

Together or Apart: A Structural Model of Intergenerational Location Choice

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November 2025

Job Market Paper

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Abstract

This paper examines the relationship between the location decisions of young adults and those of their parents within the US. I build and estimate a dynamic choice model of the co-location decision of adult children and their parents. The model incorporates both moving costs and the heterogeneous utility of parent-child proximity. By separately identifying each, I am able to conduct a counterfactual analysis in which parents and children make individually optimal migration decisions, while keeping other migration inhibiting factors fixed. Without these family ties there are substantial increases in overall migration rates and a significant reallocation of young adults across labor markets towards more productive locations. The findings suggest that parental bonds are nearly as important in preventing young adult movement as all other moving costs combined. This suggests that these ties are a significant factor limiting the reallocation of labor across the US and provide a natural obstacle to policy attempts to address geographic labor market disparities.

Introduction

Geographic wage inequality is high and increasing in the United States, causing concern among public officials (U.S. Department of Commerce 2023). At first glance, this large disparity in wages should result in workers moving from low-wage, low-productivity labor markets to high-wage, high-productivity ones. Although there are many possible explanatory factors contributing to these persistent wage differentials, they have in part motivated a growing literature examining potential inhibiting factors of domestic migration in the US. This paper contributes to this literature by assessing the role that intergenerational family ties have on working age adults' location decisions.

There are many potential determinants of whether adults move to a different labor market or not, including potential wage gains, high costs of relocating, geography-specific human capital, and non-pecuniary benefits of living in certain locations. Given that young adults typically start life in the same location as their parents, it is a challenge to determine to what extent young adults and their parents tend to live close due to the costs of relocating or due to potential benefits of proximity. The primary contribution of this paper is to build and estimate a dynamic model capable of disentangling the joint-decision problem of parents and children in order to measure the contribution of these ties to labor (im)mobility in the US. While there have been several papers that have incorporated the important influence of family-ties on migration decisions, to the author's knowledge no previous work has sought to isolate the effect that parent-child ties have on both agents' mobility and quantify their importance relative to other factors.

The model is a dynamic discrete choice model based on the migration model of Kennan and Walker (2011), but extended to include both adult children and their parents choosing their locations. The dynamic aspect of the model allows it to capture the fact that parents and children frequently relocate to one another even after separating. I can separately identify the moving cost structure from the utility benefits of proximity through differentials in initial migration and return

rates. As in Kennan and Walker (2011), the value of a particular combination choice is dependent upon possible locations as well as the previous period locations. The model is structurally estimated using the Panel Study of Income Dynamics (PSID), the generational structure of which allows me to track adult children after they leave their parent’s household. The choice set I construct for the agents is flexible enough to accurately capture parent and child proximity and geographic variation in labor market characteristics without expanding the level of geography to the point that estimation is infeasible. With the model estimated I am able to perform counterfactual analyses that reveal the location choices and migration rates of parents and adult children as if there were no family ties. The results suggest that family ties play a significant role in the location decisions of adult children, of a similar magnitude to the influence of wages. I find that eliminating the utility of the parent-child proximity results in larger flows of young adults to higher wage locations than in the baseline scenario. The effect on parent location choice is comparatively muted, suggesting parent-child ties are not the cause of parents not relocating to potentially preferred locations. I also find that factors often hypothesized to be important contributors to the benefit of parent-child proximity, such as negative parental health shocks or the presence of a grandchild, are not significantly influential in the decision to live close to each other, which seems in line with the descriptive findings of Compton and Pollak (2015).

The rest of the paper is structured as followed. I first examine the existing relevant literature noting how this paper contributes to it. I then describe the data and explore several important descriptive patterns of young adult and their parents’ migration. I document the relevance of family ties to adult children’s migration choices and the importance parental location decisions. Finally, I describe the model and review the estimates before conducting the counterfactual described above.

Related Literature

This paper builds on the work by Kennan and Walker (2011), which used the National Longitudinal Survey of Young (NLSY79) to estimate a dynamic discrete choice model of young adult migration using US states as location options, finding that income prospects play a substantial role in migration decisions. They also find that young adults' home locations are important in decision making and result in high levels of return migration, even after many year away. Other early work includes Bishop (2007) who uses the NLSY79 to estimate a dynamic discrete choice model of location choice using metropolitan areas as the relevant geographic choice. Rather than using full solution methods as in Kennan and Walker (2011) and here, that paper utilizes a two-step estimator, estimating the choice probabilities in the first step.

Most directly, this paper contributes to a group of papers that structurally model aspects of parent-child dynamics and their relationship to migration decisions. Anstreicher and Venator (2022) estimate a dynamic discrete choice model of labor force participation and migration among women of child bearing age. The model incorporates grandparent contributions to childcare when proximate, but grandparent locations are taken as given. Here, I allow for possible childcare benefits of living close to a parent, but have grandparent locations as well as the parent locations part of a decision process. Anstreicher (2024) estimates a model of intergenerational human capital investment, migration and child-rearing using a four period model with two potential moving decisions. Unlike in this paper, the model does not incorporate parental migration decisions or interactive effects of parent and child choices when both are adults.

Coate (2013) estimates a model of young adult location decisions, particularly focusing on parental proximity and occupation on their children's wages. The model allows for stochastic parent moves based on a transition process rather than an explicitly modeled decision process potentially coordinated with adult children. The choices the agents face are to stay, move to

a home location, move to their parent, or make what is referred to as a ‘national move’ which is any other location in the United States. This national move is a random assignment to another metropolitan area following a transition process. This setup, while capturing the benefits of parent-child proximity, would not allow me to conduct the counterfactual location choices I am interested in here.

Several reduced form studies also explore migration and parent-child relationships. Spring et al. (2017) look specifically at local movers within metropolitan areas using a discrete choice model. They find parent age is a strong predictor of an adult child moving close to them and that already living close to a parent reduces the likelihood that a young adult moves. Reyes and Shang (2024) use the Health and Retirement Study (HRS) to assess changes in parent and child proximity when parents experience health shocks in the form of the onset of a functional limitation or cognitive impairment. They find evidence that parents and children remain closer or move closer in response to these shocks and find significant gendered interactions, with mother-daughter combinations more likely to move closer.

Compton and Pollak (2015) used the National Survey of Families and Households in conjunction with Census Data to document predictors of parent and child proximity. Their findings suggest college graduates and older children are less likely to live close to their parents. They find having grandchildren is not correlated with close proximity and that mothers having a disability is correlated with living in the same house, but not with overall proximity. This suggests proximity is not necessarily driven by children assisting parents or parents assisting with grandchildren, but may have benefits outside these scenarios. On the other hand, Choi et al. (2014) use the HRS to examine older adults developing at least one activity of daily living limitation. Using a multinomial logit model, they found residential proximity of spouses and children prevented nursing home enrollment. This indicates the proximity of parents and children potentially provide substantial

benefits to older adults experiencing adverse health events.

This paper also relates to a literature that utilizes dynamic models that incorporate marital ties into the migration decision-making process. Gemici (2013) estimates a dynamic discrete choice model of married couples using an intra-household bargaining framework using the PSID. The results show that this form of family ties reduces both mobility and wages. Lessem (2018) estimates a dynamic discrete choice model of immigration and location choice that incorporates spousal ties through independent utility functions that vary with spouse location choice. Venator (2024) estimates a unitary structural model of married couples' migration decisions, particularly looking at the effect of unemployment insurance eligibility for trailing spouses. Each member of the household shares a joint utility function and preference shocks are at the joint husband-wife level, in a manner similar to the one adopted here with parents and children. Divorce or non-cooperation among spouses is shut down as a possibility.

There is also a group of literature modeling joint decision processes that do not directly deal with migration choices. Mommaerts (2025) estimates a dynamic discrete choice model of parent and child decisions over long-term care using a limited commitment framework rather than a non-cooperative model. This is motivated by high levels of coresidence observed among adult children and parents, suggesting a non-cooperative game would be poor model choice. Here the results suggest that parent-child proximity plays a significant role in informal care for parents and the demand for long-term care insurance. Voena (2015) studies the joint decision process of married couples, examining divorce laws in the United States using a dynamic model of married couples' decisions over savings, consumption and divorce. The agents here make decisions independently by using a model of risk-sharing with limited commitment with the additional feature of a taste for marriage.

Finally, it is worth noting that among the papers cited above, Kennan and Walker (2011),

Bishop (2007), Gemici (2013), Lessem (2018), Coate (2013), and Venator (2024) all include some form of home location preference based on residence at an early age (varying by study). Anstreicher and Venator (2022), Anstreicher (2024), and Coate (2013) all explicitly incorporate the importance of the actual parent location in the decision process, with Coate (2013) also incorporating a separate home location preference as mentioned. One contribution of this study is to establish that, while home location may be a good proxy for parent location when this is not available to the researcher, it appears to be unnecessary to include in the child decision process when parent location is available.

Data

The data used for this analysis come from the Panel Study of Income Dynamic (PSID). The PSID is a longitudinal study following families that was started in 1968 and collects information on employment, wages, expenditures, education, health, and, critically, location. This type of study is feasible because of the geneological nature of the PSID. When the children in a family unit move out of a household, the survey establishes a separate family unit for them and continues to collect their information. This setup provides a richly detailed panel dataset with multiple generations of families. Here I use data from the years 2001-2019. During this period the survey is conducted biennially. Though the survey inquires about between-wave moves, I only use information from the years the survey is conducted, in order to have consistent data on characteristics only collected point-in-time, such as parental health. Therefore, each time-period in this analysis is a two year period and any rates of change should be interpreted bi-annual rather than annual. I limit the sample to parent-child pairs where the children are between the ages of 22 and 43. At this age, children of the adult children begin to leave their family units in large numbers, starting their own family units. In order to avoid double counting a single parent or child I limit each individual to one appearance in a pair, preferencing those who participate in more waves and then randomly

selecting among ties.

I gather data on parent and child education, work status, marital status, retirement status and parental health in the form of the parent having a reported Activities of Daily Living (ADL) limitation. Using restricted geocoded data, I also have information on parent and child location at a granular level. For the first part of this analysis I consider parent and child location to be which Core Based Statistical Area (CBSA) they live in. CBSAs consist of Metropolitan and Micropolitan Statistical Areas as determined by the United States Census Bureau. I also use the nine Census Divisions as alternative geographic definitions for comparison, as these are frequently used in the migration choice literature. Individual's education status is considered fixed over time at the highest level ever attained, as is parent's marital status since there is little variation over time in this measure. Home location when used is considered the individual's location at age 17 or 18, depending on which age they were in the year the survey was conducted. The location and demographic-specific wage data is gathered from the Current Population Survey for the years 2001-2019.

Descriptive Analysis

In Table 1 I document migration and co-location patterns among parents and their adult children by a variety of demographic characteristics. Across all demographic slices, a majority of adult children and their parents live in the same CBSA. This could be driven by a strong preference to locate near one another, or simply reflect the fact children begin their lives with their parents and moving away is costly. Migration rates for children are higher than for parents across all demographic characteristics. However, parents are far from stationary, with over 4 percent moving CBSAs on average over any given two-year period. This is similar to the rate that adult children move between Divisions, which are frequently used in empirical economic models of migration. This

in part motivates my decision to incorporate parent migration choices into my structural analysis, rather than assume they are immobile.

Table 1. Migration and Co-location Patterns among Adult Children and Their Parents

	Child Moves and Co-location By Child Characteristic			Parent Moves and Co-location by Parent Characteristic		
	Moves CBSA	Moves Division	Same CBSA	Moves CBSA	Moves Division	Same CBSA
All	0.117	0.049	0.717	0.043	0.016	0.717
Married	0.112	0.049	0.597	0.041	0.015	0.697
Unmarried	0.120	0.049	0.798	0.048	0.015	0.697
College	0.157	0.074	0.599	0.053	0.022	0.613
Non-College	0.090	0.033	0.796	0.039	0.014	0.755
Retired	-	-	-	0.044	0.017	0.690
Non-Retired	-	-	-	0.042	0.016	0.738
Grandchild	0.094	0.036	0.698	-	-	-
No Grandchild	0.139	0.063	0.736	-	-	-

Among both parents and children, migration rates at both the CBSA and Division level are higher for the college-educated. Rates are also higher for adult children without children. Retirement status and marital status do not have clear differences in migration rates. It is important to note these are just subsample means and are not adjusted for other demographic characteristics. Across the board, the migration rates are substantially higher at the CBSA level than at the Division level, which is expected given many CBSA moves would still be within the same Division. The differences seem to be somewhat more pronounced among the parents, indicating they may be less likely to make farther cross-Division moves relative to the rate they move CBSAs.

The rate at which parent-child pairs co-locate can vary substantially by demographic, particularly with the characteristics of the children. College-educated children and parents are less likely to live in the same CBSA, as are retired parents and adult children who are married and or have children of their own. The relationship between child marital status and co-location is not surprising given that these couples would have another set of parents and may need to decide between living with one or the other. This may drive the difference among pairs with grandchildren and those without, since the grandchild would have another set of grandparents to possibly be close to and provision care.

Table 2. Average Hourly Income in Next Period Location

Kids	Mean	SE
Non-movers	24.61	0.07
Movers	27.86	0.26
Parents		
Non-Movers	25.21	0.07
Movers	25.97	0.46

Note: Average income is estimated from the Current Population Survey (CPS) and is adjusted for age, sex, education, and location.

Table 2 presents the inflation adjusted average hourly income in the CBSAs of movers and non-movers of parents and adult children, adjusting for age, sex, and education. It is widely observed that young individuals tend to move to higher wage locations and that pattern holds for this adult children sample. The next-period location of moving children have, on average, wages three dollars per hour higher than the locations of those who choose to remain. This pattern does not hold among parent movers, with no significant difference in average wages of these destination choices. This suggests wages may play a significant role in young adults migration decisions, but a less important role for parents.

Table 3. Child Location Decisions when Not Home or With Parent

	Est.	SE
Move Home, Parent Home	0.140	0.010
Move Home, Parent not Home	0.006	0.002
Move to Parent, Parent not Home	0.055	0.005

Note: Locations defined as CBSA, apart defined as not residing in the Same CBSA. Home location defined as adult child's location at 17 or 18.

Return migration home among young adults is a frequently observed feature of the domestic migration literature, with home usually defined as the location at 17 or 18. Table 3 presents return estimates for three different types of possible return. These estimates are for parent-child pairs not currently living in the same location, defined as CBSA. Here we see different 'return rates' at

which children move home or to their parent. By row, these are the rate at which children move (1) to their home location and parent location when they are the same, (2) to their home location location when their parent is not there, and (3) to their parent location when the parent is not in the child’s home location. The return rates to the parent locations are both significant, with the rate when they coincide being the highest. However, when the home location does not align with the parent location, very few adult children move to their home location. The rate is nearly an order of magnitude smaller than the other rates. This strongly suggests that home location is nearly irrelevant in isolation from parent location in young adults location choices, a fact that I exploit in my structural analysis below.

Table 4. Adult Children and their Parents’
Migration Rates when Apart

	Est.	SE
Child Moves to Parent	0.087	0.005
Share of All Child Moves	0.421	0.018
Parent Moves to Child	0.031	0.003
Share of All Parent Moves	0.427	0.033

Note: Estimates are for adult children and their parents who are not currently residing in the same CBSA.

The rates at which children and parents move to one another are compared in Table 4. The subsample investigated here includes parent-child combinations that are not currently residing in the same CBSA. The rate at which children move to parents is higher than the rate at which parents move to children. As a share of all moves however, we see that parental move-to rates are about the same share of moves as the children’s are. The difference in the move-to rates is entirely driven by the overall differences in migration rates between parents and children. This suggests that parent and child decisions are mutually influencing and that the relationship between their

location decisions is not straightforwardly one-way, with children taking their parent’s location as given. Therefore, when examining the dynamics of both location choices it is important to consider the influence of children’s choices on their parents as well.

Table 5. Migration Rates Among Adults
Without and With Deceased Parents

Est.	SE	Est.	SE
0.067	0.002	0.064	0.009
N=15,349		N=781	

The rest of the results in this section attempt to tease out the influence of parents on their children’s migration choices by comparing young adults with parents living to those whose parents have died. I expand the sample to include the individuals 22-43 who report all of their parents as dead. Table 5 shows the baseline migration rates for these two groups. Here we see the rates do not differ significantly between the two groups. However, we expect the socio-demographic characteristics of those whose parents died while they were young to be substantially different from those who did not.

Table 6. Sample Characteristics

	Living Parents	Deceased Parents
Female	0.515	0.638
Married	0.399	0.376
Kid College	0.403	0.230
Parent College	0.270	0.051
Grandchild	0.497	0.657
Parents Married	0.766	0.332
Sample Size	15,349	781

In Table 6 we see this is born out by the data. Those with living parents tend to be much more likely to attend college and have (had) a parent who attended college, as well as to have (had) parents who were married. They are also less likely to have a child of their own. Therefore I run a least-squares regression adjusting the mean in migration rate by these characteristics. These

results are presented in Table 7. Here we see that adjusted for the same characteristics, migration rates among those with deceased parents are around 3 percentage points higher than those without. While not causal, these results are further evidence that parental ties play a significant role in child migration decisions and resulting rates.

Table 7. Relationship Between Parental Death and Migration Rate

	Est.	p-value
All Parents Deceased	0.034	0.001
Female	-0.006	0.123
Married	0.009	0.043
College	0.041	<0.001
Grandchild	-0.018	<0.001
Parent College	0.033	<0.001
Parents Married	0.004	0.341
Age Fixed Effects	Yes	
Location Fixed Effects	Yes	
R-Squared	0.0271	

Altogether, these results point to several important aspects of adult migration that need to be considered in the structural analysis. (1) Co-location is an important aspect of parent and child decisions. (2) Parent movement seems to be significant enough and influential enough to warrant consideration in young adults' location decisions. (3) Home locations of adult children are not nearly as important for their migration decisions as the location of their parents. (4) The influence of child locations on where parents move is as important as the influence of parent locations on where children move. Each of these findings are incorporated into the structure of the model developed in the following section.

The Model

The model is a dynamic discrete choice model of joint parent-child location decisions. The model begins when children turn 22. At this point parents and children have a given initial location. In each period, the parent-child combinations know their marital, grandchild, parental health, and retirement status. As in the descriptive analysis, education levels and parental marital status are fixed at the maximum level they are observed to report in the same manner as Coate (2013). Transitions over child marital status, grandchildren, health, and parent retirement are stochastic.

In each period the parent-child combination receives a payoff shock for each possible location combination. Given this state they must decide jointly where each will locate in the next period. The objective is to maximize joint utility over a 20 year horizon. Utility is affected by each parent and child's location and current state space, as well as whether the parent and child live in the same location. In the model, utility is unitary within parent-child combinations. This is similar to how utility is handled in Venator (2024) for spousal pairs. While it may be less realistic to assume as much in this setting, the evidence of significant coordination and mutual-assistance found in above and in previous studies suggests this may be the best possible modeling choice for this analysis.

Let $v_t(l_{c,t}, l_{p,t}, \Omega_t)$ be the value of a parent-child joint choice with $l_{c,t}$ being the child's location and $l_{p,t}$ the parent's. Here, Ω_t is the state space including previous locations $l_{c,t-1}$ and $l_{p,t-1}$. Before making a choice, the parent-child duo receives a vector of payoff shocks ξ_t across each possible location combination in $L = l_p \times l_c$, distributed Type 1 Extreme Value. They then jointly choose their locations to maximize

$$V_t(\Omega, \xi_t) = \max_{l \in L} v_t(l_{c,t}, l_{p,t}, \Omega_t) + \xi_{it} \quad (1)$$

Flow payoff includes both the one-period utility of the choice as well as the discounted expected

value of $V_{t+1}(\Omega_{t+1})$:

$$v_t(l_{c,t}, l_{p,t}, \Omega_t) = u_t((l_{c,t}, l_{p,t}, \Omega_t) + \beta \mathbb{E}[V_{t+1}(\Omega_{t+1} | \Omega_t)]) \quad (2)$$

The flow utility function is defined by,

$$\begin{aligned} \tilde{u}_i(l_{c,t}, l_{p,t}, tog_t, \Omega) = & \alpha_c \cdot wage(l_{c,t}, \Omega_c) + \alpha_p \cdot wage(l_{p,t}, \Omega_p)(1 - \omega_{ret}) \\ & + \phi_c \cdot sun(l_{c,t}) + \phi_p \cdot sun(l_{p,t}) + \theta \cdot tog_t + \theta_{gk} \cdot tog_t \cdot \omega_{gk} + \theta_{hlth} \cdot tog_t \cdot \omega_{hlth} \\ & + \theta_{pmar} \cdot tog_t \cdot \omega_{pmar} + \theta_{kmar} \cdot tog_t \cdot \omega_{kmar} + \theta_{sex} \cdot tog_t \cdot \omega_{sex} + \theta_{ret} \cdot tog_t \cdot \omega_{ret} \end{aligned} \quad (3)$$

Here α_c and α_p are the utility parameters associated with expected wages $wage(l_{c,t}, \Omega_c)$ and $wage(l_{p,t}, \Omega_p)(1 - \omega_{ret})$. Expected wages are estimated using least-squares regression, controlling for age, sex, and education status. Using expected wages by location follows after the work of Kennan and Walker (2011) and Lessem (2018). The ϕ parameters reflect the utility benefit of average annual sunshine in each location $sun(l_t)$. Each θ parameter represents a part of the utility benefit of the pairs co-locating in a location, with tog_t being an indicator function whether the combination choice is one where they are together and each ω is an indicator for whether a the state space has that particular value. These are, in order, over grandchild presence, parental health, marital statuses, sex, and current retirement status. Moving costs allow for heterogeneity over age, location distances, and location populations. The full parameterization is provided in the Appendix.

Given payoff shocks are distributed type 1 extreme value, the choice probabilities have logit

form. Therefore the probability of selecting joint location combination $(l_{c,t}, l_{p,t})$ is

$$P_t(l_{c,t}, l_{p,t} | \Omega_t) = \frac{e^{u_t(l_{c,t}, l_{p,t}, \Omega_t) + \beta \mathbb{E}[V_{t+1}(\Omega_{t+1} | \Omega_t)]}}{\sum_{i \in L} e^{u_t(i, \Omega_t) + \beta \mathbb{E}[V_{t+1}(\Omega_{t+1} | \Omega_t)]}} \quad (4)$$

The model is estimated using maximum likelihood estimation. The value functions are solved via backward induction over the 20 year period, with the final period being when the children reach the starting age of the parents.

Geographies

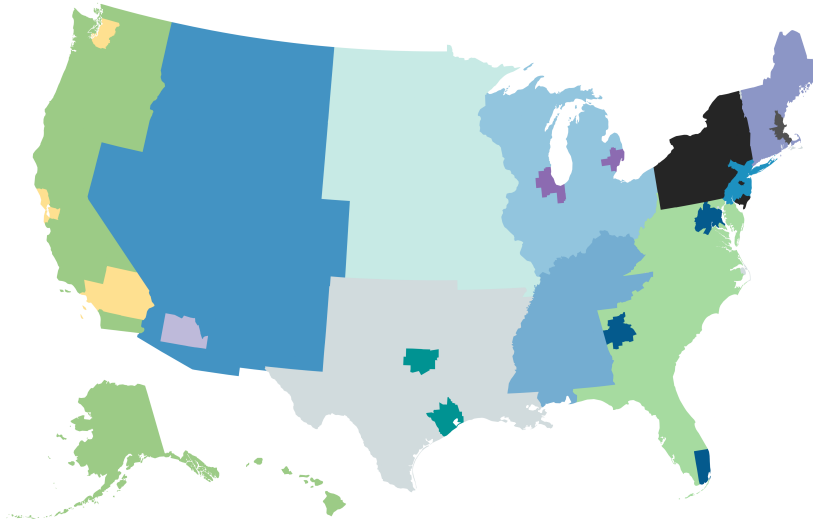
A perennial issue for the migration literature is selection of the relevant geographic unit for analysis. Too fine a measure may not capture genuine parent and child proximity or may overstate the importance of nearby moves. Too broad a measure could overstate the rate of parent and child proximity while undercounting economically significant moves. One option would be to follow the path of Kennan and Walker (2011) and use the 50 states as possible location choices. However, given the dual nature of the problem this becomes $50 \times 50 = 2500$ choices with a potentially very large state space when multiplied by the other state space elements. Strategies for coping with large choice sets such as those employed by Bishop (2007) and Coate (2013) would not allow me to conduct the counterfactual analysis I am interested in, so I seek an alternative strategy.

One possible alternative is to use the US Census Bureau's nine Census Divisions. Census Divisions have been used as the geographies in a variety of papers examining location choices including Gemici (2013), Diamond (2016), and Anstreicher and Venator (2022). However, there are several issues with relying solely on Census Divisions when considering joint locations. First, a child living in the same Census Division as their parent does not guarantee that the pair are living near each other. For instance, living in a combination of Pittsburgh and Albany could not be

justified as living in close proximity. To overcome this issue I add an additional dimension to the choice set. When parents and children choose to live in the same Division they must additionally choose whether they will be living together in that Division or apart. Here I define together as choosing to live within the same CBSA within a Division. This allows me to genuinely capture whether a parent and child are living near one another without exploding the choice set to be every possible CBSA combination, of which there would be over 800,000 possibilities. In the basic 9 Division model, this results in 9 additional together choices to the 81 possible combinations where they are apart.

Census Divisions also fail to capture an important aspect of migration seen in the data, which is that young adults tend to migrate towards large metropolitan areas away from smaller ones and rural areas. To overcome this issue and more richly capture these migration patterns I split the Census Divisions into the parts within large MSAs and the parts outside of them. Here, I define large as the 15 largest MSAs in the 2000 Census. This has the effect of adding 7 more locations to the choice set. In this way we can think of example locations as ‘Large Metropolitan Mid-Atlantic Division’, counting Philadelphia MSA and New York City MSA or ‘Non-Large Metropolitan Mid-Atlantic Division’ counting the remainder of the Mid-Atlantic. Figure 1 shows the resulting locations with each color representing one of the 16 possible locations. The together and apart option also exists for the ‘Metropolitan’ options that consist of more than one MSA. So, for example, Philadelphia MSA and New York City MSA constitute one location, but a combination of parent and child residing in each separately would be counted as choosing Large-Metropolitan Mid-Atlantic and Apart. This change also increases the share of cross-CBSA moves captured by the model. Cross-Division moves alone capture 40 percent of all moves while this split captures 60 percent. With both of these changes, the choice set expands to 270 options, but remains computationally tractable.

Figure 1. Map of Location Options



Results

The parameter estimates and standard errors are presented in Table 8. The first section of parameter estimates are the utility benefits, while the bottom half reflect the estimates of moving costs. Here the utility benefit of expected hourly wages is positive for both parents and children, although higher for children than parents. This difference may be explained by children being earlier in their careers and having more to gain over their remaining working career by relocating. Wages here are not adjusted for price differences. The results of the price-adjusted model and a discussion of why unadjusted prices are the preferred specification can be found in the Appendix.

The benefits of living in a sunnier place do not differ between adult children and their parents. The results of the utility benefits of residing together and how it varies across demographic groups are suggestive of some drivers of this decision process. Overall, there appears to be very large utility benefits to residing in the same CBSA, roughly as large as a \$10 increase in average hourly wages

for children.

Table 8. Parameter Estimates

	Estimate	SE
<i>Utility</i>		
Wage Child (per \$10)	0.641	0.027
Wage Parent (per \$10)	0.249	0.029
Same CBSA	0.671	0.027
Same CBSA with grandchild	-0.088	0.026
Same CBSA with parent ADL Limitation	0.200	0.053
Same CBSA with child married	-0.061	0.029
Same CBSA with parent married	0.053	0.019
Same CBSA Female	-0.093	0.017
Same CBSA parent retired	-0.321	0.025
Child hundred hours of sunshine	0.172	0.027
Parent hundred hours of sunshine	0.166	0.024
<i>Moving Costs</i>		
Kid age	0.197	0.012
Parent age	0.872	0.030
Population	0.505	0.020
Distance (hundreds of mi)	0.362	0.007
Switching to/from same CBSA	1.470	0.044
Marital moving cost	0.527	0.056
College moving cost	0.898	0.048
Grandkid moving cost	0.459	0.050
To/from large metro move	0.629	0.044

The subsequent terms are the utility benefit of residing together given specific aspects of the state space. The benefit of residing in the same CBSA when the parent has an ADL limitation is positive, suggesting parent-child pairs prefer to reside near each other when negative health shocks to the parent occur. The utility of residing together when the child is married is negative. This likely captures the fact that married children also face another set of parents they may choose to reside near that is not observable to me. The utility of co-residing when there is a grandchild present is negative, which is surprising given previous findings in the literature such as Anstreicher and Venator (2022). It may be the fact that the model is picking up the effect of another set of grandparents when the adult child is unmarried to the other parent. However, in either case we should not expect the effect to be so negative if the utility benefit of living together was on average

the same for the grandparents we observe as those we do not.

Two of the moving cost terms may need some greater explication. The term for switching to or from the same CBSA captures the cost of switching from being together to apart or vice versa when neither parent or child switches geographies. The final parameter is the cost of moving to and from a large metro area. This is needed since the distance between large metro and non-large metro parts of the divisions are not really calculable. The distance between Seattle-San Francisco-LA and the rest of the Pacific states is not a comprehensible measure given the noncontiguous nature of the large metro locations. Since this cannot be captured by the distance moving cost these types of moves are captured by single switching cost parameter.

Table 9. Model Fit

Top 3 Accuracy	0.919
Brier Score	0.266
Child Actual Migration Rate	0.067
Child Predicted Migration Rate	0.086
Parent Actual Migration Rate	0.024
Parent Predicted Migration Rate	0.066
Actual Together Rate	0.691
Predicted Together Rate	0.726

Model fit diagnostics are presented in Table 9. The Top 3 Accuracy is 92 percent, meaning among the actual observed choices, they were among the top 3 of the 270 possible choices 92 percent of the time. The migration rates for both parent and child are somewhat higher in the model than in the observed data. It is important to note again that these rates are over a two year period so for a rough calculation of annual rates we would see actual versus predicted child migration rates of 0.033 vs 0.043 and actual versus predicted annual parent migration rates of 0.012 and 0.033. The rate at which parents and adult children choose to reside in the same CBSA is very close to the model prediction.

Counterfactual Analysis

The primary counterfactual of interest and motivation for conducting this study is elimination of any utility benefits of parent-child proximity. This allows me to see to what extent migration decisions are affected by this type of family tie. I can simulate alternative migration and location decisions where the moving cost structure remains the same, but any binding effect of parent-child ties is removed. In practice, this means eliminating all of the θ terms from the utility function.

Table 10 presents the comparison between the baseline model and the counterfactual. In this scenario migration rates increase overall for parents and children. At the same time the share of moves that are return migration to the parents location decreases. The share of parents and adult children choosing to live in the same CBSA decreases from 0.715 to 0.399. This reduction suggests that the utility benefits of co-locating are a substantial reason young adults live close to their parents, explaining 44 percent of the incidence of parent-child proximity.

Table 10. Counterfactual Comparison		
	Baseline	Counterfactual
Child Migration Rate	0.086	0.138
Child Move to Parent Rate	0.044	0.032
Parent Migration Rate	0.066	0.086
Together Share	0.715	0.399
Child Wage	\$53,672	\$54,204
Parent Wage	\$56,483	\$56,389

I also observe the expected child and parent wages under the baseline and counterfactual regime. This measure essentially takes the expected hourly wages and assumes they work full-time 40 hour weeks, unless retired in which case they are excluded from the calculation. Among adult children

we see just over a \$500 or about a 1 percent increase in population level annual wages. For parents, there is a negligible decline. This suggests adult children are being kept from moving to higher wage locations by these family ties, while the ties do not have the same effect on parents.

While this illuminates the extent to which these ties matter, why these ties matter remains a question. Previous findings in the literature suggest a variety of possible reasons that parents and children may derive a benefit from proximity beyond mere preference for living close. As noted in the literature review, the two most frequently hypothesized mechanisms of benefits are (1) adult children providing care for their parents due to health concerns and (2) parents providing childcare for their grandchildren. In this model, there are 7 different ways for utility to differ when parents and children reside in the same CBSA, the baseline utility increase from proximity along with interactions with other characteristics of the parent child combination, such as presence of a grandchild or parental health. Recall in the main counterfactual I eliminated all of these parameters from the decision process at once. In order to ascertain the relative importance of each of these terms I now eliminate each one individually to see what effect on parent and child decision making they have.

Table 11. Counterfactuals Comparison Eliminating Parameters Individually

	Child Migration	Move-to-Parent	Parent Migration	Together Share
Baseline	0.086	0.044	0.066	0.715
Full Counterfactual	0.138	0.032	0.086	0.399
No Base Together	0.159	0.028	0.094	0.280
No Grandchild x Together	0.084	0.045	0.065	0.739
No Health x Together	0.089	0.043	0.066	0.698
No Child Married x Together	0.085	0.045	0.066	0.730
No Parent Married x Together	0.090	0.043	0.066	0.692
No Sex x Together	0.084	0.045	0.065	0.739
No Retired x Together	0.077	0.048	0.064	0.788

Table 7 presents these results, with the first two rows restating the findings from the baseline scenario and the full counterfactual eliminating all utility benefits and costs of parental proximity. Each subsequent row contains the estimates when the listed individual θ parameter is removed from the baseline model. Here we see that the vast majority of variation is caused by the baseline preference to locate together, which closely aligns with the full counterfactual values. Among the other parameters the most substantial change from baseline is the retirement interaction, where it seems without the disutility of being together and the parent being retired, an additional 7 percent of pairs would live together. These results suggest that the primary benefit of parent-child co-location is general preference for living near one another, rather than benefits relating to providing elder care for parents or childcare for grandchildren. While this may be surprising given the body of literature exploring these mechanisms, this is in line with the findings Compton and Pollak (2015), which found no relationship between parental health or the presence of grandchildren and proximity.

Beyond top-line migration rates, part of the purpose of this analysis is to see how location choices would be altered if these parent-child ties were not binding the individuals movements. Figure 1 presents the location share choices for each of the 16 locations used in this study. In the first panel we see location choices among parents remain fairly stable. This indicates the distribution of parent choices are not heavily influenced by the preference to locate near their children and that they are already residing where they prefer to be given moving costs. The right panel in comparison shows fairly substantial swings in location choices among adult children between the baseline and the counterfactual.

Figure 1. Location Choices among Adult Children and Their Parents

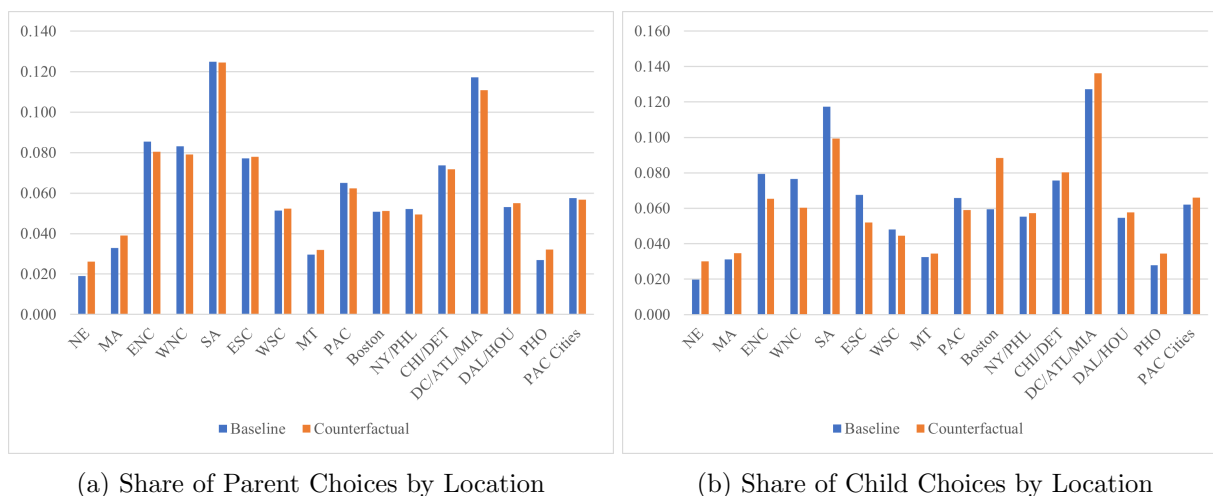
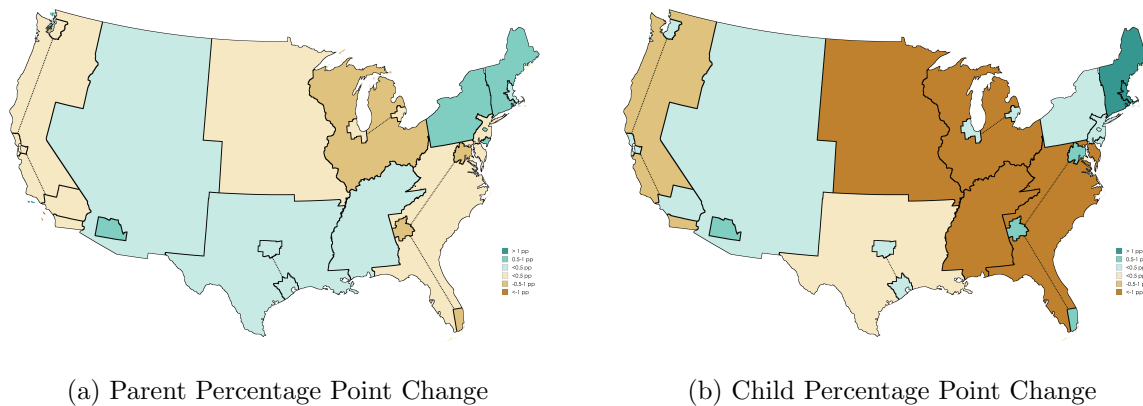


Figure 2 maps these differences between the counterfactual and the baseline scenario. Here again we see parent location swings are of a much smaller magnitude than the children's. Given that the effect of the counterfactual on location choices is concentrated among the children this portion of the analysis will focus on them. Among the adult children's location choice changes, each of the large metropolitan areas has an increase in choice share under the counterfactual scenario with the largest losses among the the non-large metropolitan location choices, particularly the East North Central, West North Central, South Atlantic, and East South Central Divisions. Three of the

non-large metro Divisions saw increases in adult children location choices, namely the Mountain, Mid-Atlantic and New England Divisions.

Figure 2. Percentage Point Changes in Location choice among Adult Children and their Parents



It is important to note that Figure 2 does not simply represent where individuals would move if they were not stuck living in their baseline location. Even in the baseline scenario there are substantial inflows and outflows from each location. Figure 3 shows the inflows and outflows by location of the adult children. Here we see over the 20 years from age 22 to 43, there are substantial flows into the large metropolitan locations in particular, and the northeastern regions more generally compared to other parts of the country. For outflows in the baseline model we see higher outflow rates among the non-large metropolitan locations, particularly in the eastern half of the US. It is worth noting that the Mid-Atlantic and New England seem to have moderate inflow and outflow in the baseline model, indicating that overall mobility seems to be higher in northeastern US relative to other regions.

Figure 3. Baseline Inflow and Outflow for Adult Children

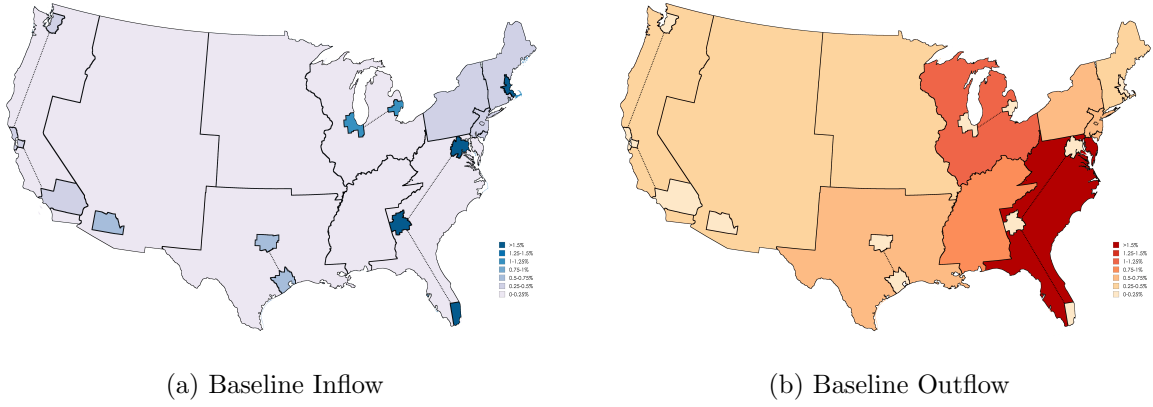
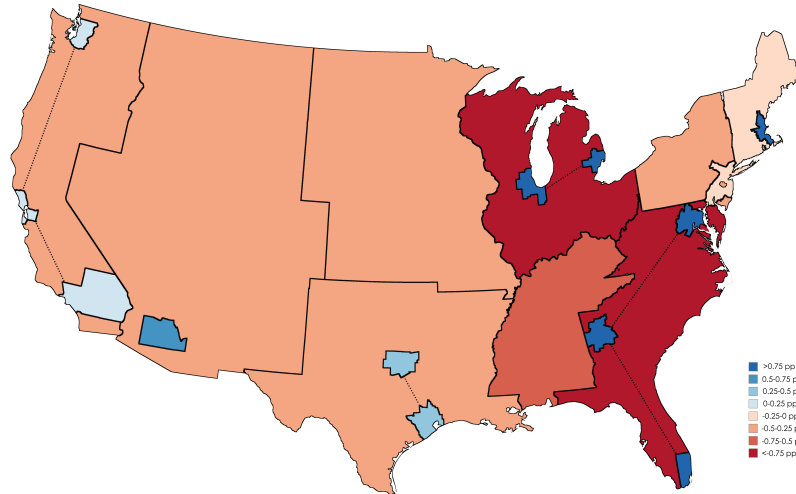


Figure 4 plots the net flow of the adult children in the baseline model. Here it makes it clear we tend to see large net inflows into the large metropolitan areas and net outflow of the non-large metropolitan locations. This suggests the model accurately captures the tendency of young adults to move to large urban areas. The exception is the large metro Mid-Atlantic region consisting of New York City and Philadelphia, which had moderately high inflows and outflows, but the net was a slight outflow in the model.

Figure 4. Net Flow in Baseline



Now turning to the counterfactual with no utility from parental proximity, we see a similar

and elevated pattern of inflows and outflows in Figure 5. Inflows increase across the board when family ties are eliminated, with more moves to the large metro areas as well as more moves to the non-metro geographies. Similarly, outflows were up across the board as well. This highlights that overall mobility is increasing when family ties are eliminated. While young adults tied to their parents in South Carolina may now be able to move to Atlanta, there are young adults tied to their parents in Atlanta who will now move to South Carolina as well.

Figure 5. Counterfactual Inflow and Outflow for Adult Children

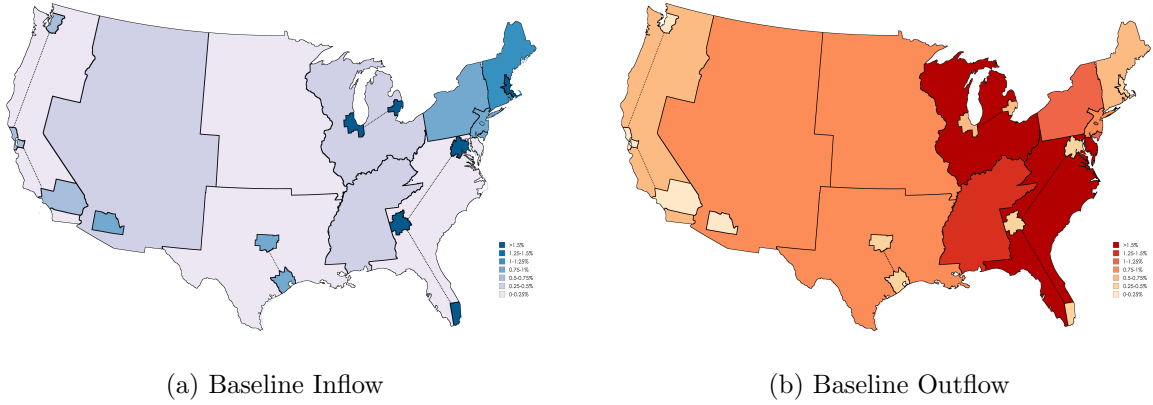


Figure 6 shows the net flow in the counterfactual scenario. Here we see broadly the same pattern as in the baseline scenario. However several net outflow areas have their net outflows exacerbated or attenuated in this scenario, while every net inflow region sees their net inflows increased. The net outflow New England saw in the baseline flips to a net inflow in the counterfactual scenario.

Figure 6. Net Flow in Counterfactual

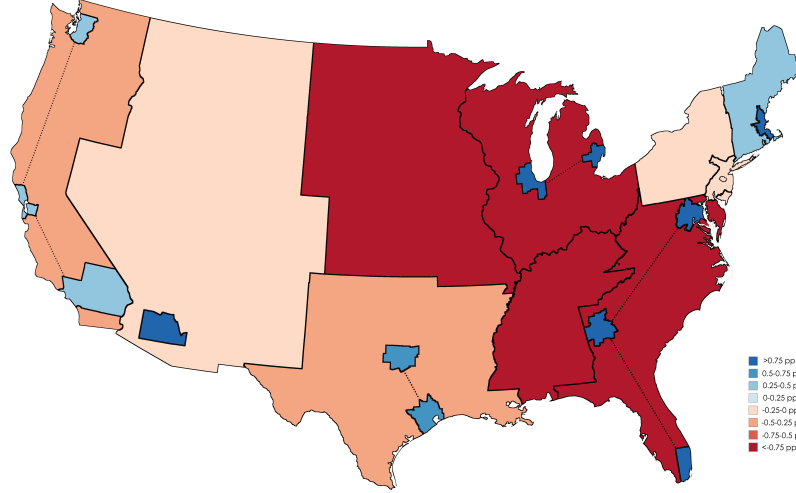
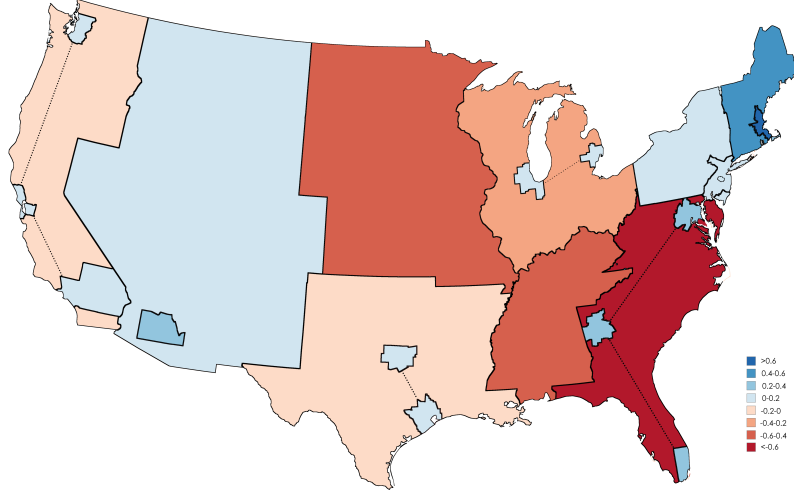


Figure 7 maps the differences between Figures 4 and 6. This shows the changes in net flow from the baseline to the counterfactual scenario. Here we see that every large metropolitan geography sees a positive change in their net flow rate. The non large metro New England, Mid-Atlantic and Mountain Division also see increases. In practice, this figure very closely matches Figure 2b. This is not depicting the same change though, since Figure 7 only examines flows while Figure 2 is total location share choices, even among those who never move. For instance, in Figure 7 an individual who moves from rural Texas to Houston in period 1 and stays for the remaining periods counts the same as someone who lives in rural Texas for all periods except the last, in which they move to Houston. In Figure 2, these individuals would have different contributions to the total location choices in all years counted.

Figure 7. Change in Net Flow from Baseline to Counterfactual



While these patterns are interesting they also raise the question of what within the model is driving particular locations to have the increases and decreases seen in Figure 2. Wage utility and the distance moving cost are the only two significant drivers of parent-child choices apart from the utility of living together. Appendix Figures A.2-A.5 present comparisons exhibiting these relative magnitudes. Therefore, I am interested in how the wage utility and the distance moving cost contribute to the reallocations seen in Figure 2 and whether either seems to explain why particular regions benefit or not from the removal of family ties. To further explore this I need to re-estimate the counterfactual while eliminating variation in wages and in distances to see how each affects the counterfactual.

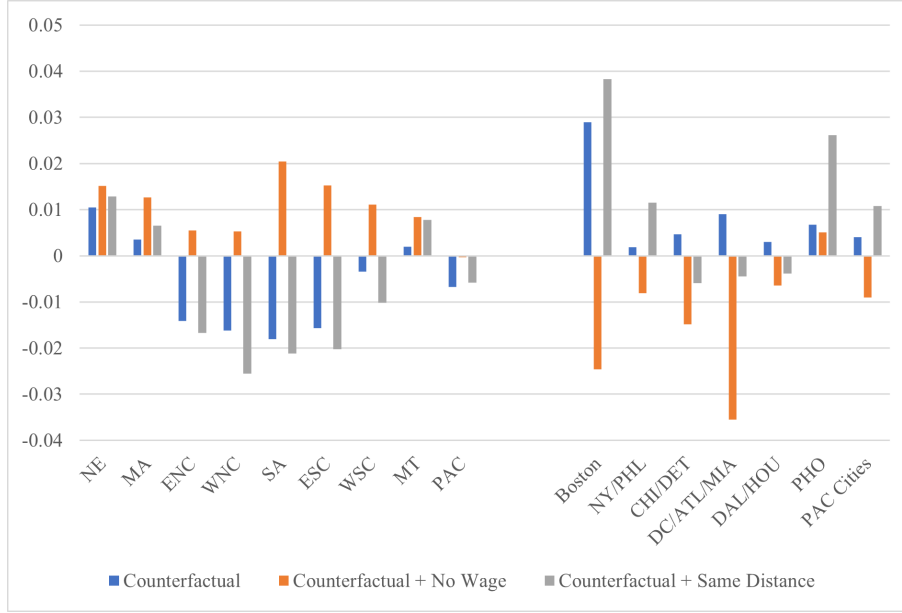
While eliminating wage variation is relatively straightforward, removing variation in distance moving costs is not. If all distance moving costs were eliminated, migration rates would increase substantially, and most importantly, the role that random shocks play in the decision process would increase. However, if distance moving costs were set too high, for example by taking the average distance between all locations, only shocks great enough to justify cross-country moves

would overcome them, effectively keeping individuals in their home locations. To overcome this, I find the uniform distance between locations that results in the same migration rate as in the baseline scenario. In this case, it is 730 miles.

Figure 8 plots the change from baseline of the three scenarios, with the first bar demonstrating the effect of eliminating family ties, the second of eliminating family ties and eliminating wage differences, and the third of eliminating family ties and eliminating distance variation. It is clear that effect of eliminating distance tends to increase the magnitude of the effect of eliminating family ties. What this suggests is that the distance moving costs are actually working in the opposite direction as the counterfactual, and keeping the counterfactual closer to the baseline scenario than it otherwise would be. Eliminating wage variation on the other hand, not only tends to attenuate the effect of the counterfactual on location choices, but in most cases flips the sign of the change. This suggests that without wages in the model the effect of the counterfactual on location share changes would be the opposite of the effect observed. From this it seems clear that the wage variation is playing the determining role on the effect that eliminating family ties has on location choice distribution among young adults in this model.

Although the model attributes this movement to expected wages, it is also possible that unobserved features correlated with wages are the actual driving force behind these alternative decisions. In particular, large metropolitan areas tend to provide better amenities than other parts of the country. Future work should attempt to better capture amenities beyond climate, as I have done here. However, this would not affect the model's ability to capture that these areas are the preferred locations of young adults and where they would move to in greater numbers without parental ties.

Figure 8. Change in Net Flow from Baseline to Counterfactual



Conclusion and Extensions

This paper analyzes and quantifies the relative importance of parent-child ties in the joint location decisions of adult children and their parents. I find that these ties significantly hinder the mobility of adult children, resulting in them remaining in lower wage areas than they would prefer absent these ties. Counterfactual results suggest that without these ties, there would be half as many parent-child pairs residing in the same metropolitan area. The results presented here also suggest these ties are mostly due to the utility benefit of proximity itself and not mainly driven by other observable features such as the presence of a grandchild or parental health concerns. Without these ties, there would be greater migration and movement across all parts of the country, with areas with higher wages being net recipients of young adults.

There are several possible extensions I would like to pursue with this research. Incorporating unobserved heterogeneity in proximity preferences would allow me to better capture any persistent preferences for some parent-child combinations that do not care about co-locating or actually

prefer to not to. Under the current specification, this is being attributed to time-period specific taste shocks, rather than different utility co-locating preference parameters. I am also interested in incorporating endogenous parent retirement decisions, rather than having them as part of the state transition process. Retirement is a factor that contributes to older adult migration and decisions around both are often made in conjunction. As mentioned in the previous section, better capturing amenity values would potentially allow to determine if net migration to high wage areas was driven by the wages per se or factors that are correlated with higher wages.

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Appendix

Table A.1 Parameter Estimates with Cost of Living Adjusted Wages

	Estimate	SE
<i>Utility</i>		
Wage Child (per \$10)	0.935	0.079
Wage Parent (per \$10)	0.432	0.077
Same CBSA	0.820	0.043
Same CBSA with grandkid	0.008	0.053
Same CBSA with parent ADL Limitation	0.304	0.089
Same CBSA with kid married	-0.154	0.055
Same CBSA with parent married	0.130	0.033
Same CBSA Female	-0.035	0.030
Same CBSA parent retired	-0.047	0.040
Child hundred hours of sunshine	0.236	0.052
Parent hundred hours of sunshine	0.223	0.048
<i>Moving Costs</i>		
Kid age	0.261	0.017
Parent age	0.907	0.038
Population	0.265	0.017
Distance (hundreds of mi)	0.339	0.007
Switching to/from same CBSA	1.475	0.056
Marital moving cost	0.537	0.076
College moving cost	0.885	0.053
Grandkid moving cost	0.448	0.063
To/from large metro move	0.557	0.042

Table A.1 presents the point estimates for the model adjusted for regional prices. Prices are adjusted according to population-weighted Regional Price Parities 2006-2010 calculated by the Bureau of Labor Statistics (BLS). It is an open question whether wages should be adjusted for cost of living. As noted by Diamond and Moretti (2024), between 89 and 95% of the spatial variation in price indices is accounted for by housing costs. At the same time around two-thirds of the country owned their own home in 2010, the middle of the period analyzed here. Purchasing a house can in some ways be viewed as a form of tax advantaged savings or investment, rather than straightforward consumption expenditures that should be deflated away.

In practice, when I adjust wages in this manner, certain wage differentials between metropolitan

geographies and non-metropolitan ones evaporates, specifically in the sunbelt. The model struggles to rationalize why individuals would move from a place like Arkansas to Dallas or Atlanta, and attributes such moves entirely to random shocks. The performance of this adjusted-wage model is markedly worse than that of the unadjusted model. The predicted migration rate for children is 0.105 compared to 0.086 in the unadjusted model and 0.067 in the data. For parents it is 0.0853 compared to 0.066 in the unadjusted model and 0.024 in the data. The co-location rate is 0.801 compared to 0.726 in the unadjusted model and 0.691 in the data. Given the worse performance and the conceptual issue explored above, the unadjusted model is my preferred specification. However, the counterfactual location changes for the adjusted model are presented below for the interested reader.

Figure A.1 Percentage Point Changes in Location Choice with Wages Adjusted for Cost of Living

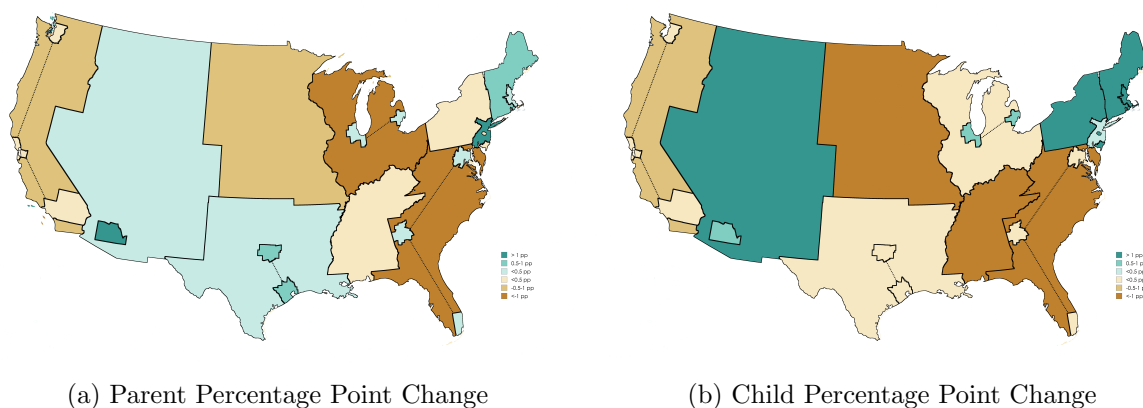


Figure A.2 Counterfactual Change from Baseline

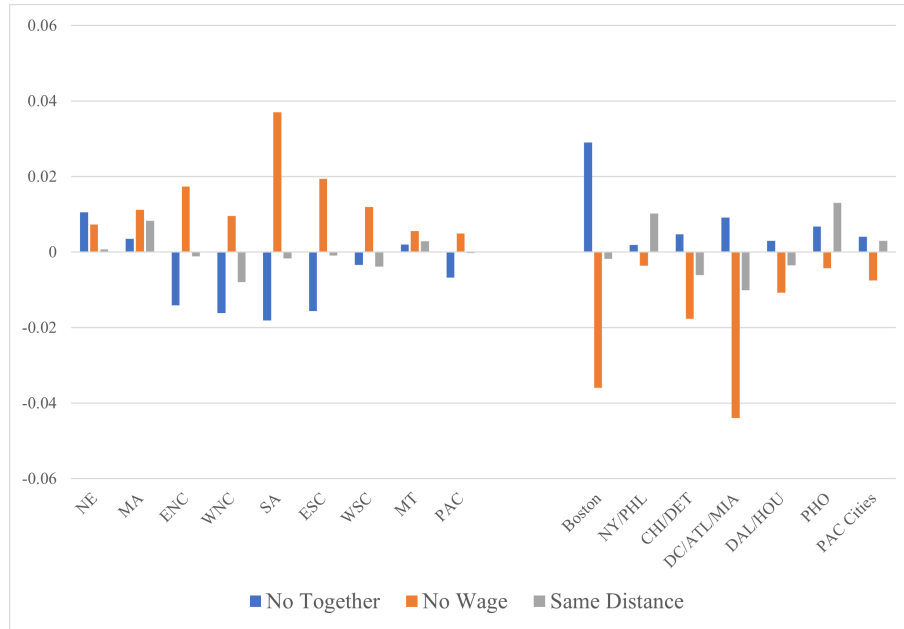
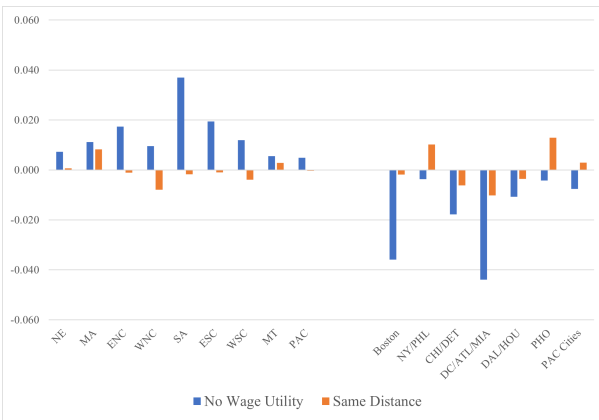
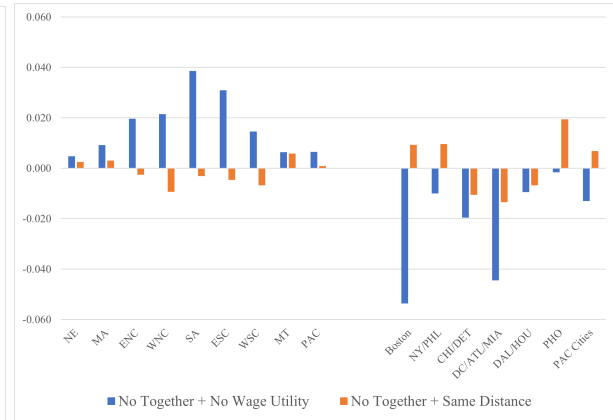


Figure A.3 Effect of Eliminating Wage and Distance Variation in Baseline and Main Counterfactual



(a) Change from Baseline



(b) Change from Counterfactual

Figure A.4 Effect of Eliminating Wage Variation in Baseline and Main Counterfactual

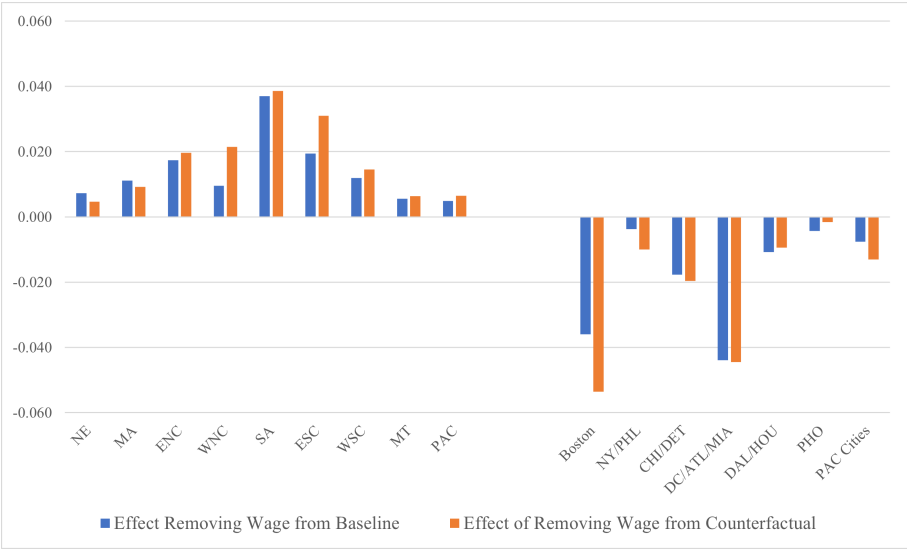
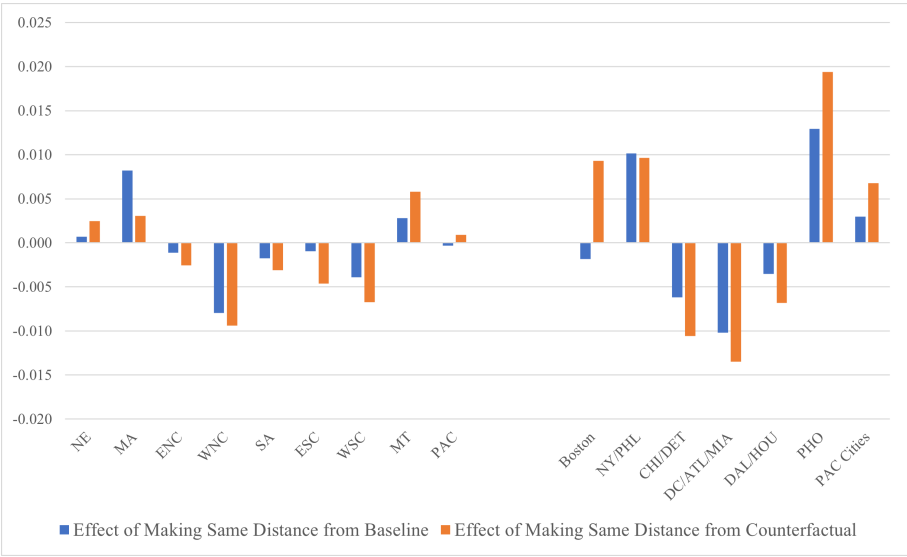


Figure A.5 Effect of Eliminating Distance Variation in Baseline and Main Counterfactual



The moving cost is parameterized,

$$\begin{aligned}
MC(l_{c,t}, l_{p,t}, l_{c,t-1}, l_{p,t-1}, tog_t, tog_{t-1}, \Omega) = & \lambda_{dist} \cdot dist(l_{c,t}, l_{c,t-1}) + \lambda_{dist} \cdot dist(l_{p,t}, l_{p,t-1}) \\
& + 1(l_{p,t} \neq l_{p,t-1}) (\lambda_{parage} \cdot \omega_{parage} \\
& + \lambda_{pop} \cdot pop(l_{p,t}) + \lambda_{sd} samediv(l_{p,t}, l_{p,t-1})) \\
& + 1(l_{c,t} \neq l_{c,t-1}) (\lambda_{kidage} \cdot \omega_{kidage} \\
& + \lambda_{pop} \cdot pop(l_{c,t}) + \lambda_{col} \cdot \omega_{gk} + \lambda_{mar} \cdot \omega_{mar} \\
& + \lambda_{coll} \cdot \omega_{coll} + \lambda_{sd} samediv(l_{c,t}, l_{c,t-1})) \\
& + \lambda_{togmove} \cdot 1(l_{p,t} = l_{p,t-1}) \cdot 1(l_{c,t} = l_{c,t-1}) \\
& \cdot 1(tog_t \neq tog_{t-1})
\end{aligned}$$