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The effects of growth in occupational licensing on intergenerational mobility

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Abstract

We use a newly produced data set on growth in occupational licensing of low-income occupations to estimate the relationship between growth in occupational licensing and intergenerational mobility. Our empirical results suggest growth in state licensing is associated with a 1.6% to 6.2% reduction in absolute mobility at the county level. Growth in licensing is also associated with increases in county level Gini coefficients (and thus income inequality) ranging from 3.9% to 15.4%. The relationship between the growth in licensed occupations and absolute mobility provides suggestive evidence of loss in opportunity and reduced mobility for potential entrants into these occupations.

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1. Introduction

While the United States is widely known as the land of opportunity, recent research reveals that there are a number of countries with higher rates of economic mobility in the developed world. One way to measure economic mobility is to look at intergenerational mobility or changes in income and social status among different generations within the same family. In this study, we examine an intergenerational mobility measure that compares the income distribution rank of parents and that of their children after these children reach peak wage earning ages. Even though Americans are more optimistic than Europeans about their social mobility relative to citizens in European Union countries (Alesina et al. 2018), intergenerational income mobility is actually lower in the U.S. than all other OECD countries except Great Britain and Italy (d'Addio, 2007).

There are various factors that can affect social mobility including; race (Hardaway and McLoyd, 2008), family background (Black and Devereux, 2010; Jäntii et al., 2006), income (Corak, 2006), and family structure (particularly divorce – DeLeire and Lopoo, 2010). In the same vein, Delgado (2007) identifies other factors such as pollution, environmental hazards, poor prenatal nutrition and health care, as well as inadequately funded and staffed schools. Moreover, limited transportation mobility and inaccessibility to job opportunities for low-income residents have an impact on social mobility as well (Chapple, 2001; Grengs, 2010; Ong and Miller, 2005). In addition, Augustine and Negraia (2018) find that mother's education provides higher intergenerational returns when education is obtained before children are born.

Neighborhood and residential area characteristics that can have a significant impact on mobility as well. Chetty et.al. (2014a, 2014b) show that areas with high levels of upward mobility tend to have: "(1) less residential segregation, (2) less income inequality, (3) better primary schools, (4) greater social capital, [and] (5) greater family stability." This list of geographic characteristics is not comprehensive, however. For example, Ewing et al. (2016) demonstrate that upward mobility is lower in areas that are characterized by urban sprawl than in compact areas, which is attributable to better job accessibility. Furthermore, less impoverished areas, with more equal income distribution, superior schools, a lower share of single parent families, and lower crime rates tend to provide children in poor families with better outcomes (Chetty, Hendren and Katz, 2016; Chetty and Hendren, 2017).

Blanden (2013) points out that mobility is positively correlated with a nation's education spending and negatively correlated with inequality. The inverse relationship between intergenerational mobility and inequality is significant and it was coined as the "Great Gatsby Curve." This curve illustrates the trend in intergenerational earnings mobility across countries, which tends to be low in countries with high inequality such as Italy, the United Kingdom, and the United States, and much higher in the Nordic countries, where income is distributed more evenly (Corak 2013). These findings, that US experiences lower upward mobility at the bottom of the income distribution than Norway and Sweden, have been confirmed by recent studies as well (Bratberg et. al. 2017).

It appears that various socioeconomic characteristics have an effect on economic mobility. There also appears to be an inverse relationship between economic mobility and inequality. What is less understood is how particular regulatory institutions, such as occupational licensing, impact economic mobility. In other words, are occupational licensing laws preventing individuals from earning more than their parents? This is particularly interesting since several studies on occupational choice between generations showed that there is a strong relationship between father's and son's occupations (Carmichael 2000, Di Pietro and Urwin 2003) as well as father's and daughter's occupations (Hellerstein and Morrill 2011).

Intergenerational mobility shows the changes in income between generations. In our study we focus on the lower 25th percentile ranks of the income distribution. Income structure for that part of the distribution primarily consists of wage earnings as opposed to rent or dividends. Therefore, changes in intergenerational mobility could potentially be attributable to factors that affect wage-earnings. Previous theoretical findings and empirical research consistently demonstrates that occupational licensing is associated with increases in practitioners' wages. Adam Smith believed that occupational licensing was the way to "limit the number of apprentices per master, thus ensuring higher earnings for persons in these occupations" (Smith 1776) and Milton Friedman introduced the idea that professional organizations were the source of monopoly rents since they established more difficult barriers to entry (Friedman 1962). Occupational licensing restricts the supply of labor to the occupation and therefore forces the price of labor increase (Kleiner 2000), More specifically, licensing increases wages by about 15-18 percent and the combination of being licensed and belonging to a union can increase wages by more than 24 percent (Kleiner and Krueger 2010 and 2013). Turning to specific occupations, licensing increases optician annual earnings by as much as 16.9 percent (Timmons and Mills 2018), massage therapist wages by as much as 16.2 percent (Thornton and Timmons 2013), and radiologic technologists by as much as 6.9 percent (Timmons and Thornton 2008). In addition, imposing increasingly strict training and educational licensing requirements tend to increase private security guard wages as much as 9 percent (Meehan, 2015). By creating barriers to entry, growth in occupational licensing can potentially affect incomes of non-practitioners and thus negatively affect intergenerational mobility.

Utilizing a newly produced data set documenting growth in occupational licensing of low-income occupations with data from The Equality of Opportunity Project, we find evidence of a negative correlation between growth in licensed occupations and absolute economic mobility (Timmons et al. 2018).

In the analysis that follows, we assess and analyze how occupational licensing may be restricting opportunities in the US. In the next section, we describe our data and variables of interest. Our paper then proceeds by estimating the effect that growth in occupational licensing has had on absolute economic mobility and on income inequality. Finally, we draw conclusions and delineate avenues for further research.

2. Data

Our main variables of interest in our empirical analysis are:

1) *Occupational licensing growth*: This variable shows the change in low- and moderate-income occupations requiring a license from 1993 through 2012 in each state. As indicated above, the data pertaining to licensing growth were obtained from a newly published data set (Timmons et al. 2018). The choice of 102 occupations follows the methodology of Carpenter II et. al (2012):

"The 102 occupations included in this sample were identified by first downloading a list of licensed occupations from http://www.careerinfonet.org/, a career website sponsored by the United States Department of Labor. That list was then cross tabulated against occupational lists maintained by the BLS. Any occupation that did not appear in the BLS lists was excluded, thus creating a list of "recognized" occupations. Finally, the BLS-referenced list was rank ordered by average income. All occupations that fell above the national average income were excluded, resulting in a final list of low- and middle-income occupations" (pp. 189)

These data were then combined with existing cross-county data made available through The Equality of Opportunity Project (Chetty et al., 2014a).

2) *Absolute upward mobility*: The main dependent variable for our empirical analysis is the absolute upward mobility measure from this paper. In each county, this estimate captures the expected (average) income rank of a child whose parents are at the 25th percentile of the national income distribution.[1] The 25th percentile of the income distribution was selected as the primary measure of interest in Chetty et al. (2014a). This variable is also relevant for our analysis since it captures the chances of an individual raised in a relatively low-income family of moving up the income distribution. As such, the estimate is centered on the absolute income mobility of the children of low or moderate-income families. In contrast, relative upward mobility is measured as a slope of the ranks and shows the difference in outcomes between children from top vs. bottom income families. For our analysis, absolute upward mobility is chosen over relative upward mobility because this measure is less sensitive to observations with zero income and to outliers (Chetty 2014a). The national income distribution rank is used in this estimate instead of the local level to show absolute changes in economic income distribution ranks. Local level distribution ranks might include local level noise. For example, if local level economic conditions deteriorate, and the income of a child is the same (in real terms) to their parents, it might appear that they have moved up the income distribution even if they have moved down the national level distribution.

The data gathered from the Chetty et al. (2014a) study are county level estimates using 1980–82 birth cohorts. These data take into account the income percentile of parents and their children by examining tax return data for families with dependent children. The income statistics used to construct the children's income percentile come from each child's family income in 2011 and 2012. The parent-income percentile data come from 1996 through 2000. Both income and change in income were adjusted for inflation. The children born between 1980 and 1982 should be reaching some of their prime work years in 2012 when they are in their early 30's. The parental family income statistics correspond to when the children are between 15 and 20 years old. While the estimate is a cross-sectional statistic for each county it does capture the income earning dynamics across two generations. The county statistics are based on where the child was born, not where they move to as an adult. As stated by Chetty et. al. (2014a):

" We permanently assign each child to a single CZ [commuting zone, and in our data a county] based on the ZIP code from which his or her parent filed their tax return in the first year

[1] The definition of absolute upward mobility provided directly within the dataset used for this analysis, available at equality-of-opporutnity.org/data (Online Data Table 3 for Chetty et. al. (2014 a)): "Absolute upward mobility (AM) is the expected rank of children whose parents are at the 25th percentile of the national income distribution."

the child was claimed as a dependent. We interpret this CZ as the area where a child grew up." (pp. 1587)

Chetty et. al. (2014a) mapped ZIP codes to counties using 1999 Census crosswalk between ZIP codes and counties. Some of the ZIP codes were split over the years, some of the counties' definitions were changed between 1999 and 2011, and some of the children in the dataset had missing ZIP codes. These missing observations in the dataset resulted in the final dataset containing 2,717 counties.

The absolute mobility statistic could be influenced by occupational licensing growth over the 1993-2012 period. Occupational licensing occurs at both the state and local level in the U.S. Unfortunately; statistics on changes to local level occupations licensed for these 102 low- to moderate- income occupations are not available. Consequently, the analysis is limited to changes in low-income licensed occupations at the state level, while the absolute upward mobility data are county level statistics. We record the state level change in licensing for each county within a state.

3) *Income inequality*: County level inequality is measured using a county level Gini coefficient that was included in the Chetty et al. dataset. The Gini coefficient is a very common measure of income inequality and is defined by the U.S. Census as follows: "The Gini index, or index of income concentration, is a statistical measure of income inequality ranging from 0 to 1. A measure of 1 indicates perfect inequality, i.e., one household having all the income and rest having none. A measure of 0 indicates perfect equality, i.e., all households having an equal share of income."[2] As this number increases, measured income inequality also increases. Ideally, we would measure the change in the county level Gini Coefficient over the 1993-2012 period, but we do not have access to the 1993 data. We therefore rely on the 2012 data for our analysis.

4) *Teenage birth rate*: This variable measures the fraction of female children (aged 13-19) giving birth in the core sample. These data come from Chetty et. al. (2014a) The Equality of Opportunity Project Online Table 3.

5) *College Attendance*: This variable is defined in line with Chetty et. al. (2014a) as an indicator for having one or more 1098-T forms filed on one's behalf when the individual is aged 18-21.

6) *College quality*: Using data from 1098-T forms, Chetty, Friedman, and Rockoff (2014) construct an earnings-based index of "college quality" using the mean individual wage earnings at age 31 of children born in 1979-80 based on the college they attended at age 20.

7) *Uninsured Rate*: This variable measures the percent of a county's population (younger than 65) without health insurance and is obtained from the 2012 estimates of the U.S. Census Small Area Health Insurance Estimates (SAHIE) Program.[3]

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[2] https://www.census.gov/glossary/#term_GiniIndex

[3] https://www.census.gov/programs-surveys/sahie.html

In addition to the variables described above, county level income per capita figures and population were obtained for both 1993 and 2012 from the US census.[4] These data are also used in the estimation that follows.[5]

3. Estimates of the Effect of Licensing Growth on Economic Mobility

The empirical models are county-level cross sectional OLS models and are estimated as follows:

$$\ln(AbsoluteUpwardMobility)_i = \beta_0 + \beta_1 \ln(\Delta LowIncomeOccupationsLicensed)_j + \boldsymbol{X}_i + \varepsilon_i \quad \textbf{(1)}$$

$$\ln(CountyGiniCoefficient)_i = \beta_0 + \beta_1 \ln(\Delta LowIncomeOccupationsLicensed)_j + \boldsymbol{X}_i + \varepsilon_i \quad \textbf{(2)}$$

$\Delta LowIncomeOccupationsLicensed_j$ is the change in low- and moderate-income occupations in state *j* requiring a license from 1993 through 2012. $\boldsymbol{X}_i$ is a vector of county level (subscript *i*) demographic controls which includes the natural logs of county-level income and population measures for 2012, as well as county-level changes in real ($2012) income per capita over the period of interest (1993-2012), and the 2012 uninsured rate population described above. The percentage of children born to teenage mothers and controls for predicted college enrollment and college quality for children in the 25th income percentile within each county within the U.S. are also included as controls. ε_i is the idiosyncratic error. Standard errors were clustered by county level, as errors may be correlated within geographic areas. Unemployment rates are not included as a control as they are likely closely related to changes in occupational licensing. Occupational licensing limits entry and controls the pool of job seekers; it has the potential to have impacts on unemployment within those industries. As the number of occupations licensed increases the

[4] https://www.census.gov/

[5] Estimation was also attempted using 2017 county level air quality measures from the EPA (https://www.epa.gov/outdoor-air-quality-data) and county level measures of non-white population percentage (https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_12_1YR_B02001&prodType=table). Adding both of these control variables limited the number of observations to 394 counties from the 2717 in the original sample, so the number of observations was a small fraction of our current analysis. In this limited sample, air quality measures were also not significant at any typical significance level. Delgado (2007) identifies pollution and healthcare as factors that affect social mobility referring to environmental justice movement books by Luke W. Cole and Sheila R. (1999) and Pellow and Park (2002). Both Delgado's study and the referred books base their analysis primarily on historical arguments and one of the books have been criticized for suffering from "sparse empirical evidence on environmental racism" (Gille 2003). Thus, we should mention that those variables do not have a strong support to be included in the model based on the lack of statistical analysis in the literature in the first place.

more likely this change is to have impacts on the aggregate unemployment rate within a county. In a *Brookings* policy paper, Ryan Nunn (2016) documents the close relationship between unemployment and licensed professions. As indicated by Nunn:

"Licensing creates "crowding" in unlicensed occupations and labor scarcity in licensed occupations driving a wedge between the unemployment rates in the two sectors."

Licensing may also be closely related to average income per capita measures. Licensing may limit entry into a profession and reduce the potential earnings of those attempting to enter that profession. Licensing may also increase the earnings of those fortunate enough to obtain licenses. In this way, the relationship between licensing growth and per capita income is ambiguous. As a result, we elect to include it as a control variable in the analysis.

Given the cross-sectional nature of the data, these relationships should be taken as suggestive, no claims of causation are made. This analysis also deals with the growth in licensing, not the stringency of licensing requirements. Substantial changes to the requirements needed to acquire licenses has also changed over time. Examples of these requirements include experience, training, and exam requirements to acquire licenses. This analysis does not focus on these changes but instead on the change in the number of occupations licensed because of a lack of specifics on historic licensing requirements. Table 1 gives the summary statistics for these data, and Table 2 presents the estimation results. As presented in Table 1, absolute upward mobility has a mean of 43. This figure indicates that individuals with parents in the bottom half of the income distribution had reached the 43rd percentile of the income distribution by the age of 30 on average.

Table 1: Summary Statistics

	Mean	Standard Deviation
State Level Change in Low Income Licensed Occupations	*31.04*	*10.37*
2012 Population	*100732.1*	*322070.8*
2012 Income Per Capita	*37700.9*	*10823.5*
1993-2012 Change in Income Per Capita	*20147.53*	*8547.241*
Teenage Birth Rate	*16.5265*	*5.7815*
Absolute Upward Mobility	*43.4408*	*5.4513*
County Level Gini Coefficient	*0.3838*	*0.0861*
Predicted College Attendance for Low Income Children	*41.5204*	*8.507326*
Predicted College Quality for Low Income Children	*39.2664*	*4.0629*
2012 Percent of Population without Health Insurance (under 65 Years Old)	*17.6*	*5.4*

Table 2: Relationship Between Low Income Licensed Occupations, Absolute Upward Mobility, and County Level Gini Coefficients.		
	(1) ln(Absolute Upward Mobility)	(2) ln(Gini Coefficient)
Ln(Change in Low Income Licensed Occupations)	*-0.0275**** *(0.0045)*	*0.0493**** *(0.0097)*
Ln(2012 Population)	*-0.0328**** *(0.0017)*	*0.0874**** *(.0035)*
Ln(2012 Income Per Capita)	*-0.0749**** *(0.0151)*	*0.0565*** *(0.0289)*
Ln(1993-2012 Change in Income Per Capita)	*0.0874**** *(0.0081)*	*0.1185**** *(0.0157)*
% change in population 1993-2012	*0.0002**** *(0.0001)*	*-0.0010**** *(0.0001)*
Ln(Teenage Birth Rate)	*-0.1576**** *(0.0082)*	*0.1731**** *(0.0172)*
Ln(Predicted College Attendance for Low Income Children)	*0.0928**** *(0.0186)*	*0.0274* *(0.0356)*
Ln(Predicted College Quality for Low Income Children)	*0.1777**** *(0.0429)*	*-0.1358* *(0.0837)*
Ln(Uninsured Rate)	*0.0302**** *(.0075)*	*0.2323**** *(0.0171)*
Intercept	*3.46*	*-4.500*
N	*2,717*	*2,717*
R^2	*0.6006*	*0.4268*
Clustered Robust Standard errors in parentheses. *** $p < .10$, ** $p < .05$, *** $p < .01$**		

Turning to our results in Table 2, increases in occupational licensing are associated with reductions in absolute upward mobility and increases in county Gini coefficients. This suggestive relationship provides some evidence that increases in licensing of low income occupations may hamper mobility and increase income inequality. In estimation (1) the coefficient (-0.0275) represents the percentage change in absolute mobility associated with changes in adding state level licenses. A doubling of the number of low to moderate income licenses (most states more than doubled these licenses over the period) is associated with a 2.75% reduction in absolute mobility. To facilitate interpretation of these results at the state level, we also include estimates of licensing growth in Table 4 of the appendix. The most extreme growth in low income licensed occupations occurred in Louisiana, which licensed 59 more occupations in 2012 than in 1993. Our results suggest that Louisiana's growth in licensing is associated with a 2.7 unit reduction in the absolute upward mobility figure. Evaluating this figure at the mean level of absolute upward mobility from Figure 1, this corresponds with a 6.25% reduction in absolute mobility. Such a reduction in absolute economic mobility indicates corresponding reductions in the expected income percentile that a person born into the 25^{th} percentile income quartile would expect to be at as an adult. Using the sample mean growth in low- and moderate-income licensed occupations (31.04) as opposed to Louisiana's change (59), yields an associated 3.3% reduction in the absolute mobility figure. Percentage change is again calculated using the sample mean of the absolute mobility figure. At the other extreme, Oklahoma and Kentucky had the smallest changes in the number of occupations licensed--just 15. A change of this magnitude is associated with a 1.6% reduction in the absolute mobility figure. In summary, growth in the number of low- and moderate-income licensed occupations is associated with a reduction in absolute economic mobility ranging from as low as 1.6% in Oklahoma to as much as a 6.25% reduction in Louisiana. On average, economic mobility declined by 3.3% as the number of low- and moderate-income occupations grew from 1993 to 2012.

We now turn our attention to column (2) of Table 2. In this calculation we estimate the effect that growth in licensing has had on income inequality measured using the county-level Gini coefficient. In column (2) the coefficient (0.0493) is an estimate of the percentage change in the county-level Gini coefficient associated with an increase in low income licensing. A doubling in the number of low to moderate-income licenses is associated with approximately a 5% increase in the Gini coefficient. This increase in the Gini coefficient is representative of an increase in inequality associated with increases in low- to moderate-income licensing growth. We can use the estimates from Table 4 to examine how the Gini coefficient changes as a state adds licensing requirements for one low- or moderate-income occupation. If we compare Louisiana and Oklahoma, following a similar technique as above, we find that Louisiana's county-level Gini coefficient increased 0.059 units or a 15.4% increase (evaluated at the mean in Table 1). Oklahoma, by contrast, experienced a 3.9% increase in its Gini coefficient. If we evaluate the effect using the average change in licensed occupations (31.04), we estimate an 8.1% increase in the Gini coefficient. To summarize, growth in the number of low- and moderate-income occupations from 1993 to 2012 is associated with a 3.9% (Oklahoma) to 15.4% (Louisiana) increase in income inequality. It should be noted that national estimates of the increase in the Gini coefficient from 1992 to 1993 is approximately 10.2% or 4 Gini points.[6]

4. State Level Estimates

In our previous estimations, we estimate how changes in occupational licensing at the state level have affected county-level intergenerational mobility. Ideally, we would have dependent and independent variables all measured at the same level of geography. As noted previously, we were not able to obtain county-level data on occupational licensing. In addition, data from Chetty et al. (2014) is reported at the county level only. Our main data analysis is county based. Focusing on the state level results is valuable information being thrown away. Difference in state regulation may impact counties in different ways, including impacting opportunity in different counties that have larger proportions of low- to moderate-income workers. Examining income and many of these measures at the state level doesn't allow us to get at within state variation of richer and poorer counties.

With these numerous limitations in mind, we perform an additional robustness check using the county-level data to produce state-level estimates of absolute mobility. We use these measures in

[6] US Census. Income and Poverty in the United States: 2016. https://www.census.gov/content/dam/Census/library/publications/2017/demo/P60-259.pdf

a simple cross-sectional analysis with 51 observations, every state and Washington D.C. We should caution that these sample population numbers may or may not reflect actual state population trends. For these reasons, the following analysis should be interpreted with even more caution than the county-level analysis. A lack of observations and the number of control variables added also add to these concerns. Table 3 reports the results of this analysis. Due to the availability of more data at the state-level, we included some additional controls in this analysis. Measures of union membership (from Unionstats.com maintained by Barry Hirsch) and minority population percentages (obtained from the US Census) at the state level were included as additional regressors. Union membership has been found in other research to be associated with changes in absolute economic mobility (Mezaros 2018). At the state level, we find evidence that teenage birth rates are negatively correlated with intergenerational mobility. Although the coefficient on growth in licensing is negative, it is not statistically significant. Although there are shortcomings with both empirical approaches, we feel most confident with our county-level empirical analysis.

Table 3:

State Level Relationship Between Low Income Licensed Occupations and Absolute Upward Mobility

	(1)ln(Absolute Upward Mobility)	*(2)ln(Absolute Upward Mobility)*	*(2)Ln(Absolute Upward Mobility)*
Ln(Change in Low income Licensed occupations)	*-0.0167 (0.0199)*	*-0.0263 (0.0309)*	*-0.0438 (0.0311)*
Ln(population)	*-0.0192*** (0.0067)*	*-0.0176 (0.0136)*	*-0.025 (0.015)*
Percent change in union membership	*-0.0992 (0.0651)*	*-0.0993 (0.0654)*	*-0.0007 (0.0045)*
Ln(2012 Income per capita)	*0.0059 (0.0728)*		
Ln(% of population non-white population)	*0.0179 (0.0143)*	*-0.00319 (0.0189)*	
Ln(Teenage Birth Rate)	*-0.199*** (0.0649)*	*-0.213*** (0.0327)*	
Percent change union membership	*-0.0594 (0.0492)*		
Ln(Uninsured Rate)	*0.0849** (0.0342)*		
Intercept	*1.793*	*3.648*	*4.272*
N	*51*	*51*	*51*

Clustered Robust Standard errors in parentheses
*** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$**

5. Conclusion

This study provides an important contribution to the literature on U.S. labor mobility and income inequality. The potential of occupational licensing to influence labor opportunities, economic mobility, and income distribution outcomes has been mostly unexplored up to this point in this literature. Our analysis builds on the pioneering work of Chetty et al. (2014a). We should note that the nature of the data (cross sectional) limits our ability to perform causal inference. In other words, we cannot say that growth in licensing caused reductions in economic mobility or increases in income inequality. Instead, the findings of this paper shed light on a suggestive relationship between the growth of occupational licensing, the labor mobility of low income Americans, and income inequality. More specifically, our analysis suggests that growth in occupational licensing of low- and moderate-income occupations may be limiting opportunities for upward economic mobility (a 1.6% to 6.25% reduction). Licensing shrinks the pool of potential laborers by creating barriers to entry and this reduction in mobility also seems to relate to increases in income inequality (3.9% to 15.4%) as measured by U.S. county level Gini coefficients.

References

Alesina, A., Stantcheva, S., Teso, E. (2018) "Intergenerational Mobility and Preferences for Redistribution" *American Economic Review* **108(2),** 521–554

Augustine, J.M. and Negraia, D.V. (2018) "Can Increased Educational Attainment Among Lower-Educated Mothers Reduce Inequalities in Children's Skill Development?" *Demography* **55(1),** 59-82

Black, S.E., and Devereux, P.J. (2010) "Recent developments in intergenerational mobility" National Bureau of Economic Research. working paper 15889. Retrieved from http://www.nber.org/papers/w15889 (5.23.2018)

Blanden, J. (2013) "Cross-national rankings of intergenerational mobility" *Journal of Economic Surveys* **27(1),** 38-73

Bratberg, E., Davis, J., Mazumder, B., Nybom, M., Schnitzlein, D. and Vaage, K. (2017) "A Comparison of Intergenerational Mobility Curves in Germany, Norway, Sweden, and the US" Scandinavian *Journal of Economics* **119,** 72–101

Carmichael, F. (2000) "Intergenerational mobility and occupational status in Britain" *Applied Economics Letters* **7(6),** 391-396.

Carpenter II, D., Knepper L., Erickson A., Ross J. (2012) "License to Work: A National Study of Burdens from Occupational Licensing" Institute for Justice First Edition.

Chapple, K. (2001) "Time to work: Job search Strategies and commute time for women on Welfare in San Francisco" *Journal of Urban Affairs* **23,** 155-173.

Chetty, R. Hendren, N, and Katz, L. (2016) “The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment” *American Economic Review* **106(4),** 855–902

Chetty, R. Hendren, N, (2017) “The Impacts of Neighborhoods on Intergenerational Mobility II: County-Level Estimates” NBER working paper number 23002. Retrieved from http://www.nber.org/papers/w23002 (5.23.2018)

Chetty, R. Hendren, N. Kline, P. and Saez. E. (2014a) “Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States” *The Quarterly Journal of Economics* **129(4),** 1553-1623.

Chetty, R. Hendren, N. Kline, P., Saez E., and Turner, N. (2014b) “Is the United States still the land of opportunity? Recent trends in generational mobility” National Bureau of Economic Research.

Cole, L. W. and Foster, S.R. (1999) “From the ground up: environmental racism and the rise of the environmental justice movement” New York University Press: New York

Corak, M. (2006) “Do poor children become poor adults? Lesson from a cross country comparison of generational earnings mobility” IZA discussion paper number 1993.
Corak, M. (2013) “Income inequality, equality of opportunity, and intergenerational mobility” *Journal of Economic Perspectives* **27(3),** 79-102

d'Addio, A. C. (2007) “Intergenerational transmission of disadvantage: Mobility or immobility across generations? A review of the evidence for OECD countries” OECD Social, Employment and Migration working paper number 52.

Deleire, T. and Loopo, L. (2010) “Family structure and economic mobility of children. The Pew Charitable Trusts: Economic Mobility Project” Retrieved from http://www.pewtrusts.org/~/media/legacy/uploadedfiles/pcs_assets/2010/familystructurepdf.pdf (5.23.2018)

Delgado, R. (2007) “The myth of upward mobility” *University of Pittsburg Law Review* **68(4),** 879-913

Di Pietro, G. and Urwin P. (2003) “Intergenerational mobility and occupational status in Italy” *Applied Economics Letters* **10(12),** 793-797

Ewing, R., Hamidi, S., Grace, J.B., Wei, Y.D. (2016) “Does urban sprawl hold down upward mobility?” *Landscape and Urban Planning* **148,** 80-88

Friedman, M. (1962) “Capitalism and Freedom” Chicago: University of Chicago Press

Gille, Z. (2003) "The Silicon Valley of Dreams: Environmental Injustice, Immigrant Workers, and the High-Tech Global Economy by David Naguib Pellow and Lisa Sun-Hee Park" *American Journal of Sociology* **109(2),** 521-522.

Grengs, J. (2010) “Job accessibility and the modal mismatch in Detroit” *Journal of Transport Geography* **18,** 42-54

Hardaway, C.R. and McLoyd, V.C. (2008) “Escaping poverty and securing middle class status: How race and socioeconomic status shape mobility prospects of African Americans during the transition to adulthood” *Journal of Youth and Adolescence* **38(2),** 242-256

Hellerstein, J.K. and Morrill, M.S. (2011) “Dads and Daughters the Changing Impact of Fathers on Women’s Occupational Choices” Journal Human *Resources* **46(2),** 333-372

Jantii, M. Bratsberg, B. Røed, K., Raaum, O., Naylor, R., Österbacka, E., et. al. (2006) “American Exceptionalism in a New Light: A Comparison of Intergenerational Earnings Mobility in the Nordic Countries, the United Kingdom and the United States” IZA discussion paper number 1938.

Kleiner, M. (2000) "Occupational Licensing" *Journal of Economic Perspectives* **14 (4),** 189-202.

Kleiner, M. and Krueger, A. (2010) “The Prevalence and Effects of Occupational Licensing” *British Journal of Industrial Relations* **48(4),** 676–687.

Kleiner, M. and Krueger, A. (2013) "Analyzing the Extent and Influence of Occupational Licensing on the Labor Market" *Journal of Labor Economics* **31(2),** S173-202.

Meehan, B. (2015) “The impact of licensing requirements on industrial organization and labor: Evidence from the US private security market” *International Review of Law and Economics* ***42*****,** 113-121.

Meszaros, John, (2018) "Inequality and unionization within the United States," *The Quarterly Review of Economics and Finance* **67(C),** 326-333.

Nunn, R. (2016) “Occupational Licensing and American Workers” The Hamilton Project. Brookings Institution. pg.7. https://www.brookings.edu/wp-content/uploads/2016/07/occupational_licensing_and_the_american_worker.pdf

Ong, P.M., and Miller, D. (2005) “Spatial and transportation mismatch in Los Angeles” *Journal of planning education and research* **25,** 43-56.

Pellow, D.N. and Park, L.S. (2002) “The Silicon Valley of dreams: environmental injustice, immigrant workers, and the high-tech global economy” New York University Press: New York

Smith, A. (1776). “Wealth of Nations.” New York: Modern Library Edition, 1994 [1776]

Thornton, R. and Timmons, E. (2013) "Licensing One of the World’s Oldest Professions: Massage" *The Journal of Law and Economics* **56(2),** 371-388.

Timmons, E. Meehan, B. Meehan, A. and Hazenstab, J. (2018) “Assessing growth in occupational licensing of low-income occupations: 1993-2012” *Journal of Entrepreneurship and Public Policy* **7(2)**, 178-218.

Timmons, E. and Mills, A. (2018) “Bringing the Effects of Occupational Licensing into Focus: Optician Licensing in the United States” *Eastern Economic Journal* **44,** 69-83

Timmons, E. and Thornton, R. (2008). “The Effects of Licensing on the Wages of Radiologic Technologists” *Journal Labor Research* **29(4),** 333-346