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Some causes of the undercount of low income students under the Community Eligibility Provision in Baltimore City Public Schools

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EXECUTIVE SUMMARY

Beginning in the 2015-2016 school year, Baltimore City public schools joined the U.S. Department of Agriculture Community Eligibility Provision (CEP). Under CEP, all Baltimore City public school students are eligible to receive free meals, not just low income students. However, an unfortunate result of the switch to CEP has been an underestimation of the number of low income students in the Baltimore City public schools. In practice, the introduction of CEP reduced the official City schools measure of poor or low income students by 16 percentage points.

Why does it matter?

- **State funds are distributed, partly, on the basis of the measured proportion of low income students in each school district.**
- **Within Baltimore City public schools, the undercount of low income students under CEP affects some schools more than others, which may cause a redistribution in funding away from some of the schools with the largest proportion of low income students.**

Before joining CEP, like almost all school districts in Maryland, Baltimore City public schools measured the number of low income students as those receiving Free and Reduced Price Meals (FARM). Students were eligible for FARM through "Direct Certification"--where students are considered low income if they are in foster care or receive TANF or SNAP (food stamps)–-plus those students who do not receive these public subsidies but who indicate on a FARM application that their family income is less than 185% of the poverty line. Because under CEP the schools do not collect FARM applications, students who do not receive Direct Certification but whose incomes indicate that they are eligible for FARM are no longer included in the low income student calculation.

We identify two reasons why low income families who would have been counted under the historic FARM measure are not counted under the Direct Certification (DC) measure required by the CEP.

- **The income eligibility limits for FARM are higher than in the DC programs. For example, children are eligible for SNAP if family incomes are below 130% of the poverty line, while these same children are income eligible for FARM if family incomes are below 185% of the poverty line.**
    - **We find that about half of the low income students who are undercounted by the new CEP measure live in families with incomes between 130% and 185% of the poverty line.**
- **Eligibility requirements of SNAP and TANF exclude many legal immigrants and all undocumented immigrants, while all students (including undocumented immigrants) are eligible for FARM.**
    - **We estimate that an additional 16% of the undercount may be accounted for by immigrant families not eligible for, or reluctant to apply for, SNAP or TANF.**

Baltimore City schools are considering including Medicaid as an additional criteria in the CEP measure of low income students. We examine the consequences of doing so.

- **We find that adding Medicaid to the Direct Certification measure reduces the undercount of low income students under CEP from 16% to 7% of Baltimore City public school students.**
    - **African American students make up 3/4 of the reduction in the undercount when Medicaid is added to the DC measure.**
- **Most low income legal immigrant students (including U.S.-born students in undocumented families) are captured by the DC plus Medicaid measure.**
    - **On the other hand, adding Medicaid to the DC measure does not capture low income undocumented immigrant students, who are still undercounted.**
    - **There is evidence in the ACS that English Language Learner students, 80% of whom are low income, can be used as proxy measure for low income undocumented immigrant students.**

Some causes of the undercount of low income students under the Community Eligibility Provision in Baltimore City public schools

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I. Introduction and Motivation

Beginning in the 2015-2016 school year, Baltimore City public schools joined the U.S. Department of Agriculture Community Eligibility Provision (CEP). Under CEP, all Baltimore City public school students are eligible to receive free meals. The CEP program not only provides Baltimore City schools with federal funding to provide free meals to more students, but can also save money by reducing the costs of administering the system of subsidized meals to students.

One consequence of the switch to CEP is that the historic way that Baltimore City schools (and most other school districts in the country) measure of the number of low income students cannot be used. Before 2015-2016 Baltimore City public schools measured the number of low income student as those receiving Free and Reduced Price Meals (FARM). Students were eligible for FARM through "Direct Certification"--where students are considered low income if they are in foster care or receive TANF or SNAP (food stamps)[2]– plus those students who do not receive these public subsidies but who show that they are eligible for FARM by living in a family with an income of less than 185% of the poverty line. To qualify under the latter, families submitted application forms to schools that specified total family income. The FARM application for 2010-2011 school year is reproduced in the appendix.

The Department of Agriculture requires that "schools that adopt CEP are reimbursed using a formula based on the percentage of students categorically eligible for free meals based on their participation in other specific means-tested programs, such as the Supplemental Nutrition Assistance Program (SNAP) and Temporary Assistance for Needy Families (TANF)."[3] After joining the CEP, City schools now use only Direct Certification (DC) to measure the number of low income students, no longer supplemented by FARM applications (because FARM applications are no longer collected). Because students who do not receive these public subsidies but whose incomes indicate that they are eligible for FARM are no longer included in this calculation, the official City schools measure of poor or low income students fell substantially in 2015-2016 and after. The proportion of low income students measured using the DC measure in 2015-2016 was approximately 16 percentage points lower than the proportion of low income students measured using the historic FARM criteria.[4]

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[1] Contact author email: gindling@umbc.edu. We would like to thank researchers at the Baltimore Public Schools Office of Achievement and Accountability for helpful discussions: Theresa Jones, Christopher Wohn, Shane Hall, Heather Nolan, Ben Goldberg, Ike Diibor, Melissa Broome and Amir Francois. We are also grateful for comments from Felipe Filomeno, Sara Poggio, Tania Lizarazo and Thania Munoz of UMBC.

[2] TANF, previously called Aid for Families with Dependent Children (AFDC), may also be referred to as Temporary Cash Assistance (TCA) or simply "welfare payments." SNAP may also be referred to as the Food Supplemental Program (FSP) or food stamps.

[3] https://www.fns.usda.gov/school-meals/community-eligibility-provision

[4] https://www.marylandhealthconnection.gov/medicaid-coverage-marylanders/

Why does it matter? State funds are distributed, partly, on the basis of the proportion of low income students in each school district, and fewer low income students may result in fewer state funds for Baltimore City schools.[5] Within Baltimore City public schools, the undercount of low income students under CEP affects some schools more than others.[6] As some funding for each school depends on the proportion of low income students in that school, the change in methodology could redistribute funding away from schools with a large undercount of low income students under CEP. It is important to understand which students and schools are disadvantaged by the new DC methodology. This issue is likely to become increasingly significant as a new funding formula within City schools "will now be largely influenced by student poverty levels instead of standardized test scores."[7] Finally, other school districts are likely to face similar issues as they consider joining the CEP.

In this paper we use the American Community Surveys for 2013 to 2016 to verify that the change in the actual proportion of low income students in Baltimore City public schools did not fall after the introduction of CEP; we show that there was no significant fall in the poverty rate or the proportion of students who meet the income requirements for FARM among Baltimore city public schools students before and after the introduction of CEP in 2015-2016. We then verify that the measured fall in the reported proportion of low income students occurred because some students who would have received FARM (and so were counted in the historic measure) do not receive one of the DC public subsidies (and so are not counted in the DC measure). Next, we examine which low income students who were counted under the historic criteria are not counted under the new DC measure. To do this we first review the eligibility criteria for FARM, SNAP and TANF. Next, we examine the characteristics of students who are eligible to receive FARM but not TANF or SNAP (that is, the students who are undercounted by the new DC measure). While the Baltimore City Public Schools Achievement and Accountability Office has already examined some characteristics using administrative data, the ACS survey data allow us to look at student characteristics that are not available in the administrative data. For example, we examine the contribution of income limits for each program and the role of students living in immigrant families.

We identify two causes of the undercount of low income students under CEP. First, the income eligibility limits for FARM are higher than for the programs in the DC measure. For example, children are income eligible for SNAP if family incomes are below 130% of the poverty line, while these same children are income eligible for FARM if family incomes are below 185% of the poverty line. We find that about half of the students who are FARM eligible but do not receive SNAP or TANF live in families with incomes between 130% and 185% of the poverty line. Second, eligibility requirements of SNAP and TANF exclude many legal immigrants and all undocumented immigrants from these programs, while all students (including undocumented immigrants) are eligible for FARM. In addition, eligible students (i.e. U.S-born students) with undocumented family members may not receive SNAP or TANF because these

[5] Although the State legislature addressed this issue in House Bill 965, "The Hunger-Free Schools Act of 2015," signed by the governor May, 2015, this issue has continued to be a concern.

[6] Tali Richmond, "Free lunch program unintentionally cost some Baltimore schools thousands in federal funding," Baltimore Sun, March 7, 2018. http://www.baltimoresun.com/news/maryland/education/bs-md-ci-poverty-undercount-20180202-story.html

[7] Associated Press, "Poverty rates to influence Baltimore City school funding," January 24, 2018. https://wtop.com/baltimore/2018/01/poverty-rates-to-influence-baltimore-city-school-funding/

families may be reluctant to apply. We estimate that 16% of the low income undercount under CEP may be accounted for by children in immigrant families.

Baltimore City schools are considering including Medicaid in the Direct Certification measure. The ACS data also allow us to examine the impact of expanding the DC measure to include Medicaid. We find that adding Medicaid reduces the undercount of low income students under CEP by more than half, from 16% to 7% of Baltimore City public school students. Adding Medicaid to the DC measure reduces the undercount of low income legal immigrants to less than 0.5% of Baltimore County public school students, but does not capture undocumented immigrant students.

We also find evidence in the ACS that English Language Learner (ELL) students, 80% of whom are low income and would be eligible for FARM, can be used as a proxy measure for immigrants who are low income and FARM-eligible. Therefore, it would make sense to also include ELL students in the count of low income students. Doing so will not have a large impact on the total estimate of low income students because the Direct Certification plus Medicaid measure captures almost all low income ELL students. However, adding ELL students to the estimate of low income City school students could substantially reduce the undercount for some schools with large numbers of undocumented immigrant students.

II. Data

The data used in this paper are the Public Use Microdata Samples (IPUMS) of American Community Surveys (ACS) for 2013, 2014, 2015 and 2016. The ACS is conducted throughout the year, and surveys approximately 2.5% of the U.S. population, although the public use sample includes a subset of only about 1% of the population. While yearly data for the country as a whole are representative, this is not always true for smaller geographic areas. The ACS IPUMS user guidelines note that 1-year statistics from geographic areas with populations of less than 100,000 are not representative and not reliable. While Baltimore City, with a population greater than 600,000, is above this threshold, the Baltimore City public school student population is about 80,000, below the 100,000 threshold. To obtain larger sample sizes, representativeness and statistical significance for smaller geographic areas, the ACS publishes estimates using more than one year of data.

Because the Baltimore City public school population is below the 100,000 threshold, we do not report results using only one year estimates of ACS data. Specifically, to measure any changes among all Baltimore City school students, we compare 2-year samples (2013-2014 with 2015-2016). Not only does this give us a larger sample size and therefore smaller statistical errors, these two-year comparisons are more consistent with the school years than are calendar year-to-calendar year changes. When we look at narrower demographic groups or sub-samples of the school population (i.e. those receiving SNAP and TANF) the sample size gets smaller and confidence intervals become wider. To address this, when we look at the characteristics of smaller sub-samples of students we do not attempt to compare changes over time but instead average all four years of data (2013-2016). In addition, we calculate confidence intervals (margins of error) to take into account statistical error. Finally, where possible we verify our estimates with other published estimates and the Baltimore City schools calculations using the administrative data.

III. Trends in poverty, Free and Reduced Price Meals (FARM) and Direct Certification measures, 2013-2014 to 2014-2015

a. Poverty rates

Table 1 presents the proportion of people and school-age students who live in poor families in Baltimore City. We present these numbers to test whether a fall in student poverty might explain the fall in the measured proportion of low income students between 2013-2014 and 2015-2016. Contrary to this hypothesis, we find that poverty rates among school age children in Baltimore City increased between 2013-2014 and 2015-2016, although this change is not statistically significant.

We also present poverty rate estimates to show that our estimates are similar to other published estimates. The U. S. Census Bureau Small Area Income and Poverty Estimates (SAIPE) are the "gold standard" for one-year poverty estimates for small geographic areas. As described by the Census Bureau, "The estimates are not direct counts from enumerations or administrative records, nor direct estimates from sample surveys. Instead, for counties and states, we model income and poverty estimates by combining survey data with population estimates and administrative records. For school districts, we use the model-based county estimates and inputs from federal tax information and multi-year survey data to produce estimates of poverty."[8] Our estimates are similar to the SAIPE estimates for both overall poverty and poverty among school age children. As in our estimates, the SAIPE estimates of poverty rates for school-age children increase between 2013-2014 and 2015-2016.

Table 1: Poverty Rates for Baltimore City, 2013-2014 and 2015-2016

95% confidence intervals in italics

	2013-2014		2015-2016		Change
Poverty Rate for Children of School Age (% of Children 5-17 years old)	**35.4%**		**36.1%**		**0.7%**
	32.9% to 37.9%		*33.6% to 38.6%*		
Overall poverty rates (% of people)	**23.7%**		**22.9%**		**-0.8%**
	22.9% to 24.5%		*22.1% to 23.7%*		
SAIPE PUBLISHED ESTIMATES	**2013**	**2014**	**2015**	**2016**	
Poverty Rate for Children of School Age (% of Children 5-17 years old)	30.5%	32.2%	33.7%	31.6%	
Overall poverty rates (% of people)	22.7%	23.3%	22.7%	21.8%	

Notes: *= significantly different from zero at 10%, **=significant at 5%, ***=significant at 1%
Sources: Authors' calculations using the ACS and https://www.census.gov/programs-surveys/saipe.html

b. Measuring the proportion of students eligible for Free and Reduced Price Meals (FARM)

The ACS does not have a variable that identifies whether the students receive Free and Reduced Price Meals (FARM). Instead, we estimate the proportion of students who are "FARM-eligible." Federal guidelines state that families with income below 185% of poverty line are eligible for reduced price

[8] https://www.census.gov/programs-surveys/saipe/about.html

meals, and families with incomes below 130% of poverty line are eligible for free meals. We define a student as "FARM-eligible" if family income is 185% or less of the poverty line using the ACS variable that reports family income as a percent of the poverty line. Note that this is not the same as the historic measure of the number of students receiving FARM calculated by Baltimore City and other public school districts. In Baltimore city public schools, prior to joining CEP, a student received FARM if they qualify by Direct Certification **or** their family income reported on the FARM application was below 185% of the poverty line. However, our measure of FARM-eligibility has advantages for our study. Our measure allows us to identify FARM-eligible students even if every student receives free meals, as in Baltimore City. In addition, our measure allows us to compare FARM-eligible across school districts, even if different districts use different criteria for FARM.

Table 2 presents our measures of FARM-eligibility for Baltimore City and other school districts in Maryland. We estimate that about 61.5% of students are FARM-eligible in Baltimore city schools over the 2013-2016 period. This is highest proportion of FARM-eligible students of any Maryland public school system. While we find a fall in the proportion of FARM-eligible students between 2013-2014 and 2015-2016 in Baltimore City public schools, this fall is not statistically significant. Further, the fall in FARM-eligible students in other public school districts in Maryland is larger than the measured fall in Baltimore City schools, and the fall in other school districts is statistically significant.

Table 2: FARM-eligible Children of School Age in Public Schools, 2013-2014 and 2015-2016

	2013-2014	2015-2016	Change
Other Counties	28.2%	26.9%	-1.2%
	26.9% to 29.4%	*25.7% to 28.2%*	
Montgomery, Prince Georges, Howard, Anne Arundel	26.6%	24.7%	-1.9%***
	25.6% to 27.7%	*23.7% to 25.7%*	
Baltimore County	31.4%	28.3%	-3.1%**
	29.3% to 33.5%	*26.2% to 30.3%*	
Baltimore City	**61.9%**	**60.9%**	**-1.0%**
	59.1% to 64.7%	***58.1% to 63.8%***	
Maryland	30.9%	29.1%	-1.8%***
	30.2% to 31.7%	*28.4% to 29.9%*	

Notes: *= significantly different from zero at 10%, **=significant at 5%, ***=significant at 1%
Sources: Authors' calculations using the ACS

c. Measuring the proportion of low income students using Direct Certification (DC)

The Baltimore City public schools Direct Certification measure considers students to be low income if they receive SNAP, TANF or are in foster care. We use three variables available in the ACS to identify these students. Our identification of students in foster care is derived from a question that asks "How is this person related to the primary householder?" where one answer is "foster child." Our identification of students who receive SNAP is derived from a question that asks "IN THE PAST 12 MONTHS, did you or any member of this household receive benefits from the Food Stamp Program or SNAP? Do not include WIC, the School Lunch Program or assistance from food banks. Mark 'Yes' or 'No'." Finally, the identification of students who receive TANF subsidies is derived from a variable that reports the dollar amount of public support received by a person during the previous year, INCWELFR. If this variable is greater than zero, then we identify that person as receiving TANF. Specifically, the following are included within INCWELFR: (a) AFDC/TANF, (b) General Assistance (GA), and (c) federal/state

Supplemental Security Income (SSI) payments to elderly (age 65+), blind, or disabled persons with low incomes. (This does not include separate payments for hospital or other medical care.)

Table 3 presents our estimates of the proportion of students in Baltimore City public schools with each type of Direct Certification qualification. We estimate that 54.2% of Baltimore City public school students received SNAP in 2015-2016. Our estimate is similar to the 58.5% of Baltimore City public school students receiving SNAP in 2017-2018 that is reported in official Maryland Department of Education statistics (58.5% is within the 5% confidence interval for our estimate).[9] We estimate the total proportion of students who qualify under the DC methodology to be 55.9% in 2015-2016. This is not very different from the 58.4% of students reported to qualify under DC by the Baltimore City public schools in the 2016-2017 school year (58.9% it is within the 5% confidence interval for our estimates). The proportion of students who receive public assistance falls between 2013-2014 and 2015-2016, but the fall is not statistically significant.

Table 3: Proportion of school age children in public schools who receive public assistance, by program in Baltimore City public schools

	2013-2014	2015-2016	Change
Any	56.8%	55.8%	-1.0%
	54.0% to 59.7%	*52.9% to 58.7%*	
SNAP	55.1%	54.2%	-0.9%
	52.2% to 57.9%	*51.3% to 57.1%*	
TANF	12.1%	12.4%	0.3%
	10.2% to 14.0%	*10.5% to 14.3%*	
FOSTER	0.9%	0.6%	-0.3%
	0.4% to 1.5%	*0.2% to 1.1%*	

Notes: *= significantly different from zero at 10*, **=significant at 5%, ***=significant at 1%
Sources: Authors' calculations using the ACS

Table 4 presents our estimates of what the change between 2013-2014 and 2015-2016 in the proportion of students qualified by Direct Certification would have been in several Maryland school districts. This table shows that the fall in Directly Certified students was much larger (and statistically significant) in Prince Georges and Baltimore Counties than in Baltimore City, once again indicating that the proportion of low income students falls by much more in those school districts compared to Baltimore City. The Maryland Department of Education presents estimates of the Direct Certification measures for Maryland School districts for the 2016-2017 school year. These estimates are 15.4% for Montgomery County, 23.6 for Prince Georges County, 24.8% for Baltimore County, and 58.4 for Baltimore City.[10] In

[9] We compare our estimates to the official 2016-2017 school year SNAP and DC estimates because this is the first full school year after the introduction of CEP. We do not compare to the official 2015-2016 school year SNAP and DC estimates because that was a transition year where City schools were experimenting with different ways to implement the CEP measure and therefore the official numbers are not directly comparable to our estimates. http://www.marylandpublicschools.org/programs/Pages/School-Community-Nutrition/FreeReducedPriceMealStatistics.aspx

[10] http://www.marylandpublicschools.org/programs/Pages/School-Community-Nutrition/FreeReducedPriceMealStatistics.aspx

most cases, the official measures for 2016-2017 are within the 5% confidence intervals of our estimate for 2013-2014 and 2015-2016.

Table 4: "Direct Certification" estimates for Baltimore City and neighboring school districts
Proportion of school age children in public schools who receive SNAP, TANF or foster care

	2013-2014	2015-2016	Change
Other Counties	18.5%	18.2%	-0.4%
	17.6% to 19.5%	*17.3% to 19.1%*	
Montgomery	15.1%	16.5%	1.4%
	13.8% to 16.5%	*15.2% to 17.9%*	
Prince Georges	26.9%	22.5%	-4.5%***
	25.1% to 28.8%	*20.7% to 24.3%*	
Baltimore County	24.9%	18.6%	-6.4%***
	34.4% to 38.8%	*32.8% to 37.1%*	
Baltimore City	56.8%	55.8%	-1.0%
	54.0% to 59.7%	*52.9% to 58.7%*	
Maryland	23.5%	22.0%	-1.4%***
	22.8% to 24.1%	*21.3%3 to 22.7%*	

Notes: *= significantly different from zero at 10*, **=significant at 5%, ***=significant at 1%
Sources: Authors' calculations using the ACS

Table 5 presents our estimates of the 2015-2016 proportion of students in the Baltimore City public school system who would be considered low income by the Direct Certification method and the contribution of each public program (SNAP, TANF and foster care). SNAP alone accounts for over 95% of students who qualify under the DC methodology. Adding TANF increases the proportion of students who qualify for DC by 1.1%--from 54.2% to 55.2%-- and adding students in foster care adds another 0.6%. The final (fourth row) of Table 4 presents our estimate of what the proportion of students receiving free-lunch would have been under the historic measure--71.8%.

Table 5: Marginal effect of each program on the measure of low-income students

	2015-2016	Marginal increase
SNAP	54.2%	
	51.2% to 57.1%	
SNAP + TANF	55.2%	1.1%
	52.3% to 58.1%	
SNAP + TANF + FOSTER	55.8%	0.6%
	52.9% to 58.7%	
SNAP + TANF + FOSTER + FARM eligible	71.8%	16.0%
	69.2% to 74.5%	

Notes: *= significantly different from zero at 10*, **=significant at 5%, ***=significant at 1%
Source: Authors' calculations using the ACS, 2015 and 2016.

d. The undercount of low income students in Baltimore City public schools

Our estimate of the low income undercount in Baltimore city schools due to the change in methodology will be measured by the number of students who are FARM-eligible but are not identified as low income using the Direct Certification measure. Row 4 of table 5 presents our estimate of the proportion of students who would be considered low income by the school district's historic measure. The difference between rows 3 and 4 is our estimate of the undercount of low income students under CEP—it is proportion of Baltimore City public school students who would be counted as low income under the historic measure but not under the newer Direct Certification measure. Our estimate is that in 2015-2016 the new DC measure undercounts low income students by 16% of all public school students, which is the same percentage estimated by the Office of Accountability and Achievement using administrative data.[11]

Table 6 presents measures of what the 2015-2016 low income undercount under CEP would be in other Maryland school districts if they used the same Direct Certification measure as Baltimore City public schools. The undercount, as a percent of the total number of students in the school district, is presented in the last column of Table 6. If Prince Georges and Baltimore counties switched to CEP and DC measures of low-income students, the undercount of low income students would be 18.7 and 16.5 percent of students in each district; this is greater than the 16% undercount in Baltimore City. Switching from the traditional measure to the DC measure would cause a large low income student undercount in all Maryland school districts. This may discourage other school districts from joining CEP and providing free lunch to all students.

[11] http://www.baltimorecityschools.org/Page/24385

Table 6: Marginal effect of each program on the measure of low-income students, estimates for Baltimore City and neighboring school districts		
Proportion of school age children in public schools who receive SNAP, TANF or foster care		
	2015-2016	**Low-income undercount under CEP**
Other Counties: SNAP + TANF + foster care	**18.2%**	
	to	
	17.3% 19.1%	
SNAP + TANF + foster care + FARM-eligible	**28.5%**	**10.3%**
	to	
	27.4% 29.6%	
Montgomery: SNAP + TANF + foster care	**16.5%**	
	to	
	15.2% 17.9%	
SNAP + TANF + foster care + FARM-eligible	**29.6%**	**13.1%**
	to	
	27.9% 31.3%	
Prince Georges: SNAP + TANF + foster care	**22.5%**	
	to	
	20.7% 24.3%	
SNAP + TANF + foster care + FARM-eligible	**22.5%**	**18.7%**
	to	
	20.7% 24.3%	
Baltimore County: SNAP + TANF + foster care	**18.6%**	
	to	
	32.8% 37.1%	
SNAP + TANF + foster care + FARM-eligible	**35.1%**	**16.5%**
	to	
	32.9% 37.3%	
Baltimore City: SNAP + TANF + foster care	**55.8%**	
	to	
	52.9% 58.7%	
SNAP + TANF + foster care + FARM-eligible	**71.8%**	**16.0%**
	to	
	69.2% 74.5%	
Maryland State: SNAP + TANF + foster care	**22.0%**	
	3 to	
	21.3% 22.7%	
SNAP + TANF + foster care + FARM-eligible	**35.3%**	**13.3%**
	34.6% 36.1%	

Source: Authors' calculations using the ACS, 2015 and 2016.

Figure 1 presents four year averages of the proportion of Baltimore City public school students who are FARM-eligible but do not receive SNAP, TANF or foster care (averaging the 2013 through 2016 data). This is a measure of the average 2013-2016 low income undercount under CEP, and suggests that 16.8% of students who would be counted as low income by the historic measure are not counted as low income by the Direct Certification measure. As noted before, most of those are undercounted because they qualify for SNAP but are not FARM-eligible.

Figure 1: Cross-tabulations of FARM and Direct Certification measures, 2013-2016

	Direct Certification (foster, TANF or SNAP)	
FARM	No	Yes
Not Eligible	26.8%	11.7%
Eligible	16.8%	44.6%

	SNAP	
FARM	**No**	**Yes**
Not Eligible	27.4%	11.2%
Eligible	18.0%	43.4%

	TANF	
FARM	**No**	**Yes**
Not Eligible	36.9%	1.7%
Eligible	50.8%	10.6%

Source: Authors' calculations using the ACS, 2013, 2014, 2015 and 2016.

IV. Which low income students are likely to be undercounted in the DC measure under CEP?

As shown, the students who are undercounted using the DC measure are those who are FARM-eligible but do not receive SNAP, TANF or foster care. In this section we ask: Who are the student who are FARM-eligible but do not receive SNAP, TANF or foster care? To answer this question, we first review the eligibility criteria for SNAP and TANF and compare these to the criteria for FARM-eligility. Then, using four year averages from the ACS data (2013-2016), we examine the characteristics of students who are FARM-eligible but do not receive SNAP, TANF or foster care.

a. Eligibility criteria for SNAP, TANF and FARM-eligible

Our identification of FARM-eligibility is derived from the Federal Guidelines for Free and Reduced Price meals, which is based on family income. A household is eligible for free meals if family income is below 130% of the poverty line, and eligible for reduced price meals if family income is below 185% of the poverty line. All students, including undocumented immigrants, who meet income requirements are eligible for Free and Reduced Price lunches.

Students are eligible for SNAP if their family gross income is less than 130% of the poverty line. In addition, there are several other eligibility requirements for SNAP. To be eligible, applicants must be citizens or non-citizens who are lawfully-admitted permanent residents, refugees, conditional entrants, battered non-citizens, parolees, deportation withhold status, and immigrants from some specific

countries or ethnic groups. Undocumented immigrants and immigrants on student visas are not eligible, nor are convicted felons. To obtain SNAP, the caregiver must provide a Social Security number. In addition, for adults there is a work requirement. Students' families must re-apply for SNAP each year, and otherwise eligible students might not receive SNAP if the correct forms are not filled out correctly or on time.

Further, under certain conditions some people may also be eligible even if they do not meet the income requirement. For example, if they are elderly, disabled, pregnant, under the age of 18, or military. Thus, as we saw in Figure 1, there will be Baltimore City students who receive SNAP but are not eligible for FARM (that is, they receive SNAP even though they have family incomes higher than 185% of the poverty line).[12]

To be eligible for TANF a student must live in a family with a very low income. The formula to determine the income limit for TANF is complicated, but the income limit is always less than the 130% of the poverty line used for SNAP; in 2015 the income limit in Maryland was $795 per month. To be eligible for TANF, households must have a child under 19 years of age (or a pregnant mother). To be eligible for TANF, a student must be a citizen or non-citizen who is lawfully-admitted permanent residents, refugees, conditional entrants, battered non-citizens, parolees, deportation withhold status, and immigrants from some specific countries or ethnic groups. Other immigrants (including undocumented) are not eligible unless benefits are paid for with state funds. As with SNAP, a student's caretaker must provide Social Security number. There is a work requirement, and a 5-year limit on TANF benefits.[13] As shown in Figure 1, we estimate that only a very small percent of Baltimore City public school students with incomes above 185% of the poverty line (FARM-eligible) receive TANF.

This review of eligibility requirements suggests two clear reasons why a student may be FARM-eligible but not receive SNAP or TANF. First, the programs have different income requirements. For example, a student is FARM-eligible if family income is below 185% of the poverty line, while SNAP has an income limit of 130% of the poverty line. Because TANF income eligibility limits are well below those of SNAP, if a student is "income-eligible" for SNAP (s)he is also "income-eligible" for TANF. Therefore, to examine the impact of different income limits for different programs we will focus on comparing SNAP and FARM-eligibility.

The second reason a student may be FARM-eligible but not receive SNAP or TANF is immigration status. Specifically, undocumented immigrants are eligible for FARM but not for SNAP or TANF. In addition, even some legal immigrants are also not eligible for SNAP or TANF. Further, if a parent or other family members are undocumented, then even if the student is eligible for SNAP they may be reluctant to apply for fear of legal action or deportation of relatives. This fear could be made worse by the requirement that the caretaker needs to provide a Social Security number. Therefore, not only undocumented immigrant students, but also immigrant families with undocumented members may be reluctant to apply for public benefits even for children born in the U.S.

[12] http://www.dsd.state.md.us/comar/comarhtml/07/07.03.17.09.htm
[13] http://www.dsd.state.md.us/comar/SubtitleSearch.aspx?search=07.03.03.*

b. How many students are eligible for FARM but not for SNAP because of the different income eligibility requirements?

To estimate the number of students who are FARM-eligible but not eligible for SNAP we exploit the fact that families with incomes between 130% and 185% of poverty line are eligible for FARM but may not be eligible for SNAP. We find almost half of students (44%) who are part of the low income undercount under CEP have family incomes that fall between 130% and 185% of the poverty line. This represents 7.4% of all Baltimore City public school students (this is 44% of 16.8%). On the other hand, only 15.8% of students who are FARM-eligible but do receive SNAP or TANF have family incomes that fall within 130% to 185% of the poverty line. That is, FARM-eligible students who live in families within this income gap are three times less likely to receive SNAP than are students in families with incomes below 130% of the poverty line. This suggests that the lower income eligibility requirements for SNAP compared to FARM can account for almost half of the students who are FARM-eligible but do not receive SNAP. If these students were counted, the low income undercount under CEP would fall from 16.8% to 8.4% of all Baltimore City public school students. However, there is no easy way for the Baltimore City schools to count these students because without FARM applications the school district does not collect information on family incomes of students.

c. Distribution by immigrant status

To examine the impact of personal and family characteristics on the low-income student undercount, we present the distribution of characteristics among students for four samples: all students; all FARM-eligible students; FARM-eligible students who receive SNAP, TANF or foster care; and FARM-eligible students who do not receive SNAP, TANF or foster care. The last sample is composed of those low income students who are undercounted using the DC measure compared to the historic measure.

As noted previously many low income legal immigrants, and all undocumented immigrants, are not eligible for SNAP or TANF. To examine the role of immigrant students and families in the low income undercount under CEP, Table 7 presents the proportion of immigrant students in each of the samples described in the last paragraph. We estimate that 2.9% of students in Baltimore City public schools were born abroad. Foreign born students are NOT more likely to be low income FARM-eligible (column 2) compared to all Baltimore City school students (column 1). However, foreign born students ARE more likely to be undercounted as low income students under CEP (this is reported in column 4) relative to other low income students (compare column 3 with column 4). Specifically, FARM-eligible immigrant students are more than twice as likely to receive none of the DC public subsidies as they are to receive public assistance. Thus, immigrant status is a partial reason why some schools are disproportionately negatively affected by the low income undercount. Still, immigrant students are only 3.9% of students who are FARM-eligible but do not receive public assistance, while students born in the U.S. account for 96% of the low income students who are undercounted under CEP. Therefore, the immigration status of students explains a small amount of the total low income undercount in Baltimore City schools. On the other hand, the immigrant status of students will cause a much greater undercount of low income students in specific schools with a high proportion of immigrant students, possibly causing these schools to lose some funding despite actually having a high proportion of low income students.

Table 7: Percent of students in each sample (column) by place of birth				
	All students	**FARM-eligible**	**FARM-eligible and SNAP, TANF or foster care**	**FARM-eligible but no SNAP, TANF or foster care**
% of All students	100%	61.4%	44.6%	16.8%
Born in US	97.1%	97.7%	98.3%	96.1%
Foreign Born	2.9%	2.3%	1.7%	3.9%
TOTAL	100%	100%	100%	100%

Source: Authors' calculations using the ACS, 2013, 2014, 2015 and 2016.

But looking at the immigrant status of students may not be the appropriate characteristic. Not only may immigrant students not quality for SANP or TANF, but U.S.-born students with undocumented immigrant family members may also be reluctant to claim public assistance. Table 8 presents the distribution of students in families with immigrant parents in the four samples. Children living in immigrant families are LESS likely to be low income FARM-eligible, compared to their proportion in the total Baltimore City school student population. On the other hand, children in low income immigrant families are MORE likely to be undercounted under CEP (compared to their percentage in the population). More than 16% of FARM-eligible students with no SNAP or TANF have foreign-born parents. Most of these students are U.S.-born children of immigrant parents. FARM-eligible students in immigrant families are more than three times as likely to receive no public assistance compared to those who do receive SNAP or TANF. Thus, the immigrant status of parents is also an important cause of the low income student undercount under CEP, although immigrant families account for a smaller proportion of undercount than the different income eligibility requirements between FARM and SNAP.

One factor that may lead us to underestimate the contribution of immigrants to the low income undercount under CEP is that immigrants may be underrepresented in the ACS data that we use. Because they may be worried about attracting attention, immigrant families (even those with U.S.-born children) may not complete and return the ACS questionnaires, especially if a family member is undocumented. Although responding to the survey is required by law, in practice there are no consequences for not responding (there have been no prosecutions since 1970). The Pew Research Center estimates that immigrants are underrepresented in the 2014 ACS by 2% to 3%,[14] which would

[14] Jeffrey Passel and D-Vera Cohn (2016), "Overall number of U.S. unauthorized immigrants holds steady since 2009," Pew Research Center, http://www.pewhispanic.org/2017/02/13/estimates-of-unauthorized-immigrant-population-by-metro-area-2014/

double our estimates for Baltimore City students who are foreign-born to 5% to 6% of all students. If the proportion of students in immigrant families is actually double our estimate (as suggested in the previous sentence), then children living in these immigrant families may account for more than 16%--possibly as high as 32%--of the total low income undercount.

Table 8: Percent of students in each column by place of birth of household head

	All students	FARM-eligible	FARM-eligible and SNAP, TANF or foster care	FARM-eligible but SNAP, TANF or foster care
Parent Born in US	90.2%	91.6%	94.6%	83.9%
Foreign Born parent	9.8%	8.4%	5.4%	16.1%
US born student	7.3%	6.2%	3.8%	12.2%
Foreign Born student	2.6%	2.2%	1.6%	3.9%
TOTAL	100%	100%	100%	100%

Source: Authors' calculations using the ACS, 2013, 2014, 2015 and 2016.

As noted, we estimate that children in immigrant families represent 16% of the low income student undercount (those who are FARM-eligible by do not receive SNAP, TANF or foster care). Of these students in immigrant families, 35% live in families with incomes between 130% and 185% of the poverty line. That is, even if these students did not live in immigrant families, they would be FARM-eligible but still may not receive SNAP or TANF. This suggests that immigrant families may account for a smaller percentage of the low income undercount than the 16% estimate.

To what extent are immigrant families part of the low income undercount because they are legal immigrants who do not qualify for SNAP or TANF, and to what extent because they are undocumented? U.S.-born students with a family member who is undocumented may be reluctant to apply for SNAP or TANF, even if the student meets the eligibility criteria. The ACS does not ask about documented or undocumented status, but we attempt to identify undocumented immigrant parents based on the technique developed in Borjas (2017).[15] Because many of the Borjas criteria are work characteristics, it is applicable only to adults—in this case the parents. The Borjas method identifies legal immigrants using characteristics available in the ACS and then classifies as undocumented any immigrant who is not classified as having legal status. Borjas identifies an immigrant with legal status as one who: a. arrived before 1980; b. is a citizen; c. receives Social Security benefits, SSI, Medicaid, Medicare, or Military Insurance; d. is a veteran, or is currently in the Armed Forces; e. works in the government sector; f. was born in Cuba (as practically all Cuban immigrants were granted refugee status before 2017); g. that

[15] George J. Borjas (2017) "The labor supply of undocumented immigrants," *Labour Economics*, Vol 46, pages 1-13.

person's occupation requires some form of licensing (such as physicians, registered nurses, air traffic controllers, and lawyers); h. spouse is a legal immigrant or a person born in the U.S.. All immigrants who are not classified as legal are classified as undocumented.[16] We classify a student as living in an undocumented family if the household head is classified as undocumented (independent of where the student was born).

Table 9: Percent of students in each column by immigration status of household head

	All students	FARM-eligible	FARM-eligible and SNAP, TANF or foster care	FARM-eligible but no SNAP, TANF or foster care
Parent Born in US	90.1%	91.6%	94.6%	83.9%
Parent legal immigrant	6.4%	5.0%	2.7%	11.1%
Parent undocumented immigrant	3.4%	3.3%	2.7%	4.9%
US born student	2.4%	2.2%	1.9%	3.0%
Foreign Born student	1.0%	1.1%	0.8%	1.9%

Source: Authors' calculations using the ACS, 2013, 2014, 2015 and 2016.

By our estimates, children living in undocumented immigrant families make up 3.4% of all Baltimore City public school students. This implies that 36% of immigrant families of Baltimore City public school students have an undocumented household head. More than two-thirds of these students were born in the U.S. Children living in undocumented immigrant families account for 4.9% of the low income student undercount under CEP (column 4 of Table 9), compared to 11.1% of the low income undercount due to legal immigrant families whose children do not receive SNAP or TANF. Further, most of the students in undocumented families who are FARM-eligible but do not receive SNAP or TANF are U.S.-born. In summary, undocumented immigrant families account for a relatively small fraction of the low income undercount under CEP; legal immigrants account for substantially more of the low income undercount under CEP than do the children in undocumented immigrant families.

Still, undocumented immigrants are likely be underestimated in the ACS, even compared to other immigrants. In addition, recent immigrants in the ACS over-report that they are naturalized citizens, which will also lead to an under identification of undocumented immigrants. The Pew Research Center estimates that these factors lead to an under representation of undocumented immigrants in the ACS by

[16] Unlike Borjas (2017), we cannot identify whether a person resides in public housing or receives rental subsidies, or that person is a spouse of someone who resides in public housing or receives rental subsidies another indication of legal status.

5% to 7%.[17] If we are also underestimating the number of undocumented immigrants by 5 to 7%, this suggests that students living in undocumented immigrant families may account for up to 12% of the students who are FARM-eligible but receive no public assistance (that is, the undercounted). While this is significant, and could affect schools with a large proportion of students living in undocumented immigrant families, students living in undocumented immigrant families still account for a much smaller proportion of the total undercount than children living in legal immigrant families and children living in families with incomes between 130% and 185% of the poverty line.

d. Distribution by race

Table 10 presents the distribution of students by race for each of our four samples. African Americans make up a large majority of the low income students undercounted under CEP. We estimate that 75% of students who are FARM-eligible but do not receive TANF, SNAP or foster care are African American, 13.7% are white and 9.5% are Hispanic.

FARM-eligible Hispanic students are more than twice as likely to not receive TANF, SNAP or foster care as they are to receive these types of public assistance. [18] Therefore, in individual schools with high Hispanic student populations, the low-income undercount under CEP will be larger. As most recent immigrants to Baltimore City are Hispanic, this is consistent with our results regarding immigrants. Also, recall that the estimates in Table 10 are 4-year averages from 2013-2016. Over this time period the Baltimore City Public schools report the percent of Hispanic students increasing from 5.4% in 2013 to 9.4% in 2016-2017. Thus, the estimates in Table 10 underestimate the current proportion of Hispanic students in Baltimore City schools, and the Hispanic student population is likely to continue growing in the future. However, even taking the growth in the Hispanic population into account, the vast majority of low income FARM-eligible students who are undercounted under CEP will still be African American. This is because African Americans make up a much larger proportion of total students in Baltimore City public schools. Therefore even though individual African Americans are less likely to be undercounted than other races, there are still by far the largest part of those low income students who are undercounted.

[17] Jeffrey Passel and D-Vera Cohn (2016), "Overall number of U.S. unauthorized immigrants holds steady since 2009," Pew Research Center, http://www.pewhispanic.org/2016/09/20/overall-number-of-u-s-unauthorized-immigrants-holds-steady-since-2009/. The American Immigration Council estimates that 7% of U.S. citizens in Maryland live with an undocumented parent. (Fact Sheet: Immigrants in Maryland, https://www.americanimmigrationcouncil.org/research/immigrants-in-maryland). Our estimate, using the technique described in this paper, is that 5% of public school children in Maryland are U.S.-born children living with an undocumented household head.

[18] FARM-eligible white students are also twice as twice as likely to receive no public assistance as they are to receive SNAP or TANF.

Table 10: Percent of each sample (column) in each racial group, Baltimore City Public Schools				
	All students	FARM-eligible	FARM-eligible and SNAP, TANF or foster care	FARM-eligible but no SNAP, TANF or foster care
Hispanic	6.1%	5.6%	4.2%	9.5%
African American	79.2%	85.0%	88.8%	74.9%
Asian	1.6%	0.9%	0.7%	1.4%
White	12.3%	7.6%	5.4%	13.7%
Other	0.7%	0.8%	1.0%	0.5%
TOTAL	100%	100%	100%	100%

Source: Authors' calculations using the ACS, 2013, 2014, 2015 and 2016.

V. Including Medicaid in the Direct Certification methodology to identify low income students.

Baltimore City schools are considering including Medicaid in the Direct Certification measure. In this section we explore the impacts of adding Medicaid to the DC measure. We identify students who receive Medicaid using the ASC question "Is this person CURRENTLY covered by any of the following types of health insurance of health coverage plans?." One possible answer is "d) Medicaid, Medical Assistance, or any kind of government-assistance plan for those with low incomes of disability."

Income eligibility for Medicaid is complex, and income limits that may be as high as 210% of poverty line. Eligible for Medicaid are citizens plus non-citizens who are lawfully-admitted permanent residents, refugees, conditional entrants, battered non-citizens, parolees, deportation withhold status, and immigrants from some specific countries or ethnic groups. Other immigrants (including undocumented) are not eligible. Legal immigrants are not eligible for Medicaid until five years after receiving qualified immigrant status, except for pregnant women and children under 21 who are "lawfully present." Someone may also be eligible even if they do not meet the income requirement if they are elderly, disabled, pregnant, are under the age of 18, or military (under certain conditions). This review suggests that there are several reasons why families may not receive Medicaid even if they are low income FARM-eligible and why families may receive Medicaid even if they are not eligible for FARM. [19]

Table 11 adds Medicaid to the Direct Certification measures from Table 5. As we can see comparing row 3 with row 4, adding Medicaid to the DC measure increased the proportion of students who are identified as low income by about 16 percentage points. The DC plus Medicaid measure estimates that

[19] https://www.marylandhealthconnection.gov/medicaid-coverage-marylanders/

the proportion of low income students in City schools is 72.1%. This is almost identical to our estimate of the historic low income measure (DC plus FARM-eligible) when the DC measure does not include Medicaid (71.8%). However, students who are counted as low income under the historic criteria are not necessarily the same students who are counted as low income under the DC plus Medicaid measure. Figure 2 compares a cross tabulation of FARM-eligible with those who qualify as low income under the DC measure (on the left) and under the DC plus Medicaid measure. Figure 2 shows that the proportion of student who are FARM-eligible but are not counted under either DC measure fell from 16.8% to 7.4%. That is, adding Medicaid to the DC measure reduced the low-income undercount by 9.2% of the total Baltimore City public schools student population. However, once Medicaid is added to the DC measure, it is also true that proportion of students who are not FARM-eligible but qualify as low income under the DC plus Medicaid measure increased by 7.4%--these are students who would not be counted as low income by the historic measure of low income students but are now counted as low income by the DC plus Medicaid measure.[20]

Table 11: Marginal effect of each program on the measure of low-income students

	2015-2016	Marginal increase
SNAP	**54.2%**	
	51.2% to 57.1%	
SNAP + TANF	55.2%	**1.1%**
	52.3% to 58.1%	
SNAP + TANF + FOSTER	**55.8%**	**0.6%**
	52.9% to 58.7%	
SNAP + TANF + FOSTER + MEDICAID	**72.1%**	**16.3%**
	69.5% to 75.4%	
SNAP + TANF + FOSTER + MEDICAID+ FARM-eligible	**79.1%**	**7.0%**
	76.7% to 81.5%	

Source: Authors' calculations using the ACS, 2015 and 2016.

[20] If we also add FARM-eligible students to the DC plus Medicaid measure, the total number of low income students in Baltimore City schools would be 79% (Table 11). This is slightly smaller than the estimate by the Baltimore City public schools for 2014-2015, which was 84%. http://www.baltimorecityschools.org/Page/24385

Figure 2: Cross-tabulations of FARM and Direct Certification plus Medicaid measures, 2013-2016

	Direct Certification (foster, TANF or SNAP)				Direct Certification (foster, TANF, SNAP or Medicaid)	
FARM	No	Yes		**FARM**	**No**	**Yes**
Not Eligible	26.8%	11.7%		**Not Eligible**	20.2	18.4%
Eligible	16.8%	44.6%		**Eligible**	7.4%	54.1%

Source: Authors' calculations using the ACS, 2013, 2014, 2015 and 2016.

After adding Medicaid to the DC measure, 7.4% of Baltimore City public school students who would be counted under the historic measure of low income students are still not counted. That is, 7.4% of students who would be FARM-eligible do not receive either SNAP, TANF, foster care or Medicaid. Although the size of the undercount is smaller when Medicaid is added to the DC measure, the characteristics of the students who are undercounted are similar whether Medicaid is included or not. For example, we find more than half of students (53%) who are FARM-eligible but do not receive SNAP, TANF, foster care or Medicaid have family incomes between 130% and 185% of the poverty line. This represents 3.9% of all City school students. This again suggests that differences in income eligibility requirements for FARM and SNAP are the biggest identifiable reason why students who are FARM-eligible do not receive other types of public assistance. If these students could be counted, the low income undercount under the DC plus Medicaid measure would fall from 7.4 to 3.5% of all Baltimore City school students. Unfortunately, there is no easy way for Baltimore City schools to identify these students.

Adding Medicaid to the DC measure has the largest impact on African Americans compared to other racial groups (Table 12). While the vast majority (77%) of low income students undercounted are still African America, the number of African American students undercounted fell by more than half when Medicaid was added to the DC measure; undercounted low income African American students fell from 12.7% of all Baltimore City school students under the DC measure to 5.7% of all City school students under the DC plus Medicaid measure. Under the DC plus Medicaid measure, Hispanic and White students each represent about 10% of the undercount, although both groups each represent less than 1% of total Baltimore City schools students. For both groups adding Medicaid to the DC measure reduced the low income undercount by more than half.

Table 12: Percent of each sample (column) in each racial group, Including Medicaid in the DC measure				
	All students	FARM-eligible	FARM-eligible and public assistance	FARM-eligible but no public assistance
Hispanic	6.1%	5.6%	4.8%	11.2%
African American	79.2%	85.0%	86.1%	77.0%
Asian	1.6%	0.9%	0.8%	1.8%
White	12.3%	7.6%	7.3%	10.0%
Other	0.7%	0.8%	0.9%	0%

Adding Medicaid to the Direct Certification method reduces the proportion of FARM-eligible students in immigrant families who are undercounted under CEP to 9.8% (Table 13, column 4). The number of students from immigrant families who were part of the low income undercount fell from 2.7% of all Baltimore City schools students under the DC measure to 0.7% under the DC plus Medicaid measure. Thus, adding Medicaid to the DC measure shifted most of the students from immigrant families into the measured low-income category. In summary, after adding Medicaid to the DC measure immigrant families who do not receive SNAP, TANF or Medicaid account for a small fraction of the total low income undercount of students under the CEP.

Table 13: Percent of students in each column by place of birth of household head, including Medicaid in the DC measure				
	All students	**FARM-eligible**	**FARM-eligible and SNAP, TANF, foster care or Medicaid**	**FARM-eligible but no SNAP, TANF, foster care or Medicaid**
% of All students	100%	61.5%	54.1%	7.4%
Parent Born in US	90.2%	91.6%	91.8%	90.2%
Foreign Born parent	9.8%	8.4%	8.2%	9.8%
US born student	7.3%	6.2%	6.3%	5.2%
Foreign Born student	2.6%	2.2%	1.9%	4.6%
TOTAL	100%	100%	100%	100%

Source: Authors' calculations using the ACS, 2013, 2014, 2015 and 2016.

Table 14 presents the proportion of Baltimore City legal and undocumented immigrant students who are undercounted by the DC plus Medicaid (column 4). Adding Medicaid to the DC measure reduces the low income undercount of legal immigrants (including US born students in undocumented families) from

2.4% to 0.5% of all Baltimore City students. That is, adding Medicaid to the DC measure takes almost all legal immigrants out of the low income undercount. On the other hand, the proportion of the undercount that is accounted for by foreign born students in undocumented families increased from 1.9% to 2.7% (although the number of students in this category did not change significantly, remaining at about 0.2% of all Baltimore city public school students). That is, while adding Medicaid to the DC measure captures almost all low income legal immigrants, it still does not capture low income immigrant students in undocumented families.

Even though foreign born children from undocumented immigrant families account for a small fraction of the total low income undercount of students under the CEP, it is also true that these undocumented immigrant students are more than 3 times as likely to receive no public assistance as they are to receive SNAP, TANF or Medicaid. Once again, this suggests that schools with a large proportion of children in undocumented immigrant families are likely to experience a disproportionate number of undercounted low income students. As an example, in Lakeland Elementary and Middle school, with 32% English Language Learner students and a large immigrant student population, the low income undercount is 40% of students even when Medicaid is included in the DC measure.[21]

Table 14: Percent of students in each column by immigration status of household head, including Medicaid in the DC measure

	All students	FARM-eligible	FARM-eligible and public assistance	FARM-eligible but no public assistance
Parent Born in US	90.1%	91.6%	91.8%	90.2%
Parent Legal immigrant	6.4%	5.0%	4.8%	6.8%
Parent Undocumented immigrant	3.4%	3.3%	3.4%	3.0%
US born student	2.4%	2.2%	2.4%	0.3%
Foreign Born student	1.0%	1.1%	0.9%	2.7%

Source: Authors' calculations using the ACS, 2013, 2014, 2015 and 2016.

To reduce the large undercounts in schools with a large undocumented immigrant student population, it would be useful to have an indicator that could identify immigrant students in undocumented families. The Baltimore City public school system is considering adding students who are English Language Learners to the DC measure of low income students. According to administrative data from Baltimore City schools, over the years for which we have data about 4% of Baltimore City public schools students were classified as English Language Learners (ELL).[22] Is there evidence from the ACS that ELL students

[21] This is the change in the measured proportion of low income students between 2014-2015 under the historic measure and the 2015-2016 CEP plus Medicaid measure. See http://www.baltimorecityschools.org/Page/24385

[22] Angélica Montoya Ávila (2017), "Trends in Maryland Public Schools: English Language Learner Enrollment" Maryland Equity Project. https://education.umd.edu/research/centers/mep/research/k-12-education/trends-maryland-public-schools-english-language-learner

are likely to be low income, and are they likely to make up a large proportion of students who are part of the low income undercount under CEP? To explore this possibility we use an ACS variable that identifies English-language proficiency. The ACS first asks each person if they speak only English at home. People who speak another language at home are asked: "How well does this person speak English." The possible categories of this variable are: speaks only English at home; speaks English very well; speaks English well; speaks English not at all or not well." We assume that those who answer "not at all or not well" are likely to be ELL students.

Table 15 presents the percent of students by English language proficiency for: all students, FARM-eligible and SNAP. TANF, foster care or Medicaid, and FARM-eligible but NOT SNAP, TANF, foster care of Medicaid. One conclusion from this table is that ELL students (those who do not speak English well) are more likely to be low income than non-ELL students; 81% of students who do not speak English well are FARM-eligible, while in the student population as a whole only 61% are FARM-eligible. On the other hand, this table also shows that only a small proportion of students in the ACS who are likely to be ELL students are FARM-eligible but do not receive SNAP, TANF, foster care or Medicaid (our measure of the low income undercount). Even for the group with the least English proficiency only 20% are FARM-eligible but do not receive SNAP, TANF, foster care or Medicaid (while 62% are FARM-eligible and do receive one of these forms of public assistance). However, the undercount among ELL students is likely to be underestimated in the ACS because the ACS underestimates the number of undocumented immigrant students, who are likely to be both ELL students and low income students.

In summary, we find evidence in the ACS that English Language Learner (ELL) students can be used as a proxy measure for immigrants who are low income and FARM-eligible. Therefore, it makes sense to include ELL students in the count of low income students. However, doing so will not have a large impact on the total estimate of low income students because in the ACS data most FARM-eligible students likely to be ELL students also receive SNAP, TANF, Medicaid or foster care.

Table 15: Percent of each column by English proficiency and the low income student undercount: including Medicaid in the DC measure				
	Speaks another language than English			Speaks only English
	Does not speak English well	Speaks English well	Speaks English very well	
Non-FARM eligible	19.1%	43.2%	68.1%	36.6%
FARM eligible and SNAP, TANF, foster or Medicaid	61.8%	42.5%	25.7%	56.1%
FARM eligible and NOT SNAP, TANF, foster or Medicaid	19.0%	14.3%	6.2%	7.3%
TOTAL	100%	100%	100%	100%

Source: Authors' calculations using the ACS, 2013, 2014, 2015 and 2016.

VI. Conclusions

Why did the proportion of measured low income students in Baltimore City public schools fall by approximately 16 percentage points after the change in measurement technique in the 2015-2016 school year? Our evidence suggests that it was not due to a fall in the number of poor or low income students in Baltimore City. Rather, our evidence suggests that different income eligibility requirements for FARM and SNAP can account for about half of the undercount. Unfortunately, there is no way for Baltimore City public schools to easily account for this as the school system no longer collects information on family incomes.

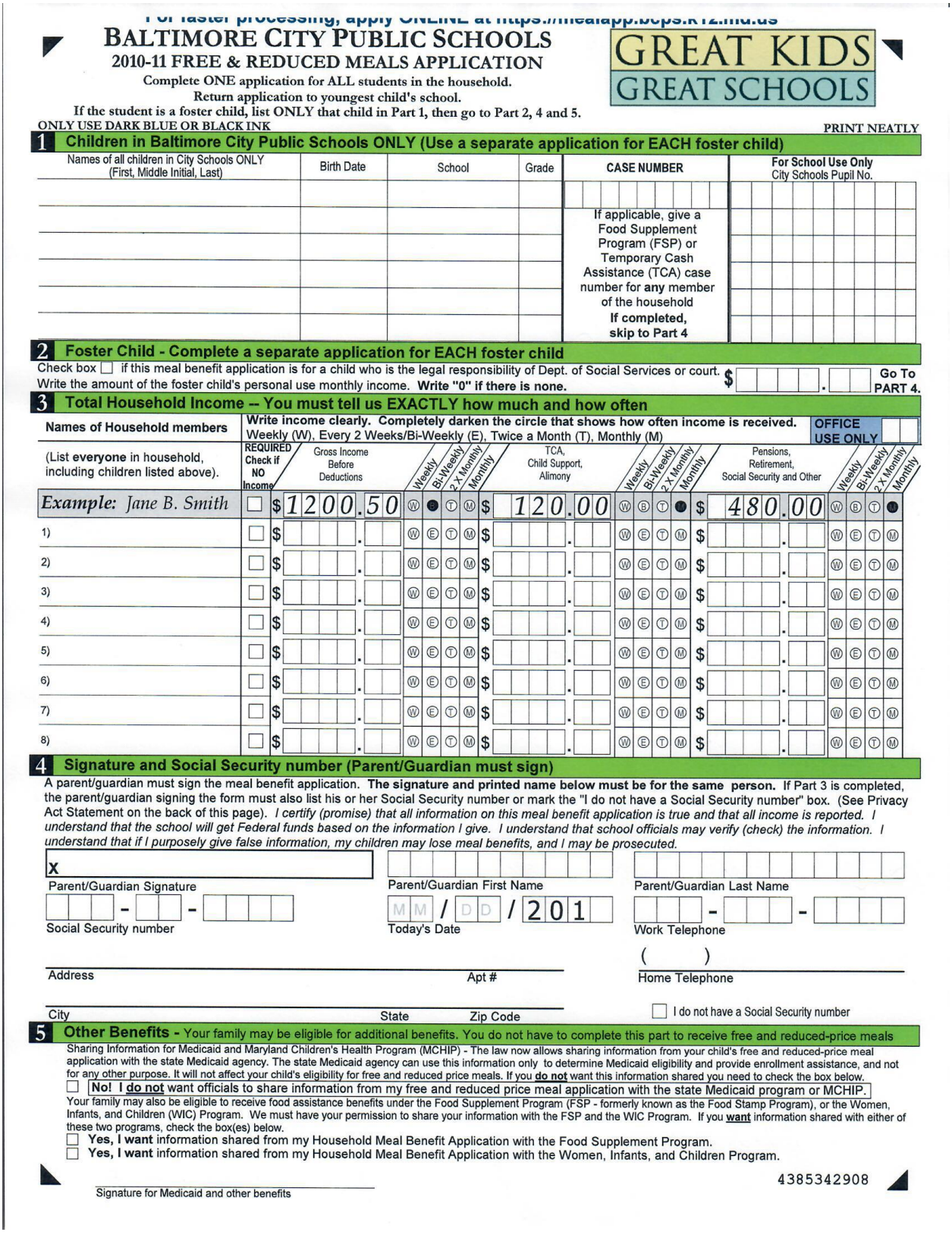
We estimate that an additional 16% of the undercount may be accounted for by immigrant families not eligible for, or reluctant to apply for, SNAP or TANF. About two-thirds of these immigrant families are headed by legal immigrants, and one-third of these are undocumented immigrant families. Even though immigrant families account for a smaller percent of the total low income undercount, their presence can have a significant effect on the count of low-income students in schools with a large population of students living in immigrant families. Thus, switching to the CEP low income measure could shift resources away from schools with a large proportion of students from low income immigrant families (especially foreign-born students of undocumented immigrant families).

We find some evidence in the ACS that English Language Learner (ELL) students are a good proxy for immigrants who are low income and FARM-eligible. Therefore, it makes sense to include ELL students in

the count of low income students. However, doing so will not have a large impact on the total estimate of low income students because in the ACS data most FARM-eligible students likely to be ELL students also receive SNAP, TANF, Medicaid or foster care. However, adding ELL students to the estimate of low income City school students could substantially reduce the undercount for some schools with large numbers of immigrant students (especially undocumented immigrant students).

Baltimore City schools are considering including Medicaid in the Direct Certification measure. We find that adding Medicaid would reduce the undercount of low income students under CEP by more than one-half, from 16% to 7% of Baltimore City public school students. Further, adding Medicaid also captures many of the low income legal immigrant students who are not captured by the DC measure. However, adding Medicaid does not capture low income undocumented immigrant students.

Appendix: Baltimore City public schools FARM application for the 2010-2011 school year.



For faster processing, apply ONLINE at https://mealapp.bcps.k12.md.us

BALTIMORE CITY PUBLIC SCHOOLS

2010-11 FREE & REDUCED MEALS APPLICATION

GREAT KIDS
GREAT SCHOOLS

Complete ONE application for ALL students in the household.
Return application to youngest child's school.
If the student is a foster child, list ONLY that child in Part 1, then go to Part 2, 4 and 5.

ONLY USE DARK BLUE OR BLACK INK — PRINT NEATLY

1 Children in Baltimore City Public Schools ONLY (Use a separate application for EACH foster child)

Names of all children in City Schools ONLY (First, Middle Initial, Last)	Birth Date	School	Grade	CASE NUMBER	For School Use Only City Schools Pupil No.
				If applicable, give a Food Supplement Program (FSP) or Temporary Cash Assistance (TCA) case number for **any** member of the household **If completed, skip to Part 4**	

2 Foster Child - Complete a separate application for EACH foster child

Check box ☐ if this meal benefit application is for a child who is the legal responsibility of Dept. of Social Services or court. Write the amount of the foster child's personal use monthly income. **Write "0" if there is none.** $ ____ . ____ **Go To PART 4.**

3 Total Household Income -- You must tell us EXACTLY how much and how often

Names of Household members (List **everyone** in household, including children listed above).

Write income clearly. Completely darken the circle that shows how often income is received. Weekly (W), Every 2 Weeks/Bi-Weekly (E), Twice a Month (T), Monthly (M)

OFFICE USE ONLY

	REQUIRED Check if NO Income	Gross Income Before Deductions	Weekly	Bi-Weekly	2 X Monthly	Monthly	TCA, Child Support, Alimony	Weekly	Bi-Weekly	2 X Monthly	Monthly	Pensions, Retirement, Social Security and Other	Weekly	Bi-Weekly	2 X Monthly	Monthly
Example: Jane B. Smith	☐	$ 1200.50	W	●	T	M	$ 120.00	W	B	T	●	$ 480.00	W	B	T	●
1)	☐	$	W	E	T	M	$	W	E	T	M	$	W	E	T	M
2)	☐	$	W	E	T	M	$	W	E	T	M	$	W	E	T	M
3)	☐	$	W	E	T	M	$	W	E	T	M	$	W	E	T	M
4)	☐	$	W	E	T	M	$	W	E	T	M	$	W	E	T	M
5)	☐	$	W	E	T	M	$	W	E	T	M	$	W	E	T	M
6)	☐	$	W	E	T	M	$	W	E	T	M	$	W	E	T	M
7)	☐	$	W	E	T	M	$	W	E	T	M	$	W	E	T	M
8)	☐	$	W	E	T	M	$	W	E	T	M	$	W	E	T	M

4 Signature and Social Security number (Parent/Guardian must sign)

A parent/guardian must sign the meal benefit application. **The signature and printed name below must be for the same person.** If Part 3 is completed, the parent/guardian signing the form must also list his or her Social Security number or mark the "I do not have a Social Security number" box. (See Privacy Act Statement on the back of this page). *I certify (promise) that all information on this meal benefit application is true and that all income is reported. I understand that the school will get Federal funds based on the information I give. I understand that school officials may verify (check) the information. I understand that if I purposely give false information, my children may lose meal benefits, and I may be prosecuted.*

X
Parent/Guardian Signature

Parent/Guardian First Name

Parent/Guardian Last Name

___ - ___ - ____
Social Security number

MM / DD / 201
Today's Date

___ - ___ - ____
Work Telephone

Address Apt #

( )
Home Telephone

City State Zip Code

☐ I do not have a Social Security number

5 Other Benefits - Your family may be eligible for additional benefits. You do not have to complete this part to receive free and reduced-price meals

Sharing Information for Medicaid and Maryland Children's Health Program (MCHIP) - The law now allows sharing information from your child's free and reduced-price meal application with the state Medicaid agency. The state Medicaid agency can use this information only to determine Medicaid eligibility and provide enrollment assistance, and not for any other purpose. It will not affect your child's eligibility for free and reduced price meals. If you **do not** want this information shared you need to check the box below.

☐ **No! I do not** want officials to share information from my free and reduced price meal application with the state Medicaid program or MCHIP.

Your family may also be eligible to receive food assistance benefits under the Food Supplement Program (FSP - formerly known as the Food Stamp Program), or the Women, Infants, and Children (WIC) Program. We must have your permission to share your information with the FSP and the WIC Program. If you **want** information shared with either of these two programs, check the box(es) below.

☐ **Yes, I want** information shared from my Household Meal Benefit Application with the Food Supplement Program.
☐ **Yes, I want** information shared from my Household Meal Benefit Application with the Women, Infants, and Children Program.

Signature for Medicaid and other benefits

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