III. CERTIFICATION AND PARTICIPATION EFFECTS OF DIRECT CERTIFICATION

In Chapter I, we described direct certification as a policy implemented to improve access to the NSLP. In this chapter, we present estimates of the effects of direct certification on two measures of program access, certification for free/reduced-price meals and NSLP participation. Section A describes the methodology used to estimate the effects of direct certification. The estimated effects of direct certification on rates of certification and participation are presented in Section B.

A. METHODS

We used two empirical approaches for estimating the effects of direct certification: (1) a district-level analysis, and (2) a State-level analysis. The district-level analysis compares levels of the outcome measures (rates of certification, participation) in districts using direct certification with the levels of the outcome measures in districts not using direct certification at a single point in time (October 2001). The State-level analysis compares the change in the outcome measures in States that began using direct certification over a given period with the changes in States that did not begin using direct certification over the same period.

1. District-Level Analysis

We first describe the basic district-level model below, then give the details of how the model was used to estimate the effects of direct certification on certification and participation.

a. General Model

The district-level model explores the relationship between a district's direct certification status and the outcome measures(certification and participation). In the model, each observation

represents information on the characteristics of a given school district as of October 2001.[18] The

model can be expressed:

(1) $y_i = c + X_i b + a\ DC_i + e_i$

where:

y_i = outcome of interest for district i

X_i = vector of district i's characteristics hypothesized to influence outcome

DC_i = binary variable indicating whether district i used direct certification

In addition, e_i is an error term, and a, b, and c are parameters to be estimated. The key

coefficient is a, which represents the effect of direct certification on the outcome of interest.

This specification assumes that direct certification has a constant effect on the outcome of

interest: a district's rate of certification or participation. In other words, the model assumes that

the effect of the direct certification policy does not vary across districts according to differences

in the implementation of direct certification, in terms of variables such as the length of time the

district has been using direct certification or important aspects of the policy's operational

features. We tested the assumption implicit in this model by estimating alternative specifications

of the basic model that allowed for differential effects of direct certification depending on its

characteristics. In particular, we estimated alternative specifications that allowed the effect of

direct certification to vary by district size and poverty level. We also estimated specifications

that modeled the influence of direct certification in the following ways:

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[18]In most of the estimation results presented in this chapter, the observations of the model are not
weighted according to the size of the district. For selected models, however, we did use sample weights,
so that the experiences of large districts accounting for a larger proportion of enrolled and certified
students count more heavily than do the experiences of smaller districts with fewer students.

- Direct certification entered into the model as a series of variables indicating how long the district had been using the policy (no more than 2 years, 3 to 5 years, 6 to 10 years, or more than 10 years).[19]

- Direct certification entered into the model as a series of variables indicating what type of direct certification implementation the district used (nonmatching, district-level matching with passive consent, district-level matching with active consent, State-level matching with passive consent, State-level matching with active consent, or mixed).

- Direct certification entered into the model as a single continuous variable indicating the proportion of certified free students in the district who had been directly certified (set to 0 if the district did not use direct certification).

The basic model included another feature designed to determine whether the effect of direct certification differs in different contexts. In particular, we interacted direct certification status with a variable indicating whether the district included schools operating under Provision 2 or 3, and in which the base year was earlier than the 2001-2002 school year. If direct certification were used in the Provision 2 or 3 schools in these districts, it would have been used prior to 2001-2002, and thus may have had a different effect on the outcome measures of certification and participation than in districts without Provision 2 or 3 schools.[20]

The estimation of these alternative specifications was undertaken to deepen our understanding of how, if at all, direct certification influences rates of certification and participation. Does the effect of the policy grow stronger over time? Does direct certification

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[19]We collected information on how long districts had been using direct certification on the SFA survey. However, because some districts could not report an exact number of years of direct certification experience, we allowed them to report their experience within the ranges of years shown above. We also included in the model a binary variable indicating whether the district had formerly used direct certification but no longer did so by the 2001-2002 school year.

[20]Since schools operating under Provision 2 or 3 would not have conducted verification, districts with these schools were excluded from the analysis of the effects of direct certification on rates of ineligibility among certified students.

have stronger effects if it is implemented in a particular way? How do its effects differ if it involves a large versus small proportion of a district's certified students?

b.   District-Level Model of the Effect of Direct Certification on Rates of Certification

The model represented by Equation (1) estimates the effect of direct certification on certification when the outcome variable y_i represents the certification rate in district i. The analysis focuses primarily on the effect of direct certification on the free certification rate, defined as the proportion of all enrolled students in a district who are certified for free meal benefits.[21] We also estimated versions of the certification models in which the dependent variables were the reduced-price certification rate—the proportion of enrolled students certified for reduced-price meals—and the total certification rate—the proportion of enrolled students certified for free or reduced-price meals. Since these certification rate measures are continuous variables, we estimated these models using ordinary least squares (OLS) regression techniques.[22]

A critical aspect of successfully estimating the effect of direct certification on the free certification rate in a district is that the model adequately controls for any district characteristics that influence certification and that potentially could differ between direct certification and non-direct certification districts. Failure to control for such characteristics may result in selection bias in the estimated effects of direct certification. For example, certification rates are likely to be higher in districts with larger proportions of low-income students, and districts with large low-income populations may be more likely to use direct certification, especially if these low-

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[21]See Appendix Table C.1 for information on the rates of certification for free and reduced-price meals, as well as NSLP participation in public school districts nationally that offer NSLP lunches. The information in that table was based on data collected as part of the SFA Survey and was used to create the dependent variables used in the analysis.

[22]In estimating the standard errors of the model's regression coefficients, we took into account the complex sample design of the SFA survey, using the SUDAAN statistical package, which employs a Taylor series expansion to account for design effects.

income populations contain numerous FS/TANF/FDPIR recipients. Thus, it is important that the model control for the economic status of a district's students.

The district characteristics hypothesized to have an important influence on the free certification rate are represented by the vector X_i in Equation (1). The variables included in X_i are listed in Table III.1,[23] and were selected because they fell into one of the following categories:

- ***Demographic and Socioeconomic Characteristics of the District's Students.*** Since certification requires that students' household incomes fall below certain thresholds (or that they receive FS/TANF/FDPIR), controlling for the socioeconomic status of districts' students is important. We included two measures of poverty in the model—an estimate of the poverty rate of students in the district and an estimate of the overall poverty rate in the county—along with the squares of these measures. Elements of socioeconomic status are also measured by the racial/ethnic distribution in the district and by the percentage of students who are limited English proficient. Another demographic characteristic that has been shown to be related to certification is a student's age (Gleason 1996), in which the model included a measure of the percentage of the district's students enrolled in elementary school.

- ***District Size.*** The number of enrolled students in a district may be related to certification rates for at least two reasons. First, district size may influence the way the program is administered, which in turn could influence how easy or difficult it is for students to become certified. Second, the size of the district may affect the stigma of being certified. For example, students who are certified may more easily be identifiable and noticeable in smaller districts.

- ***Administration of the NSLP.*** As suggested above, the way in which a district administers the NSLP may influence rates of certification. In particular, students may, more or less, be likely to become certified, depending on how the district distributes and processes applications, encourages or fails to encourage households to apply for benefits, monitors the certification status of students over the course of the school year, and conducts the verification process. We included several variables in the model that proxy for various aspects of the district's program administration, including several features of the verification process, whether they use single child or multi-child applications, and their use of electronic point-of-sale systems for

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[23]Table IV.1 also lists variables not included in X_i in the main model but that were included in alternative specifications whose results are also presented in this chapter. Descriptive statistics on the variables listed in Table IV.1 are shown in Appendix Table C.2, overall and by direct certification status.

TABLE III.1

DISTRICT CHARACTERISTICS INCLUDED IN DISTRICT-LEVEL ANALYSIS

Direct certification	Binary indicator of whether district uses direct certification
	Binary indicator of whether direct certification has been in place for 1-2 years Binary indicator of whether direct certification has been in place for 3-5 years Binary indicator of whether direct certification has been in place for 6-10 years Binary indicator of whether direct certification has been in place for more than 10 years
	Binary indicator of whether non-matching direct certification is in place Binary indicator of whether district-matching, passive consent direct certification is in place Binary indicator of whether district-matching, active consent direct certification is in place Binary indicator of whether State-matching, passive consent direct certification is in place Binary indicator of whether State-matching, active consent direct certification is in place Binary indicator of whether a mixed form of direct certification is in place
	Binary indicator of whether district formerly used direct certification but did not do so in the 2001-2002 school year
	Continuous variable indicating the percentage of certified free students who are directly certified
Provision 2 or 3 Schools	Binary indicator of whether the district includes any schools operating under Provision 2 or 3 and in which the base year for most of these schools prior to the 2001-2002 school year
Size of district	Binary indicator of enrollment no more than 500 Binary indicator of enrollment between 501 and 1,000 Binary indicator of enrollment between 1,001 and 5,000 (excluded from model) Binary indicator of enrollment between 5,001 and 10,000 Binary indicator of enrollment between 10,001 and 25,000 Binary indicator of enrollment greater than 25,000
Proportion of young students	Percentage of enrolled students who are in elementary school (typically grades K through 5)[a]
Urbanicity	Binary indicator of urban residence Binary indicator of suburban residence (excluded) Binary indicator of rural residence
State	Set of binary indicators of the State in which the district is located (Note—States in which fewer than 10 districts were included in the sample were combined with other nearby States and represented by a single binary variable. In particular, the following sets of States were represented by these combined binary variables: AK and HI; DE and NJ; NM and AZ; RI and CT; DC and MD; NH and VT; SD and ND; and MT, ID, and WY.
Racial/ethnic distribution	Proportion of students in the district who are white, non-Hispanic (excluded) Proportion of students in the district who are black, non-Hispanic Squared proportion of students who are black, non-Hispanic Proportion of students in the district who are Hispanic Squared proportion of students who are Hispanic Proportion of students in the district who are "other" Squared proportion of students who are "other"

Table III.1 (*continued*)

Primary language used by students	Proportion of students in the district classified as "limited English proficient"[a]
Poverty rate	Estimated (1997) poverty rate among students attending district Squared poverty rate among students attending district Poverty rate (1999) among all who live in county Squared poverty rate among all who live in county
Month verification process completed	Binary indicator of verification process completed in October or earlier Binary indicator of verification process completed in November Binary indicator of verification process completed in December (excluded) Binary indicator of verification process completed in January or later
Type of verification sample selected	Binary indicator that random verification sample selected (excluded) Binary indicator that focused verification sample selected Binary indicator that other type of verification sample selected
Size of verification sample selected	Binary indicator that less than 1 percent of applications selected verification sample Binary indicator that 1 to 2 percent of applications selected for verification sample Binary indicator that 2 to 4 percent of applications selected for verification sample (excluded) Binary indicator that 4 to 10 percent of applications selected for verification sample Binary indicator that >10 percent of applications selected for verification sample
Type of application used	Binary indicator that district uses single-child certification applications (excluded) Binary indicator that district uses multi-child certification applications Binary indicator that district uses some other type of certification application
Use of verification for cause	Binary indicator of whether district uses verification for cause
Use of electronic point-of-sale system	Binary indicator of whether district uses an electronic point-of-sale system[a]

[a]This variable has a substantial number of missing values in its original form. These missing values have been imputed using the mean of all valid observations of the variable. In addition, the model includes a binary variable that indicates whether or not the values of the variable have been imputed in this way.

processing school meals. Districts' use of electronic systems has been hypothesized to promote certification by reducing stigma (USDA 1999). The other measures may or may not directly influence certification rates, but even if they have no direct effects, they may proxy for important aspects of NSLP administration that do influence certification.

- *Geographic Factors.* The model includes indicators of whether districts are located in urban, suburban, or rural areas, as well as the individual States in which districts are located. Urbanicity may influence certification because of differences between urban, suburban, and rural areas in attitudes toward government programs and because of differences in available alternatives to school meals. A district's State may influence certification because of differences between States in the administration of the NSLP and/or differences in economic conditions.

c. District-Level Model of the Effect of Direct Certification on NSLP Participation

The underlying model that explains how direct certification may influence participation differs somewhat from that shown in Equation (1). This underlying model can be represented by the following set of equations:

(2) $\qquad C_i = Z_{1i}b_1 + a_1 DC_i + u_{1i}$

(3) $\qquad P_i = Z_{2i}b_2 + a_2 C_i + a_3 DC_i + u_{2i}$

(4) where:

$\qquad C_i \quad$ = rate of certification in district i

$\qquad P_i \quad$ = rate of NSLP participation in district i

$\qquad Z_{1i} \quad$ = vector of district characteristics hypothesized to influence certification

$\qquad Z_{2i} \quad$ = vector of district characteristics hypothesized to influence participation

$\qquad DC_i \quad$ = binary variable indicating whether district i used direct certification

In this model, Equation (2) is analogous to Equation (1) and is basically the model described in subsection 1b. Equation (3) represents the determinants of the participation rate in a given district. Our main focus in the analysis will be on the overall participation rate—the proportion

of all enrolled students who get a school meal on a given school day. However, we will also examine free, reduced-price, and paid school lunches among all students and among the students who qualify for those meals. In the model, the district characteristics represented by Z_{2i} is hypothesized to influence participation in the district, and these characteristics may or may not be the same characteristics hypothesized to influence certification. In addition, certification itself has been shown to influence NSLP participation (Gleason 1995; and Maurer 1984) and is included in the model. Direct certification may affect participation either directly, as represented by the model parameter a_3), or indirectly, through its effect on the certification rate.

We estimated a reduced-form version of this model. By substituting Equation (2) into Equation (3), we obtained the following:[24]

$$(5) \qquad P_i = Z_i(a_2 b_1 + b_2) + (a_2 a_1 + a_3)DC_i + (a_2 u_{1i} + u_{2i})$$

This reduced-form model can be estimated by ordinary least squares (OLS) by regressing the participation rate on district characteristics and direct certification status. In the reduced-form model, it is not possible to distinguish between the direct effect of direct certification on participation and its indirect effect (via certification). The model provides a valid estimate of the overall effect of direct certification on NSLP participation, which is the impact of primary interest.

The control variables included in the model are the same as those included in the certification model and listed in Table III.1. Other district characteristics have been found to influence NSLP participation that are not included in the model, such as gender, available alternatives to school meals in the district, and the price of school meals (Gleason 1995).

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[24]For simplicity, Equation (4) assumes that the factors that influence participation (Z_{1i}), and the factors that influence participation (Z_{2i}), are the same and are represented by Z_i.

However, this information was not collected as part of the Direct Certification Study. We felt that these district characteristics were unlikely to be strongly correlated with a district's decision to use direct certification and thus that their exclusion would not lead to a substantial bias in the estimated effect of direct certification on districts' NSLP participation rate.

2.   State-Level Analysis

Despite the range of factors controlled for in the district-level model, a potential weakness of the model is that there may be important district characteristics that influence districts' rates of certification, participation, and/or ineligibility for which we lack data. If these unmeasured characteristics are also related to whether or not a district uses direct certification, then the estimated effects of direct certification could suffer from selection bias. For example, suppose that the intensity of a district's efforts to promote certification have an important influence on the certification rate. Districts that make an extra effort to promote certification might also have chosen to use direct certification; thus, failure to control for these efforts may lead to a biased estimate of the effect of direct certification on the certification rate. In this instance, we would attribute the results of a district's efforts to promote certification to the effect of direct certification.

A related problem is that district-level characteristics may be measured inaccurately. For example, the variables measuring the level of poverty in the district may not accurately capture differences between direct certification and non-direct certification districts in their levels of economic distress. In other words, two districts with identical measured poverty rates may differ in terms of the proportion of students who are economically disadvantaged and would benefit from free/reduced-price certification. If the more disadvantaged of these districts are also more likely to use direct certification, then the model would detect a spurious positive relationship between direct certification and the certification rate.

To address this potential weakness of the model, we would like to control for all relevant differences between districts, both measured and unmeasured. A "fixed-effects" model offers one way to control for unmeasured fixed (unchanging) differences between districts.[25] In a district-level, fixed-effects model, a district would essentially serve as its own control. Changes in districts' free certification and participation rates over time could be examined to determined whether these changes were correlated with whether or not the district had implemented direct certification over that period. For example, if the certification rate had increased substantially over a given period in districts that implemented direct certification at some point during that period, but had remained constant in districts that had not done so, we would conclude that direct certification had positively influenced the free certification rate.

To estimate a fixed-effects model, we need longitudinal data—information at more than one point in time on districts' certification/participation rates, direct certification status, and other characteristics included as control variables in the model. Unfortunately, we have no such longitudinal data for the school districts in our sample; we do have longitudinal information on districts' rates of certification and participation, direct certification status, and other factors defined at the State level. This information allowed us to estimate State-level fixed-effects models of certification and participation. Since we had no State-level data on rates of ineligibility among certified students, we could not estimate State-level models of ineligibility among certified students.

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[25]An alternative approach to the issue of selection bias that we considered but rejected would be to estimate an instrumental variables or "selection correction" model. In this type of model, districts' decision to use direct certification would be explicitly modeled and a two-stage estimation strategy would be used to estimate the effect of direct certification on the outcome of interest. This estimation strategy requires there to be "identifying variables" that are strongly related to a district's direct certification status and have no direct effect on the outcome of interest. We decided against this approach because of the difficulty of finding appropriate identifying variables in the context of the certification, participation, and ineligibility models.

The Food and Nutrition Service's (FNS's) administrative records provided the data needed to construct the key dependent variables of the model—State-by-State rates of certification for free and reduced-price meals and NSLP participation. This information was available for all 50 States and the District of Columbia for the period between 1990 and 2001. For each State, the certification and participation rates were measured in October of each year.

The key independent variable on State use of direct certification over this period came from the 1996 Study of Direct Certification (Jackson et al. 1999). This survey included a question on whether any district in a State was using direct certification and, if so, when the policy was first implemented in the State. All but two States had begun using direct certification by 1996; we learned whether/when the two remaining States began using the policy by phoning these States' child nutrition directors. This information allowed us to construct a set of variables indicating whether each State was using direct certification and the length of time they had been using it as of each of the years between 1990 and 2001.[26]

The other independent variables in the State-level fixed-effects model measure State characteristics that change over time. These time-varying characteristics were obtained from a

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[26]We also have two measures of the penetration of direct certification within each state. The first source of this information was the 1996 study, which provided information on the percentage of school districts in the state using the policy as of 1996. Second, the SFA survey conducted as part of the current study provides us with samples of districts within each of the states, from which we estimated the percentage of the state's districts using the policy as of 2001-2002. However, since this information was available only at these two points in time, we could not include the penetration of direct certification as an independent variable in the model. Instead, we used this information to categorize states into high-penetration and low-penetration ones and estimated differential effects of direct certification across the two types of states.

variety of Federal government sources and cover the period 1990 to 2001. These variables include:[27]

- Percentage of the State's residents receiving Aid to Families with Dependent Children (AFDC) or TANF

- Percentage of the State's residents receiving food stamps

- Median income

- Poverty rate

- Unemployment rate

- Mean hourly wage in the manufacturing industry

We estimated the following State-level, fixed-effects model to determine the impact of direct certification use on a State's certification and participation rates. In the model, each observation represented conditions in a given State in a given year (from 1990 to 2001), so that each State contributed 12 State-year observations.

$$(6) \qquad y_{it} = c_1 + c_2 DC\_YRS_{it} + d_1' Z_{it} + d_2' YEAR_t + d_3' STATE_i + u_{it}$$

where:

y_{it} = outcome of interest in State i in year t (certification or participation rate)

DC_YRS_{it} = number of years direct certification has been used in the State

Z_{it} = vector of time-varying characteristics of State i in year t

$YEAR_t$ = vector of binary variables representing the year (1990-2001)

$STATE_i$ = vector of binary variables representing the State

u_{it} = random error term

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[27]Descriptive statistics on these independent variables, as well as on the variables representing states' direct certification status and certification and participation rates over the 1990 to 2001 period, are provided in Appendix Table C.3.

The dependent variables in the model included the free and reduced-price certification rates, as well as the free, reduced-price, paid, and overall participation rates. The key coefficient estimate from the model is c_2, which represents the effect of one year of using direct certification in the State on the dependent variable.

This specification of the State-level model differs from the specification of the district-level model in that the key independent variable of the model that captures direct certification use is measured as the number of years of direct certification use, rather than as a single binary variable indicating whether or not the State used direct certification in a given year. The rationale for this specification was our hypothesis that a State's use of direct certification in a given year will have a different effect depending on the number of years the policy has been in use in the State. One reason for this hypothesis is that when direct certification was first implemented in a State, it may not have been implemented in many districts within the State. The longer the policy has been in place anywhere in the State, however, the more likely it is that its use has spread to a larger proportion of districts in the State. Since we would expect the effect of direct certification in a State to be larger if the percentage of districts in the State that use direct certification were larger, we also would expect the estimated effect of direct certification to be larger if it had been used in the State for a longer period. The previous study of direct certification provides empirical support for this hypothesis; (Jackson et al. 1999) found that the estimated impact of direct certification did indeed grow stronger over time in States, and that this effect was roughly linear.

Given that by 2001, direct certification had been used in many States for more than 10 years, it is possible that this growing effect of direct certification reached a maximum at some point. Thus, we estimated an alternative specification of the State-level model that allowed for a nonlinear effect of direct certification. This nonlinear specification involved entering the State's

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experience with direct certification as a set of binary variables indicating the length of time the policy had been used in the State. Finally, we estimated a model in which the effect of direct certification was allowed to differ in States with a high direct certification penetration rate versus in States with a low penetration rate. The penetration rate is the proportion of districts in the State that used direct certification at a given point in time.[28]

B. EFFECTS OF DIRECT CERTIFICATION ON CERTIFICATION AND PARTICIPATION RATES

This section presents estimates of the effects of direct certification on districts' rates of certification and participation, based on district-level and State-level analyses. In both types of analysis, we find that direct certification has a small, but statistically significant, positive effect on the percentage of a district's students who are certified for free meals. Evidence on the effect of direct certification on participation is mixed, with the State-level analysis suggesting a small positive effect and the district-level analysis indicating that the effect of direct certification is statistically insignificant. These results are generally consistent with estimates of the effect of direct certification on certification and participation from the previous study of direct certification.

1. District-Level Analysis

The district-level analysis tells us whether districts using direct certification have higher rates of certification and participation than districts not using direct certification, controlling for a wide variety of measurable district characteristics. The two key outcomes we used to measure certification and participation are the percentage of enrolled students certified for free meals—

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[28]We estimated this specification of the state-level model in two ways, using the two versions of the direct certification penetration rate described above.

the free certification rate—and the percentage of enrolled students who get a school lunch on a typical school day—the overall participation rate. Table III.2 presents estimates of the effects of direct certification and other district characteristics on these two outcomes.

a. Estimated Effects on Certification

Since direct certification is designed to certify students for free meals, the hypothesized impact of direct certification on the free certification rate is a positive one. All else equal, we hypothesize that the free certification rate will be higher in districts using direct certification than in districts not using this policy.

Estimation of the basic model suggests that direct certification has a positive, statistically significant effect on a district's free certification rate, although the effect is relatively small in magnitude. The estimates indicate that direct certification leads to an increase of about 1.3 percentage points in a district's free certification rate (Table III.2). For example, since the average non-direct certification district has a free certification rate of 29.7 percent (see Appendix Table C.1), the estimates suggest that if this average district began using direct certification, its free certification rate would increase to 31.0 percent. Since there are about 46 million students in public school districts offering NSLP lunches and 31 million in districts that use direct certification, this 1.3 percentage point effect implies that direct certification leads to about 400,000 additional students being approved for free meals who would not have been approved in the absence of direct certification. This estimated effect is roughly in line with the estimated effect of direct certification found in earlier research. For example, the previous Direct Certification Study found that one year of direct certification experience led to an increase in the free certification rate of 0.56 percentage points, and that five or more years of direct certification

TABLE III.2

COEFFICIENT ESTIMATES FROM DISTRICT-LEVEL MODELS OF THE IMPACT OF DIRECT CERTIFICATION
ON THE FREE CERTIFICATION RATE AND OVERALL PARTICIPATION RATE
(Rates are shown as percentages)

Variable	(1) Free-Certification Rate Model	(2) Overall Participation- Rate Model
Intercept	-4.78* (2.69)	46.5*** (4.56)
District Uses Direct Certification	1.32** (0.67)	0.48 (1.00)
Provision 2 or 3 Schools	1.65 (2.00)	5.10** (2.15)
Provision 2 or 3 Schools Interacted with Direct Certification	0.90 (2.11)	-3.79 (2.36)
District Formerly Used Direct Certification	2.40*** (0.85)	1.46 (1.27)
Size of District		
500 or less	4.72*** (1.19)	9.08*** (1.70)
501 to 1,000	1.17 (0.76)	3.62*** (1.39)
1,001 to 5,000	—	—
5,001 to 10,000	-0.86 (0.64)	-3.33*** (1.05)
10,001 to 25,000	-1.68** (0.84)	-5.13*** (1.36)
More than 25,000	-2.94*** (0.84)	-7.47*** (1.30)
Proportion of Elementary School Students	7.18 (1.99)	14.74*** (2.98)
Urbanicity		
Urban	1.79** (0.83)	-1.44 (1.10)
Suburban	—	
Rural	-0.63 (0.67)	1.55 (1.13)

Table III.2 (*continued*)

Variable	(1) Free-Certification Rate Model	(2) Overall Participation- Rate Model
Racial/Ethnic Distribution (Percentage)		
White	—	—
Black	30.80***	11.91*
	(3.81)	(6.28)
Black squared	-5.05	-11.71
	(4.60)	(8.29)
Hispanic	33.63***	-1.40
	(4.87)	(8.28)
Hispanic squared	-6.23	15.06
	(6.45)	(9.64)
Other	11.57	-15.74
	(8.93)	(13.16)
Other squared	18.02	28.66
	(17.58)	(19.11)
Proportion of Students Who Are "Limited English Proficient"	10.61*	20.51***
	(5.66)	(6.87)
Poverty Rate		
Poverty rate within district	144.57***	71.88***
	(8.05)	(13.99)
Poverty rate within district squared	-122.30***	-60.63**
	(19.08)	(28.81)
Poverty rate within county	61.05***	96.30***
	(12.01)	(21.42)
Poverty rate within county squared	-50.54	-242.12***
	(37.15)	(69.26)
Month Verification Process Completed		
October or earlier	-1.45*	-3.93**
	(0.75)	(1.58)
November	-0.14	-2.49***
	(0.57)	(0.87)
December	—	—
January or later	-0.41	-4.52**
	(0.93)	(1.82)
Type of Verification Sample Selected		
Random sample	—	—
Focused sample	-0.22	-0.06
	(0.62)	(0.96)
Other	-3.44**	-0.97
	(1.62)	(4.77)

Table III.2 (*continued*)

Variable	(1) Free-Certification Rate Model	(2) Overall Participation- Rate Model
Size of Verification Sample Selected (Percentage of Applications)		
Less than 1	0.59 (0.79)	2.34* (1.40)
1 to 2	1.61*** (0.59)	2.79*** (1.06)
2 to 4	—	—
4 to 10	-0.62 (0.58)	-0.45 (1.06)
More than 10	-1.63 (1.61)	-0.36 (2.39)
Type of Application Used		
Single-child	—	—
Multi-child	0.32 (0.55)	-2.23*** (0.85)
Other	-0.55 (0.92)	-0.22 (1.29)
District Uses of Verification for Cause	0.01 (0.44)	-1.29* (0.78)
District Uses Electronic Point-of-Sale System	0.18 (0.65)	1.66 (1.05)
Mean of Dependent Variable	**29.44**	**60.72**
R-Squared	**0.87**	**0.56**
Sample Size	**1,212**	**1,208**

Source: 2001 Direct Certification Study SFA Survey.

Note: Standard errors are in parentheses. These models were estimated using ordinary least squares (OLS) regression techniques. Standard errors have been adjusted to account for the complex sample design using the SUDAAN statistical package. In addition to the variables listed above, the model contained binary variables to represent the States in which districts were located (as described in Table III.1). Missing value flags were also included in the model for the proportion of elementary school students, the proportion of students who are limited English proficient, the size of the verification sample selected, the type of application used, and whether the district uses an electronic point-of-sale system.

 *Significantly different from zero at the .10 level, two-tailed test.
 **Significantly different from zero at the .05 level, two-tailed test.
 ***Significantly different from zero at the .01 level, two-tailed test.

experience led to an increase in the free certification rate of 2.01 percentage points (Jackson et al. 1999).[29]

The estimated effects of the other district characteristics included in the model on the free certification rate generally correspond to expectations. The characteristic with the largest effect is the poverty rate. Not surprisingly, districts with the highest poverty rates (and located in the counties with the highest poverty rates) have the highest free certification rates, and these estimated positive effects of poverty on the free certification rate are highly statistically significant.[30] In addition, being located in an urban area is positively related to the free certification rate, as are having high proportions of students who are black and Hispanic. A district's size has a negative influence on the free certification rate, with the rate significantly lower in districts with larger numbers of students, all else equal. Finally, the estimated effects of most of the variables measuring the type of certification application used, whether the district uses an electronic point-of-sale system, and various aspects of the districts' verification system were not statistically insignificant.

In the basic free certification model described above, the estimated effect of direct certification is assumed to be constant across all direct certification districts, regardless of the

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[29]This finding from Jackson et al. (1999) is based on their state-level, fixed-effects model. They also estimated a district-level model and found that the estimated effect of direct certification in that model was negative and statistically insignificant. However, the authors concluded that the district-level model potentially produced a biased estimate of the true effect of direct certification and emphasized the results of their state-level model rather than the district-level model. Although we estimated a district-level model similar to that of Jackson et al. (1999), we made three sets of changes to try to avoid the problems associated with selection bias mentioned in that report. First, we included a second measure of poverty to try to better control for the economic circumstances in the district. Second, we included several measures of the district's administration of the NSLP not included in Jackson et al. (1999). Third, we included a set of state dummy variables to capture state-level factors (either economic or related to NSLP administration) not captured by other variables in the model.

[30]The estimated positive effect of both district and county poverty rates diminishes as the poverty rate increases, but remains positive throughout the relevant range of poverty rates.

district's characteristics. Because it is possible that this effect differs for direct certification districts with different characteristics, we estimated a series of alternative specifications of the model. These alternative specifications allow for differential effects of direct certification according to such factors as the length of time that direct certification has been in place in the district and the manner in which it was implemented.[31] Table III.3 presents the estimated effect of direct certification from these and other alternative specifications.

The first alternative specification, shown in row 1b of Table III.3, changes the direct certification classification of nine districts in the northeast region of the United States. These districts reported not using direct certification on the SFA survey even though the use of direct certification is mandated throughout the Northeast. For this specification, we treated these districts as direct certification districts and reestimated the model. This change did not materially affect the results; the estimated effect of direct certification declined to 1.28 (from 1.32) and remained statistically significant.

We also examined whether the results changed when we applied a set of weights to the districts in the sample based on the number of enrolled students in the district. In this specification (row 1c of Table III.3), the estimated effect of direct certification was 1.1 percentage points, and remained statistically significant at the 0.10 level.

We found little evidence (based on this district-level model) that the effect of direct certification grows stronger the longer it has been in place in a district. The estimated effects of

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[31]In addition to the alternative specifications described in the text below, we estimated two specifications in which direct certification status was interacted with some other key district characteristic. In one case, we interacted direct certification and district enrollment, and found that the estimated effect of direct certification was not significantly different in large districts than in small districts. In the second case, we interacted direct certification with the poverty rate among students in the district and again found that the effect of direct certification was not significantly different in districts with different poverty rates.

TABLE III.3

CERTIFICATION RATE MODEL, ALTERNATIVE SPECIFICATIONS

Specification	Dependent Variable	Variables Measuring Direct Certification	Coefficient Estimate	Standard Error
1a Basic model	Free-certification rate	DC (binary)	1.32**	0.67
1b. Basic model with adjusted direct-certification variable	Free-certification rate	Adjusted DC[a]	1.28**	0.65
1c. Basic model with student-level weights	Free-certification rate	DC (binary)	1.10*	0.66
2. Direct certification effect allowed to differ by number of years it has been in place	Free-certification rate	Number of years:		
		1 to 2	1.51	0.95
		3 to 5	1.93**	0.77
		6 to 10	1.07	0.72
		More than 10	0.33	0.86
3. Direct certification effect allowed to differ by type of direct-certification implementation	Free-certification rate	DC implementation type:		
		Non-matching	2.75**	1.14
		District matching, passive consent	1.38*	0.73
		District matching, active consent	1.63	1.15
		State matching, passive consent	0.67	0.77
		State matching, active consent	2.93**	1.28
		Mixed	0.89	1.10
4. Direct certification effect allowed to differ by the percentage of free-certified students who are directly-certified	Free-certification rate	DC (binary)	0.89	0.86
		Percentage of free-certified students directly certified	1.27	2.30
5. Reduced-price certification rate basic model	Reduced-price certification rate	DC (binary)	0.39	0.25
6. Total certification rate basic model	Total certification rate	DC (binary)	1.93**	0.76

Source: 2001 Direct Certification Study SFA Survey.

Note: These models were estimated using ordinary least squares (OLS) regression techniques. The control variables included in the model were the same as those listed in Table III.2.

[a]The adjusted direct certification variable is identical to the original direct certification variable except that it defines as direct certification districts all districts in the northeast region (except for New York City), including nine districts that had reported not using direct certification on the SFA survey and defined as non-direct certification districts in the original direct certification variable.

  *Significantly different from zero at the .10 level, two-tailed test.
 **Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

direct certification for districts that have used the policy for no more than 2 years, for 3 to 5 years, and for 6 to 10 years are all between 1 and 2 percentage points, with the effect in districts that have used the policy for 3 to 5 years (1.93) statistically significant.

Direct certification does vary systematically according to the manner in which districts implement the policy. In particular, the estimated effect of direct certification is larger among districts requiring students to actively consent to being directly certified than among districts using passive consent. This pattern holds regardless of whether districts use matching as part of the direct certification process. The estimated effect of direct certification on the free certification rate is nearly 3 percentage points (and statistically significant) in nonmatching districts and in State-matching, active-consent districts (Table III.3). In district-matching, active-consent districts, the estimated effect (1.63 percentage points), while not statistically significant, is larger than the estimated effect of direct certification in districts using passive consent.

It is not clear why the estimated effect of direct certification is greater in districts using active consent. One might expect that the requirement of active consent would limit, rather than promote, free meal certification, since it requires an additional step for students to become certified over and above the steps required by passive-consent districts. It may be the case that the use of active consent is correlated with some other unobserved aspect of direct certification implementation in these districts. For example, active-consent districts may have more effective procedures than passive-consent districts for accurately matching the list of enrolled students with the list of food stamp/TANF recipients (which is done in all direct certification districts using matching). Also, active consent districts may do more to notify students of their potential eligibility for direct certification. However, since the study did not collect qualitative information on districts' implementation of direct certification, we cannot test any of these explanations, which remain speculative.

We also estimated a specification in which the effect of direct certification was allowed to vary according to the percentage of the district's free certified students who were directly certified. This measure proxies for the scale of direct certification in a district—in districts with a large number of students on FS/TANF, one might expect a large fraction of free certified students to be directly certified. The specification shown in row 4 of Table III.3 examines whether this leads to a larger effect on the district's certification rate. We found that although the estimated effect of the percentage of free certified students who were directly certified on the certification rate was positive, this effect was not statistically significant.

The final two alternative specifications shown in Table III.3 differ from the basic model in the dependent variable; rather than estimating the effect of direct certification on the free certification rate, these specifications examine the effect of direct certification on the reduced-price and total certification rates. Because students are directly certified for *free* meals, one would not expect the policy of direct certification to have a strong influence on certification for reduced-price meals. It is possible, however, that direct certification indirectly influences the likelihood that students will become certified for reduced-price meals. If direct certification increases the free certification rate and leads to a larger number of students in a school receiving school meals, then students eligible for reduced-price benefits may be encouraged to apply for benefits and become certified because of reduced stigma or an increase in the flow of information about the certification process. Alternatively, students who are directly certified in one school year may come back the following year eligible for reduced-price meals rather than free meals, but be encouraged to apply for benefits again based on their experience as a directly certified student the previous year. Jackson et al. (1999) refer to this type of explanation for direct certification leading to an increase in the reduced-price certification rate as the *spillover explanation*.

The estimated effect of direct certification on the reduced-price certification rate is positive (0.4 percentage points) but small and not statistically significant. The estimated effect of direct certification on the total certification rate is 1.93 percentage points—as expected, this is roughly the sum of its effects on the free and reduced-price certification rates.[32]

b.   Estimated Effects on Participation

As described in Section A, the main way in which direct certification could influence a district's NSLP participation rate is an indirect one. In particular, direct certification leads to more students becoming certified for free meals, and various studies have found that free meal certification positively affects NSLP participation (Akin et al. 1993; Gleason 1995; and Maurer 1984). Thus, direct certification is hypothesized as leading to greater NSLP participation overall. In addition, direct certification could influence participation through the same sort of spillover mechanisms as those described above in the context of effects of certification. In particular, a district's use of direct certification and the corresponding increase in certified students could lead to less stigma, greater information about the meal programs, or increases in the number of children who had been certified or been participants in the previous year. If these effects are substantial, then participation in the program could increase as a result of direct certification, even among students whose certification status did not change as a result of the policy.

Column 2 of Table III.2 shows the coefficient estimates from the overall participation model. The estimated coefficient on the binary direct certification variable is positive (0.48) but not statistically significant. This result from the district-level model suggests that direct

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[32]The reason that the estimated effect of direct certification on the free and reduced-price certification rates does not sum exactly to the estimated effect on the total certification rate is that the models were based on slightly different numbers of observations. This was because a handful of districts reported a free certification rate but their reduced-price certification rate was missing.

certification does not lead to a detectable increase in the NSLP participation rate, despite leading to a small increase in free meal certification.

The overall participation rate can be broken down into participation of students getting free meals, reduced-price meals, and paid meals. Thus, in addition to estimating an overall participation model, we estimated models examining the effect of direct certification on free, reduced-price, and paid participation rates *among all enrolled students*. These results are presented in Table III.4, along with the results of additional models that show the estimated effects of direct certification on free, reduced-price, and paid participation rates among students *conditional on their certification status*.

The estimated effect of direct certification on each of these participation rate measures is not statistically significant. In other words, according to the district-level model, direct certification does not lead to significant changes in participation—children actually eating school lunches—among students certified for free meals, students certified for reduced-price meals, or students paying full price for meals.

TABLE III.4

PARTICIPATION RATE MODEL, ALTERNATIVE SPECIFICATIONS

Specification	Dependent Variable (Mean Value)	Variables in Model Representing Direct Certification	Coefficient Estimate	Standard Error
1. Overall Participation Rate Model	Overall Participation Rate (60.8)	DC (binary)	0.48	1.05
Participation Rates Among All Enrolled Students				
2. Free-Participation Rate Model	Free-Participation Rate Among Enrolled Students (23.0)	DC (binary)	0.35	0.58
3. Reduced-Price Participation-Rate Model	Reduced-Price Participation Rate Among Enrolled Students (6.8)	DC (binary)	0.23	0.19
4. Paid Participation Rate Model	Paid Participation Rate Among Enrolled Students (31.1)	DC (binary)	-0.02	0.74
Conditional Participation Rates				
5. Free-Participation Rate Model	Free Participation Rate Among Free Certified Students (77.3)	DC (binary)	-0.76	0.92
6. Reduced-Price Participation-Rate Model	Reduced-Price Participation Rate Among RP Certified Students (71.7)	DC (binary)	-0.39	1.07
7. Paid-Participation Rate Model	Paid Participation Rate Among Non-Certified Students (52.4)	DC (binary)	0.90	1.17

Source: 2001 Direct Certification Study SFA Survey.

Note: These models were estimated using ordinary least squares (OLS) regression techniques. The control variables included in the model were the same as those listed in Table III2.

  *Significantly different from zero at the .10 level, two-tailed test.
 **Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

2. State-Level Model

Since direct certification was first implemented at different times in different States, we can turn to an alternative source of information to determine how the implementation of this policy has influenced participation in the NSLP and certification for free and reduced-price meals. As described in Section A, the State-level approach for estimating this effect involves examining changes over time in State certification and participation rates as direct certification is implemented. In particular, these changes are compared to the analogous changes in certification and participation rates in States that did not implement direct certification over the same period of time. If certification and participation increased by greater amounts in the States that implemented the policy, holding other factors constant, this would be evidence of a positive effect of direct certification on rates of certification and participation.

a. Estimated Effects on Certification

One advantage of collecting longitudinal State-level data on certification and participation rates, the use of direct certification, and a variety of State characteristics is that this allowed us to estimate a model in which we can control for fixed State effects, which represent unobserved, time-invariant State-level factors potentially influencing the outcome of interest. To illustrate the importance of controlling for these fixed State effects, we estimated the model both with and without these fixed effects.

The fixed effects model results suggest that a State's use of direct certification leads to an increase in the certification rate in the State. The estimated effect of an additional year of direct certification use is an increase of 0.20 in the State's free certification rate, and this estimate is statistically significant at the 10 percent level (Table III.5). The size of this estimate suggests

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TABLE III.5

COEFFICIENT ESTIMATES FROM STATE-LEVEL MODELS OF THE IMPACT OF DIRECT CERTIFICATION ON
THE FREE CERTIFICATION RATE, WITH AND WITHOUT FIXED STATE EFFECTS

Variable	(1) Fixed Effects Model	(2) Model Without Fixed State Effects
Intercept	23.72** (3.59)	-5.33* (3.11)
Number of Years State Has Used Direct Certification	0.20* (0.12)	-0.05 (0.13)
Percentage Receiving Aid to Families with Dependent Children or Temporary Assistance to Needy Families	0.65*** (0.19)	0.48*** (0.18)
Percentage Receiving Food Stamps	0.24** (0.12)	1.36*** (0.13)
Median Income	-0.10** (0.05)	0.30*** (0.05)
State Poverty Rate	-0.02 (0.06)	1.31*** (0.10)
Unemployment Rate	0.06 (0.12)	0.42** (0.20)
Mean Wage, Manufacturing Industry	-0.26 (0.21)	-1.29*** (0.15)
Mean of Dependent Variable	**29.5**	**29.5**
R-Squared	**0.97**	**0.79**
Sample Size	**612**	**612**

Source: The free certification rate and percentage receiving food stamps were drawn from the U.S. Department of Agriculture, Food and Nutrition Service Data Bank, 1990 through 2001. The number of years of direct certification use was obtained from the 1996 Direct Certification Study State Survey. The percentage receiving AFDC/TANF was obtained from the U.S. Department of Health and Human Services, Administration for Children and Families. Median income and the poverty rate were obtained from the U.S. Bureau of the Census' Current Population Survey and from the 2000 Census (for the county poverty rate). The unemployment rate and mean wage in the manufacturing industry were obtained from the U.S. Department of Labor, Bureau of Labor Statistics.

Note: Standard errors are in parentheses. In addition to the variables listed above, both models included a set of binary variables indicating the year of data collection (1990 through 2001) and the fixed effects model included a set of binary variables indicating the state of data collection.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

that the certification rate would increase by 1 percentage point (from 29 to 30 percent, for example) for every five years the policy has been in place. Note that this estimated effect is substantially different from an estimate based on a model that excluded the fixed State effects (which was negative and not statistically significant).

Most of the other State characteristics included in the model have effects that are in the expected direction. In particular, the size of a State's AFDC/TANF caseload and food stamp caseload has a significant, positive effect on the State's free certification rate. Conversely, median income has a significant, negative effect on the certification rate. The estimated effects of the State poverty rate, unemployment rate, and mean wage in the manufacturing industry are not statistically significant.

The model presented in Table III.5 assumes a linear effect of the number of years of direct certification use in a State on the free certification rate. In other words, it assumes that each additional year that a State has been using direct certification leads to the same change in the certification rate. Since the estimated effect of this variable was 0.20, this linear effect implies that the first year of direct certification use leads to an increase of 0.20 percentage points in the certification rate, the second year leads to an additional increase of 0.20 percentage points (so that the cumulative effect is 0.40), and so on. Jackson et al. (1999) found empirical evidence in support of such a linear effect in the 1996 Study of Direct Certification. In a specification in which the effect of each additional year of direct certification experience in a State (up through 5 years) was estimated separately, they found that these estimates suggested a linear trend, with the effect growing stronger over time. They argued that the effect of direct certification grew stronger over time, for two main reasons: (1) it took time for States to learn to efficiently operate the policy, and (2) the use of direct certification probably spread to a greater proportion of districts in a State, the longer the policy was in place.

By 2001, however, direct certification had been used in many States for more than 10 years. With a policy around that long, it seems unlikely that the implementation of direct certification or the proportion of districts using the policy in a State would change greatly from one year to the next. Thus, while the effect of the number of years of direct certification policy use may have grown stronger over the first few years of its implementation, we hypothesize that this effect reaches a limit at some point and ceases growing stronger over time. At this point, in other words, the effect of the number of years of direct certification use in States may be nonlinear.

To test for this possibility, we estimated an alternative specification of the fixed-effects model presented in Table III.5, column 1 (also shown in Table III.6 as model 1). In this specification (model 2 in Table III.6), direct certification use was included in the model as four binary variables that indicate whether the policy has been in place in the State for 1 to 2 years, 3 to 5 years, 6 to 10 years, or more than 10 years. The results of the estimation of this model suggest that the effect of direct certification does level off after having been in place for a number of years. In the first two years of implementation, the model suggests that direct certification has no effect on the State's free certification rate. The estimated effect is 0.9 percentage points in years 3 to 5, growing to 1.4 percentage points in years 6 to 10. For States that have used the policy for more than 10 years, however, the effect is only slightly larger, at 1.7 percentage points. Thus, it appears that at some point five years after direct certification has been introduced in a State, its effect on the free certification rate reaches a high point and levels off. [33]

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[33]We estimated yet another specification in which separate binary variables were included for each additional year of direct certification use (through 10 years). The results of the estimation of this specification suggested that the effect of direct certification on the certification rate continued to grow at a relatively steady pace for 7 years, after which it leveled off, increasing in some years and decreasing in others.

TABLE III.6

STATE-LEVEL CERTIFICATION RATE MODEL, ALTERNATIVE SPECIFICATIONS

Model	Description	Key Variable(s)	Coefficent (Standard Error)
1	Basic fixed-effects model, direct certification enters model linearly as number of years of direct certification experience	Number of years of direct-certification use	0.20* (0.12)
2	Direct certification enters-fixed effects model nonlinearly as a set of binary variables indicating number of years of direct certification experience	1 to 2 years of direct- certification use	0.00 (0.37)
		3 to 5 years of direct certification use	0.86* (0.50)
		6 to 10 years of direct certification use	1.42** (0.69)
		More than 10 years of direct certification use	1.66* (0.93)
3	Direct certification enters fixed-effects model linearly as number of years of direct certification experience, separately for States with high versus low 1996 penetration of direct certification	Number of years of direct certification use, high penetration States	0.20* (0.12)
		Number of years of direct certification use, low penetration States	0.18 (0.13)

Source: See Table III.5.

Note: Standard errors are in parentheses. Model 1 is taken from Table III.5, column (1). The remaining models are identical to model 1 except for the manner in which direct certification enters the model.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

Another specification shown in Table III.6 tested whether the effect of direct certification was any different in States with low penetration rates (defined as States in which fewer than 60 percent of districts used the policy as of 1996), compared with high penetration States.[34] We found little difference in the estimated effects of direct certification use in high penetration versus low penetration States—in each case, an additional year of direct certification use was estimated to lead to an increase in the free certification rate of roughly 0.2 percentage points.[35] Together, the estimation of these alternative specifications led us to choose a "preferred specification" in which the number of years of direct certification use entered the model nonlinearly as a set of four binary variables; but the estimated effect of direct certification was assumed to be the same in high penetration and low penetration States. We then used this specification to estimate the impact of direct certification on States' rates of reduced-price certification (along with a number of participation rate outcomes). The results of the estimation of these models are shown in Table III.7.

The reduced-price certification model (Table III.7, row 2) suggests that direct certification has no effect on a State's reduced-price certification rate, regardless of the number of years the policy has been in place in the State. For States that have been using direct certification for more

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[34]Unfortunately, we have measures of direct certification penetration only at two points in time, 1996 and 2001; both of these points in time occurred after the major period of expansion in the use of direct certification. Thus, we could not include variable in the model indicating a state's penetration rate in each year covered by the sample (1990 to 2001). We could only examine whether the estimated effect of direct certification differed in those states that had become high penetration states versus those that had become low penetration states by 1996 (or by 2001).

[35]We estimated an analogous model using the 2001 penetration rate to define high- versus low-penetration states. We also estimated separate effects of direct certification in high versus low penetration states using the nonlinear specification of years of experience with the policy. In each case, we found no evidence of a stronger effect of direct certification in high penetration states.

TABLE III.7

ESTIMATED EFFECTS OF DIRECT CERTIFICATION ON STATE CERTIFICATION
AND PARTICIPATION RATES

Model/Dependent Variable (R^2)	Mean of Dependent Variable	Coefficients on Variables Representing Number of Years of Direct-Certification Use			
		1 to 2	3 to 5	6 to 10	More than 10
Certification Rates					
1. Free certification rate (0.97)	29.5	0.00 (0.12)	0.86* (0.50)	1.42** (0.69)	1.66* (0.93)
2. Reduced-price certification rate (0.89)	6.8	-0.13 (0.11)	-0.04 (0.15)	0.17 (0.21)	0.34 (0.28)
Participation Rates Among All Enrolled Students					
3. Free participation rate among all students (0.97)	22.8	0.41 (0.27)	0.94*** (0.36)	1.06** (0.48)	0.55 (0.65)
4. Reduced-price participation rate among all students (0.95)	4.6	-0.01 (0.06)	0.10 (0.08)	0.17 (0.11)	0.11 (0.15)
5. Paid participation rate among all students (0.96)	28.2	-0.17 (0.34)	0.08 (0.45)	0.28 (0.60)	0.30 (0.81)
Conditional Participation Rates					
6. Free participation rate among free-certified students (0.77)	78.9	1.06 (0.75)	0.31 (1.03)	-0.60 (1.41)	-2.10 (1.89)
7. Reduced-price participation rate among reduced-price certified students (0.87)	68.5	0.87 (0.70)	0.86 (0.96)	0.51 (1.32)	-0.48 (1.77)
8. Paid participation rate among non-certified students (0.96)	43.7	0.72 (0.59)	1.98** (0.80)	3.21*** (1.10)	3.32** (1.48)
9. Total participation rate among all students (0.96)	55.6	0.23 (0.44)	1.12* (0.58)	1.51* (0.78)	0.96 (1.05)

Source: See Table III.5.

Note: Standard errors are in parentheses. Model 1 is taken from Table III.6, row (2). The remaining models are identical to model 1 except for the dependent variable.

   *Significantly different from zero at the .10 level, two-tailed test.
  **Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.

than five years, this estimated effect is positive, ranging from 0.17 to 0.34 percentage points, but these estimates are statistically insignificant.

b. Estimated Effects on Participation

We estimated the effects of direct certification on two different versions of the free participation rate (along with the reduced-price and paid participation rates). First, we examined how the policy influences the free, reduced-price, and paid participation rates *among all enrolled students* in a State—in other words, the average number of all students in the State who obtain a free, reduced-price, or paid meal on a given day. These results are shown in rows 3, 4, and 5 of Table III.7. Second, we examined the effect of the policy on the conditional free, reduced-price, and paid participation rates among only students certified for free meals, certified for reduced-price meals, or not certified for free or reduced-price meals. These results are shown in rows 6, 7, and 8. Row 9 shows the estimated effect of direct certification on the overall participation rate.

The model estimates provide some evidence that direct certification leads to a small increase in the free participation rate among all students. For States in which the policy has been in place for at least three years, the estimated effect ranges from 0.6 to 1.1 percentage points. On the other hand, the estimated effects of direct certification on the reduced-price and paid participation rates among all enrolled students are small and not statistically significant.

Overall, the State-level model suggests that direct certification leads to a modest increase in NSLP participation. Use of the policy for three or more years is estimated to lead to a 1.0 to 1.5 percentage point increase in the overall participation rate. Most of this increase appears to arise from the fact that the policy leads to more students becoming certified for and receiving free meals, rather than from an increase in the number of reduced-price or paid meals served.

The estimated effects of direct certification on the conditional participation rates help us further interpret the results. While the estimated effect on the free meal participation rate among all enrolled students was positive and significant, the estimated effect on the conditional free meal participation rate among certified students is not statistically significant. In other words, even though the policy leads to an increase in the number of free meals served in a district, it does not lead to an increase in the likelihood that a given student who is certified for free meals will participate in the NSLP. Rather, the increase in the number of free meals served arises from an increase in the number of students who are certified for free meals.

By contrast, direct certification does not influence the reduced-price participation rate, either among all students or among students certified for reduced-price meals. The estimated effect of each level of direct certification experience on each reduced-price participation rate is not statistically significant. Given that direct certification does not lead to any significant change in the proportion of students certified for reduced-price meals, this lack of an effect on the reduced-price participation rate is not surprising.

And, while direct certification does not significantly influence the paid participation rate among all students, it does positively and significantly influence the paid participation rate among noncertified students. In particular, the use of direct certification for 3 to 5 years, 6 to 10 years, and more than 10 years leads to a 2 to 3 percentage point increase in the participation rate among students not certified for free or reduced-price meals. This effect may arise from a small increase in the number of paid meals served (perhaps due to the spillover effect described above) coupled with a decrease in the number of noncertified students.

3. Summary

Overall, the results of the district-level and State-level models tell a reasonably consistent story about the effects of direct certification on rates of certification for free and reduced-price

meals and participation in the NSLP. In addition, these results are consistent with those reported in Jackson et al. (1999). These three sets of estimates of the effect of direct certification on several key outcomes related to certification and participation are reported in Table III.8.

Based on the results of these models, we conclude that direct certification has a positive and statistically significant effect on the free certification rate (and little or no effect on the reduced-price certification rate). This effect on the free certification rate is relatively small, with the estimates ranging from 1.3 to 2.8 percentage points. Given that the average district has a free certification rate of about 30 percent, this percentage point effect amounts to a 4 to 9 percent increase in the percentage of a districts students who are certified for free meals. An alternative way of looking at the size of this effect is that direct certification will cause 0.4 to 0.9 million students nationally to move from being not certified for free meals to being certified.

The evidence indicates that direct certification has a small positive effect on the overall participation rate, with mixed evidence as to whether this effect is statistically significant. The estimated effects range from 0.5 to 1.5 percentage points, and only the State-level model estimate is statistically significant. If direct certification has an effect on the overall participation rate, results from both the State-level model and Jackson et al. (1999) suggest that this effect results mostly from an increase in participation among students newly certified for free meals as a result of direct certification. In short, the evidence suggests that direct certification leads to an increase in free meal certification, which, in turn, leads to a somewhat smaller increase in NSLP participation.

TABLE III.8

ESTIMATED EFFECT OF DIRECT CERTIFICATION ON CERTIFICATION AND
PARTICIPATION RATES,
COMPARISON OF DISTRICT-LEVEL MODEL AND STATE-LEVEL MODEL RESULTS

Impact of Direct Certification on:	(1) District-Level Model[a]	(2) State-Level Model[b]	(3) Jackson et al. (1999)[c]
Free Certification Rate	1.32**	1.42**	2.80*
Reduced-Price Certification Rate	0.39	0.17	0.85***
Free Participation Rate Among All Enrolled Students	0.35	1.06**	1.35**
Reduced-Price Participation Rate Among All Enrolled Students	0.23	0.17	0.20*
Paid Participation Rate Among All Enrolled Students	-0.02	0.28	-0.55
Overall Participation Rate	0.48	1.51*	1.05

Source: 2001 Direct Certification Study SFA Survey; various State-level data sources (see Table III.5); Jackson et al. (1999), Table V.6.

[a]The district-level results are drawn from the specification in which direct certification enters the model as a single binary variable. These results are reported in Tables III.3 and III.4.

[b]The State-level results are drawn from the specification in which direct certification enters the model as a set of binary variables indicating the number of years in which direct certification has been in use in the State. The estimate reported in the table is the effect of 6 to 10 years of direct certification use.

[c]The results from Jackson et al. (1999) are drawn from the specification in which direct certification enters the model linearly as a single variable indicating the number of years in which direct certification has been in use in the State. The estimate reported in the table is the effect of 5 years of direct certification use (where the estimated effect of a single year of direct certification use was multiplied by 5 to determine the estimated effect of 5 years). The significance level reported refers to the significance of the estimated effect of a single year of direct-certification use.

  *Significantly different from zero at the .10 level, two-tailed test.
 **Significantly different from zero at the .05 level, two-tailed test.
***Significantly different from zero at the .01 level, two-tailed test.