



Geographic and Community Correlates of College Savings: Evidence from the Universe of Pennsylvania 529 Accounts

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Abstract

College savings behaviors are associated with students' postsecondary enrollment and degree attainment. While prior research has focused on economic and sociological influences, less is known about how geographic and community factors relate to savings. Using administrative data on nearly 200,000 Pennsylvania 529 accounts linked with community-level indicators, this study explores how place descriptively relates to plan selection, contribution amounts, and saving frequency. Results indicate that community characteristics and resources—such as socioeconomic status, income inequality, and the presence of local nonprofit organizations—are consistently associated with various college savings behaviors. The findings describe how savings behaviors among account owners vary across communities and offer insights for policymakers and researchers alike seeking to better understand existing college savings behavior and opportunities for targeting future savings interventions.

Keywords: 529 plans; college savings; communities; descriptive analysis; income inequality; Pennsylvania; socioeconomic status; sociology of education

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Disclosures

Robert Nathenson discloses prior work on behalf of the Pennsylvania Treasury.

Introduction

Earning a college credential is now central to upward social mobility (Chetty et al., 2020). Individuals with a postsecondary credential, on average, earn more, live longer, and generate positive externalities for society (Pender et al., 2026). Yet access to college remains sharply divided along racial, socioeconomic, and geographic lines, in part because rising college prices and declining affordability disproportionately affect students from groups traditionally underrepresented in higher education (Dynarski et al., 2022). Since 2000, the average price of tuition and fees at public, four-year colleges has risen 82% in constant dollars, while real median household income has grown just 17% (College Board, 2025; Federal Reserve Bank of St. Louis, 2025).

Students and families typically pay for college through some combination of savings, grants, and loans. Federal and state aid has not kept pace with rising costs, and evidence on the costs and benefits of loans for key groups—like students of color and those enrolled at community colleges—remains mixed (Long & Riley, 2007). A broad literature has considered family savings for college and its relationship to enrollment and attainment (e.g., Cheatham & Elliott, 2013; Conley, 2001; Hamilton, 2013), focusing predominantly on how race, gender, parental education, and earnings shape savings behaviors (Hillman et al., 2015; Quadlin & Conwell, 2021; Song & Elliott, 2012). Yet despite the salience of place in students' educational and economic trajectories (Chetty & Hendren, 2018; Odle, 2022), geographic and community-level factors remain largely absent from research. González Canché (2022) mapped the zip-code distribution of federal student loan interest deductions, and Briscese et al. (2025) found that 529 participation in Illinois was concentrated among higher-income, more-educated zip codes. These studies show that geography relates to who benefits from education tax advantages and who

holds a savings account. We extend this work to the intensive margin: Among individuals who already have an account, how do geographic and community factors relate to which plan they select, how much they contribute, and how often? Because holding a college savings account is an important correlate of college-going, understanding how place relates to account use may help unpack existing inequalities in college-going.

A growing body of evidence links geographic and community features to students' educational opportunities and outcomes (Chetty, Hendren, & Katz, 2016; Chetty, Hendren, Kline, et al., 2014; Chetty, Hendren, Lin, et al., 2016). Local institutions can foster individual social capital (Roman & Moore, 2004), and features of communities (e.g., educational attainment and racial/ethnic composition) relate to financial literacy and the availability of financial resources (Faber, 2019; Lachance, 2014). We might similarly expect college savings behaviors to vary with both community features (e.g., demographics, educational attainment, income inequality) and community resources (e.g., institutions and organizations). Both may aid the transmission of the importance of saving and knowledge of college savings options, including 529 accounts. This may ultimately influence whether and how individuals develop “college-bound identities” and save for college (Elliott et al., 2011).

In this study, we pair administrative records on the universe of Pennsylvania 529 (PA529) account owners and beneficiaries with zip-code-level community indicators to descriptively explore which community features and resources are associated with savings behaviors, including plan selection, contribution amounts, and contribution frequency. In doing so, we extend research on college savings and the role of place in shaping students' educational opportunities. We also generate information that may help policymakers identify features of communities where savings-support resources could be targeted.

Literature Review

College Savings

College savings is associated with whether and where students enroll in college, and whether they earn a credential (Charles et al., 2007; Elliott & Beverly, 2011). While prior studies identify a correlational link between savings and enrollment, more recent work estimates quasi-experimental impacts (Arbour et al., 2026; Song & Petracchi, 2020). Students whose families have *not* saved for college enroll at lower rates, a gap that is larger for Hispanic students than for their white counterparts (O'Connor et al., 2010). Among families with newborns, Hispanic families were more likely to state that it was “too early” to save for college, suggesting that family savings behaviors may be entrenched early in a child’s life (Nathenson & Pennsylvania Treasury Department, 2021). Proximity to other families who do or do not save for college may help explain how these beliefs develop, concentrate, and spread.

Savings provide financial resources to pay for college and may also shape parents’ and students’ educational aspirations, a rationale behind the widespread implementation of College Savings Account (CSA) programs at state and local levels. Aspirations, in turn, relate to K-12 achievement and college enrollment (Nelson, 1972; Somers et al., 2002)—and are importantly shaped by students’ environments, including individual, familial, peer, school, and community characteristics (Antonio, 2004; Ceja, 2004; Kiyama, 2010; Stewart et al., 2007). Elliott et al. (2011) and Zhan and Sherraden (2003) found a strong link between students’ college expectations and savings. Much of this work relies on observational designs (e.g., matching or regression adjustment) that adjust for observed differences between savers and non-savers but cannot rule out selection on unobserved characteristics. Taken together, this evidence suggests

college savings may shape educational aspiration, enrollment, and attainment—and that *place* appears to play an important role.

While almost every state offers a CSA program, typically through 529 account, it is important to note the difference between the *conceptual* benefits of CSAs and their effects in practice. While the theoretical tax benefits of 529 accounts (e.g., state tax deductions or credits, tax-free growth, and/or tax-free withdrawals) apply universally, take-up is especially concentrated amongst higher-income households (Briscese et al., 2025), and the largest tax benefits accrue in lock-step with contribution size (Reeves & Joo, 2017). Households with smaller tax burdens, including lower-income families, thus experience the fewest tax benefits. Even though universal programs and those that incentivize automated contributions expand the potential use of CSAs to a broader set of families, 529 programs can be considered regressive—predominantly benefitting families with the least need (Reeves & Joo, 2017).

Family Influences on College Savings

Prior work shows that family characteristics relate to whether, when, and how much families save for college. Savings and savings expectations vary by race, gender, parental education, income, and family size (Hillman et al., 2015; Sallie Mae & Ipsos, 2025; Steelman & Powell, 1989). These factors also intersect. Families of Black children save less than those of white children, and savings for *high-achieving* Black girls are equivalent to those for Black girls with the weakest academic records (Quadlin & Conwell, 2021). What families know and expect matters as well. Parents' knowledge of college costs strongly relate to saving (Hossler & Vesper, 1993), and among Hispanic families, expectations for children's achievement mediate the relationship between savings and enrollment (Song & Elliott, 2012). Because several of these factors, such as income, also cluster geographically (Reardon & Bischoff, 2011), where account

holders live may relate to the choices they make, including which plan they select and how much and how often they contribute. These relationships, particularly on the intensive margin *among savers*, remain largely unexamined.

The Role of Place

Where children grow up shapes their educational and economic trajectories. Studies using families who move (Chetty & Hendren, 2018) and the random assignment of housing assistance (Chetty, Hendren, & Katz, 2016) show that growing up in lower poverty neighborhoods improves long-run economic outcomes. Descriptively, upward mobility is higher in places with less residential segregation and income inequality, better K-12 schools, more social capital, and greater family stability (Chetty, Hendren, Kline, et al., 2014). Income, the prevalence of racial/ethnic minority and single-parent families, and neighborhood disadvantage also related to students' short- and long-run outcomes (Chetty, Hendren, Lin, et al., 2016). Many of these features, including socioeconomic status, inequality, disadvantage, schools, and local organizations, parallel the community measures we examine here.

We expect college savings behaviors to vary with where individuals live for two reasons. First, families sort into neighborhoods by income (Reardon & Bischoff, 2011) and other characteristics that may also predict saving, so savings may vary across places simply because likely savers cluster together. Second, neighbors' educational attainment or income, concentrated disadvantage, and local institutions may relate to savings beyond the characteristics of any one family—features of a neighborhood itself. Several studies above use movers or random assignment to separate these explanations (Chetty & Hendren, 2018; Chetty, Hendren, & Katz, 2016), but our data cannot. We therefore treat our community measures as describing how savings behaviors among account owners vary across communities (i.e., variation that

necessarily reflects differences across account owners and across communities), rather than as estimates of the *effects* of place on savings.

Features of communities relate to financial resources and to important outcomes like financial literacy. The kinds of financial institutions available in a neighborhood vary widely with racial/ethnic composition and income (Faber, 2019), and a zip code's average education level is the strongest predictor of residents' financial literacy (Lachance, 2014). Lachance (2014) attributed this finding to the impact of individuals' advantaged or disadvantaged social networks.

Local institutions and organizations may also matter. The number of community-based, social service, religious, and pro-social organizations in a neighborhood is positively related to individuals' engagement, trust, and social cohesion (Roman & Moore, 2004). K-12 schools likewise serve as long-standing neighborhood institutions, often hosting after-school and summer programs for children, adult education (e.g., high school equivalency, English as a Second Language classes), health and civic services (e.g., blood drives, flu shots, polling stations), and college and career fairs. We might therefore expect nonprofit organizations and schools, alongside community features (the presence of college-educated or college-saving individuals), to relate to college savings behaviors through similar hypothesized mechanisms: by facilitating social networks and peer effects, transmitting college-going or college-saving information, and/or providing structural resources. Documenting those *mechanisms* is beyond the scope of this descriptive study.

Pennsylvania's 529 College and Career Savings Program

Pennsylvania holds an important place in the college savings arena. In 2019, the state legislature became among the first to create a universal (no income eligibility requirement), automatic, at-birth CSA program, "Keystone Scholars." Keystone Scholars was designed to

minimize burden on families and maximize value, incorporating nine of the ten recommended design elements for these programs as described by Michael Sherraden, Margaret Clancy, and colleagues, who are widely recognized as pioneers of the CSA field (Huang et al., 2021). The Pennsylvania Treasury runs the program, where \$100 is automatically invested into a PA529 CSA for every baby born or adopted by a family residing in Pennsylvania. Keystone Scholars doubled the likelihood a family opened a PA529 account within the first year of a child's life (Nathenson & Pennsylvania Treasury Department, 2022). The Treasury also administers the umbrella, state-sponsored 529 program, which has more than 342,000 unique PA529 accounts and more than \$10 billion in total assets (Pennsylvania Treasury Department, 2026a), reflective of the state's relative scale as the fifth largest state and sixth largest economy in the nation. Of states with a universal CSA, Pennsylvania is the only one to receive a gold rating from Morningstar consecutively for the last three years, suggesting the state is both a leader in CSA innovation and management (Pennsylvania Treasury Department, 2026b).

Pennsylvania is also geographically diverse, where more than 70% of counties are classified as rural (Center for Rural Pennsylvania, 2020). Just over half of the population is clustered in two population centers of Pittsburgh in the southwestern and Philadelphia in the southeastern corners of the state, which contribute to significant regional variation in income and wealth as observations move from the state's most urban centers through suburban regions and into rural zones (Briem, 2026; Pennsylvania Department of Human Services, 2024; Pennsylvania Department of Labor & Industry, 2020). At the same time, Pennsylvania is consistently ranked as one of the most unaffordable states for higher education. It is in the bottom 10% of U.S. states with respect to state support per postsecondary student, cost of attendance, and average student loan debt (McCann, 2025; Pennsylvania State Board of Higher Education, 2026; Polson, 2022).

This suggests that college savings may play a particularly important role for Pennsylvania families' ability to pay, and, ultimately, postsecondary enrollment behavior.

The PA529 account program has no income limit or restriction on who can contribute, and the minimum contribution is currently \$1. Contributions are deductible from state income tax, and earnings and qualified withdrawals for in-state or out-of-state higher-education costs are free of federal and state income tax. Under current rules, some of which follow our analytic window, contributions can also be used for some expenses in recognized credential and registered apprenticeship programs, and up to \$20,000 per year for elementary or secondary school tuition (Pennsylvania Treasury Department, 2026a). Owners invested in one of two ways: the Guaranteed Savings Plan (GSP), a lower-risk plan managed by the Treasury and indexed to tuition growth, or the Investment Plan (IP), a portfolio-driven plan where plan owners can select from a variety of Vanguard investment vehicles.

Data and Measures

Our data are administrative records from the Pennsylvania Treasury Department on the universe of PA529 account owners and beneficiaries from Q1 2006 through Q4 2018 and include information on both owner and beneficiary age and zip code, savings plan and investment type, contributions, withdrawals, and automatic investment selections. We focus on four outcomes of interest: plan selection (GSP or IP), the size of the first contribution, the mean contribution across our observational window, and the average annual number of contributions (aggregated quarterly; up to four per year). These outcomes allow us to observe engagement with the PA529 program and the size and frequency of college savings contributions. Account-level variables include the account owner and beneficiary age at year of account opening, the delivery preference for account correspondence (email or letter), and whether the account has active

automatic contributions. After isolating owners and beneficiaries residing in Pennsylvania with complete zip-code information, our sample covers 197,889 unique owner-beneficiary accounts; one row per account.¹

We merge this dataset with zip-code-level measures of socioeconomic status (SES), concentrated affluence and disadvantage, income inequality, K-12 schools, and nonprofit organizations. Because our outcomes reflect decisions of account *owners* (i.e., plan selection, size of first contribution, mean annual contribution, and frequency of contributions), we link these geographic and community factors using owners' zip code.² This dataset allows us to observe the universe of in-state PA529 accounts and their owners' savings behaviors alongside a host of geographic and community factors of interest, including:

Socioeconomic status. From the U.S. Census Bureau's American Community Survey (2014-2018 five-year estimates; aligned with the end of our Treasury data), we derive a zip-code-level measure of socioeconomic status following prior work by Cowen et al. (2012) and Jang and Reardon (2019). We standardize five components (median household income, median housing prices and rent levels, the unemployment rate, the poverty rate, and educational attainment) and, following those prior works, average them into a single composite.

Concentrated affluence and disadvantage. From the same ACS, we derive two measures of communities' economic contexts. Guided by Massey (1996), we observe concentrated affluence, which combines the percentage of families with incomes of \$75,000 or higher, the proportion of adults with a college degree, and the proportion of adults working in managerial or

¹ We restrict the sample to owners and beneficiaries residing in Pennsylvania with valid zip codes and exclude accounts that were unfunded or closed at the end of the observation period, as well as 190 accounts recording more than four contributions per year.

² Owners and beneficiaries may or may not be the same person or reside together (e.g., accounts opened by grandparents). Our data cannot verify co-residence. An owner with accounts for multiple beneficiaries contributes one row per account. Because an owner's accounts share a zip code and therefore a county, our county-clustered standard errors also account for correlation across accounts.

professional roles. We also observe concentrated disadvantage, a composite measure of the proportion of families below the poverty line, the proportion on public assistance, the proportion of households headed by single women, and the unemployment rate (Wodtke et al., 2011).

Income inequality. Because income inequality is associated with educational outcomes (Chetty, Hendren, Kline, et al., 2014), we collect the zip-code-level Gini Index from the same ACS (Reardon, 2011), which ranges from 0 (perfect equality) to 1 (perfect inequality).

K-12 schools as institutions. From the U.S. Department of Education's Common Core of Data (2018-19 academic year) and Private School Universe Survey (2017-18 academic year; performed only in odd years), we collect the number of public and private schools in each zip code as one measure of community resources.

Community organizations. As a nominal indicator of community institutions that could facilitate educational and economic opportunity (Roman & Moore, 2004), we collect the number of 501(c)(3) non-profit organizations registered in each zip code from the Urban Institute's National Center for Charitable Statistics Data Archive's December 2018 Business Master File. This measure, like our count of K-12 schools, is a raw count. Because zip codes vary widely in population and physical size, and because organizations are recorded at their address on file regardless of where or whom they serve, both counts may also reflect a zip code's population, density, or urbanicity—or the clustering of organizational headquarters. We therefore interpret them as broad indicators of local institutional presence rather than direct measures of resources available to account owners.

All community measures align with the end of our observation window (December/Q4 2018). Because they are a single cross-section, they capture community features at that point rather than tracking them across the years accounts were open or setting them to another constant

(e.g., year of account open). Recall that our data are organized as one row per account, so we cannot dynamically align community features to each contribution. Fixed effects for year of account opening absorb secular differences across opening cohorts but do not adjust for this. We therefore interpret these measures as capturing relatively stable features of place, consistent with evidence that neighborhood conditions are highly persistent over time (Wodtke et al., 2011). Recall also that we observe community features for the account owner rather than those of the beneficiary. Where the two differ, our estimates describe the community context of the saver.

Table 1 presents descriptive statistics, with each community measure reported in its native scale. In subsequent estimations, the Gini Index is standardized so that its coefficients describe a one-standard-deviation change of roughly 0.04 points on the 0-1 index, also shown in Table 1. As noted above, socioeconomic status, concentrated affluence, and concentrated disadvantage are composites of standardized components, so a “one-unit change” has no natural interpretation. We therefore discuss all results practically in standard-deviation terms. Roughly half (47%) of accounts selected the lower-risk GSP plan. Contribution amounts are highly right-skewed: The mean initial contribution was \$2,905, which exceeds the 75th percentile (\$1,525); the 25th percentile was \$100, and 350 accounts opened with more than \$100,000. The average number of contributions to an account per year was 2.41 (quarterly, out of 4) at an average contribution amount of \$325. These descriptives also point to large differences in college savings behaviors (e.g., wide variation in the size of the first and mean contributions and number of contributions), access to community resources (i.e., K-12 schools and nonprofit organizations), and community SES, concentrated affluence and disadvantage, and income inequality.

Methods

Given the exploratory nature of this study, we employ correlational and regression analyses to descriptively examine how community factors relate to college savings outcomes. After examining how each predictor relates to our outcomes of interest, we ask how, after controlling for account-level details, each community feature and resource (individually and collectively) predicts (1) selection of a savings plan, (2) the size of the first contribution, (3) the average contribution amount, and (4) the annual number of contributions. We model these relationships using ordinary least-squares (OLS):

$$Savings_{iz} = \alpha_0 + \beta Account'_{iz} + \lambda Features'_z + \theta Resources'_z + \phi_t + \pi_c + \varepsilon_{iz} ,$$

where the savings behavior for account i in zip code z is a function of account-level information (owner and beneficiary age, account preferences, as well as plan type and its interaction with automatic contributions for contribution outcomes), zip-code-level community features (SES, concentrated affluence, concentrated disadvantage, income inequality), and zip-code-level community resources of interest (K-12 schools, nonprofits). We also control for across-region, time-variant factors with year-of-account-open fixed effects (ϕ_t) and for region-specific, time-invariant characteristics with county fixed effects (π_c), where counties c contain zip codes z .³ We log first and mean contribution given highly skewed distributions, using the natural log of the dollar amount without an offset, and also predict plan selection (GSP versus IP) with this

³ Zip codes spanning multiple counties are assigned to the county with the largest population share in the HUD-USPS ZIP-county crosswalk.

linear probability model.⁴ Because outcomes may be correlated among nearby owners (Burdick-Will, 2018), we cluster heteroscedastic-robust standard errors at the county level.⁵

Two features of this design determine what these coefficients describe. First, with county fixed effects, coefficients are identified from differences across zip codes within the same county. This means that time-invariant differences in average savings behavior across counties, including those arising from families' sorting across counties, are absorbed; sorting across zip codes within a county is not. Second, it is important to note that our data do not include account owners' income, wealth, educational attainment, or race/ethnicity—which are likely correlated with characteristics of their zip code. Each community coefficient therefore necessarily combines any contextual association of place with compositional differences in who lives there, including with any unmeasured zip-code-level community factors correlated both with our measures and savings outcomes. We cannot separate these, so we interpret all community estimates as descriptive associations rather than neighborhood effects or determinants of college savings.

Results

Table 2 presents correlations among our outcomes and predictors. While our outcomes are similar in nature, they appear to capture distinctive savings behaviors. The strongest correlation among them is between the first and mean contributions, but only at a level of 0.47, suggesting initial contribution size is related to but not strongly predictive of ongoing contributions. Furthermore, while our predictors and indices share many common features, they too capture distinct measures of community resources. The only correlations above 0.50 are

⁴ No accounts drop from the logged models ($N = 197,889$), so all first contributions are positive; Table 1's minimum rounds to \$0. We do not trim or winsorize. Extreme values are rare: 350 accounts (0.18%) had first contributions above \$100,000, which we treat as genuine transactions, and 184 (0.09%) had a recorded age above 100, which likely reflect errors in the underlying administrative records.

⁵ Without ongoing access to the Treasury records, we cannot test robustness to alternative specifications (e.g., logistic, interactive, multilevel, or bounded-outcome models, or winsorized outcomes).

between SES and concentrated disadvantage (-0.74) and between counts of nonprofit organizations and K-12 schools (0.66). In all, these suggest our data are equipped to provide us with useful insights into how savings behaviors vary with many distinct geographic features and resources—individually and jointly.

Regarding our outcomes of interest, the strongest correlate to GSP plan selection was socioeconomic status (-0.15), suggesting that account owners in higher-SES zip codes were more likely to choose the Investment Plan (IP) option, and may be less risk averse towards and have greater comfort with financial instruments. Accounts opened for older children (those already closer to college-age) were more likely to be invested in the less-risky GSP plan (0.10), which could be driven by the investment preferences of owners that wait to open an account (i.e., preferring a more conservative investment strategy as tuition expenses approach) and a diminished time horizon to take advantage of stock market returns in the IP plan. For first contribution size, the strongest correlates were owner age (0.14), beneficiary age (0.12), automatic investments (-0.16), and SES (0.12). These suggest that accounts held by older individuals, for older children, and in higher-SES neighborhoods had higher average initial contributions, but that accounts where owners chose to make automatic contributions, the initial investment was less, potentially preferring smaller, ongoing investments in lieu of a large, one-time contribution. The strongest correlates to mean contribution amount were SES (0.21), concentrated disadvantage (-0.12), and income inequality (0.13), suggesting that average investment amounts were higher in zip codes with higher SES and income inequality and lower in zip codes with higher concentrated disadvantage. The strongest correlate to the frequency of contributions was a mechanical association with automatic investments (0.66), but also with account owner age (-0.18) and email notification delivery (0.13). These suggest older account

owners make fewer contributions annually but that those who receive emailed account statements and updates made more contributions, which could also speak to potentially effective default program design features (e.g., recurring reminders and savings information).

Table 3 presents OLS results for our four primary outcomes.⁶ Three factors emerged as significant and consistent predictors of college savings: SES, income inequality, and community resources.

Socioeconomic status. SES is a statistically significant predictor of all outcomes in our sample. After controlling for other factors, a one-standard-deviation increase in zip-code SES is associated with a 5.6 percentage point lower likelihood an account owner selected the GSP over the IP plan.⁷ Similarly, a one-standard-deviation increase in SES is associated with first and mean contributions being approximately 40% and 44% higher, respectively. Because contributions are highly skewed, we translate these percentages into dollars at the 25th and 75th percentiles for practical interpretation (applying only to a skewed mean would overstate them). This equates to a roughly \$40-615 higher first contribution and a roughly \$16-155 higher mean contribution. SES was also associated with slightly fewer annual contributions, but this figure is only nominal (-0.04 on a contribution range of 0-4). In all, account owners in higher-SES zip codes were more likely to choose the investment-driven plan, which may accrue higher returns over longer horizons to yield higher overall savings balances, and to make larger first and mean contributions.

Income inequality. Gini is also a statistically significant predictor for all four outcomes. A one-standard-deviation increase in zip-code income inequality (roughly 0.04 points on the 0-1

⁶ Appendix Tables A1-A4 report reduced, stepwise, and fully saturated models.

⁷ We multiply coefficients from Table 3 by each factor's SD and then exponentiate for any logged outcomes. For example, for SES and first contribution, $\exp(0.428 \times 0.79) - 1 = 40\%$.

index) for the account owner was associated with a 2.9 percentage point decrease in GSP selection. Higher income inequality was also associated with approximately 15% higher first and mean contributions, or roughly \$16-235 and \$6-55 at the 25th and 75th percentiles. A one standard-deviation increase in Gini was also associated with 0.03 fewer annual contributions. These results cumulatively suggest that account owners in neighborhoods with greater income inequality also preferred the IP plan and made larger first and mean contributions. Because we do not observe owners' income, we cannot determine which owners within these zip codes drive this association.⁸

Community organizations. The number of 501(c)(3) organizations registered in each zip code was associated with small but significant changes in some savings behaviors. A one-standard-deviation increase in the number of organizations (SD = 83.5, mean = 110) is associated with a 0.8 percentage point lower likelihood of GSP selection and with first and average contributions roughly 4% (\$4-65) and 3% (\$1-9) higher. These results suggest that the number of community resources may be associated with higher contribution amounts and more optimal plan selection but also that the *type* of community resource may matter. We do not detect any relationship at conventional levels between K-12 school counts and our outcomes, either on their own or alongside other measures (Table 3; Appendix Tables A1-A4).

Discussion and Implications

Prior work has examined how economic and sociological aspects of families shape college savings, but less is known about how geographic or community factors relate to savings, including among those who already have savings accounts. Using administrative records on the

⁸ Higher zip-code inequality can reflect more high-income residents, more low-income residents, or fewer residents near the median. Gini is positively correlated with both SES (0.12) and concentrated disadvantage (0.26) in our sample (Table 2).

universe of PA529 account owners paired with a variety of community-level indicators, we find that zip-code socioeconomic status and income inequality are associated with all four savings outcomes we examine, and that the local count of nonprofit organizations is associated with plan selection and contribution amounts. These findings inform our understanding of college savings patterns among account owners and may support policymakers seeking to expand college savings generally or by targeting related savings-support resources.

In zip codes with higher socioeconomic status and income inequality, PA529 account owners made larger initial and average contributions and more often selected the investment-driven plan. While these findings are among the first to link these community features to college savings, they parallel prior findings that income, educational attainment, and unemployment (factors within our SES scale), as well as income inequality, predict childrens' long-run college attendance, employment, and earnings (Chetty, Hendren, Kline, et al., 2014; Chetty, Hendren, Lin, et al., 2016). Our work suggests these differences may extend to college savings. While SES may be an unsurprising correlate to college savings, our work underscores just how unevenly the resources that appear to carry currency in the college-savings process are distributed across communities. While individuals in lower-SES neighborhoods in general hold considerable social and cultural resources (Kiyama, 2010; Yosso, 2005), and although account owners in these neighborhoods already completed the steps to open an account, our results are consistent with them facing additional structural barriers in accessing specific forms of capital that the college-savings system rewards, including in plan selection and contribution size. Likewise, just as upward mobility is lower in racially/ethnically and economically segregated areas (Chetty, Hendren, Kline, et al., 2014), income inequality is also associated with differences in college savings behaviors, even among current account owners.

Prior work has linked local social capital to upward mobility (Chetty, Hendren, Kline, et al., 2014) and the number of local organizations to residents' social capital (Roman & Moore, 2004). Our results show that the number of 501(c)(3) organizations in an owner's zip code is associated with plan selection and both first and mean contribution amounts, net of the other community measures. These organizations could plausibly support savings by facilitating connections among saving and non-saving families (see Lachance, 2014, on neighborhood social networks), transmitting college-going or college-saving information, or providing structural resources, though interrogating these pathways is beyond the scope of our study. The contrast between null K-12 school relationships and positive nonprofit relationships may suggest that the type of community resource matters or may reflect other differences across communities (i.e., the concentration of K-12 schools or nonprofits within urban areas). Because these counts may also proxy for population size or urbanicity, and because we do not observe whether owners engage with these organizations, we cannot say whether the nonprofits here support saving directly—only that their presence is correlated with savings and worthy of further exploration.

Our study has notable limitations and opportunities for improvement. First, our largest blind spot is on the extensive savings margin. We are unable to observe account balances, individuals who do *not* save for college, or those who may save in different ways, precluding us from comparing savers to non-savers. Just as prior work has examined how aspirations and savings relate to postsecondary enrollment and attainment, future work should examine how these factors relate to college enrollment and choice. Second, our study does not attempt or claim to establish causal relationships. Most importantly, we do not observe account owners' income, wealth, educational attainment, or race/ethnicity. Because these characteristics are likely correlated with the community measures we do observe, the associations we report may reflect

differences in *who* lives in a given zip code, independent features of that *place*, or both. Much of the prior work we draw on conditions on such family-level characteristics or uses mover or experimental designs. Linking 529 records to household-level data would help future work decompose which parts of this relationship are due to composition and which are due to context. Third, our nonprofit and school measures are raw counts, which may partly reflect population size or urbanicity. Future work could use adjusted measures (e.g., on a per-capita, per-child, or size-adjusted basis) or measures of the services organizations actually provide.

Our study also has important implications for policy. Among owners who had already opened a PA529 account, those in lower-SES zip codes and in zip codes with fewer nonprofit organizations were more likely to select the GSP and made smaller first and mean contributions. These patterns describe existing account owners only and, as noted above, may reflect who opens accounts in these communities as well as features of the communities themselves. Even so, they can help policymakers and program administrators send communication about college savings to particular communities, identify community features that may be useful for other savings-support resources, and suggest areas in which programs may solicit feedback for continuous improvement. Future work could examine mechanisms behind these patterns, such as financial literacy, exposure to CSA initiatives, and nonprofit-led programs. Such investigations could yield causal evidence on how to raise and equalize college savings and inform on 529-program designs.

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Table 1. Descriptive Statistics

Variable	N	Mean	St. Dev.	Min	25 th Pctl.	75 th Pctl.	Max
Plan Selection (GSP)	197,889	0.47	0.50	0	0	1	1
First Contribution (\$)	197,889	2,904.99	9,301.18	0	100	1,525	446,374
Mean Contribution (\$)	197,889	325.35	537.15	0.02	37.20	357.69	12,576.92
Mean Annual N Contributions	197,889	2.41	1.33	0.08	1.00	3.70	4.00
Account Owner Age (at open)	197,889	42.78	11.29	0	35	47	119
Beneficiary Age (at open)	197,889	5.98	6.39	0	1	9	108
Delivery Preference (email)	197,889	0.90	0.30	0	1	1	1
Automatic Contributions (yes)	197,889	0.44	0.50	0	0	1	1
Socioeconomic Status	197,889	3.42	0.79	0.09	2.81	4.02	7.23
Concentrated Disadvantage	197,889	-0.28	0.49	-1.23	-0.60	-0.12	4.87
Concentrated Affluence	197,889	0.32	1.05	-2.24	-0.37	0.91	4.31
Gini Coefficient (0-1)	197,889	0.43	0.04	0.004	0.41	0.46	0.79
N K-12 Schools	197,889	8.04	5.15	0	4	12	27
Community Organizations	197,889	109.85	83.47	1	50	153	1,786

Sources: American Community Survey (U.S. Census), Common Core of Data and Private School Universe Survey (U.S. ED), PA Department of Treasury, and Urban Institute.

Notes: Figures rounded. For extreme values: Among the 197,889 records, 350 accounts received initial contributions over \$100,000; An additional 184 accounts had a recorded owner or beneficiary age above 100. The minimum first contribution is positive but rounds to \$0 (see Methods). Recall, there are virtually no limitations on contributions, who can open an account, or who can be a beneficiary. Accounts can be opened for oneself or for others and can also be used to pay education-related expenses (e.g., loans). Accounts are also tax-free and inheritable. Community measures, including Gini, are reported in native units; Gini is standardized for estimation.

Table 2. Correlation Matrix

	GSP	First Cont.	Mean Cont.	Annual N Cont.	Owner Age	Benef. Age	Email Delivery	Auto. Invest	SES	Disadv.	Affluence	Gini	K-12 Schools	Com. Orgs.
GSP	1													
First Cont.	-0.029	1												
Mean Cont.	-0.043	0.474	1											
Annual N Cont.	0.107	-0.224	0.012	1										
Owner Age	-0.012	0.137	0.089	-0.181	1									
Benef. Age	0.102	0.123	0.111	-0.127	0.214	1								
Email Delivery	-0.007	-0.013	0.034	0.131	-0.077	-0.014	1							
Auto. Invest	0.003	-0.163	-0.093	0.660	-0.162	-0.138	0.082	1						
SES	-0.146	0.121	0.208	-0.050	0.044	0.009	0.060	-0.011	1					
Disadvantage	0.074	-0.059	-0.115	0.007	-0.015	0.006	-0.054	-0.004	-0.742	1				
Affluence	-0.050	0.047	0.077	-0.023	0.025	0.007	0.013	-0.008	0.313	-0.097	1			
Gini	-0.096	0.094	0.130	-0.068	0.060	0.013	0.005	-0.036	0.123	0.257	0.149	1		
K-12 Schools	-0.050	0.028	0.040	-0.016	0.014	0.002	0.024	0.001	0.122	0.056	0.034	0.261	1	
Com. Organizations	-0.071	0.066	0.086	-0.043	0.050	0.005	0.022	-0.022	0.188	0.024	0.053	0.413	0.658	1

Sources: American Community Survey (U.S. Census), Common Core of Data and Private School Universe Survey (U.S. ED), PA Department of Treasury, and Urban Institute.

Notes: N = 197,889; Figures rounded.

Table 3. Geographic and Community Predictors of College Savings Behaviors, by Outcome of Interest

	Plan Selection (GSP)	First Contribution (log\$)	Mean Contribution (log\$)	Mean Annual N. Contributions
Plan Type (GSP)	-	-0.560***	-0.432***	0.261***
	-	(0.028)	(0.023)	(0.016)
Owner Age	-0.001**	0.025***	0.015***	-0.007***
	(0.0003)	(0.001)	(0.001)	(0.0003)
Beneficiary Age	0.007***	0.014***	0.016***	-0.007***
	(0.0003)	(0.002)	(0.002)	(0.001)
Delivery (email)	0.010 ⁺	0.110***	0.605***	0.381***
	(0.006)	(0.017)	(0.021)	(0.013)
Auto Investment (yes)	0.023***	-0.753***	0.301***	1.796***
	(0.004)	(0.021)	(0.018)	(0.014)
SES	-0.071***	0.428***	0.459***	-0.056***
	(0.008)	(0.023)	(0.022)	(0.009)
Conc. Disadvantage	0.003	0.011	0.020	-0.026
	(0.010)	(0.035)	(0.028)	(0.016)
Conc. Affluence	0.001	0.009	0.006	0.003
	(0.003)	(0.008)	(0.009)	(0.002)
Gini (standardized)	-0.029***	0.144***	0.142***	-0.026***
	(0.004)	(0.014)	(0.015)	(0.005)
K-12 Schools	0.0003	-0.003	-0.002	0.002 ⁺
	(0.001)	(0.002)	(0.002)	(0.001)
Community Organizations	-0.0001*	0.0005***	0.0003***	-0.0001⁺
	(0.00003)	(0.0001)	(0.0001)	(0.0001)
Type × Auto. Invest.	-	0.188***	0.170***	-0.149***
	-	(0.023)	(0.023)	(0.014)
Constant	0.999***	3.580***	2.706***	1.891***
	(0.016)	(0.064)	(0.057)	(0.034)
Year Open FE	Y	Y	Y	Y
County FE	Y	Y	Y	Y
Observations	197,889	197,889	197,889	197,889
Adjusted R ²	0.140	0.145	0.132	0.476

Sources: American Community Survey (U.S. Census), Common Core of Data and Private School Universe Survey (U.S. ED), PA Department of Treasury, and Urban Institute.

Notes: ⁺ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. Table reports coefficients and heteroscedastic robust standard errors clustered at county level (in parentheses). Figures rounded. Community measures enter in native units; Gini is standardized prior to estimation. SES, Gini, and Community Resources bolded for ease of identification by readers.

APPENDIX

Table A1. Plan Selection (GSP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Owner Age	-0.001*** (0.0003)	-0.001*** (0.0003)	-0.001*** (0.0003)	-0.001*** (0.0003)	-0.001*** (0.0003)	-0.001*** (0.0002)	-0.001*** (0.0002)	-0.001** (0.0003)
Beneficiary Age	0.007*** (0.0003)	0.007*** (0.0003)	0.007*** (0.0003)	0.007*** (0.0003)	0.007*** (0.0003)	0.007*** (0.0003)	0.007*** (0.0003)	0.007*** (0.0003)
Delivery (email)	0.002 (0.006)	0.009 (0.006)	0.006 (0.006)	0.002 (0.006)	0.003 (0.006)	0.002 (0.006)	0.003 (0.006)	0.010+ (0.006)
Auto Investment (yes)	0.026*** (0.004)	0.025*** (0.004)	0.026*** (0.004)	0.026*** (0.004)	0.024*** (0.004)	0.026*** (0.004)	0.025*** (0.003)	0.023*** (0.004)
SES		-0.078*** (0.004)						-0.071*** (0.008)
Conc. Disadvantage			0.066*** (0.010)					0.003 (0.010)
Conc. Affluence				-0.006+ (0.004)				0.001 (0.003)
Gini (standardized)					-0.035*** (0.003)			-0.029*** (0.004)
K-12 Schools						-0.001 (0.001)		0.0003 (0.001)
Community Orgs							-0.0002*** (0.00004)	-0.0001* (0.00003)
Constant	0.835*** (0.013)	1.045*** (0.014)	0.845*** (0.013)	0.836*** (0.013)	0.795*** (0.013)	0.843*** (0.014)	0.868*** (0.014)	0.999*** (0.016)
Year Open FE	Y	Y	Y	Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	197,889	197,889	197,889	197,889	197,889	197,889	197,889	197,889
Adjusted R ²	0.129	0.137	0.132	0.129	0.133	0.129	0.131	0.140

Sources: American Community Survey (U.S. Census), Common Core of Data and Private School Universe Survey (U.S. ED), PA Department of Treasury, and Urban Institute.

Notes: + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. Table reports coefficients and heteroscedastic robust standard errors clustered at county level (in parentheses). Figures rounded. Model predicts GSP plan type selection using a linear probability specification. Community measures enter in native units; Gini is standardized prior to estimation.

Table A2. First Contribution (log \$)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Plan Type (GSP)	-0.634*** (0.035)	-0.579*** (0.031)	-0.614*** (0.032)	-0.633*** (0.036)	-0.608*** (0.032)	-0.634*** (0.035)	-0.625*** (0.033)	-0.560*** (0.028)
Owner Age	0.027*** (0.001)	0.026*** (0.001)	0.027*** (0.001)	0.027*** (0.001)	0.026*** (0.001)	0.027*** (0.001)	0.026*** (0.001)	0.025*** (0.001)
Beneficiary Age	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.003)	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.002)
Delivery (email)	0.156*** (0.020)	0.112*** (0.017)	0.131*** (0.017)	0.155*** (0.020)	0.151*** (0.019)	0.155*** (0.021)	0.150*** (0.019)	0.110*** (0.017)
Auto Investment (yes)	-0.770*** (0.023)	-0.762*** (0.021)	-0.770*** (0.023)	-0.770*** (0.023)	-0.759*** (0.021)	-0.770*** (0.023)	-0.767*** (0.022)	-0.753*** (0.021)
SES		0.456*** (0.032)						0.428*** (0.023)
Conc. Disadvantage			-0.385*** (0.055)					0.011 (0.035)
Conc. Affluence				0.053* (0.022)				0.009 (0.008)
Gini (standardized)					0.186*** (0.020)			0.144*** (0.014)
K-12 Schools						0.004 (0.004)		-0.003 (0.002)
Community Orgs							0.001*** (0.0002)	0.0005*** (0.0001)
Type × Auto. Invest.	0.193*** (0.024)	0.191*** (0.024)	0.192*** (0.023)	0.194*** (0.024)	0.190*** (0.024)	0.193*** (0.024)	0.193*** (0.024)	0.188*** (0.023)
Constant	4.666*** (0.053)	3.399*** (0.056)	4.589*** (0.053)	4.654*** (0.053)	4.858*** (0.053)	4.633*** (0.054)	4.473*** (0.054)	3.580*** (0.064)
Year Open FE	Y	Y	Y	Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	197,889	197,889	197,889	197,889	197,889	197,889	197,889	197,889
Adjusted R ²	0.122	0.140	0.129	0.123	0.130	0.122	0.125	0.145

Sources: American Community Survey (U.S. Census), Common Core of Data and Private School Universe Survey (U.S. ED), PA Department of Treasury, and Urban Institute.

Notes: ⁺ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. Table reports coefficients and heteroscedastic robust standard errors clustered at county level (in parentheses). Figures rounded. Community measures enter in native units; Gini is standardized prior to estimation.

Table A3. Mean Contribution (log \$)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Plan Type (GSP)	-0.508*** (0.031)	-0.451*** (0.024)	-0.486*** (0.027)	-0.507*** (0.032)	-0.483*** (0.028)	-0.507*** (0.031)	-0.500*** (0.030)	-0.432*** (0.023)
Owner Age	0.016*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.015*** (0.001)
Beneficiary Age	0.017*** (0.003)	0.016*** (0.002)	0.017*** (0.002)	0.017*** (0.003)	0.016*** (0.003)	0.017*** (0.003)	0.017*** (0.002)	0.016*** (0.002)
Delivery (email)	0.653*** (0.025)	0.607*** (0.021)	0.627*** (0.021)	0.652*** (0.024)	0.648*** (0.024)	0.652*** (0.025)	0.648*** (0.024)	0.605*** (0.021)
Auto Investment (yes)	0.284*** (0.019)	0.292*** (0.018)	0.284*** (0.020)	0.284*** (0.020)	0.295*** (0.018)	0.284*** (0.019)	0.287*** (0.019)	0.301*** (0.018)
SES		0.478*** (0.033)						0.459*** (0.022)
Conc. Disadvantage			-0.409*** (0.056)					0.020 (0.028)
Conc. Affluence				0.051* (0.022)				0.006 (0.009)
Gini (standardized)					0.181*** (0.022)			0.142*** (0.015)
K-12 Schools						0.003 (0.004)		-0.002 (0.002)
Community Orgs							0.001*** (0.0002)	0.0003*** (0.0001)
Type × Auto. Invest.	0.174*** (0.022)	0.172*** (0.022)	0.174*** (0.022)	0.175*** (0.022)	0.171*** (0.023)	0.175*** (0.022)	0.175*** (0.022)	0.170*** (0.023)
Constant	3.861*** (0.048)	2.534*** (0.050)	3.779*** (0.047)	3.849*** (0.048)	4.048*** (0.048)	3.839*** (0.048)	3.684*** (0.048)	2.706*** (0.057)
Year Open FE	Y	Y	Y	Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	197,889	197,889	197,889	197,889	197,889	197,889	197,889	197,889
Adjusted R ²	0.187	0.210	0.196	0.188	0.196	0.187	0.190	0.216

Sources: American Community Survey (U.S. Census), Common Core of Data and Private School Universe Survey (U.S. ED), PA Department of Treasury, and Urban Institute.

Notes: ⁺ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. Table reports coefficients and heteroscedastic robust standard errors clustered at county level (in parentheses). Figures rounded. Community measures enter in native units; Gini is standardized prior to estimation.

Table A4. Mean Annual Number of Contributions (N)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Plan Type (GSP)	0.271*** (0.016)	0.265*** (0.017)	0.269*** (0.016)	0.271*** (0.016)	0.266*** (0.017)	0.271*** (0.016)	0.269*** (0.016)	0.261*** (0.016)
Owner Age	-0.007*** (0.0003)	-0.007*** (0.0003)	-0.007*** (0.0003)	-0.007*** (0.0003)	-0.007*** (0.0003)	-0.007*** (0.0003)	-0.007*** (0.0003)	-0.007*** (0.0003)
Beneficiary Age	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)
Delivery (email)	0.377*** (0.013)	0.381*** (0.013)	0.378*** (0.013)	0.377*** (0.013)	0.378*** (0.013)	0.377*** (0.013)	0.378*** (0.013)	0.381*** (0.013)
Auto Investment (yes)	1.799*** (0.015)	1.798*** (0.015)	1.799*** (0.015)	1.799*** (0.015)	1.797*** (0.014)	1.799*** (0.015)	1.798*** (0.015)	1.796*** (0.014)
SES		-0.048*** (0.006)						-0.056*** (0.009)
Conc. Disadvantage			0.024* (0.010)					-0.026 (0.016)
Conc. Affluence				-0.004 (0.004)				0.003 (0.002)
Gini (standardized)					-0.033*** (0.005)			-0.026*** (0.005)
K-12 Schools						-0.0003 (0.001)		0.002+ (0.001)
Community Orgs							-0.0002*** (0.00003)	-0.0001+ (0.0001)
Type × Auto. Invest.	-0.150*** (0.014)	-0.150*** (0.014)	-0.150*** (0.014)	-0.150*** (0.014)	-0.149*** (0.014)	-0.150*** (0.014)	-0.150*** (0.014)	-0.149*** (0.014)
Constant	1.770*** (0.028)	1.902*** (0.030)	1.775*** (0.028)	1.771*** (0.028)	1.736*** (0.028)	1.773*** (0.028)	1.797*** (0.028)	1.891*** (0.034)
Year Open FE	Y	Y	Y	Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	197,889	197,889	197,889	197,889	197,889	197,889	197,889	197,889
Adjusted R ²	0.475	0.476	0.476	0.475	0.476	0.475	0.476	0.476

Sources: American Community Survey (U.S. Census), Common Core of Data and Private School Universe Survey (U.S. ED), PA Department of Treasury, and Urban Institute.

Notes: + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. Table reports coefficients and heteroscedastic robust standard errors clustered at county level (in parentheses). Figures rounded. Community measures enter in native units; Gini is standardized prior to estimation.