Journal of Economic Behavior and Organization 226 (2024) 106683

Contents lists available at ScienceDirect

Journal of Economic Behavior and Organization

journal homepage: www.elsevier.com/locate/jebo

Research Paper

Finance and intergenerational mobility: Evidence from US banking reforms

Sotiris Kampanelis [a,*], Dimitris Chronopoulos [b], John O.S. Wilson [b]

[a] Cardiff Business School, Aberconway Building, Colum Road, Cathays, Cardiff CF10 3EU, UK
[b] Centre for Responsible Banking & Finance, Business School, University of St Andrews, The Gateway, North Haugh, St Andrews, Fife KY16 9RJ, UK

ARTICLE INFO

JEL classifications:
J62
G21
I22
L26

Keywords:
Bank deregulation
Bank competition
Intergenerational mobility
Education
Entrepreneurship

ABSTRACT

We investigate the impact of US banking industry deregulation on intergenerational mobility. In order to do so, we use a quasi-natural experimental research design to investigate how a change in state level bank competition (following geographic deregulation) affects the intergenerational mobility of individuals born to (poorer) families at the lower end of the income distribution. We find that individuals born to poorer families who spend their first years as adults in an area with a more competitive banking system, experience higher mobility relative to counterparts located in areas characterised by lower levels of bank competition. Increased educational opportunities and entrepreneurship are important underlying factors driving the observed increases in intergenerational mobility.

1. Introduction

Intergenerational mobility captures the relationship (if any) of the socio-economic status of parents (measured by earnings, occupation, educational attainment, social class) with that of their children upon reaching adulthood. In the United States (US) today (and in most other developed countries) there are significant geographic differences in intergenerational mobility (Chetty 2014a, 2014b). This suggests that the environment an individual is born into and spends their formative years (to some extent) determines subsequent intergenerational mobility (Chetty et al., 2016; Chetty and Hendren, 2018a, 2018b). If individual chances of success and prosperity depend on place of birth, societal fairness is likely to be undermined, and social and economic inequality will persist. Prior evidence suggests that the financial system plays an important role in determining the level and distribution of incomes and wealth (Levine, 2005; Beck et al., 2010). However, to date there is a paucity of evidence regarding the role of the financial system in driving intergenerational mobility across generations. In this paper, we address this evidence gap.

Prior literature in sociology and economics has investigated the intergenerational association in earnings, wealth, occupation, educational attainment and social class between parents and children (Black and Devereaux, 2011; Corak, 2013; Torche, 2015; Solon, 2018). A key empirical challenge facing researchers engaged in this endeavour has been access to population level datasets that allow accurate matching of parents with children, and thus the measurement and quantification of intergenerational linkages in key outcome variables. Fortunately, in the US, the availability of population census data and administrative social security and tax records provide researchers with opportunities to measure the extent of intergenerational mobility in education (Card et al., 2022) and income (Chetty

* Corresponding author.
E-mail address: kampaneliss@cardiff.ac.uk (S. Kampanelis).

https://doi.org/10.1016/j.jebo.2024.106683
Received 19 September 2023; Received in revised form 17 June 2024; Accepted 22 July 2024
Available online 2 August 2024
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et al., 2014). The estimates derived from such analyses provide a useful starting point to understanding the myriad of economic and social factors in driving observed geographic differences in intergenerational mobility.

In this paper, we draw upon prior literature to investigate whether the financial environment prevailing in the location where an individual is born and grows up matters for intergenerational mobility. As a setting we use the US, a country which experienced intergenerational mobility through much of the 20th century, but where in recent decades this is less evident.[1] Recent research (using matched datasets on incomes of parents and children) attribute the observed decline in intergenerational mobility to so-called (negative) neighbourhood exposure effects to outcomes such as health and income inequality, lack of education, declining social capital and higher crime among others (Chetty and Hendren, 2018a, 2018b).

In this paper, we utilise individual de-identified data covering the US population to measure intergenerational mobility at the county level for adults aged 26 for individuals in birth cohorts covering the period 1980 to 1986. Our intergenerational mobility outcome variable spans the period from 2006 to 2012. A quasi-natural experimental research design is used to investigate how the financial environment (proxied by the openness of the banking industry following geographic bank deregulation) an individual is born into and grows up influences their intergenerational mobility. Apriori, we expect that a more open (and competitive) banking industry mitigates financial constraints facing young adults, and in doing so allows them to pursue educational and entrepreneurial opportunities. Consequently, leading to improved earnings and mobility.

Our research design relies on a change in state level bank competition, following US inter-state branching deregulation. Commencing in the 1970s, and continuing throughout the 1980s and 1990s, the US banking industry experienced a significant reduction in restrictions on bank location leading to the entry of out-of-state banks, competition with incumbent banks, and culminating in Congress passing the Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) of 1994. The IBBEA removed many of the restrictions on interstate banking activity, but also granted individual states the right to impose restrictions to prohibit the entry or activities of out-of-state banks. Individual states could impose up to four restrictions relating to: the minimum age of a target institution in any merger (Minimum Age); de novo interstate branching (De Novo Branching); the acquisition of individual bank branches (Acquisition); a state-wide deposit cap (Deposit Cap). As a result, following the passage of the IBBEA, the level of competition facing incumbent banks continued to vary across states. Using information regarding these aforementioned restrictions, we follow prior literature to develop a time-varying index of bank competition across states (Rice and Strahan, 2010; Favara and Imbs, 2015; Cornaggia et al., 2015; Celerier, 2019). The staggered process of interstate banking deregulation permits us to assign values to the index across space and time. We then use this index within a difference-in-differences framework to estimate the impact of bank competition on intergenerational mobility, between 2006 and 2012, of individuals born into poorer families at the lower end of the income distribution during the period 1980 through 1986, at the local (county) level.

By way of preview, the results of our empirical analysis suggest that individuals born to poorer families who spend their first years as adults in a county with a more competitive banking system, experience higher income mobility in adulthood. This suggests that the prevailing financial environment plays an important role in driving intergenerational mobility. Our findings also suggest that educational attainment (percentage of individuals without a high school degree), lower racial segregation (percentage of Hispanic individuals), lower religious adherence, and lower crime rates contribute to intergenerational mobility.

We also use data collected from the Panel Study of Income Dynamics (PSID) and the Survey of Income and Program Participation (SIPP) to investigate the extent to which educational and entrepreneurial opportunities affect the intergenerational mobility of individuals located in areas characterized by lower or higher levels of bank competition. The results of this investigation suggest that individuals growing up in areas characterized by higher levels of bank competition take advantage of educational opportunities relative to counterparts living in areas with less bank competition. We also find that bank deregulation leads to an increasing number of poorer individuals securing (debt or equity) funding in order to pursue entrepreneurial opportunities. Overall, our results suggest that both education and entrepreneurship play an important role in driving the relationship between banking industry deregulation and intergenerational mobility.

Our results are robust to a series of additional tests. First, in order to ensure that our results are not driven by regulatory restrictions that are easy to be circumvented by out-of-state banks seeking to enter new markets, we repeat our empirical analysis using an alternative index of bank deregulation (based on two restrictions, namely acquisition and deposit cap), which prior evidence suggests are significant barriers to entry (Johnson and Rice, 2008; Nguyen et al., 2018). Second, in order to ensure that our estimated empirical relationships pertain to individuals belonging to the lower quartile of the national income distribution, we also estimate the impact of banking industry deregulation on the educational and entrepreneurial activities of wealthier young individuals. Our baseline results hold in light of these aforementioned tests, and thus suggest that younger individuals from the poorest US households are the main beneficiaries of US banking industry reforms. We assess the internal validity of our results by conducting a number of placebo tests and a contiguous county level analysis. The results suggest that our findings are not driven by secular trends, reverse causality or (observed or unobserved) omitted shocks that could have occurred around the timing of deregulatory events.

We contribute to several strands of literature. First, we contribute to the literature on spatial variations in intergenerational mobility and its underlying drivers. This literature suggests that intergenerational mobility is driven by genetic, locational and educational factors (Corak, 2013; Blanden, 2013; Chetty 2014a, 2014b). We augment this literature by presenting results, which suggest that there is a causal link between the prevailing financial environment where individuals reside during early adulthood and subsequent intergenerational mobility.

[1] Chetty et al. (2017) find that the proportion of children with incomes exceeding that of their parents declined from approximately 90% for those born in 1940 to approximately 50% for individuals entering the labor market at the time the study was published.

Second, we complement a voluminous literature linking finance and financial development to the level and distribution of individual and aggregate income (Levine, 1997, 2005; forthcoming; Cettorelli, 2019) as well as the research regarding the effects of financial environment on economic opportunities for the disadvantaged (Solon, 1999; Levine, 2008; Kpodar and Singh, 2011; Aaaronson et al., 2021). The results of the present study suggest that the financial environment plays a crucial role in determining the evolution of incomes across generations by enhancing educational and entrepreneurial opportunities for those individuals at the lowest end of the income distribution.

Third, we contribute to the vast literature on the real economic effects of the staggered US banking industry deregulation that occurred from 1994 onwards (Berger et al., 2020, forthcoming). These effects are associated with: increases in the quantity and quality of innovation (Cornaggia et al., 2015; Amore et al., 2013); reducing volatility in state-level incomes (Morgan et al., 2004); interstate trade (Michalski and Ors, 2012); bank valuation (Brook et al., 1998); reduced labour market imperfections (Kneer, 2013); increased home ownership (Tewari, 2014); increased entrepreneurship (Rice and Strahan, 2010); and reduced income inequality (Beck et al., 2010). We find that in addition to these aforementioned effects, banking industry deregulation also plays an important role in driving the intergenerational mobility of individuals at the lower end of the income distribution.

The remainder of the paper is structured as follows. Section 2 provides a discussion of relevant literature regarding intergenerational mobility in the United States. In Section 3, we describe our data and empirical strategy. Section 4 presents the results of our baseline model along with several robustness checks. Section 5 proposes and tests possible underlying mechanisms between the financial environment and intergenerational mobility. Section 6 concludes.

2. Literature

Intergenerational mobility can be measured using a variety of methods, which capture the links between the socio-economic status (measured by level of education, income, occupation, social class) of parents and their respective offspring. Persistence in socio-economic status from one generation to the next implies limited or no intergenerational mobility. Income mobility (the form of mobility examined in the present study) can be measured by the: intergenerational elasticity of income (derived from the slope coefficient from an estimable regression model that estimates the relationship between the logarthim of parent and child incomes); intergenerational correlation (measured by the Pearson correlation coefficient between the logarithm of child and parental incomes); and rank correlation (measured by the correlation coefficient between the relative rank of child income and the relative rank of parental income within the prevailing income distribution of a respective generation).[2]

The US has traditionally been characterised as the *land of opportunity*, which provides poorer individuals with a significant chance of climbing up the income, education and social ladder. Early US research was inhibited by a lack of accurate data, compounded by high levels of immigration during the 19th and 20th centuries, which led to frequent and signficant changes in the composition of the population at both national, state and local level. Moreover, the absence of accurate data linking the socio-economic status of parents to offsping prevented researchers from accurately measuring intergenerational mobility. Consequently, early research on intergenerational mobility is based on historical narratives, theoretical expositions and crude measures of occupational status (Foote and Hatt, 1953; Hauser et al.,1975; Becker and Tomes, 1979).

Improvements in data and econometric approaches allowed researchers to examine intergenerational mobility over the longer term. Guest et al. (1989) investigate US post-World War II intergenerational mobility relative to intergenerational social mobility prevailing in the 19th century. The authors find that intergenerational mobility is more pronounced in the second half of the 20th century relative to the 19th century. Aaronson and Mazumder (2008) examine trends in US intergenerational mobility over the period 1940 to 2000, using the Integrated Public Use Microdata Series from the decennial censuses. Intergenerational income elasticities are derived for each decade of the sample period. The results suggest that intergenerational mobility increased during the post-war period, but then decreased in the decades after 1980. Chetty et al. (2017) find that rates of income mobility declined for children born in 1980s. Hilger, 2015 draws similar conclusions with respect to educational mobility. Song et al. (2020) utilise data on five million linked household and population records from 1850 to 2015 to document long-term trends in US intergenerational social (occupational) mobility. The authors find that intergenerational mobility declines during the sample period, with most of the change taking place prior to 1900. Davis and Mazumder (2024) show that relative US intergenerational mobility declined for cohorts of individuals born in the early 1960s, relative to counterparts born around 1950.[3]

Recent research exploits detailed administrative data to investigate intra-country variations in intergenerational mobility. Chetty (2014a) utilises a large dataset of individual federal tax returns of 40 million children and their parents covering the period 1996 through 2012. The authors use the rank correlation approach to measure intergenerational income mobility. They find substantial spatial variation in intergenerational mobility, which is correlated with residential segregation, income inequality, quality of educational provision, the level of social capital and the structure of family units. Chetty and Hendren (2018a) find that so-called neighborhood exposure effects play a crucial role in determining the extent of intergenerational mobility. Specifically, the authors find that a child's future adult income increases with every year spent growing up in a higher income neighborhood. In a companion study, Chetty and Hendren (2018b) investigate the impact of growing up in a specific US county on children's income in adulthood. In

[2] Jäntti and Jenkins (2015), Mitnik et al. (2015) and Deutscher and Mazumder (2021) provide a detailed discussion on the relative merits of various intergenerational mobility measures.

[3] Other notable contributions investigating intergenerational socio-economic mobility over the long run include: Solon (1992); Zimmerman (1992); Mazumder (2005); Aaronson and Mazumder (2005); Hertz (2007); Lee and Solon (2009); and Justman and Stiassnie (2021).

Table 1
Descriptive statistics (for ages 18–21).

	Obs	Mean	Std. dev	Min	Max	Description	Source
Dependent Variable							
Intergenerational Mobility	9388	45.64	5.09	30.77	71.08	Expected income rank at age 26.	Chetty et al. (2018)
Deregulation Variable							
$\overline{DREG}_{18-21}$	9674	2.08	1.41	0	4	Average banking competition index (0–4) during early adulthood (ages 18–21).	Rice and Strahan (2010) & Berger et al. (2023)
Demographic Variables							
Income	9674	27.34	6.99	0	105.23	Personal income per capita ($ thousands).	Unites States Census Bureau & Bureau of Economic Analysis
Poverty	9674	13.23	5.69	2.20	50.07	Percentage of people under poverty.	Unites States Census Bureau
Education	9674	6.86	4.04	0.61	46.75	Percentage of people with less than high school education.	Unites States Census Bureau
Crime	9674	0.32	0.27	0	3.16	Violent crime per capita.	Unites States Census Bureau
Hispanics	9674	7.11	11.95	0.24	98.00	Percentage of people with Hispanic origin.	Unites States Census Bureau
Blacks	9674	9.73	13.56	0.01	81.28	Percentage of people with Black origin.	Unites States Census Bureau

Table 2
Banking deregulation and intergenerational mobility.

	The dependent variable is intergenerational mobility				
	(1)	(2)	(3)	(4)	(5)
$\overline{DREG}_{18-21}$	0.3634***	0.3621***	0.3437***	0.3740***	0.3612***
	(0.0930)	(0.0930)	(0.0929)	(0.0944)	(0.0940)
Income		−0.0153			0.0323
		(0.0320)			(0.0328)
Poverty		−0.0049			0.0467
		(0.0524)			(0.0519)
Education			−0.3858***		−0.3458***
			(0.0638)		(0.0756)
Crime			−0.8319**		−0.8885**
			(0.3970)		(0.4055)
Blacks%				0.0155	0.0430
				(0.0578)	(0.0582)
Hispanics%				−0.2484***	−0.1428**
				(0.0566)	(0.0614)
County FEs	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
R-sq.	0.888	0.888	0.889	0.888	0.889
Observations	9388	9388	9388	9388	9388

Notes: This table presents the estimation results investigating how the banking industry environment ($\overline{DREG}_{18-21}$) prevailing during the early adult years (18–21) of disadvantaged individuals influences intergenerational mobility. The units of analysis are US counties. All regressions include our controls explained in Section 3.4, as well as county and year fixed effects. Variables descriptions are provided in Table 1. The estimations include a constant term which is omitted for space considerations. Standard errors clustered at the county level are in parentheses. *, ** and *** denote that a coefficient is statistically significant at 10 %, 5 % and 1 %, respectively.

order to do so, the authors use children's ranks in the income distribution at age 26 using data for all children born between 1980 and 1986. The authors find that for children growing up in low-income households, each year of exposure to living in a better county increases income in adulthood by 0.5 %. Better outcomes are observed in US counties with lower poverty, lower crime, less income inequality, better educational opportunities and a traditional family structure. Overall, the findings of these fine-grained spatial analyses using large administrative datasets suggest a role for active place-based policies designed to invest in areas where there are less economic opportunities. Home ownership can also potentially influence intergenerational income mobility via the provision of imputed rent as non-monetary income (Alexeev, 2020) and less financial strain on families, which allows for more investment in education and other opportunities for children (Garbinti and Savingnac, 2021).

While prior research provides valuable evidence regarding the various socio-economic and locational factors driving intergenerational mobility, the role of the financial system has been somewhat neglected. This is somewhat surprising given the scale, scope and

Table 3
Banking deregulation and intergenerational mobility.

	The dependent variable is intergenerational mobility		
	(1)	(2)	(3)
$\overline{DREG}_{18-21}$	0.3626***	0.3768***	0.3769***
	(0.0943)	(0.0943)	(0.0943)
$\overline{DREG}_{14-17}$	0.0358		0.0187
	(0.0502)		(0.0508)
$\overline{DREG}_{22-25}$		−0.1504	−0.1435
		(0.0935)	(0.0949)
Controls 18–21	Yes	Yes	Yes
Controls 14–17	Yes	No	Yes
Controls 22–25	No	Yes	Yes
County FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
R-sq.	0.889	0.889	0.889
Observations	9388	9388	9388

Notes: This table presents the estimation results investigating how the banking industry environment prevailing either during the adolescence ($\overline{DREG}_{14-17}$) or the early adult years ($\overline{DREG}_{18-21}$) or later adulthood years ($\overline{DREG}_{22-25}$) of disadvantaged individuals influences intergenerational mobility. The units of analysis are US counties. All regressions include our controls explained in Section 3.4 for all referenced periods. Variables descriptions are provided in Table 1. Moreover, the model includes county and year fixed effects. The estimations include a constant which is omitted for space considerations. Standard errors clustered at the county level are in parentheses. *, ** and *** denote that a coefficient is statistically significant at 10 %, 5 % and 1 %, respectively.

Table 4
Banking deregulation and intergenerational mobility.

	The dependent variable is intergenerational mobility				
	(1)	(2)	(3)	(4)	(5)
$\overline{DREG}_{(ALTERNATIVE)}$	0.7094***	0.7065***	0.6426***	0.7283***	0.6763***
	(0.2357)	(0.2367)	(0.2360)	(0.2365)	(0.2376)
Income		−0.0171			0.0300
		(0.0321)			(0.0330)
Poverty		−0.0131			0.0384
		(0.0526)			(0.0522)
Education			−0.3866***		−0.3443***
			(0.0642)		(0.0761)
Crime			−0.8118**		−0.8635**
			(0.3962)		(0.4045)
Blacks%				0.0108	0.0382
				(0.0575)	(0.0580)
Hispanics%				−0.2459***	−0.1411**
				(0.0569)	(0.0617)
County Fes	Yes	Yes	Yes	Yes	Yes
Year Fes	Yes	Yes	Yes	Yes	Yes
R-sq.	0.888	0.888	0.889	0.888	0.889
Observations	9388	9388	9388	9388	9388

Notes: This table presents the estimation results investigating how the banking industry environment ($\overline{DREG}_{(ALTERNATIVE)}$) prevailing during the early adult years (18–21) of disadvantaged individuals influences intergenerational mobility. The units of analysis are US counties. All regressions include our controls explained in Section 3.4 as well as county and year fixed effects. Variables descriptions are provided in Table 1. The estimations include a constant term which is omitted for space considerations. Standard errors clustered at the county level are in parentheses. *, ** and *** denote that a coefficient is statistically significant at 10 %, 5 % and 1 %, respectively.

significance of the financial services industry in providing liquidity and capital for households, SMEs, and corporates, as well as prior evidence which suggests that finance plays an important role in driving both the quantity and quality of tangible and intangible investments and economic growth (Levine, 1997, 2005, 2021; forthcoming; Beck et al., 2023). Moreover, prior evidence also suggests that the reduction in market imperfections and more efficient allocation of capital flowing from the development of the financial system disportionately increases the incomes of the poor, leading to a decline in income inequality (Beck et al., 2007; Levine, 2008). In other words, finance can help ease credit contraints and provide much needed funding for productive investments. Thus improving the incomes of the less well off in society.

Indeed, there is a substantive evidence base, which suggests that the deregulation of the US banking industry (the setting for the

Table 5
Banking deregulation and intergenerational mobility.

	The dependent variable is intergenerational mobility	
	(1) Deregulation variable reallocation	(2) States reallocation
$\overline{DREG}_{(PLACEBO)}$	0.0610	0.0223
	(0.0398)	(0.0702)
Income	0.0285	0.0286
	(0.0330)	(0.0331)
Poverty	0.0416	0.0434
	(0.0517)	(0.0519)
Education	−0.3535***	−0.3667***
	(0.0758)	(0.0757)
Crime	−0.7433*	−0.7481*
	(0.4010)	(0.4026)
Blacks%	0.0157	0.0222
	(0.0576)	(0.0571)
Hispanics%	−0.1392**	−0.1296**
	(0.0629)	(0.0620)
County FEs	Yes	Yes
Year FEs	Yes	Yes
R-sq	0.889	0.889
Observations	9388	9388

Notes: This table presents placebo estimation results investigating how the banking industry environment ($\overline{DREG}_{(PLACEBO)}$) prevailing during the early adult years (18–21) of disadvantaged individuals influences intergenerational mobility. The first test reallocates the deregulation index among states in a random fashion, while maintaining its original empirical distribution. The second reallocates states randomly by matching them with deregulation values of other states in the same year. All regressions include our controls explained in Section 3.4 as well as county and year fixed effects. Variables descriptions are provided in Table 1. The estimations include a constant term which is omitted for space considerations. Standard errors clustered at the county level are in parentheses. *, ** and *** denote that a coefficient is statistically significant at 10 %, 5 % and 1 %, respectively.

present study), and subsequent increases in bank competition and efficiency brought about increases in economic growth (Jayaratne and Strahan, 1996; Berger and Sedunov, 2017). This deregulation brought significant benefits to households via: greater home ownership (Tewari, 2014); increased incomes, especially for females and non-white minorities (Demyanyk, 2008; Levine et al. 2014); reduced income inequality (Beck, Levine, and Levkov, 2010); greater educational opportunities and improved mental health outcomes (Hu et al. 2019). In a recent contribution, and in a similar vein to the present study, Aaronson et al. (2021) examine the impact of finance on intergenerational mobility. In order to do so, the authors investigate whether the lack of finance in areas subject to so-called red-lining (by the Home Owners Loan Corporation during the 1930s) had an impact on the socio-economic outcomes of individuals that grew up in these areas four decades later. The authors find that the actions taken by the Homeowners Loan Corporation had a significant long lasting negative impact on the socio-economic outcomes of birth cohorts of individuals in the late 1970s and early 1980s.[4]

Bank competition during young adulthood is particularly salient, given that this life stage often marks the beginning of individuals' engagement with the financial system, significantly impacting their future economic behaviors and outcomes. Early adulthood is when many individuals first open bank accounts, take out loans, and begin to manage personal finances independently. Increased bank competition during this period can lead to better access to financial services, lower costs, and improved financial literacy, which are crucial for establishing sound financial habits. For instance, Celerier and Matray (2019) emphasize that an increased bank branch presence in local markets provides easier access to banking services. This enhances financial inclusion and wealth accumulation particularly for low-income and minority populations. This access to banking services during young adulthood can prevent financial exclusion and promote economic stability in the long term. Moreover, earlier financial inclusion has long-term benefits. Friedline and Rauktis (2014) highlight that opening a savings account at a young age extends financial inclusion and prevents unbanked or underbanked status later in life.

Engaging with financial institutions early in life can lead to continued relationships with mainstream banking and improved financial outcomes. Stein and Yannelis (2020) provide evidence that early exposure to financial services through competitive banking environments can reduce racial and gender gaps in entrepreneurship by improving access to credit and reducing discrimination. This is particularly important for young adults from minority and low-income backgrounds who are disproportionately represented among the unbanked and underbanked (FDIC, 2015).

A separate branch of literature investigates the role of credit constraints, investment in human capital and socio-economic outcomes between generations. Early evidence suggests that financial constraints are an important drag on intergenerational mobility,

[4] Lukes and Cleveland (2021) complement these findings to show that schools located today in areas that were redlined have less spending per-pupil, less diverse student populations, and inferior examination results relative to areas not subject to redlining.

Table 6
Banking deregulation and the intergenerational mobility-education channel.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age:	18<=&<=19	18<=&<=20	18<=&<=21	18<=&<=22	18<=&<=23	18<=&<=24	18<=&<=25
Panel A: Individuals from the bottom 25 % of income distribution							
Dependent variable:	Years of education						
$DREG_{EDUC}$	0.0877**	0.0704**	0.0723**	0.1004***	0.0858***	0.0811***	0.0578**
	(0.0405)	(0.0288)	(0.0303)	(0.0263)	(0.0262)	(0.0243)	(0.0276)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq.	0.140	0.143	0.156	0.148	0.150	0.139	0.127
Observations	1792	2725	3697	4596	5495	6307	6994
Panel B: Individuals with incomes up to the sample average							
Dependent variable:	Years of education						
$DREG_{EDUC}$	0.0149	0.0229	0.0259	0.0420**	0.0292	0.0280	0.0159
	(0.0268)	(0.0188)	(0.0203)	(0.0192)	(0.0206)	(0.0206)	(0.0190)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq.	0.128	0.129	0.145	0.157	0.160	0.163	0.160
Observations	4351	6492	8756	11,019	13,403	15,760	18,002
Panel C: Educational choices of young individuals							
Dependent variable:	High School Graduate	College Enrolment	Two-Year College	College Graduate			
$DREG_{EDUC}$	0.0198***	0.0116	0.0034	0.0004			
	(0.0063)	(0.0071)	(0.0060)	(0.0036)			
Year FEs	Yes	Yes	Yes	Yes			
State FEs	Yes	Yes	Yes	Yes			
R-sq.	0.088	0.104	0.106	0.076			
Observations	6994	6994	6994	6994			

Notes: This table presents the estimation results investigating how competition in the banking industry ($DREG_{EDUC}$) influences the educational attainment of disadvantaged individuals. Panel A presents results for a sample of young individuals aged 18 to 25 from households in the bottom 25 % of the income distribution, where the dependent variable is years of education. Panel B, expands the sample to include young individuals from households with incomes up to the sample's average, where again the dependent variable is years of education. Panel C presents results based on clearly defined levels of educational attainment. *High school graduate* is a binary variable, set to one if an individual has completed at least 12 years of education, and zero otherwise. *College enrolment* is also a binary variable, set to one for individuals who have pursued more than 12 years of education. *Two-year college* is equal to one for those who have achieved 14 or more years of education, while *College graduate* is set to one for individual with at least 16 years of education. The analysis focuses on young individuals aged 18 to 25 from households within the bottom 25 % of the income distribution. All regressions include individual and family-related controls as well as state and year fixed effects. Variables' descriptions are provided in Table 1 and Appendix 1. The estimations include a constant term which is omitted for space considerations. Standard errors clustered at the state level are in parentheses. *, ** and *** denote that a coefficient is statistically significant at 10 %, 5 % and 1 %, respectively.

especially for individuals from lower income households (Loury, 1981; Becker and Tomes, 1986). Specifically, financial constraints represent a significant barrier to the acquisition and accumulation of human capital when financially constrained parents or children are unable to secure the finance necessary to attend higher education (Solon, 2004). Consequently, leading to less intergenerational mobility for individuals from financially constrained families. Lochner and Monge-Naranjo (2011) develop a human capital model, which shows that over time, differences in educational attainment are increasingly dependent on family financial resources and access to government student loan programs. Brown et al. (2012) find that financial aid can increase educational attainment amongst poorer children, where parents tend to underinvest in their offspring's education. Therefore, credit constraints are likely to influence economic opportunities, and intergenerational mobility rates. Han and Mulligan (2001) find that intergenerational mobility is lower amongst non-borrowing constrained families. Individuals with higher ability are more likely to be related to higher ability (potentially wealthier) parents, and therefore, the optimal level of investment on skills development is higher.[5]

3. Data & empirical strategy

In this section, we first describe our deregulation and intergenerational mobility measures. We then outline our model specification used to examine the relationship between the aforementioned variables. Finally, we discuss the sources of data and present summary statistics pertaining to the variables used in our empirical analysis.

[5] Bratsberg et al. (2007) find that for Nordic countries (such as Norway, Denmark and Finland) with more egalitarian education systems exhibit higher intergenerational mobility.

Table 7
Banking deregulation and intergenerational mobility-entrepreneurship channel.

	The dependent variable is	
	Business debt (1)	Business equity (2)
$DREG_{(ENTR)}$	0.0027**	0.0023**
	(0.0010)	(0.0011)
Wealth	−0.0498	0.0998**
	(0.0432)	(0.0411)
Permanent Wealth	−1.1502***	−1.1281***
	(0.1165)	(0.0992)
Debt	0.2285***	0.3249***
	(0.0342)	(0.0288)
Number of Vehicles	0.0086***	0.0143***
	(0.0012)	(0.0014)
Number of Persons	0.0002	0.0017*
	(0.0006)	(0.0010)
Sex	−0.0066***	−0.0122***
	(0.0012)	(0.0017)
Education	0.0034	0.0090***
	(0.0030)	(0.0030)
Hispanic Household	−0.0035*	−0.0071**
	(0.0021)	(0.0033)
Race	−0.0065***	−0.0118***
	(0.0016)	(0.0023)
Marital Status	−0.0055***	−0.0090***
	(0.0018)	(0.0022)
Year FEs	Yes	Yes
State FEs	Yes	Yes
R-sq	0.078	0.057
Observations	83,546	83,546

Notes: This table presents the estimation results investigating how the banking industry environment ($DREG_{(ENTR)}$) prevailing during the early adult years (18–21) of disadvantaged individuals influences entrepreneurship. The units of analysis are US households. All regressions include individual and family-related controls as well as county and year fixed effects. Variables descriptions are provided in Table 1. The estimations include a constant term which is omitted for space considerations. Standard errors clustered at the state level are in parentheses. *, ** and *** denote that a coefficient is statistically significant at 10 %, 5 % and 1 %, respectively.

3.1. Research setting and deregulation measure

Historically US banks were geographically restricted by statute. However, during the 1970s and 1980s states gradually relaxed restrictions on statewide branching and out-of-state bank acquisitions. This geographic deregulation trend culminated in the passing of the 1994 Interstate Banking and Branching Efficiency (IBBEA) Act, which formally legalized statewide branching and interstate banking (Berger et al., 1995; Spong, 2000; DeYoung, 2019; Schneider et al., forthcoming). However, states retained the right to impose restrictions to limit interstate branching. Specifically, the IBBEA allowed states to restrict the entry of out-of-state branches by imposing restrictions or prohibitions on: de novo interstate branching; the minimum age of the target institutions for acquisitions; acquisitions of an individual branch or a portion of an institution; and any branch acquisition of in-state banks that held more than 30 % of the deposits in that state. States adopted (if at all) different combinations of these aforementioned restrictions leading to differences in competition facing banks across states. Indeed, Johnson and Rice (2008) document that the interstate branching deregulation increased the number of out-of-state bank branches and competition within states.

At this point, it's worth noting that the 1994 Interstate Banking and Branching Efficiency (IBBEA) Act was driven primarily by regulatory and policy considerations, rather than macroeconomic conditions. If this was the case, it would raise endogeneity issues. While macroeconomic conditions may have influenced the broader political and economic context in which the IBBEA was passed, prior evidence suggests that the act itself was not a direct response to macroeconomic conditions. For instance, Celerier and Matray (2019) suggest that the timing of interstate banking deregulation was independent of state-level macroeconomic variables such as unemployment and GDP per capita. In the same vein, Kroszner and Strahan (1999) find no effect of bank failure rates on the timing of state-level bank deregulation.

The IBBEA provides a natural setting for identifying whether changes in the competition facing banks affect intergenerational mobility. Using information on these aforementioned restrictions (and following Rice and Strahan, 2010; Favara and Imbs, 2015; and Berger et al., 2020) we construct a deregulation index.[6] The value of the index ranges between zero and four (zero if a state implements

[6] We thank Allen Berger for sharing an updated list of state statutes pertaining to restrictions on interstate branching stemming from IBBEA that allows us to construct our index until 2011.

all the restrictions and four if a state does not implement any of the restrictions) to capture each dimension of state-level branching restrictions. In other words, higher values of the index imply fewer restrictions on the entry of out-of-state branches, and more intense competition among banks in a state.

Given that we are interested in the impact of deregulation induced bank competition on intergenerational mobility, we measure the competitive environment facing banks as the average deregulation index during each birth cohort's (1980–1986) early adulthood (18–21 years old), which we denote $\overline{DREG}_{18-21}$. For example, the measure of deregulation induced bank competition at age 18–21 for the 1980 birth cohort is computed by averaging the deregulation index in each state over years 1998–2001. We focus on early adulthood, given that this is the period when individuals graduate from school and/or take important decisions regarding their career. Nevertheless, in robustness checks, we also calculate the $\overline{DREG}$ variable by calculating the average deregulation index over different periods of an individual's life.

3.2. Intergenerational mobility measurement

Intergenerational mobility examines the relationship between parents' income and the earnings of their children. In other words, it studies the joint distribution of parent and child income. In prior research, this relationship has been used as a basis for measuring intergenerational mobility via intergenerational elasticity estimates (IGE) derived from regressing the log of child income on the log of parent income.[7] However, Chetty (2014a) contend that this log-log specification fails to account for children with zero income, and any non-linear relationships between the log child income and log parent income.

To address this bias, the authors suggest using a rank-rank specification instead. In this approach children from the same birth cohort are ranked according to their income at age 26, and their parents are ranked similarly based upon their incomes. Chetty (2014b), demonstrate that the relationship between the income ranks of parents and children is approximately linear both nationally and locally. Leveraging this linearity, one could use the linear relationship's intercept and slope to estimate a child's expected income rank given their parents rank.

Based on this approach regressing the income ranks of children on those of their parents yields slope and intercept coefficients, which Chetty and Hendren (2018b) use to calculate the absolute income mobility within counties at any given percentile p.[8] In the present study, we utilize this absolute intergenerational income mobility measure at the county level. Specifically, we focus on the expected income rank of a child at age 26 given their parents' income within the 25th percentile of the national income distribution.

3.3. Empirical strategy

To investigate whether the interstate banking deregulation commencing in 1994 and the resultant competition in the banking industry impacts the intergenerational mobility of individuals in birth cohorts covering the period 1980–1986, we employ the following model.

$$Mobility_{c,s,t} = \delta \overline{DREG}_{18-21,s,t} + \beta \overline{X}_{c,s,t} + a_c + \gamma_t + \varepsilon_{c,s,t} \quad (1)$$

where $Mobility_{c,s,t}$ measures the intergenerational mobility in county c and state s, for adults turning 26 at year t (t ∈ 2006–2012). For example, the mobility measure for county c in 2006 reflects the mobility of the 1980 cohort in that county (the earliest cohort in our sample), whereas the outcome variable for county c in 2012 reflects the mobility of the 1986 birth cohort (the latest cohort in our sample). $\overline{DREG}_{18-21,s,t}$ denotes the average value of the deregulation index for each birth cohort's in state s during early adulthood (18–21 years old). $\overline{X}_{18-21,c,s,t}$ is a vector of county characteristics (control variables) that vary over time and across counties and includes: the (log) of median household income, poverty rate, the percentage of residents without a high school diploma at the age of 25 or older, and the percentage of Hispanics and African-Americans residing in a particular county. The vector contains for each birth cohort, the average values of these baseline control variables during early adulthood (18–21 years old). The model includes county specific fixed effects, a_c, to control for unobserved time invariant county level heterogeneity, such as geographic and climatic characteristics. Year fixed effects, γ_t, are also included to account for time effects common to all counties.[9] $\varepsilon_{c,s,t}$ is a stochastic error term. We estimate Eq. (1) via Ordinary Least Squares (OLS) with standard errors clustered at county level to account for serial correlation within counties (Bertrand et al., 2004).[10] The parameter of interest is δ, which captures how (deregulation induced) bank competition in a

[7] For a review see Solon (1989, 1999, 2002) and Becker and Tomes (1986).

[8] Chetty and Hendren (2018a) calculate intergenerational mobility by first estimating the following equation: $\text{Childinc}_{i,j} = \delta_j + \gamma_j \text{Parinc}_{i,j} + \varepsilon_{i,j}$. $\text{Childinc}_{i,j}$ shows the national income rank of child i among offsprings in their birth cohort who grew up in county j and $\text{Parinc}_{i,j}$ represents the corresponding rank for their parent in the income distribution of parents. Intercepts (δ_j) are measured on a 0–100 scale and slopes (γ_j) on a 0–1 scale. They next solve the equation $\rho_{i,j} = \delta_j + 25 \times \gamma_j$ (the intercept + 25 × rank-rank slope) in order to find the absolute income mobility for children from families at the 25th percentile of the national parent income distribution. For more details see Chetty and Hendren (2018a, 2018b) and Chetty et al. (2014b).

[9] The year fixed effects can be considered as cohort fixed effects, corresponding to the 26th year of each cohort in our sample (1980-1986).

[10] We opt to include clusters and fixed effects at the same (county) level in order to reduce the intra-cluster correlations (MacKinnon et al., 2023). In unreported regressions, we also cluster at the commuting zone level (geographic areas that consist of one or more counties with common labor markets) and metropolitan statistical areas (MSAs). The results are similar as in section 4.

given state *s* impacts intergenerational mobility.

3.4. Data and summary statistics

In Table 1 we present descriptive statistics for the deregulation and mobility variables, and other covariates used in our estimable baseline model. Definitions and summary statistics of variables used in robustness checks and in subsequent sections are presented in Supplementary Material Appendix 1. Our mobility measure ranges between the 30th and 70th percentile, suggesting a significant variation in intergenerational mobility across birth cohorts and space. According to maps constructed by Chetty and Hendren (2018b), some states such as South Carolina experience consistently low rates of intergenerational mobility. In other states including Texas, New Mexico, California, Colorado, there is significant heterogeneity in intergenerational mobility. Similar to the outcome variable, $\overline{DREG}_{18-21}$ also exhibits high variation since it captures the whole range of deregulation values, i.e., from 0 to 4. Figure A.2.1 in Supplementary Material Appendix 2 illustrates the geographic distribution of the banking deregulation for two different cohorts - those born in 1980 and 1986, during the years they were aged 18 to 21. As of 1998, when individuals from the first cohort turned 18, ten states had a fully deregulated banking sector. The peak of the deregulation activity occurred between 1997 and 2002. By the end of our observation period in 2007, a total of 13 states had fully deregulated banking sectors. Concurrently, 15 states continued to enforce three of the restrictions mandated by the IBBEA. Notably, eight midwestern states had yet to initiate any bank deregulation. This suggests that there are individuals included in our sample that spent their early adulthood years in counties within states with regulated banking environments, and others where the banking environment was fully deregulated.

We define our income per capita control variable as the ratio of aggregate income to total population for each county. Our data includes counties with income per capita that ranges from 0 to more than $100,000.[11] This is a significant range considering that the median income according to the United States Census Bureau in the US in 2021 was $70,784. Moreover, poverty is measured by the fraction of the number of individuals below the poverty line threshold (which according to the United States Census Bureau is $35,801) divided by the number of residents in each county. Variation in poverty is considerable. Our sample includes counties with relatively low poverty, and other counties where more than 50 % of residents live under the poverty line. Furthermore, we define our education control variable as the proportion of individuals aged 25 years and over who have completed less than a 9th grade education. We define violent crime per capita as the number of violent crimes divided by the total number of residents in each county. The data show that our sample incorporates counties with a considerable variation of violent crime. We also control for the proportions of Hispanic and Black residents in a given county. Overall, our data suggest that our sample comprises an heterogenous socio-economic environment. Prior research has associated all the above variables with intergenerational mobility (Rothwell and Douglas, 2015; Sharkey and Torrats-Espinosa, 2017; Davis and Mazumder, 2018; Arenas and Hindriks, 2021), and therefore we employ them as control variables in our estimated regressions.

Correlation coefficient tables, which are reported in Table A.1.2, Appendix 1, show a statistically significant, albeit weak, linear relationship between the $\overline{DREG}$ and each of the control variables included in our model specifications. Notably, the correlation analysis highlights that $\overline{DREG}$ exhibits a positive correlation with income, but a negative correlation with poverty (Jayaratne and Strahan, 1996; Beck et al., 2010).

4. Results

In this section, we discuss the results (in Section 4.1) of estimating our baseline model investigating the impact of banking industry deregulation on intergenerational mobility. We also conduct further analyses (in Section 4.2) in order to assess the robustness of our main results to alternative specifications, definitions of banking competition, placebo tests, and other potential biases.

4.1. Baseline results

Table 2 presents the results of estimating the baseline model (Eq. (1)). Column 1 shows the impact of bank deregulation on intergenerational mobility. The coefficient on $\overline{DREG}_{18-21}$ is positive and statistically significant. This suggests an increase in intergenerational mobility takes place following the geographic deregulation that led to an increase in bank competition. Columns 2 through 4 augment the baseline specification by introducing various socio-demographic variables. Column 6 presents the results of a saturated model that includes a full set of control variables along with county and year fixed effects. The coefficient on $\overline{DREG}_{18-21}$ retains significance across all specifications.[12] Adults living in counties within states experiencing intense bank competition (i.e., where $\overline{DREG}_{18-21}$ equals 4) between the ages of 18- and 21-years old experience a 1.444 (0.361×4) point increase in their expected income rank at age 26. This increase is relative to counterparts residing in areas with less intense bank competition. Such an increase is

[11] A few counties in our sample were parts of larger census areas during 1990s and/or early 2000s (for instance, see Wrangell, Alaska). Since our data start from 1990, our data sources (Unites States Census Bureau and Bureau of Economic Analysis) consider the income of these counties for several years equal to zero.

[12] The findings from additional analyses, detailed in Supplementary Material Appendix 3, decompose the deregulation index and indicate that the relationship between bank competition and intergenerational income mobility is primarily driven by the removal of Minimum Age and Acquisition restrictions.

not only statistically significant, but also economically significant. Specifically, the size of the effect implies that the increase in bank competition when a state abolishes all relevant barriers to entry is associated with a (1.444/5.09=) 28.3 standard deviation increase in the expected income rank of offsprings whose parents are at the 25th percentile. To quantify this effect in monetary terms, we turn to the findings of Chetty and Hendren (2018b), which suggest that each percentile increase in income at age 26 corresponds to an average $818 for individuals whose parents were in the 25th percentile of income distribution. The increase of 1.444 percentiles results in a monetary benefit of approximately (1.444 x $818=) $1181. Considering that the average per capita income is $27,340, the benefit translates to 4.31 % more income for young adults residing in areas with a more competitive banking system relative to counterparts residing in areas characterized by lower levels of bank competition. This increase income underlines the significance of banking competition for individual financial outcomes.

The coefficients on our statistically significant control variables have the expected signs. Focusing on the saturated version of our baseline model, we find that individuals residing in areas with lower educational attainment experience lower rates of intergenerational mobility. This is in line with prior evidence, which finds a positive association between opportunities of schooling and intergenerational mobility (Arenas and Hindriks, 2021). Intergenerational mobility is also lower in areas characterized by higher levels of reported crime. Previous research also shows a negative and causal effect of neighborhood crime with intergenerational mobility rates (Sharkey and Torrats-Espinosa, 2017). Also in line with prior evidence, areas with a higher proportion of Hispanic residents exhibit less intergenerational mobility (Chetty and Hendren, 2018a, 2018b).

4.2. Robustness analyses

4.2.1. An instrumental variable approach

We also check that our findings are robust to the use of an instrumental variable approach.[13] In the spirit of Melki and Pickering (2020), we use the variable $DREG_{Neighbours,t-5}$, which is defined as the average deregulation index in the neighbouring states five years earlier. When neighbouring states implement banking deregulation, their experience provides a valuable point of reference and learning for state policymakers in proximate states. This learning process can motivate a state to pursue similar deregulatory actions.

Column 1 of Table A.4.1 in the Supplementary Material Appendix 4 reports the first stage regression results, where the dependent variable is the bank deregulation index $DREG_{18-21}$. The first-stage regression has a Kleibergen-Paap Wald F statistic of 38.45, exceeding the widely accepted threshold of 10. Thus, indicating that the chosen instrument is not weak. Column 2 reports the results of the second-stage regression whose dependent variable is intergenerational income mobility. The variable of interest in this regression is the fitted deregulation index obtained from the first-stage regression. The results confirm our main findings that the deregulation induced competition in the banking sector leads to an improvement in intergenerational income mobility.

4.2.2. Differences across the age distribution

The results of our baseline analysis suggest that intergenerational mobility is affected by prevailing banking competition during an individual's young adult life (18–21 years of age). One may argue that the benefits of a more competitive banking environment on income (and therefore intergenerational mobility) are felt at ages younger than 18 years old. For instance, Rothstein and Schanzenbach (2022) find that school finance reforms (designed to alleviate unequal and inadequate school funding at the local level) lead to increases in educational attainment and earnings, especially for black and female students. Equally, a more competitive banking environment could be conducive to economic growth. Thus also benefitting adults at later stages in live.

To investigate whether the impact of bank competition on intergenerational mobility is experienced by adults across the entire age distribution (or merely young adults), we compute measures of bank competition (i.e., $\overline{DREG}$) over various time periods in the lives of a given birth cohort. Specifically, we average the state-level deregulation index when: individuals belonging to a birth cohort are: between 14 and 17 years old ($\overline{DREG}_{14-17}$); and between 22 and 25 years old ($\overline{DREG}_{22-25}$). Table 3 presents the results of our baseline regression, augmented with these variables capturing bank competition at different stages of a cohort's lives. Neither of these variables enters any of the regressions with a statistically significant coefficient. Our main variable of interest $\overline{DREG}_{18-21}$ remains both statistically and economically significant across all specifications. These findings suggest that the impact of bank competition is important during the first years of adulthood.

4.2.3. Alternative measures of competition

Following Nguyen et al. (2018) we also test our hypothesis using a different measure of bank competition via $\overline{DREG}_{(ALTERNATIVE)}$. $\overline{DREG}_{(ALTERNATIVE)}$ is a variable indicating whether a state chooses not to adopt either the restriction for acquisition of individual branches by an out-of-state bank, or impose a deposit cap equal or less than 30 % on branch acquisitions. We adopt this narrower definition of bank competition on the basis that age, and de novo interstate branching are more likely to be circumvented by banks. To align with our main variable of bank competition, we average this alternative measure of bank competition for the years when the 1980–1986 birth groups are in their early adulthood (18–21 years old). The results presented in Columns (1) to (5) of Table 4 suggest that our results remain robust to using the alternative bank competition index. This confirms that interstate banking deregulation had a positive impact on the intergenerational mobility of poorer young people.

[13] We are grateful to an anonymous reviewer for recommending this approach and suggesting the appropriate type of instrument to use.

4.2.4. Other determinants of intergenerational income mobility

In this section, we examine the robustness of our baseline findings by considering additional potential determinants of intergenerational income mobility. We re-estimate our baseline specification to include several socio-demographic covariates calculated at the county level. These covariates include: home ownership, which captures the proportion of owner-occupied households to total occupied households; the Gini coefficient, which reflects income inequality; a composite index of social capital; migration percentages; and a set of variables measuring the importance of major religious groups. The results of these analyses are reported in Supplementary Material Appendix 5. Notably, the supplementary variables related to religion demonstrate a negative and highly significant impact on intergenerational mobility. This suggests that regions with higher religious adherence are associated with lower intergenerational mobility. However, our measures concerning home ownership, income inequality, social capital, and migration do not display a significant association with intergenerational mobility. Importantly, despite the inclusion of these additional controls, our primary variable of interest continues to exhibit a positive and significant impact on intergenerational mobility.

4.2.5. Omitted variable bias

4.2.5.1. Placebo analysis. Another potential concern relates to omitted variable bias. By using the difference-in-differences technique and controlling for all of our socio-demographic variables, as well as local and year fixed effects, this potential concern may be mitigated. However, if an omitted variable fluctuates with $\overline{DREG}$ (our main variable of interest), any observed heterogeneity in intergenerational mobility at the county level which we attribute to deregulation induced bank competition would be merely a correlation rather than a causal relationship. While the likelihood of such an omitted variable fluctuating every or most of the time states deregulate their banking industries is small, we nevertheless perform two distinct placebo tests following Berger et al. (2023). The first test involves the reallocation of the deregulation index among states in a random fashion, while preserving the enactment years. The second test preserves the treated states (those states that engaged in banking deregulation) but randomizes the enactment years. The results presented in columns 1 and 2 of Table 5 suggest that none of the placebo coefficients ($\overline{DREG}_{(PLACEBO)}$) are significant. This alleviates concerns that our results are driven by omitted variable bias.

4.2.5.2. Contiguous county-pair analysis. As a second approach to investigate whether any omitted variables may have affected our results of banking environment on intergenerational mobility, we employ a contiguous county-pair analysis (akin to Dube et al., 2010). In Supplementary Material Appendix 6, we restrict our sample of counties around the state borders. Considering that these counties may experience common socio-economic environment due to their geographic proximity, this may suggest that any observed differences of intergenerational mobility are likely to be driven by the banking deregulation. Reassuringly, our main variable of interest (shown in column 1 of Table A.6.2.) remains positive and significant. Thus, validating our baseline findings in Table 2. Nevertheless, caution is required when interpreting these results given the lack of available mobility data for a significant number of counties that are tangential to state borders.

5. Underlying mechanisms

In this section, we explore the possible mechanisms relating to education and entrepreneurship through which banking competition may impact intergenerational mobility.

5.1. Education

Prior research suggests that banking deregulation not only increases the supply of credit, but also significantly enhances college attendance (Sun and Yannelis, 2016). This expansion in credit allowed poorer households to make greater educational investments and enabled the next generation to attain the qualifications necessary for higher earning employment. Thus, driving intergenerational income mobility.

To assess whether bank deregulation facilitates increased educational opportunities, we collect information on individual educational attainment (measured by the actual grade of school completed) from the Panel Study of Income Dynamics (PSID). We restrict our sample to young adults for the period 1993 through 2012 (the last available year that we can calculate intergenerational mobility based on our 1986 birth cohort) whose family income lies in the lowest 25 % of the income distribution. The sample is augmented with additional data on individual and household characteristics.

To investigate whether banking deregulation affects education attainment for birth cohorts covering the period 1980 through 1986, we estimate the following model:

$$Education_{i,s,t} = \delta DREG_{(EDUC)s,t} + \beta X_{i,s,t} + \eta_s + \gamma_t + \varepsilon_{i,s,t} \quad (2)$$

where $Education_{i,s,t}$ denotes the educational attainment of individual i residing in state s in year t. $DREG_{(EDUC)s,t}$ denotes the banking environment. $X_{i,s,t}$ denotes individual and household covariates including age, sex, marital status, race of household head, household income, and home value. We also control for state η_s and year γ_t fixed effects. $\varepsilon_{i,s,t}$ is an idiosyncratic error term. Standard errors are

clustered at the county level.

The results presented in Panel A, Table 6, column 1 (focusing on young adults aged 18 and 19, indicate a positive and significant relationship between bank competition and educational attainment.[14] This suggests that education is an underlying mechanism in driving the relationship between banking industry deregulation and intergenerational mobility. To expand our understanding, we extend the analysis to include older individuals aged 21 to 25 years. The findings, presented in columns (2) to (7) suggest that young individuals whose family income lies in the lowest quartile of the income distribution consistently enjoy educational benefits following banking deregulation.

As a counterfactual analysis, we expand our sample further to include individuals with family income up to the mean of the income distribution. According to the coefficients in Panel B of Table 6, there appears to be no significant relationship between deregulation and educational outcomes for this group. These findings suggest that economically disadvantaged young adults are the primary beneficiaries of banking deregulation, in terms of educational outcomes. This is a significant finding, given prior US public policy interventions aimed at encouraging educational attendance among young individuals living in poverty.

We also conduct additional robustness checks where we restrict our sample to individuals in households where income is above the lowest 25 %, but below the sample average. The results presented in Appendix 7, Table A.7.1 are insignificant. This reinforces our findings that banking deregulation has particularly enhanced the educational prospects of young individuals at the lower end of the family income distribution.

Earning a high school diploma is generally recognised as a minimum requirement to accessing higher education and securing well-paid employment. It is well-documented that college graduates typically earn more than individuals without a college degree (Angrist and Chen, 2011; Lemieux and Card, 2001). Similarly, high school graduates tend to earn more than individuals failing to complete high school (Schweitzer, 1971; Card, 1999). We expand our analysis to explore the impact of banking deregulation on the educational choices of young individuals. We consider two scenarios. In the first, disadvantaged young individuals take advantage of new banking conditions to access the necessary financial resources to pursue higher educational study, such as college or post-graduate degrees. In the second scenario, young individuals from low-income families, who have not completed the mandatory US education of at least 12 grades take advantage of new banking conditions to meet this educational milestone. Our analysis considers young individuals aged between 18 and 25 from families in the lowest 25 % of the family income distribution.

The results, presented in Panel C of Table 6, indicate that banking industry deregulation significantly impacts mandatory education. However, it does not affect higher education choices such as college enrolment, college attendance or graduating with a degree.[15] We observe positive coefficients on the variable of interest in all cases, albeit none are statistically significant. These findings are of policy relevance, given that government agencies across the globe routinely implement programs designed to provide educational opportunities to individuals who failed to complete mandatory schooling in their formative years. Our findings augment prior research (Sun and Yannelis, 2016), which suggests that the banking deregulation of the 1970s and 1980s positively influenced college attendance. In the present study, our findings highlight that banking industry deregulation increased the opportunity for disadvantaged young individuals to pursue mandatory education, leading to future economic advancement.

5.2. Entrepreneurship

Prior literature suggests that access to finance can constrain the entrepreneurial opportunities of poorer individuals with little collateral and / or high fixed costs of borrowing. Moreover, improved access to credit can improve the entrepreneurial opportunities of poorer individuals disproportionately (Beck et al., 2010). Therefore, if higher bank competition alleviates credit constraints for disadvantaged individuals, this could lead to an increase in entrepreneurial activity. Indeed, Rice and Strahan (2010) find that firms trading in a geographic area where there is greater bank competition can borrow at lower rates of interest. Moreover, Li (2022) suggests that in states with higher bank competition, banks are more likely to finance the entrepreneurial endeavours of borrowers (in terms of gender and race). This is notable, given that minorities may experience higher frictions in education and labour markets, and lower intergenerational mobility rates. Consequently, entrepreneurship may act as an underlying mechanism in driving the relationship between banking competition and intergenerational mobility.

In order to test whether banking industry deregulation improves entrepreneurial opportunities, we collect micro data over the period 1993–2011 from the Survey of Income and Program Participation (SIPP). This dataset provides information on economic, social, and financial characteristics at the household level.[16] Each survey spans two to three years, during which time several waves of individuals within the same family are interviewed. Each survey wave comprises several modules including one covering the assets and liabilities of households, including business debt and business equity. In the current setting, we test whether banking industry deregulation after 1993 affected entrepreneurship via the following model:

$$Entrepreneurship_{i,s,t} = DREG_{(ENTR)s,t} + \beta X_{i,s,t} + \eta_s + \gamma_t + \varepsilon_{i,t} \quad (3)$$

[14] Complete results, including all control variables, are presented in Appendix 7 Table A.7.2

[15] We define “College enrolment” as 12 or more years of education. College attendance is proxied by “Two-year college” variable which is defined as 14 or more years of education. Finally, we capture individual with a college degree using the variable “College graduate” defined as 16 or more years of education.

[16] Due to confidentiality reasons, households are only matched to the states they belong to.

where $Entrepreneurship_{i,s,t}$ is a dummy variable that takes the value one if at least one member in the household increases her/his business debt. According to the SIPP database, the business debt is the total debt owed by a family member against all her/his businesses. This dummy variable refers to each household i in state s, and in year t. $DREG_{(ENTR)}$ is our main variable of interest, while $\overline{X}_{i,s,t}$ represents social and economic characteristics of the household i, including household wealth, debt, number of vehicles, and the number of household members. $X_{i,s,t}$ also include dummy variables capturing the sex (where female =1, and 0 otherwise), race (where non-white =1, and 0 otherwise), education (where high school or better educational attainment =1, and 0 otherwise) and marital status of the householder (where not married =1, and 0 otherwise).[17] We control for state (η_s) and year (γ_t) fixed effects, and cluster standard errors at the state level. $\varepsilon_{i,t}$ is an idiosyncratic error term for state i and year t. We also repeat the analysis by replacing business debt with household business equity. This is a dummy variable equal to one if at least one member of the household has business equity, and zero otherwise. Since our mobility measure refers to individuals from families at the 25th percentile in the national income distribution, we also restrict our business debt and equity data that refer to the bottom 25 % of wealthy households.[18] Our sample comprises 83,546 households over the period 1993–2011.

Table 7 presents our results. Column 1 suggests a positive and significant impact of banking industry deregulation on the likelihood of households having business debt. All control variables except household wealth, householder's education, and size of household enter the model with significant effects. Households with higher permanent wealth or Hispanic culture exhibit lower levels of business debt.[19] The same applies for households where the householder is either female or non-white or unmarried. Column 2 shows the same relationship with business equity. The coefficient of our main variable of interest is also positive and significant at the 5 % level. In this case, all control variables are significant and with the expected signs.[20]

6. Conclusion

For much of the 19th and 20th century, the United States was characterised as the *land of opportunity*, where successive generations had a significant chance of climbing up the income, education and social ladders. Prior evidence suggests that various socio-economic and locational factors play an important role in driving intergenerational mobility. However, to date, there is a paucity of evidence regarding the role of the financial system. In this paper, we fill this important evidence gap by investigating the importance of bank competition and the prevailing local financial environment on intergenerational mobility. In order to test our hypothesis that a change in state level bank competition (following geographic deregulation) affects the intergenerational mobility of individuals born to (poorer) families at the lower end of the income distribution, we estimate the effects of interstate banking on intergenerational mobility.

We construct a competition index at the local level for the United States when all cohorts from 1980 to 1986 were in their first adulthood years i.e., 18–21 years old. Then, we exploit intergenerational mobility data from Chetty and Hendren (2018b) for the same cohorts at 26 years old. Our estimations suggest a positive and significant effect of banking competition on intergenerational mobility. More specifically, our results suggest that young adults who spend their first adulthood years in a more competitive financial environment experience higher intergenerational mobility rate. Moreover, we find that education and entrepreneurship are significant links between banking competition and intergenerational mobility. Overall, our findings suggest that policies (such bank deregulation), which widen access to finance, increase opportunities for poorer individuals and ultimately feed through to intergenerational mobility.

Declaration of competing interest

We declare that there's no financial/personal interest or belief that could affect our objectivity and competing interests do not exist. We also declare that the article is the authors' original work, has not received prior publication and is not under consideration for publication elsewhere.

Data availability

Data will be made available on request.

[17] The householder is the family member in whose name the home in owned or rented. If the house is owned jointly by a married couple, either partner may be listed as the householder.

[18] Households' wealth is calculated in dollars (in millions) using information provided for all adults 15 or older in the household. The total amount is assigned to all household members regardless of age.

[19] Permanent wealth is total wealth minus assets held in banking and other institutions, mortgages, U.S. saving bonds, checking accounts, and other interest earning assets.

[20] In Supplementary Material Appendix 8, Table A.8.1, we also test whether deregulation affected both business debt and equity of households with wealth below the mean wealth of our sample, or between the 25th percentile and the mean. All results suggest that the banking industry deregulation affected the entrepreneurial outcomes of poorer individuals (in terms of wealth).

Acknowledgements

We would like to thank Luis Angeles, Barbara Casu, Evangelos V. Dioikitopoulos, George Dotsis, Claudia Girardone, Anna Sarkysian, Jose Linares Zegarra, Linh Nguyen and Daniel Oto-Peralias for their valuable insights. We also extend our gratitude to the participants at the EFIC 2018 Conference in Banking, Finance and Financial Econometrics at Essex Business School, University of Essex, the Financial Engineering & Banking Society (FEBS) conference at the National and Kapodistrian University of Athens in Athens, Greece, and CRETE 2023 Conference on Research on Economic Theory and Econometrics in Naxos, Greece, for valuable feedback. Additionally, we would like to thank Allen Berger for generously sharing his dataset on banking deregulation in the US. All remaining errors are of our own.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jebo.2024.106683.

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