

Financial Literacy and Employer Business Formation Across U.S. States: A Within-Between Analysis, 2020-2026

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ABSTRACT

Financial literacy, the ability to understand and apply financial knowledge to make informed decisions and manage resources effectively, has often been studied for its importance to individual outcomes. This study examines its potential role in shaping entrepreneurship at the state level. Using descriptive correlation analysis and a mixed-effects within-between (Mundlak) panel regression model, this paper investigates the relationship between state-level financial literacy and employer business formation across the United States from 2020 to 2026. The results indicate that within-state increases in financial literacy are significantly associated with increases in employer business formation, even after accounting for selected economic conditions and state characteristics. The baseline model also identified a significant positive association between persistent differences in average financial literacy across states and business formation, while the controlled model showed that within-state increases in financial literacy remained significantly associated with increases in business formation. Together, these findings provide consistent evidence of a positive relationship between financial literacy and employer business formation, with the most robust association occurring between changes in financial literacy and business formation within states over time.

Keywords: financial literacy, business formation, entrepreneurship, entrepreneurial entry, financial education, financial capability

INTRODUCTION

The formation of new businesses is a major component of entrepreneurial activity. Although business formation does not necessarily imply business success or economic growth, it can contribute to competition, employment, and innovation and is an easily measurable metric. More specifically, this study assesses the relationship between financial literacy and the decision to start a business. Understanding what influences entrepreneurial entry is therefore important for evaluating policies intended to support entrepreneurship.

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Entrepreneurship depends on financial decision-making, requiring individuals to evaluate risk, secure financing, allocate resources, and adapt to changing market conditions. Financial literacy provides knowledge and skills that support these entrepreneurial demands, influencing decisions such as when and whether individuals enter the market. This study controls for selected economic conditions, including personal income and unemployment, and examines whether state-level financial literacy is associated with employer business formation across U.S. states from 2020 to 2026. In particular, it distinguishes persistent differences in financial literacy between states from changes in financial literacy within states over time. Instead of representing economic growth or that greater formation is necessarily beneficial, employer business formation serves as an indicator for entrepreneurial entry. Accordingly, this study asks whether state-level financial literacy is associated with employer business formation and, more specifically, whether this relationship reflects persistent differences between states or changes in financial literacy within states over time.

The results aim to provide a more informed perspective on the potential role of financial literacy in entrepreneurial entry and on broader policy discussions surrounding financial education and entrepreneurship.

LITERATURE REVIEW

Despite the importance of financial literacy, it remains limited across countries. Drawing from theoretical and empirical research from the United States and abroad, Lusardi and Mitchell (2014) found that many individuals struggle to understand fundamental concepts such as compound interest, inflation, and risk diversification. They concluded that the low levels of financial literacy found in the United States are also prevalent internationally, indicating that financial illiteracy is not confined to a particular country or stage of economic development. To illustrate the consequences of limited financial knowledge, the authors reported that “sub-optimal refinancing among U.S. homeowners resulted in 0.5-1 percent per year higher mortgage interest rate, or in aggregate, \$50-100 billion annually” (Lusardi & Mitchell, 2014, p. 24). These findings point to substantial financial opportunities that many individuals miss because of gaps in basic financial knowledge, supporting the need for greater emphasis on financial literacy.

Cross-country studies have mainly viewed financial literacy as an outcome rather than a cause, linking it to both individual and institutional factors. Cupák et al. (2021) found that institutional factors, beyond individual characteristics alone, played a major role in explaining cross-country differences in financial literacy. Secondary-school enrollment had the strongest standardized relationship with the unexplained financial-literacy gap, followed by PISA math scores and stock-market capitalization, highlighting the importance of institutional environments in shaping financial literacy (Cupák et al., 2021, p. 430).

Davoli and Rodríguez-Planas demonstrated that the relationship between personal characteristics and financial literacy may vary by stage of economic development. The correlates of financial literacy vary

substantially across economic and institutional contexts. For example, patience may be positively associated with financial literacy in wealthier countries but negatively associated with financial literacy in lower-income countries. Their findings challenge the assumption that the correlates of financial literacy are consistent across countries (Davoli & Rodríguez-Planas, 2021).

Perez suggested that financial-literacy education can improve students' understanding of important financial concepts. However, the study measures knowledge and attitudes toward financial education rather than long-term financial behavior or entrepreneurial activity (Perez, 2025), limiting its ability to establish the broader impact of financial literacy.

A smaller body of literature extends financial literacy research to entrepreneurship. However, most of these studies examine the performance of businesses that have already been established rather than the formation of new ones, producing mixed results. Dahmen and Rodríguez found a strong association between firms' financial strength and owners' use of financial statements (Dahmen & Rodríguez, 2014). Similarly, Mogale et al. found that financial literacy and access to finance were positively associated with return on assets among 90 South African enterprises, but financial knowledge and attitudes alone were weaker predictors (Mogale et al., 2025). Conversely, Gali et al. found no significant relationship between financial literacy and financial performance among 68 students involved in Philippine family businesses, potentially because the students lacked decision-making authority and business outcomes depended on broader managerial and market conditions (Gali et al., 2026). Together, these findings suggest that financial knowledge alone may be insufficient; its effect may depend on whether owners can apply that knowledge, access financing, and exercise control over business decisions.

The studies pertaining to business performance each differ in the way business performance is assessed. Dahmen and Rodríguez measure whether owners actively use financial statements, whereas Gali et al. measure students' knowledge, awareness, and behavior even though those students may not control important business decisions (Dahmen & Rodríguez, 2014; Gali et al., 2026). Mogale et al. define business performance as return on investment (Mogale et al., 2025). Their mixed findings may reflect differences in how financial literacy is measured, who exercises decision-making authority, which performance indicators are used, and the economic contexts in which the firms operate. The literature therefore does not provide consistent evidence that financial knowledge by itself improves firm performance.

Existing research finds that financial literacy remains limited yet important in personal finance, linking higher financial literacy to improved individual outcomes such as saving, investing, and debt management. Given its established importance, much of the current literature examines the individual and institutional factors that contribute to differences in financial literacy, thereby treating financial literacy primarily as an outcome rather than as a potential cause of broader economic outcomes. The limited research that examines financial literacy as a cause mainly focuses on business performance. Because business performance is an ambiguous concept, the lack of consistent quantitative metrics across literature

makes comparative studies challenging. In addition, it encompasses numerous types of outcomes across a firm's life cycle, making it difficult to isolate the significance of a single factor, such as financial literacy.

Financial literacy may influence entrepreneurial entry because starting a business requires individuals to evaluate financing options, expected costs and returns, and financial risks before committing resources. Greater financial knowledge may reduce knowledge barriers to making these decisions and allow individuals to better assess whether a business opportunity is financially viable. However, financial literacy does not necessarily increase business formation in every case, as greater financial knowledge may also lead individuals to reject opportunities they consider excessively risky or unprofitable. Financial literacy may therefore influence not only how businesses perform after formation, but also the decision of whether to enter entrepreneurship in the first place.

Business formation therefore provides a more defined metric for entrepreneurial entry, capturing a specific and consistently defined event. In contrast with previous research on financial literacy and entrepreneurship, which focused largely on business performance, examining employer business formation isolates entrepreneurial entry and provides a measurable outcome that can be compared consistently across states and over time. This association between financial literacy and business formation at the aggregate level has rarely been examined. Macro-level studies more commonly treat financial literacy as an outcome explained by institutional, demographic, or historical conditions rather than as a factor potentially associated with broader economic activity.

This study addresses this gap by answering two questions: whether states with higher levels of financial literacy experience greater business formation, and whether increases in financial literacy within a state over time are associated with increases in formation within that same state. Its contribution is threefold. First, it focuses on entrepreneurial entry, a defined metric, instead of post-entry business performance by using employer business formation as a standardized and quantifiable outcome. Second, it places financial literacy, which is typically studied with individual outcomes such as financial behavior, household decision-making, or entrepreneurial performance, within a broader macro-level context by examining whether differences in financial literacy are associated with patterns of economic activity across states, in particular, business formation. Third, it separates between-state differences from within-state changes in financial literacy. This is important because a cross-sectional association between states may reflect persistent differences in factors such as income, labor-market conditions, institutions, or entrepreneurial culture rather than changes in financial literacy itself. By distinguishing whether states with higher average financial literacy have higher formation rates from whether increases in financial literacy within a given state are associated with increases in formation, the study provides a more precise examination of the relationship beyond persistent differences in states' economic and institutional environments.

METHOD

Variable Construction

State-level financial literacy rates were obtained from the National Financial Capability Study (NFCS) conducted by the FINRA Investor Education Foundation. Financial literacy was measured as the percentage of respondents in each state who correctly answered at least 5 of the 7 standardized financial literacy questions covering concepts such as interest rates, inflation, mortgages, risk diversification, and bond prices. The NFCS provides a large state-level dataset, with 25,500 participants answering the survey across U.S. states. However, FINRA's reliance on online non-probability quota sampling, a method in which researchers set specific quotas for demographic groups, may introduce selection bias because respondents are not selected randomly. In addition, the survey's online format may exclude people who are offline or have limited digital access (FINRA Investor Education Foundation, 2025).

Employer business formation data were obtained from the U.S. Census Bureau's Business Formation Statistics (BFS). Because employer business formation data were not available for the most recent four years, a spliced employer business formation measure was preferred. Unlike high-propensity business applications, this measure preserves observed employer formation as the outcome, while also allowing the formation window to be more closely aligned with the timing of the financial-literacy data than projected business formations. The BFS provides monthly estimates of employer business formations for each state. This study focuses exclusively on seasonally adjusted employer business formations, as seasonal adjustment removes predictable fluctuations that recur throughout the year and allows more meaningful comparisons. For each state and year from 2020 through 2025, the average monthly number of employer business formations was calculated by averaging the 12 monthly observations reported by the U.S. Census Bureau:

$$\bar{B}_{st} = \frac{1}{12} \sum_{m=1}^{12} B_{stm} \quad (1)$$

where $\bar{B}_{st}$ denotes the average monthly employer business formations in state s during year t . B_{stm} denotes the seasonally adjusted employer business formations in state s , year t , and month m from January to December.

Because complete monthly observations for 2026 were unavailable at the time of data collection, the average monthly number of employer business formations was calculated using the available months released by the Census Bureau:

$$\bar{B}_{s,2026} = \frac{1}{M} \sum_{m=1}^M B_{s,2026,m} \quad (2)$$

where $\bar{B}_{s,2026}$ denotes the average monthly employer business formations in state s in 2026. $B_{s,2026,m}$ denotes the seasonally adjusted employer business formations in state s , and month m of 2026, where M is the number of months for which 2026 data were available at the time of data collection.

The average monthly employer business formation counts were then standardized using annual state population estimates and expressed as formations per 100,000 residents:

$$SAR_{st} = \frac{\bar{B}_{st}}{P_{st}} \times 100,000 \quad (3)$$

where SAR_{st} denotes the employer business formation rate per 100,000 residents for state s in year t ; $\bar{B}_{st}$ is the average monthly number of employer business formations for state s in year t ; and P_{st} is the annual resident population of state s in year t .

For 2026, $\bar{B}_{st}$ in Equation (3) is replaced by the partial-year average calculated in Equation (2).

Annual state population estimates for 2020-2025 were obtained from the U.S. Census Bureau Population Estimates Program (PEP). As official Census estimates for 2026 were not yet available at the time of data collection, 2026 state population estimates were obtained from World Population Review. These population estimates were used to standardize employer business formation counts across states and years.

Population estimates corresponding to each study year were matched with employer business formation data. For 2026, the most recent population estimates available at the time of data collection were used.

The employer business formation rate measures the average number of new employer businesses formed each month per 100,000 residents, allowing comparisons across states with substantially different population sizes while maintaining consistency across the study period.

To account for differences in economic conditions across states, annual state personal income and unemployment rates were used, obtained from the U.S. Bureau of Economic Analysis and the Bureau of Labor Statistics, respectively. Quarterly personal income observations were averaged to construct annual values. For 2026, the available first-quarter observation was used because complete annual data were not yet available at the time of data collection. Monthly unemployment rates were similarly averaged within each year, with the 2026 average calculated using all months available at the time of data collection. Personal income serves as an indicator of overall economic prosperity, capturing differences in economic resources and access to capital, while the unemployment rate reflects labor market conditions that may influence entrepreneurial activity, such as incentives and opportunities for business creation. These

variables were included to account for selected economic conditions that may be associated with both financial literacy and business formation.

Statistical Analysis

As a preliminary analysis, the most straightforward approach was to examine the cross-sectional relationship between financial literacy and employer business formation using a single financial-literacy period to calculate annual cross-sectional Pearson correlations across states. Although the data were published in 2025, it was recorded in 2024, making 2024 the latest period. This analysis provides a simple descriptive assessment of whether states with higher current levels of financial literacy also tend to exhibit higher rates of employer business formation.

The main regression analysis required a more rigorous longitudinal approach. The annual state-level data were first divided into three observation periods corresponding to the survey waves with available financial literacy estimates. As the financial-literacy survey waves used in this study were conducted approximately every 3 years, the 2018 data was used for the 2020-2021 period; the 2021 data was used for the 2022-2024 period; the 2024 data was used for the 2025-2026 period. This method was incorporated to capture changes in financial literacy within states over time as well as persistent differences between states. Because this provided only three observations of financial literacy for each state, there was limited within-state variation over time. A conventional state fixed-effects model would absorb time-invariant between-state differences. A pooled OLS regression would use both within- and between-state variation but would not account for repeated observations of the same states or persistent differences between states. As a result, it would provide little additional insight beyond the preliminary correlation analysis. To better utilize the available information and account for repeated observations within states and differences across states, a mixed-effects within-between (Mundlak) model was used. This model was introduced by Mundlak to separate within-unit changes from between-unit differences (Mundlak, 1978).

The Mundlak specification separates each time-varying explanatory variable into two parts. The between-state component is calculated as each state's average value across all observation periods, representing persistent differences between states. The within-state component measures how much each observation differs from that state's average, capturing changes within the state over time. These two components, applied to financial literacy, personal income, and unemployment rate, allow the model to distinguish between two relationships: whether states with consistently higher financial literacy show higher rates of business formation than other states (the between-state effect), and whether changes in financial literacy within a state are associated with changes in business formation within that state over time (the within-state effect):

$$SAR_{st} = \beta_0 + \beta_1 FL_{st}^W + \beta_2 FL_s^B + \beta_3 INC_{st}^W + \beta_4 INC_s^B$$

$$+ \beta_5 UNEMP_{st}^W + \beta_6 UNEMP_s^B + \gamma_t + \alpha_s + \varepsilon_{st} \quad (4)$$

where SAR_{st} denotes the employer business formation rate per 100,000 residents for state s during period t ; FL_{st}^W and FL_s^B represent the within-state and between-state components of financial literacy, respectively; INC_{st}^W and INC_s^B denote the within-state and between-state components of state personal income; $UNEMP_{st}^W$ and $UNEMP_s^B$ denote the within-state and between-state components of the unemployment rate; γ_t denotes the survey-period indicator variables; α_s is the state-specific random intercept capturing time-invariant heterogeneity across states; and ε_{st} is the idiosyncratic error term.

Random intercepts were included for each state to account for persistent unobserved heterogeneity, including differences in institutional environments, regulatory frameworks, entrepreneurial culture, and other time-invariant characteristics that may influence business formation. Period indicators were included to account for nationwide changes over time that may have affected business formation. All models were estimated using Restricted Maximum Likelihood (REML). Statistical significance was evaluated at the 5% level, and all data processing and statistical analyses were conducted in Python using the pandas and statsmodels libraries.

RESULTS

Preliminary Correlation Analysis

Pearson correlation coefficients were calculated between 2024 state financial-literacy scores and employer business formation rates for each year from 2020 to 2026, providing an initial assessment of the relationship between state-level financial literacy and employer business formation. A two-tailed t-test was used to evaluate the significance of each annual correlation coefficient. From 2020 to 2026, the estimated correlation coefficients remained positive, ranging from approximately .30 to .40, as shown in Figure 1A. The p-values remained below .05, meaning that all correlations were statistically significant. Although these findings show a positive descriptive correlation between financial literacy and employer business formation over time, the small to moderate correlation provides only a raw bivariate relationship and does not account for other economic conditions that may influence business formation. Regression analysis was therefore used to determine whether the association persists after accounting for these factors.

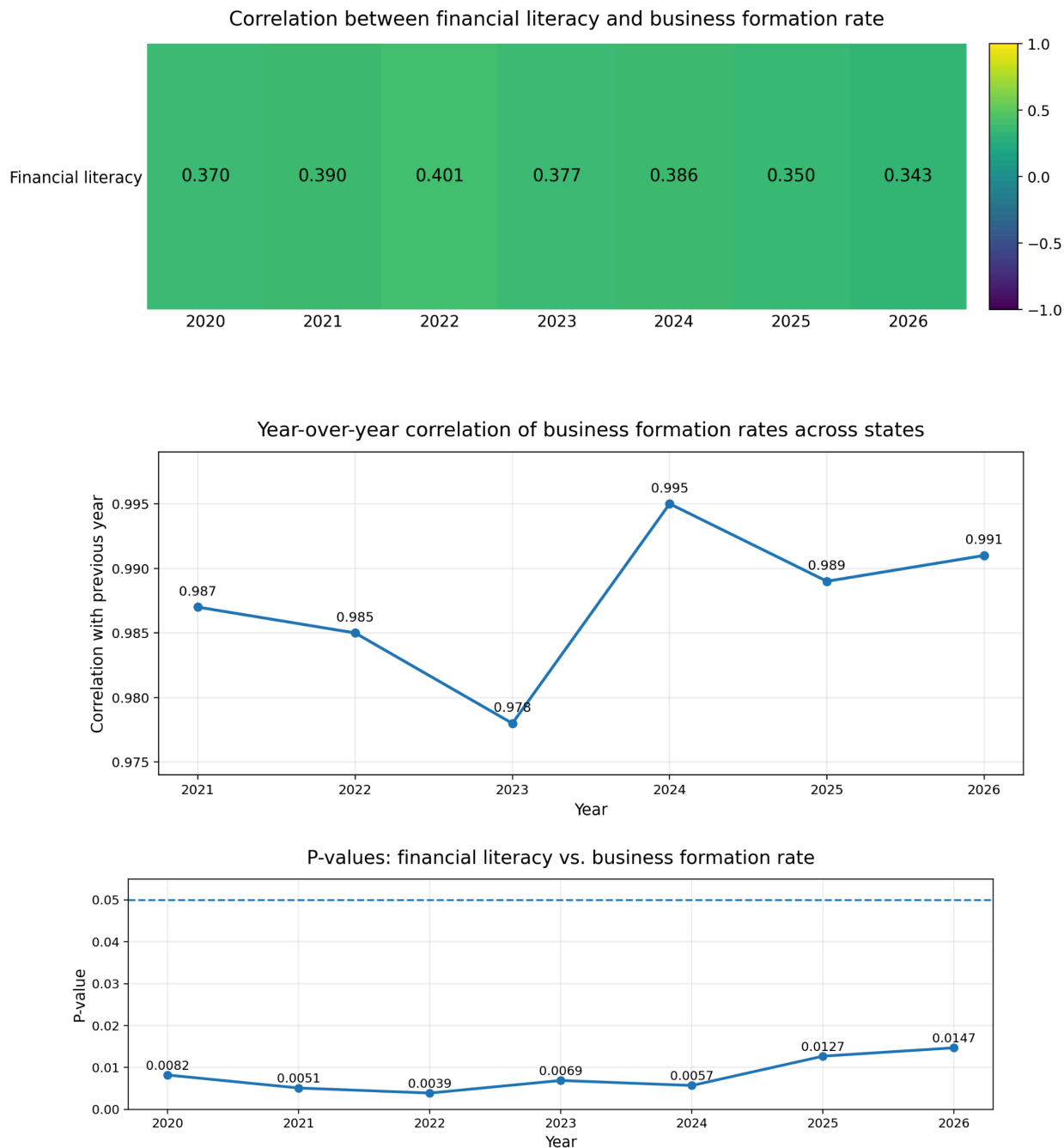


Figure 1. (A, top) Correlation between most recent data on financial literacy across states and business formation rates. (B, middle) Correlation between business formation rates between years, with all correlation coefficients being statistically significant. (C, bottom) The p-values for the correlations between financial literacy and business formation rates.

Employer business formation rates exhibited substantial persistence across states over time. As shown in Figure 1B, Pearson correlations between consecutive years exceeded 0.97 in every comparison and were statistically significant, indicating that states with relatively high employer business formation rates generally maintained those relative positions throughout the study period. This persistence suggests that entrepreneurial activity is influenced by state-specific characteristics, supporting the use of regression analysis that accounts for repeated observations within states.

While these descriptive analyses provide useful insight into the raw relationships present in the data, correlation analysis does not account for differences in economic conditions or repeated observations within states. In response, a multivariate panel-data model was estimated to determine whether financial literacy remained significantly associated with employer business formation after controlling for additional state-level characteristics and unobserved heterogeneity.

Mixed Linear Regression Results

Table 1 reports the estimates from the mixed-effects linear regression model examining the relationship between state-level financial literacy and employer business formation. A baseline model is presented alongside a model with economic control variables as a specification check, showing whether the financial-literacy association persists after accounting for plausible confounders.

Table 1A. Baseline Mixed-Effects Linear Regression Model

Variable	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>	95% CI
Intercept	-2.402	2.230	-1.077	.282	[-6.773, 1.970]
Financial literacy	38.062	8.006	4.754	< .001	[22.371, 53.753]
State intercept variance	10.282	1.787	—	—	—

Across both mixed linear regressions, financial literacy was positively and statistically significantly associated with the business formation rate. In the baseline model including all 50 states, financial literacy had a coefficient ($B = 38.062$, $p < .001$).

Table 1B. Mixed-Effects Linear Regression Model With Economic Controls

Variable	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>	95% CI
Intercept	-5.669	3.109	-1.824	.068	[-11.762, .423]

Financial literacy	28.943	11.026	2.625	.009	[7.333, 50.552]
State personal income (\$1,000s)	.070	.027	2.587	.010	[.017, .124]
Percent unemployed	.227	.130	1.743	.081	[-.028, .483]
State intercept variance	10.448	1.871	—	—	—

The relationship also remained significant after accounting for economic controls. After personal income and unemployment were added, financial literacy remained positively and statistically significantly associated with business formation ($B = 28.943$, $p = .009$, 95% CI: 7.333, 50.552). Personal income was also statistically significant ($B = .070$, $p = .010$, 95% CI: 0.017, 0.124), whereas unemployment was not ($B = .227$, $p = .081$, 95% CI: -0.028, 0.483). Financial literacy remained positively associated with business formation across each of the two specifications, although the magnitude of its estimated coefficient varied considerably across models.

In practical terms, the coefficient indicates that a one-percentage-point increase in financial literacy was associated with an estimated 0.29 additional employer business formations per 100,000 residents per month, holding personal income and unemployment constant.

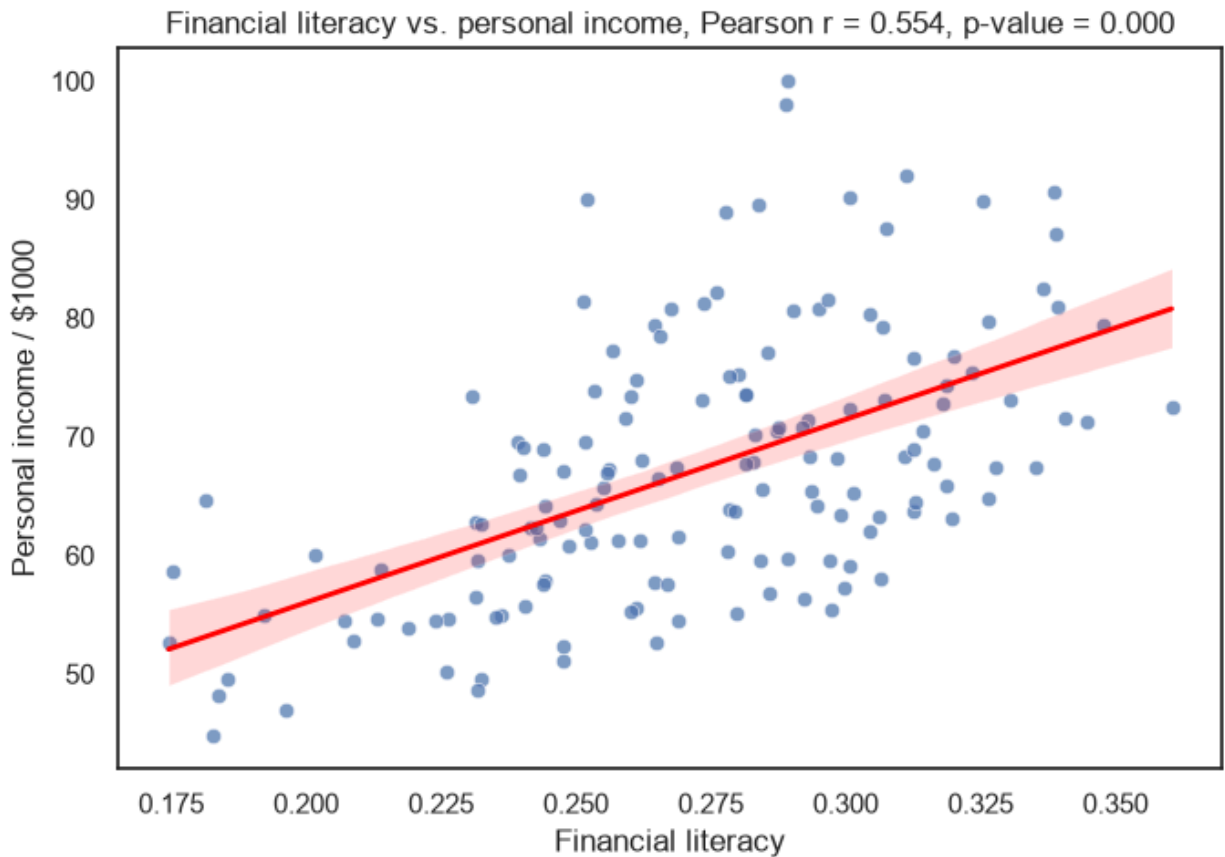


Figure 2. Correlation between financial literacy scores and state personal income across all states

There is a statistically significant, moderate positive correlation between financial literacy and personal income ($r = .554$, $p < .001$).

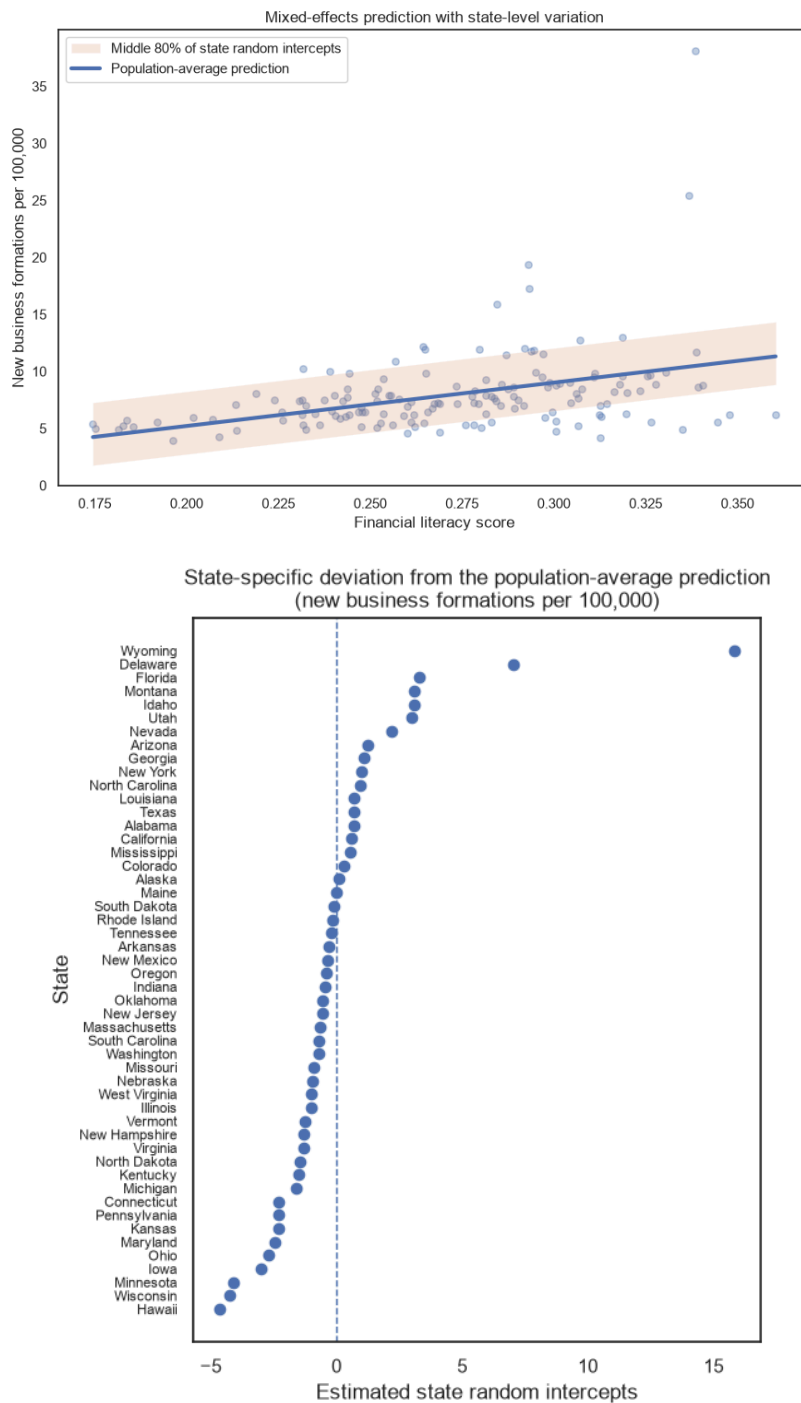


Figure 3. (A, top) Mixed-effects prediction for new business formations as a function of financial literacy score with state-level variation. (B, bottom) State random intercepts for the regression model.

The mixed-effects model identified a positive and statistically significant association between financial literacy and employer business formation per 100,000 residents after controlling for personal income and unemployment. Figure 3A displays the positive population-average relationship between financial literacy and employer business formation alongside observed state-level variation. Figure 3B displays the estimated state random intercepts, representing each state's deviation from the population-average prediction. Wyoming exhibited by far the largest positive state-specific deviation, while most states were substantially closer to the population-average prediction.

Mixed-Effects Within-Between Regression Results

Table 2A reports the estimates from the mixed-effects within-between (Mundlak) regression model examining the relationship between state-level financial literacy and employer business formation.

Table 2A. Baseline Mixed-Effects Within-Between (Mundlak) Model

Variable	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>	95% CI
Intercept	-.884	3.463	-.255	.799	[-7.670, 5.903]
Period: 2022–2024	-.653	.497	-1.315	.189	[-1.627, .321]
Period: 2025–2026	-.031	.505	-.062	.950	[-1.021, .958]
Financial literacy (within-state)	52.210	18.743	2.786	.005	[15.475, 88.945]
Financial literacy (between-state)	33.326	12.541	2.657	.008	[8.746, 57.906]
State intercept variance	10.404	1.844	—	—	—

The baseline Mundlak specification included period indicators together with the within-state and between-state components of financial literacy. Both the within-state and between-state financial-literacy coefficients were positive and statistically significant ($B = 52.210$, $p = .005$) and ($B = 33.326$, $p = .008$). A one-percentage-point increase in financial literacy within states is associated with a 0.52 additional

employer business formations per 100,000 residents per month [95% CI: 0.15, 0.89], while a one-percentage-point increase in financial literacy between states is associated with another 0.33 additional employer business formations per 100,000 residents per month [95% CI: 0.087, 0.58]. The period indicators for 2022–2024 and 2025–2026 were not statistically significant in the baseline specification.

Table 2B. Mixed-Effects Within-Between (Mundlak) Model With Economic Controls

Variable	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>	95% CI
Intercept	1.771	5.085	.348	.728	[-8.195, 11.737]
Period: 2022–2024	-3.470	1.093	-3.173	.002	[-5.613, -1.327]
Period: 2025–2026	-5.926	1.691	-3.505	< .001	[-9.240, -2.612]
Financial literacy (within-state)	38.504	18.046	2.134	.033	[3.135, 73.873]
Financial literacy (between-state)	23.669	17.142	1.381	.167	[-9.928, 57.266]
Personal income (within-state, \$1,000s)	.434	.112	3.889	< .001	[.215, .653]
Personal income (between-state, \$1,000s)	.060	.069	.873	.383	[-.075, .195]
Unemployment (within-state)	.138	.231	.596	.551	[-.316, .591]
Unemployment (between-state)	-.256	.609	-.421	.674	[-1.449, .937]
State intercept variance	10.790	2.053			

When personal income and unemployment were added to the model, the within-state financial-literacy coefficient remained positive and statistically significant ($B = 38.504$, $p = .033$, 95% CI: 3.135, 73.873), while the between-state financial-literacy coefficient was no longer statistically significant ($B = 23.669$, $p = .167$, 95% CI: -9.928, 57.266). The 95% confidence intervals for both are slightly depressed and broadened. For the within-state estimate, a one-percentage-point increase in financial literacy relative to a state's average was associated with approximately 0.39 additional employer business formations per 100,000 residents per month, holding the other variables constant. Neither the within-state nor between-state unemployment terms were statistically significant. The between-state income coefficient was statistically insignificant ($B = .060$, $p = .383$), while the within-state income coefficient was statistically significant ($B = .434$, $p < .001$). Both the 2022-2024 and 2025–2026 period indicators were significant and negative ($B = -3.470$, $p = .002$) ($B = -5.926$, $p < .001$).

The within-between model reveals a distinction not apparent in the simpler mixed-effects specification. In the baseline Mundlak model, both the within-state and between-state components of financial literacy were positively and statistically significantly associated with business formation. After personal income and unemployment were added, however, only the within-state financial-literacy association remained statistically significant. This suggests that the between-state association may partly overlap with persistent differences in economic conditions across states; variables such as personal income and unemployment partly absorb the heterogeneity across business formation outcomes. Conversely, the fact that within-state components remained statistically significant highlights that improvements in financial literacy within a given state exert an independent effect on business formations beyond what is expected from other changes in economic health, regardless of broader, static macroeconomic disparities between states.

DISCUSSION

The descriptive analysis, mixed-effects linear regression, and mixed-effects within-between (Mundlak) regression all show a positive association between financial literacy and employer business formation. The initial correlation analysis (Figure 1) provides a baseline view of the relationship between the variables, while the regression models assess the relationship after accounting for economic conditions, time effects, and state-level differences.

Personal income was significantly associated with business formation in the mixed-effects linear regression (Table 1). The Mundlak analysis provides more specific conclusions by separating changes occurring within states over time from persistent differences between states (Table 2). In the controlled Mundlak regression, only the within-state component of personal income was statistically significant, while the between-state component was not. This suggests that increases in personal income within a state were associated with increases in business formation within that same state over time, whereas persistent differences in personal income across states were not independently associated with business formation after accounting for the other variables in the model.

Although entrepreneurial activity depends on many structural characteristics, including industry composition, access to capital, regulation, and demographics, the mixed-effects linear regressions show that the positive association between financial literacy and business formation remains statistically significant after controlling for differences in state economic conditions, such as income and unemployment (Table 1). In the baseline Mundlak specification, both the within-state and between-state components of financial literacy were positively and significantly associated with business formation. However, after controlling for income and unemployment, the within-state component remained statistically significant while the between-state component was no longer statistically significant, suggesting that persistent differences in financial literacy across states may partly overlap with other state characteristics. In contrast, increases in financial literacy within a state remained significantly associated with increases in business formation within that same state over time. The persistence of this within-state association after the inclusion of economic controls provides the strongest evidence in this study for a relationship between financial literacy and business formation.

The magnitude of the within-state financial-literacy association was also substantial, with a one-percentage-point increase in financial literacy associated with approximately 0.39 additional employer business formations per 100,000 residents per month. However, its 95% confidence interval indicates considerable uncertainty regarding the precise magnitude of the estimated association. This imprecision is consistent with the relatively few observations in the panel, which contains only three observations per state. Substantial state-level variation also remained (Figure 3B) after accounting for financial literacy, income, and unemployment, indicating that financial literacy and the included economic conditions do not fully explain differences in entrepreneurial entry across states.

Financial literacy and personal income were moderately correlated ($r = .554$), indicating that states with higher incomes tended to exhibit higher levels of financial literacy. This relationship raises the possibility that part of the observed association between financial literacy and business formation could reflect differences in state income rather than financial literacy itself. Importantly, financial literacy remained statistically significant in the linear regression after personal income and the other economic conditions were included, suggesting that the overall financial-literacy association in the mixed-effects linear model is not solely attributable to its relationship with income. In the Mundlak regression, both the within-state and between-state components of financial literacy were initially significant, but after controlling for other economic conditions, only within-state financial literacy remained significant. This pattern is similar to that observed for personal income and suggests that, in the controlled Mundlak specification, the associations of both financial literacy and income with business formation are more evident for changes occurring within states over time than for persistent differences across states.

As seen in Figure 3B, Wyoming exceeds the estimated state random intercept by approximately 15, a deviation of almost 10 more than the next biggest state deviation. Wyoming's unusually high business formation rate may partly reflect the interaction between its small population of around half a million residents and economic opportunities generated by major industries such as agriculture, a multibillion-dollar industry in Wyoming alone (U.S. Census Bureau, n.d.; Wyoming Economic Development Association, 2024). Because business formation is standardized per 100,000 residents,

relatively high formation activity within a small population can produce an unusually large per-capita rate. However, these factors cannot independently explain Wyoming's outlier status, as similar characteristics are present in other states.

Within-state changes in financial literacy (as well as personal income) are found to be significantly and positively correlated with increases in business formations. While the data and analysis is insufficient to establish a causal relationship, by isolating within-state changes, which represent each state's own temporal variations relative to its overall mean, from between-state changes, which represent static differences unique to each state's economic and educational environment, the analysis shown here suggest that gains in financial literacy and in business formation move together within the same state over time, independent of that state's long-term economic baseline.

Nevertheless, because of the limited, time-averaged three survey waves, the timing between financial literacy improvement and business creation cannot be strictly decoupled. Unobserved, time-varying factors such as state-level policy reforms, small business support programs, or shifts in regional economic conditions could simultaneously enhance financial literacy and incentivize entrepreneurship concurrently.

Financial literacy does not necessarily encourage business formation in every case. Greater financial knowledge may also lead individuals to reject unprofitable or excessively risky opportunities. The positive association observed in this study is consistent with the possibility that reductions in informational and financial barriers to entrepreneurial entry may outweigh this screening effect.

The evidence therefore suggests that financial literacy may be one factor associated with the environment for business formation, particularly through changes occurring within states over time, but the results do not establish financial literacy as an independent causal driver of entrepreneurship.

LIMITATIONS AND FUTURE STUDIES

Several limitations should be considered when interpreting this study's findings. First, financial-literacy estimates were available for only three survey waves. Although the within-between (Mundlak) specification uses the available information to distinguish changes within states from persistent differences between states, additional survey waves would improve the precision and reliability of the estimated within-state relationship by capturing longer-term patterns and changes in the data.

Furthermore, the use of spliced employer business formation rates introduces some limitations regarding the timing of the observed relationship. Although the constructed periods allow observed business formations to be more closely aligned with the financial-literacy data, they cannot establish whether changes in financial literacy occurred before changes in business formation or account for potential delayed effects. However, this limitation is reduced by the construction of the business formation measure. The underlying BFS data are reported monthly and were aggregated into average monthly formation rates for each year, smoothing short-term monthly fluctuations and reducing the influence of

the precise timing of individual formations. Furthermore, the same splicing procedure was applied consistently across all states, and period indicators were included in the Mundlak model to account for common differences across the constructed observation periods. As a result, the analysis is intended to capture broader changes in business formation across periods rather than short-term responses at a particular point in time. Nevertheless, the observed relationship should still be interpreted as an association rather than evidence that changes in financial literacy directly preceded or caused changes in business formation.

Third, the study is observational and therefore cannot establish that financial literacy causes employer business formation. Although the model controls for personal income, unemployment, survey-period effects, and persistent state-level heterogeneity, many variables that affect both financial literacy and entrepreneurial activity have yet to be included in the model. Factors such as educational attainment, state business regulations, taxation, industrial composition, venture-capital availability, and demographic change may influence the estimated relationship. Reverse causality may also be possible if states with greater entrepreneurial activity provide residents with more opportunities to acquire and apply financial knowledge. The results should therefore be interpreted as evidence of association rather than causation. Future studies could look at policy changes, such as the staggered adoption of state financial-education mandates, to support stronger causal inference.

Fourth, employer business formation measures the creation of new employer businesses rather than their long-term performance or success. A higher formation rate does not necessarily mean that more businesses survive, expand, create sustained employment, or generate greater revenue. Business formation represents the initial stage of entrepreneurship, but measures such as survival rates, length of operation, revenue growth, and employment growth would provide a more complete assessment of entrepreneurial outcomes. Consistent state-level longitudinal data for these measures are more difficult to obtain, but incorporating them into future analyses could reveal whether financial literacy is associated not only with starting businesses but also with sustaining and expanding them.

The study period also overlaps with the COVID-19 pandemic, which produced unusual changes in business formation and economic activity. Because of this, changes in formation during later periods may partly reflect post-pandemic adjustments or other pandemic-related conditions rather than changes in financial literacy. Period indicators were included to account for common nationwide shifts across survey waves; however, the short panel and broad survey periods prevent pandemic-related effects from being fully isolated. Future research using a longer pre- and post-pandemic panel is needed to determine whether the observed relationship persists over time.

Finally, substantial differences in business formation persisted across states even after accounting for the variables included in the models. The state random intercepts account statistically for persistent differences between states but cannot identify the specific factors responsible for them. Future research using longer panels and additional state-level variables could examine these factors more directly.

CONCLUSION

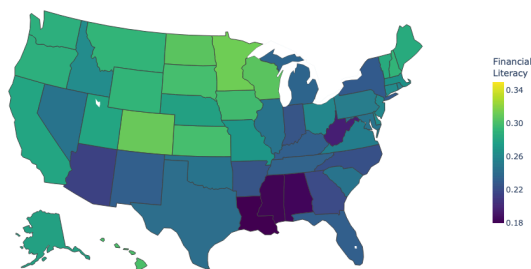
This study examined the relationship between state-level financial literacy and employer business formation across the United States from 2020 to 2026. The results provide evidence of a positive association between financial literacy and business formation after accounting for selected state economic conditions.

The Mundlak analysis further showed that both within-state and between-state financial literacy were initially associated with business formation. However, after controlling for economic conditions, only the within-state association remained statistically significant, while the between-state association was no longer statistically significant. This suggests that increases in financial literacy within a state are associated with increases in business formation within that same state over time, while persistent differences in financial literacy across states may partly reflect other state-level characteristics. Interestingly, personal income exhibited a similar pattern: although both financial literacy and personal income were significant in the controlled mixed-effects linear regression, only their within-state components remained significant in the controlled Mundlak model.

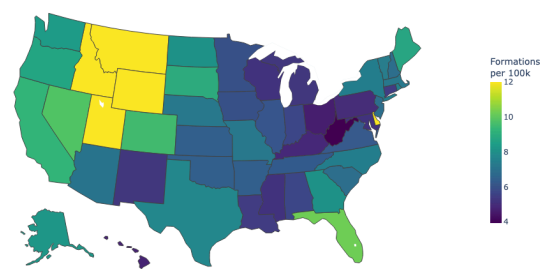
These findings do not establish financial literacy as a causal determinant of entrepreneurship. Instead, they suggest that financial literacy may be one component of the broader environment associated with business creation, alongside economic opportunity, labor-market conditions, access to capital, institutions, and other factors. Further research using longer panels and individual-level data is needed to determine whether improvements in financial literacy directly influence entrepreneurial entry and long-term business outcomes.

APPENDIX

Financial Literacy by State



New Business Formations per 100,000 by State (95th percentile cap)



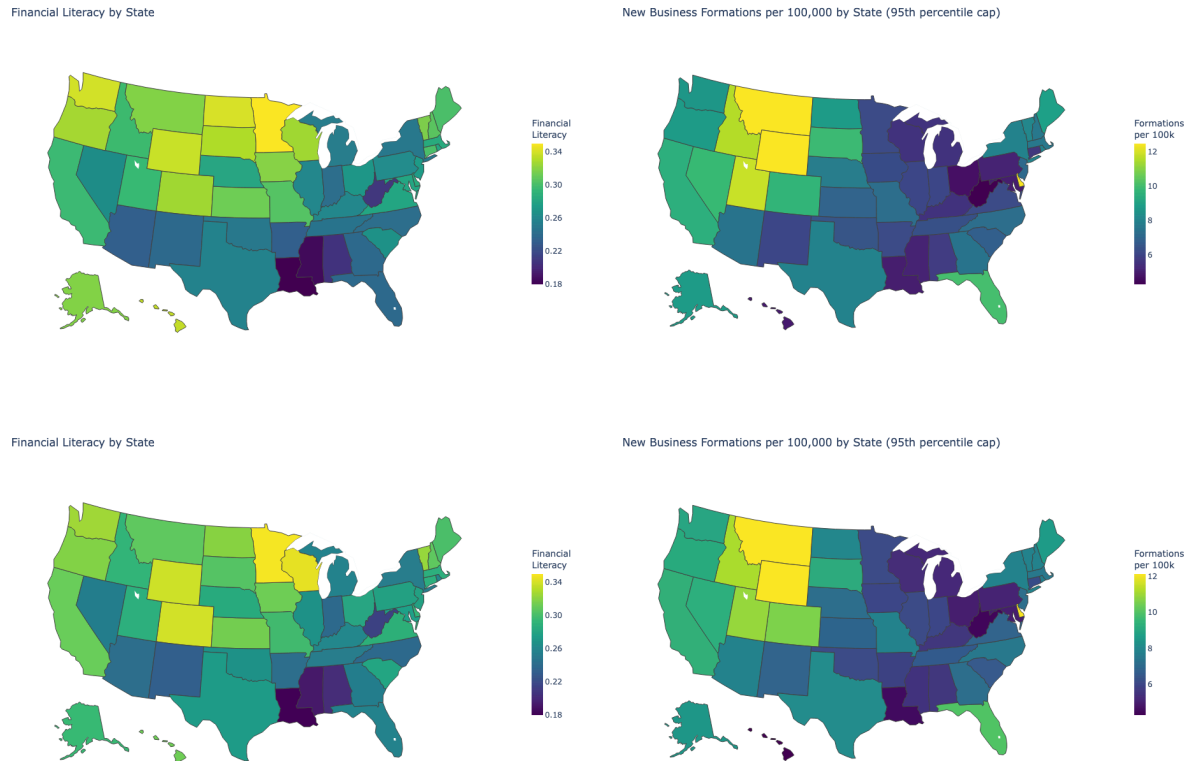


Figure A1. Financial Literacy Rates by state in the 2020-2021 (top left), 2022-2024 (middle left), and 2025-2026 period (bottom left); Business Formation Rates by state in the 2020-2021 (top right), 2022-2024 (middle right) and 2025-2026 period (bottom right).

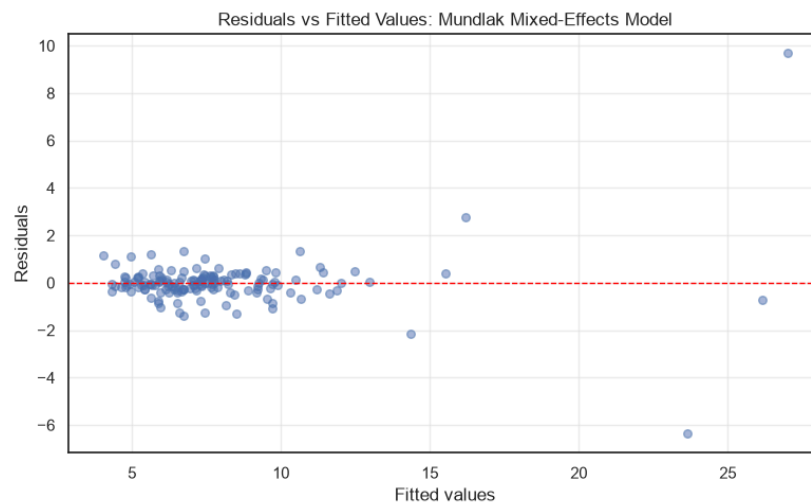


Figure A2. Residuals of original model (with Wyoming, with all variables)

Table A3. Descriptive Statistics for Study Variables

Variable	N	Mean	SD	Min	Max
Employer business formation rate	150	7.964147	3.766448	3.951021	38.11679
Financial literacy	150	0.272339	0.03968	0.1745	0.3604
Personal income (\$1,000s)	150	67.188667	11.069004	44.7945	99.972
Unemployment (%)	150	4.491667	1.548031	1.83333	10.15

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