APPENDIX: TECHNICAL INFORMATION ON THE DESCRIPTIVE ANALYSIS

NAME	REGULATION DATA SOURCES
Table A-1. Primary sources used to gather information on private school regulations	
D.C. Opportunity Scholarship Program	1. Scholarships H.R. 471
	2. "How to Use your Scholarship," D.C. Investment Trust, http://www.dcscholarships.org/elements/file/OSP/How%20to%20Use%20Your%20Scholarship%2012-13%20(English).pdf
Indiana Choice Scholarship Program	1. Indiana Code 20-51-1; Indiana Code 20-51-4
	2. "Application to Become an Eligible School Under Indiana's Choice Scholarship Program," Indiana Department of Education, http://www.doe.in.gov/sites/default/files/school-choice/application-become-eligible-school.pdf
	3. "Indiana Choice Scholarship Program: Frequently Asked Questions – Eligible Schools," Indiana Department of Education, http://www.doe.in.gov/sites/default/files/school-choice/2012-05-faqforschools.pdf
Louisiana Student Scholarship for Educational Excellence	1. Louisiana HB 976
	2. Louisiana Department of Education, "Criteria for School Participation in the Student Scholarship for Educational Excellence Program," http://www.louisianaschools.net/lde/uploads/20035.pdf
Ohio EdChoice Scholarship Program	1. Ohio Code 3310
	2. *Ohio Educational Choice Scholarship Program: Policy and Procedures Manual*, Ohio Department of Education
Cleveland Scholarship and Tutoring Program	1. Ohio Code 3313
	2. *Cleveland Scholarship Tutoring Program 2009-10 Policy Manual*, Ohio Department of Education
Milwaukee Parental Choice Program	1. Wisconsin Stat. 119.23
	2. "Milwaukee Parental Choice Program: Program Forms," Wisconsin Department of Public Instruction, http://sms.dpi.wi.gov/sms_forms
Arizona Individual School Tuition Organization Tax Credit	1. Ariz. Stat. 43-1089, Arizona Department of Revenue
	2. *Manual for School Tuition Organizations*, Arizona Department of Revenue, http://www.azdor.gov/LinkClick.aspx?fileticket=NfhvNE7I864%3d&tabid=114
Arizona Corporate School Tuition Organization Tax Credit	1, Ariz. Stat. 43-1183, http://www.azleg.state.az.us/ars/43/01183.htm
	2. *Manual for School Tuition Organizations*, Arizona Department of Revenue, http://www.azdor.gov/LinkClick.aspx?fileticket=NfhvNE7I864%3d&tabid=114
Florida Tax Credit Scholarship Program	1. Florida Stat. 1002.395
	2. "Participate Now," Step Up for Students, http://www.stepupforstudents.org/HowItWorks/ForSchools/ParticipateNow
Georgia Private School Tax Credit	1. Georgia HB 325
Iowa School Tuition Organization Tax Credit Program	1. Iowa Code 422.11S
Pennsylvania Educational Improvement Tax Credit	1. Pennsylvania Article XVII – F
Rhode Island Corporate Tax Credit Scholarship Program	1. Rhode Island Code Chapter 44-62

Table A-2. Private school choice program requirements used to determine regulatory burden scores

	AZ CORP TCS	AZ IND TCS	CLEV VOUCHER	DC VOUCHER	OH ED CHOICE	FL TCS	GA TCS	IN VOUCHER	IA TCS	LA VOUCHER	MILW VOUCHER	PA TCS	RI TCS
Financial Reporting & Disclosure													
Submit annual financial report that includes audit by independent public accountant						X				X	X		
Submit annual financial report								X					
Disclose voucher/scholarship expenditures			X				X						
Disclose non-voucher/scholarship expenditures										X			
Provide state with details on tuition rate structure				X									
Eligibility Requirements													
Register private school with state			X	X	X			X	X	X		X	X
Accreditation/charter required for participating schools at some point			X		X		X	X		X			
Accreditation/charter required at time of participation			X		X								
Application Requirements													
Notify state of intent to participate			X					X		X	X		
Submit application to participate for the first time			X							X	X		
Required to submit application every year					X	X							
Application fee required													
Required to submit proof of financial viability				X	X					X			
Required to submit proof/certificate of insurance													
Required to obtain surety/fidelity bond or letter of credit						X				X			
Curriculum & Instruction Requirements													
Maintain copies of Constitution, etc.								X					
Display American flag in each classroom			X					X			X		
Provide instruction on American civics, history, or heritage								X		X			X
Provide instruction in core subjects (reading, math, science)	X	X	X					X	X				X
Provide education on drugs, alcohol, tobacco								X				X	
Follow state academic content standards								X	X				
Tuition & Fee Restrictions													
School cannot charge voucher recipient more than voucher amount			X		X					X			
Maximum set on scholarship/voucher amount (cap)	X	X	X							X	X		
Fixed voucher amount set for all eligible recipients			X							X			
Parents required to contribute portion of scholarship			X										

	AZ CORP TCS	AZ IND TCS	CLEV VOUCHER	DC VOUCHER	OH ED CHOICE	FL TCS	GA TCS	IN VOUCHER	IA TCS	LA VOUCHER	MILW VOUCHER	PA TCS	RI TCS
Certification & Licensure Requirements													
Criminal background checks for all employees	X		X		X			X		X		X	X
Bachelor's degrees required of instructional staff			X		X			X					X
Teacher certificate/license required of all teachers			X					X					
Administrator certificate/license required of all administrators			X		X				X		X		
Annual performance evaluations required of all teachers								X					
Oversight													
State budget line item for program oversight/compliance						X							
Designated office in state department of education for compliance			X		X								
Published instructions on how to report fraud or violations			X		X	X					X		
Program staff conducts announced site visits			X						X	X			
Program staff conducts unannounced site visits			X		X			X					
Admissions & Enrollment Guidelines													
Abide by written admissions policy			X		X	X		X					
Students allowed to opt out of religious activity													
Lottery required for oversubscription			X		X			X					
Cap on voucher students in first few years										X			
Adopt open-enrollment policy											X		
No enrollment preference for siblings													
No enrollment preference to students previously enrolled													
School required to admit new students in all grades offered				X		X					X		
Restricted to students enrolled in public school or Kindergarten students	X			X				X					
Program restricted to families based on income	X		X		X					X	X	X	X
Restricted to families assigned to failing schools					X					X			
Restricted to families assigned to failing schools and in poverty										X			
Testing & Accountability Requirements													
Administer some form of standardized test	X		X		X	X		X		X	X		
Administer the state's standardized tests			X		X			X		X			
Test voucher recipients in at least one grade	X							X					
Test voucher recipients in all grades	X		X			X		X		X			

	AZ CORP TCS	AZ IND TCS	CLEV VOUCHER	DC VOUCHER	OH ED CHOICE	FL TCS	GA TCS	IN VOUCHER	IA TCS	LA VOUCHER	MILW VOUCHER	PA TCS	RI TCS
Administer test to non-voucher students								■					
Report annual test scores to state			■	■	■			■		■	■		
Provide parents with student's test scores			■	■	■			■		■	■		
State releases test scores at state level			■	■	■			■		■	■		
State releases test scores at school level			■		■			■		■	■		
State releases test scores at subgroup level			■		■			■					
School receives annual accountability rating from state								■		■			
Follow state regulations regarding test security and proctoring			■		■			■		■	■		
Pay costs of administering tests	■												
Required to maintain school improvement plan/strategic plan			■		■	■		■			■		
Paperwork & Reporting													
Maintain student health records	■	■		■		■		■	■	■	■	■	■
Maintain certificate of occupancy for building and facilities	■			■		■		■		■			
Maintain immunization records for all students	■	■	■	■		■		■	■	■	■	■	■
Have fire safety inspections			■	■	■	■		■		■			■
Submit annual compliance report			■		■			■		■			
Maintain daily attendance records on voucher students			■	■	■			■		■			■
Submit enrollment records of voucher students at least once per year			■		■			■		■		■	
Submit enrollment records of voucher students at least twice per year			■		■					■			
Verifying family income eligibility status								■		■			
Maintain records of family income eligibility								■		■			
Submit application for scholarship on parents' behalf			■		■			■		■			

*Indicates requirement applies to program

Source: Program regulation information collected from state departments of education

Note: The Milwaukee Parental Choice Program's pre-accreditation requirement is considered a form of accreditation for the purposes of this study.

	NO. ITEMS (REQUIREMENTS)	INTERNAL CONSISTENCY (CRONBACH'S ALPHA)	ITEM-REST CORRELATION (INDEX)
Table A-3. Reliability Statistics on the Regulatory Burden Measure			
School Eligibility Requirements	3	0.72	0.77
Application Procedures	7	0.82	0.84
Admissions & Enrollment Guidelines	12	0.69	0.78
Tuition Restrictions	4	0.61	0.64
Testing & Accountability Requirements	13	0.91	0.94
Financial Reporting & Disclosure	5	0.80	0.82
Curriculum & Instruction Requirements	6	0.77	0.32
Compliance Reporting	11	0.82	0.91
Certification & Licensure Requirements	5	0.71	0.63
Oversight	5	0.76	0.66
Overall	**71**	**0.92**	

Source: Regulation information collected from state departments of education.

Note: Table A-3 reports the number of requirements in each of the ten domains, along with the internal consistency Cronbach's alpha coefficient for each domain and the correlation of each domain-level score to the rest of the domain-level scores.

❖ MODEL OF SCHOOL PARTICIPATION

We use a random intercept logistic regression model to examine the relationship of regulatory burden and private school participation. The model we fit predicts participation as a function of school and program factors. It can be written as:

$$P_{jk}{}^* = X_{jk}\beta + Z_k\lambda + R_k\delta + \mu_k + \varepsilon_{jk}$$
$$Where\ P_{jk} = 1\ if\ P_{jk}{}^* \geq 0;\ P_{jk} = 0\ if\ P_{jk}{}^* < 0$$

Where P* is conceptualized as a latent continuous response variable representing the propensity of school j to participate in their school choice program k, which underlies P_{jk}, the observed binary indicator of school participation status in 2011-12.[51]

X_{jk} is a vector of school-specific independent variables that includes measures of the local demand for the private school from eligible voucher recipients, the excess capacity of the school to enroll more students, and other school characteristics expected to influence participation. Descriptions of these variables are provided in Table A-4. Some of the variables are taken from Private School Universe Survey (PSS) data in the year (s) immediately prior to the enactment of schools' respective choice programs to address concern that the post-program measures are endogenous to participation. For instance, school enrollment size will be endogenous to participation in post-program years because schools that enroll voucher/scholarship students are expected to see an increase in enrollment. β is a vector of coefficients that corresponds X_{jk}.

Z_k is a vector of program-level explanatory variables with coefficients λ. The small sample of programs (n=13) imposes limits on the number of program-level factors we can include in the same model. Our base model includes two program-level controls that we expected to influence school participation. An estimate of the total number of vouchers/scholarships available to eligible families in 2011-12 and the average voucher/scholarship amounts.

R_k is the measure of the regulatory burden that comes with participation in program *k*. This measure is constant for all schools within a given program jurisdiction. As described in the main body of the report, R is based on the number of requirements each program has across 10 domains of regulation. Seventy-one unique requirements were counted across the 10 domains. Min-max normalization is used to put programs' results on a scale with a plausible range of 0 to 100 (observed range 8

to 76). The measure is adjusted to account for differences in the "baseline" regulatory burden that apply to schools across the 11 states in our sample; some of the 71 requirements we counted apply to *all* private schools in certain states and only participating schools in others. Our interest is in the effects of the regulatory burden that is specific to participation, so we adjust the scores for baseline requirements by calculating the regulatory burden scores for *non-participating* schools in each program (using the same 71 requirements shown in Table A-2) and then subtracting these from the scores of *participating* schools. The minimum and maximum scores from the participating schools distribution are used to calculate the non-participant scores in order to maintain the scale.

The quantity we are most interested in is the effect of a change in R_k on the probability school participates in a school choice program. Our hypothesis is that schools will have lower probabilities of participation at higher

levels of R_k. Accordingly, our null hypothesis is that the coefficient on R_k will be zero, H_0: $\delta = 0$. μk represents program-specific random intercepts, which are included to capture the effects of unobserved factors that are constant for all schools in the same program. The random intercepts are assumed to be normally distributed $\mu k \sim N(0, \psi)$ independent and identically distributed across schools and independent of Xjk. ϵjk are residual errors which follow a standard logistic distribution and are assumed to be independent of μk and Xjk. The model is estimated by maximum likelihood methods.

We ran a number of variants on model 1 in order to test the robustness of our results to different specifications on the model, sample, and construction of the regulatory burden measure. First, we ran Model 1 on the subsample of schools located in urban communities (n=2023 unweighted). The urban sample includes all schools with an urban-centric community type designation of large

Table A-4. Variables used in model of relationship between choice program regulations and private school participation		
VARIABLE NAME	**DESCRIPTION**	**SOURCE**
Outcome Variables		
Participation Status	School applied to participate or was registered as participant for 2011-12	State DOE websites
Community/ Demand Factors		
Rural	School located in Census-designated rural area	PSS
Town-Suburb	School located in Census-designated town or suburb	PSS
District 4 Year Graduation Rate	Freshmen graduation rate in local school district	CCD
Religious Adherence Rate	Countywide adherence rate to school's religion (per 1000 residents)	2010 USRC
Poverty rate in neighboring schools	Pct. of public school students enrolled within 5 mile radius on free or reduced price lunch in 2009-10	CCD
Voucher Eligible Student Nearby	School has at least 1 eligible student within 5 miles	PSS, 2000 Census, CCD
High Poverty ZIP Code	> 23 percent (90th percentile) of residents in ZIP code live below poverty line	PSS, 2000 Census
High Public School Density	School has > 15 public schools located within 5 mile radius	CCD
Local school district Per-Pupil Expenditures	Per pupil expenditures of local public school district (2008-09)	CCD
Enrollment and Capacity		
Enrollment drop prior to program	School enrollment declined by more than 25 students over 3 years immediately prior to program launch	PSS
High Student-Teacher Ratio	Ratio of students to private schools was 20:1 or higher prior to program launch	PSS, CCD
Small School	50 $\geq$ students enrolled in school in year prior to program launch	PSS

Table A-4. Variables used in model of relationship between choice program regulations and private school participation (cont'd)

VARIABLE NAME	DESCRIPTION	SOURCE
School Characteristics		
High School	School served grades 9-12 exclusively prior to choice program launch	PSS
High Minority	> 50% of student population enrolled in year prior to program launch was minority (non-white)	PSS
Alternative School	School classified as Alternative School	PSS
Montessori School	School classified as Montessori School	PSS
Non-Catholic Religious School	School has religious orientation other than Catholic	PSS
Catholic	School classified as Catholic school	PSS
Tuition & Costs (Program Level)		
Average Scholarship/Voucher Amount of Program	Average scholarship amount of program	Friedman Foundation
No. available scholarships	The total number of vouchers/scholarships available to eligible families.	Alliance for school choice
Regulatory Burden (Program Level)		
Overall Regulatory Burden Score	Normative measure ranging from 0 to 100 based on number of requirements across 10 domains (total of 71 possible requirements)	Author calculations

Sources: Data were collected from the 2009-10 Private School Universe Survey (PSS), the 2010-11 Common Core of Data (CCD), the Alliance for School Choice, the Friedman Foundation, various state departments of education, the 2000 Census, and the 2010 U.S. Religious Census: Religious Congregations & Membership Study (USRC).

Notes: Table A-4 indicates the data sources for variables used in base logit model specification (Model 1). All participation data are from the 2011-12 with the exception of Louisiana, which used the list of schools indicating their intent to participate in the new statewide program in 2012-13.

that participation rates will be lower in new programs as a function of schools (and families) unfamiliarity with the requirements for participation. A number of the schools in Indianapolis that responded to our survey indicated they did not learn about their program early enough to apply for it.

Third, we introduce a fixed effect for voucher programs, excluding the other program level controls, but retaining the regulatory burden measure. This model tests the association of regulatory burden to school participation while controlling for systematic differences in participation between schools in voucher and tax credit scholarship programs.

Fourth, we estimate Model 1 using an alternative weighting scheme for the measure of regulatory burden, which assigns weight to the domain-level scores according to the level of importance revealed in the survey responses. The alternative "survey-based" weights are derived from respondents' average rating

of the importance of factors (items) that corresponded to each of the 10 domains of regulation. We use the average of their ratings on the 5-point Likert scale ranging from 1 = "not at all important" to 5 = "extremely important". The survey-based weights may better represent the type of regulatory burden that schools respond to, although the preferences of the survey respondents in the four voucher programs may not generalize to schools in the other 9 programs. The original and alternative weights for the 10 domains are shown in Table A-5.

Fifth, we specified a probit model with correlated random effects in an attempt to correct for potential selection bias in the sample that arises due to school eligibility (accreditation) restrictions.[52] Specifically, this is to deal with the fact that the sample includes 63 non-chartered schools in Ohio and 148 non-accredited schools in Indiana that are not eligible to participate in their respective voucher programs. Since ineligible schools do not have the option to partici-

pate, their participation outcomes are treated as missing in Model 1. Selection bias will arise if the ineligible schools differ from the eligible schools in unobserved ways that affect their probability of participation. The bivariate probit model makes a correction for this bias.

Finally, we replaced the program random-effects with state fixed-effects in order to exploit the within-state variation in program regulatory burden that exists in Arizona. Arizona has two tuition tax-credit scholarship programs that have different levels of regulation. We include the state fixed effects to test if schools within the same state are more likely to participate in the program with lower regulatory burden. Robust standard errors are used to account for multiple observations of Arizona schools in the sample.

Results from different specifications were not substantively different in terms of the magnitude or significance of the marginal effects of regulatory burden on participation. In all specifications we find a positive and statistically significant association of regulatory burden to the odds of participation.

Table A-5. Original and survey-based weighting of regulatory burden measure

REGULATION DOMAIN	ORIGINAL WEIGHT (EQUAL-WEIGHTING)	ALTERNATIVE WEIGHT (SURVEY-WEIGHTING)
Eligibility Requirements	10%	7%
Application Requirements	10%	6%
Curricular Requirements	10%	8%
Tuition & Fee Restrictions	10%	12%
Student Admission Guidelines	10%	17%
Paperwork & Reporting	10%	16%
Oversight & Enforcement	10%	6%
Licensure & Credentialing	10%	9%
Financial Disclosure & Reporting	10%	6%
Testing & Accountability	10%	8%

Source: Regulation information collected from state departments of education.

Note: Table reports the weight assigned to each of the 10 domains when calculating the overall average regulatory burden. The original measure assigns equal weight (10%) to all 10 domains, while the alternative weighting scheme assigns weights based on the results of the private school survey conducted in Milwaukee, Indianapolis, Dayton, Cincinnati, and Cleveland.