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Early Access: Elementary School Outcomes for Arkansas Better Chance Pre-Kindergarten Participants

Sarah McKenzie
University of Arkansas, Fayetteville

Josh B. McGee
University of Arkansas, Fayetteville

Emily Jordan
University of Arkansas, Fayetteville

Charlene A. Reid
University of Arkansas, Fayetteville

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This Brief

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Summary Points

- The Arkansas Better Chance (ABC) program, funds pre-K programs for low-income or at-risk students.
- Over **25%** of each incoming Kindergarten class included in our analysis attended ABC pre-K programs housed in public schools.
- Students who attend ABC pre-K experience **higher math and reading state test scores** than similar peers in 3rd grade, indicating **lasting positive results** related to the program.
- By 5th grade, however, we find no significant difference in state test scores between students who attended ABC pre-K and similar students who did not.

Early Access: Elementary School Outcomes for Arkansas Better Chance Pre-Kindergarten Participants

The Arkansas Better Chance (ABC) program has been providing low-income and at-risk Arkansas children with tuition-free pre-K since 1991. Enrollment in the state’s public pre-K programs has increased modestly over the last ten years. This brief reports the results of an analysis of the 3rd and 5th grade outcomes for students who attended ABC pre-K in the academic years of 2011-12 through 2014-15. We find that students who enroll in ABC programs in the year prior to starting Kindergarten outperform similar peers on math and reading state tests in 3rd grade, but these effects largely fadeout by 5th grade.

Arkansas Better Chance (ABC)

The state of Arkansas has been prioritizing early childhood education for nearly three decades. In 1991, the state launched the Arkansas Better Chance (ABC) program which funded various service providers for families with children birth to age 5.

The Arkansas Better Chance for School Success (ABCSS) legislation passed in 2003 outlined specific guidelines and requirements for pre-K programs serving students with ABC funding. These programs are considered high-quality, as teachers in ABC classrooms are required to have bachelor’s degrees and current AR teaching licenses, and the ABC program meets eight of ten quality standards set by the National Institute for Early Education Research.

The literature on pre-K effectiveness indicates that programs with certain characteristics, including developmentally appropriate curriculum, highly qualified educators and regular professional development, and sufficient learning time, are more likely to lead to lasting outcomes (Atteberry, 2019; Meloy et al., 2019). Legislators and program advocates have consistently prioritized quality in the program’s development.

Students become eligible for spots in ABC classrooms based on a number of criteria. Families with combined household incomes less than or equal to 200% of the federal poverty level are eligible for priority enrollment and free tuition. Students can also qualify for eligibility if they have other risk factors, including disabilities, developmental delays or limited English proficiency. When there are additional spots in ABC classrooms unfilled by qualifying students, other children in the community can enroll and pay tuition on an income-based sliding scale.

As of 2018-19, 100% of counties in Arkansas offer ABC pre-K enrollment opportunities for their surrounding communities (NIEER, 2020).

Enrollment Trends

The number of students enrolled in ABC programs has increased slightly over the past decade. Figure 1 presents the number of students enrolled in ABC pre-K classrooms in public schools from the fall of 2008 through the fall of 2019. In the latest academic year, approximately 16,000 students were enrolled, compared to about 13,000 in the fall of 2008. In each year, approximately 75% of students in the program qualified for the Free or Reduced-Price Lunch program, indicating that their family incomes are less than or equal to 185% of the Federal Poverty level. This proportion is higher than the state average of K-12 students who are FRL-eligible, but this pattern is expected due to the fact that the ABC program is targeted toward low-income families.

Figure 2 presents the racial composition of program enrollment for each of these academic years. As evidenced here, slightly over 50% of ABC students in each academic year since 2008-09 have been White, while Black students comprised approximately 26-30% of each year's enrollment, and about 11-15% of enrollment was comprised of Hispanic students. Notably, the proportion of Hispanic students enrolled in ABC has increased since the fall of 2008, while the proportion of Black students has decreased. Also, both Black and Hispanic student groups are overrepresented in ABC programs relative to their contribution to the state's K-12 enrollment. This is also unsurprising due to the targeted nature of the program toward at-risk student populations.

Figure 1: ABC Enrollment, 2008-09 through 2019-20

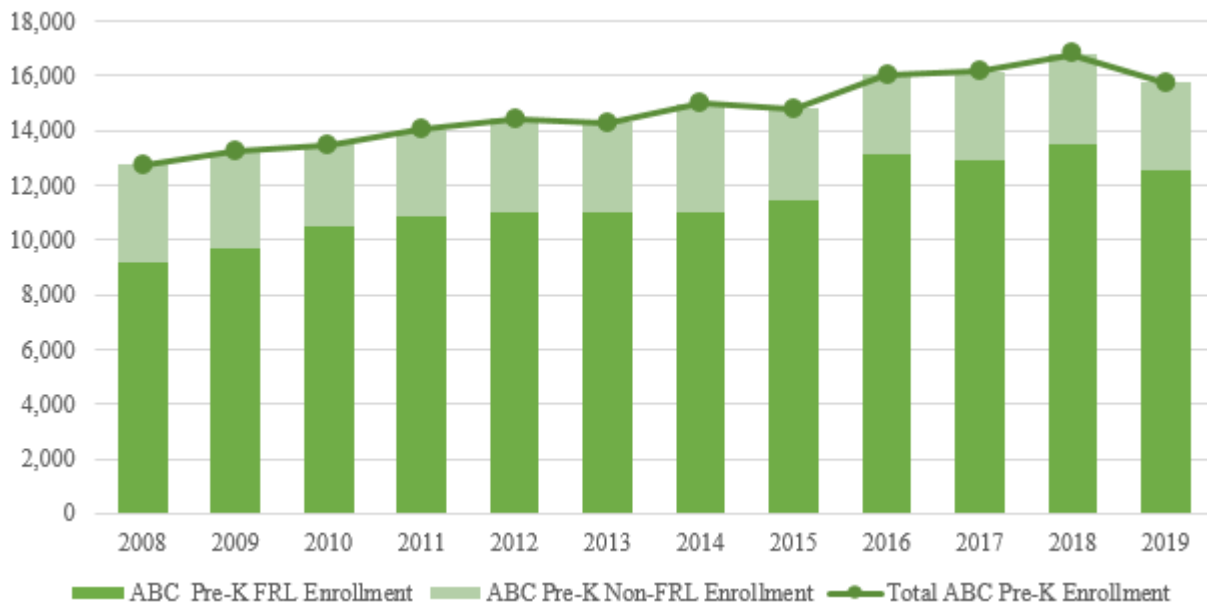
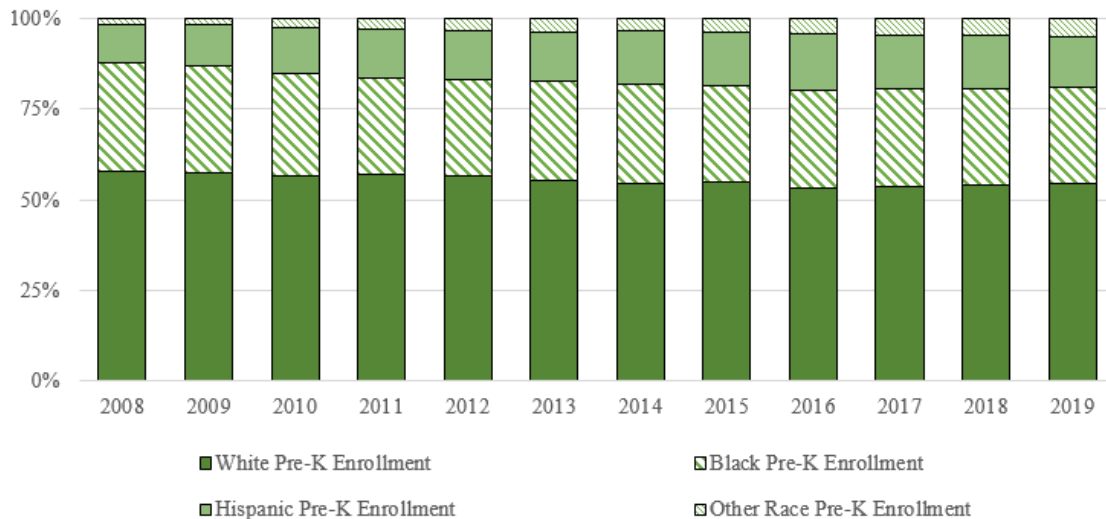


Figure 2: Percent of Total ABC Enrollment by Race (2008-09 through 2019-20)



Descriptive Trends in Academic Achievement

In order to analyze achievement over time and across changing standardized tests, we convert students' individual test scores into standardized "z-scores". A z-score is a value in units of standard deviations that tells us where students are scoring relative to the group average, where a value of 0 represents the average test score for all students in the analytic sample. The following figures present average z-scores for math and reading achievement in 3rd grade. In Figure 3, we see that ABC pre-K participants, on average, have higher math z-scores than non-ABC students in the first cohort, lower math z-scores in the second and third cohorts, and in the fourth cohort, ABC and non-ABC students had similar average math scores. For reading, there was a similar pattern, with ABC pre-K students scoring above their non-ABC peers in the first cohort but then lower than those students in the second, third, and fourth cohorts. At surface level, this suggests that this group as an aggregate scored slightly higher on standardized math and reading exams in Cohort 1, relative to their peers who did not attend ABC, and they scored slightly lower than them for the later three cohorts. However, these values of 0.05 standard deviations or smaller are not very large, so ultimately there is not a very meaningful difference between these two groups on this level.

Figure 3: Average 3rd Grade Math Z-scores for Full Analytic Sample

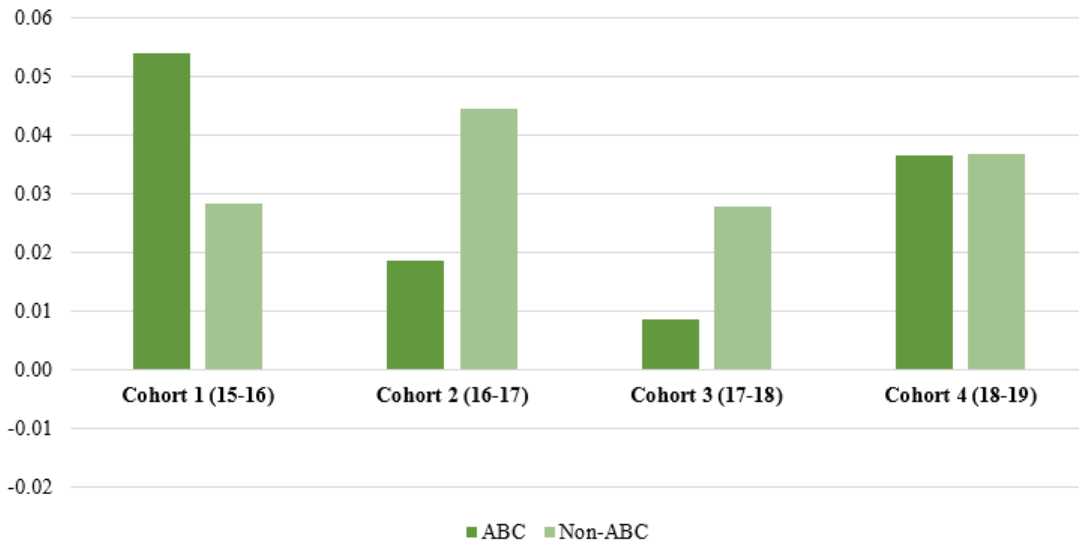
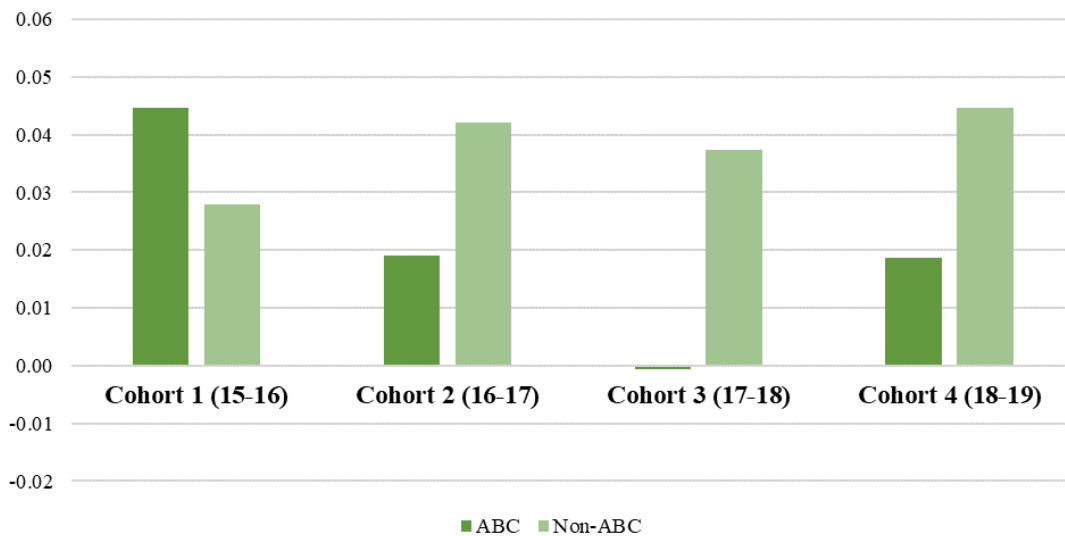


Figure 4: Average 3rd Grade Reading Z-scores for Full Analytic Sample



Descriptive Trends for Low-Income Students

Low-income students, on the other hand, seem to benefit more from ABC attendance. Similar figures that describe only the subgroup of FRL-eligible students are presented below. Here, we see that both groups are consistently scoring below the state average. This is unsurprising because it is well documented that low-income students are at-risk for poor academic performance. However, we see that the group of students who attended ABC pre-K has an average z-score that is much closer to the state average. In math, ABC attendees scored about 0.15 standard deviations higher than their peers in Cohort 1, 0.12 standard deviations higher in Cohort 2, 0.07 standard deviations higher in Cohort 3, and 0.14 standard deviations higher in Cohort 4. There are similar, very large score differences between the two groups in reading. As evidenced in Figure 6, ABC participants scored 0.16 standard deviations higher than non-ABC students in Cohort 1, 0.13 standard deviations higher in Cohort 2, 0.07 standard deviations higher in Cohort 3, and 0.12 standard deviations higher in Cohort 4. While it is discouraging that the FRL-qualifying students who attended ABC are still scoring below the state average, it seems that program participants are scoring much higher relative to similar peers who did not attend ABC pre-K before starting Kindergarten. All of these figures present purely descriptive information about the average achievement of ABC and comparison students in 3rd grade.

Figure 5: Average 3rd Grade Math Z-scores for FRL Subgroup

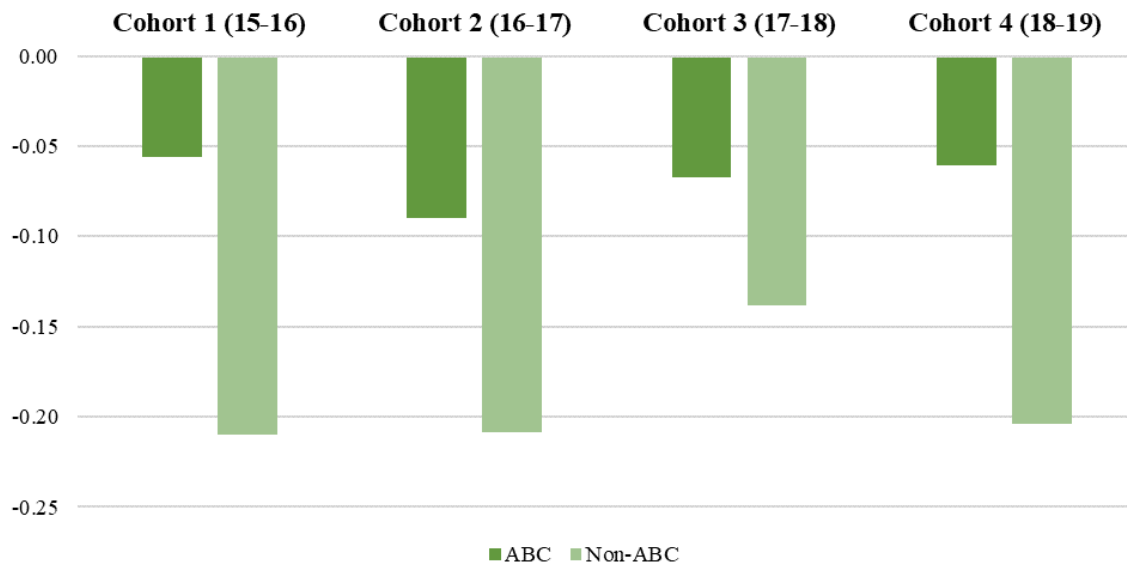
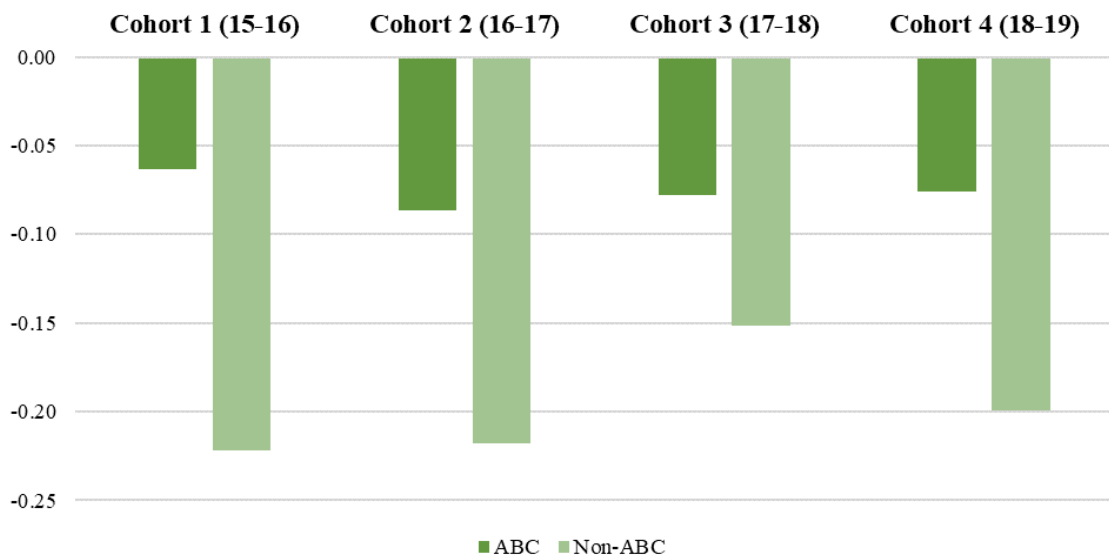


Figure 6: Average 3rd Grade Reading Z-scores for FRL Subgroup



ABC and Academic Outcomes

We run multivariate regressions to determine the unique contribution of ABC pre-K attendance to 3rd and 5th grade achievement outcomes. These regression models control for student gender, race, Free or Reduced Price lunch eligibility, Special Education status, and English Language Learner status, meaning that the outcomes of ABC participants are compared to those of demographically similar peers. Findings from this regression analysis are presented in Table 1. Each of the coefficients are in units of standard deviation because students' test scores are standardized prior to analysis. Measuring achievement in terms of standard deviations allows us to compare student outcomes relative to the average outcomes of the entire group, and it also allows for meaningful comparisons across time and changing state test formats.

We expected to find that ABC participants would experience more positive academic outcomes than demographically-similar peers who did not attend ABC prior to starting Kindergarten. We found that this was true for students in 3rd grade in three out of four of our cohorts. All else equal, ABC participation was associated with positive, statistically significant increases in 3rd grade math and reading achievement in cohorts 1, 2, and 4. In the most recent cohort of analysis, ABC participation was related to a 0.0532 standard deviation increase in 3rd grade math achievement and a 0.0223 standard deviation increase in 3rd grade reading achievement.

Associations between program participation and academic achievement were smaller in magnitude and mostly not statistically significant for the 5th grade analysis. In Cohort 2, ABC participation was associated with a marginally significant 0.0205 standard deviation increase in 5th grade reading achievement ($p < 0.1$).

Table 1: Multivariate Regression Coefficients for Math and Reading Outcomes by Cohort and Grade

	Cohort 1	Cohort 2	Cohort 3	Cohort 4
3 rd Grade Math	0.0832***	0.0388***	0.0156	0.0532***
	(0.0112)	(0.0111)	(0.0124)	(0.0109)
3 rd Grade Reading	0.0684***	0.0401***	-0.0071	0.0223**
	(0.0111)	(0.0110)	(0.0121)	(0.0110)
5 th Grade Math	0.0121	0.0070	-	-
	(0.0091)	(0.0114)	-	-
5 th Grade Reading	0.0098	0.0205*	-	-
	(0.0087)	(0.0105)	-	-

Note: 5th Grade coefficients are only available for the two cohorts of students who had completed 5th grade. Standard errors in parentheses

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

Conclusion & Policy Implications

Findings from this analysis suggest that Arkansas Better Chance (ABC) pre-K programs in Arkansas are contributing to lasting academic achievement for participating students. We followed four cohorts of students who attended ABC pre-K in the academic years of 2011-12 through 2014-15 and found positive, statistically significant relationships between pre-K attendance and 3rd grade math and reading achievement in three out of four cohorts, but these effects largely fade out by 5th grade.

Positive results associated with this program are especially promising because students who attend ABC are more likely to be low-income and have other risk factors for poor academic performance. Programs and interventions that serve these vulnerable students should be of particular interest to policymakers and advocates. These findings suggest that high-quality pre-K education is a critical tool for ensuring all students have the opportunity to succeed. There are also likely additional program benefits not captured by this analysis. Prior pre-K research demonstrates that pre-K can contribute to positive social and behavioral outcomes in addition to academic and cognitive benefits (Gorey, 2001). Getting an additional year or two to learn classroom rules and procedures, socialize with peers, and adapt to the school routine should equip students with behavioral and social skills that will help them succeed in Kindergarten and beyond.

Enrollment in ABC programs has been slowly increasing over the last decade, and within our analysis, approximately 25% of each Kindergarten class attended ABC pre-K. Findings from the current analysis suggest that the state should consider expanding enrollment. ABC participants are outperforming peers who are attending a variety of alternatives around the state. Particularly for low-income and disadvantaged students, increased enrollment opportunities for this high-quality, state-funded program could mean an opportunity for lasting academic success.

For more information about this Policy Brief and other education issues in Arkansas contact us:

Office for Education Policy
211 Grad Ed Building
Fayetteville, AR 72701
Phone: (479) 575-3773
Fax: (479) 575-3196
oep@uark.edu

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EXECUTIVE DIRECTOR:

Sarah McKenzie, Ph.D.

ASSOCIATE DIRECTOR:

Josh McGee, Ph.D.

RESEARCH STAFF:

Emily Jordan

Charlene A. Reid



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