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State Curriculum Mandates and Student Knowledge of Personal Finance

This study analyzes the relationship between high school students' scores on a test of personal financial literacy and their state's personal finance curriculum mandate. At the time of the testing, twenty of the thirty-one states included in the study had some kind of educational policy in the area of personal financial management. The results of the study show that curriculum mandates, broadly defined, are not generally associated with higher students' scores. However, students in states that required specific financial education course work scored significantly higher than those in states with either a general mandate or with no mandate.

The financial awareness and knowledge of American youth receives a great deal of attention in the academic arena and also recently in the popular press. Much available evidence suggests that teens are lacking in basic knowledge and understanding of personal finance principles such as spending and money management, saving and investing, and the use of credit and debt. In several recent, well-publicized studies, high school students scored poorly on tests on personal finance topics. In 1997 and again in 2000, the Jumpstart Coalition for Personal Finance Literacy administered a test of financial literacy to high school seniors. In 1997 students correctly answered only 57 percent of the questions on average, and in 2000 students averaged only 52 percent correct (Jumpstart Coalition 1997, 2000). Similar results were found in earlier studies by the Consumer Federation of America (1991) and by Danes and Hira (1987).¹

These findings, coupled with Americans' low rates of saving, heavy use of credit and high rates of bankruptcy, have fueled public concerns that teens need educational preparation to successfully manage their finances in adulthood. One public policy receiving increasing attention is

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to mandate the teaching of personal finance in schools.² Currently many students may graduate from high school having had no education in the subject area, as only a minority of states mandate its teaching in the public schools.

Before expanding curriculum mandates for personal finance education, it is important to consider whether such a policy is likely to achieve its desired goal.³ Exhibiting greater financial management skill as a consumer is several steps removed from the receipt of personal finance education as a student. One critical concern is whether education will be effective in increasing student knowledge and whether increases in knowledge will translate into more effective consumer behaviors. Another important issue is whether mandating such education will increase or decrease educational effectiveness. Educational mandates should increase the number of students exposed to the subject area. However, mandates may have little impact if written into requirements without teaching directives or integration into existing curricula. Mandate effectiveness also could be compromised if mandates create negative learning environments or if teachers are untrained in the subject area.⁴

This study examines the relationship between existing state mandates for personal finance education and student knowledge of personal finance. The study analyzes scores on a test of personal financial literacy administered to a national sample of high school students to determine whether student scores are significantly higher in states with personal finance curriculum mandates. The premise underlying the study is that the variation in mandates across states may confound the finding of a simple relationship between mandates and student knowledge. Thus, the analysis distinguishes the various forms of states' personal finance curriculum mandates in seeking such relationships.

BACKGROUND

A large amount of existing literature on formal consumer education has addressed both the issue of educational effectiveness and that of mandate effectiveness. While the early results were mixed, many studies suggest that formal consumer education significantly increases knowledge.⁵ Recent literature includes evaluations of specific high school curricula, which demonstrate that carefully designed courses do have a significant positive impact. Danes, Huddleston-Casas, and Boyce (1999) found that the NEFE High School Financial Planning Program produces significant change in both student knowledge and behaviors. Similarly, Barrese,

Garner, and Thrower (1998) found that high school students who study an Insurance Education Foundation insurance education module significantly improve their understanding of insurance concepts. Earlier studies by Langrehr (1979), Langrehr and Mason (1978), and Peterson (1992), among others, have also found that students who take a specific course in consumer education or economics significantly improve their competency in the subject area studied.

Studies of mandates for consumer education also have produced mixed results. In a study of mandated economics education in high schools, Marlin (1991) found that teacher attitudes toward economics were directly related to student learning and that teacher attitudes were more negative in states with mandated education.⁶ Rhine (1989), nonetheless, found that improvements in student knowledge, as a result of an economics course, were similar in mandate and non-mandate environments. In a report using the same data set analyzed in this article, Mandell (1997) compared mean test scores in states with personal finance mandates to those in states without them and failed to find a positive relationship between mandates and scores. However, Bernheim, Garrett, and Maki (1997) found that mandated personal finance education positively affects behaviors over the long term. Using a large nationally representative data set, these authors demonstrated that exposure to mandated personal finance education in school is related to higher rates of saving in adulthood.

State Personal Finance Curriculum Mandates

The majority of U.S. states mandate that students receive some exposure to consumer education in middle school or high school. Consumer education is fairly broadly conceived, however, and generally includes economics, consumer decision making, and consumer law as well as personal finance.⁷ Moreover, state curriculum requirements vary considerably in both exactitude and focus. For example, some states require that students receive consumer education or economics education but not education in personal finance. Additionally, some state mandates require specific course content and/or student testing, while others only set general educational guidelines or objectives (Clow 1999).

This study focuses on states that set standards or requirements specifically for personal finance education. Personal finance education includes the study of income and its determinants, money management and budgeting, saving and investing, and credit and debt.⁸ Table 1 summarizes the status of the curriculum requirements for personal finance education by

Table 1
Personal Finance Mandates by State

Standards only (9)	No Standards (33)
Alabama	Alaska
Connecticut	Arizona
Florida	Arkansas
Idaho	California
Minnesota	Colorado
Mississippi	Delaware
Oklahoma	Georgia
Texas	Hawaii
Wisconsin	Indiana
	Iowa
Course (3)	Kansas
Illinois*	Kentucky
Nebraska	Louisiana
New York*	Massachusetts
	Missouri
Test (10)	Montana
Illinois*	Nevada
Maine	New Jersey
Maryland	North Dakota
Michigan	Ohio
New Hampshire	Oregon
New Mexico	Pennsylvania
New York*	Rhode Island
North Carolina	South Carolina
Virginia	South Dakota
Washington	Tennessee
	Utah
	Vermont
	West Virginia
	Wyoming
	District of Columbia

* Indicates state that has both test and course mandates

state at the time the data for this study were collected. The categorization of states is based upon that of Clow (1999) and Bernheim, Garrett, and Maki (1997), supplemented by correspondence with state education departments when these two sources did not match or the state requirements were otherwise unclear.

In total, twenty states were found to articulate some form of educational policy in the specific area of personal finance. Educational policies include setting guidelines for educational standards that should be met or defining essential skills that should be imparted to students. Of these twenty states, ten require that tests of personal finance concepts are

administered to students, and three require the teaching of a specific course or course module. The remaining nine states set standards without specifying curriculum content, sequencing, or testing. In two states, Illinois and New York, the curriculum mandate specifies both that a specific course be taken and that students be tested on their knowledge of personal finance concepts.⁹

EMPIRICAL METHODOLOGY

The study assesses the impact of personal finance curriculum mandates by examining the relationship between state educational requirements and student scores on a test of personal financial literacy. The data used in the study are from the 1997 survey of high school students conducted by the Jumpstart Coalition for Personal Financial Literacy.¹⁰ Designed to assess the financial literacy of U.S. high school seniors, the survey administered a test of personal financial literacy to students in twelfth grade English or social studies classes in randomly selected public high schools throughout the country. The test contained thirty-one multiple-choice questions regarding terminology, facts, and decisions related to personal financial management. The survey also included additional questions regarding students' family background, financial experience, aspirations, and demographic characteristics.

This study employs multivariate analysis of the test scores. Such methodology allows for examination of the effects of curriculum mandates while controlling for other possible correlates of student test scores. An empirical model is developed to test the hypothesis that the existence of a personal finance curriculum mandate is positively related to students' test scores, after controlling for individual student characteristics, school size, and other characteristics of the state. A simple form of the hypothesis is first tested by including in the model an indicator variable equal to one if the student's state has in place any type of mandate for personal finance education and equal to zero if the state has no personal finance mandate. A more complex form of the hypothesis that allows for different effects on scores of the different forms of mandates is also tested by including three separate state indicator variables. The three indicator variables are set equal to one if a state mandates educational standards, mandates teaching of personal finance in a specific course, or mandates student testing in personal finance. The more specific curriculum mandates (requiring a course or a test) are hypothesized to have a greater positive impact on student scores than the nonspecific educational standards.

Data

The data set analyzed contains information on 1,643 students attending sixty-five schools in thirty-one states.¹¹ Table 2 summarizes the geographic distribution of the sample by state. There is substantial variation in personal finance curriculum mandates across the states from which the sample is drawn. Only sixteen of the thirty-one states had some form of personal finance mandate in place at the time of testing. Of these sixteen, seven had only generic educational standards, three required the teaching of personal finance within a specific course and eight required that students be tested. Of the 1,643 students in the sample, 804 had not been exposed to mandated personal finance education, and 839 had been exposed to some type of mandate. Of those exposed to a mandate, 301 were required to study personal finance in a specific course, and 443 were required to be tested. The data set contains no information regarding whether any students in non-mandate environments had received personal finance education.

Table 3 summarizes the personal characteristics of the students in the sample. Of the students who provided demographic information, 56.8 percent are Caucasian, and 54.5 percent are female. The vast majority of students are high school seniors, but 5.1 percent are underclassmen. More than half or 61.7 percent of students plan to attend a four-year college or university after high school, and 81.8 percent plan to attend either a two-year or four-year college or university. Only 7.4 percent of students have no further educational plans. Among those who provided information, 38.1 percent of students' parents hold college or advanced degrees, and 90.1 percent of parents have at least a high school degree. Students also were asked to estimate their annual household income. Among those responding, 52.9 percent estimated household income of over \$40,000, 29.0 percent estimated income between \$20,000 and \$40,000, and 18.1 percent estimated household income of below \$20,000 per year.

The test of personal financial literacy administered in the survey is based upon guidelines for high school financial management curricula. The test questions concern topics about income, money management, saving and investing, and spending and debt. Of the thirty-one questions, seven relate to income, five relate to money management, eight relate to saving and investing, and eleven relate to spending and debt. Approximately one-half of the questions test knowledge of terms, definitions or facts; the other one-half of the questions require understanding or analysis of the financial implications of events, circumstances, or personal choices.¹²

Table 2
States in Sample

State	Number of Schools	Number of Students	Generic Mandate	Course Mandate	Test Mandate
Alabama	2	50	X		
Arizona	2	63			
California	7	209			
Connecticut	1	30	X		
Florida	2	63	X		
Georgia	2	56			
Illinois	6	142		X	X
Indiana	2	42			
Iowa	1	27			
Kansas	2	57			
Kentucky	1	24			
Louisiana	1	19			
Maine	1	14			X
Michigan	2	45			X
Minnesota	2	44	X		
Mississippi	1	21	X		
Nebraska	2	52		X	
New Hampshire	1	11			X
New Jersey	2	51			
New Mexico	2	62			X
New York	4	107		X	X
North Carolina	1	36			X
Ohio	2	61			
Pennsylvania	3	84			
Tennessee	1	25			
Texas	6	103	X		
Utah	1	30			
Virginia	1	26			X
Wisconsin	2	33	X		
West Virginia	1	34			
Wyoming	1	22			
Total	65	1,643	7	3	8

As reported in Table 4 and previously in Mandell (1997), students answered 56.7 percent of the questions correctly on average. There were no significant differences in the scores of male and female students. Caucasian students scored significantly higher than non-Caucasian students, achieving an average score of 60.6 percent on the test, compared to 51.9 percent for non-Caucasian students. Twelfth-grade students scored significantly better than underclassmen on the exam, averaging 57.3 percent correct versus 49.9 percent correct for underclassmen.

Average scores on the test also were positively related to future educa-

Table 3
Sample Characteristics

Demographic Characteristic	No. of Respondents	Pct. of Respondents
Race		
Caucasian	911	56.8
African American	268	16.7
Hispanic	224	14.0
Asian American	80	5.0
Native American	44	2.7
Other	76	4.7
Sex		
Female	883	54.5
Male	736	45.5
Grade Level		
High school senior	1,532	94.9
Other	83	5.1
Future Educational Plans		
None/ don't know	121	7.4
Other training or education	175	10.8
Two-year college	327	20.1
Four-year college	1,003	61.7
Parents' Education		
Some high school	154	9.9
High school graduate	444	28.5
Some college	366	23.5
College graduate or more	593	38.1
Parents' Income		
Less than \$20,000	243	18.1
\$20,000 to \$39,999	390	29.0
\$40,000 to \$79,999	496	36.9
\$80,000 or more	215	16.0

tional plans. Students with plans to attend a four-year college or university scored significantly better on the exam than other students, scoring on average 59.7 percent correct. Students with plans to attend a two-year college or to receive other training or education scored significantly higher than students with no educational plans, averaging 53.2 percent and 54.3 percent correct, respectively. Students with no further educational plans achieved the lowest scores, averaging 47.2 percent correct.

Students' scores were also positively related to their parents' level of education. Students whose parents did not finish high school scored significantly lower than other students, achieving on average only 50.8 per-

Table 4
Summary of Test Results

	Number of Students	Mean	Standard Deviation
Overall	1,643	0.5670	0.1535
By Race			
Caucasian	911	0.6056	0.1410
Non-Caucasian	732	0.5191*	0.1551
By Sex			
Female	883	0.5759	0.1393
Male	736	0.5624	0.1643
By Grade Level			
Seniors	1,532	0.5733	0.1502
Non-seniors	83	0.4994*	0.1605
By Future Educational Plans			
No further education	121	0.4719	0.1758
Other training or education	175	0.5425*	0.1597
Two-year college	327	0.5318*	0.1408
Four-year college	1,003	0.5973*	0.1428
By Parents' Education			
Neither completed high school	154	0.5084	0.1565
Completed high school	444	0.5678*	0.1437
Some college	366	0.5832*	0.1421
College graduate or more than college	593	0.5887*	0.1524

* Indicates mean score is significantly different from that of the group listed first in the category, at the 1 percent significance level, two-sided t-test.

cent correct compared to scores averaging from 56.8 percent to 58.9 percent correct for students whose parents have more education.¹³

RESULTS

Table 5 reports comparisons of the mean test scores in states with curriculum mandates to those without mandates. Consistent with Mandell's earlier findings from these data, the table shows that the existence of a state curriculum mandate is not related to students' test scores on average. In states with a mandate, students averaged 56.9 percent correct on the test, while in states without a mandate, students averaged 56.5 percent correct.

Because curriculum mandates vary across states, there may be important differences in the implementation and effectiveness of state mandates. Some evidence of this variance is demonstrated in Table 5, which

Table 5
Test Results by State Personal Finance Mandate

	Number of Students	Mean	Standard Deviation
Any Standard			
Yes	839	0.5690	0.1549
No	804	0.5650	0.1521
Standard Only			
Yes	344	0.5459	0.1675
No	804	0.5650	0.1521
Course			
Yes	301	0.5916*	0.1334
No	804	0.5650	0.1521
Test			
Yes	443	0.5818	0.1455
No	804	0.5650	0.1521

* Indicates mean score is significantly different from that in states with no standard, at the 1 percent significance level, two-sided t-test.

also reports mean test scores by type of state mandate. Mean student scores in states that mandate a specific course were significantly higher than in states that have no personal finance mandate. However, mean scores in states with educational standards or test-related mandates were not significantly different than those in states without any mandate. These results suggest that mandating personal finance education may be effective in increasing student knowledge but only if the mandate requires significant exposure to personal finance concepts.

Alternatively, the differences in student scores across the states with different curriculum mandates may simply reflect differences in student characteristics across the schools or states participating in the study.¹⁴ As noted previously, student test scores were significantly related to race, future educational plans, and parents' education. If there are systematic differences in these student attributes across states or schools, then these may be confounded with the apparent effects of mandates.

Multivariate analysis of test scores is employed to control for these other possible correlates. A linear relationship between student scores and the explanatory variables is posited.¹⁵ The control variables include personal characteristics of the student, and in some models, characteristics of the school and the state. The test for a relationship between curriculum mandates and test scores is implemented by including in the model an

indicator variable set equal to one for states with any personal finance curriculum mandate. An alternative specification allows for different effects of different types of mandates by including three separate state indicator variables, one for each form of mandate (educational standards, test requirement, and course requirement).

The student characteristics included in the model are intended to proxy for student ability, experience or confidence in test taking, or other omitted characteristics that might affect test scores.¹⁶ The student's future educational plans are included to control for potential effects of academic ability or preparation. Educational plans are entered as an indicator variable corresponding to the type of institution a student plans to attend after high school: vocational or technical school, two-year college, and four-year college. The omitted category is no specific educational plans. To control for potential effects of family background, students' parents' educational attainment is included in the model.¹⁷ Parents' education is entered as an indicator variable corresponding to the level of educational attainment: high school graduate, some college, or college graduate. The omitted category is less than high school education. Also included are students' race (entered as an indicator variable equal to one if the student is non-Caucasian), gender (entered as an indicator variable equal to one if the student is male), and grade in school (entered as an indicator variable equal to one if the student is a senior), as proxy variables for other factors that may influence test scores.

To partially control for differences across states other than curriculum mandates, two state-level variables, per capita income and per capita spending on public schools, are included in some versions of the model. These variables are intended to serve as proxies for school quality. School size is also included in these models, to capture any unobservable differences in resources or educational quality across schools of different size.¹⁸ School size is entered in the model as an indicator variable corresponding to the size category of the school by number of students: 500 to 999, 1000 to 1499, 1500 to 1999, 2000 to 2499, and over 2500. The omitted category is schools with under 500 students.

The results of ordinary least squares (OLS) estimation are reported in Table 6. The first two columns report the estimates for the model that includes only student characteristics as control variables. The second two columns report the estimates when school size and state characteristics are also included as controls. The school size indicators are included in these models but are not reported in the table.¹⁹ Two versions of each estimate are reported: one that includes only a single indicator variable set equal to

Table 6
Ordinary Least Squares Estimates of Student Test Scores

Variable	Model 1	Model 2	Model 3	Model 4
Constant	0.4402* (0.0230)	0.4423* (0.0229)	0.3093* (0.0362)	0.3291* (0.0368)
Non-Caucasian	-0.0765* (0.0073)	-0.0753* (0.0073)	-0.0790* (0.0074)	-0.0786* (0.0075)
Male	0.0007 (0.0073)	0.0008 (0.0072)	-0.0029 (0.0072)	-0.0030 (0.0072)
Plans other training	0.0576* (0.0174)	0.0592* (0.0173)	0.0548* (0.0173)	0.0552* (0.0173)
Plans two-year college	0.0470* (0.0159)	0.0472* (0.0158)	0.0403* (0.0159)	0.0396* (0.0159)
Plans four-year college	0.1090* (0.0146)	0.1091* (0.0146)	0.0983* (0.0147)	0.0972* (0.0147)
Parents HS grads	0.0239 (0.0134)	0.0253** (0.0133)	0.0289** (0.0133)	0.0295** (0.0133)
Parents some college	0.0366* (0.0138)	0.0374* (0.0137)	0.0385* (0.0137)	0.0392* (0.0137)
Parents college grads	0.0284** (0.0132)	0.0298** (0.0132)	0.0301** (0.0131)	0.0312** (0.0131)
High school senior	0.0547* (0.0165)	0.0513* (0.0166)	0.0435* (0.0171)	0.0432* (0.0172)
State per capita income	—	—	5.4E-6* (1.5E-6)	4.7E-6* (1.5E-6)
State per capita school financing	—	—	-5.3E-7 (3.6E-6)	-2.7E-7 (3.6E-6)
State any standard	0.0077 (0.0071)	—	0.0076 (0.0074)	—
State standard only	—	-0.0085 (0.0092)	—	-0.0086 (0.0089)
State requires course	—	0.0318* (0.0114)	—	0.0227** (0.0119)
State requires test	—	-0.0033 (0.0102)	—	-0.0035 (0.0109)
Adjusted R-squared	0.1354	0.1408	0.1525	0.1542

* Indicates estimated coefficient is significantly different from zero at the 1 percent confidence level, two-sided t-test. ** Indicates significance at the 5 percent confidence level.

one in all states that have any form of personal finance curriculum mandate, and another that includes an indicator variable for each form of mandate (standard only, course requirement, and test requirement).

The estimated parameter values for the control variables are similar across all model specifications. Students who have any educational plans beyond high school performed significantly better on the test than those with no further educational plans, and students who plan to attend a four-year college scored significantly better on the test than all others. This suggests that future educational plans are a good indicator of student ability and academic preparation. Higher levels of parental education are also positively related to scores on the test. The only effect significant at the 1 percent confidence level is for parents who have some (but did not complete) college; however, the other parental education variables are often significant at the 5 percent confidence level. Caucasian students scored significantly better on the test than non-Caucasian students, and seniors did significantly better than underclassmen, but there are no significant differences in scores by gender.

When curriculum mandates are considered as a whole, students in mandate states did not perform significantly better than other students. However, when broken down separately, curriculum mandates that require the teaching of personal finance concepts within a specific course are significantly and positively related to student test scores. When state and school characteristics are included in the model, the coefficient estimate is no longer significant at the 1 percent confidence level but is significant at the 5 percent level. Generic educational standards and required testing mandates are not significantly related to student test scores in either model.

The estimated impact of the course mandate on student test scores is small, however. The estimates with only student characteristics indicate that students exposed to a mandated personal finance course achieve a score 3.2 points higher than otherwise expected, given their personal characteristics. When state per capita income, spending on schools, and school size are included in the model, the estimated relationship between a personal finance course and student scores is only a 2.3 point increase.

Results for Test Component Scores

Beyond identifying a relationship between student test scores and exposure to a personal finance course, it is of interest to understand more about the types of knowledge that are increased under a mandated course.

Table 7
Test Results by Personal Finance Mandates and Subject Category

	Income	Money Management	Saving and Investing	Spending and Debt
Overall (N=1643)	0.7140 (0.2006)	0.5345 (0.2516)	0.4677 (0.1930)	0.4944 (0.1811)
No standard (N=804)	0.7144 (0.1964)	0.5346 (0.2544)	0.4596 (0.1916)	0.4940 (0.1827)
Any standard (N=839)	0.7136 0.2048	0.5344 (0.2490)	0.4754 (0.1942)	0.4947 (0.1797)
Standard only (N=344)	0.6898 (0.2263)	0.5052 (0.2467)	0.4506 (0.1926)	0.4773 (0.1951)
Course (N=301)	0.7361 (0.1794)	0.5495 (0.2446)	0.5029* (0.1889)	0.5159 (0.1543)
Test (N=443)	0.7307 (0.1877)	0.5544 (0.2517)	0.4853 (0.1925)	0.5026 (0.1698)

*Indicates mean score is significantly different from that in states with no standard, at the 1 percent significance level, two-sided t-test.

The data set includes student responses to each of the test questions individually not just the percentage of questions answered correctly. This detail is utilized to take a closer look at the relationship between curriculum mandates and student knowledge by analyzing student scores on different components of the test.

Results by Subject Area

Table 7 reports the mean percentage of correct answers to test questions in each of the four major areas of personal finance: income, money management, saving/investing, and spending/debt. Scores are reported for the sample overall, and by the type of personal finance curriculum mandate in operation in the student's state. Students performed best on the questions regarding income, answering 71.4 percent correct on average. Performance was significantly worse in the other topic areas, with students averaging 53.5 percent correct on questions of money management, 46.8 percent correct on questions of saving/investing, and 49.4 percent correct on questions of spending/debt. Students exposed to a personal finance course scored significantly higher on questions of saving/investing than other students. There are no other significant relationships between curriculum mandates and student test performance.²⁰

Similar relationships are found in multivariate analysis of scores on the separate sections of the test. Table 8 reports the OLS estimates of student test scores in each of the four subject areas. Only the model measuring the impact of curriculum mandates using three separate indicator variables for educational standard, course requirement, and test requirement are reported. Student characteristics, as well as state per capita income, per capita spending on schools, and the school size categories are also included in the model.

The patterns of signs and significances of coefficient estimates for the control variables are similar in these estimates to those for overall test scores, although significance levels tend to be lower. The coefficient estimates for the state mandate variables show that only course-related mandates are significantly related to test scores in any of the subjects. Course mandates are associated with significantly higher test scores in both the income and saving/investing subject areas. The estimated association of a course-related mandate on student scores is a positive 3.7 points on questions related to saving and a positive 3.1 points on questions related to income.

Results by Question Type

In addition to varying by subject matter, the test questions also varied in their focus on factual versus analytical knowledge. About one-half of the questions on the test relate to definitions of terms or matters of fact. For example, one question of this type asks the respondent to identify the correct term for retirement income from a company; another question asks the respondent to identify (from a list of selections) the type of savings instrument that is not protected by the government against losses. The other one-half of the questions require students to understand the impact of external events or personal decisions on personal finances. For example, one such question asks the respondent to identify the personal circumstances that would lead to the greatest need for life insurance; another asks about the impact of compound interest on investments.

The effect of exposure to curriculum mandates on student performance on each of these two categories of questions is examined separately. Table 9 reports the mean percentage of correct answers for factual and analytical questions. Overall, students did slightly better on factual questions than on analytical questions (57.8 percent correct versus 56.9 percent correct), but the differences are not statistically significant. There is also no statistically significant relationship between scores on either type of ques-

Table 8
Ordinary Least Squares Estimates of Test Scores by Subject Area

Variable	Money			
	Income	Management	Saving	Spending
Constant	0.4981* (0.0508)	0.1950* (0.0647)	0.2575* (0.0488)	0.2973* (0.0451)
Non-Caucasian	-0.0819* (0.0103)	-0.0733* (0.0131)	-0.0774* (0.0099)	-0.0698* (0.0091)
Male	0.0014 (0.0099)	-0.0044 (0.0127)	0.0067 (0.0095)	-0.0070 (0.0088)
Plans other training	0.0367 (0.0238)	0.0585** (0.0304)	0.0580* (0.0229)	0.0539* (0.0212)
Plans two-year college	0.0526* (0.0219)	0.0339 (0.0279)	0.0317 (0.0210)	0.0293 (0.0194)
Plans four-year college	0.0898* (0.0202)	0.0953* (0.0258)	0.0923* (0.0194)	0.0877* (0.0180)
Parents, HS grads	0.0037 (0.0184)	0.0348 (0.0234)	0.0160* (0.0176)	0.0442* (0.0163)
Parents, some college	0.0265 (0.0188)	0.0417 (0.0240)	0.0260 (0.0181)	0.0504* (0.0167)
Parents, college grads	0.0188 (0.0181)	0.0518** (0.0230)	0.0288 (0.0173)	0.0272 (0.0160)
High school senior	0.0338 (0.0237)	0.0589** (0.0302)	0.0528** (0.0227)	0.0349 (0.0210)
Per capita income	4.1E-6** (2.1E-6)	5.9E-6** (2.7E-6)	4.6E-6** (2.0E-6)	4.1E-6** (1.9E-6)
Per capita school financing	5.3E-7 (5.0E-6)	6.8E-6 (6.4E-6)	-3.9E-6 (4.8E-6)	-8.7E-7 (4.5E-6)
State standard only	-0.0194 (0.0123)	-0.0199 (0.0157)	0.0041 (0.0118)	-0.0075 (0.0109)
State requires course	0.0313** (0.0164)	-0.0060 (0.0209)	0.0371* (0.0158)	0.0180 (0.0146)
State requires test	-0.0118 (0.0151)	0.0140 (0.0192)	0.0029 (0.0145)	-0.0106 (0.0134)
Adjusted R-squared	0.0789	0.0671	0.0913	0.0868

* Indicates estimated coefficient is significantly different from zero at the 1 percent confidence level, two-sided t-test. ** Indicates significance at the 5 percent confidence level.

Table 9
Test Results by Personal Finance Mandates and Question Type

	Factual Questions	Analytical Questions
Overall (N=1643)	0.5776 (0.1627)	0.5685 (0.1830)
No standard (N=804)	0.5748 (0.1646)	0.5652 (0.1795)
Any standard (N=839)	0.5804 (0.1610)	0.5716 (0.1864)
Standard only (N=344)	0.5551 (0.1723)	0.5502 (0.1996)
Course (N=301)	0.6071* (0.1367)	0.5936* (0.1688)
Test (N=443)	0.5969* (0.1531)	0.5812 (0.1763)

*Indicates mean score is significantly different from that in states with no standard, at the 1 percent significance level, two-sided t-test.

tion and exposure to curriculum mandates overall. However, consistent with the findings for overall test scores, exposure to a course-related curriculum mandate is associated with significantly higher scores on both types of questions. Students in states with mandated testing scored significantly higher on factual questions only.

Table 10 reports the OLS estimates of student test scores for each of the two types of questions, using the same model specification reported in the analysis of subject-area scores. The parameter estimates for the control variables are similar to those for test scores overall and with similar levels of statistical significance. With respect to curriculum mandates, only course-related mandates have a significant relationship with test scores on either type of questions, and the relationship is comparatively weak. Course mandates are associated with significantly higher test scores on factual questions at the 5 percent confidence level. Course mandates are positively related to test scores on analytical questions, but this relationship is statistically significant at only the 10 percent confidence level. The estimates suggest that exposure to course mandates implied a score increase of about 2.6 points on both factual questions and analytical questions.

Table 10
Ordinary Least Squares Estimates of Test Scores by Question Type

Variable	Factual Questions	Analytical Questions
Constant	0.3263* (0.0401)	0.3422* (0.0445)
Non-Caucasian	-0.0633* (0.0081)	-0.0961* (0.0090)
Male	-0.0101 (0.0078)	-0.0016 (0.0087)
Plans other training	0.0508* (0.0188)	0.0648* (0.0209)
Plans two-year college	0.0461* (0.0173)	0.0361 (0.0192)
Plans four-year college	0.0940* (0.0160)	0.1048* (0.0177)
Parents, HS grads	0.0321** (0.0145)	0.0218 (0.0161)
Parents, some college	0.0430* (0.0149)	0.0361** (0.0165)
Parents, college grads	0.0274** (0.0143)	0.0316** (0.0158)
High school senior	0.0476* (0.0187)	0.0465** (0.0208)
Per capita income	4.1E-6* (1.7E-6)	5.2E-6* (1.8E-6)
Per capita school financing	2.7E-6 (4.0E-6)	-3.5E-6 (4.4E-6)
State standard only	-0.0071 (0.0097)	-0.0062 (0.0108)
State requires course	0.0264** (0.0129)	0.0262 (0.0144)
State requires test	-0.0021 (0.0119)	-0.0035 (0.0132)
Adjusted R-squared	0.1111	0.1394

* Indicates estimated coefficient is significantly different from zero at the 1 percent confidence level, two-sided t-test. ** Indicates significance at the 5 percent confidence level.

CONCLUSIONS

To assess the relationship between state curriculum mandates and student knowledge of personal finance, this study examines students' scores on a test of personal financial literacy. Even after controlling for individual student characteristics, school size, and characteristics of the state that might affect scores, a significant relationship between some curriculum mandates and student test scores emerges. When averaged over all forms of mandates, no association between mandates and student test scores was found. However, mandates that require the teaching of a specific course do exhibit a significant and positive association with scores.

Course mandates are associated with higher student scores on both factual and analytical questions, although the latter relationship is of marginal statistical significance. Course mandates are also associated with significantly greater student knowledge in the topic areas of savings/investing and income. However, there was no significant relationship found in the topic areas of money management and spending/debt. The finding that course mandates have the greatest impact on test scores in the area of saving/investing is interesting in the context of Bernheim, Garrett, and Maki's (1997) finding that savings rates are higher for adults who were exposed to mandated personal finance education in high school. These long-term effects mirror improvements in student knowledge in the short term.

The results of this study suggest that the form of a curriculum mandate appears to be critical in determining student outcomes. While no causal inferences are possible under the research design in this study, mandatory coursework is more highly correlated with student knowledge than is mandatory testing. However, it should be noted that the lack of a statistical relationship between test mandates and student performance appears to be due to variation in that relationship across states rather than due to a uniform lack of relationship between test mandates and student scores (Tennyson, Nguyen, and Bristow 2000).

The fact that there are significant differences in the relationship between different mandates and student scores raises questions regarding the implementation of mandates at the school district or the school level. New data collection efforts should be undertaken to increase understanding of how curriculum mandates are implemented and to what extent variation in implementation within a state depends upon the form of the mandate.

Additional avenues for future research include examination of the questions posed here using a larger, more nationally representative data

set, in which information on students' coursework and teachers' training are included. Additionally, the findings here demonstrate only an improvement in students' exam performance, which may not necessarily translate into improvements in consumers' behaviors. Further study of the impact of mandated education on consumers' behavior is essential.

ENDNOTES

1. A recent survey of college students found that 25 percent to 40 percent were lacking understanding of the obligations and consequences of using credit cards (see Joo and Grable 1999).
2. See, for example, Jumpstart Coalition, 2000.
3. Even beyond establishing the effectiveness of mandates, the benefits relative to the full opportunity costs should be considered in the determination of policy.
4. For example, early studies of high school teachers' knowledge of consumer education and personal finance topics have identified deficiencies. These studies also identified knowledge increases from courses (Garman 1979, Lofgren and Suzuki 1979), suggesting that mandates should be accompanied by teacher training.
5. Langrehr and Mason (1977) survey some of the results of the literature to that date. Most of the studies found no significant impact of consumer education on consumer knowledge or competency. However, most of the studies cited did not use multivariate analysis and, thus, could not control for preexisting differences in student competencies.
6. Rhine's study measured student knowledge by performance on the Test of Economic Literacy. The study did find that there were differences in the determinants of student performance in mandate and non-mandate environments.
7. See Bernheim, Garrett, and Maki (1997) and the references therein for a more detailed description of consumer education and its fields.
8. See Mandell (1997), Appendix A, for a summary of learning objectives in high school personal financial management education.
9. Illinois requires that the course be taken by students who do not pass a preliminary test; students who pass the test may take economics instead. New York's course requirement applies to middle school rather than high school.
10. Extensive details on the survey methodology, the test instrument, and the findings are reported in Mandell (1997).
11. A request to participate in the survey was initially sent to a randomly selected set of 149 public high schools, balanced by region and size. See Mandell (1997) for a detailed discussion of the sampling process and a more detailed description of the data.
12. The distribution of questions by subject area is taken from the analysis of The Jumpstart Coalition (Mandell 1997). The distribution of questions by type of knowledge required is the assessment of the authors.
13. The student test results are discussed and analyzed more extensively by Mandell (1997) in his earlier report on this survey. The summary statistics in this study differ slightly because Mandell's analysis included only high school seniors while this analysis includes all students in the sample.
14. This study treats the determination of curriculum mandates as exogenous, consistent with the findings of Ford (1977) who studied the characteristics of states that had enacted mandatory consumer education and found no significant association with region, income, retail sales, or high school graduates.
15. Because the test scores are the percentage of test questions answered correctly, the scores are bounded by zero and one. To smooth the distribution of the data and to assure that predicted values from the empirical model also lie between zero and one, models using the logistic transformation of the student's test score also were estimated. In these models the dependent variable was defined as $\ln(\text{Score}/(1-\text{Score}))$ where Score is the percentage of questions answered correctly. The results from

estimating these models were qualitatively and quantitatively very similar to those that use the raw test scores as the dependent variable.

16. Previous studies have found that student knowledge of consumer education topics varies with academic achievement overall, socioeconomic class, and, in some studies, gender. See Langrehr and Mason (1977) for a review of early literature and Grable and Joo (1999) for more recent findings.

17. Household income was also considered as a covariate. However, many students answered "don't know" to this question. Accuracy of the students' estimates of their household income was also a concern. Moreover, among students who answered both questions, household income is highly correlated with parents' education levels. For these reasons, the education variable is included instead of the income variable.

18. School size is used as the control variable because the data set contains no information regarding the school other than its location (by state) and its size.

19. The statistical significance of the school size variables varied widely across the models reported in this paper. Inclusion of these variables does increase the explanatory power of the model, however, and does affect the statistical significance of the curriculum mandate variables.

20. Using a 5 percent confidence level, two-sided test, students under a test-mandate scored significantly higher in the area of saving/investing, and students under a course mandate also scored significantly higher in the area of spending/debt than students under no mandate.

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