Refined by Fire: The Great Depression and Entrepreneurship

Christos A. Makridis and Erin McGuire *

July 24, 2019

PRELIMINARY, COMMENTS WELCOME, click here for updates.

Abstract

Industrial production in the United States declined by 47 percent between 1929 and 1933. Motivated by the potential effects that the Great Depression may have had on family and habit formation, this paper quantifies how the severity of the Great Depression within a location may affect contemporaneous entrepreneurship rates. On one hand, a more severe decline in productivity could have persistent effects that adversely affect entrepreneurship today. On the other hand, a more severe decline could have prompted individuals growing up during the Great Depression to become more entrepreneurial and frugal, thereby influencing the values that they emphasized to their children. Consistent with the latter hypothesis, we find that a one percentage point increase in retail sales growth is associated with a 0.04 percentage point decline in entrepreneurship two generations later. Using the Panel Study of Income Dynamics, we explore the role of personal experience as a moderating factor, finding that individuals in areas more affected by the Depression are more financially sophisticated.

JEL: D14, L26, G11, G41.

Keywords: Entrepreneurship; Financial Literacy; Great Depression; Habit Formation.

*Christos: MIT Sloan, makridis@mit.edu, www.christosmakridis.com; Erin: Georgia Tech and NBER, erin@nber.org. These views are ours only and do not represent those of affiliated institutions or the United States. We thank Steve Strosko for excellent work with the Survey of Consumer Finance and thoughtful conversations earlier in our analysis.
1. Introduction

“My early life was relatively comfortable given that I grew up in the midst of the Great Depression and then World War II. By good fortune, my hometown of Teaneck, New Jersey was growing rapidly. I was too young to serve in the war. But, as I look back, there is no doubt that my father’s prominent position in local government had a huge impact on the way I view life and the world.” – Paul Volcker (2018).

Entrepreneurship is an important determinant of economic growth (Decker et al., 2016) and serves as the foundation for modern macroeconomic models of economic growth (Aghion and Howitt, 1992). While there is a larger literature about the cyclical determinants of entrepreneurship (Jovanovic, 2009; Koellinger and Thurik, 2012), this paper focuses on the long-lived effects of historical shocks on entrepreneurship moderated by the role of personal experience.

Motivated by an emerging empirical literature about the importance of personal experience on, for example, beliefs about inflation (Malmendier and Nagel, 2016), housing prices (Kuchler and Zafar, 2019), and macroeconomic activity (Malmendier and Nagel, 2011; Makridis, 2018), this paper exploits variation in the severity of the Great Depression across different locations to understand how large-scale financial shocks affect the prospects for future entrepreneurship. On one hand, a more severe experience could generate geographic scarring that limits future productivity. On the other hand, the Great Depression could alter habits around financial sophistication, prompting those who grew up during the Depression to endow their children with similar financial sophistication skills. Understanding the answer to this question highlights the behavioral factors that underpin entrepreneurship, which is particularly important in light of the decline in labor
market dynamism over the past few decades (Davis and Haltiwanger, 2015).

Using cross-sectional variation in retail sales growth and unemployment rates as primary measures of economic shocks, together with state and core business statistical area (CBSA) data on entrepreneurship rates from the Business Dynamics Statistics (BDS), we estimate the causal effect of historical Great Depression shocks on contemporaneous entrepreneurship. Our baseline identification strategy semi-parametrically controls for a wide array of demographic characteristics at the time of the Great Depression and more recently to address concerns about omitted variables bias. We find that a one percentage point rise in retail sales growth during the Great Depression is associated with a 0.04pp decline in establishment entry and reallocation rates. Moreover, these effects on entrepreneurship are concentrated in years that are most likely to contain individuals who grew up with parents who experienced the Great Depression.

To assess whether our elasticities reflect genuinely causal estimates, we employ an instrumental variables strategy. We exploit plausibly exogenous variation in the timing of weather fluctuations, specifically changes in drought conditions leading up to the Great Depression across locations. By generating variation in agricultural productivity through these random fluctuations in weather leading up to the Depression, we compare areas that were more susceptible to declines in economic activity. Whereas demand for manufacturing goods and services were highly elastic, demand for agriculture was less so, meaning that areas that experienced declines in agricultural productivity in the run-up of the Depression were more exposed to the subsequent economic decline.

To isolate the mechanism behind these effects, we finally turn to microdata from the Panel Study of Income Dynamics. First, we find that parental investments in children have economically and statistically significant effects on their future financial behavior. Second, we show that individuals residing in states that were harder hit by the Great Depression are more likely to save,
hold more liquid assets, own a home, and hold more equity. We present evidence that the changes in investment due to these economic shocks are passed down over generations, driving the long run impact on local entrepreneurship rates. These differences are not driven by demographic factors at either an individual or geographic level, but rather the transmission of human capital across generations through the role of personal experience.

These results add to an emerging series of empirical results highlighting the role of personal experience in forming beliefs about inflation (Malmendier and Nagel, 2016), housing prices (Kuchler and Zafar, 2019), macroeconomic activity (Malmendier and Nagel, 2011; Makridis, 2018), asset prices (Malmendier et al., 2018), and consumption (Malmendier and Shen, 2018). Our paper most closely builds upon Malmendier and Nagel (2011) — who found that individuals growing up during the Great Depression are less likely to invest in the stock market — by showing that large-scale historical shocks can also generate effects for contemporaneous aggregate outcomes by influencing the habits of those exposed to the shock and their subsequent transmission of those habits. Our results are also closely related with Babina and Berger (2019) who find that bank distress during the Great Depression reduces the local supply of entrepreneurs by 1.3 percentage points per decade between 1930 and 2010. Unlike our paper, however, they focus on banking shocks, whereas we focus on productivity shocks; banking shocks could differ because a removal of credit prevents the revitalization of business following a contraction.

Our paper is also related to two additional literatures. The first focuses on the economic history of the Great Depression and its long-lived effects. Perhaps most notably, Fishback et al. (2005) examines how relief and public works spending and payments to farmers affected retail consumption between 1933 and 1939 across counties. While public works and relief spending was associated with an increase in 1939 retail sales, the payments to farmers had a negative effect.
Moreover, Fishback and Kachanovskaya (2015) find that the effects on state per capita income as a result of an additional dollar of federal spending were only between 40 and 96 cents on average—potentially negative in the case of payments to farmers. Rosenbloom and Sundstrom (1999) show that industrial composition was an important moderating factor for understanding the effects of the Great Depression on employment growth. Romer (1992) finds that the expansion of the money stock may have stimulated investment and durable consumption expenditures.

The second focuses on the impact of experience on future activity and beliefs.¹ Most closely related is Giuliano and Spilimbergo (2014) who show that individuals growing up during a recession are more likely to support government redistribution and vote for left-wing parties. Similarly, Malmendier and Nagel (2011) show that individuals who experienced lower stock returns due to exposure to different business cycles are also more pessimistic about future returns and less likely to participate in the stock market. Cogley and Sargent (2008) model macroeconomic shocks as “belief-twisting” events that have a prolonged and persistent impact on beliefs. Alesina and Angeletos (2005) explain how these differences in beliefs can propagate and influence macroeconomic policy and choices around the optimal amount of redistribution, particularly around the relative importance of luck versus effort as a driver of economic success Piketty (1995). These results also provide a countervailing narrative to Friedman and Schwartz (1963) who argued that the Great Depression “shattered” beliefs in the future of capitalism. To the contrary, our results suggest that improved frugality led to heightened financial sophistication.

The structure of the paper is as follows. Section 2 discusses the data and measurement strategy. Section 3 presents the empirical strategy, main results, and robustness. Section 4 investigates the

¹Our paper is also related to an additional economics and finance literature about the determinants of entrepreneurship; see Glaeser et al. (2010) for a broad discussion of relevant factors.
mechanism. Section 5 concludes.

2. Data and Measurement

Determination of the Focus Group Age.—One of the most important aspects of studying generational effects of over time is determining the age group in which to analyze at both the beginning and the end of the spectrum. The target group of individuals during the Great Depression will be adolescents ages 13-19. This age range was chosen due to a large body of research in psychology defining the adolescent years as the most important years of self-development (Steinberg and Morris, 2011) and follows recent behavioral finance work (Malmendier and Nagel, 2011).^2

The years of 1930 – 1940 will be used to define the period of the Great Depression, and therefore, we will focus our attention on adolescents during this time period. Using research from the National Center for Health Statistics on average childbearing age for that period puts our target adolescents starting families at the age of 21 (NCHS Data Brief, 2011). Mapping together the Great Depression year range and the average starting family, age, gives us an approximate date range where we would expect the Great Depression adolescents to start becoming parents. This year range is 1932 - 1949. Individuals born during 1932-1949 will be our main focus group, as these individuals are being raised by parents who were shaped the most dramatically by the Great depression. Using 42 as the average age of an entrepreneur in the century, the children of these parents will most likely become entrepreneurs in the year range of 1974 – 1991.

Geographic Proxy for the Severity of the Great Depression.—Our baseline proxy for the severity

^2(Steinberg and Morris, 2011) state that “[a]dolescence has long been characterized as a time when individuals begin to explore and examine psychological characteristics of the self in order to discover who they really are, and how they fit in the social world in which they live... We also know that adolescents evaluate themselves both globally and along several distinct dimensions—academics, athletics, appearance, social relations, and moral conduct.”
of the Great Depression draws on retail sales data constructed by Fishback et al. (2005) to study the effects of the New Deal during the Great Depression. We specifically use their measure of county retail sales growth between 1933 and 1929, which marks the two extremes during the Great Depression. Retail sales growth is viewed as a strong proxy for consumption expenditures on durable and non-durable goods — a key variable in understanding the Depression among economic historians (Temin, 1976). Figure 1 documents significant variation in the severity of the decline in retail sales per capita across counties.

While our retail sales help us understand the severity of the Great Depression in these geographies, data during these years is limited at an annual frequency. We, therefore, supplement the small sample of 43 core business statistical areas (CBSAs) with state and county data from the Decennial Census. Here, we use the percent change in the unemployment rate between 1940 and 1950. While these years are not ideal, the share of individuals looking for work in 1940 and 1950 was 10.1% and 4.8%, respectively, providing sufficient cross-sectional variation to identify the parameters of interest. Moreover, we also experiment with the growth in manufacturing establishments and agricultural crop value (deflated using the consumer price index with a 1982 – 1984 base year), which were important sources of local economic growth. According to the Bureau of Labor Statistics (BLS), the manufacturing and agricultural employment shares in 1910 were 32.4% and 31.5% (versus 8.7% and 1.5% in 2015), respectively.³

For the latter half of the paper where we examine the mechanism, we turn towards state-level data because it is the most detailed geographic information observed about the location of

---

https://sites.google.com/site/asgerwingender/home/structural-transformation-data-set
residence for survey responses. Using a combination of Fishback and Kachanovskaya (2015) for years prior to 1970 and the Bureau of Economic Analysis (BEA) for years following 1970, we measure personal income for each state in real 1967 dollars using the national consumer price index (CPI). The data suggests that there is substantial variation in income across both states and time. Figure 5 shows regional trends in personal income between 1918 and 1950—the most volatile time period in the sample. States in the South consistently have lower income than in other regions. There were substantial differences in the size of the income drop during the Great Contraction between 1929 and 1933. The average drop in state income during this time period was 37%, with a minimum drop of 16% in South Dakota and a maximum drop of 65% in Maryland.

The greatest state income variation occurs during the Great Depression and World War II era beginning in 1929 and lasting until 1945. At first, the Great Depression hit heavily industrialized areas like Pennsylvania (steel), Indiana (steel), and Michigan (automobiles). Areas that supported railroads and coal mining also suffered. At the same time as the Great Depression, large droughts happened in the West, meaning devastation in Oklahoma, Texas, Kansas, Colorado, and parts of New Mexico. This led to widespread unemployment and poverty in these states. Recovery was rapid until the United States entered World War II in December 1941, when income growth returned to its long run path. The resulting variation in not only the cross-section, but also the time series arising from cohorts who were heterogeneously exposed to their state’s business cycle—that is, differences in the age distribution within a state generate differences in the economic

---

4Personal income is defined as income after subtracting business savings, social security contributions from employer and employee, contributions to the Railroad Retirement Fund, and contributions to retirement systems for government employees as these are not available for spending. The BEA added back in many of the transfer payments, such as direct and work relief, federal pensions to veterans, adjusted service benefits, other government retirement allowances, unemployment compensation, railroad insurance benefits, old-age insurance benefits, and agriculture benefit payments. For more information on state income data between 1919 and 1938, see Thomasson and Fishback (2015), Martin (1939), or Cone (1940).
conditions that individuals' parents were exposed to in their state during their formative ages.

*Panel of Individuals and Household Finances.*—To measure individual outcomes and financial wealth over time, we draw from the longest longitudinal database available: the Panel Study of Income Dynamics (PSID) hosted through the University of Michigan. The PSID is a longitudinal panel survey of American families measuring economic, social, and health factors over multiple generations (see Blundell et al. (2008) for details). We drop the oversample of low-income families to ensure we estimate a nationally representative average treatment effects and we restrict the sample to individuals between ages 30 and 65. We focus on asset holdings for 1984, 1989, 1994, and biennially between 1999 and 2017. In addition to standard demographics, we also observe family income and the value of liquid assets, defined as the sum of an individual’s savings account balances, stock holdings, and bond holdings. We also investigate investment in real estate.

*Geographic Entrepreneurship Rates.*—We measure entrepreneurship using a combination of state and core business statistical area (CBSA) data from the Kauffman Foundation and the Business Dynamics Statistics (BDS) on startups and establishment entry, respectively. We crosswalk counties into core statistical business areas (CBSAs) using the Missouri Geocorr crosswalk with 2010 Census populations as weights. While the Kauffman Foundation and BDS data have a 0.30 correlation at the state-level (see Figure 2), the BDS contains 366 CBSAs and the Kauffman Foundation contains only 40, prompting us to use the BDS for our baseline analysis because of the greater variation and more representative sample.

[INSERT FIGURE 2 HERE]

Figure 3 plots establishment entry rates across the 366 CBSAs available in the BDS data. Although there is a negative decline in establishment entry, consistent with the decline in labor
market fluidity documented by Davis and Haltiwanger (2015), we observe noticeable spatial heterogeneity over time. For example, we see a particularly striking concentration of establishment entry in the West in the 1990s, but it subsides in the 2000s, potentially a result of increasing land-use regulation that has affected the cost of living (Herkenhoff et al., 2018).

[INSERT FIGURE 3 HERE]

Geographic Drought Conditions.—Since part of our identification strategy relies upon exploiting plausibly exogenous weather conditions across locations leading up to the Great Depression, we draw on the monthly Standardized Precipitation Evapotranspiration Index (SPEI) across counties. Although the Palmer Drought Severity Index (PDSI) and the Standardized Precipitation Index (SPI) are alternative drought indices, we converged on the SPEI for three reasons. First, it is multi-temporal and can be compared across different time intervals to understand different types of drought, unlike the PDSI. Second, SPEI is more comparable across geography and different hydrological systems. Third, unlike the SPI, the SPEI also includes information on evapotranspiration, which allows the index to capture climatic conditions that may affect water demand through evapotranspiration. The SPEI values ranged from -2.8 to +2.8 where the more negative the value corresponded to a greater period of dryness or drought.

3. The Great Depression and Entrepreneurship

This section explores the relationship between the severity of the decline in economic activity during the Great Depression and contemporaneous entrepreneurship rates. We find that areas that were more adversely affected exhibit greater establishment entry today.

\footnote{http://spei.csic.es/index.html}

\footnote{https://climatedataguide.ucar.edu/climate-data/standardized-precipitation-evapotranspiration-index-spei}
3.1. Identification Strategy

Our baseline empirical specification relates measures of contemporaneous entrepreneurship with measures of the severity of the Great Depression, conditional on controls:

$$ENTREP_{lt} = \gamma \Delta y^0_l + \beta X_{it} + \xi D^0_l + \epsilon_{lt}$$

(1)

where $ENTREP$ denotes the entrepreneurship rate in location $l$ and year $t$, $\Delta y^0$ denotes the productivity shock in a location in the initial state $t$ (i.e., the Great Depression), $X$ denotes time-varying controlling covariates, such as the age and education distribution, and $D^0$ denotes fixed time-invariant characteristics at the time of the Great Depression. Standard errors are clustered at the location-level to allow for arbitrary degrees of autocorrelation (Bertrand et al., 2004).

Our identifying assumption in Equation 1 is that unobserved shocks to contemporaneous entrepreneurship rates in a metropolitan area are uncorrelated with the severity of the Great Depression. If, for example, areas with a more severe decline in productivity also exhibit greater manufacturing employment shares, then contemporaneous entrepreneurship could be affected by the composition of industries dating back to the Great Depression. We address these types of concerns by controlling for a combination of time-varying and time-invariant demographic factors, focusing heavily on the characteristics of an area at the time of the Great Depression.

We introduce two complementary instrumental variables strategies that exploit plausibly exogenous variation in industrial composition during the Great Depression. We begin by using the logged value of farmland and crops. Our first-stage correlation comes from the fact that areas with greater dependence on manufacturing were more adversely affected during the Great Depression.
(Rosenbloom and Sundstrom, 1999), whereas agriculture was less elastic. That is, although food consumption declined during the Depression, it was less elastic than demand for manufacturing products. Our exclusion restriction is that cross-sectional variation in agriculture leading up to the Great Depression is not correlated with unobserved shocks to future entrepreneurship.

However, we recognize the restrictiveness of this assumption. For example, if areas with greater dependence on agriculture also have less access to waterways and ports, which have long-lasting impacts on economic activity and the transition to manufacturing (Bleakley and Lin, 2012), then the time-invariant heterogeneity will create bias. We address the limitations of the first instrument by now drawing on the SPEI drought index across counties leading up to the Great Depression. We compute the year-to-year growth in the annual and monthly drought index between 1924 and 1926 as our instruments. In this sense, we proxy for plausibly exogenous variation in shocks to agricultural productivity leading up to the Depression, motivated by historical links between weather and agriculture (Bleakley and Hong, 2017).

Figure 4 plots the first-stage correlations between our instruments and retail sales growth between 1933 and 1929. In both cases, the correlation is strong and statistically significant. While we recognize the limitations and potential violations to the exclusion restriction of our first instrument, we observe that greater growth in drought conditions leading up to the Great Depression also has a strong and negative correlation of -0.23 with retail sales growth. Although the negative association between growth in the drought index and retail sales might appear counterintuitive, this reflects the fact that better growing conditions raises agricultural productivity and potentially substitutes with manufacturing, thereby reducing retail sales.

[INSERT FIGURE 4 HERE]
3.2. Main Results

We begin by describing the results associated with Equation 1 in Table 1. Starting with column 1, we see a strong negative association between retail sales growth and establishment entry rates: a 1pp rise in the growth rate of retail sales is associated with a 0.04pp decline in establishment entry. Once we add on contemporaneous demographic controls in columns 2 and 3, however, the estimated coefficient becomes statistically insignificant, though economically meaningful.

Do these reflect causal elasticities between the intensity of a location’s shock during the Great Depression and contemporaneous entrepreneurship? As we discuss later, one mechanism consistent with these results is the presence of personal experience whereby individuals growing up during the Depression cultivate greater financial sophistication and frugality, which they endow to their children. If true, then, as we discussed in the data and measurement section, we should observe a concentration of these effects between 1974 and 1991. When we interact an indicator for those years with retail sales growth during the Depression, we find a robust economically and statistically significant effect on establishment entry (column 4). Moreover, the fact that the statistical significance increases, relative to columns 2 and 3, suggests that pooling all the years together raises the noise-to-signal ratio as more recent years add an additional intergenerational layer to the transmission mechanism.

Turning towards another measure of entrepreneurship, we now look at the reallocation rate. Unlike establishment entry, reallocation refers to the sum of job creation and job destruction net of the absolute value of net job creation, which is the difference between the job creation and destruction rates. Its correlation with establishment entry is only 0.57, illustrating how it captures different patterns in the data. We find that a 1pp rise in retail sales growth during the Depression
is associated with a 0.06pp decline in the reallocation rate, controlling for historical demographic factors (column 6). The statistical and economic significance decline only marginally after adding modern demographic controls and controlling for aggregate shocks (columns 7 and 8). However, we do not find the effect on the reallocation rate concentrated between the years 1974 and 1991, which could reflect the fact that reallocation is simply distinct from establishment entry.

[INSERT TABLE 1 HERE]

We now turn towards our instrumental variables results, which address the concern that there are other unobserved factors correlated with a location’s modern entrepreneurship rates and their historical decline during the Great Depression. Returning to Table 1, we examine our instrumental variables results in columns 5 and 11 that use crop/farm value: a 1pp rise in retail sales growth is associated with a 0.09pp and 0.15pp decline in the establishment entry and reallocation rates, respectively. Although we are capturing potential historical factors that led some areas to be more agricultural than others, the fact that these estimates are slightly larger reflects a potential violation to the exclusion restriction: since areas with greater agriculture will tend to have lower entrepreneurship rates, but be less exposed to the Great Depression, then this may cause downwards bias.

We turn towards our preferred instrumental variables results in columns 6 and 12, which exploit plausibly exogenous variation in the timing of drought shocks leading up to the Great Depression. Our identifying assumption is that the timing of these drought conditions is random, generating variation in the vulnerability of different locations to the Great Depression based on their agricultural productivity leading up to it. We again find results almost indistinguishable from our least squares estimate. For example, we see in columns 6 and 12 that a 1pp rise in retail
sales growth is associated with a 0.04pp decline in both establishment entry and reallocation rates.

How do our results compare with Malmendier and Nagel (2011) who find that risky asset returns experienced over an individual’s life reduces their willingness to take financial risks? Indeed, as in Malmendier and Nagel (2011), individuals directly exposed to the Great Depression (e.g., someone who is laid off) may be less inclined to take risks. However, to the extent these individuals are forced to “do more with less,” they may endow their children with a set of financial sophistication habits (e.g., frugality) that may make them better entrepreneurs.

One alternative concern about these results is that they reflect the persistent effects of harmful New Deal policies. While some herald the New Deal as a solution to the economic malaise of the Great Depression, the consensus among both macroeconomists and economic historians tells a different story. For example, Cole and Ohanian (2004) show that the policies of the National Industrial Recovery Act, which were designed to raise prices and wages and to weaken antitrust enforcement, unintentionally raised unemployment and prolonged the Great Depression because they prevented the market from clearing. Moreover, Higgs (1997) finds that the introduction of New Deal policies led to greater uncertainty and lower private investment than would otherwise have occurred. Fishback et al. (2005) find that the Agricultural Adjustment Administration (AAA) policies to farmers did not stimulate retail sales and may have even had an adverse effect by crowding out lower end non-landowners.

4. Understanding the Mechanisms

This section investigates the potential causal sources behind the earlier association between the Great Depression and entrepreneurship. We draw heavily on longitudinal records of parents and
their children, together with detailed accounts of financial investments of the children and their parents’ location at the time of the Great Depression. Our results are consistent with the view that, because parental endowments shape financial behavior, parents who were more exposed to the Great Depression taught their children more habits that proxy for financial sophistication.

4.1. Parental Endowments and the Transmission of Habits

While there is already a well-known literature about the importance of parental investments for childhood development (Cunha et al., 2010) and the role of time allocated to childcare (Guryan et al., 2008), there is not yet much empirical evidence on the association between parental investments and children’s financial literacy. Using multiple waves from the PSID Child Development Supplement (CDS), we show that exposure to different shocks moderates the effect of parental investments, particularly spending time with children, on childhood development.

To understand the relationship between parental investments and financial sophistication, we estimate regressions of the form:

\[
FS_{ist} = \gamma PINV_{ist} + \phi SINC_s + \xi (PINV_{ist} \times SINC_s) + \beta X_{ist} + \epsilon_{ist}
\]  

(2)

where \(FS\) denotes our proxy for financial sophistication of the child (i.e., the percent of liquid assets in savings), \(PINV\) denotes our proxy for parental investment in the child’s human capital (i.e., time allocated towards reading with the child), \(SINC\) denotes state per capita income during

---

There is an applied psychology literature that has provided cross-sectional evidence on the relationship between parental influences and savings and other financial behaviors (Jorgensen and Savla, 2010; Koposko and Hershey, 2014).
the child’s formative years, and $X$ denotes our usual vector of demographic controls, namely a quadratic in age and education, marital status, gender, number of children, and race.

Our measure of state per capita income during the child’s formative years proxies for the return to working that the head of household faces. Our identifying assumption is that cross-sectional differences in the economic vibrancy of a state lead to different trade-offs among parents as to how much time they are willing to invest in their children. For example, using variation during the Great Recession from the American Time Use Survey, Aguiar et al. (2013) find that time allocated to child care is fairly cyclical. In this sense, as the return to working rises, the head of household may allocate less time to child care and more time to the market, thereby reducing their investment in the child’s human capital.

Table 2 documents our results. We find a positive association between financial sophistication and parental investment in the child’s human capital: a 10% rise in time allocated to reading to the child is associated with a 4.02 percent increase in the child’s liquid assets in savings (column 1). The result is statistically significant at a 10% level, largely because of the small sample size. As we add additional controls, such as marital status, children, education, and income, the economic significance declines slightly in magnitude, but not in a statistically significant way.

Turning towards state per capita income between the child’s age of 13 and 19, we find a positive association with savings, which may reflect the fact that better economic conditions as a child is growing up improves the odds that the child will find a better job after graduation, thereby raising the child’s income and potential savings. Finally, we find that the interaction of state per capita income and parental investment has a robust negative association with the percent of liquid assets in savings. Although the interaction between two continuous variables does not have a straightforward interpretation, these results are consistent with the view that,
while greater parental investment in children raises their financial sophistication, improvements in economic conditions actually encourages parents to allocate more time to the market, thereby reducing their investment in child human capital and financial sophistication.

Another channel through which parents may influence their offspring’s financial decision-making is by directly increasing the child’s wealth through gifts or inheritances. A parent who lived through the Great Depression and saved more throughout his life may have more savings upon death and thus leave larger inheritances to his children. This increased wealth may reduce the liquidity constraint that the children face when deciding to start a business. Both Holtz-Eakin and Joulfaian (1994) and Hurst and Lusardi (2004) find that financial endowments have a slight positive influence on entrepreneurship. In this sense, the receipt of larger inheritances may increase the likelihood that children become entrepreneurs.

We leverage the inheritance data in the PSID to investigate whether children of parents who faced worse conditions in their impressionable years leave larger financial endowments to their children. We model the value of inheritance left to children using the following equation:

\[
INH_{ist} = \gamma FINC_{is} + \beta X_{ist} + \lambda_s + \epsilon_{ist}
\]  

(3)

where \(INH\) denotes the total inheritance received by individual \(i\) in state \(s\) and year \(t\). \(FINC\) is the log of the per capita personal income in the father’s state during his impressionable years (13-19). \(X\) contains demographic information about the individual (sex, race, marital status, number of children). Since the majority of individuals reporting inheritance do so in the later years of the PSID (2000 and above), we are unable to include extra controls for parental experience during the Great Depression (i.e., we do not have coverage going back far enough).
The identifying variation for $\gamma$ in equation 3 comes from variation in state economic conditions during the father’s impressionable years. Since we don’t have father birth cohort effects, national variation in economic conditions influence the estimates as well. Although father’s education and income are unobservable in the data, it is unclear whether these intermediate outcomes should be included in the regression. Parental education level and income would have been influenced by the state economic conditions they experienced during their impressionable years.

The results in Table 3 suggest that parents who experienced lower levels of state income during their impressionable years leave larger sums of money to their children. A 10% increase in state income during the father’s impressionable years reduces the inheritance that he leaves to his children by 3%. This is logical, as earlier results in the literature showing that individuals who experience worse economic conditions save more throughout their lives, so they are more likely to accumulate greater wealth by the time they pass away.

As inheritances have a positive influence on entrepreneurship (Holtz-Eakin, Joulfaian, and Rosen 1994), our results present an additional interpretation to our proposed mechanism about the relationship between poor economic conditions during the Great Depression and higher levels of entrepreneurship in the long run. Worse economic conditions during the Depression may have led individuals to save more and leave more money to their children, endowing children with enough initial capital to become entrepreneurs.

4.2. The Great Depression and Financial Sophistication

Following a similar identification strategy to our earlier results, we now explore whether the state-level severity of the Great Depression for an individual’s parent is associated with measures of
financial sophistication. Unlike before, however, now we have longitudinal information on individuals, so we exploit heterogeneity across the age distribution. These data enable us to compare individuals whose parents were exposed to the Great Depression during their more formative years (ages 13 to 19) when financial literacy skills are still under development with other individuals whose parents were sufficiently old enough to have already formed their financial habits.

While we do not have specific measures of individual entrepreneurship, we do have measures of financial behavior, such as investment in stocks and property; these are consistent with empirical finance evidence that entrepreneurs hold much higher wealth (Gentry and Hubbard, 2004) and invest more in housing / hold more home equity (Schmalz et al., 2017). We now relate measures of individual financial behavior, denoted $y_{ist}$, with an indicator for whether the individual’s father was between ages 13 and 19 during the Great Depression, denoted $1[GD_i]$, real state personal income per capita during the years the individual’s father’s age is between ages 13 and 19, denoted $FINC_{is}$, and their interaction, conditional on controls:

$$y_{ist} = \gamma FINC_{is} + \phi 1[GD_i] + \xi (FINC_{is} \times 1[GD_i]) + \beta X_{ist} + \alpha_s + \epsilon_{ist} \quad (4)$$

where $X$ denotes a vector of individual controls, $\alpha$ denotes state fixed effects, and the variables of interest are as defined above.

In addition to standard demographic individual controls, including current family income, race, education, marital status, and number of children in the year that the outcome is measured, we also include fixed effects on the individual’s birth state. These fixed effects isolate variation from individuals living in the same state.\footnote{The childhood state dummies are not collinear with the state income averages because we have variation in birth cohorts, thus all children who grew up in the same state do not have the same $SI_i$. If we were to include} Moreover, we include a quadratic in age to remove life cycle
effects, thereby exploiting sharp differences in exposure between individuals who happened to be born into one cohort over another. Our inclusion of historical real state personal income helps mitigate concerns about unobserved time-invariant heterogeneity that could be correlated with current financial behavior (e.g., access to better education).

Table 4 documents the results associated with Equation 4 when the outcome variable is the percent of liquid assets in savings. Starting without income or education controls in column 1, we find that individuals with a father who was 13-19 during the Great Depression hold 3.1 percentage points more liquid assets in savings, consistent with Malmendier and Nagel (2011). Moreover, state income during the father’s formative years has a similar correlation with the outcome variables: a fathers living in a state with 10% higher state income per capita have a 0.1% higher investment of liquid assets in savings. However, the coefficient on the interaction between the two has the opposite sign: a 10% increase in state per capita income among fathers who were exposed to the Great Depression during those formative years have a 0.6% lower share of liquid assets in savings.

One concern with these results is that individuals exposed to the Great Depression were adversely selected in some way. For example, they may have been less likely to go to school because they had to find work to help their parents pay the bills. Column 2 subsequently adds household income and education as controls. Not surprisingly, wealthier and more educated individuals are more likely to invest in stocks and hold less liquid assets in savings, but the inclusion of these variables does not alter the interaction effect.

[INSERT TABLE 4 HERE]

The savings investment results suggest that paternal experiences during the impressionable interactions of childhood state with birth cohort dummies, then these would be collinear with $SI_i$. 
years significantly influence the adulthood investment decisions of their children. Fathers who were exposed to worse conditions in their impressionable years during the Great Depression have children who substitute away from stock and property investment in adulthood towards savings. This implies that in adulthood, children with Great Depression parents have a larger amount of liquid assets that can easily be accessed to ease liquidity-related barriers to entrepreneurship. Another possibility is that entrepreneur children move most of their investment into their company, which would be consistent with findings in Moskowitz and Vissing-Jorgensen (2002).

5. Conclusion

Recent studies have explored the consequences of personal experiences on decision-making and preference formation. Our paper advances the literature further by demonstrating that local economic shocks have a long-run, substantial influence on local entrepreneurial activity. We argue that the mechanism behind these long-term, multi-decade effects is through paternal influence on individual investment decisions. Specifically, we show that individuals whose fathers experienced worse economic conditions during the Great Depression invest more of their money into savings and receive greater inheritances from their parents. When put together, these effects increase individual liquidity, which improves the chances of success in entrepreneurship.

Our results have important implications for understanding how large-scale events, whether personal or societal, affect real economic outcomes in the long-run, particularly selection into entrepreneurship and local dynamism. Our paper provides several areas for fruitful analysis. First, what are the specific parental investments that affect a child’s long-run entrepreneurial outcomes? For example, Laudenbach et al. (2019) show that individuals growing up under communism in
Germany are less likely to invest in the stock market because of the association between stocks and the West. Second, how do historical experiences interact with contemporaneous conditions and what are the potential implications for optimal policy intervention? For example, Bernheim et al. (2001) show that educational campaigns can be effective for raising awareness, but these interventions struggle to change individual habits unless they become part of the routine. We leave these avenues, among others, open for future inquiry.

**References**


**Tables and Figures**
### Table 1: The Effect of Historical Great Depression Shocks on Current Entrepreneurship

<table>
<thead>
<tr>
<th>Dep. var. =</th>
<th>establishment entry rate</th>
<th>reallocation rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>retail sales growth, 1933-1929</td>
<td>(1) -0.04** (2) -0.02 (3) -0.02 (4) -0.01 (5) -0.09** (6) -0.04**</td>
<td>(7) -0.06** (8) -0.04** (9) -0.04** (10) -0.15** (11) -0.15** (12) -0.04**</td>
</tr>
<tr>
<td>× 1[1974 &lt; t &lt; 1991]</td>
<td>-0.04**</td>
<td>-0.01</td>
</tr>
<tr>
<td>R-squared</td>
<td>.29 (.02)</td>
<td>.16 (.03)</td>
</tr>
<tr>
<td>Sample Size</td>
<td>1634 1634 1634 1634 1634 1292 1634 1634 1634 1634 1634 1292</td>
<td>1634 1634 1634 1634 1634 1634 1634 1634 1634</td>
</tr>
<tr>
<td>F-statistic</td>
<td>5.47 8.64</td>
<td>5.47 8.64</td>
</tr>
<tr>
<td>Historical Controls</td>
<td>Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes</td>
<td></td>
</tr>
<tr>
<td>Contemporaneous Controls</td>
<td>No Yes Yes Yes No No No Yes Yes Yes</td>
<td></td>
</tr>
<tr>
<td>Year FE</td>
<td>No No Yes Yes Yes No No Yes Yes Yes</td>
<td></td>
</tr>
<tr>
<td>Crop IV</td>
<td>No No No No Yes No No No Yes No</td>
<td></td>
</tr>
<tr>
<td>Drought IV</td>
<td>No No No No No No No Yes Yes Yes</td>
<td></td>
</tr>
</tbody>
</table>

Notes.—Source: Fishback et al. (2005), Business Dynamics Statistics, Census Bureau, 1977-2014. The table reports the coefficients associated with regressions of the establishment entry and reallocation rates between 1977 and 2014 on the growth rate of retail sales between 1933 and 1929 (and in certain specifications its interaction with an indicator for whether the year is between 1974-1991), conditional on controls. Historical controls include the population of a CBSA in 1940, share of males, the age distribution (under 20, 20-34, 35-49, 50-64, 65+), and the education distribution (none, some elementary, some high school, some college). Contemporaneous controls include the population in 1990, share of males, age distribution (under 18, 18-24, 25-34, 35-44, 45-64, and 65+), share of whites and blacks, share of married individuals, and the education distribution (less than high school, high school, and some college). The establishment entry rate is measured as the ratio of establishment entry in year t and the average of establishment entry in year t and t-1. The reallocation rate is the sum of job creation and job destruction net of the absolute value of the net job creation rate. The “crop IV” instrumental variables in columns 5 and 11 are logged crop value and farm value in 1930 before the Great Depression shock, capturing the fact that areas more exposed to durable manufacturing were harder hit by the crisis (relative to those with greater agriculture). The “drought IV” instrumental variables in columns 6 and 12 are the year-to-year average growth in the Standardised Precipitation-Evapotranspiration Index (SPEI) drought index between 1924 and 1926. The instruments include a quadratic in average annual SPEI growth, as well as the average SPEI growth for each month within the year. All county data (e.g., retail sales growth and drought) is crosswalked into CBSAs using the 2000 Census delineation. Standard errors are clustered at the CBSA-level.
Distribution of Growth Rates in Retail Sales per Capita, 1933-1929

**Figure 1:** Notes.—Source: Fishback et al. (2005). The figure plots the distribution of growth rates in retail sales per capita using real 1967 dollars across core business statistical areas (CBSAs), which were obtained by using a crosswalk between counties and CBSAs from Missouri Geocorr on the county data from Fishback et al. (2005).
Comparison of Kauffman Foundation and Business Dynamics Statistics Data

Figure 2: Notes.— Source: Kauffman Foundation and Business Dynamics Statistics (BDS). The figure plots a binscatter of the establishment entry rate and startup growth between the two datasets between 1985 and 2014 51 states.
Spatial Heterogeneity in Establishment Entry Rates

Figure 3: Notes.—Source: Business Dynamics Statistics (BDS). The figure plots a spatial map of establishment entry rates in 1990 and 2000 across core business statistical areas (CBSAs).
First-stage Tests between Instruments and Retail Sales Growth

Figure 4: Notes.—Source: Fishback et al. (2005), 1930 Census Bureau and NOAA. The figure in Panel A plots the relationship between retail sales growth between 1933 and 1929 and logged 1930 crop values. The figure in Panel B plots the relationship between retail sales growth and the year-to-year annual Standardised Precipitation-Evapotranspiration Index (SPEI) drought index. County data on retail sales growth is crosswalked into CBSAs using the 2000 Census delineation. Observations are weighted by 1920 pseudo-CBSA population.
Figure 5: Income dynamics by region, 1919-1950
Table 2: Parental Investment and Financial Sophistication Results

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Percent Liquid Assets in Savings</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Time Reading)</td>
<td>0.402*</td>
<td>0.383*</td>
<td>0.389*</td>
<td>0.372*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.171)</td>
<td>(0.166)</td>
<td>(0.167)</td>
<td>(0.165)</td>
<td></td>
</tr>
<tr>
<td>ln(State Income 13-19)</td>
<td>0.124</td>
<td>0.119</td>
<td>0.140</td>
<td>0.144</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.111)</td>
<td>(0.110)</td>
<td>(0.115)</td>
<td>(0.113)</td>
<td></td>
</tr>
<tr>
<td>x ln(Time Reading)</td>
<td>-0.242**</td>
<td>-0.229*</td>
<td>-0.228**</td>
<td>-0.218*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.097)</td>
<td>(0.094)</td>
<td>(0.092)</td>
<td>(0.092)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.017</td>
<td>0.012</td>
<td>0.019</td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.025)</td>
<td>(0.026)</td>
<td>(0.025)</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.024</td>
<td>0.013</td>
<td>0.005</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.021)</td>
<td>(0.022)</td>
<td>(0.024)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>-0.012</td>
<td>-0.013</td>
<td>-0.017</td>
<td>-0.015</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.014)</td>
<td>(0.016)</td>
<td>(0.016)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.212</td>
<td>0.217</td>
<td>0.199</td>
<td>0.191</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.156)</td>
<td>(0.159)</td>
<td>(0.154)</td>
<td>(0.142)</td>
<td></td>
</tr>
<tr>
<td>Age^2</td>
<td>-0.004</td>
<td>-0.004</td>
<td>-0.003</td>
<td>-0.003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.002)</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>-0.014</td>
<td>-0.003</td>
<td>0.008</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.022)</td>
<td>(0.021)</td>
<td>(0.021)</td>
<td></td>
</tr>
<tr>
<td># Children</td>
<td>0.015*</td>
<td>0.005</td>
<td>0.004</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.004)</td>
<td>(0.005)</td>
<td>(0.005)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0.027</td>
<td>0.022</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.046)</td>
<td>(0.044)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education^2</td>
<td>-0.001</td>
<td>-0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln(Income)</td>
<td></td>
<td></td>
<td>-0.025**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.010)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-squared</td>
<td>.014</td>
<td>.016</td>
<td>.021</td>
<td>.025</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>1197</td>
<td>1197</td>
<td>1197</td>
<td>1192</td>
<td></td>
</tr>
</tbody>
</table>

† Robust Standard errors clustered by age in parentheses (* p < 0.10, ** p < 0.05, *** p < 0.01)
Table 3: Conditions During Parent’s Impressionable Years and Inheritance

<table>
<thead>
<tr>
<th></th>
<th>ln(Total Inheritance)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>ln(Father State Income 13-19)</td>
<td>-0.352***</td>
<td>-0.347**</td>
<td>-0.304**</td>
</tr>
<tr>
<td></td>
<td>(0.126)</td>
<td>(0.130)</td>
<td>(0.141)</td>
</tr>
<tr>
<td>Black</td>
<td>0.336</td>
<td>0.506</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.784)</td>
<td>(0.803)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>-0.087</td>
<td>-0.014</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.338)</td>
<td>(0.348)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>-0.427**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.159)</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td></td>
<td>-0.039</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.165)</td>
<td></td>
</tr>
<tr>
<td># Children</td>
<td></td>
<td>-0.086</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.053)</td>
<td></td>
</tr>
<tr>
<td>R-squared</td>
<td>.007</td>
<td>.008</td>
<td>.017</td>
</tr>
<tr>
<td>N</td>
<td>1041</td>
<td>1041</td>
<td>1041</td>
</tr>
</tbody>
</table>

† Robust Standard errors in parentheses (* p < 0.10, ** p < 0.05, *** p < 0.01)
Table 4: Baseline Effects of Parental Exposure to Great Depression on Financial Behavior

<table>
<thead>
<tr>
<th>Outcome Variable:</th>
<th>% Liquid Assets in Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>ln(Father State Income 13-19)</td>
<td>0.088*** (0.010)</td>
</tr>
<tr>
<td>Father Born 1910-1920</td>
<td>0.031** (0.015)</td>
</tr>
<tr>
<td>x State Income 13-19</td>
<td>-0.082** (0.034)</td>
</tr>
<tr>
<td>Female</td>
<td>0.046*** (0.009)</td>
</tr>
<tr>
<td>Black</td>
<td>0.099*** (0.027)</td>
</tr>
<tr>
<td>White</td>
<td>-0.004 (0.024)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.006*** (0.002)</td>
</tr>
<tr>
<td>Age^2</td>
<td>0.000* (0.000)</td>
</tr>
<tr>
<td>Married</td>
<td>-0.062*** (0.006)</td>
</tr>
<tr>
<td>Number Children</td>
<td>-0.006 (0.004)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Education^2</td>
<td>0.000*** (0.000)</td>
</tr>
<tr>
<td>ln(Household Income)</td>
<td></td>
</tr>
</tbody>
</table>

R-squared: .06 .102
N: 17579 17579

† Household characteristic controls include value of liquid assets, household income, race, sex, years of education, number of children, and marital status

†† Robust Standard errors in parentheses (* p < 0.10, ** p < 0.05, *** p < 0.01)