

# Which grade works best for high school financial education?<sup>1</sup>

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## Abstract

States implementing high school financial education policies often select the grade students will take the course. That leads policymakers to regularly ask which grade is most effective. This paper draws upon administrative financial literacy certification test data from nearly a half million students to see which grade has the highest knowledge gains. We first use cross-state variation in the grade personal finance is taught in states where a full semester course is required for high school graduation to show that 11th grade students have the greatest knowledge gains, followed by 12th, 10th, and 9th grade students. We find that this ranking is preserved when we instead use across school variation within states to make our comparisons. These effects are largely driven by students in lower grades having smaller knowledge gains in harder topics—like insurance and investing. These findings suggest 11th and 12th grades are likely better homes for personal finance than earlier grades, though all grades still have meaningful knowledge gains.

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# 1 INTRODUCTION

Research consistently documents that personal finance coursework in high school improves downstream adult financial outcomes for students (Urban et al., 2020; Harvey, 2019; Mangrum, 2022; Stoddard and Urban, 2020; Brown et al., 2016; Frisanco, 2023a; Bruhn et al., 2016). However, many of these studies use quasi-experimental methods to understand if students who were subject to the new requirement have improved financial behaviors in the medium and long-run. This makes it hard to understand what features of the education generate the greatest effects. One of the most common questions policymakers ask when writing high school personal finance legislation is: in which grade should the course be taught? This question echoes a long line of research that examines when to teach different personal finance topics across developmental stages (Consumer Financial Protection Bureau, 2016).

In this paper, we provide the first piece of evidence seeking to understand which grade is the best for learning personal finance topics in high school. We use administrative data from Working in Support of Education (W!SE) to document which grade has the highest value added measured by knowledge gains. W!SE testing allows us to use a knowledge measure external to individual classrooms, as the teacher does not know exactly what will be on the W!SE test, they only know broad content areas.

One empirical challenge in estimating the knowledge gains to personal finance education by grade is that students can self-select into personal finance coursework. This selection can go in either direction: students could choose to opt into a personal finance course because they want to learn how to help their family with financial struggles or students could choose to opt into a personal finance class because they already learned a lot

of personal finance at home. We choose a sample where all students have to complete a standalone personal finance course prior to high school graduation—commonly referred to as “guarantee states.” Research finds that guarantee states have the greatest benefits in both administrative credit behaviors and subjective financial well-being (Collins and Urban, 2025). In many cases, guarantee states recommend or specify the grade in which students have to complete the personal finance course. In other cases, states allow the schools to pick which grade personal finance will be recommended or required. This gives us natural variation in the grade that personal finance is taken both across states with different requirements and across schools within the same state. We further validate our results by comparing it to within school changes over time in the common grades for personal finance coursework.

Our findings suggest that while all grades generate sizeable knowledge gains, 11th grade courses produce the highest knowledge gains, followed by 12th, 10th, and then 9th. This ordering largely comes from more complicated modules, including banking, credit, and investing/insurance. The differences across knowledge gains on basic money management are substantially smaller and only statistically different from 9th grade gains for 11th grade students.

The biggest gap between 9th grade and upper grades comes from students who have the lowest financial knowledge at baseline, who in theory have the greatest potential for learning new content. This finding suggests that waiting until at least 10th grade, but preferably 11th grade, has the greatest potential to improve the financial knowledge of students who have learned less at home. This is particularly important since research has found that students from low-income families can bring personal finance knowledge and

skills back to their parents (Frisancho, 2023*b*).

## **2 DATA**

We draw upon test score data from Working in Support of Education (W!SE) who has been administering an independent, psychometrically-validated, financial literacy certification test since 2003, with online tests beginning in 2009. The test is designed to be paired with high school financial literacy instruction. Students can earn a “W!SE Certified Financially Literate” certificate by passing this test. In some states, such as Virginia, students need a professional credential as part of their high school graduation requirements, and the W!SE certificate satisfies this requirement. While the test is opt-in, more than 90,000 students took the test in 2025 alone.

We use data on test scores from 2016 to 2025 when the pretest and the posttest were the same length and tested the same concepts. We exclude the 2020 data, as the COVID-19 pandemic disrupted all education that year. We further exclude observations where the student did not take the pretest. The test includes four core areas: (1) Money, money management, and financial planning (for simplicity, we will call this budgeting going forward, but it is in practice broader than this), (2) Banking, (3) Credit, (4) Insurance and investing.

To remove as much student selection into courses as possible, we use data from only guarantee states—where a full semester personal finance course is required prior to high school graduation. In the years before the requirement, students could select into personal finance courses, but after the requirement goes into place, all students take the course. Thus, we restrict our data to include guarantee states after the policy effective date, the

year of and following the first graduating cohort required to complete a full semester of personal finance instruction. W!SE does not have universal coverage nationally. Table 1 reports each guarantee state through the graduating class of 2025, the year the policy went into effect, whether we include the state, and why (if not).<sup>4</sup> While W!SE coverage is most expansive in Virginia, our results remain substantively similar but have larger standard errors if we exclude Virginia from our study.

### 3 METHODS

We make three comparisons to identify the value added of financial education by grade. First, we consider cross state differences in the grade states most commonly use for the standalone personal finance course. This cross-state variation is seen in Figure 1. For example, nearly all Alabama students take the course in 9th grade while in North Carolina nearly all students take the class in 12th grade.<sup>5</sup> Virginia and Nebraska students most commonly take personal finance in 11th grade, though there is more variation in these two states than in Alabama and North Carolina. Tennessee students are more evenly distributed across grades, suggesting that schools choose the grade more flexibly in this state. Our first strategy uses this variation in when personal finance is taught across states as a main driver for identification.

We estimate a version of Equation 1 for each of the three comparisons.

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<sup>4</sup>Nearly all students in the schools in the Utah sample take personal finance in 11th grade, so there is virtually no variation in grade. W!SE has limited test score data for students in Iowa, Missouri, Mississippi, and Rhode Island.

<sup>5</sup>For freshmen entering high school in the 2024-2025 academic year, Alabama students now must complete a full year of financial literacy instruction. Districts also have to report their scores on a test. This class no longer is restricted to 9th grade.

$$Y_{i,j,s,t} = \alpha + \beta_1 \text{Grade } 10_{i,j,s,t} + \beta_2 \text{Grade } 11_{i,j,s,t} + \beta_3 \text{Grade } 12_{i,j,s,t} + (\delta_s) + (\gamma_t) + [\eta_j] + \varepsilon_{i,j,s,t} \quad (1)$$

where  $Y_{i,j,s,t}$  is the percentage point gain in knowledge from the pretest to the posttest for individual  $i$  in school  $j$  in state  $s$  and year  $t$ .  $\text{Grade } 10_{i,j,s,t}$ ,  $\text{Grade } 11_{i,j,s,t}$ , and  $\text{Grade } 12_{i,j,s,t}$  are indicator variables for the grade in which students take financial education where Grade 9 is omitted and serves as the reference category.  $(\delta_s)$  are state fixed effects,  $(\gamma_t)$  are year fixed effects, and  $[\eta_j]$  are school fixed effects.

For the first comparison that leverages cross-state variation, we only include the grade level indicator variables in our regression.

Second, we consider within state differences in grade to account for the fact that different states have different educational environments and the remaining variation within a state can come from school decisions. This strategy compares schools within the same state to see if those with personal finance classes in different grades have different knowledge gains. We include both state fixed effects  $(\delta_s)$  and year fixed effects  $(\gamma_t)$  in this specification. Since grade varies most across states as discussed previously, estimates under this specification with fixed effects will have less power than our approach in the first comparison. This tradeoff in power allows us to account for differences in the evolution of personal finance across states and over time that could be correlated with the grade choice. For example, students in Alabama primarily take personal finance in 9th grade, so when we include state fixed effects, we have less variation in grade to identify the knowledge gains relative to the cross-state differences approach.

Third, as a robustness check, we consider within school differences over time. Over our sample period, some schools change the most common grade when their class is taught. This identifying variation comes from school changes in resources—for example, some schools may have lower capacity one year and expanded capacity the subsequent year due to staffing challenges. This strategy will include school ( $\eta_j$ ) and year fixed effects ( $\gamma_t$ ), akin to a two-way-fixed effects (TWFE) strategy. Since this variation requires there to be many observations within the same schools over time, we expect these effects to be noisier and less precise. We also alternatively used a school district level fixed effect to look at within district differences in grade in an alternate specification, though this is less like a TWFE, as a school can set policies or grades different than a district (e.g., this is a mix of cross sectional and panel variation).

Our outcome of interest for this study is knowledge gains, that is differences in scores from pretest to posttest. Before moving to results on the grades with the highest gain, we first caution that students starting at a lower knowledge level may have the opportunity to gain more knowledge relative to baseline. Thus, we first run regressions to see how baseline knowledge changes by grade. These mirror the regressions we run for our knowledge gains specifications, but they instead look at pretest knowledge both overall and by category. We plot the coefficient regressions in Figure 3. The top panel shows that regardless of model choice, students in higher grades score higher on pretests than those in lower grades, where all grades outperform 9th graders at baseline. This is not surprising as students get better at test-taking over time and are likely to have more basic financial knowledge at later ages.

The bottom panel of Figure 3 further shows that the increase in baseline knowledge by

progressive grades remains consistent across topics.<sup>6</sup> While this could be in itself evidence that students at later ages are more prepared to begin a personal finance course, it could also result in higher grades having lower value-added than lower grades, where students—on average—know less to start with. It could also be possible that students in higher grades already have a first class in personal finance. For example, Alabama students who took a required course in 9th grade could also take an elective in a later grade. This could further bias us against finding later grades as higher value added.

### *3.1 Summary Statistics*

We begin by exploring descriptive trends in knowledge gains by grade in Figure 4. We show the full distribution of knowledge gains for each grade, along with the corresponding mean for each grade with a vertical, dashed blue line. One takeaway is immediate: knowledge gains exist across all grades, with a normal distribution for gains across all grades. It is descriptively clear that students are learning across all grades in guarantee states. The mean gains are lowest for grade 9 (27.9 percentage points) and highest for grade 11 (32.4 percentage points), with grade 12 being second highest (31.1 percentage points) and third highest for grade 10 (30.1 percentage points). The overall standard deviation of knowledge gains is 15.2, suggesting large increases in knowledge from a standalone course across the board. Even students at the 25th percentile of the gains distribution in the 9th grade—the grade with the lowest gains—exceed a one standard deviation increase in knowledge.

We show mean posttest scores by each pretest score by grade to allow for a better

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<sup>6</sup>We show these coefficients in the model with state fixed effects, as that model produces more conservative estimates. The results are similar and more precisely estimated if we instead choose the cross-state model.

visualization of the data in Figure 5 and by topic area in Figure 6. We plot the 45 degree line, which represents the case where pretest and posttests would be the same (cyan triangles). Anything above that line indicates knowledge gains, and anything below that line represents lower posttest scores than pretests scores. In Figure 5, knowledge gains on average are large and come from students who score below 80 percent on the pretests. The only “knowledge losses” come from students who scored very high on the pretest. This finding is even clearer when looking by topic area in Figure 6. On average, students are vastly improving their financial knowledge.

Figure 5 also shows that 9th grade students starting with the lowest pretest scores (40 percent and below) visually have lower average posttest scores than all other grade levels. This suggests that 9th graders with the lowest baseline knowledge levels have the most trouble with personal finance content. We further show that this trend is similar by topical area in Figure 6. Since more 9th graders start with a lower average baseline of knowledge and 9th grade personal finance has lower knowledge gains, descriptively, this suggests that 9th grade adds less value than other classes. These students begin with less knowledge and accumulate smaller gains in knowledge over the semester.

## **4 RESULTS**

So far, we have presented descriptive results to explore the trends in knowledge gains by grade. Next, we present our regression results to validate these results. We plot coefficient estimates for ease of visualization in Figure 7 though the corresponding estimates are presented in Appendix Table 2 and Table 3.

Using the cross-state comparison, 11th graders see a 4.5 percentage point higher knowledge gain than 9th graders. The second largest gain is experienced by 12th graders, and 10th graders also experience more knowledge gains than 9th graders. While the magnitude of the gain is smaller when we instead conduct a within state comparison, the trend remains consistent: 11th grade has the highest gains, followed by 12th, 10th, and then 9th. We posit that 11th graders outperform 12th graders in part because they are in the most focused part of their curriculum—before they have made postsecondary education decisions. When we instead use within school variation (Column (3) of Table 7), 11th grade still has the greatest gains, but the difference between 12th and 10th is no longer statistically different. This is likely due to the very imprecise estimate of the 12th grade coefficient. The results are substantively similar when using within district variation.

We next explore if there are specific topics that are best taught in each grade. The bottom panel of Figure 7 shows the results for the model with state and year fixed effects that looks at knowledge gains by topic area.<sup>7</sup> Across topic areas, 11th graders accrue the greatest knowledge gains from the class. The biggest differences come from the more challenging content: banking, credit, and insurance/investing. In 12th grade, students also see a much greater knowledge gain in these more challenging areas than 9th or 10th grade. For credit and insurance/investing, 10th grade students have higher knowledge gains than 9th graders, though the difference is small.

Budgeting content sees the smallest difference in knowledge gains across the three grades, where only 11th grade students have higher knowledge gains than 9th graders and these gains are much smaller in magnitude than the other topics. There is no statistical

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<sup>7</sup>If we instead estimate the raw coefficients, our estimates are more precise and show larger differences across grades.

difference across 9th, 10th, and 12th grade students in gains in budgeting knowledge.

## 5 SCHOOL-LEVEL VARIATION

The analysis presented in the prior section relied upon variation across and within guarantee states. Next, we draw upon data on high school-level standalone personal finance course requirements, collected by the authors from 2019 through 2025 (L'Esperance, 2025; Luedtke and Urban, 2023; Urban, 2020). We use this data to construct a sample of students in guarantee schools to complement the prior analysis that used a sample of students in guarantee states. The prior analysis relied on state policy to identify students exposed to a full semester of personal finance instruction while the present analysis leverages school-level information on personal finance courses required for graduation. We keep only the test scores from students in the 355 schools who require a full semester of personal finance for high school graduation. These data span 17 states, including guarantee states and states without guarantees where schools opt to require a personal finance course for graduation. We look at the relative gains by grade with the two main cross-sectional identification strategies we use in our guarantee state sample. We then also look at within district and within school differences to account for additional variation. The data include 253,012 individual observations.<sup>8</sup>

The results are in Figure 8, where the top panel shows overall effects by model type and the bottom panel shows effects by topic with state and year fixed effects (the model with district and year fixed effects is in Appendix Figure 9 and substantively similar but

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<sup>8</sup>This method restricts the sample as many schools do not have online high school course catalogs, even in guarantee states. It also restricts to years to the academic years: 2020-2021 through 2024-2025 to both eliminate the COVID year and include only years with high school course catalog data.

noisier estimates). Overall, the story remains consistent with this variation: 11th grade has the highest knowledge gains, followed by 12th. The differences between 10th and 9th grade are smaller in this setting. The topical results are also similar, where knowledge gains in later grades are highest among harder topics, while simpler money management topics have negligible differences in knowledge gains across grades.

## **6 CONCLUSION**

While all grades see knowledge gains after a high school personal finance course, gains for 9th grade students are lower than other grades, with 11th grade having the highest gains and 12th grade being second. This difference is most pronounced for more complicated topics, such as credit and investing/insurance. There is only a small gap in knowledge gains across grade for budgeting and money management. Descriptive evidence suggests that 9th graders with low baseline financial knowledge—as measured by a pretest score—have lower knowledge gains from the class than those with equally low baseline knowledge in upper grades. Thus, putting guaranteed financial education in 9th grade is least likely to lift up the students who have the lowest financial knowledge to start with.

While 11th graders outperform 12th graders in knowledge gains, we suspect that this is in part due to 12th graders already having postsecondary plans in place, making them perhaps a bit less focused on school in general than 11th graders.

These findings suggest that states with flexibility should recommend personal finance be taught in 11th or 12th grade, with 10th grade being an option if those two do not work. If states choose 9th grade, they should redesign curricula to either (1) better engage students

in challenging topics or (2) to cover more topics relevant to students in grade 9.

While this study is the first to document suggestive evidence on the optimal grade for financial education in high school, we are not without limitations. First, we only study knowledge gains via test scores. While the test is independent and not designed by the instructor “teaching to the test,” it does not capture behavior change. Second, we look only at short-run knowledge gains, as we cannot see sustained knowledge. Third, this research is descriptive in nature. Some variation in the grades personal finance is taken could be correlated with unobserved factors that cause students to score higher or lower on the pre or post test. While our within school change model helps with this concern, we cannot rule out this omitted variable bias entirely.

Future work should randomize the grade at which personal finance is taken to see if there is a difference in long run behavior change to more definitively answer the question of which grade is optimal for high school financial education.

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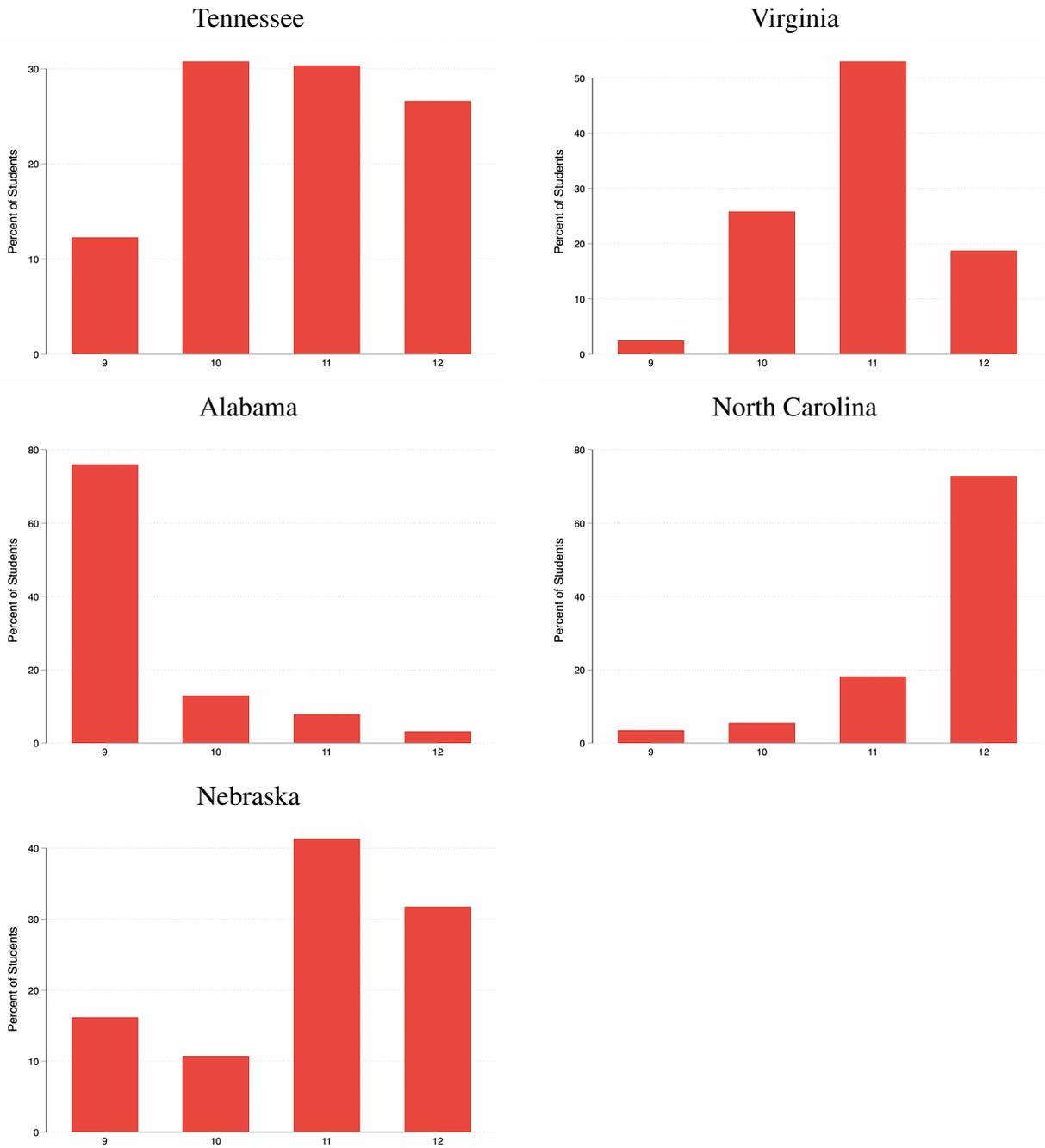
## 7 TABLES AND FIGURES

Table 1: Guarantee States with W!SE Coverage

State	Policy Year	Number of Tests	Number of Schools	Included?	Rationale
UT	2008	No*	No variation in grade		
MO	2010	No	Not enough schools		
TN	2013	Yes			
VA	2015	Yes			
AL	2017	Yes			
IA	2021	No	Not enough schools		
MS	2022	No	Not enough schools		
NC	2024	Yes			
RI	2024	No	Not enough schools		
NE	2024	Yes			

Notes: Guarantee states W!SE coverage reported. Guarantee states implement standalone personal finance course requirements by the graduating class of 2025. We only include states after the guarantee goes into place, so the first year covered is either 2016 or the year reported in the Year column, where the first graduating cohort completed a standalone personal finance course. W!SE data span 2016-2025.

Figure 1: Personal Finance Grade Prevalence in Guarantee States



Notes: Data come from W!SE tests from 2016-2025. Percent of students taking both the pre and post W!SE test by grade in states when personal finance was always required as a standalone course.

Figure 2: Personal Finance Grade Prevalence in Guarantee States Over Time

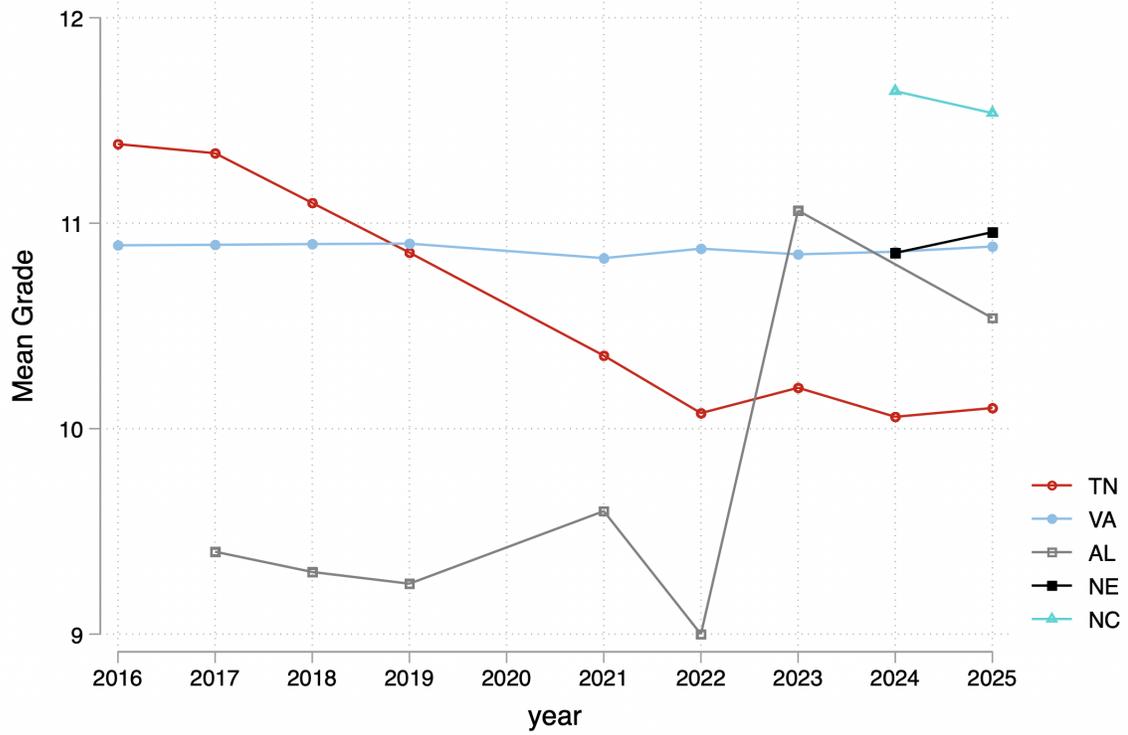
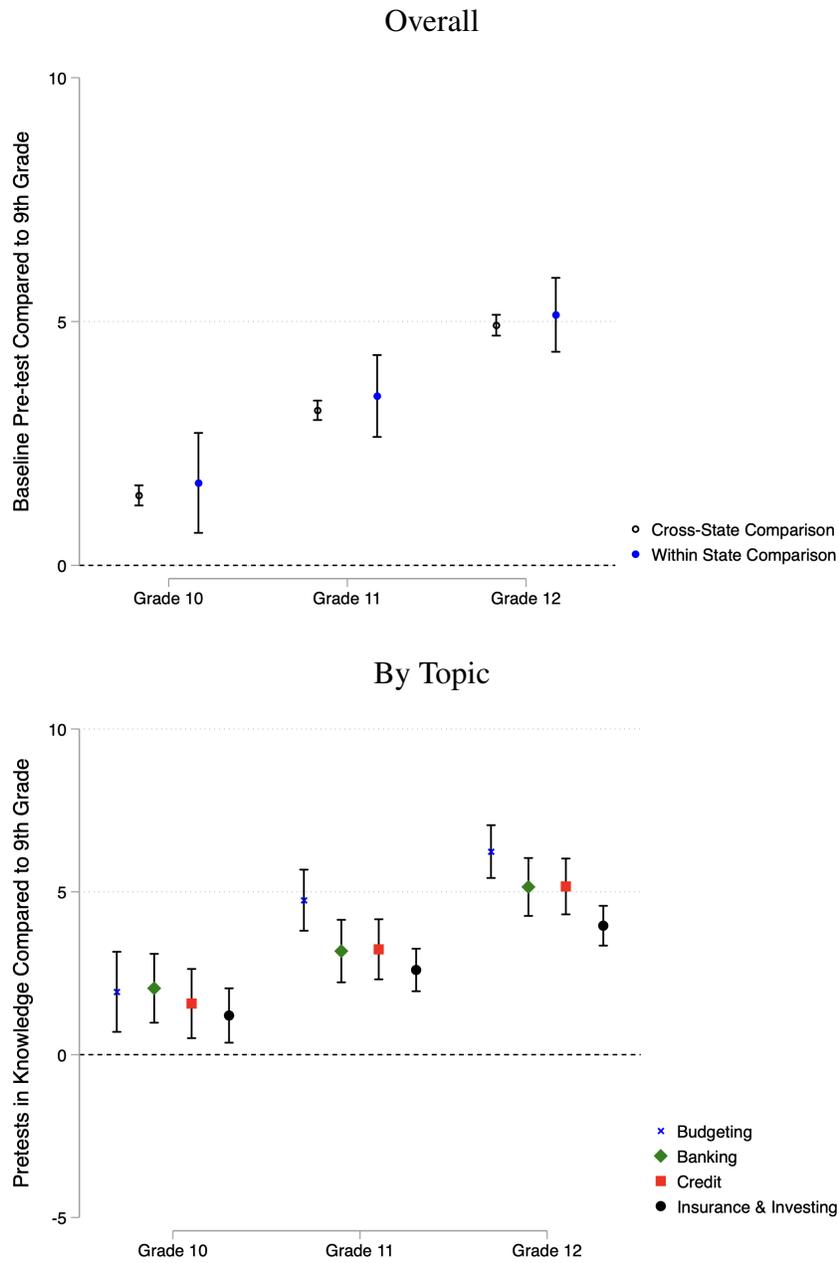
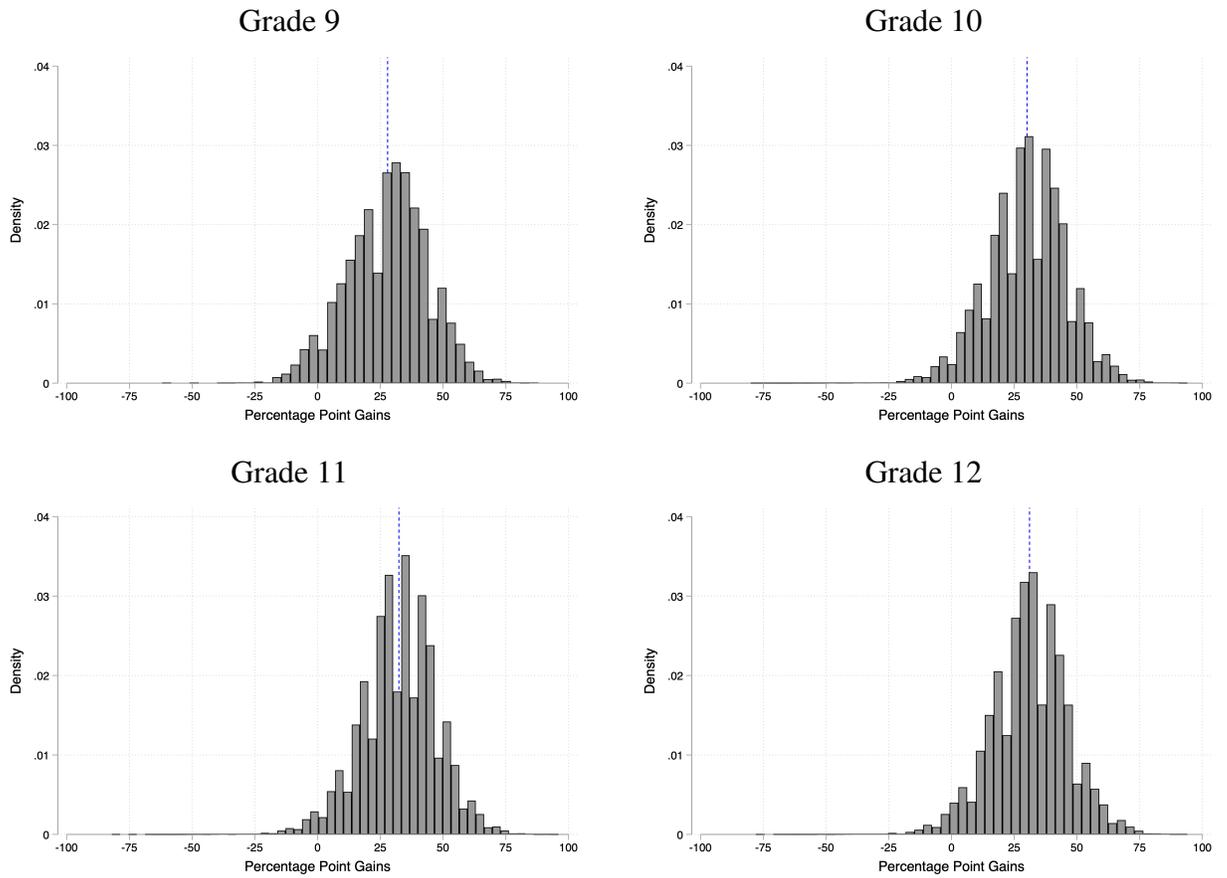


Figure 3: Baseline Pre-test Scores are Highest for Students at Higher Grade Levels



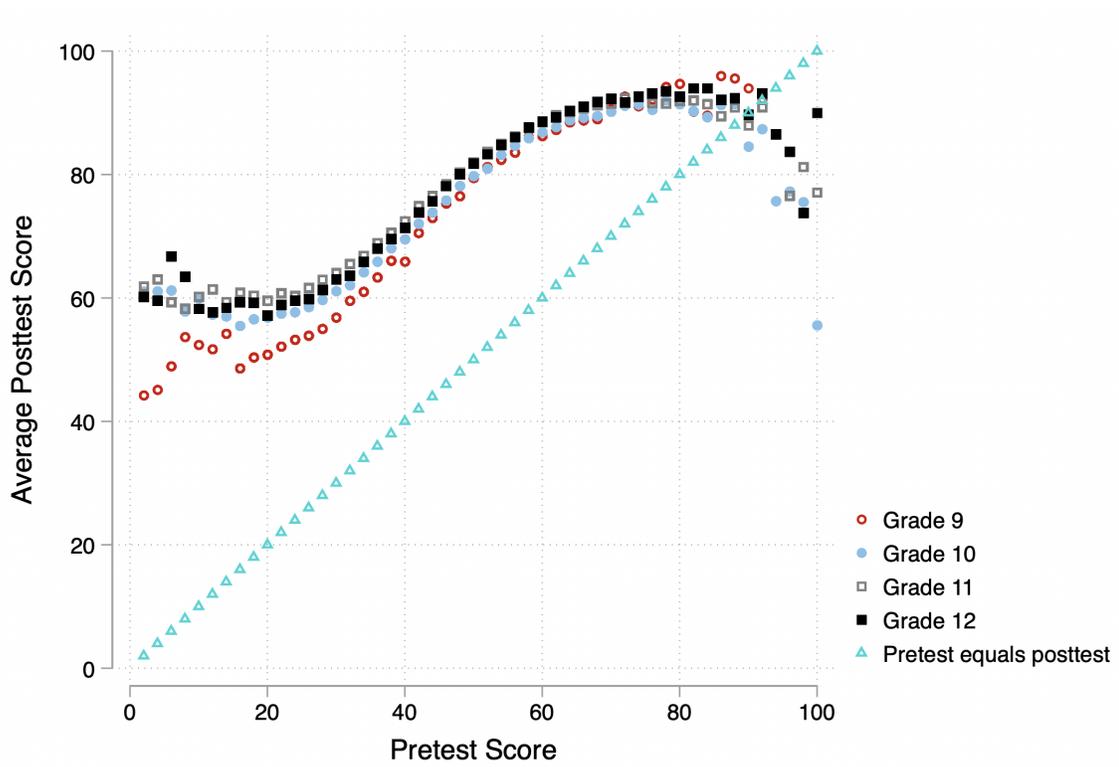
Notes: Estimates and 95 percent confidence intervals reported. The top panel looks at the difference in overall pre-test percent scores (0 to 100) across students in different grades. The first regression coefficients (black open circle) have no controls beyond the grade dummies, where the excluded group is grade 9. The second regression coefficients (blue closed circle) have state and year fixed effects. The bottom panel shows coefficient estimates of pretest scores across four different topical categories: budgeting, banking, credit, and insurance and investing. These regression models include state and year fixed effects.

Figure 4: Histogram of Percentage Point Gains by Grade



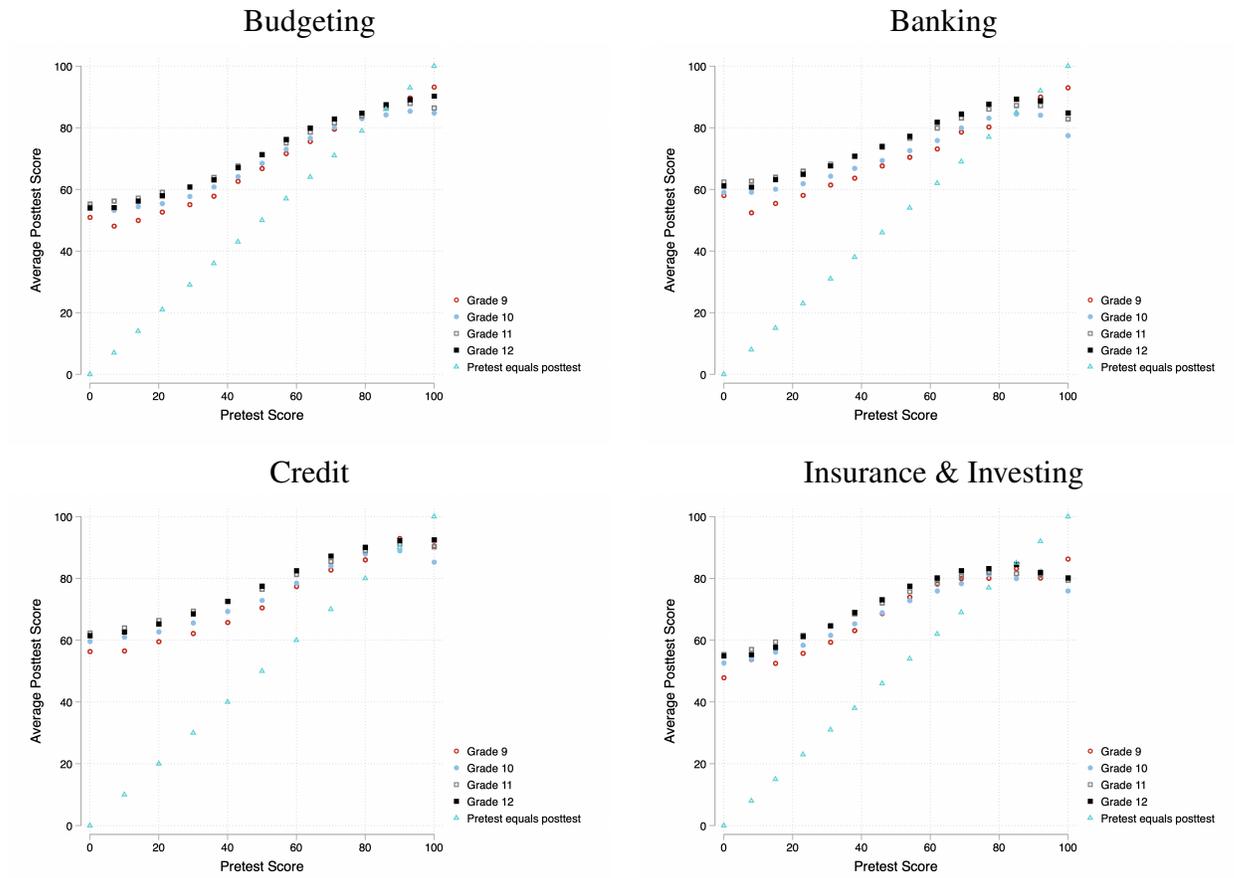
Notes: Data come from W!SE tests from 2016-2025. The distributions show the gains (posttests minus pretest) in percentage point terms. Number of observations by grade is: 9 (15,822); 10 (127,730); 11 (260,761); 12 (93,931). Vertical blue dashed lines represent the means for the grade.

Figure 5: Average Posttest Scores by Pretest Scores by Grade



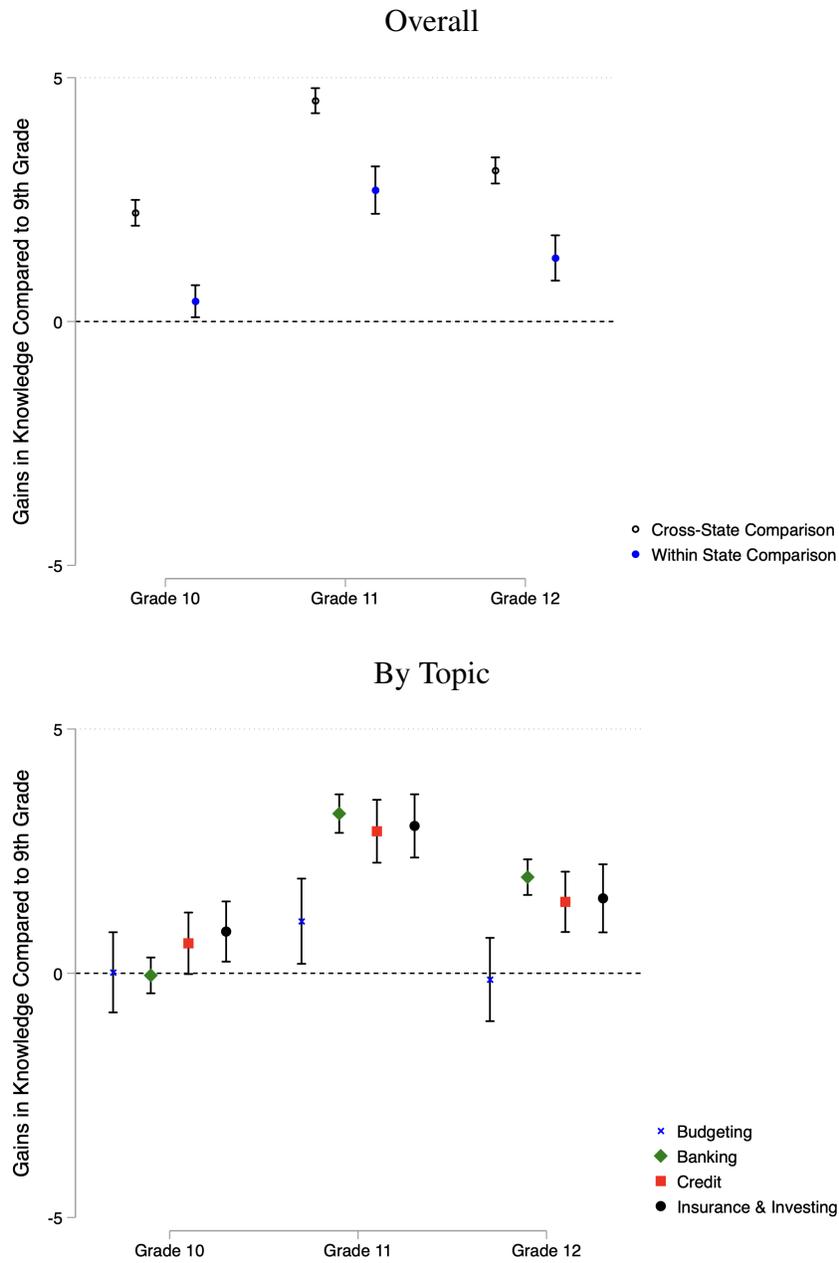
Notes: Data come from W!SE tests from 2016-2025. Data are binned into pretest scores and average posttest scores are taken as the average within the pretest score bin. The cyan triangles represent the 45 degree line, where pretests and posttests would be hypothetically equal.

Figure 6: Average Posttest Scores by Pretest Scores by Topic



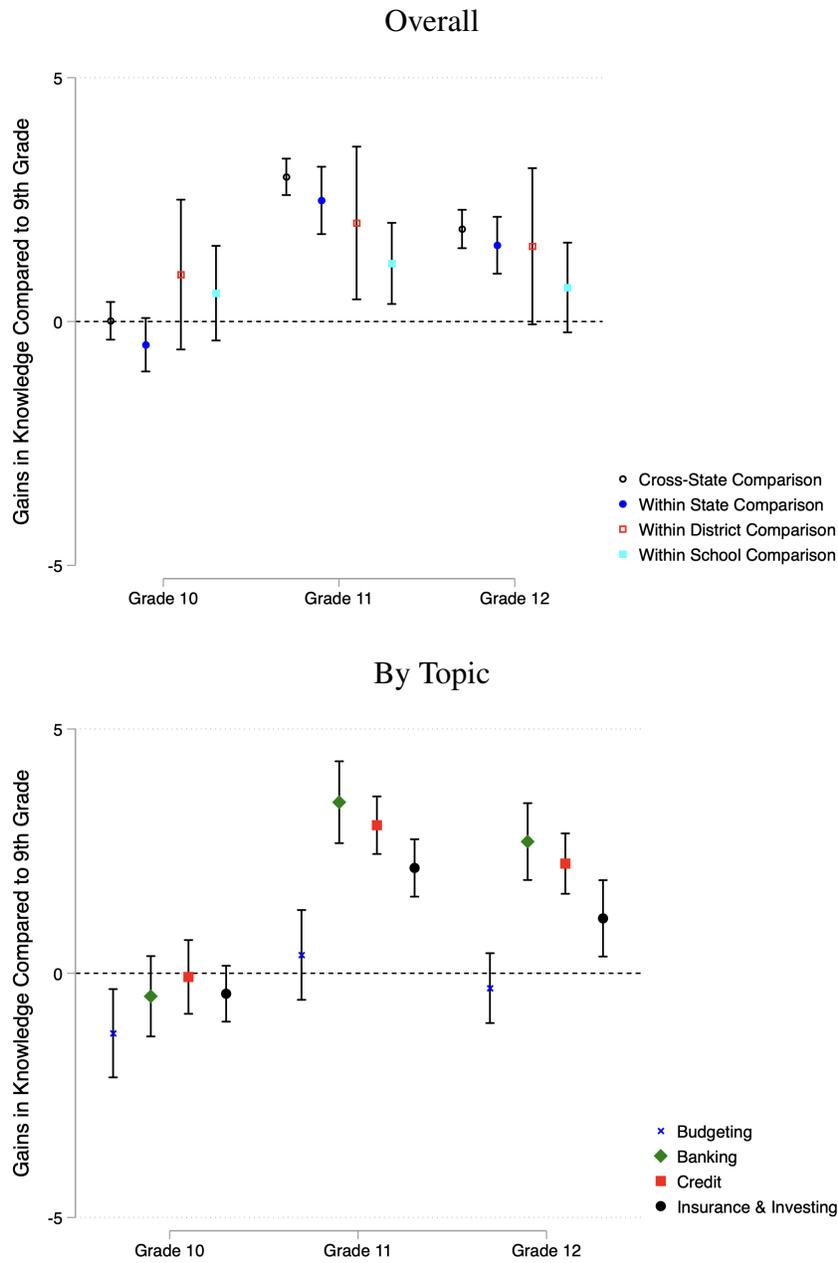
Notes: Data come from W!SE tests from 2016-2025. Data are binned into pretest scores and average posttest scores are taken as the average within the pretest score bin. The cyan triangles represent the 45 degree line, where pretests and posttests would be hypothetically equal.

Figure 7: Gains by grade, compared to grade 9 in Guarantee States



Notes: Estimates and 95 percent confidence intervals reported. The top panel looks at the difference in overall pre-test percent scores (0 to 100) across students in different grades. The first regression coefficients (black open circle) have no controls beyond the grade dummies, where the excluded group is grade 9. The second regression coefficients (blue closed circle) have state and year fixed effects. The bottom panel shows coefficient estimates of pretest scores across four different topical categories: budgeting, banking, credit, and insurance and investing. These regression models include state and year fixed effects.

Figure 8: Gains by grade, compared to grade 9 in Guarantee Schools



Notes: Estimates and 95 percent confidence intervals reported. The top panel looks at the difference in overall pre-test percent scores (0 to 100) across students in different grades. The first regression coefficients (black open circle) have no controls beyond the grade dummies, where the excluded group is grade 9. The second regression coefficients (blue closed circle) have state and year fixed effects. The third regression coefficients (red open square) include school district and year fixed effects. The fourth regression coefficients (cyan closed square) include school and year fixed effects. The bottom panel shows coefficient estimates of pretest scores across four different topical categories: budgeting, banking, credit, and insurance and investing. These regression models include state and year fixed effects.

## 8 APPENDIX

Table 2: Which grade has the highest knowledge gains?

	DV = Percentage Point Gains			
	(1)	(2)	(3)	(4)
Grade 10	2.229*** (0.135)	0.416** (0.118)	0.967** (0.469)	1.058 (0.689)
Grade 11	4.528*** (0.131)	2.694*** (0.175)	1.324*** (0.453)	1.940** (0.814)
Grade 12	3.097*** (0.137)	1.303*** (0.167)	0.134 (0.480)	0.837 (0.724)
Observations	498,244	498,244	498,244	455,777
State Fixed Effects	NO	YES	NO	NO
Year Fixed Effects	NO	YES	YES	YES
School District Fixed Effects	NO	NO	YES	NO
School Fixed Effects	NO	NO	YES	YES

Notes: Robust standard errors clustered at the state-level are in parentheses. Coefficients should be compared to the excluded group, 9th grade. Gains are Post-tests minus pre-tests ranging from 0 to 100. Guarantee states require a full semester of personal finance prior to high school graduation. The data come from W!SE test scores from 2016-2025.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

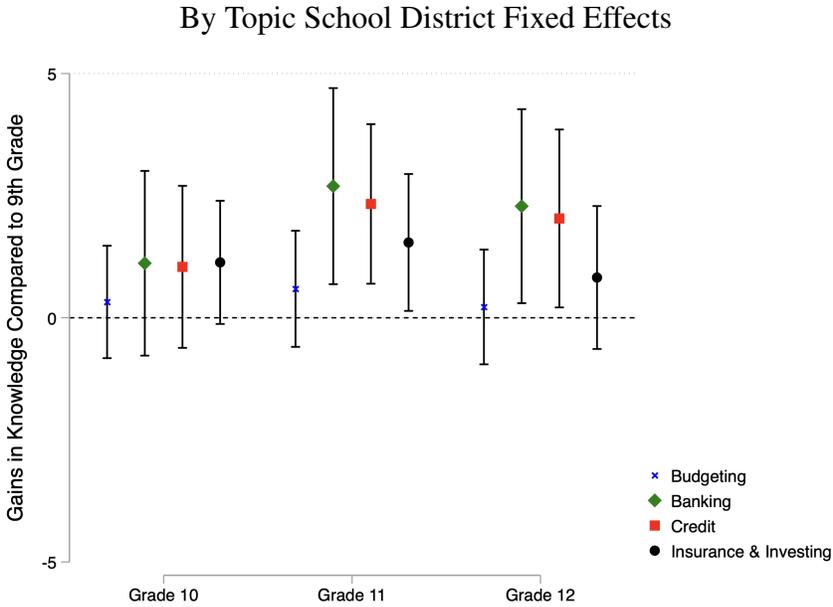
Table 3: Which grade has the highest gains across topic areas?

	(1) Budgeting	(2) Banking	(3) Credit	(4) Investing & Insurance
Grade 10	0.019 (0.296)	-0.044 (0.132)	0.613* (0.227)	0.854** (0.222)
Grade 11	1.065** (0.314)	3.268*** (0.142)	2.907*** (0.232)	3.016*** (0.233)
Grade 12	-0.128 (0.307)	1.967*** (0.131)	1.462*** (0.222)	1.533*** (0.251)
Observations	498,244	498,244	498,244	498,244
State Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES

Notes: Robust standard errors clustered at the state-level are in parentheses. Coefficients should be compared to the excluded group, 9th grade. Gains are Post-tests minus pre-tests ranging from 0 to 100. Guarantee states require a full semester of personal finance prior to high school graduation. The data come from W!SE test scores from 2016-2025.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Figure 9: Gains by grade, compared to grade 9 in Guarantee Schools with District Level Fixed Effects



Notes: Estimates and 95 percent confidence intervals reported. The plot shows coefficient estimates of pretest scores across four different topical categories: budgeting, banking, credit, and insurance and investing. These regression models include district and year fixed effects.