The Ties that Bind: Occupational Licensing and Family Migration

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Abstract

We examine how the limited portability of occupational licenses across states affects interstate migrants' labor market outcomes. To address selection into migration, we focus on female workers with family ties. First, we show that interstate migration is uncorrelated with their licensing status. Next, we show that the limited portability of occupational licenses has a negative employment effect on female interstate migrants with family ties and reduces the likelihood that they continue the same occupation relative to their peers moving within a state. Our findings suggest occupational licensing barriers have negative implications for interstate migrants' labor market activity and career development.

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I. Introduction

Occupational licensing is a prominent labor market institution in many countries. For example, the share of workers with an occupational license is above 20% in the United States and the European Union.[1] As a government-issued credential, occupational licenses are expected to address market failure due to asymmetric information on service quality and protect consumers from unscrupulous providers.[2] However, by requiring government permission to practice, occupational licensing creates barriers to entry and is likely to serve special interests rather than the public interest.[3] In particular, state licensure prevents individuals with out-of-state licenses from providing a service, even though they are trained, credentialed, and experienced workers who are likely to raise little concern on service quality.

Under the existing system, occupational licenses are often not portable across states: an individual licensed in a state cannot practice in another state until obtaining another license, which often requires additional training, exams, or practice experience. This limitation in license portability may reduce interstate exchange of licensed services and geographic mobility of licensed individuals. In this vein, previous studies found that occupational licensing barriers reduce interstate migration of licensed practitioners.[4] Also, for those who moved to a new state despite the barrier, for example, because of family ties, a costly relicensing procedure may prevent or delay their practice in licensed occupations after migration. However, little is known about the effect of occupational licensing barriers on interstate migrants' labor market outcomes.

We examine how the limited portability of occupational licenses affects labor market outcomes of interstate migrants among female workers with a male spouse—a clearly established family tie.[5] The motivation of our focus on female migrants with family ties is to address a potential

[1] See U.S. Bureau of Labor Statistics 2022 for U.S. statistics and Koumenta and Pagliero 2019 for EU statistics.
[2] See Akerlof 1970, Leland 1979, Shapiro 1986, Larsen et al. 2020, and Anderson et al. 2020. For counterevidence, see Kleiner and Kudrle 2000, Angrist and Guryan 2008, Kleiner et al. 2016, Farronato et al. 2020, and Kleiner and Koumenta 2022.
[3] Freidman 1962, Stigler 1971, Peterson, Pandya, and Leblang 2014, McMichael 2017.
[4] See Holen 1965, Pashigian 1979, and Johnson and Kleiner 2020. Also, Smith 1776 discussed a similar issue for apprenticeships in the Middle Ages.
[5] In this paper, we use the term "female workers with family ties" and "female workers with a male spouse" interchangeably.

bias arising from selection into migration. Since workers expecting occupational licensing barriers in a new state may not move across states, a study of self-selected migrants may find little effect of the same barrier on their post-migration labor market outcomes. Thus, we study the labor market outcomes of female workers with family ties whose migration is likely to be driven by their spouse's job opportunity rather than their own career.[6] To check the validity of this approach, we also examine an association between individual licensing status and interstate migration in the sample.

To identify the effect of limited license portability across states, we compare labor market outcomes between interstate and intrastate migrants with a low portability license, relative to those with a high portability license. The outcomes of primary interest are employment and the continuation of the same occupation after migration. Our difference-in-differences method uses two dimensional variations in the portability of occupational licenses. First, we use geographic variations in the portability of occupational licenses – individuals moving across states face occupational licensing barriers, while those moving within a state do not. Among intrastate migrants, our baseline analysis uses intrastate intercounty migrants as a control group. The comparison between interstate and intrastate intercounty migrants is expected to isolate the effect of the limited portability of occupational licenses across states by factoring out the effect of other labor market frictions associated with moving a long distance at least across counties, such as limited information on the job or business opportunity in a new place.

Next, we utilize variations in the portability of occupational licenses between two groups of licensed occupations for our analysis. Occupations that require state-specific licensing exams ("state-specific licensed occupations") tend to provide a lower portability of occupational licenses than occupations that require national standard exams ("quasi-national licensed occupations") (Johnson and Kleiner 2020). It is important to note that individuals in both licensed groups may have higher job and career stability than unlicensed workers[7], implying that they may have similar risk attitudes and face similar labor market frictions. In sum, we compare the labor market outcomes between interstate and intrastate intercounty migrants who were in

[6] Sandell 1977, Mincer 1978, Taylor 2007, Jayachandran et al. 2024
[7] Kleiner and Xu 2023, Blair and Chung 2022, 2024

state-specific licensed occupations, relative to those who were in quasi-national licensed occupations.

To implement the analysis, we use individual-level data from the Current Population Survey (CPS) Annual Socio-Economic Supplements (ASEC) 2003-2023.[8] In each year, it provides migration status in the previous year. It also provides data on the labor market activity in the previous calendar year as well as that as of the survey. We use the previous calendar year's occupation to approximate whether an individual worked in a state-specific or quasi-national licensed occupation before migration. Our analysis primarily focuses on the sample of female workers aged 25 to 64 who worked in a state-specific or quasi-national licensed occupation and moved across counties with a male spouse in the previous year.

From our analysis of interstate migration, we find that the propensity of interstate migration is uncorrelated with individual licensing status among female workers with family ties. We attribute this finding to the fact that tied migrants are unlikely to select out of interstate migration despite the limited portability of their occupational license across states. On the other hand, we find a strong negative association between individual licensing status and interstate migration among female workers without a spouse and male workers with a spouse, who may have little to weak family ties for a location choice. This finding confirms that our focus on female workers with family ties is valid to address selection into migration based on licensing status.

From our analysis of migrants' labor market outcomes, we find a negative employment effect of limited license portability across states. Among female workers with family ties, the employment rate is 10.2 percentage points lower among interstate migrants in state-specific licensed occupations than it is among intrastate intercounty migrants in the same occupations, relative to the same difference among migrants in quasi-national licensed occupations. Moreover, we find a negative effect of limited license portability on migrants continuing a career in the same occupation. Conditional on workers being employed, those who worked in state-specific licensed occupations are 11.5 percentage points more likely to change their occupation after interstate

[8] We use the CPS ASEC as a pooled cross-section but not as a collection of two-year panels because the CPS does not follow movers (Madrian and Lefgren 2000).

migration than those who worked in quasi-national licensed occupations, relative to the same difference among intrastate intercounty migrants.

Taken together, about 20% of female interstate migrants with family ties in state-specific licensed occupations neither have a job nor continue an occupation on average six months after migration. This large interruption to the career of female spouses, caused jointly by family migration and occupational licensing, may cause a loss of occupation-specific human capital and a downward shift of their earnings trajectory. Also, the male dominance in family migration and the prevalence of female-dominated licensed occupations may reinforce and further widen the spousal earnings gap, which has a negative implication on the overall gender earnings gap.[9] Moreover, since migrants with out-of-state licenses are experienced practitioners with transferrable skills across U.S. states, occupational licensing barriers across states may reduce public welfare.[10]

This paper makes several contributions to the literature and ongoing policy debates. First, the study adds to the literature on occupational licensing. It broadens a perspective on the implications of geographic barriers against occupational license portability. Previous studies from Holen (1965) to Johnson and Kleiner (2020) focused on the negative implications of occupational licensing barriers across states on interstate migration.[11] Expanding on the existing literature, our study shows that licensing barriers have negative effects on interstate migrants' employment and career in the same occupation.[12] Moreover, our study uncovers that the two effects fall on different groups of workers: interstate mobility is restricted among workers who can circumvent the licensing barrier in a new state by selecting out of migration (e.g., females without a spouse or males with a female spouse), while the labor market activity is constrained among workers who cannot avoid moving to the new state (e.g., females with a male spouse).

[9] Blau and Kahn 2017, Jayachandran et al. 2024
[10] See Kleiner and Soltas (2019) and Blair and Fisher (2022) for more evidence of the welfare losses from occupational licensing regulations in the United States.
[11] See Cooke, Ellis, and Wright 2022 for a recent study claiming that occupational licensing has no effect on interstate migration flows.
[12] There is mixed evidence on the employment effect of occupational licensing in general. See Blair and Chung 2019, Plemmons 2022, and Dodini 2023 for negative employment effects, and Law and Marks 2009 and Zapletal 2019 for non-negative employment effects. See Dillender et al. 2024 for limited employment effect of scope of practice expansion for nurse practitioners.

Next, the study contributes to the literature on family migration. Previous studies commonly found that individuals with a spouse are less likely to move a long distance than those without a spouse, and that if they move, male spouse's earnings increase more than female spouse's (Mincer 1978, Taylor 2007, Burke and Miller 2018, Jayachandran et al. 2024). Our study reveals a mechanism behind the divergence in earnings after family migration in the context of state licensing in the U.S.: occupational licensing barriers across states restrict interstate migrants' labor market activity among female spouses but not male spouses. In the same context, Johnson (2021) documented that couples are less likely to move across states if the male spouse faces licensing barriers, and that the female spouse facing the same barrier tends to exit from the labor force after interstate migration.

Lastly, the study suggests that policy reforms to improve the portability of occupational licenses may have the potential to reduce labor market frictions against migrants in licensed occupations. Our finding is crucial because previous studies on occupation-specific license portability programs for nurses or certified public accountants (CPA) do not find evidence that they effectively increased employment and migration in the United States (DePasquale and Stange 2016, Cascino, Tamayo, and Vetter 2021).[13] However, our results are in line with positive employment and wage effects of a foreign occupational credential recognition program in Germany (Brücker et al. 2021). Our study is also consistent with early studies on the impact of license portability programs such as universal recognition of out-of-state licenses (Deyo and Plemmons 2022, Shakya, Plemmons, and Norris 2024, Bae and Timmons 2023).

II. Background on Occupational License Portability

Under the regime of state licensure, U.S. states regulate entry into various occupations.[14] Physicians, dentists, and pharmacists have long been licensed in most states since the early twentieth century, and occupational licensing has expanded to regulate many other healthcare

[13] See U.S. Federal Trade Commission 2018 for several different approaches for occupational license portability.
[14] See Knee Regulatory Research Center (KRRC) 2023, National Conference of State Legislatures (NCSL) 2023, CareerOneStop 2023, and Knepper et al. 2022 for variations in licensed occupations and licensing requirements by states.

workers, beauty workers, contractors, real estate agents, etc. (Law and Kim 2005, Han and Kleiner 2021) According to the State Occupational Licensing Index 2023 (Trudeau and Timmons 2023), U.S. states overall regulate 331 occupational titles with occupational licensing, and there are large variations in the number of licensed occupations across states.

States typically require an applicant for licensure to pay a licensing fee, obtain a minimum level of education, experience, or training, and pass licensing exams.[15] However, these licensing requirements are not necessarily the same across states. Many occupations that are licensed in all U.S. states still require licensing exams varying by states (Johnson and Kleiner 2020). Also, some of the occupations have widely different training requirements across states: for example, cosmetology training requirements vary from 1,000 hours to 2,100 hours (Knee Regulatory Research Center (KRRC) 2023).

For individuals with out-of-state licenses, states have generally not provided a standardized relicensing procedure. Instead, relicensing has been based on occupation-specific rules such as licensure by reciprocity or endorsement. Licensure by reciprocity refers to relicensing rules based on bilateral agreements between states. It is typically a route to relicensing for occupations with substantially varying licensing requirements across states such as teachers, cosmetologists, electricians, and real estate agents. Licensure by endorsement does not require reciprocity agreements, and currently it is the dominant way of relicensing for occupations with national standard exams such as nurses, physicians, and social workers. Also, states often require that applicants were licensed in another state with a substantially equivalent licensing standard for licensure by endorsement. As a result, licensure by reciprocity or endorsement are applicable only to individuals in select occupations from select states.

Some states or occupations have adopted license portability programs such as interstate licensure compacts or universal recognition of out-of-state licenses (U.S. Federal Trade Commission 2018). However, many licensed workers are still not eligible to obtain a new license through these programs. Interstate licensure compacts streamline the relicensing procedure only among compact member states. Moreover, existing compacts are mostly for occupations with national

[15] See Appendix Table B1 for select licensing requirements on 16 state-specific licensed occupations.

standard exams (National Center for Interstate Compacts 2022). For example, the compact for nurses, the largest occupation with a national standard exam, began in 2000, while one for teachers, the largest occupation with state-specific exams, just started to operate in 2024. Also, universal recognition programs often exempt several state-specific licensed occupations including teachers, insurance agents, and pest control workers. Some states also require that the original license was issued by a state with substantially equivalent licensing standards for licensure by universal recognition (Bae and Deyo 2024).

As a result, when people move across state lines, they cannot simply exchange the occupational license issued by the home state for a new license in the destination state as they often can for a driver's license. Relicensing can be particularly costly if an applicant needs to complete additional training, exams, or practice experience due to this limitation in relicensing rules. On top of that, any applicant must complete additional paperwork for an application and wait for the issuance of a new license. This time-consuming relicensing procedure may force workers to incur non-trivial monetary costs and potentially large opportunity costs of time that would be used for paid work otherwise. Therefore, occupational license portability across U.S. states is limited and particularly low in occupations with state-specific licensing exams.

III. Empirical Methodology

1. Analytical Framework

Above all, our study focuses on female workers with a male spouse (family ties) to address selection into migration based on individual licensing status. As shown in Johnson and Kleiner (2020), workers expecting occupational licensing barriers in a new state may not choose to cross state lines. Thus, a study of self-selected migrants may not be proper to identify the genuine effect of occupational licensing barriers on migrants' labor market outcomes. To avoid the issue, it is crucial to identify a group of interstate migrants who are not selected into migration based on occupational licensing barriers in a new state. Therefore, we restrict our attention to female workers with a male spouse whose move is likely to be driven by their spouse's career rather than their own post-move job opportunities.

The approach is motivated by literature on family migration. In Mincer (1978)'s simplest model, a tied migrant in a male-female couple is defined as the one whose potential earnings are lower in a new place than the status quo, if any. By definition, a tied migrant did not select out of migration even if the person had expected occupational licensing barriers in the new state. Hence, it would be ideal to study a sample of tied migrants to examine the licensing barrier's effect on post-move labor market outcomes. However, due to data limitations on potential earnings, it is difficult to directly identify which one is tied and which one is not within a migrant couple. Despite this, studies have commonly shown that family migration is motivated more by the male spouse's job opportunities than those of the female spouse, and that family migration tends to increase male spouse's employment and earnings but not female spouse's (Mincer 1978, Taylor 2007, Burke and Miller 2018, Jayachandran et al. 2024). The findings imply that female spouses are more likely to be tied migrants than male spouses. In this vein, we focus on the sample of female workers with a male spouse.

As a diagnostic test on the self-selection issue, we first examine an association between individual licensing status and interstate migration among female workers with family ties and all other workers, respectively. If we find little to weak association between them, it is indicative that only a small fraction of female workers with family ties have selected out of interstate migration due to occupational licensing barriers across states. Otherwise, the selection issue remains, but a negative selection into interstate migration of workers expecting occupational licensing barriers may lead to an underestimation of the same barrier's effect on post-move labor market outcomes.

(1) Occupational Licensing and Interstate Migration

In the analysis, we compare the propensity of interstate migration between workers in licensed occupations that requires state-specific exams ("state-specific licensed occupations" with a low portability license) and those in licensed occupations that require national standard exams ("quasi-national licensed occupations" with a high portability license). We adopt the exam-based classification of licensed occupations from Johnson and Kleiner (2020).

To implement the analysis, we use a two-way fixed effects (TWFE) OLS regression model

$$InterStateMove_{igst} = \beta StateSpecificLicensed_g + \alpha_s + \lambda_t + \gamma X_{igst} + \epsilon_{igst}$$

where i indexes an individual, g indexes a group of occupations either state-specific or quasi-national licensed occupations, s indexes a state of residency, t indexes year, $InterStateMove_{igst}$ is an indicator if the individual moved across states, $StateSpecificLicensed_g$ is an indicator if the individual worked in a state-specific licensed occupation, α_s is state fixed effects, λ_t is year fixed effects, X_{igst} is a vector of individual characteristics, and ϵ_{igst} is an error term.

The outcome variable is an indicator for interstate migrants, and the explanatory variable of interest is an indicator for individuals who worked in state-specific licensed occupations. Individual characteristics include dummy variables for age groups by five years, female, black, Hispanic, other racial or ethnic group (except white, black, and Hispanic), married male, married female, male living with own children, female living with own children, foreign-born, and three education groups (some college education, college degree, and advanced degree).

In the regression model, the coefficient β measures an association between individual licensing status and interstate migration after accounting for observable characteristics. To account for potential heterogeneity in long-distant migration between the two groups of licensed occupations, we also estimate the same model with the sample of intercounty migrants. The analysis is analogous to Johnson and Kleiner (2020) to show a negative migration effect of licensing barriers across states. By contrast, our analysis is to test if individual licensing status and interstate migration are uncorrelated among female workers with family ties.

(2) Occupational Licensing and Interstate Migrants' Labor Market Outcomes

In the second part of our analysis, we examine the effect of licensing barriers across states on post-migration labor market outcomes among female workers with family ties. The analysis exploits two dimensional variations in occupational licensing barriers across states. By geography, interstate migrants in licensed occupations must obtain a new license in a new state,

while intrastate intercounty migrants in the same set of occupations need not. By occupation, interstate migrants in state-specific licensed occupations are expected to face more difficulty in obtaining a license in a new state than those in quasi-national licensed occupations.

In a difference-in-differences framework, we compare labor market outcomes between interstate migrants (migration treatment) and intrastate intercounty migrants (migration control) among workers in state-specific licensed occupations (licensing treatment), relative to the same difference among those who are in quasi-national licensed occupations (licensing control). Specifically, we use a two-way fixed effects (TWFE) OLS regression model

$$Y_{igst} = \beta_0 InterStateMove_{igst} + \beta_1 StateSpecificLicensed_g + \beta_2 InterStateMove_{igst} StateSpecificLicensed_g + \alpha_s + \lambda_t + \gamma X_{igst} + \epsilon_{igst}$$

where i indexes an individual, g indexes a group of occupations either state-specific or quasi-national licensed occupations, s indexes a state of residency, t indexes a year, Y_{igst} is the labor market outcome after migration, $InterStateMove_{igst}$ is an indicator if the individual moved across states, $StateSpecificLicensed_g$ is an indicator if the individual worked in a state-specific licensed occupation, α_s is state fixed effects, λ_t is year fixed effects, X_{igst} is a vector of individual characteristics, and ϵ_{igst} is an error term.

We examine the effect of occupational licensing barriers on two primary outcomes of female migrants with family ties. Our first outcome is an indicator if an individual is employed after migration, and the second outcome is an indicator for whether the individual has the same occupation before and after migration. As a secondary measure, we also use two more outcomes on whether the individual is in the labor force and unemployed, respectively. The analysis accounts for the same set of individual characteristics used for our previous analysis of interstate migration.

In the regression model, the coefficient β_0 measures the effect of labor market frictions against interstate migrants in quasi-national licensed occupations. Our primary coefficient of interest β_2

identifies an additional effect of limited portability of occupational license on interstate migrants in state-specific licensed occupations. A key assumption for the causal interpretation of β_2 is that individual migration and licensing status are not systematically correlated with the post-migration labor market outcome.

Our method is designed to address several threats to identification. First, we focus on female migrants with family ties to address selection into migration based on their own licensing status, as discussed at the beginning of the section. If all members of our sample are tied movers who follow their spouse's opportunity, there would be no issue in selection between interstate and intrastate migration. However, it is realistic to assume that the sample includes some self-selected movers on the basis of their own potential earnings and occupational licensing barriers in a new place. Given a tendency of positive selection into interstate migrants in ability (Borjas and Chiswick 2019) and a negative selection in an expected licensing barrier, we expect that self-selected movers in the sample may attenuate our estimate of post-migration labor market effects. As a result, we suspect that our estimated coefficients should serve as a conservative lower bound of the true effect on movers who are not self-selected into interstate migration.

Next, we compare labor market outcomes between migrants in two groups of licensed occupations with different degrees of license portability. We do this to isolate the effect of limited license portability while avoiding potential issues in selection into occupational licensing. Recent studies have shown that licensed workers tend to stay with the same occupation and be protected from recessions relative to unlicensed workers (Morris and Xu 2023, Blair and Chung 2024). Moreover, there is evidence of job market signaling with an occupational license (Blair and Chung 2022), which could help licensed workers find a job in a new place (unless they cross state lines). Taken together, licensed and unlicensed workers may vary in risk attitudes and face different level of labor market frictions after migration, which may complicate a comparison of migrants' labor market outcomes between them. However, once individuals selected into occupational licensing, whether licensing exams are state-specific or quasi-national might be quasi-random, and so might the degree of license portability.

Even if there's little selection into migration or licensing, workers in state-specific and quasi-national licensed occupations may have different labor market outcomes regardless of interstate migration. We account for the heterogeneity between state-specific and quasi-national licensed occupations by using intrastate long-distance migrants in the same occupation as a control group. Given the limitation in granularity of migration data in the CPS ASEC, we regard intercounty migration as long-distance migration in the study.[16] This is why we compare labor market outcomes between interstate migrants and intrastate intercounty migrants who were in state-specific licensed occupations, relative to those who were in quasi-national licensed occupations.

At the same time, our method accounts for heterogeneity in the labor market outcome between long-distant migrants and those who are not. Long-distance migrants may face labor market frictions associated with moving in distance, such as limited information on the job or business opportunity in a new place, which may have negative effects on their post-move labor market outcome regardless of occupational licensing barriers. Our method of differencing the labor market outcome between interstate and intrastate intercounty migrants in the same occupation group is expected to isolate the effect of occupational licensing barriers depending on whether an individual crossed a state line from the effect of all other labor market frictions that are common to long-distant migrants.

Moreover, we conduct several robustness checks to mitigate remaining concerns on our identification strategy such as selection into occupation or heterogeneity across occupations. One possible concern would be potential differences in unobservable ability or skills between state-specific and quasi-national licensed occupations (despite our use of intrastate migrants as a control group). To mitigate the concern, we check the robustness of our baseline results with external data on skills and ability by occupations from the O*NET database. Another possible concern would be the potential limitations in transferability of skills across states that could confound with the limited portability of occupational license. For example, skills for teaching students or caring for patients are transferable across states, while an expertise on a state-specific

[16] For example, the American Community Survey (ACS) provides migration data between Public Use Microdata Areas (PUMAs). Based on the centroid distance between PUMAs, Johnson and Kleiner (2020) define moving 50 or above miles as long-distance migration.

law are not transferrable to another state (Pashigian 1979). To relax this type of concern and check the influence of heterogeneity within state-specific occupations, we examine the sensitivity of baseline estimates to an exclusion of a major state-specific licensed occupation such as teachers, cosmetologists and barbers, real estate brokers and sales agents, or lawyers from the sample.

Also, we conduct two placebo tests as alternative ways to validate our method. The first placebo test is on the effect of intrastate intercounty migration on post-move labor market outcomes. In this analysis, we compare labor market outcomes between intrastate intercounty movers and movers within county in state-specific licensed occupations relative to those in quasi-national licensed occupations. We anticipate estimating a null effect in this analysis since both types of occupational licenses are portable within state. The second placebo analysis is estimating the effect of interstate migration on post-move labor market outcomes among male workers with a female spouse and female workers without a spouse, respectively. Once more, a null effect is expected since these workers with little to weak family tie might have opted out from interstate migration if they anticipated occupational licensing barriers in a new state.

2. Data

(1) Data Source and Measurements

We use the Current Population Survey (CPS) Annual Socio-Economic Supplements (ASEC) 2003-2023 downloaded from the IPUMS CPS website (Flood et al. 2023). The survey provides rich microdata on the primary occupation, migration status, and labor market activity as well as socio-demographics at the individual-level. We define two primary outcome variables: whether a migrant is employed after migration, and whether a migrant continues the same occupation before and after migration.

Data on the primary occupation and migration status are key for identifying interstate migrants who were in state-specific licensed occupations and may be negatively affected by licensing barriers across states. We define interstate migrants as individuals who changed the state of residency in the previous year and intercounty migrants as those who changed the county of

residency. Due to our use of an annual migration measure, our study effectively examines the labor market effect of occupational licensing barriers on recent migrants who moved across states in the previous year, or equivalently on average six months before the survey.[17]

Next, we define individuals in licensed occupations based on a self-reported primary occupation in the previous calendar year and as of the survey, respectively. If an individual reported one of 22 occupations that is identifiable in the survey and licensed in all U.S. states, the person is categorized into individuals in licensed occupations. Appendix Table B2 shows the list of 22 licensed occupations obtained from Johnson and Kleiner (2020) with CPS occupation codes in 2003-2023, which accounts for some changes in occupation codes between 2010 and 2011, and between 2019 and 2020. We also adopt Johnson and Kleiner's classification of 16 state-specific licensed occupations and 6 quasi-national licensed occupations based on whether states administer their own exams or a national standard exam as a key licensing requirement.

So that readers can gain a better understanding of our study, we would like to make several points on our occupation-based measure of licensing. First, the occupation-based measure could differ from an individual attainment measure of professional license or certification, which is available in the CPS Basic Monthly since 2015. This difference is driven by a statistical definition of occupations for the Census survey that does not perfectly match a regulatory definition of occupations by state agencies. Nevertheless, a large fraction of individuals in the 22 licensed occupations have an active professional license or certification based on the CPS Basic Monthly data matched to our study sample, as shown in the fourth column of Appendix Table B2.[18]

Next, CPS data on the previous calendar year's primary occupation ("previous occupation") is available only for individuals who worked in the period. This restriction effectively excludes

[17] We do not use data on migration status in the previous five years available in 2005 and 2015 CPS ASEC. It is mainly because the survey does not provide data on occupation five years ago, which is crucial to know pre-move occupations.

[18] We do not directly use the individual license attainment data for the study. The survey does not provide the individual license attainment data a year before the survey, which would reflect licensing status before migration. Next, using the data as a two-year panel is not feasible for the study because the CPS does not follow movers (Madrian and Lefgren 2000).

individuals who did not work in the previous calendar year from our study sample. By comparison, CPS data on the primary occupation as of the survey ("current occupation") is available for individuals who worked in the previous year or who are in the labor force as of the survey, indicating either the current occupation (for those employed) or the most recent occupation (for those who are not employed). Therefore, unless an individual recently found a new job in a new occupation, the person's current occupation would be the same as the previous occupation regardless of whether the person is employed or not as of the survey.

In our analysis, we approximate a pre-move occupation with the previous calendar year's occupation. We should note that this approximation might not be perfect and could introduce some measurement error. For example, for those who moved in the early part of the previous calendar year (for example, April 2022 in the 2023 CPS ASEC sample), changed occupations upon the move, and maintained the new occupation until the survey (mostly in March 2023 in the same sample), the primary occupation in the previous calendar year and that as of the survey may be the same even though they changed occupations after the move. Although this measurement error is a concern, we anticipate that any resulting attenuation bias makes our analysis and estimates more conservative.

(2) Sample

The full sample is civilian workers aged 25 to 64 who worked in the previous calendar year and are not in group quarters as of the survey with non-imputed values for the annual migration status, occupation, employment status, age, sex, race, ethnicity, education, marital status, and state of residency a year before the survey, excluding those who lived outside the 50 U.S. states or the District of Columbia a year before the survey in the CPS ASEC 2003-2023. For most of our analysis, we restrict our attention to a subsample of female workers who worked in a state-specific or quasi-national licensed occupation and moved across counties with a male spouse in the previous year. In this subsample, we make sure that each female worker and their male spouse reported the same migration status in the previous year and state of residency a year before the survey. Also, we exclude female workers whose male spouse worked in a licensed occupation from the subsample to avoid selection into migration based on their spouse's licensing status.

As shown in Table 1, the sample of female workers with family ties consists of 412,269 individuals (column 2), which is 30.9% of the full sample (column 1). The share of workers in licensed occupations is higher in the sample of female workers with family ties (17.5%) than it is in the full sample (12.3%). It is mainly because several large licensed occupations such as K-12 teachers and nurses are traditionally female occupations. Also, the annual migration rate of female workers with family ties (1%) is lower than that of all workers (1.4%). Within the sample of female workers with family ties, there are 41,425 individuals in state-specific licensed occupations (10.1% in the sample) and 30,298 individuals in quasi-national licensed occupations (7.4%), as shown in Table 1 columns 3 and 4. In each occupation group, about 2% of workers moved across counties in the previous year, and about a half of them moved across states.

A comparison of mean characteristics in Table 1 columns 3 and 4 reveals heterogeneity between workers in state-specific licensed occupations and those in quasi-national licensed occupations. State-specific licensed occupations have a larger share of white workers and smaller share of immigrants than quasi-national licensed occupations. Relative to quasi-national licensed occupations, state-specific licensed occupations are over-represented by both the least and most educated group of workers.[19] Turning to labor market outcomes, the employment and labor market participation rate are about 2 percentage points lower among workers in state-specific licensed occupations than those in quasi-national licensed occupations. This means that a simple comparison of migrants' labor market outcomes between the two occupation groups may lead to a biased estimation of the effect of occupational licensing barriers on labor market outcomes. Additionally, Appendix Table B3 shows that interstate migrants are more homogeneous to intrastate intercounty movers than stayers within county in both groups of occupations, which suggests intrastate intercounty movers are a preferred control group for our baseline analysis.

IV. Results

[19] This pattern may partly reflect that the occupation group covers a wide range of licensed workers with different levels of skills from cosmetologists to lawyers. See Appendix Table B1 for more details on variations in education requirements across state-specific licensed occupations.

1. Occupational Licensing and Interstate Migration

Our first set of results show that there is little or weak association between occupational licensing status and interstate migration among female workers with family ties. As shown in Table 2 Panel A column 1, female workers with family ties who were in state-specific licensed occupations are merely 0.11 percentage points (or 11% of the mean outcome) less likely to move across states in the previous year than those in quasi-national licensed occupations with similar observable characteristics. Our estimated coefficient is marginally significant. Our estimate in column 2 in the same panel and table focuses exclusively on intercounty movers. In this case we observe a statistically insignificant association between the propensity of interstate migration and whether a female worker with family ties worked in state-specific licensed occupations.

By contrast, the corresponding estimates in Panel B of the table show a strong negative association between working in state-specific licensed occupations and moving across states among all other workers, including female workers without a spouse and male workers either with or without a spouse. All other workers in state-specific licensed occupations are 0.88 percentage points (or 52.1%) less likely to move across states than those in quasi-national licensed occupations (Table 2 Panel B column 1). We also find a similar result conditional on movers across counties (Table 2 Panel B column 2).

Taken together, these findings uncover a stark heterogeneity in the effect of occupational licensing barriers on the geographic mobility by family ties: those whose location choice is tied to their spouse's career and those whose location choice is autonomous based on their own job perspective. In this vein, the study extends previous studies on occupational licensing and geographic mobility (Holen 1965, Pashigian 1979, Johnson and Kleiner 2020) and those on family migration (Mincer 1979, Taylor 2007, Jayachandran et al. 2024).

Moreover, the findings imply that selection out of interstate migration based on occupational licensing barriers in a new state is much weaker, if any, among female workers with family ties than it is among other workers. It provides a strong justification for the next part of our analysis focusing on female workers with family ties to learn the effect of occupational licensing barriers

on interstate migrants' labor market outcomes. If we study self-selected migrants who already considered potential costs of occupational licensing barriers before a migration decision, we would be unlikely to find any effect of the same barriers on their post-move labor market outcomes.

2. Occupational Licensing and Interstate Migrants' Labor Market Outcomes

The next set of results show that occupational licensing barriers across states have negative effects on interstate migrants' labor market outcomes. Among female migrants with family ties, the employment rate is 10.2 percentage points (or 12% of the mean outcome) lower among interstate migrants in state-specific licensed occupations than it is among those in quasi-national licensed occupations with similar observable characteristics, relative to the same difference among intrastate intercounty migrants, as shown in Table 3 column 1. In other words, after accounting for common labor market frictions against long-distance movers in both groups of licensed occupations (e.g., limited information on job or business opportunities in the new place), interstate movers in state-specific licensed occupations face additional labor market friction resulting from the limited portability of occupational licenses.

Table 3 columns 2 and 3 also show that the negative employment effect on female migrants with family ties is because of a decline in their labor force participation rate after interstate migration (11.2 percentage points). By contrast, we find little effect on their unemployment rate among those in the labor force. Given our use of annual migration data, our estimates quantify the labor market effect of occupational licensing barriers across states on average six-month after interstate migration. This means that 12.6% of female workers with family ties have stayed out of labor force six months after interstate migration due to the additional labor market friction arising from the limited portability of occupational licenses. They might have been waiting for an issuance of a new license or discouraged to work because of a time-consuming and costly relicensing procedure.

Moreover, Table 3 column 4 reveals the negative impact of occupational licensing barriers across states on interstate migrants' career development in the same occupation. Among female

migrants with family ties who are employed after migration, interstate migrants in state-specific licensed occupations are 11.5 percentage points or 12.5% less likely to continue the same occupation after migration than their peers in quasi-national licensed occupations, relative to intrastate intercounty migrants. That is, the career of these female migrants with family ties is disrupted by the limited portability of occupational license across states. These workers might be forced to work in a new occupation either temporarily until they obtain a new license or permanently because the relicensing procedure is too costly.

Overall, about 20% of interstate migrants are negatively affected by the limited portability of occupational licenses across states among female workers with family ties. We identify two mechanisms by which occupational licensing barriers across states are limiting the labor market activity of female workers with family ties: one is the extensive margin effect on the employment rate, and the second is the intensive margin effect of unwanted job changes among the employed. It should be noted that these migrants are experienced workers with an out-of-state license, and that their skills for licensed practice are mostly transferrable across U.S. states. Hence, US citizens would almost surely be better off by allowing female workers with family ties to practice without a costly relicensing procedure after migration.

3. Placebo Test Results

We now present placebo test results on two groups of migrants which are similar to female interstate migrants with family ties but not affected by occupational licensing barriers across states after migration ("placebo treatment").

(1) Intrastate Migrants

First, we examine whether our findings are unique to interstate migrants and not observable for intrastate migrants. As a group of intrastate migrants that are as close to interstate migrants as possible, we analyze an association between individual licensing status and labor market outcomes among intrastate intercounty migrants among female workers with family ties. As shown in Table 4 Panel A, we find little difference in labor market outcomes between intrastate

intercounty movers and stayers within county in state-specific licensed occupations, relative to those in quasi-national licensed occupations.

By contrast, when we compare labor market outcomes between interstate movers and stayers within county among female workers with family ties, we obtain estimates in Table 4 Panel B, which are almost the same to our baseline estimates in Table 3. That is, our baseline findings from the analysis of using intrastate intercounty movers as a control group are robust to an alternative control group of stayers within county. Interstate migrants are more similar to intrastate intercounty movers than stayers within county, as discussed in the earlier section, but nonetheless our difference-in-differences method seems to also work well when we utilize this alternative control group.

In sum, intrastate movers in state-specific licensed occupations do not experience negative labor market outcomes after migration, while interstate movers do. In other words, moving across geography with an occupational license does not affect migrants' labor market outcomes until they cross state lines. The findings are perfectly in line with the fact that an occupational license is portable within states but not across states because of state licensing arrangements in the United States.

(2) Self-Selected Migrants

As the second placebo test, we explore whether our findings persist when we focus on workers without the same family ties. In this analysis, we consider two groups of migrants whose move is likely to be determined by their own career rather than family ties: female workers without a spouse and male workers with a spouse. In each group of workers, we find little difference in the employment, labor force participation, and unemployment rate between interstate and intrastate intercounty migrants in state-specific licensed occupations, relative to those in quasi-national licensed occupations (Table 5 columns 1 to 3). As shown in Table 5 column 4, we also find a lower propensity of workers continuing in an occupation among workers in state-specific licensed occupations after interstate migration among both groups of workers.

Why would workers without family ties also be less likely to remain in an occupation with state-specific licensing requirements when comparing interstate and intrastate intercounty migrants? We suspect that these workers might have two choices: either selecting out of interstate migration or selecting into it and changing occupations. As a result of the first type of selection, we do not observe any employment effect for these untied workers. As a result of the second type of selection, we find a large negative effect on these workers retaining the same occupation among the employed.

Combining both placebo test results with our baseline results, we find a negative association between individual licensing status and post-move employment status if and only if female migrants with family ties in state-specific licensed occupations cross state lines. This set of estimates provides strong support for our previous findings that occupational licensing barriers across states cause negative labor market outcomes for female interstate migrants with family ties in state-specific licensed occupations.

4. Robustness Results

Additionally, we present several robustness results on our findings of negative labor market effects from occupational licensing barriers across states among female migrants with family ties.

(1) Comparisons with Coarse Control Groups

First, we find similar results when using all workers who did not move across states ("stayers within state") as a control group to interstate migrants, as shown in Table 6 Panel A. Stayers within state includes stayers within county as well as intrastate intercounty movers, which is the control group for our baseline analysis. As discussed in the data section, interstate migrants are more homogeneous to intrastate intercounty movers than stayers within county, and stayers within county are about 99% of stayers within state. Despite this, the estimates are almost identical to our baseline estimates in Table 3 and Table 4 Panel B.

Next, Table 6 Panel B shows that some of our findings are robust, and some are not when we use workers in all other occupations as a control group to workers in state-specific licensed occupations. All other occupations means all occupations excluding state-specific licensed occupations—this group is largely comprised of unlicensed workers. From the alternative analysis, point estimates of the employment and labor force participation effect are slightly smaller than our baseline estimates in Table 3. When we compare the point estimate for retaining the same occupation to our baseline estimate, it is significantly smaller.

We suspect that the differences that we observe when we use this alternative control group can be attributed to potential problems arising from the inclusion of unlicensed workers into the control group because of heterogeneity between licensed and unlicensed workers. For example, Morris and Xu (2023) show that licensed workers are more likely to continue a career in the same occupation, which may cause an underestimation of the effect of occupational licensing barriers across states on the continuation of a state-specific licensed occupation after interstate migration relative to all other occupations.

(2) Sensitivity to Observables and O*NET Ability and Skills

Also, our findings are robust to the inclusion or exclusion of whether we account for observable characteristics in the CPS ASEC data or in the O*NET ability and skills data. In the analysis, we construct three composite indices on cognitive abilities, basic skills, and complex problem-solving skills and link them to the CPS ASEC data by occupations (see Appendix A for more details on the procedure). Table 7 presents estimates on the employment effect in Panel A and the continuing occupation effect in Panel B with varying sets of control variables. Column 3 of the table corresponds to our baseline method that excludes EMTs and paramedics due to the lack of O*NET ability and skills data. Since EMTs and paramedics are only a small fraction (0.7% in the sample) of female workers with family ties in 22 licensed occupations for the study, the estimates are very close to our baseline estimates in Table 3. If we exclude individual characteristics or state and year fixed effects from our regressions, point estimates become a bit smaller (Table 7 columns 1 and 2). If we add O*NET ability and skills indices to our regressions, point estimates become a bit larger, as shown in Table 7 column 4. Importantly, all the estimates from varying specifications are statistically not different from one another. Taken together, these

findings imply that the potential for selection on observables, if any, or omitted variables like ability or skills are unlikely to cause an overestimation of the effect of occupational licensing barriers on the labor market outcomes of female interstate migrants with family ties in state-specific licensed occupations.

(3) Sensitivity to Major State-Specific Licensed Occupations

Lastly, our findings are not solely driven by any major state-specific licensed occupations. As shown in Table 8 columns 1 and 2, if we exclude teachers (60.9% of workers in state-specific licensed occupations in the sample) from the sample, point estimates of the effects on employment and continuing the same occupation become larger in magnitude and stay similar in statistical significance. Similarly, the remaining columns in the table confirm that the estimates do not change much when we exclude cosmetologists (9.9%), real estate broker and sales agents (7.4%), and lawyers (6.2%), respectively. These results imply that workers in state-specific licensed occupations across varying level of skills commonly experience negative labor market effects of occupational licensing barriers after interstate migration. Also, potential heterogeneity in the transferability of occupational specific skills may not be the main reason behind our findings. Even when we exclude lawyers whose expertise on a state-specific law are not transferrable to another state (Pashigian 1979), we find slightly larger points estimates in magnitude.

V. Conclusion

Our study demonstrates that occupational licensing barriers across states have negative labor market effects on interstate migrants among female workers with family ties. We first provide empirical evidence that female workers with a male spouse tend not to select out of interstate migration based on occupational licensing barriers relevant to their own occupation. Next, we show that the employment and continuation of the same occupation after migration for this subset of workers is negatively affected by the limited portability of occupational licenses across states. Given that these female workers with family ties are experienced practitioners with an out-of-state license, the licensing barrier may cause a loss of social welfare. By contrast, we find

little employment effect of the licensing barrier on female workers without a spouse and male workers with a female spouse, respectively, who may select out of migration.

Our findings shed a new light on the economic implications of occupational license portability across geography, which is broader than their effect on geographic mobility. The occupational licensing barriers across states not only limit interstate mobility of workers but also restrict the labor market activity of interstate migrants. Our study also reveals a dichotomy between the two effects by family ties: the licensing barrier restricts the interstate mobility of male workers or female workers without a spouse, but licensing instead limits the post-migration labor market activity of female workers with a male spouse. This finding implies if male workers motivate family migration, occupational licensing barriers may worsen the spousal earnings gap, which is a vicious circle to further male dominance in family migration.

It should be noted that our study's scope is limited to a relatively short-term effect of occupational licensing barriers across states within a country, and several extensions seem possible to understand broader implications of occupational license portability. First, the long-term labor market effect of occupational licensing barriers across states may differ from our findings on average six months after migration. It is unclear how the effect evolves over time. A conjecture is that the negative employment effect may diminish as more workers obtain a license in a new state or adjust to another occupation over time, while the negative effect on continuing the same occupation may be sustained at least for some tied migrants. Second, the effect of occupational licensing barriers across countries may have a larger effect than what our study finds, and this may have implications for immigration policy. Since the licensing barrier is expected to be stronger between countries than it is between states within a country, we would anticipate larger negative effect on immigrants' labor market activity and overall efficiency. Third, there are growing research opportunities on the effectiveness of occupational license portability programs. Our study provides a practical guide on plausible effects of these programs: they may increase geographic mobility of male workers or female workers without a spouse, while they may improve the post-move labor market activity of female workers with family ties.

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Table 1. Descriptive Statistics

Variable	(1) Full sample	(2) Female workers with family ties	(3)	(4)
	All	All	State-specific licensed	Quasi-national licensed
Individual characteristics				
Age	43.2	43.4	43.1	43.0
	(10.5)	(10.1)	(9.9)	(10.0)
Female	0.488	1.000	1.000	1.000
White	0.682	0.726	0.819	0.777
Black	0.099	0.070	0.054	0.079
Hispanic	0.133	0.116	0.072	0.056
Other race/ethnicity	0.086	0.089	0.055	0.088
High school or below	0.344	0.308	0.093	0.039
Some college education	0.283	0.297	0.159	0.320
College degree	0.237	0.256	0.367	0.399
Advanced degree	0.136	0.140	0.382	0.242
Married	0.666	0.919	0.955	0.942
Having kids	0.601	0.685	0.731	0.718
Immigrant	0.149	0.144	0.074	0.111
Licensing status				
Licensed occupations	0.123	0.175	1.000	1.000
State-specific licensed	0.078	0.101	1.000	0.000
Quasi-national licensed	0.045	0.074	0.000	1.000
Geographic mobility				
Migration between counties	0.029	0.021	0.020	0.020
Migration across states	0.014	0.010	0.010	0.010
Labor market outcomes				
Employed	0.926	0.923	0.945	0.965
Labor force	0.962	0.947	0.956	0.975
Unemployed	0.037	0.025	0.011	0.010
Continuing occupation	0.938	0.938	0.970	0.975
Observations	1,334,307	412,269	41,425	30,298

Notes: Unweighted means. Standard deviations are in parentheses. The full sample in column 1 is civilian workers aged 25 to 64 who worked in the previous calendar year and are not in group quarters as of the survey with non-imputed values for the annual migration status, occupation, employment status, age, sex, race, ethnicity, education, marital status, and state of residency a year before the survey, excluding those who lived outside the 50 U.S. states or the District of Columbia a year before the survey in the CPS ASEC 2003-2023. The subsample of female workers with family ties in column 2 consists of female workers with a male spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year.

Table 2. Occupational Licensing and Interstate Migration

VARIABLES	(1) All	(2) Intercounty movers
A. Female workers with family ties		
State-specific licensed	-0.0011*	-0.0187
	(0.0006)	(0.0264)
Observations	71,723	1,425
R-squared	0.011	0.161
Mean outcome	0.0100	0.5046
B. All other workers		
State-specific licensed	-0.0088***	-0.0833***
	(0.0012)	(0.0230)
Observations	91,977	3,207
R-squared	0.019	0.148
Mean outcome	0.0169	0.4849

Notes: Outcome variable is an indicator for interstate movers. The full sample is civilian workers aged 25 to 64 who worked in the previous calendar year and are not in group quarters as of the survey with non-imputed values for the annual migration status, occupation, employment status, age, sex, race, ethnicity, education, marital status, and state of residency a year before the survey, excluding those who lived outside the 50 U.S. states or the District of Columbia a year before the survey in the CPS ASEC 2003-2023. For Panel A estimations, the sample is restricted to female workers with a male spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year. The sample for Panel B estimations is all workers excluding female workers with family ties in the full sample. Column 1 estimates are obtained from a comparison of the propensity of interstate migration between workers in state-specific licensed occupations and those in quasi-national licensed occupations after accounting for individual characteristics. Column 2 estimates are from the same analysis with a subsample of intercounty movers. All estimations account for age (by five-year categories), black, Hispanic, other race/ethnicity dummies, a dummy for the married, a dummy for those living with their own children, a dummy for the foreign-born, and three education group dummies (some college education, college degree, and advanced degree). Panel B estimations also include dummy variables for female, married female, and female living with their own children, respectively, because the sample of all other workers have both males and females. Standard errors are clustered by states and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 3. Occupational Licensing and Interstate Migrants' Labor Market Outcomes

VARIABLES	(1) Employed	(2) Labor force	(3) Unemployed (in the labor force)	(4) Continuing occupation (among the employed)
(Interstate mover)	-0.102***	-0.112***	-0.001	-0.115***
*(State-specific licensed)	(0.035)	(0.032)	(0.018)	(0.029)
Observations	1,425	1,425	1,265	1,212
R-squared	0.156	0.143	0.091	0.131
Mean outcome	0.851	0.888	0.042	0.922

Notes: Outcome variable is an indicator for employment, in labor force, unemployment, and continuing occupation (whether an employed worker has the same occupation before and after migration) as stated in the column header. The sample is restricted to female workers with a male spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year. Each estimate is obtained from a difference-in-differences estimation that compares the outcome between interstate movers (treatment) and intrastate intercounty movers (control) in state-specific licensed occupations (treatment) relative to those in quasi-national licensed occupations (control) after accounting for individual characteristics. All estimations include a dummy for interstate movers and a dummy for those in state-specific licensed occupations, whose estimated coefficients are not presented in the table. All estimations account for age (by five-year categories), black, Hispanic, other race/ethnicity dummies, a dummy for the married, a dummy for those living with their own children, a dummy for the foreign-born, and three education group dummies (some college education, college degree, and advanced degree). Standard errors are clustered by states and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 4. Occupational Licensing and Migrants' Labor Market Outcomes: Intrastate Migrants

VARIABLES	(1) Employed	(2) Labor force	(3) Unemployed (in the labor force)	(4) Continuing occupation (among the employed)
A. Intrastate intercounty movers vs. Stayers within county				
(Intrastate intercounty mover)	-0.011	0.001	0.013	0.001
*(State-specific licensed)	(0.018)	(0.016)	(0.010)	(0.017)
Observations	71,004	71,004	68,547	67,831
R-squared	0.018	0.019	0.005	0.008
Mean outcome	0.955	0.965	0.010	0.972
B. Interstate movers vs. Stayers within county				
(Interstate mover)	-0.108***	-0.102***	0.017	-0.105***
*(State-specific licensed)	(0.030)	(0.027)	(0.017)	(0.022)
Observations	71,017	71,017	68,480	67,737
R-squared	0.025	0.024	0.007	0.011
Mean outcome	0.954	0.964	0.011	0.975

Notes: Outcome variable is an indicator for employment, in labor force, unemployment, and continuing occupation (whether an employed worker has the same occupation before and after migration) as stated in the column header. The sample is restricted to female workers with a male spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year. Panel A estimates are obtained from difference-in-differences estimations that compare the outcome between intrastate intercounty movers (placebo treatment) and stayers within county (control) in state-specific licensed occupations (treatment) relative to those in quasi-national licensed occupations (control) after accounting for individual characteristics. Panel B estimates are from difference-in-differences estimations that compare the outcome between interstate movers (actual treatment) and stayers within county (control) in state-specific licensed occupations (treatment) relative to those in quasi-national licensed occupations (control) after accounting for individual characteristics. All estimations include a dummy for intrastate intercounty movers (Panel A) or interstate movers (Panel B) and a dummy for those in state-specific licensed occupations, whose estimated coefficients are not presented in the table. All estimations account for age (by five-year categories), black, Hispanic, other race/ethnicity dummies, a dummy for the married, a dummy for those living with their own children, a dummy for the foreign-born, and three education group dummies (some college education, college degree, and advanced degree). Standard errors are clustered by states and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 5. Occupational Licensing and Migrants' Labor Market Outcomes: Self-Selected Migrants

VARIABLES	(1) Employed	(2) Labor force	(3) Unemployed (in the labor force)	(4) Continuing occupation (among the employed)
A. Female workers without a spouse				
(Interstate mover)	0.007	-0.008	-0.012	-0.144***
*(State-specific licensed)	(0.035)	(0.035)	(0.021)	(0.041)
Observations	1,053	1,053	994	953
R-squared	0.130	0.107	0.109	0.123
Mean outcome	0.905	0.944	0.041	0.917
B. Male workers with a female spouse				
(Interstate mover)	0.006	-0.030	-0.033	-0.088*
*(State-specific licensed)	(0.036)	(0.028)	(0.026)	(0.051)
Observations	653	653	616	595
R-squared	0.194	0.210	0.177	0.183
Mean outcome	0.911	0.943	0.034	0.904

Notes: Outcome variable is an indicator for employment, in labor force, unemployment, and continuing occupation (whether an employed worker has the same occupation before and after migration) as stated in the column header. The sample for Panel A estimations is restricted to female workers without a spouse as of the survey, and that for Panel B is male workers with a female spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year. Each estimate is obtained from a difference-in-differences estimation that compares the outcome between interstate movers (placebo treatment) and intrastate intercounty movers (control) in state-specific licensed occupations (treatment) relative to those in quasi-national licensed occupations (control) after accounting for individual characteristics. All estimations include a dummy for interstate movers and a dummy for those in state-specific licensed occupations, whose estimated coefficients are not presented in the table. All estimations account for age (by five-year categories), black, Hispanic, other race/ethnicity dummies, a dummy for the married, a dummy for those living with their own children, a dummy for the foreign-born, and three education group dummies (some college education, college degree, and advanced degree). Standard errors are clustered by states and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 6. Comparisons with Coarse Control Groups

VARIABLES	(1) Employed	(2) Labor force	(3) Unemployed (in the labor force)	(4) Continuing occupation (among the employed)
A. Interstate movers vs. Stayers within state				
(Interstate mover)	-0.108***	-0.102***	0.017	-0.105***
*(State-specific licensed)	(0.030)	(0.027)	(0.017)	(0.022)
Observations	71,723	71,723	69,146	68,390
R-squared	0.025	0.024	0.007	0.011
Mean outcome	0.954	0.964	0.011	0.972
B. State-specific licensed vs. Those in all other occupations				
(Interstate mover)	-0.088***	-0.080***	0.012	0.029
*(State-specific licensed)	(0.027)	(0.024)	(0.015)	(0.023)
Observations	8,595	8,595	7,292	6,741
R-squared	0.070	0.058	0.040	0.067
Mean outcome	0.784	0.848	0.076	0.821

Notes: Outcome variable is an indicator for employment, in labor force, unemployment, and continuing occupation (whether an employed worker has the same occupation before and after migration) as stated in the column header. The sample is restricted to female workers with a male spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year. Panel A estimates are obtained from difference-in-differences estimations that compare the outcome between interstate movers (treatment) and stayers within state (coarse control) in state-specific licensed occupations (treatment) relative to those in quasi-national licensed occupations (control) after accounting for individual characteristics. Panel B estimates are from difference-in-differences estimations that compare the outcome between interstate movers (treatment) and stayers within county (control) in state-specific licensed occupations (treatment) relative to those in all other occupations (coarse control) after accounting for individual characteristics. All estimations include a dummy for interstate movers and a dummy for those in state-specific licensed occupations, whose estimated coefficients are not presented in the table. All estimations account for age (by five-year categories), black, Hispanic, other race/ethnicity dummies, a dummy for the married, a dummy for those living with their own children, a dummy for the foreign-born, and three education group dummies (some college education, college degree, and advanced degree). Standard errors are clustered by states and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 7. Sensitivity to Observables and O*NET Ability and Skills

Outcome variables	(1)	(2)	(3)	(4)
A. Employment				
(Interstate mover)	-0.098***	-0.094**	-0.108***	-0.109***
*(State-specific licensed)	(0.033)	(0.036)	(0.035)	(0.036)
State, year fixed effects		X	X	X
Individual characteristics			X	X
O*NET ability and skills				X
Observations	1,415	1,415	1,415	1,415
R-squared	0.061	0.099	0.149	0.163
Mean outcome	0.850	0.850	0.850	0.850
B. Continuing occupation (among the employed)				
(Interstate mover)	-0.095***	-0.101***	-0.103***	-0.111***
*(State-specific licensed)	(0.027)	(0.030)	(0.030)	(0.031)
State, year fixed effects		X	X	X
Individual characteristics			X	X
O*NET ability and skills				X
Observations	1,203	1,203	1,203	1,203
R-squared	0.024	0.085	0.120	0.136
Mean outcome	0.924	0.924	0.924	0.924

Notes: Outcome variable is an indicator for employment for Panel A estimations and an indicator for continuing occupation (whether an employed worker has the same occupation before and after migration) in Panel B estimations. The sample is restricted to female workers with a male spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year. Each estimate is obtained from a difference-in-differences estimation that compares the outcome between interstate movers (treatment) and stayers within county (control) in state-specific licensed occupations (treatment) relative to those in quasi-national licensed occupations (control). Individual characteristics include age (by five-year categories), black, Hispanic, other race/ethnicity dummies, a dummy for the married, a dummy for those living with their own children, a dummy for the foreign-born, and three education group dummies (some college education, college degree, and advanced degree). O*NET ability and skills are controlled with three standardized continuous variables on cognitive abilities, basic skills, and complex problem-solving skills that the authors created based on the O*NET ability and skills data database. EMT/paramedics are not included in the analysis of all columns because of the lack of O*NET ability and skills data. Standard errors are clustered by states and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 8. Sensitivity to Major State-Specific Licensed Occupations

Outcome variables	(1) Baseline	(2) Except teachers	(3) Except cosmetologists/barbers	(4) Except real estate agents	(5) Except lawyers
A. Employment					
(Interstate mover)	-0.102***	-0.154***	-0.083**	-0.094***	-0.113***
*(State-specific licensed)	(0.035)	(0.042)	(0.036)	(0.033)	(0.036)
Observations	1425	921	1343	1364	1374
R-squared	0.156	0.210	0.158	0.158	0.161
Mean outcome	0.851	0.877	0.854	0.853	0.848
B. Continuing occupation (among the employed)					
(Interstate mover)	-0.115***	-0.148***	-0.097***	-0.120***	-0.125***
*(State-specific licensed)	(0.029)	(0.038)	(0.032)	(0.029)	(0.031)
Observations	1212	808	1147	1163	1165
R-squared	0.131	0.156	0.134	0.134	0.135
Mean outcome	0.922	0.934	0.925	0.923	0.919

Notes: Outcome variable is an indicator for employment for Panel A estimations and an indicator for continuing occupation (whether an employed worker has the same occupation before and after migration) in Panel B estimations. The sample is restricted to female workers with a male spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year. Each estimate is obtained from a difference-in-differences estimation that compares the outcome between interstate movers (treatment) and stayers within county (control) in state-specific licensed occupations (treatment) relative to those in quasi-national licensed occupations (control). Column 1 estimates are the replica of baseline estimates in Table 3. Columns 2 to 5 estimates are obtained from subsample estimations excluding workers in one of four major state-specific licensed occupations specified in the column heading. All estimations include a dummy for interstate movers and a dummy for those in state-specific licensed occupations, whose estimated coefficients are not presented in the table. All estimations account for age (by five-year categories), black, Hispanic, other race/ethnicity dummies, a dummy for the married, a dummy for those living with their own children, a dummy for the foreign-born, and three education group dummies (some college education, college degree, and advanced degree). Standard errors are clustered by states and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Appendix A. O*NET Ability and Skills Measures for the Study

As a component of our robustness analysis, we use three composite measures of O*NET ability and skills. To construct each composite index, we compute a z-score standardized element index at the O*NET SOC occupation level, which is finer than the CPS occupation for all 22 licensed occupations in the study. Cognitive abilities consist of 21 components, basic skills have 10 elements, and complex problem-solving skills is a single element unto itself (O*NET database 2024). Then, we link O*NET SOC occupations to CPS occupations using crosswalks from O*NET SOC occupations to the BLS Matrix occupations to CPS occupations available on the website of the Bureau of Labor Statistics (2024a). Then, we take the average of each composite index weighted by the number of employees in each BLS Matrix occupation within the CPS occupation. For the weighting, we use data on the number of employees as of 2023 by BLS Matrix occupations (Bureau of Labor Statistics 2024b).

References for the Appendix A

U.S. Bureau of Labor Statistics. (2024a). *Classifications and Crosswalks*. Retrieved November 2024, from Employment Projections: https://www.bls.gov/emp/documentation/crosswalks.htm

U.S. Bureau of Labor Statistics. (2024b). *Occupational Employment Projections Data*. Retrieved November 2024, from Employment Projections: https://www.bls.gov/emp/data/occupational-data.htm

Appendix B. Additional Tables

Table B1. Median Licensing Requirements for State-Specific Licensed Occupations

Occupation names	Initial licensing fee ($)	Education	Experience /Training	Number of exams	Source database
Teacher	75	Bachelor's degree	-	1	KRRC
Lawyer	620	Juris doctoral degree	-	4	KRRC
Cosmetologist/barber	167	High school	1,500 hours	2	KRRC
Real estate broker/sales agent	157	-	60 hours	1	NCSL
Electrician	50	-	4 years or 8,000 hours	1	NCSL
Insurance agent	60	-	20 hours	1	NCSL
Pharmacist	208	Doctoral degree	1,500 hours	2	KRRC
EMT/paramedics	113	-	160 hours	2	NCSL
Dental hygienist	150	Associate degree	-	3	KRRC
Dentist	342	Doctoral degree	-	3	KRRC
Real estate appraiser/assessor	338	Associate degree	2,150 hours	1	NCSL
Veterinarian	215	Doctoral degree	-	2	KRRC
Pest control worker	90	-	-	2	NCSL
Chiropractor	300	Doctoral degree	-	2	KRRC
Optometrist	300	Doctoral degree	-	3	KRRC
Podiatrist	400	Doctoral degree	2,000 hours	1	KRRC

Notes: Median licensing requirement in 50 states and the District of Columbia. Cosmetologist, real estate agent, EMT, real estate appraiser data are used for cosmetologist/barber, real estate broker/sales agent, EMT/paramedic, and real estate appraiser/assessor category, respectively.
Source: Knee Regulatory Research Center (KRRC) Occupational Licensing Database and National Conference of State Legislatures (NCSL) National Occupational Licensing Database as of May 15, 2024.

Table B2. List of 22 Licensed Occupations in the Sample

Occupation names	CPS occupation codes	License attainment rate (%)	Share in the sample (%)
State-specific licensed occupations			
Elementary/secondary teacher	2300, 2310, 2320, 2330, 2340, 2350, 2360	77.3%	35.4%
Lawyer	2100, 2105	88.3%	3.6%
Cosmetologist/barber	4500, 4510	76.5%	5.8%
Real estate broker/sales agent	4920	76.1%	4.3%
Electrician	6350, 6355	49.2%	0.1%
Insurance agent	4810	68.0%	2.3%
Pharmacist	3050	89.4%	1.5%
EMT/paramedic	3400, 3401, 3402	82.9%	0.7%
Dental hygienist	3310	84.0%	1.8%
Dentist	3010	94.9%	1.0%
Real estate appraiser/assessor	810	61.9%	0.4%
Veterinarian	3250	94.7%	0.6%
Pest control worker	4240	45.0%	0%
Chiropractor	3000	92.1%	0.2%
Optometrist	3040	89.0%	0.4%
Podiatrist	3120	100.0%	0.1%
Quasi-national licensed occupations			
Nurse (RN/LPN)	3130, 3255, 3256, 3258, 3500	85.1%	26.9%
Physician	3060, 3090, 3100	91.7%	4.3%
Social worker	2010, 2011, 2012, 2013, 2014	42.8%	4.3%
Occupational and physician therapist	3150, 3160	85.4%	3.8%
Psychologist	1820, 1821, 1822, 1825	82.4%	2.2%
Physician assistant	3110	84.6%	0.5%

Notes: The list of 22 licensed occupations is obtained from Johnson and Kleiner (2020). CPS occupation codes, shares in the study sample, and license attainment rates are added by the authors. The license attainment rate is calculated as the share of individuals who have an active professional license or certificate among *all civilian workers* aged 25 to 64 who worked in the previous calendar year in a U.S. state, who are not in group quarters as of the survey, and who have non-imputed data on occupation, migration status, employment status, age, sex, race, Hispanic origin, marital status, and educational attainment *in the CPS ASEC and Basic March in 2015-2023*. The share in the sample is calculated as the share of individuals in each occupation among *female civilian workers with family ties* at age 25 to 64 who worked in the previous calendar year in a U.S. state, who are not in group quarters as of the survey, and who have non-imputed data on occupation, migration status, employment status, age, sex, race, Hispanic origin, marital status, and educational attainment *in the CPS ASEC 2003-2023*. Female workers with family ties means female workers with a male spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year.

Table B3. Individual Characteristics by Migration Status

Variable	(1) All	(2) Interstate movers	(3) Intrastate intercounty movers	(4) Stayers within county	(5) =(2)-(3)	(6) =(2)-(4)
A. State-specific licensed						
Age	43.1	37.4	37.2	43.2	0.2	-5.8***
	(9.9)	(9.6)	(10.0)	(9.8)	(0.7)	(0.5)
White	0.819	0.837	0.837	0.818	-0.001	0.018
Black	0.054	0.039	0.048	0.054	-0.009	-0.015
Hispanic	0.072	0.051	0.074	0.073	-0.023	-0.021*
Other race/ethnicity	0.055	0.073	0.041	0.055	0.033**	0.018
High school or below	0.093	0.066	0.084	0.093	-0.018	-0.027*
Some college education	0.159	0.149	0.184	0.158	-0.035	-0.010
College degree	0.367	0.376	0.352	0.367	0.024	0.009
Advanced degree	0.382	0.410	0.380	0.382	0.029	0.028
Married	0.955	0.932	0.871	0.956	0.061***	-0.024**
Having kids	0.731	0.612	0.629	0.733	-0.017	-0.121***
Immigrant	0.074	0.063	0.069	0.074	-0.006	-0.010
Observations	41,425	410	418	40,597	828	41,007
B. Quasi-national licensed						
Age	43.0	36.7	36.3	43.1	0.3	-6.4***
	(10.0)	(9.6)	(8.9)	(10.0)	(0. 8)	(0.6)
White	0.777	0.774	0.781	0.777	-0.008	-0.004
Black	0.079	0.065	0.073	0.080	-0.008	-0.015
Hispanic	0.056	0.052	0.028	0.056	0.024	-0.004
Other race/ethnicity	0.088	0.110	0.118	0.087	-0.008	0.023
High school or below	0.039	0.013	0.031	0.039	-0.018	-0.026**
Some college education	0.320	0.230	0.274	0.322	-0.045	-0.092***
College degree	0.399	0.333	0.406	0.400	-0.073*	-0.067**
Advanced degree	0.242	0.424	0.288	0.240	0.136***	0.184***
Married	0.942	0.896	0.851	0.943	0.046*	-0.046***
Having kids	0.718	0.579	0.632	0.721	-0.053	-0.141***
Immigrant	0.111	0.091	0.080	0.111	0.011	-0.021
Observations	30,298	309	288	29,701	597	30,010

Notes: Unweighted means. Standard deviations are in parentheses. The sample is civilian workers aged 25 to 64 who worked in the previous calendar year and are not in group quarters as of the survey with non-imputed values for the annual migration status, occupation, employment status, age, sex, race, ethnicity, education, marital status, and state of residency a year before the survey, excluding those who lived outside the 50 U.S. states or the District of Columbia a year before the survey in the CPS ASEC 2003-2023. The sample is restricted to female workers with a male spouse as of the survey who reported the same migration status in the previous year and state of residency a year before the survey, and who worked in an occupation other than state-specific or quasi-national licensed occupations in the previous calendar year. Panel A shows the mean characteristics of workers in state-specific licensed occupations, and Panel B shows that of workers in quasi-national licensed occupations. Columns 1 to 4 show the characteristics for all workers, interstate movers, intrastate intercounty movers, and stayers within county (those who stayed with state), respectively. Column 5 tests the difference in means between interstate movers and intrastate intercounty movers, and column 6 does that between interstate movers and stayers within county. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.