# Political Impacts on State-to-State Migration Trends from 2007-2011

By Julie Dawkins

December 11th, 2023

**Abstract**

This paper analyzes state-to-state migration trends from the American Community Survey data for the years 2007-2011 to assess the impacts of a state's political leanings (measured via the Cook Index) on the net migration and outward migration of individuals at various education attainment levels. Using simple OLS regression, I found that as the Cook Index increases (indicating a more Democratic state), the out-migration rate of individuals with less than a bachelor's degree decreases by 3-4% compared to those with BAs. I found no other Cook Index significance. Further, I found unintuitive and conflicting signs for homeownership rate and unemployment, but positive and significant effects of per capita income.

## Introduction

As the United States has become increasingly polarized, state legislatures have gained greater power and scrutiny as they shape the economy and politics of their state separate from the national government. This is particularly relevant as major political events – most notably the 2022 Supreme Court decision *Dobbs v. Jackson*, which overturned *Roe v. Wade* – have increased differences in critical policies across the fifty states. Today, disparities arise in critical policy areas such as taxes, abortion, gun control, and more. This has key implications for the individuals who live in that state, either by choice or by birth.

Although "brain drain" is a term most used to refer to the migration of educated individuals from low- and middle-income countries to high-income countries to seek greater economic opportunity, there has been little economic research into potential "brain drain" *within* the United States – that is, if highly educated individuals are leaving states with certain attributes such as lower average income, few job opportunities, poor educational funding, or politics in either direction. The question this paper seeks to answer is whether the politics of a state has any causal effect on the number of educated individuals who choose to migrate into (or out of) that state.

## Literature

Migration is a highly complex topic, and a multitude of studies have attempted to parse out the major triggers that prompt individuals to uproot their lives and move to another region. As our world has become increasingly developed and urbanized, migration has increased due to both necessity and the greater ease of movement brought by advances in technology. Theories of migration have evolved over the 20$^{th}$ century and range from micro- to the macro-level explanations of causes of migration (Hagen-Zanker, 2008).

Analyses of state-to-state migration within the United States have tested the impacts of common economic issues – such as the labor market/unemployment, housing ownership, and per capita income – on resulting migration trends. Literature that exists on this topic primarily uses logistic models and pairs states to assess trends in migration. Sasser (2010) uses IRS data and finds that labor market conditions, per capita incomes, and housing affordability are all significant causes of interstate migration in the expected directions, but does note that across the timespan analyzed (1977-2006) the magnitude of each of these covariates varies significantly (Sasser, 2010). Giordono similarly uses a logit model to analyze both intra- and interstate migration; she determines that housing status and a higher education level both significantly increase the probability of moving out-of-state versus in-state (Schroeder Giordono, 2000). However, she finds that unemployment has an unclear impact on migration. Davies, et al., also acknowledge the historical lack of clarity regarding unemployment and migration in the literature – which, at times, may even produce an unexpected sign – but using a conditional logit approach finds unemployment to have a statistically significant impact on migration in the expected direction (i.e., an increase in unemployment resulting in greater outward migration) (Davies et al., 2001). These analyses thus support the idea that structural economic impacts are major drivers of interstate migration.

Some studies have investigated the topic of intra-US brain drain specifically, though not extensively. Literature from the mid-20$^{th}$ century investigates the "Black Brain Drain," which is the phenomenon in which educated Black individuals leave Historically Black Colleges and Universities (HBCUs) or other traditionally Black institutions for white institutions that may offer better pay and other benefits (Giannoccolo, 2009). Finally, Vazzana & Rudi-Polloshka examine the brain drain of highly educated individuals from the Appalachian region of the US and find that, in line with other studies, economic factors play the largest role in determinants of migration: the single greatest

determinant of a college student reporting that they were likely to stay in the region was if they felt they could attain a good job (Vazzana & Rudi-Polloshka, 2019).

**Data**

To conduct my analysis, I used the American Community Survey 5-year migration flow files. This is not a 5-year pooled cross-sectional or panel data set; rather, the ACS gathers migration data continually over the 5 years and reports annual county-to-county flow estimates. I use the 2007-2011 5-year flow; this is the only period in which education data is available. Next, I merge this data with political information gathered from both the "poliscidata" R package and US Census data to obtain political and demographic information for the years 2007-2012 (see Flanagan & Wilson, 2013).

The table on the following page goes further into depth on the definition of each variable.

Education Level is a numerical variable, but the numbers are not meaningful; rather, they reflect levels of education, ranging from 1-5: "Less than a High School Degree," "High School Graduate (including equivalency)," "Some College or Associate Degree," "Bachelor's Degree," and "Graduate or Professional Degree." This is more clearly reflected in the factor variable "Education_Label," which is how I will measure education in all models. The Cook Index – a measurement of how strongly each state leans toward either political party based on the voting behavior in the previous two presidential elections, where a more positive number indicates more Democrat and a more negative indicates Republican-leaning – could be highly correlated with lots of factors related to migration, such as median income, job opportunities, tax policies, the urban versus rural divide, and housing availability. Therefore, the political data such as homeownership rates, per capita income, rates of unemployment in a year preceding the years of interest, and the proportion of states with various education levels are critical controls to have in the data set.

## **Table 1:** Variable Definitions

| Variable Name | Definition |
|---|---|
| StateID | State name abbreviation |
| State | State FIPS code |
| Education_Level | Level of education (1-5) |
| Moved_In | Number of individuals estimated to have moved into the state annually |
| Moved_Out | Number of individuals estimated to have moved out of the state annually |
| Moved_Net | The difference between moved in and moved out; net gain or loss |
| LMoved_Out | Logged value of outward movement |
| Education_Label | Factor variable with the different divisions of education level, mirroring Education_Level |
| cook_index | Cook Index: Higher scores mean more Democratic |
| pop2010_hun_thou | Population (2010) in hundred thousands |
| prcapinc | Per capita income |
| unemploy | Unemployment rate (2004) |
| urban | Percent urban population (2000) |
| adv_or_more | Percent of population with advanced degree or higher |
| ba_or_more | Percent of population with a BA or higher |
| college | Percent of population with some college or higher |
| hs_or_more | Percent of population with a high school degree or more |
| Homeownership_Rate_0709 | Homeownership rate from 2007-2009 |
| Homeownership_Rate_1012 | Homeownership rate from 2010-2012 |
| Avg_Homeownership | The average of the previous two variables |
| Med_Prop_Value_0709 | Median Property Value from 2007-2009 |
| Med_Prop_Value_1012 | Median Property Value from 2010-2012 |
| Avg_Propvalue | The average of the previous two variables |

The summary statistics of these variables are listed below:

## Table 2: Summary Statistics

| | Unique (#) | Missing (%) | Mean | SD | Min | Median | Max |
|---|---|---|---|---|---|---|---|
| Education_Level | 6 | 0 | 2.5 | 1.7 | 0.0 | 2.5 | 5.0 |
| Moved_In | 298 | 0 | 32518.4 | 81569.5 | 138.0 | 5243.5 | 645369.0 |
| Moved_Out | 296 | 0 | 31409.5 | 75055.3 | 73.0 | 5618.0 | 519138.0 |
| Moved_Net | 292 | 0 | 1108.9 | 21359.1 | -112626.0 | -157.0 | 211491.0 |
| lmoved_out | 296 | 0 | 8.8 | 1.7 | 4.3 | 8.6 | 13.2 |
| cook_index | 48 | 0 | -2.5 | 8.9 | -20.2 | -1.8 | 13.4 |
| pop2010_hun_thou | 50 | 0 | 61.6 | 67.9 | 5.6 | 44.4 | 372.5 |
| prcapinc | 49 | 0 | 31951.1 | 4411.3 | 24650.0 | 31330.5 | 45398.0 |
| unemploy | 27 | 0 | 5.2 | 1.0 | 3.4 | 5.2 | 7.6 |
| urban | 47 | 0 | 71.7 | 14.8 | 38.2 | 71.5 | 94.4 |
| adv_or_more | 38 | 0 | 9.8 | 2.5 | 6.1 | 9.2 | 16.4 |
| ba_or_more | 47 | 0 | 27.2 | 4.7 | 17.3 | 26.4 | 38.2 |
| college | 44 | 0 | 25.8 | 4.5 | 17.0 | 25.1 | 35.9 |
| hs_or_more | 41 | 0 | 86.9 | 3.4 | 79.9 | 87.5 | 91.8 |
| Homeownership_Rate_0709 | 47 | 0 | 68.1 | 4.1 | 55.4 | 68.9 | 74.2 |
| Homeownership_Rate_1012 | 49 | 0 | 66.6 | 4.3 | 53.9 | 67.4 | 72.9 |
| Avg_Homeownership | 50 | 0 | 67.4 | 4.2 | 54.6 | 68.1 | 73.4 |
| Med_Prop_Val_0709 | 50 | 0 | 202454.0 | 94257.3 | 95400.0 | 176150.0 | 543600.0 |
| Med_Prop_Val_1012 | 50 | 0 | 188318.0 | 78664.6 | 98300.0 | 160650.0 | 503100.0 |

| | Unique (#) | Missing (%) | Mean | SD | Min | Median | Max |
|---|---|---|---|---|---|---|---|
| Avg_Prop Value | 50 | 0 | 195386.0 | 85864.9 | 96850.0 | 172500.0 | 523350.0 |

Notable attributes of this data is the range of net migration values – from 211,491 individuals in a net gain to -112,626, which was Texas's net migration loss for this period – as well as the range of the Cook Index, which is from -20.2 in the most Republican state to 13.4 in the most Democratic.

Finally, a critical aspect of this data is that "Education_Label" includes the factor level "All Educational Values" which encompasses larger migration values. This may double count the sub-categories of education level. Therefore, I exclude it from any analysis of educational level and exclusively use it when investigating non-education-level trends. I further note that the individual education levels *do not* add up to the "All Education Levels" moved out, moved in, or net values; this implies to me that much less data is available for these levels. The net migration summary statistics differ drastically from the larger data set when "All Education Levels" is excluded and the data is limited to rows that take on a 1-5 "Education_Level" value. This can be seen here:

**Table 3: Net Migration, "All Education Levels" Excluded**

| | Unique (#) | Missing (%) | Mean | SD | Min | Median | Max |
|---|---|---|---|---|---|---|---|
| Moved_ Net | 243 | 0 | 213.8 | 4139.0 | -13610.0 | -145.0 | 27120.0 |

The mean drops to 213.8 from 1108.9, with a minimum of -13,610 and a max of 27,120.

**Model**

In developing my analysis, I created twelve OLS models, changing the data of interest slightly between them. These OLS models are functionally three models, but each examines two outcomes: moved net, and the log of moved out. They also each examine these outcomes with two sets of controls: one with the median property value and homeownership rate broken by 2007-2009 and 2010-2012, and the other averaged. Because this data does not have "year" as a variable and is instead an annual estimation based on migration from the 2007-2011 period, I am limited to the OLS model and cannot conduct first differencing or control my model for time trends. Further, because my outcome variable is not binary, I cannot do logistic or probit models (the approach of much of the literature on this topic).

Models 1-4 investigate if there are differences at varying education levels:

$$Moved_{Net} | \ Log(Moved\_Out) = \beta_0 + \beta_1 Cook\ Index + \beta_2 Education\ Label + \beta_3 Cook\ Index * Education\ Label + \beta_4 HomeownerRate0709 + \beta_5 HomeownerRate1012 + \beta_6 MedianPropertyValue0709 + \beta_7 MedianPropertyValue1012 + \beta_8 Population2010 + \beta_9 PerCapita\ Income + \beta_{10} Unemployment\ Rate + \beta_{11} Urban + \beta_{12} Adv\_or\_More + \beta_{13} BA\_or\_More + \beta_{14} College + \beta_{15} HS\_or\_more + \mu$$

Models 3-4 averages the homeownership rate and the median property value across 2007-2012 to account for the fact that the ACS data is not indicative of any particular year within the 2007-2011 range but rather an annual estimate based on continual data collection.

$$Moved_{Net} | \ Log(Moved\_Out) = \beta_0 + \beta_1 Cook\ Index + \beta_2 Education\ Label + \beta_3 Cook\ Index * Education\ Label + \beta_4 AverageHomeowner\ Rate + \beta_5 AveragePropertyValue + \beta_6 Population2010 + \beta_7 PerCapita\ Income + \beta_8 Unemployment\ Rate + \beta_9 Urban + \beta_{10} Adv\_or\_More + \beta_{11} BA\_or\_More + \beta_{12} College + \beta_{13} HS\_or\_more + \mu$$

I analyze the net movement between the states to provide a more realistic analysis of movement, since I do not analyze where individuals move *to* (i.e., if they move to a state that is different politically or similar). However, I also examine the log of moved out to examine trends in outward movement. I check to see if either the Cook Index or Education Label (the factor variable) are meaningful and include an interaction term to allow for differences among education level. For each model, having attained a "Bachelor's Degree" is my base group. I control for homeownership rates and values across 2007-2012; a challenge within my data is that it functionally summarizes all 5 years in a single data set, despite differences in other trends in that time. I therefore have models that include the range of years as well as an averaged value for all 5 years. I further control for population size, per capita income, unemployment rate, the percent of the state that is urban, and finally I control for different proportions of education levels within each state (i.e., to account for the fact that a state with a higher percentage of individuals with a bachelor's or more will likely have a greater number of those individuals leaving the state irrespective of other characteristics).

In my models 5-8, I subset the data to exclusively individuals with a BA or more to observe their behavior separate from other levels of education. Therefore, "Education Label" is removed from this model.

$$
\begin{aligned}
Moved_{Net} \mid Log(Moved\_Out) &= \beta_0 + \beta_1 Cook\ Index + \beta_2 Homeownership\ Rate\ 2007-2009 \\
&+ \beta_3 Median\ Property\ Value\ 2007-2009 \\
&+ \beta_4 Homeownership\ Rate\ 2010-2012 \\
&+ \beta_5 Median\ Property\ Value\ 2010-2012 + \beta_6 Population 2010 \\
&+ \beta_7 PerCapita\ Income + \beta_8 Unemployment\ Rate + \beta_9 Urban \\
&+ \beta_{10} Adv\_or\_More + \beta_{11} BA\_or\_More + \mu
\end{aligned}
$$

Or, with median property value and homeownership rate averages rather than broken out by year:

$$Moved_{Net} \mid Log(Moved\_Out) = \beta_0 + \beta_1 Cook\ Index + \beta_2 AverageHomeownership + \beta_3 AveragePropertyValue + \beta_4 Population2010 + \beta_5 PerCapita\ Income + \beta_6 Unemployment\ Rate + \beta_7 Urban + \beta_8 Adv\_or\_More + \beta_9 BA\_or\_More + \mu$$

Finally, in Models 9-12, I filter to "All Education Levels" to remove education from the model and look exclusively at the net migration at all education levels to assess the significance of the Cook Index and other terms of interest.

$$Moved_{Net} | Log(Moved\_Out) = \beta_0 + \beta_1 Cook\ Index + \beta_4 Homeownership\ Rate\ 2007-2009 + \beta_5 Median\ Property\ Value\ 2007-2009 + \beta_6 Homeownership\ Rate\ 2010-2012 + \beta_7 Median\ Property\ Value\ 2010-2012 + \beta_8 Population2010 + \beta_9 PerCapita\ Income + \beta_{10} Unemployment\ Rate + \beta_{11} Urban + \mu$$

Or, with property value and homeownership rate averaged:

$$Moved_{Net} | Log(Moved\_Out) = \beta_0 + \beta_1 Cook\ Index + \beta_4 Homeownership\ Rate\ 2007-2009 + \beta_5 Median\ Property\ Value\ 2007-2009 + \beta_6 Homeownership\ Rate\ 2010-2012 + \beta_7 Median\ Property\ Value\ 2010-2012 + \beta_8 Population2010 + \beta_9 PerCapita\ Income + \beta_{10} Unemployment\ Rate + \beta_{11} Urban + \mu$$

Despite these controls in all my models, there are a few areas where exogeneity might fail. For example, New York and California are highly progressive states that also have high costs of living and challenges with housing. This might reduce the net moved value and increase the moved out value while being positively correlated with the Cook Index. This would result in a downward bias for any coefficients on the Cook Index for the moved net outcome and a positive bias for moved out. From the opposite point of view, job opportunities are a large push/pull factor, and as areas such as the Rust Belt have decreased lower job opportunities and also lean Republican, this could result in an omitted variable "job opportunities" that is negatively correlated with the Cook

Index, negatively correlated with moved net, and positively correlated with moved out, resulting in an *overestimation* of the Cook Index coefficient for moved net and an underestimation for moved out. Migration factors are highly complex and personal; with data as depersonalized as I have, in which I am unable to control for an individual's marital status, race, age, etc., this endogeneity is something I need to be aware of throughout analysis.

**Results**

My results for each model can be found in the table below. All models performed are heteroskedasticity-robust. The model results are separated by the data subset and are divided into four columns: moved net, separating housing information; moved net, averaging housing information; the log of moved out, separating housing information; and the log of moved out, with averaged housing information. The first two columns should be interpreted as the changes in net movement, while the third and fourth should be interpreted as changes in percentages.

**Table 4: Model 1-4 – Differences based on Education Level**

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| (Intercept) | -14816.212 | -18080.360* | 7.584*** | 8.978*** |
| | (9240.041) | (8985.776) | (1.862) | (1.919) |
| cook_index | -4.270 | -12.542 | 0.015 | 0.022+ |
| | (62.663) | (62.269) | (0.012) | (0.012) |
| Graduate or Professional Degree | -149.642 | -149.642 | -0.431*** | -0.431** |
| | (669.525) | (678.648) | (0.122) | (0.132) |

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| High School Graduate (includes equivalency) | 127.611 | 127.611 | -0.098 | -0.098 |
| | (802.221) | (816.720) | (0.123) | (0.133) |
| Less than High School Graduate | -256.156 | -256.156 | -0.930*** | -0.930*** |
| | (601.501) | (618.422) | (0.123) | (0.134) |
| Some College or Associate's Degree | 294.881 | 294.881 | 0.153 | 0.153 |
| | (948.296) | (966.153) | (0.125) | (0.136) |
| Median Prop Value, 07-09 | 0.032 | | 0.000* | |
| | (0.024) | | (0.000) | |
| Median Prop Value, 10-12 | -0.033 | | 0.000* | |
| | (0.024) | | (0.000) | |
| Homeowner Rate, 0709 | -1630.931*** | | 0.556*** | |
| | (350.658) | | (0.072) | |
| Homeowner Rate, 10-12 | 1259.807*** | | -0.516*** | |
| | (374.156) | | (0.071) | |
| pop2010_hun_thou | 18.073* | 22.284** | 0.008*** | 0.007*** |
| | (7.655) | (7.470) | (0.001) | (0.001) |

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| prcapinc | 0.111 | 0.185** | 0.000 | 0.000 |
| | (0.070) | (0.070) | (0.000) | (0.000) |
| unemploy | 705.656** | 555.953* | 0.092* | 0.132*** |
| | (265.407) | (238.993) | (0.036) | (0.039) |
| urban | -66.271* | -97.988*** | 0.023*** | 0.038*** |
| | (26.935) | (25.214) | (0.005) | (0.005) |
| adv_or_more | 1445.010** | 1409.622** | 0.026 | 0.037 |
| | (438.260) | (443.030) | (0.048) | (0.052) |
| ba_or_more | -113.159 | -256.961 | 0.162** | 0.198*** |
| | (283.715) | (280.309) | (0.052) | (0.055) |
| college | -648.622* | -648.379* | -0.184*** | -0.174** |
| | (304.025) | (315.466) | (0.052) | (0.054) |
| hs_or_more | 506.980*** | 565.218*** | -0.068*** | -0.091*** |
| | (140.298) | (138.073) | (0.019) | (0.020) |
| cook_index × Grad or Professional Degree | -49.750 | -49.750 | 0.017 | 0.017 |
| | (73.668) | (72.217) | (0.014) | (0.014) |
| cook_index × High School Graduate (includes equivalency) | 53.421 | 53.421 | -0.029* | -0.029* |
| | (89.310) | (88.858) | (0.014) | (0.014) |

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| cook_index × Less than High School Graduate | -37.918 | -37.918 | -0.038* | -0.038* |
| | (68.115) | (67.152) | (0.015) | (0.015) |
| cook_index × Some College or Associate's Degree | 97.749 | 97.749 | -0.031* | -0.031* |
| | (103.630) | (103.662) | (0.015) | (0.015) |
| Avg_PropValue | | 0.007 | | 0.000 |
| | | (0.006) | | (0.000) |
| Avg Homeowner | | -377.379** | | 0.043** |
| | | (145.067) | | (0.014) |
| Num.Obs. | 250 | 250 | 250 | 250 |
| R2 | 0.391 | 0.371 | 0.819 | 0.781 |
| R2 Adj. | 0.335 | 0.319 | 0.802 | 0.763 |
| AIC | 4794.5 | 4798.6 | 436.6 | 479.3 |
| BIC | 4875.5 | 4872.6 | 517.6 | 553.3 |
| RMSE | 3223.11 | 3275.86 | 0.53 | 0.58 |

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

First, with an R-squared of 0.391, this model certainly lacks some explanation of migration, but it is still decently high for the limited number of variables. This data is divided by education, and the variables of key interest to my research question are the Cook Index and the interaction between the Cook Index and education levels. The Cook Index was significant at the 10% level for one

version of this model: log of moved out, but only when homeownership and median property value are averaged. This implies that as the Cook Index increases by a point (i.e., the state leans more Democratic), the number of individuals who move out increases by 2.2%. However, the lack of robustness across other models (particularly because it is not significant with moved net, meaning it is not significant when accounting for individuals moving into a state) as well as the significance only being at the 10% level makes me skeptical of its true robustness. Next, looking at differences in migration patterns based on education level, both having a graduate degree and having less than a high school graduation result in significantly lower moved-out values than a bachelor's degree – 43% lower for a professional degree holder and a large 93% decrease in number of individuals who move out for those who have less than a high school degree. I believe this is for two reasons. Firstly, these are the extremes of the educational spectrum, and therefore the values of individuals who move out from these groups are likely to be smaller because there are by their nature fewer individuals in these categories than a bachelor's degree. Secondly, for those with less than a high school graduation, migration is likely to be more challenging than with a BA for a variety of reasons, including financial burden and job opportunities.

Finally, looking to the interaction terms, all groups lower than a bachelor's degree are negative and significant at the 5% level when log(moved out) is the outcome variable. This means that for these lower education levels, as the Cook Index increases, the number of individuals who move out is 3-4% lower than those with a bachelor's degree (my base group). This implies the opposite of the hypothesis driving this analysis: less educated individuals move *less* as the Cook Index increases for this period, contrary to the "red state brain drain" theory. However, as mentioned in the model analysis, this could be a result of complex endogeneity, in which individuals with bachelor's degrees are more financially equipped to move from high-cost-of-living states, which could also be correlated positively with the Cook Index. Regardless, it is an interesting finding.

Looking briefly at the controls, I find conflicting homeownership and median property value results depending on the years: it is an unexpected sign for 2007-2009 (implying as homeownership and value increases, the moved net decreases and the moved-out increases) yet expected for 2010-2012. The average is significant but in an unexpected sign for both models. I take this to be a complication of the time period, particularly since the housing crisis occurred in 2008-2009. Unfortunately, I am not able to control for this event. Per capita income was only significant for the moved net outcome when housing data was averaged, but it is in the expected sign; as per capita income increases, so does the net number of individuals who move there. Because per capita income is measured in dollars, this is also a decently large magnitude; for every $10 increase in per capita income, the net migration increases by nearly 2 individuals. Finally, unemployment was significant for each model, but in the unexpected sign for moved net and the expected for moved out – as unemployment increased, the moved net also increased, but so did the moved out. This implies to me that for this time period, states with high unemployment had large migration overall (hence the positive moved out coefficient), but the number of individuals moving into a state ultimately superseded the number of individuals moving out.

Next, I isolated the data to just educated individuals.

**Table 5: Models 5-8 – Educated Individuals Only**

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| (Intercept) | 12729.459 | 12276.279 | 3.636+ | 3.748+ |
| | (16912.568) | (17169.999) | (1.880) | (2.019) |
| cook_index | 73.522 | 53.098 | 0.015 | 0.020 |
| | (45.548) | (46.792) | (0.013) | (0.014) |

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| Med_Prop_Val_0709 | 0.005 | | 0.000* | |
| | (0.031) | | (0.000) | |
| Med_Prop_Val_1012 | -0.013 | | 0.000* | |
| | (0.030) | | (0.000) | |
| Homeownership_Rate_0709 | -1398.668** | | 0.660*** | |
| | (482.396) | | (0.147) | |
| Homeownership_Rate_1012 | 1163.003* | | -0.648*** | |
| | (480.459) | | (0.145) | |
| pop2010_hun_thou | -2.714 | -1.281 | 0.010*** | 0.009*** |
| | (9.377) | (7.493) | (0.002) | (0.002) |
| prcapinc | 0.212+ | 0.298* | 0.000 | 0.000+ |
| | (0.124) | (0.122) | (0.000) | (0.000) |
| unemploy | 516.301 | 457.201 | 0.060 | 0.116 |
| | (348.204) | (311.757) | (0.075) | (0.081) |
| urban | -2.494 | -48.371 | 0.028*** | 0.045*** |
| | (30.713) | (35.455) | (0.008) | (0.008) |
| adv_or_more | 630.953 | 514.667 | 0.148* | 0.207** |
| | (422.565) | (426.462) | (0.066) | (0.074) |
| ba_or_more | -313.174+ | -352.524* | -0.032 | 0.004 |
| | (175.036) | (174.189) | (0.036) | (0.040) |

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| Avg_Homeownership | | -227.313 | | 0.009 |
| | | (231.661) | | (0.023) |
| Avg_PropValue | | -0.002 | | 0.000+ |
| | | (0.008) | | (0.000) |
| Num.Obs. | 100 | 100 | 100 | 100 |
| R2 | 0.247 | 0.209 | 0.801 | 0.759 |
| R2 Adj. | 0.153 | 0.129 | 0.776 | 0.735 |
| AIC | 1905.3 | 1906.3 | 208.9 | 224.1 |
| BIC | 1939.2 | 1934.9 | 242.8 | 252.7 |
| RMSE | 2915.05 | 2988.33 | 0.60 | 0.66 |

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

My R-squared is lower in this model, perhaps indicating that individuals with a higher degree have more complex reasons for movement (and thus more omitted variables). None of the Cook Index values are significant, and they have somewhat conflicting sign directions: they are positive for moved net, and also positive for moved out. I interpret this sign direction similarly to unemployment in the last model; in states with a higher Cook Index, more individuals moved out, but ultimately more individuals moved into a state. Regardless, the lack of significance indicates that political leanings of a state do not affect the migration of highly educated individuals. Looking at the controls, the homeownership rate and value variables are conflicting, just like in the first models; in this instance, the averages are insignificant. Unemployment is insignificant for each model. Per capita income is positive (the expected sign) for the moved net values and it is significant. Overall,

the results from these models are quite mixed, though per capita income is the most consistent variable across models so far.

Finally, in the last model, I remove education as a consideration and just look at large state to state migration.

**Table 6: Models 8-12 – No Education Level Included in Data**

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| (Intercept) | -462968.604 | -510338.476+ | 9.239** | 10.104*** |
| | (310908.076) | (299844.845) | (2.812) | (2.796) |
| cook_index | 539.397 | 606.036 | -0.003 | -0.001 |
| | (937.332) | (992.881) | (0.015) | (0.013) |
| Med_Prop_Val_0709 | 0.858 | | 0.000 | |
| | (0.644) | | (0.000) | |
| Med_Prop_Val_1012 | -0.884 | | 0.000 | |
| | (0.649) | | (0.000) | |
| Homeownership_Rate_0709 | -26650.805* | | 0.387** | |
| | (10046.695) | | (0.123) | |
| Homeownership_Rate_1012 | 25399.499* | | -0.363** | |
| | (11528.203) | | (0.123) | |
| pop2010_hun_thou | 166.849 | 258.897 | 0.009*** | 0.008** |
| | (203.299) | (176.306) | (0.002) | (0.002) |

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| prcapinc | 3.765 | 5.007 | 0.000 | 0.000 |
| | (2.794) | (3.208) | (0.000) | (0.000) |
| unemploy | 14871.238 | 11213.177 | 0.067 | 0.104 |
| | (9111.840) | (7935.849) | (0.083) | (0.070) |
| urban | -324.492 | -652.255 | 0.009 | 0.018* |
| | (636.834) | (627.438) | (0.010) | (0.008) |
| adv_or_more | 11735.025 | 10968.051 | 0.035 | 0.044 |
| | (13545.356) | (13518.887) | (0.087) | (0.089) |
| ba_or_more | -909.762 | -4536.628 | 0.130 | 0.166+ |
| | (11729.978) | (11652.689) | (0.091) | (0.084) |
| college | -6413.447 | -5815.936 | -0.154+ | -0.154+ |
| | (10461.341) | (10710.293) | (0.084) | (0.084) |
| Hs_or_more | 5479.003 | 6453.573 | -0.016 | -0.031 |
| | (4969.973) | (4864.082) | (0.033) | (0.032) |
| Avg_Homeowners hip | | -1406.044 | | 0.025 |
| | | (4374.689) | | (0.022) |
| Avg_PropValue | | 0.155 | | 0.000 |
| | | (0.189) | | (0.000) |
| Num.Obs. | 50 | 50 | 50 | 50 |
| R2 | 0.470 | 0.427 | 0.805 | 0.769 |
| R2 Adj. | 0.279 | 0.261 | 0.734 | 0.702 |
| AIC | 1224.4 | 1224.4 | 69.4 | 73.8 |
| BIC | 1253.1 | 1249.2 | 98.0 | 98.6 |

| | Net, No Avg | Net, Avg | MovedOut, No Avg | MovedOut, Avg |
|---|---|---|---|---|
| RMSE | 37254.81 | 38739.05 | 0.36 | 0.39 |

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

My R-squared is 0.470, indicating that for a broad swath of data, the simple variables I have included are a decent approximation, explaining about half of the variation within movement. The Cook Index is in the hypothesized direction for *both* outcomes (positive for moved net and negative for moved out) but it is insignificant. Both unemployment and per capita income are insignificant in each model with this data set, as is nearly every other variable, indicating that when I remove education level breakdowns, the model is unable to find any significance. However, the number of observations is also the lowest of my models; at only fifty observations, there might not be enough data to get a strong sense of migration trends.

**Other Considerations**

In analyzing this data, I was limited by my data set as well as my model; other work on this topic most frequently uses logistic models with individuals as observational units rather than states. In attempting to analyze this further, taking a similar approach to Schroeder Giordono (2000) might yield more interesting results, since that paper uses individuals from the Panel Study of Income Dynamics and can analyze the effects of education on the probability of migration at an individual level.

Finally, the inspiration for this paper was borne of a very different political time than 2007-2011. A recent New York Times article discussed two families moving due to their respective state's Democratic or Republican politics, a radical decision to make and one that was perhaps not nearly as likely 15 years ago (Gabriel, 2023). Further, as remote work has increased, individuals are less tied to

the physical locations of jobs and thus might have more freedom of movement. A more interesting time to analyze therefore might be within the last year, or within the next few years.

**Conclusion**

Using a simple OLS regression, political leanings were not a causal factor for migration for highly educated individuals. The most interesting result I found was that as the Cook Index increases, individuals with less education than a bachelor's degree have 3-4% lower outward migration values than those with a bachelor's. This implies that lower-educated individuals move *less* from a state as the Cook Index increases; however, this is not significant for moved net values, which might more accurately capture if a certain demographic is leaving a state or if there is simply movement in *and* out of a state. Further, other major push/pull motivators such as home ownership, property value, state unemployment rate, and per capita income yielded complex and conflicting results. Homeownership for 2010-2012 was positively correlated with net migration and negatively correlated with outward migration in each analysis, but the opposite was true for 2007-2009 and the average between the years was either an unexpected sign or insignificant. I primarily attribute this to complications surrounding the ACS data: it was collected overlapping with the housing crisis, but I am unable to control for years or understand the yearly migration. Unemployment is significant only when all education levels are controlled for, and it is in the unexpected direction for moved net. Finally, per capita income is positive and significant for net movement (and functionally zero for the log(moved out)) in two of the three sets of models. This implies that per capita income is significant when education is controlled for and when homeownership rates are averaged. More recent data as well as a different data source and model could yield more interesting results.

# Bibliography

Davies, P. S., Greenwood, M. J., & Li, H. (2001). A Conditional Logit Approach to U.S. State-to-State Migration. *Journal of Regional Science*, *41*(2), 337–360. https://doi.org/10.1111/0022-4146.00220

Flanagan, C., & Wilson, E. (2013). Home Value and Homeownership Rates: Recession and Post-Recession Comparisons From 2007-2009 to 2010-2012. *American Community Survey Briefs*.

Gabriel, T. (2023, October). *Two Families Got Fed Up With Their States' Politics. So They Moved Out. - The New York Times*. https://www.nytimes.com/2023/10/07/us/politics/politics-states-moving.html

Giannoccolo, P. (2009). *The Brain Drain: A Survey of the Literature* (SSRN Scholarly Paper 1374329). https://doi.org/10.2139/ssrn.1374329

Hagen-Zanker, J. (2008). Why Do People Migrate? A Review of the Theoretical Literature. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1105657

Sasser, A. C. (2010). Voting with their feet: Relative economic conditions and state migration patterns. *Regional Science and Urban Economics*, *40*(2–3), 122–135. https://doi.org/10.1016/j.regsciurbeco.2010.02.001

Schroeder Giordono, L. (2000). Out-of-State vs. In-State Migration in the United States. *Journal of Public and International Affairs*, *11*, 157–184.

Vazzana, C. M., & Rudi-Polloshka, J. (2019). Appalachia Has Got Talent, But Why Does It Flow Away? A Study on the Determinants of Brain Drain From Rural USA. *Economic Development Quarterly*, *33*(3), 220–233. https://doi.org/10.1177/0891242419844320