

Broadband Vouchers: Evaluating the Alabama Broadband Connectivity Program

*Erezi Ogbo, Assistant Professor of Information Science, North Carolina Central University
(former Post-doctoral Scholar, USC Annenberg School for Communication and Journalism)*

Case Study #1 | Nov 2022

1. Introduction

There is an emerging debate on effective subsidy mechanisms to help low-income households connect to broadband. Many consumer subsidy programs in the U.S. (such as Lifeline and the Affordable Connectivity Program, or ACP) are rebates administered through ISPs. Direct-to-consumer voucher subsidies, which have been widely used in other social benefit programs such as the Supplemental Nutrition Assistance Program (SNAP), have had limited application in communication services. There has been increased advocacy for direct-to-consumer broadband voucher programs to replace ISP-administered rebates, as they are argued to improve consumer choice and increase competition by supporting broader connectivity options and providers.¹

The Alabama Broadband Connectivity (ABC) program is a rare example in the U.S. of a digital inclusion program that used direct-to-consumer vouchers to address the affordability barrier. Established in August 2020 by Governor Kay Ivey and administered by the Alabama Department of Economic and Community Affairs (ADECA), the ABC program ran through the 2020-21 school year (ending in June 2021). Using funding from the Coronavirus Aid, Relief, and Economic Security (CARES) Act, the program provided eligible low-income families with broadband vouchers or wireless hotspots. Initially, ADECA mailed a package containing personalized voucher codes and information about the program to the address of all eligible families.² The vouchers covered the cost of service and installation, and could be used with any of the 41 participating providers.³ Families that could not redeem the vouchers (for

1 See Skorup, B., & Kotrous, M. (2020). Narrowing the Rural Digital Divide with Consumer Vouchers. Mercatus Center George Mason University.

2 <https://governor.alabama.gov/assets/2020/07/Finance-ADECA-MOU-ABC-for-Students.pdf>

3 The voucher could be used to cover the cost of the baseline broadband service offered by the ISP that met the FCC's definition of broadband (minimum speeds of 25 Mbps download/3Mbps upload).

example, because they lived outside the coverage area of wireline ISPs) received a hotspot through school districts.

This policy brief seeks to contribute to the debate on effective consumer subsidy mechanisms for broadband by evaluating the Alabama Broadband Connectivity (ABC) program along four dimensions: 1) the cost to connect each household; 2) whether the program reached the families most in need; 3) the determinants of ABC participation; and 4) if outreach through ABC administrators (serving as a trusted messenger) impacted participation in the Emergency Broadband Benefit (EBB) program.⁴

A PUMA-level dataset that combines ABC enrollment data from ADECA with demographic data from the Census Bureau's American Community Survey (ACS) and other data sources is used in the analysis. See Appendix A for a discussion of how this unique dataset was created and the data sources.

2. ABC Numbers

The ABC connected over 200,000 students (in 106,987 households) during the 2020-21 school year. This represents about a third of the 725,900 students enrolled in Alabama schools. In terms of households, about 76,000 redeemed vouchers were mailed directly from ADECA to cover the cost of service and installation, while 31,326 households received wireless hotspots through school districts. Over its lifetime, the total cost of the ABC program was approximately \$50 million. In total, \$45 million (\$42/month/household) was spent on service costs, while \$4.9 million (\$4/month/household) covered the administrative costs of running the program such as outreach costs, website design and administration, and personnel costs. It is worth noting that the average monthly subsidy per household (\$42) provided by ABC was more than four times the monthly subsidy per household of the federal Lifeline program (\$9.25).⁵

Households with at least one K-12 student receiving free or reduced-price school lunch through the National School Lunch Program (NSLP) were eligible to participate in the ABC program.⁶ To normalize the program participation metric and allow for comparison across different programs and locations, we use the participation rate - defined as the ratio of enrolled households to eligible households - rather than the absolute number of households participating in the ABC program.

⁴ The ABC program was discontinued as the federal EBB program went into effect in May 2021.

⁵ FCC Lifeline Support for Affordable Communications (<https://www.fcc.gov/lifeline-consumers>).

⁶ Given that the ACS does not directly capture NSLP enrollment, we estimate ABC eligibility as households eligible for NSLP free or reduced-price lunch. Households below 186% of the federal poverty guidelines with at least one child in K-12 are eligible for NSLP free or reduced-price lunch.

At the conclusion of the voucher phase of the ABC program, 43% of eligible households had redeemed a voucher. With the inclusion of wireless hotspots, the overall participation rate in the program increases to 61%. Although ABC and EBB provided similar subsidy levels per connected household, the participation rate in the ABC program (43%) was significantly higher than the participation rate in EBB in Alabama (24% as of December 2021).⁷ However, it should be noted that ABC had a much smaller target population than EBB or Lifeline. This makes it difficult to directly compare the ABC program with EBB or Lifeline.⁸

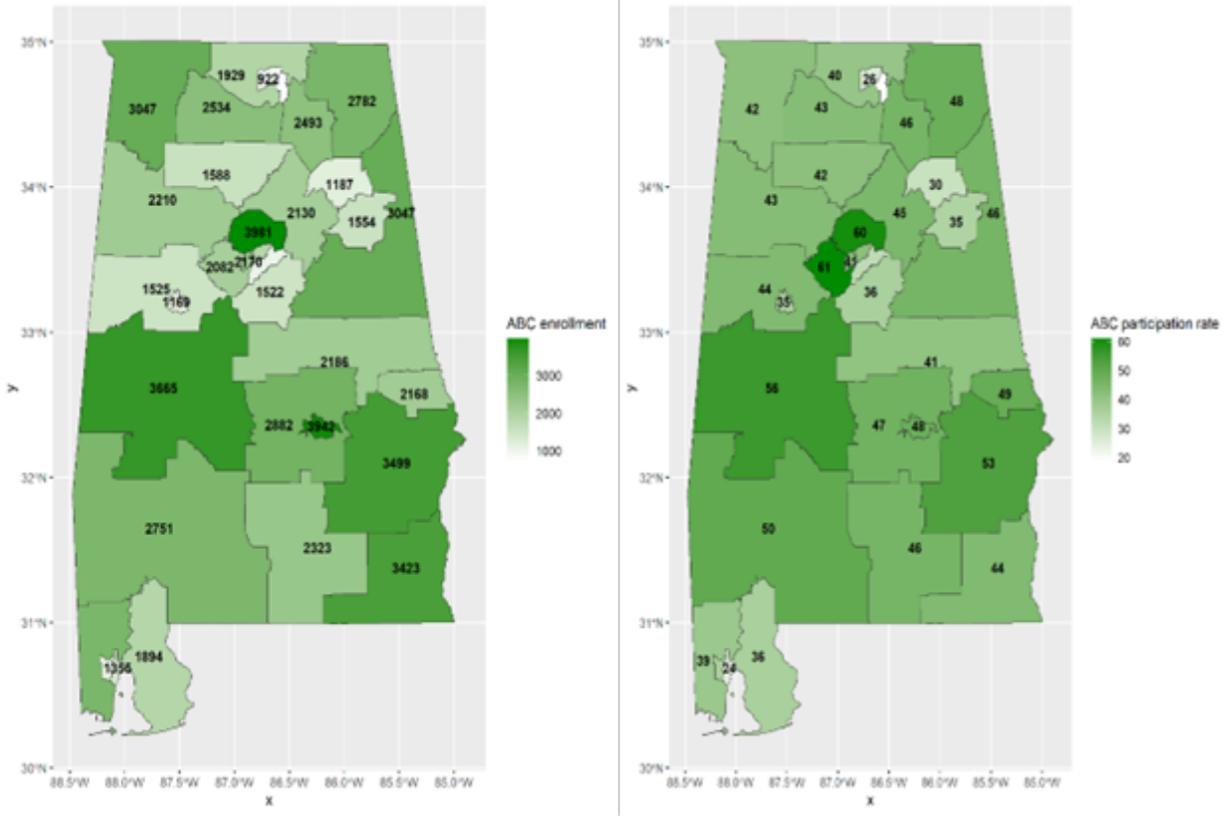
Looking more closely at the program take-up reveals significant variation in ABC enrollment and participation rates across PUMAs (Figure 1).⁹ As shown, the participation rate ranges from 19% in the Huntsville (Central & South) PUMA to 61% in Jefferson County (West) (see Figure 2).

7 See Galperin, H. (2022). A Roadmap for Affordable Broadband: Lessons from the Emergency Broadband Benefit. Available at <https://arnicusc.org/publications/a-roadmap-for-affordable-broadband-lessons-from-the-emergency-broadband-benefit>

8 The ABC program only targeted families with K-12 students enrolled in NSLP, thus the program's participation rate could be driven by multiple factors that are difficult to measure and are less likely to be observed in the target populations of EBB or Lifeline. For example, ABC families may be more likely to have used the Internet previously to support their child's education. Thus, they could be more willing to take-up broadband. Also, given that ABC is a smaller program, targeted program outreach could be easier to design and implement, than in a nationwide program like EBB or Lifeline.

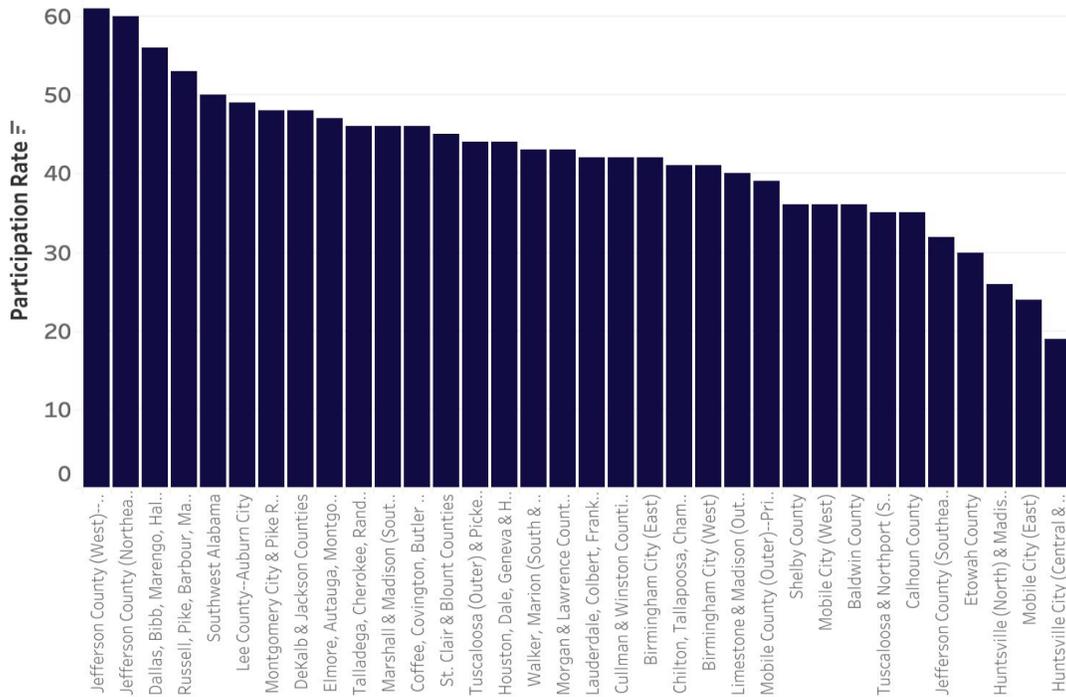
9 Public Use Microdata Areas (PUMAs) are geographic areas defined by the Census Bureau containing at least 100,000 people.

Figure 1. Maps showing ABC enrollment (on the left, in 000s) and ABC participation rate (on the right, in %) by PUMA in the State of Alabama



Source: ADECA and ACS.

Figure 2. ABC participation rate by PUMA



Source: ADECA and ACS.

3. Predicting ABC Participation

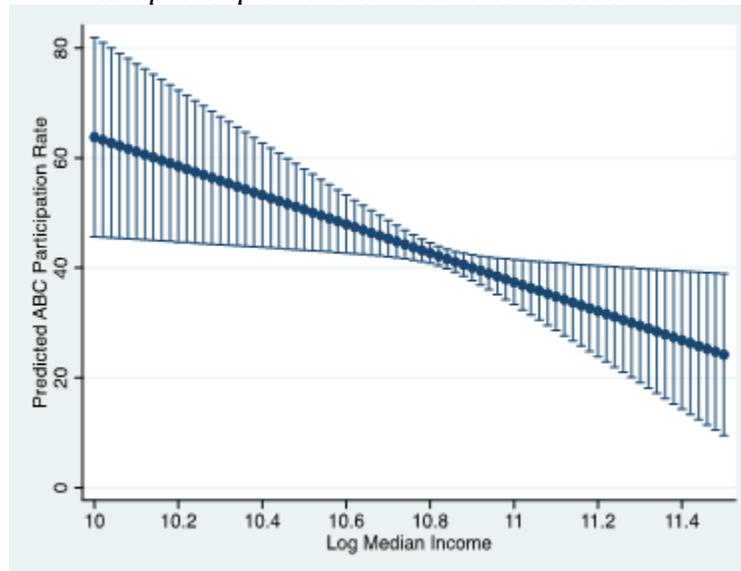
To investigate the determinants of ABC program participation across PUMAs, participation rate is modeled as a linear function of individual, household, and PUMA characteristics. The results are presented in Table A1 in the Annex.

Did the program reach the households most in need? The ABC program was designed to help low-income families with at least one K-12 student receiving free/reduced-price school lunch through NSLP to pay for broadband at home. PUMAs with lower median income had higher participation rates (see Figure 3). This suggests that families most in need of assistance redeemed the voucher. Plotting ABC participation rate against the rate of children in poverty by PUMA does not reveal any association. In fact, results from the analytical model show that, after controlling for other demographic, socioeconomic, and political characteristics, PUMAs with a higher rate of children in poverty have a lower rate of participating in the voucher program. Given that participation and median income are at the household level while child poverty is at the individual level, a possible explanation for this

finding is that there was low participation among low-income households with more children.

What are the main demographic determinants of ABC participation? The results suggest that the program helped digitally-vulnerable populations to connect to broadband at home. For example, PUMAs with higher rates of Black and Hispanic populations – who have typically been unconnected or underconnected – had higher participation rates (Figure 4). The results do not show a significant correlation between ABC participation and the percent of households without broadband at home before the start of the Covid-19 pandemic. This finding is consistent with that of existing research showing that subsidy programs help already connected low-income households but do not seem to help increase overall broadband adoption.¹⁰

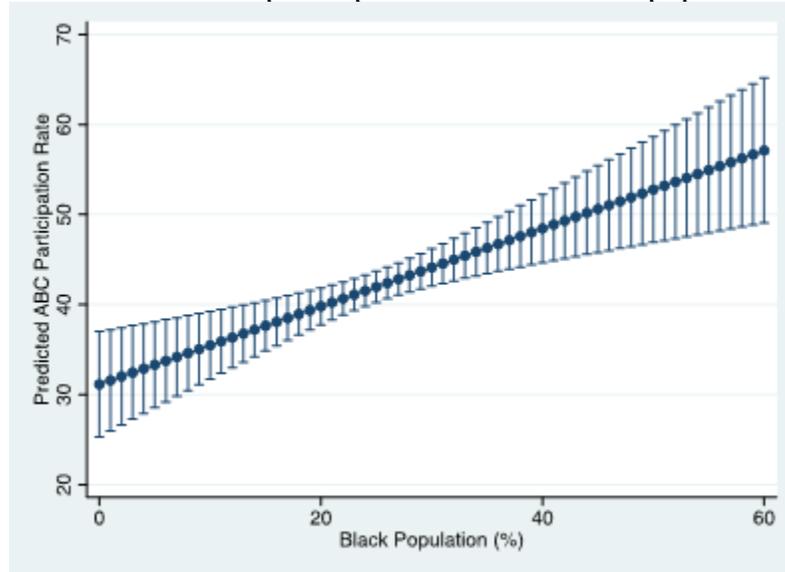
Figure 3. Predicted ABC participation and median household income (2019) by PUMA



Source: ADECA and ACS.

¹⁰ See for example Wallsten, S. (2016). Learning from the FCC's Lifeline Broadband Pilot Projects. SSRN Electronic Journal. <https://doi.org/10.2139/ssrn.2757149>

Figure 4. Predicted ABC participation rate and Black population share.

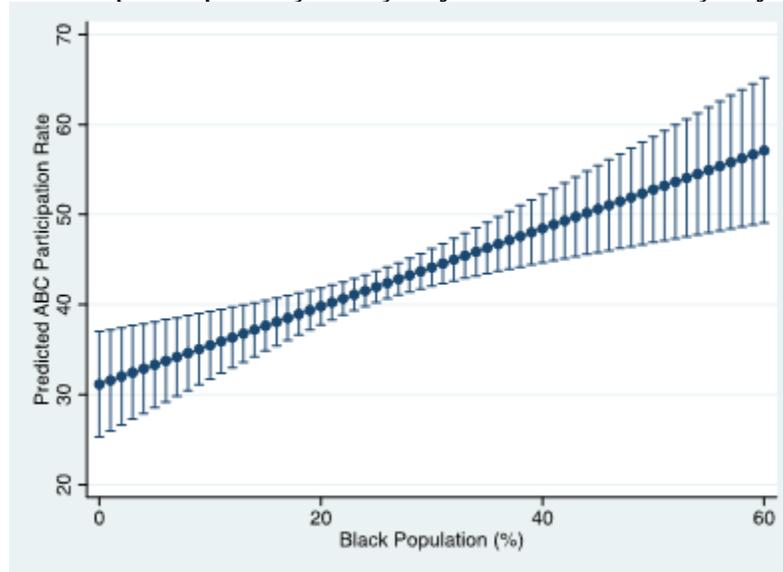


Source: ADECA and ACS.

Surprisingly, and despite the Governor of Alabama being a member of the Republican party, PUMAs with majority Democrat vote had significantly higher participation in the ABC program (Figure 5). This finding supports earlier findings of higher participation in EBB among Democratic voters, and has important implications for developing strategies to increase participation in digital inclusion programs.¹¹

¹¹ The predicted participation in EBB increases significantly as the share of Democrat votes (based on the 2020 presidential election) in a county increases. See Galperin, H. (2022). A Roadmap for Affordable Broadband: Lessons from the Emergency Broadband Benefit.

Figure 5. Predicted ABC participation for majority Democrat and majority Republican PUMAs



Source: ADECA, ACS, Federal Reserve.

An interesting non-finding is that the results did not show any evidence that being foreign-born has an impact on participation in the ABC program. This is likely because there are no immigration-status restrictions for participating in NSLP, which was the program used in determining ABC eligibility. Also, outreach was conducted in both Spanish and English. This contrasts with findings for similar programs which show that areas with a larger share of foreign-born residents tend to have lower levels of program adoption.¹²

4. Predicting Participation in EBB

Multiple studies have shown that lack of awareness is a barrier to participation in digital inclusion programs, and that targeted outreach in the right language and through trusted messengers is critical for program success.¹³ As the ABC program was nearing its end, program administrators shared information about EBB through the ABC website and encouraged ABC participants to transfer to EBB. The results show a significant and positive correlation between ABC and EBB participation, suggesting that households enrolled in ABC were significantly more likely to enroll in EBB. Figure 6 illustrates this finding by plotting the predicted EBB participation across the observed ABC participation per PUMA (using

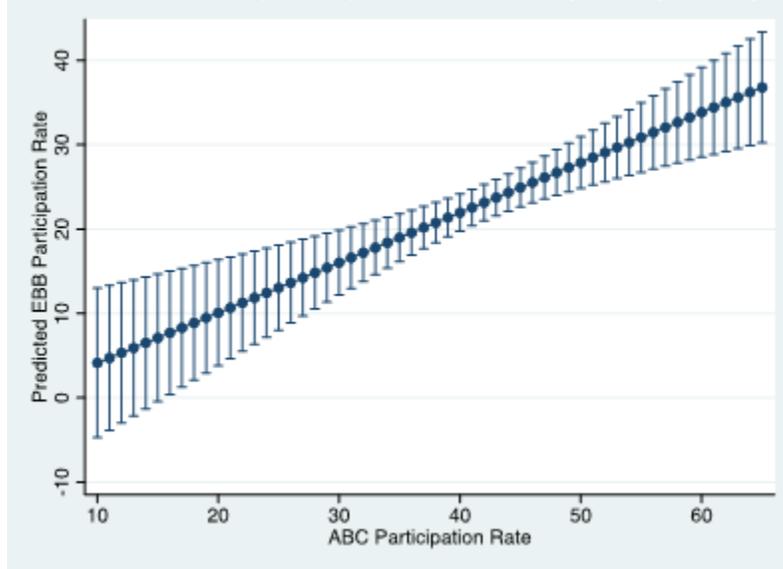
12 See Galperin, H. (2022). A Roadmap for Affordable Broadband: Lessons from the Emergency Broadband Benefit. It must be noted that the overall share of the foreign-born population in Alabama is low relative to other states.

13 For example, see Levine, L. (2020). Broadband adoption in urban and suburban California: Information-based outreach programs ineffective at closing the digital divide. *Journal of Information, Communication and Ethics in Society*, Vol. 18 No. 3, pp. 431-459.

predicted values from model 3 in Table A1). This observation broadly supports the findings in the literature that outreach using a trusted messenger (in this instance, the ABC program administrators) is essential to achieving high participation rates in digital inclusion programs.

In addition to the effect of a trusted messenger, this result could also be attributed to the reduced burden for ABC participants to determine EBB eligibility (for example the website explicitly stated “All ABC for Students participants are eligible for the new national Emergency Broadband Benefit (EBB) program”).¹⁴ Another possible explanation is that ABC families had been connected to broadband service for about 11 months, and could appreciate the value of connectivity more than households that never had residential broadband.

Figure 6. Predicted EBB participation over ABC participation per PUMA



Source: USAC, ADECA, ACS.

5. Conclusion

This study is the first to compare a direct-to-consumer voucher subsidy mechanism to existing programs based on rebates administered through ISPs. The findings suggest that the ABC program had a strong targeting efficiency, defined as how accurately benefit programs distribute resources to their intended target population. The program had a relatively high participation rate (43%) compared to similar federal programs, and the findings suggest that populations that are most in need of broadband connectivity assistance were most likely to participate in the program.

¹⁴ See the ABC informational website <https://abcstudents.org>.

These encouraging results suggest that the reduced burden of enrollment in ABC played a significant role, as eligible families were individually identified by program administrators and directly mailed personalized voucher codes for enrollment. In addition, program outreach was conducted in English and Spanish, further reducing the enrollment barriers. While the ABC program differed from similar programs along multiple dimensions, the high participation rate raises the question of whether more narrowly targeted broadband subsidy programs can achieve better participation rates.

At the same time, the findings do not point to higher program participation in areas with a larger share of disconnected households pre pandemic. This could be due to the fact that while the program aimed to help low-income families to connect to broadband, it did not prioritize unconnected families. Furthermore, the findings indicate that other factors such as service availability could negatively impact take-up rates, highlighting the need to use multiple technologies and strategies to connect unserved households (the ABC program used wireless hotspots to connect eligible households in areas without adequate fixed broadband coverage). The findings from this study also lend strong support to the use of trusted messengers for outreach to improve program participation.

About the project

This policy brief is part of the Measuring the Effectiveness of Digital Inclusion Approaches (MEDIA) project, a research program that seeks to analyze existing broadband inclusion initiatives and provide evidence-based recommendations on how best to connect low-income households to broadband on a sustainable basis.

The program is supported by The Pew Charitable Trusts, and includes the California Emerging Technology Fund (CETF) as a key research partner. The views expressed herein are those of the author(s) and do not necessarily reflect the views of The Pew Charitable Trusts or the California Emerging Technology Fund.

Principal Investigators:

Dr. Hernan Galperin, Associate Professor, USC Annenberg School for Communication and Journalism

Dr. François Bar, Professor, USC Annenberg School for Communication and Journalism

Research Assistance:

Dr. Ezezi Ogbo, Assistant Professor of Information Science, North Carolina Central University (former post-doctoral Scholar, USC Annenberg School for Communication)
eogbo@nccu.edu

ANNEX

Table A1: OLS estimations for ABC and EBB participation rates

VARIABLES	(1) ABC Participation Rate	(2)	(3)	(4)
Percent unemployed		-2.042*		-1.236
		(1.051)		(1.537)
Percent Black	0.207**	0.432***		0.156
	(0.0771)	(0.108)		(0.193)
Percent Hispanic		1.392*		0.276
		(0.687)		(1.011)
Median age		0.721		0.392
		(0.492)		(0.695)
Percent bachelor degree	-0.185*			
	(0.0907)			
Percent HHs no Internet		-0.111		-0.00846
		(0.251)		(0.340)
Percent children in poverty		-0.421*		-0.00996
		(0.228)		(0.331)
Percent foreign-born		-2.012		-1.327
		(1.312)		(1.863)
Majority Republican	-10.26***	-8.751***		-2.944
	(2.628)	(2.798)		(4.562)
Household size		13.31		10.10
		(8.468)		(12.05)
Population density	-0.00885***	-0.00515**	0.00664***	0.00592
	(0.00162)	(0.00246)	(0.00177)	(0.00364)
Public assistance income	-0.778	-1.063		-1.016
	(0.612)	(0.695)		(0.986)
Median HH income (ln)		-26.39**		-12.43
		(10.47)		(16.09)
ABC participation rate			0.594***	0.187
			(0.132)	(0.294)
Constant	71.65***	298.4**	-5.802	118.5
	(7.533)	(108.5)	(6.224)	(170.4)
Observations	34	34	34	34
AIC	211	214	223	234
BIC	221	233	227	255
Adjusted R-squared	0.710	0.728	0.392	0.307

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A2: Variable Description and Sources

VARIABLES	Description	Source	Year
ABC Participation Rate	ABC enrollment/ABC eligible HHs	ADECA/ACS	2021/ 2019
Population Density	Population density	ACS	2019
Median Age	Population median age	ACS	2019
Percent Black	Share of Black population	ACS	2019
Percent Hispanic	Share of Hispanic population	ACS	2019
Household Size	Average number of members per household	ACS	2019
Percent Bachelor	Share of population with at least a college degree	ACS	2019
Percent Unemployed	Unemployment rate	ACS	2019
Log Median Income	Median HH income (log)	ACS	2019
Public Assistance Income	Share of population receiving public assistance income	ACS	2019
Children in Poverty	Share of children below federal poverty line	ACS	2019
Percent Foreign-Born	Share of foreign-born residents	ACS	2019
EBB Participation Rate	EBB enrollment/EBB eligible HHs	USAC/ACS	2021/ 2019
No Internet	Share of HHs without Internet (any type)	ACS	2019
Majority Republican	Majority Republican vote 2020 election	MIT Lab	2020

ABC Participation Rate Calculation

ADECA provided ABC household enrollment data at the ZIP5 level. Since ZIP5 codes are not nested within PUMAs (for example some ZIP5 boundaries extend over multiple PUMAs), we used the Census Bureau’s 2010 crosswalk relationship file to match ZIP5 data to PUMAs, weighing the data by census tract population. Using this procedure we obtain the total number of enrolled households at the PUMA level, which is then divided by the total number of ABC eligible households to obtain the participation rate.

ABC offered vouchers to households with K-12 students eligible for free/reduced price lunch under NSLP (including existing and new recipients of NSLP). Since the ACS does not directly

capture enrollment in NSLP and households with new NSLP recipients can qualify for the ABC program, we defined ABC-eligible households as households eligible for free/reduced lunch under NSLP rules. To calculate the number of ABC-eligible households by PUMA, we relied on microdata (PUMS files) from the American Community Survey (ACS). Two variables are used to identify eligible households, one from the individual-level files (POVPIP) and one from the household-level files (HUPAC). The variables are:

1. Poverty status indicating household income below the 185% poverty threshold (POVPIP)
2. Household with at least one child in K-12 (HUPAC)

In our calculations, a household is considered eligible for NSLP, and therefore for the ABC program, if the household meets both eligibility criteria based on the variables above.

The household weight variable (WGTP) is used to estimate the total number of eligible households at the PUMA level.