed across occupations (Yagan, 2019).

220 occupations are classified as low-concentrated.[6] Since high-concentrated occupations employ relatively fewer workers, as seen in Figure 2, the high group comprises about 20% of the labour force in the 1990 census.

Couples are classified into five groups based on the labour force status and the occupation of the couple members. When only one partner is active in the labour force, the couple is classified as a *single*-earner couple. I distinguish four groups within couples where both partners are active in the labour force, or dual-earner couples: in *low* couples both partners are in low-concentrated occupations; *mixed* couples have a partner in a low-concentrated occupation and the other in a high-concentrated one; both partners have a high-concentrated occupation in *high* couples, but their occupations differ; and *same* occupation couple members share the same. high-concentrated occupation.

2.3 Measure of Geographic Overlap

In addition to examining the nature of partners' occupations in terms of their geographic availability separately, studying joint migration decisions requires understanding the joint geographic constraints of a couple. To this end, I construct a measure of geographic overlap for any pair of occupations. First, I set up a vector for each occupation that contains the distribution of employment across CZs. Each occupation-CZ cell contains the share of total employment in j in CZ l, denoted as $s_{j,l}$. This is the ratio plotted in Figure 1. I then compute the degree of correlation between any two pairs of occupations, based on these vectors.

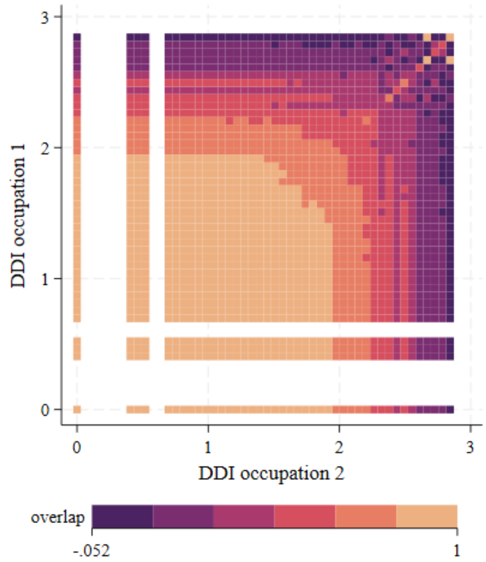
Being a correlation measure, overlap ranges between minus one and one. Positive values indicate a positive correlation, while negative values indicate the opposite. A measure close to zero suggests a lack of correlation between the geographic distribution of any two occupations. Thus, the overlap between two occupations located in the same areas will be one, whereas the overlap between two occupations that are randomly distributed in space will be close zero. I set the overlap between non-employment and any other occupation to be one, given that not being part of the labour force entails no restrictions to labour mobility.

Consider a couple where one partner is a lawyer and the other is a paralegal. Although these occupations differ, they are complementary and often located within the same areas. Hence, their overlap measure is expected to be close to one, indicating high geographic compatibility. In contrast, take a couple where one partner works in finance, primarily located in financial hubs, while the other is a conservation scientist, predominantly based around national parks and university areas. The locations where they can both find employment are not compatible, resulting in a less favourable overlap measure.[7]

[6] Table A.1 lists the ten most and least concentrated occupations.

[7] The overlap measure for lawyers and paralegals is 0.977, which is remarkably close to one. For financial managers and conservation scientists, instead, geographic overlap amounts only to 0.391.

Figure 3: Distribution of geographic overlap and DDI levels.



Notes: This figure presents the distribution of the geographic overlap measure for pairs of occupations with different levels of Duncan's Dissimilarity Index (DDI). The overlap measure is constructed by computing the correlation between occupation-specific vectors, where each vector represents the share of the total U.S. population in each commuting zone. Each occupation has a unique vector, with elements summing to one across all commuting zones. The DDI captures the geographic concentration of occupations (Benson, 2014). Occupations are classified using the Autor-Dorn classification based, on the 1990 Census, and commuting zones are constructed using the Autor-Dorn crosswalk from counties to commuting zones. Both measures are computed using data from the 1990 U.S. Decennial Census.

Figure 3 presents the distribution of the overlap measure in 1990, separately for occupations with different degrees of geographic concentration. The distribution is skewed towards higher values, with negative overlap being a rare occurrence.[8] Intuitively, overlap is higher for less concentrated occupations, as broader geographic availability increases the compatibility with other occupations. Overlap becomes a significant concern for pairs of occupations that include at least one highly concentrated occupation. Consequently, overlap is likely to be an issue mainly for couples where both partners are in high-concentrated occupations, or where one partner is in a high-concentrated occupation and the other is not.

2.4 Data Sources

Current Population Survey. The main data source used for migration is the Annual Social and Economic Supplement of the Current Population Survey (CPS). This data set contains information on a rich set of individual- and household-level social, demographic and economic characteristics. The supplement contains detailed information on occupation at the time of the interview and one year before, for all members of the household. It allows identifying spouses

[8]Negative values are predominantly observed for pairs of occupations including extractive occupations (e.g., drillers of oil wells, miners), professional speciality occupations (e.g., material engineers, physicists and astronomers), or machine operators (e.g., textile operatives, shoemaking machine operators).

within the household, providing information for both couple members.

Crucially, the supplement provides information on the migration status of the household. Specifically, respondents are asked whether they changed residence since March of the previous year and, if so, about the spatial scope of their move: within the same county, across counties but within the same state, between states or from abroad. I define cross-county migration as the sum of all households reporting moving between counties, regardless of whether the move was within or across states. This information is available since 1963, being irregularly provided during the 1970s.[9]

Migration rates are computed using households whose heads are civilians and in working age (18-65 years old), and where at least one of the couple members is participating in the labour force. However, migration patterns only minimally vary when removing these restrictions. I focus on married couples, since the CPS only started documenting unmarried partners in 1995.

Bureau of Labor Statistics data. Occupations are classified based on their educational requirements, based on the 2022 Employment and Total Requirements matrix constructed by the Bureau of Labor Statistics (BLS). This matrix provides educational degree requirements for occupations, based on the 2018 Standard Occupational Classification (SOC). This occupational classification contains about 830 occupations in its most detailed, six-digit classification. Each detailed SOC occupation is weighted by the total number of workers in that occupation, using the Occupational Employment and Wage Statistics data. This is an employer-based survey that provides yearly estimates of the number of individuals employed in each occupation. Using those weights, I aggregate the SOC occupations to the Autor-Dorn classification, using the BLS crosswalks. College occupations are those where at least half of the individuals require at least a college degree. The rest of the occupations are considered not to require college education.

3 Joint Geographic Constraints and Migration

3.1 *Push* and *Brake* Factors

To understand the implications of joint geographic constraints on migration, it is essential to formalize how geographic concentration and overlap may influence migration decisions. There are two opposing forces at play. On the one hand, *push* factors make migration more appealing for individuals in highly concentrated occupations. On the other hand, high geographic concentration of a partner's occupation can act as a *brake* on migration, exacerbating the co-location

[9] Specifically, years 1972-1975, 1977-1980, 1985 and 1995 are lacking the migration data.

problem.

For single-earner households, the *push* factor associated with the active partner's occupation drives migration decisions. Occupations with varying geographic availability present different migration opportunities. I hypothesize that single earners in more concentrated occupations are more likely to migrate for new job opportunities. This is because occupations with higher geographic concentration tend to be more profitable and require greater mobility from workers. I test this hypothesis and examine whether more concentrated occupations are indeed associated with more favourable post-migration outcomes, such as higher wages or lower probabilities of unemployment.

In dual-earner households, the partner's occupation can act as a *push* in migration decisions by creating additional migration opportunities. However, it can also function as a *brake*, introducing challenges to relocation. Limited geographic availability of occupations exacerbates the co-location problem, increasing the likelihood that couples will face the trade-off between remaining in the current location, with both partners employed, or relocating to a new area, where only one partner might find suitable employment, leaving the other either unemployed or forced into a less favourable occupation with potentially lower earnings.

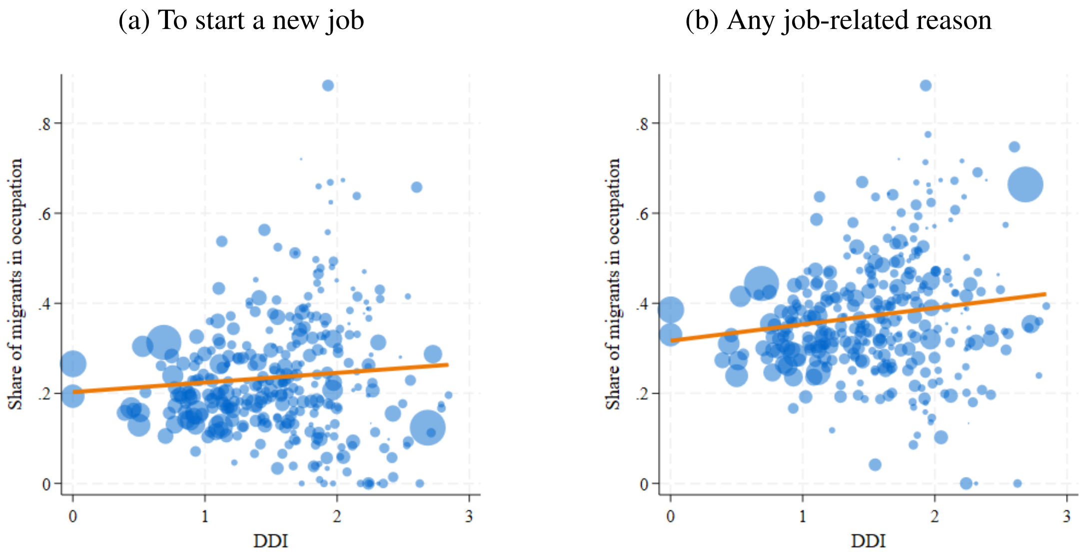
***Push* factors.** I argue that more geographically concentrated occupations also involve more migration opportunities. To test this, I examine the occupations with the highest rates of migration for job-related reasons. I obtain information on migration reasons from the CPS, with available data starting in 1999. An individual is said to have migrated for job-related reasons if they report to have relocated for an existing new job, to look for work, for easier commute, due to retirement, or for other job-related reasons.[10] As shown in Figure B.1 (a), among all cross-county migrants, approximately 36% migrate due to work-related reasons, being the largest broad reason for relocation. Figure B.1 (b) displays this share over the observation period, which has remained largely stable throughout, with a noticeable decline in 2021, likely due to the impact of COVID-19. Additionally, it indicates that around 25% of cross-county migrants do so for a new job in any given year.

I investigate whether occupations with higher geographic concentration are associated with a larger share of individuals migrating for job-related reasons. Figure 4 illustrates the relation between the share of individuals in an occupation migrating for job-related reasons and the occupation's DDI. The figure separately considers (a) the share migrating for a new job and (b) the share migrating for any job-related reason. In both cases, the association is positive, with a stronger correlation for any job-related reasons.

To examine this association at the individual level, I focus on single households. As dis-

[10]The other response options include family motives, like moving with one's partner; housing reasons, such as wanting a better neighbourhood or cheaper housing; and other reasons, which include education, health or safety motives.

Figure 4: Migrating for jobs and geographic concentration.



Notes: This figure presents the association between an occupation's degree of geographic concentration (measured by the Duncan Dissimilarity Index, DDI) and the share of cross-county migrants within that occupation who migrated for different reasons. Panel (a) shows the share of migrants who moved to start a new job, and panel (b) displays the share who migrated for any job-related reason. The DDI is constructed using data from the 1990 U.S. Decennial Census. Information on migration decisions and reasons comes from the March Supplement of the Current Population Survey. Marker sizes reflect the relative employment size of each occupation. Migrants are identified as individuals who report having moved across counties during the previous 12 months.

cussed earlier, dual-earner households face additional considerations in migration decisions. Single individuals, instead, react primarily to job prospects. Table 1 (1) presents the results from regressing the probability of having migrated for job-related reasons on DDI, in the sample of cross-county migrants. Controls include year dummies, age, sex, college education, race and family size. The positive coefficients associated with job-related reasons confirm the positive relations depicted in Figure 4.

Next, I investigate whether labour market outcomes after migration differ across individuals based on the concentration of their occupations before migrating. This analysis aims to determine if more concentrated occupations yield greater benefits from migrating. The outcomes considered include the probability of changing occupations, the probability of becoming unemployed, and changes in labour earnings after migration. Table 1 does not reveal a clear correlation between DDI and any of these outcomes. Column (7) indicates a marginal increase in labour earnings after migration, but the coefficients for occupation changes and unemployment are not statistically different from zero.

Previous literature has pointed out the relevance of educational attainment as a determinant of migration decisions with college educated individuals being more responsive to migration opportunities (Amior, 2022; Costa and Kahn, 2000; Compton and Pollak, 2007; Wozniak, 2010). There may be structural differences between high-concentrated occupations that require a college degree and those that do not. Non-college high-concentrated occupations are often tied to specific geographic areas due to natural constraints, such as those related to mining and other natural resource extraction industries. In contrast, high-concentrated college occupations are often associated with industries that could, in theory, have more flexibility in choosing their locations.

The even columns in Table 1 reveal heterogeneity in this dimension. First, individuals in high-concentrated college occupations migrate for jobs more frequently than those in occupations without college requirements. Second, individuals in highly concentrated occupations that do not require a college degree tend to change occupations more often after relocation, whereas the opposite is true for those in highly concentrated occupations with college requirements. Finally, although the differences in labor earnings changes between college and non-college occupations are not statistically significant, the positive earnings change appears to be driven primarily by occupations that require a college degree.

Table 1: Migration of single individuals and geographic concentration.

	Migrate for job		Occ. change		Unemployment		Labor earnings	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DDI	0.0154***	0.0063*	0.0041	0.0436***	-0.0022	0.0014	0.0680*	0.0484
	(0.003)	(0.003)	(0.005)	(0.005)	(0.002)	(0.003)	(0.035)	(0.041)
College occ. × DDI		0.0135*		-0.1064***		0.0026		0.0344
		(0.008)		(0.010)		(0.005)		(0.072)
Year dummies	✓	✓	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	0.246	0.248	0.018	0.026	0.027	0.028	0.277	0.279
Observations	43772	43527	43731	43527	43772	43527	2867	2854

Notes: This table presents the association between various outcomes and individuals' occupation's degree of geographic concentration (measured by the Duncan Dissimilarity Index, DDI). The sample consists of single household heads in the Current Population Survey, who reported moving across counties in the past 12 months. Columns (1) and (2) examine the probability of migrating for a job. Columns (3) and (4) analyse the likelihood of changing occupations after moving. Columns (5) and (6) assess the probability of being unemployed post-move. Columns (7) and (8) evaluate changes in labour earnings after migration. All specifications control for sex, a quadratic term for age, college education, family size, and race. Even-numbered columns include an interaction term between occupational DDI and a dummy variable indicating whether an occupation requires a college degree. Standard errors clustered at the state level are reported in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

***Brake* factors.** The analysis above suggests that geographic concentration is associated with stronger incentives to migrate. In dual-earner households where both partners are in highly concentrated occupations, one might expect higher migration rates, given that both partners face greater incentives to relocate for job opportunities. However, when considering migration decisions within couples, the issue of co-location becomes a critical factor. If a job offer requires relocation for one partner, the decision to move is not based solely on the potential benefits for that individual. Instead, the couple faces a trade-off between remaining in the current location, preserving employment for both partners, or relocating, which may enhance one partner's career prospects at expense of the other's.

To examine how brake factors influence couples' migration decisions, I analyse how the probability of relocating for a job is affected not only by an individual's own occupation but also by their partner's occupation. I conduct this analysis by regressing the probability of migrating for a job on the DDI of both partners' occupations. The results, presented in Table 2, indicate a positive association between an individual's DDI and the probability of migrating for job-related reasons. Conversely, partner DDI shows a negative association, although this correlation is not statistically significant.

Table 2: Moving for a new job and geographic concentration.

	(1)	(2)
DDI	0.0066**	0.0042
	(0.003)	(0.003)
Partner DDI	-0.0015	-0.0004
	(0.002)	(0.002)
Year dummies	✓	✓
Controls		✓
R-squared	0.002	0.012
Observations	17697	17697

Notes: This table presents the association between migrating for job-related reasons and the geographic concentration of both partners' occupations geographic concentration (measured by Duncan's Dissimilarity Index, DDI). The sample consists of married household heads in the Current Population Survey, who reported moving across counties in the past 12 months. Column (2) controls for sex, a quadratic term for age, college education, family size, and race. Standard errors clustered at the state level are reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Using the couple types defined in Subsection 2.2, I further investigate the post-migration outcomes of married couples. The outcomes of interest are the probabilities that at least one partner changes occupations and that at least one partner becomes unemployed after migrating. Each couple type is included in the regression analysis, with single-earner households serving as the baseline category.

Table 3 presents the results of this estimation. Compared to single-earner households, where the co-location problem does not play a role, the probability of changing occupations after migrating is higher for all couple types, except for those where both partners share the same occupation. Intuitively, couples with the same occupation do not face the same constraints in finding employment in the new location, given the perfect geographic overlap of their occupations. Moreover, the ordering of probabilities aligns with the level of geographic constraints: couples where both partners are in low-concentration occupations exhibit the lowest probabilities, as both partners have greater ease in securing new employment, while those in high-concentration occupations with no occupational overlap exhibit the highest probabilities.

A similar pattern emerges for the probability of becoming unemployed, with the exception that there is no significant difference between single-earner households and dual-earner households where both partners share the same occupation.

Table 3: Concentration and post-migration outcomes of couples.

	(1) Occ. change	(2) Unemployment
Both low	0.0842***	0.0504***
	(0.007)	(0.004)
Mixed	0.0990***	0.0808***
	(0.009)	(0.007)
Both high	0.1908***	0.0694***
	(0.034)	(0.018)
High, same occ.	-0.2307***	0.0123
	(0.022)	(0.030)
Year dummies	✓	✓
Controls	✓	✓
R-squared	0.038	0.033
Observations	42174	46249

Notes: This table presents the association between couple type, in terms of the geographic concentration of partners' occupations (DDI), and the probability of changing occupations and unemployment after migrating. The sample consists of married household heads in the Current Population Survey, who reported moving across counties in the past 12 months. Couple types are defined in Subsection 2.2. The baseline category are single earner households. All specifications control for sex, a quadratic term for age, college education, family size, and race. Standard errors clustered at the state level are reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.2 Couple Migration Decisions

I study whether the geographic concentration of the occupations held by the two members of the couple influences their migration decisions. I argue that migration patterns differ by couple type. Single-earner couples are the least restricted to migration: since they do not have to find a job for both partners, they can easily respond to job-motivated moves of the active partner. Low couples have the most flexibility to move out of the dual-earner couples. However, the incentives to move of these couples is arguably the lowest. Similar to single-earners, mixed couples should be able to accommodate for moving requirements of the high-concentrated partner. I hypothesize that high couples experience the largest barriers to migration, due to the restricted geographic availability of jobs for both partners and the lack of overlap in the locations of their occupations. For same occupation couples, instead, geographic restrictions exist, but the set of suitable locations is the same for both.

I study how couple type correlates with couple migration estimating the following regression:

$$y_{i,t} = \alpha^{L}_{i,t-1} + \alpha^{M}_{i,t-1} + \alpha^{H}_{i,t-1} + \alpha^{S}_{i,t-1} + \mu_t + X_{i,t}\beta + u_{i,t} \quad (1)$$

The dependent variable $y_{i,t}$ indicates whether the couple migrated during the last 12 months. On the right-hand side, $\alpha^{c}_{i,t-1}$ for $c \in \{L, M, H, S\}$ are dummies for low, mixed, high and same couples, where single-earner couples are taken as a baseline. Couple type is defined in $t-1$, when the migration decision is made. The specification also includes the full set of period dummies μ_t and controls for age, college education, race and the number of children of both partners.

Table 4 displays the estimates from Equation 1 on the CPS sample of married couples aged 30-55.[11] All coefficients are negative and significant, indicating that all types of dual earner couples migrate at lower rates than single earners, the baseline category. In line with the hypotheses listed above, the lowest coefficient corresponds to high couples, and the least negative to couples that share the same occupation.

Table 4: Internal migration by couple type.

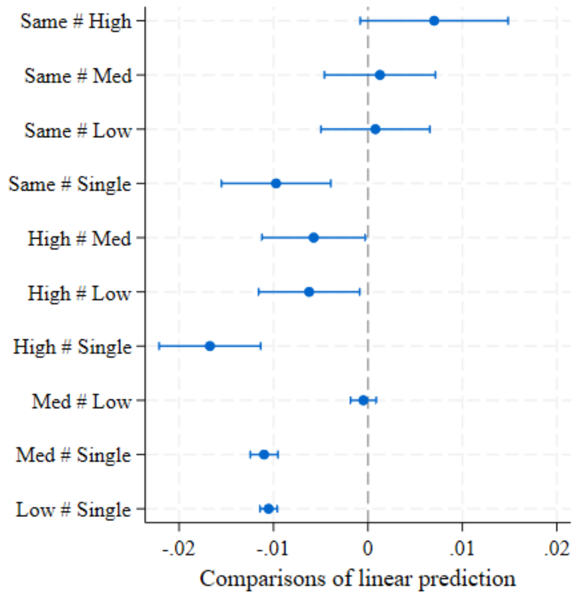
	(1)	(2)
Both low	-0.0118***	-0.0105***
	(0.000)	(0.000)
Mixed	-0.0115***	-0.0110***
	(0.001)	(0.001)
Both high	-0.0170***	-0.0167***
	(0.003)	(0.003)
High, same occ.	-0.0112***	-0.00972***
	(0.003)	(0.003)
Year dummies	✓	✓
Controls		✓
R-squared	0.004	0.011
Observations	1007484	932740

Notes: This table presents the results from estimating Equation 1 on the sample of married household heads in the Current Population Survey. The outcome is defined as reporting to having moved across counties in the past 12 months. Couple types are defined in Subsection 2.2. The baseline category are single earner households. All specifications control for sex, a quadratic term for age, college education, family size, and race. Standard errors clustered at the state level are reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

I assess whether couples of different types migrate statistically differently, comparing the predictive margins of each couple type pairwise. The results are plotted in Figure 5. Note that the comparisons including single earner couples are equivalent to the coefficients estimated in Table 4. Notably, high couples migrate significantly less than any other type of couple. However, the differences between the rest of the couple types are not statistically different

[11] The age restriction is made to accommodate for potential changes in marriage patterns over time, maximizing the comparability of couples.

Figure 5: Differences in migration across couple types.



Notes: This figure presents the pairwise differences in predictive margins across couple types. The predictive margins are derived from the estimation results reported in Table 4, column (2). Couple types are defined in Subsection 2.2. The figure also includes 95% confidence intervals.

from zero.

Despite being geographically constrained in the number of locations where they can work, partners in high-concentrated couples who share the same occupation benefit from perfect overlap in the set of locations where they can find suitable employment. I next study the role of geographic overlap in determining couple migration. As seen in Figure 3, overlap is most relevant for high-concentrated occupation pairs, being close to one for pairs of occupations with lower concentration.

Table 5 displays the results from regressing the usual cross-county migration dummy on the geographic overlap measure. All else equal, a unit increase in the overlap measure is associated with a one percentage point higher probability of migrating, a considerable size given that couple migration ranges between 3-6% in the observation window.

4 Occupational Choices Over Time

In this section I empirically test some hypotheses related to gender differences in occupational choices based on the geographic concentration measure. First, I verify that occupations that traditionally employed more men are also more geographically concentrated. Second, I study the evolution of the level of concentration of the occupations held by women and men separately.

Table 5: Couple migration and geographic overlap of occupations.

	(1)	(2)
Overlap	0.010***	0.008**
	(0.003)	(0.003)
Year dummies	✓	✓
Controls		✓
R-squared	0.0000	0.0241
Observations	776965	776965

Notes: This table presents the association between the probability of migrating across counties and the geographic overlap between partners' occupations. The sample includes married household heads in the Current Population Survey. The outcome is defined as reporting to having moved across counties in the past 12 months. Geographic overlap is measured before migration occurs. Column (2) controls for sex, a quadratic term for age, college education, family size, and race. Standard errors clustered at the state level are reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.1 Concentration of Traditionally Gendered Occupations

I start by showing that occupations that traditionally employed more men are more concentrated than occupations that traditionally had a larger share of women employed. To look at *traditional* employment levels of an occupation, I use the share of women employed in each occupation at the beginning of the observation period, in 1970.

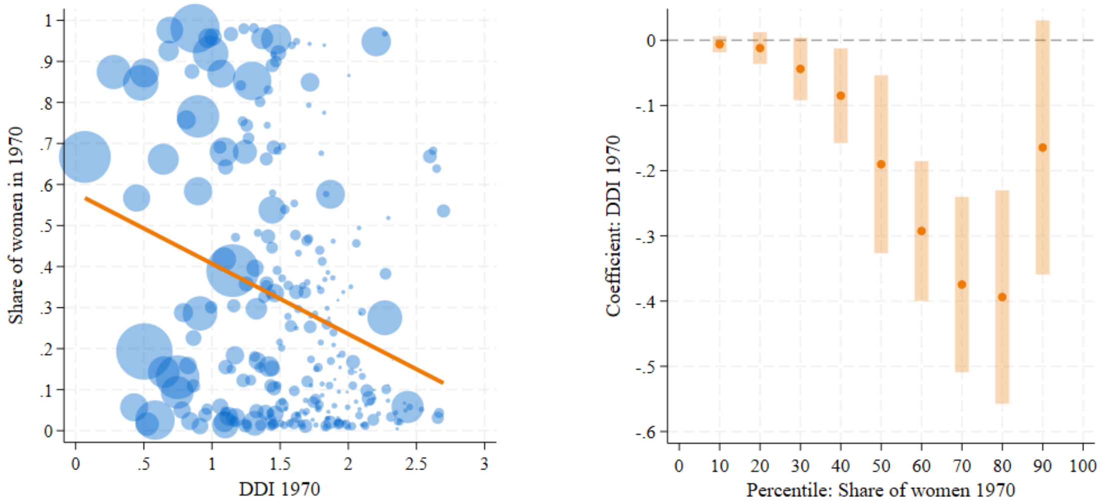
Figure 6 (a) plots the share of women employed against the DDI in 1970 for each occupation. There is a clear negative association between the women share and the DDI of an occupation. This implies that occupations traditionally taken by women are available in a wider set of CZs. This association is more formally explored in Figure 6 (b), which displays the results from estimating a quartile regression of the share of women on DDI. This association is more negative for larger shares of women in an occupation. Thus, the share of women decreases quickly as DDI increases when the share of women is relatively large, but this decrease flattens for lower shares of women.

Additionally, I study whether the share of women in 1970 is associated with changes in DDI over the observation period. Figure B.2 (a) plots the share of women employed in 1970 against the 2010 DDI. The 2010 DDI is less disperse in comparison to the 1970 DDI, since occupations at the bottom of the DDI distribution become more concentrated. The association between DDI and the share of women becomes more negative in 2010. Figure B.2 (b) displays the average changes in DDI from 1970 to 2010 at different shares of employed women in 1970. There is a slight and similar increase in DDI at all the levels of this share.

Figure 6: Traditionally female occupations and geographic concentration.

(a) Correlation

(b) Quartile regression



Notes: This figure describes the association between the share of women employed in an occupation and its level of geographic concentration (DDI), using data from the 1970 U.S. Decennial Census. Panel (a) presents a scatter plot illustrating the linear relationship between these two variables, with a fitted regression line (slope = -0.172). Marker sizes represent the share of total employment in each occupation. Panel (b) displays the coefficients from a quantile regression where the share of women employed serves as the outcome variable. The figure also includes 95% confidence bands.

4.2 Average Occupational Concentration of Women

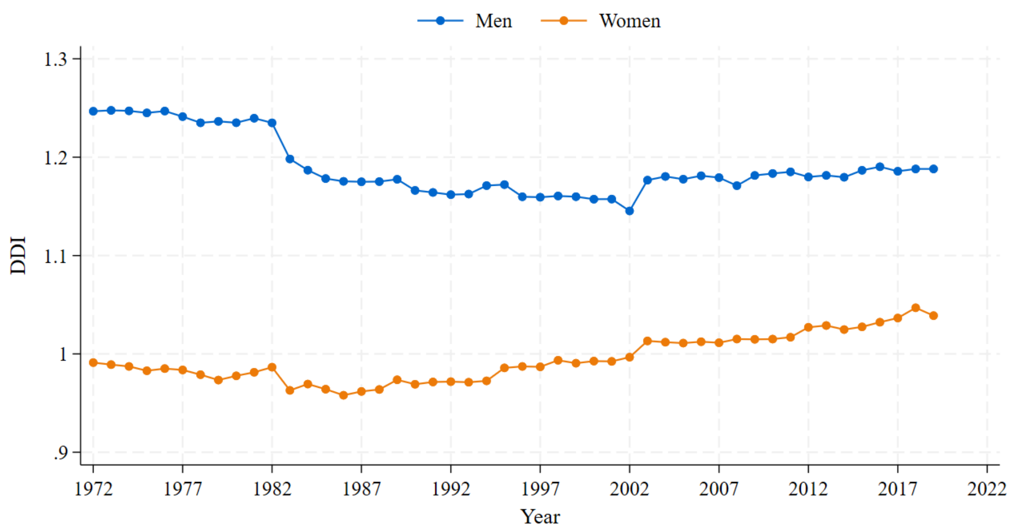
Occupational gender segregation has decreased over the last few decades, mostly due to women increasingly entering traditionally male occupations (Blau and Kahn, 2013; Cortes and Pan, 2018). However, great variation exists in the geographic concentration of those jobs. I study whether, when entering male dominated occupations, women keep sorting into low-concentrated occupations or if they also choose occupations that are high-concentrated.

Given the overall stability of the DDI documented in Figure 2, I take the value of this measure from the 1990 Decennial Census, obtaining a single value of the concentration measure per occupation. I then plug it in the CPS data and compute the average concentration for women and men separately over time. Doing this allows abstracting from changes in the level of concentration over time to focus exclusively on changes in the occupational composition of the sample members.

Figure 7 depicts the average concentration of married women and men's occupations in the CPS sample. Men's average concentration experienced a swift decrease at the beginning of the 1980s and remained stable for the remainder of the observation period. Women's average concentration, instead, steadily increased over the same period of time.

In Figure B.3 I repeat this plot disaggregating the average between college and below college educated individuals. The average level of concentration of college educated men

Figure 7: Average concentration by sex.



Notes: This figure presents the average geographic concentration of the occupations (DDI) held by married men and women over time. Occupational concentration levels are calculated using data from the 1990 U.S. Decennial Census. The average concentration is then computed for the sample of married household heads in the Current Population Survey. The plot reflects differences in the occupational composition of married individuals rather than changes in the concentration of a given occupation over time.

remained largely stable, whereas below college educated men experience a steady decrease. Conversely, below college educated women's occupations remained at a similar level of concentration for the entire period of observation. College educated women experienced the largest increase in concentration, undergoing a sustained increase throughout.

The documented changes in women's occupational choices based on geographic concentration are indicative of the evolving nature of the couples that are formed. In a context where women and men increasingly choose partners who are more similar to them (Chiappori et al., 2017; Lundberg and Pollak, 2007), having more married women in high-concentrated occupations entails having a larger share of dual-earner couples that are high-concentrated. Considering the differences in migration patterns across couple types evidenced in Figure 5, this could have implications for aggregate couple migration rates.

5 Decomposition of the Migration Rate

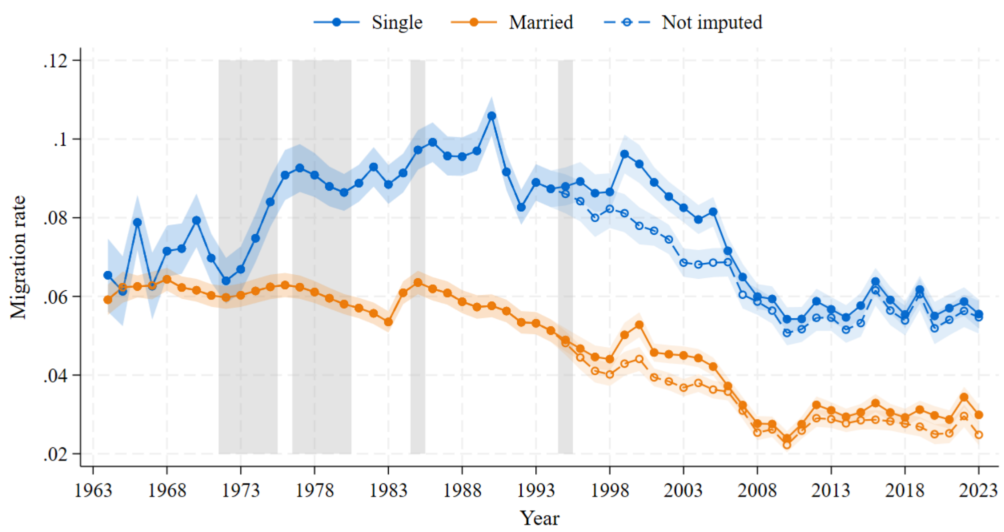
Figure 8 plots the share of households migrating across counties by marital status over time. I consider households where the head of the household is a civilian, in working age (18-65 years old) and participating in the labour force.[12] Kaplan and Schulhofer-Wohl (2012) points out that a change in the imputation method in the CPS artificially accentuated the decrease in interstate migration between 2000-2010. In order to account for that, I follow Kaplan and Schulhofer-

[12]The observed patterns largely remain when dropping these restrictions.

Wohl (2017) and also plot the migration rates excluding individuals for whom migration status was imputed using this methodology. Married households are those where the head of the household is married. Single households encompass those where the head is never married, separated and widowed.

The migration rate of married households has steadily declined over the second half of the 20th century and during the first decade of the 21st century. Both using the full data and excluding the imputed, the rate of decrease has been rather steady over the entire period of analysis. For singles, instead, cross-county migration rates experienced an increase until the early 1990s and a subsequent decrease. For both groups, migration rates stabilize after the Great Recession, at about 6% for singles and at 3% for couples.

Figure 8: Cross-county migration rate by marital status.



Notes: This figure displays the share of households who migrated across counties in the previous 12 months by marital status. The sample includes household heads from the Current Population Survey who are civilians, of working age (18-65 years old) and active in the labour force. Gray bars indicate years without available geographic mobility data (1972-1975, 1977-1980, 1985 and 1995). I interpolate migration rates in those years using a cubic spline. The dashed line represents migration rates excluding individuals whose migration status was imputed. 95% confidence bands are plotted.

I compute a shift-share decomposition of the evolution of the cross-county migration rate of couples between 1970 and 2010, to distinguish between changes in the shares of each couple type and changes in the migration rate of each couple type. Columns 1 and 2 of Table 6 display the cross-county migration rate of couples in 1970 and 2010, respectively. Over those four decades the internal migration rate of couples more than halved, being reduced in over 3 percentage points.

These migration rates are the average of the migration rates of the different couple types, weighted by the share out of all couples that each type conforms. Formally, denote by $M_{c,t}$ the migration rate of couple type c at time t, and by $W_{c,t}$ the proportion of couples in couple type c at t. Then, the aggregate migration rate at time t is given by $M_t = \sum_t W_{c,t} M_{c,t}$. The change in the aggregate migration rate is:

$$\Delta M = M_{2010} - M_{1970}$$

Similarly, the changes in the migration rates (M) and shares (W) of couple type c are:

$$\Delta M_c = M_{c,2010} - M_{c,1970}$$
$$\Delta W_c = W_{c,2010} - W_{c,1970}$$

Hence, the decomposition of the change in the aggregate migration rate is given by:

$$\Delta M = \sum_c \Delta W_{c,2010} M_c + \sum_c M_{c,2010} \Delta W_c + \sum_c \Delta M_c \Delta W_c \quad (2)$$

where the first term is the contribution of the change in the migration rate of each couple type, or the *within* change, the second term is the contribution of the change of the proportion of each couple type, or the *between* change, and the third term is the residual *interaction* term.

Columns 4-6 of Table 6 contain the different terms of the decomposition exercise. The *within* change is the main determinant of the change in the aggregate migration rate, being two orders of magnitude larger than the contribution of the *between* change.

Table 6: Shift-share decomposition of internal couple migration.

Migration Rate			Decomposition		
1970	2010	Change	Within	Between	Interaction
0.0569	0.0265	-0.0304	-0.03	0.0003	-0.0008

Notes: This table presents the results from a shift-share decomposition of cross-county couple migration rates between 1970 and 2010. The change in the cross county migration rate of couples between 1970 and 2010 is decomposed between changes in migration rates of the different couple types (*within*) and changes in the shares of couples of each type (*between*). Couple types are defined in Subsection 2.2

6 Concluding Remarks

This paper provides a new perspective on how occupational choices influence migration decisions, particularly in the context of dual-earner households. Using novel measures of occupational concentration and overlap, I find that couples in highly concentrated occupations face significant constraints on their ability to migrate. However, these constraints are mitigated when the partners' occupations have a high degree of geographic overlap, highlighting the importance of joint constraints in migration decisions.

Characterizing occupations by their geographic concentration opens new avenues for research on labour mobility and misallocation. Although migration is often viewed as a key mechanism for adjusting to local economic shocks, it is often underused. Given the constraints to relocation for individuals in high-concentrated occupations evidenced in this paper, understanding the composition of the local labour market in terms of the concentration of the occupations within it may be critical to explaining this misallocation.

The findings also shed light on gender differences in occupational sorting within this dimension. The rise in female labour force participation has been one of the largest changes in the labour market over the last few decades and has significantly impacted couple migration patterns. Although the entry of women in the labour force has stagnated, the labour market continues to evolve, driven more by shifts within the market, such as the convergence of occupational choices between men and women, rather than by the composition of the workforce.

By examining occupational segregation through the lens of geographic concentration, this paper identifies an important dimension where gender differences persist, influencing both gender disparities in the labour market and couple migration decisions. Understanding where occupational decisions still differ between men and women can inform the design of policies aimed at reducing the earnings gap and alleviating migration constraints, which is particularly important given the high proportion of individuals in dual-earner households.

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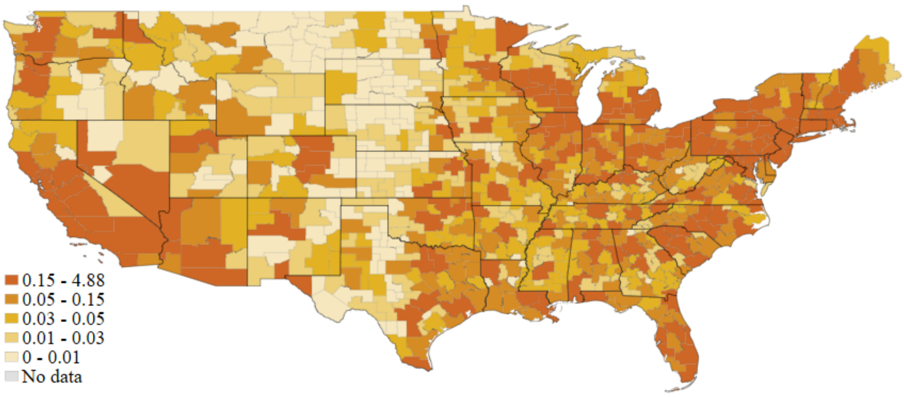
A Classification of Occupations

Figure A.1: Share of total U.S. employment in each commuting zone.



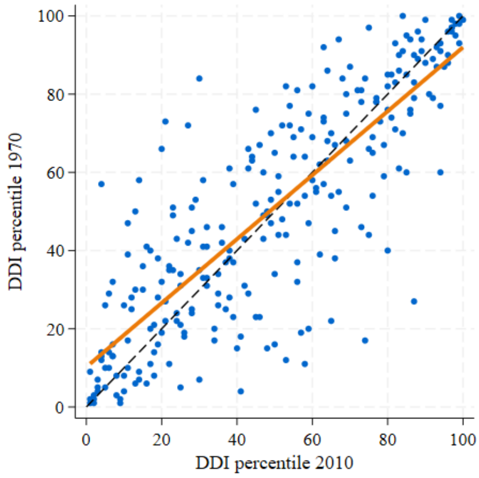
Notes: This figure displays the share of total U.S. employment in each commuting zone. Commuting zones are defined using the Autor-Dorn crosswalk from counties to commuting zones. Employment shares are calculated using data from the 1990 U.S. Decennial Census.

Table A.1: List of most and least concentrated occupations.

Least Concentrated			Most Concentrated		
Code	Occupation Title	DDI	Code	Occupation Title	DDI
275	Retail salespersons and sales clerks	0	738	Winding and twisting textile and apparel operatives	2.843
243	Sales supervisors and proprietors	0.002	616	Miners	2.789
337	Bookkeepers and accounting and auditing clerks	0.393	614	Drillers of oil wells	2.787
313	Secretaries and stenographers	0.441	617	Other mining occupations	2.725
458	Hairdressers and cosmetologists	0.459	498	Fishers, marine life cultivators, hunters, and kindred	2.711
276	Cashiers	0.500	739	Knitters, loopers, and toppers textile operatives	2.685
453	Janitors	0.511	745	Shoemaking machine operators	2.625
156	Primary school teachers	0.529	47	Petroleum, mining, and geological engineers	2.602
383	Bank tellers	0.550	496	Timber, logging, and forestry workers	2.554
355	Mail carriers for postal service	0.668	488	Graders and sorters of agricultural products	2.538

Notes: This table presents a list of the ten most and least concentrated occupations in the 1990 U.S. Decennial census. Occupations are classified using the Autor-Dorn classification, based on the 1990 Census. Concentration is measured by a generalized version of Duncan's Dissimilarity Index (DDI), as proposed by Benson (2014).

Figure A.2: Rank Stability of DDI Percentiles.

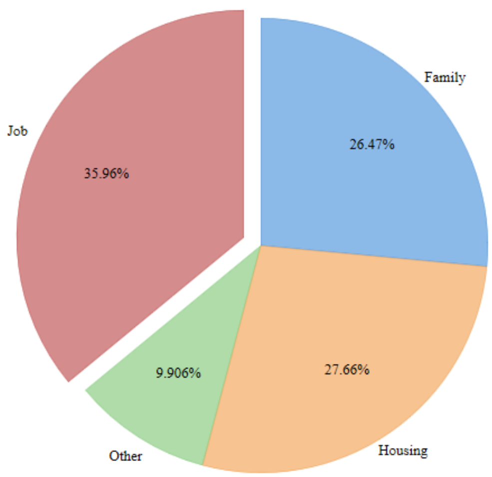


Notes: This figure depicts the association between an occupation's geographic concentration ranking in 1970 and its ranking in 2010. Geographic concentration is measured using a generalized version of Duncan's Dissimilarity Index (DDI), following Benson (2014), and constructed using U.S. Decennial Census data.

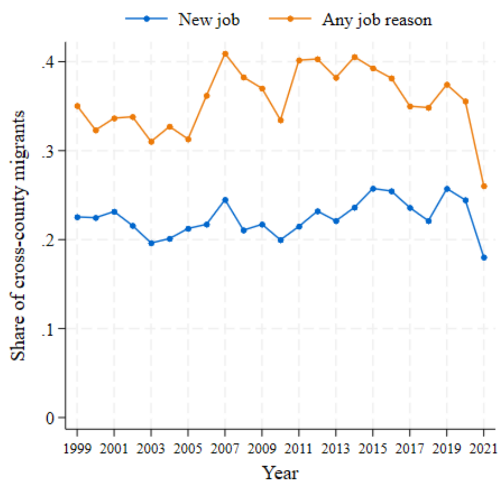
B Complementary Facts

Figure B.1: Reasons to migrate.

(a) Reasons to migrate



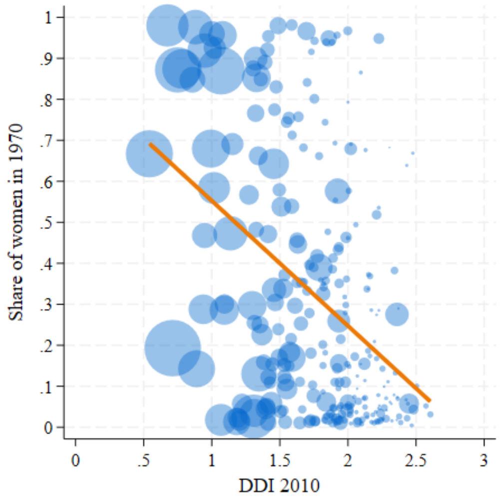
(b) Job-related reasons over time



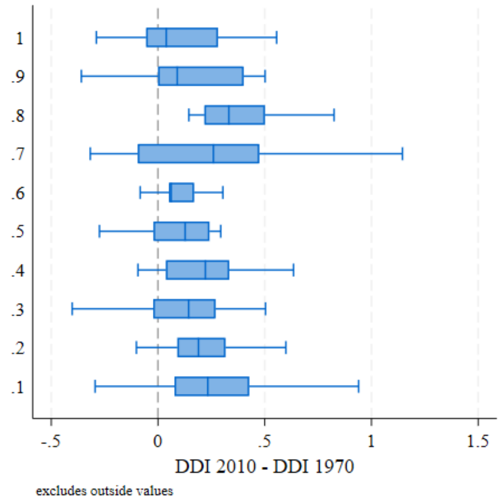
Notes: This figure presents the reasons for migration as reported in the Current Population Survey. Panel (a) shows the average share of households migrating for different reasons from 1999 to 2010. Panel (b) displays the share of households migrating specifically for job-related reasons over time.

Figure B.2: Changes in geographic concentration by women share.

(a) 2010 DDI

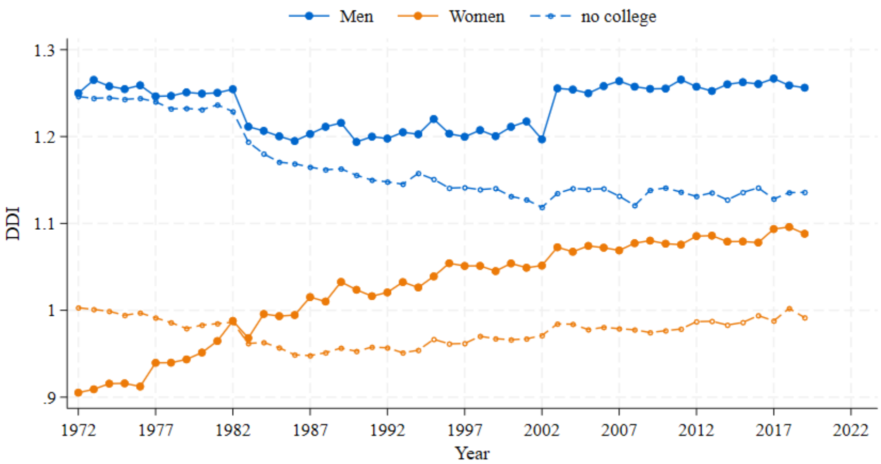


(b) Average changes by women share quartile



Notes: This figure describes the association between the share of women employed in an occupation in 1970 and the change in its geographic concentration (DDI) from 1970 to 2010, using U.S. Decennial Census data. Panel (a) presents a scatter plot depicting the linear relationship between the share of women in 1970 and the 2010 DDI, with a fitted regression line (slope = -0.305). Marker sizes represent the share of total employment in each occupation. Panel (b) shows the average change in DDI between 1970 and 2010 across occupations grouped by their 1970 female employment share. The figure includes 95% confidence bands.

Figure B.3: Average concentration by sex and education.



Notes: This figure presents the average geographic concentration of the occupations (DDI) held by married men and women with different educational attainment levels over time. Occupational concentration levels are calculated using data from the 1990 U.S. Decennial Census. The average concentration is then computed for the sample of married household heads in the Current Population Survey. The plot reflects differences in the occupational composition of married individuals rather than changes in the concentration of a given occupation over time.

C Model Set-Up

I plan to develop a dynamic general equilibrium discrete choice model featuring endogenous occupation and location choices. I will use the model to quantify the relevance of each of these factors in explaining the decline in migration rates and construct counterfactual scenarios of labour force participation.

This preliminary theoretical framework builds on the model set in Browning et al. (2014). I extend their model to include heterogeneous individuals and a location choice, and abstract from fertility decisions.

C.1 Environment and timing

Consider a two period model where individuals do not discount the future. There are two cities ($c \in \{A, B\}$) that differ in the set of available jobs. In city A there are only general jobs and in city B there are general and specialized jobs ($j \in \{G, S\}$).[13] Jobs differ in pay, such that $w^S > w^G$.

Individuals start their lives as single and are heterogeneous in gender ($g \in \{f, m\}$). Individuals choose (i) jobs and (ii) whether to move before the second period. They exogenously marry between the two decisions. If they are married, the moving decision is joint. Household level moving costs $\epsilon \sim F(\epsilon)$ are realized before the migration decision.

An individual who has chosen job j will find a job paying w^j with certainty if that job is available at their current location. If the chosen job is not available in their current location they receive a benefit $b < w^G$. There is no saving, so they consume all they earn.

Individuals meet and marry one person from the opposite sex. I assume there is the same number of women and men in the economy and that the probability of meeting an individual of a certain job does not depend on own job. Gains from marriage arise from public consumption: married individuals pool their income and both enjoy total consumption equally.

All individuals are endowed with an initial location, which is known to them. At $t = 0$, individuals choose their lifetime job. Then, they enter the marriage market. I assume that at the beginning of $t = 1$ all individuals meet an opposite sex partner and marry. At the end of the first period, married couples decide whether to stay in their initial location or move. They cannot separate.

[13] I call occupations which are set in both locations *general* and occupations that are located predominantly in a single location *specialized*. *OR: Add another specialized job located predominantly in A.*

C.2 Basic case: Single individuals

Migration decision. I assume that utility is linear in consumption and in moving costs. Given that individuals die with certainty after the second period, the value of being single in the second period is simply the value of consumption, which is given by the income of the individual, minus the idiosyncratic moving cost, which is zero if the individual does not move.

- Individuals born in city A with a general job get $W_s^A(G) = w^G$ if they stay and $W_m^A(G) = w^G - \epsilon$ if they move, since they can do their job in any location. It follows that they prefer to stay in period 2 whenever $\epsilon < 0$.
- Individuals born in city A with a specialized job get $W_s^A(S) = b$ if they stay and $W_m^A(S) = w^S + \epsilon$ if they move, since they can only do their job in city B. They prefer to stay as long as $0 > b - w^S > \epsilon$.
- Individuals born in city B with a general job get $W_s^B(G) = w^G$ if they stay and $W_m^B(G) = w^G + \epsilon$ if they move. They prefer to stay in period 2 whenever $\epsilon < 0$.
- Individuals born in city B with a specialized job get $W_s^B(S) = w^S$ if they stay and $W_m^B(S) = b + \epsilon$ if they move. They stay whenever $w^S - b > \epsilon$.

Thus, a share $F(0)$ of general workers stay in each city, a share $F(b - w^S) < F(0)$ of specialized workers stay in city A and a share $F(w^S - b) > F(0)$ of specialized workers stay in city B. This decision is equivalent to the migration decision of single earner households.

Occupation decision. The idiosyncratic moving cost has not been realized yet. Hence, individuals compare their expected utility from doing G with the expected utility from doing S in the city where they are located.

- In city A, individuals are indifferent between G and S if:

$$w^G = F(b - w^S)b + \left(1 - F(b - w^S)\right) w^S + \int_{b-w^S}^{0} \epsilon f(\epsilon) d\epsilon$$

- In city B, individuals are indifferent between G and S if:

$$w^G + \int_{0}^{w^S-b} \epsilon f(\epsilon) d\epsilon = F(w^S - b)w^S + \left(1 - F(w^S - b)\right) b$$

C.3 Dual-earner couples

After the occupation decision and before the migration decision is made, everyone is randomly matched and marries another individual in the same location. Couples maximize the joint utility, which depends on the migration cost. This cost is realized before the decision is made, so it is drawn at the couple level.

Migration decision. Since individuals die with certainty after the second period, the value of staying in city c for a couple of occupations $(j, j^-) \in \{G, S\} \times \{G, S\}$ is

$$W_s^c(j, j^-) = w^c(j) + w^c(j^-)$$

If couples migrate, they obtain

$$W_m^c(j, j^-) = w^c(j) + w^c(j^-) + \epsilon$$

Thus, the probability of moving depends on the city where the couple is located c and the couple type determined by the occupations of both members of the couple (j, j^-). Let us see this case by case:

- (G,G) couples behave the same in city A and in city B, since their incentives are the same. If they stay they get $W_s^c(G, G) = 2w^G$ and if they move they get $W_m^c(G, G) = 2w^G + \epsilon$. They prefer to move if $\epsilon > 0$. Thus, their probability of moving is:

$$\gamma^c(G, G) = 1 - F(0) \quad \text{for } c \in \{A, B\}$$

- (S,S) couples differ by location:
  - In city A they obtain $W_s^A(S, S) = 2b$ if they stay and $W_s^A(S, S) = 2w^S + \epsilon$ if they move. Their probability of moving is

$$\gamma^A(S, S) = 1 - F(2b - 2w^S)$$

  - In city B they obtain $W_s^B(S, S) = 2w^S$ if they stay and $W_s^B(S, S) = 2b + \epsilon$ if they move. Their probability of moving is

$$\gamma^B(S, S) = 1 - F(2w^S - 2b)$$

- Mixed couples differ by location:
  - In city A they obtain $W_s^A(G, S) = w^G + b$ if they stay and $W_s^A(G, S) = w^G + w^S + \epsilon$ if they move. Their probability of moving is

$$\gamma^A(G, S) = 1 - F(b - w^S)$$

- In city B they obtain $W_s^B(G,S) = w^G + w^S$ if they stay and $W_s^B(G,S) = w^G + b + \epsilon$ if they move. Their probability of moving is

$$\gamma^B(G,S) = 1 - F(w^S - b)$$

Let $\beta^c(j, j^-)$ be the expected migration cost of a couple of type (j, j^-) in city c that will migrate:

$$\begin{aligned}
\beta^c(G,G) &= \mathbb{E}[\epsilon|\epsilon > 0] \qquad \text{for } c \in \{A, B\} \\
\beta^A(S,S) &= \mathbb{E}[\epsilon|\epsilon > 2b - 2w^S] \\
\beta^B(S,S) &= \mathbb{E}[\epsilon|\epsilon > 2w^S - 2b] \\
\beta^A(G,S) &= \mathbb{E}[\epsilon|\epsilon > b - w^S] \\
\beta^B(G,S) &= \mathbb{E}[\epsilon|\epsilon > w^S - b]
\end{aligned}$$

We can write the expected utility of a couple at the beginning of period 2:

$$V^c(j,j^-) = \gamma^c(j,j^-)\left[w^c(j) + w^c(j^-) + \beta^c(j,j^-)\right] + (1 - \gamma^c(j,j^-))\left[w^c(j) + w^c(j^-)\right]$$

Marriage. I assume that each individual meets another person living in the same city at random and that they always marry. The type of individual they marry depends on the share of the population that is of that type. By now let us consider a partial equilibrium context where the shares of singles of each type in each city are exogenously given. Denote by θ the share of S individuals in each city and by $(1-\theta)$ the share of G individuals.

Occupation decision. Individuals compare their value functions considering the existing shares of G and S potential partners in the market:

$$\begin{aligned}
V^c(j) = \theta &\left[\gamma^c_{j,S}\left[w^c(j) + w^c(S) + \beta^c_{j,S}\right] + (1 - \gamma^c_{j,S})\left[w^c(j) + w^c(S)\right]\right] + \\
&+ (1-\theta)\left[\gamma^c_{j,G}\left[w^c(j) + w^c(G) + \beta^c_{j,G}\right] + (1 - \gamma^c_{j,G})\left[w^c(j) + w^c(G)\right]\right]
\end{aligned}$$