"Who's in the Circle?"
A Study of Family Participation in Georgia's Pre-K Program

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Abstract

Georgia's Pre-K Program offers universal voluntary prekindergarten to all 4-year-old children in the state. In 2007-2008, Georgia's preschool program served 76,491 children, around 53 percent of its 4-year-olds. The purpose of the study was to examine which household characteristics are related to the probability of participating in the voluntary pre-K program. This report summarizes the results of a telephone survey conducted in October 2007 to parents across the state of Georgia, and their reasons for either choosing to enroll or not in the program, as well as the relation between those choices, the information parents may have about the program, and mother's choices in the labor market. We find that knowledge about the program varied only slightly on various household background indicators, and that conditional on such program awareness, higher socioeconomic households are less likely to participate in the voluntary preschool program. We also find that the whether or not families take advantage of the program is closely related to whether or not the mother participates in the labor market, and whether she does so full time. In addition, the inclination to participate appears stronger for African American families, which amount to the single largest minority in Georgia.

Introduction

Georgia's Pre-K Program was established in 1993 and in 1995 Georgia became the first state in the country to offer voluntary universal prekindergarten to all 4-year-olds. Today the program remains one of high quality, meeting eight out of 10 benchmarks on the National Institute for Early Education Research's quality standards checklist (Barnett, Esptein, Carolan, Fitzgerald, Ackerman and Friedman, 2010). However, the program still fails to meet two critically important benchmarks related to teacher and assistant teacher degree requirements; that is requiring all lead teachers to have at least a bachelor's degree and all assistant teachers to have at least a CDA or equivalent degree. Moreover, for the last seven years, Georgia's Pre-K Program has not increased their overall enrollment, serving between 51 percent and 55 percent of all 4-year-olds in the state.

During the 2007-2008 school year, per-child spending was approximately $4,249. The program operates for 6 ½ hours a day, five days a week, and 180 days a year and is funded through the state lottery program. The maximum class size is 20 children with a staff-child ratio requirement of 1:10. All programs are required to provide lunch. Sites including public schools, Head Start agencies, private child care centers, state colleges and universities, military facilities, and faith-based organizations may apply for state funding through a competitive grant process (Barnett, Epstein, Friedman, Stevenson-Boyd, & Hustedt, 2008). All children who are 4 years old by September 1 are eligible to participate in the program for one year as long as they have not previously been enrolled. The Georgia pre-K program is available in all counties across the state through a strong partnership between public and private settings and in the 2007-2008 school year the program was offered in 162 out of 182 school districts. Of the 76,491 children enrolled during the 2007-2008 school year, 7,808 were English Language Learners, and 3,259 were receiving special education services (Barnett, Epstein, Friedman, Stevenson-Boyd, & Hustedt, 2008).

While Georgia's pre-K program remains one of the few universal programs in the country, little is known about the families who know about and choose to participate in the program, and concerns have arisen about the availability of and access to such programs (Barnett and Yarosz, 2004). This motivated NIEER to investigate determinants of household participation in VPK. This research seeks to understand how program participation varies with the characteristics of parents and children. This analysis is an effort to determine whether there are differences between the program participants and non-participants. This study is framed by the following research questions:
1. Who is enrolled in the program? Does participation in Georgia's pre-K program vary by families' demographic characteristics?
2. Does knowledge of the program vary by families' demographic characteristics?
3. How do families' characteristics relate to families' having information on the program and choosing to participate?

Household surveys administered to random samples of families with young children enable us to estimate the effects of household characteristics on the probability of participation.

We find that in Georgia the majority of parents are likely to know about the opportunity to enroll their children in the state preschool program. Lower-income parents are only slightly less likely to know about the program. We also find that the probability of participation declines with socio-economic background. Participation is also lower in rural areas, higher for families with larger households, and higher for families in which mothers work full time. In particular, we find that the program in Georgia is strongly related to mother's labor market decisions, especially for African American families.

Methodology

In the fall of 2007 NIEER conducted a telephone survey with 1,310 parents or guardians of 4- and 5-year-olds who were selected on the basis of income and race using a randomly clustered design within six groups of county clusters across the state of Georgia. Parents were randomly selected to receive calls to participate in the study from a state-wide list of households with 4-year-old children. The survey consisted of approximately 35 questions during a 15-minute telephone survey conducted in either English or Spanish.

Questions included information pertaining to parents' and children's demographic characteristics, children's prekindergarten attendance, and parents' reasons to choose whether or not to participate in Georgia's pre-K program. The sample was then weighted to accurately represent the diversity within the state to account for educational, income, and ethnic differences. We also used official statistics on all Georgia counties where families where surveyed. County child poverty rate and rural, suburban, or metropolitan status were obtained from the U.S. Census Bureau (School District Estimates of Poverty[1] and the 2000 Census, correspondingly). In addition, we extracted information on teacher salary rates as established by the official funding guidelines of the state of Georgia for the corresponding year, as way of taking into account some degree of funding differentials across counties[2].

For analyses, we weighted the sample to represent the overall population by race, income, and education. In the weighted surveyed sample 52 percent are white, 31 percent are African American, 9 percent are Hispanic, and 8 percent belong to other ethnic or racial groups. These percentages are very similar to Georgia's ethnic and racial child composition of 51 percent non-Hispanic white, 33 percent African American, and 11 percent Hispanic in 2007[3].

The sample was divided into two groups; those who had children who participated in Georgia's pre-K program (VPK) and those who did not participate (non-VPK). Those in the VPK group are parents/guardians who knew about the program and chose to enroll their child (66 percent). The non-VPK group (54 percent) is composed of parents/guardians who knew about the program and chose not to enroll their child or that did not know about the program and therefore did not enroll. Out of the overall sample, 87 percent of all respondents knew about Georgia's pre-K program. Of those respondents who knew about the program, 57 percent of them chose to enroll.

Table 1 summarizes VPK household participants and non-participants by selected household characteristics. Families that choose to participate in the VPK evidence on average lower levels of mother's education, with a higher percentage being high school dropouts, high school graduates or some college, but a lower percentage having college degrees or graduate degrees.

They also exhibit lower income levels, and are more likely to have a mother working full-time rather than part-time. In addition, they are more likely to belong to a county with a slightly higher poverty rate.

Table 1. Summary statistics for selected indicators across non-VPK and VPK households.

Variables	Non-VPK N=467		VPK N=587	
	Mean	SE	Mean	SE
Family Background				
White	0.56	0.02	0.48	0.02
Hispanic	0.12	0.02	0.07	0.01
African American	0.24	0.02	0.36	0.02
Other	0.08	0.01	0.09	0.01
Household size	4.22	0.04	4.34	0.05
Child is Bilingual	0.10	0.01	0.04	0.01
Mother's Education				
HS dropout	0.01	0.01	0.07	0.01
HS Graduate	0.20	0.02	0.27	0.02
Associate/Some College	0.20	0.02	0.28	0.02
College	0.30	0.02	0.21	0.02
Graduate	0.29	0.02	0.18	0.02
Income & Work Measures				
<=25000	0.09	0.01	0.21	0.02
>25000 & <=35000	0.09	0.01	0.14	0.01
>35000 & <=50000	0.16	0.02	0.19	0.02
>50000	0.66	0.02	0.46	0.02
Part-time work mother	*0.23*	*0.02*	*0.20*	*0.02*
Full-time work mother	*0.40*	*0.02*	*0.51*	*0.02*
Type of care				
Public	0.12	0.01	0.48	0.02
Private	0.66	0.02	0.45	0.02
Head start center	0.04	0.01	0.05	0.01
Other	0.18	0.02	0.02	0.01
County Poverty Rate	17.57	7.50	20.00	7.33

Children may either attend a non-VPK preschool program or even if they do attend VPK they may attend programs under different auspices. Table 2 depicts the distribution of participation across auspice by income categories for VPK participants and non-participants. Participation in public centers drops off considerably for VPK participants at higher income levels. This is not observed among non-VPK participants, whose participation rates were lower to begin with and who demonstrate higher levels of relative care increasing with income. VPK low-income households also enroll in private sector programs at a higher rate than their non-VPK counterparts, and this trend is reversed at higher income levels. Caution is warranted as a large percentage of non-VPK families did not specify the auspice, and this missing information could explain some of the differences as well as the unexpected low enrollment rate reported for Head Start by low-income non-VPK families.

Table.2 Distribution of participation across auspice within income categories.

	Income categories					
	<= 25000	25-35000	35-5000	> 50000	Total	
VPK Type	61	66	54	45	49	
Public	35	38	30	20		24
Private	16	23	21	23		22
Head Start	8	5	2	1		3
Other	1	0	1	1		1
Unspecified	1	0	0	0		0
*NVPK Type**	39	34	46	55	51	
Public	6	2	4	5		5
Private	6	14	25	36		30
Head Start	4	3	0	1		1
Other	5	6	8	7		7
Unspecified	18	8	9	6		8
Total	100	100	100	100	100	

(*)Family day care, day care home, relative and non-relative care in own home, relative's home, before/after school program, other

Note; Weighted tabulations. Survey appears to underestimate Head Start enrollments, which we estimate at about 6 percent in Georgia and 13 percent nationally for 4-year-olds using the National Household Education Surveys (28 percent in the lowest income quintile).

Given our interest in understanding to what extent knowledge about and participation in Georgia's pre-K program varies by families' demographic characteristics, Table 3 looks at participation and knowledge rates across various population characteristics such as maternal education, household income levels, and race/ethnicity. Participation rates are higher for low maternal education (associate degrees or less) and highest for low-income families (less than $25,000 a year), while knowledge of the program is pretty high regardless of income or education level. Similarly, while participation rates are 42 percent for whites, they are slightly higher for Hispanics (52 percent) and even higher for African Americans (65 percent) and other race/ethnicities (60 percent). Knowledge about the program also is quite high (above 90 percent) for all groups other than whites, who evidence a knowledge rate of 79 percent. It appears that while there are no great differences in knowledge of the program, participation is in fact strongly related to household background characteristics, with higher participation rates for lower educated, lower income, and minority households. This suggests that in the case of Georgia, program awareness may not be a fundamental issue.

Table 3. Participation and Knowledge about the Program within selected population characteristics.

Selected Characteristics	N	Participates (%)	Knows (%)
Mothers Education			
HS dropout	44	87	93
HS Graduate	253	62	89
Associate/Some College	254	64	90
College	261	47	90
Graduate	242	44	94
Income Level			
<25,000	165	75	84
25-35,000	124	67	94
35-50,000	186	59	90
>50,000	579	47	93
Race			
White	545	42	79
Hispanic	96	52	93
African American	324	65	90
Other	89	60	94

Figure 1 depicts participation rates by mother's educational attainment for whites, African Americans, and Hispanics. Hispanic families evidence especially low participation rates at low education levels (high school drop-outs or graduates) and beyond college. Participation rates for African Americans are similar to those of whites for families with mothers with less than a high school degree, but increases for high school graduates and families with mothers with associate degrees or similar levels of attainment and dips for households with mothers with a college degree. On the other hand it appears that participation rates for whites are somewhat similar regardless of mother's educational attainment.

Figure 1: Weighted distribution of VPK participation rates by mother's educational attainment and ethnicity.
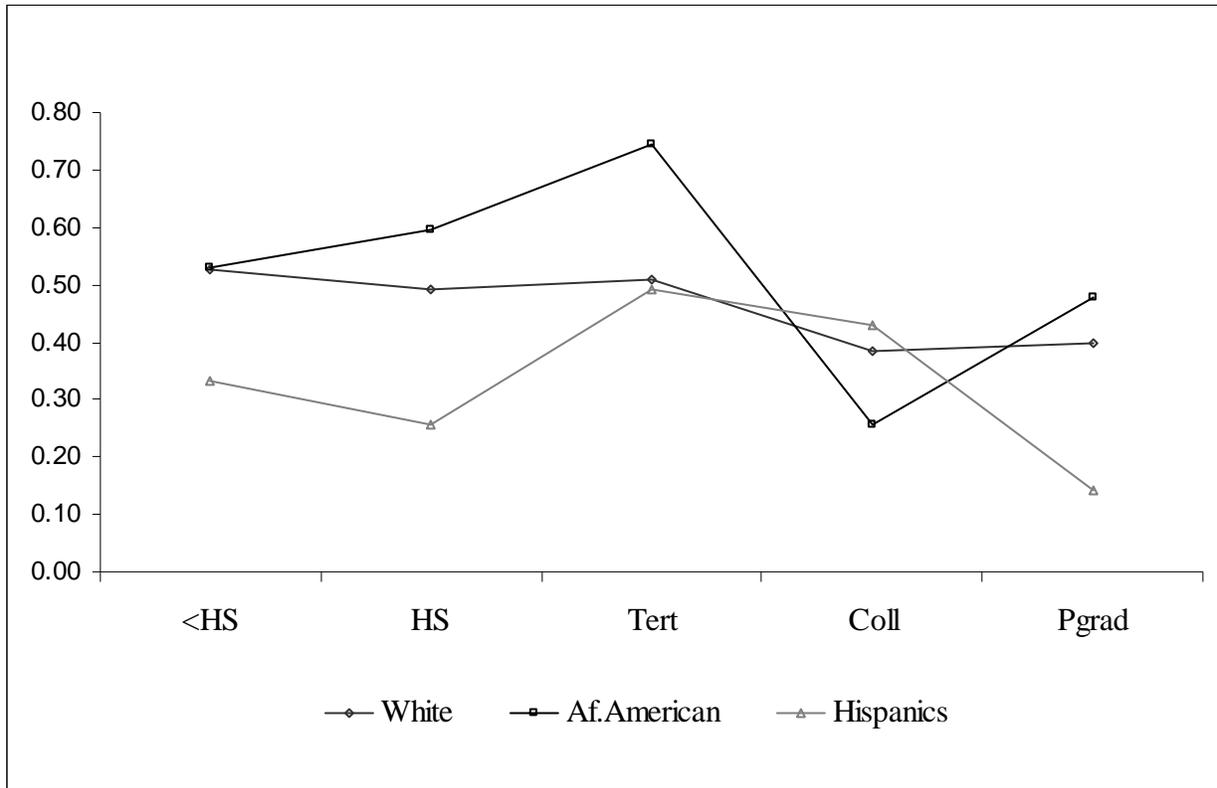
As mentioned earlier, approximately half of the sample in this study reported not being enrolled in Georgia's pre-K program. Participants who did not have their children enrolled in the program were asked whether their children attended an alternative type of educational or child care arrangement. Around 77 percent of children who were not enrolled in the program were in another type of education or child care arrangement. Of those children attending an alternative type of care, the majority were in care that required payment (63 percent). Approximately 15 percent were in non-pay center care, 6 percent were in home care, and 16 percent were on another type of care such as a church/faith-based program or in a before/after school program.

When examining the demographic characteristics of children and families who were in alternative educational and child care arrangements, several interesting findings emerged. First, there were differences in which types of care children were in depending on mothers' educational attainment (see Figure 2). For example, the more educated the mother, the more likely the child was to be in a for-pay care situation, whereas the less educated the mother, the more likely the child was in a home care situation.

**Figure 2 Alternative types of care for non-VPK participants.**
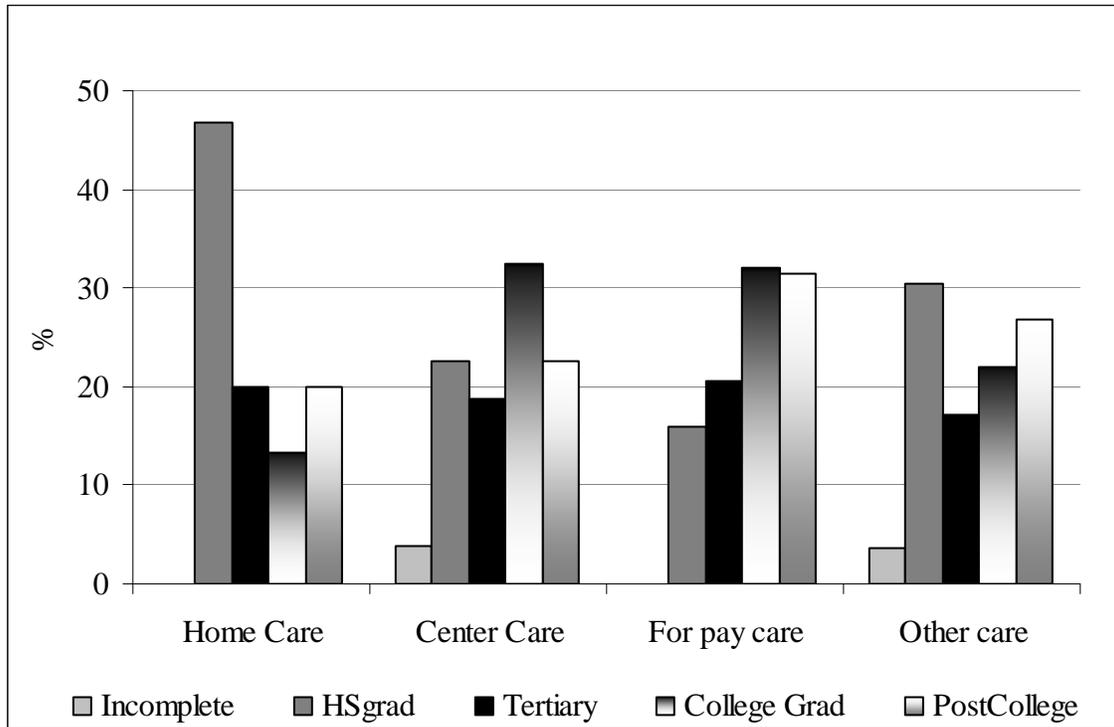
Examining home care we observe that almost 50 percent of mothers who had not completed high school had children in home care compared to only 12 percent of mothers with a post college education. Differences in type of care also emerged when looking at children's race/ethnicity (Figure 2). Almost two-thirds of those who were enrolled in home care were African American while almost two-thirds of those enrolled in for-pay care were white.

Figure 3 .

Children in home care by ethnicity   Children in pay care by ethnicity
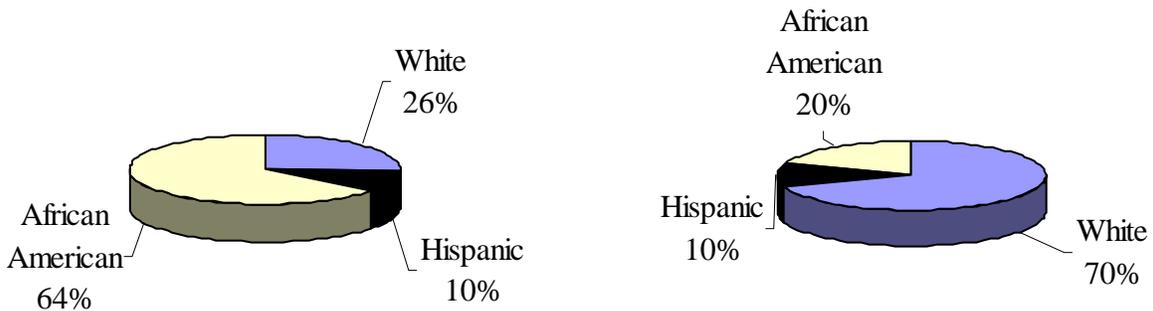
Consequently, African American families participate at a higher rate than other racial/ethnic groups or alternatively participate largely in home care. Whites on the other hand, are less likely

to be enrolled in the VPK and also alternatively more likely to be enrolled in pay care. The latter appears to suggest that VPK is capturing a portion of white families at the lower end of the income distribution for whites, and also probably capturing the upper tail of the income distribution for African Americans.

Modeling VPK participation

We estimated the relationship between VPK participation and knowledge as influenced by parents' preferences and budget constraints (household income), the availability of caregivers within the household, and other community characteristics. We assume permanent income (expected income over the long term, which is a function of parental education) and transitory income (wages/yearly income, which is subject to ups and downs due to, for example, changes in the economy) to have different effects on the propensity to enroll in the VPK. Transitory income is more important in situations in which parents cannot borrow to finance preschool care and education and therefore their choices for unpaid care will predominate. Permanent income influences the overall propensity to invest in more and better quality education over a lifetime (see Glewwe and Jacoby, 1994).

Given the previous framework, we investigated the decision to participate in the VPK program with three alternative approaches. The analytical model is formulated in Appendix I. In the first approach we estimated separately the probability that families know about the program and the probability that they enroll a child in it. In a second alternative, we jointly estimated the two, that is, we estimated the probability of VPK participation conditional on knowledge of the program. The second approach, takes into account that families cannot choose to enroll in the voluntary pre-K program if they do not have information about it and about their eligibility. However, families more interested in enrolling their children in a preschool program, particularly a publicly funded one, may also more actively seek out information about such programs. Only a small percentage of families (around 10 percent) did not report any knowledge of the program, so it may be that this approach does not provide additional information to the first one.

Finally, Georgia's program has faced financial setbacks in the last year, with their calendar shortened for the current 2011-2012 school year from 10 months to 9 months, given the reduction in available resources to fund the program. The alternative reduction the state of Georgia had considered was a reduction from full-day to half-day. Given the important effects that such a policy change would have on individuals choosing the program because of female participation in the labor market, we addressed the relation between full-time and part-time work of mothers, and their participation in the VPK, in a third approach that takes into account the relation between these decisions.

In Table 4 we provide the results for the first approach. We find that on average, Hispanic households are less likely than whites to have knowledge on the program taking into account income and education levels. Also, bilingual households have a lower probability of participation in the VPK relative to monolingual households. While a similar pattern to Hispanics and bilinguals is observed for African Americans, we do not find these relations to be statistically significant.

For the total sample higher levels of education evidence no relation with the probability of knowing about the program, while these do show a negative relation with the probability of participation. On the other hand, there is no clear picture in terms of income as households with income between $25,000 and $35,000 and households with income above $50,000 evidence a positive relation with the probability of knowledge on the program and higher income households evidence a negative relation with the probability of participation. Other variables of interest such as household size and mother part- or full-time work (versus not working at all) also evidences a positive relation with the probability of participation, which suggests the program is related to female labor market participation.

African Americans, which make up the largest minority group in Georgia, evidence slightly different patterns of knowledge of and participation in the program than the overall population. For this racial group, there are no clear patterns in terms of the relation between education and the probability of knowledge or participation in the program. There is some indication that households with tertiary and graduate education are more likely to know about the program. Overall, the relationship between income levels and the probability of knowing about the program seems to be stronger than for the total sample. In addition, full-time work evidences a negative correlation with the probability of VPK knowledge and participation. Lastly, county child poverty rates are related to knowing about and participating in the program. The latter could be the consequence of a higher concentration of African Americans in districts with higher concentrations of poverty.

Table 4. Households' Probit on Knowledge and Participation on VPK (marginal effects).

Variables	Total Sample		African Americans	
	knows	participates	knows	participates
Hispanic	-0.174***	-0.064		
	(0.064)	(0.064)		
African American	-0.023	0.064		
	(0.023)	(0.043)		
Other	0.018	0.147**		
	(0.038)	(0.069)		
Bilingual	0.006	-0.177***		
	(0.043)	(0.046)		
Mother HS Graduate	-0.017	-0.248	0.086	0.119
	(0.074)	(0.167)	(0.072)	(0.297)
Mother AA/Some College	-0.011	-0.244*	0.150*	0.199
	(0.068)	(0.139)	(0.081)	(0.251)
Mother College	-0.024	-0.354***	0.092	-0.007
	(0.064)	(0.132)	(0.080)	(0.320)
Mother Graduate	0.024	-0.393***	0.135**	0.035
	(0.059)	(0.118)	(0.068)	(0.370)
>25000 & <=35,000	0.062**	-0.007	0.062**	-0.033
	(0.031)	(0.095)	(0.025)	(0.076)
>35000 & <=50,000	0.034	-0.078	0.066**	0.100
	(0.023)	(0.077)	(0.030)	(0.125)
>50000	0.051***	-0.133***	0.122***	-0.004
	(0.019)	(0.046)	(0.024)	(0.053)

Household size	0.013	0.042***	-0.001	0.011
	(0.008)	(0.015)	(0.012)	(0.025)
Mother Part-Time work	0.001	0.051*	-0.070	-0.071
	(0.010)	(0.029)	(0.087)	(0.124)
Mother Full-Time work	0.025	0.177***	-0.100**	-0.167**
	(0.031)	(0.048)	(0.047)	(0.067)
Head Start	-0.004	-0.047	-0.046	0.065
	(0.042)	(0.086)	(0.138)	(0.211)
Suburban	0.012	-0.098	-0.278*	-0.097
	(0.040)	(0.086)	(0.147)	(0.122)
Rural	-0.060	-0.009	0.007**	0.015*
	(0.083)	(0.133)	(0.003)	(0.009)
County poor, ages 5-17, 2005 (%)	-0.001	0.003	-0.005	-0.102
	(0.002)	(0.004)	(0.043)	(0.109)
Correct for funding per teacher	-0.018	-0.087**	0.086	0.119
	(0.030)	(0.040)	(0.072)	(0.297)
Observations	1,163	1,163	260	260

Robust standard errors in parentheses,*** p<0.01, ** p<0.05, *p<0.1
Excluded groups: White, Monolingual, Mother HS dropout, Income < 25,000, Mother non-working, Private (& hstart) center, Metro area.

The second approach, in which we estimate the determinants of the probability of participation conditional on knowledge about the program, is presented in Table 5. We find that after taking into account whether or not families had information on the program, results vary slightly, particularly in terms of magnitude. For example, Hispanic families are less likely to have information about the program and, similarly, bilingual families are less likely to participate. In contrast, African Americans are more likely to participate, conditional on knowledge on the program.

We also find that conditional on knowledge about the program, households with a higher educated mother are even less likely to participate, and even more so the higher the education level, relative to high school dropouts. In addition, households with income levels beyond $50,000 are more likely to know about the program but also less likely to participate than households with lower income levels. There are no differences in participation for households with any lower level of income. Lastly, conditional participation rates increase with maternal full-time work.

There are slight variations in the strength of these relations depending on whether we account for mother's labor market participation, which suggests a relation between labor market participation and VPK participation that varies by race/ethnicity, education, and income background.

Table 5. Household's Bivariate Probit w/ measures of VPK supply and quality and interactions (Two-stage)*.

VARIABLES	knows	participates	knows	participates
Hispanic	-0.825***	-0.142	-0.838***	-0.129
	(0.170)	(0.138)	(0.153)	(0.142)
African American	-0.149	0.169	-0.085	0.273**
	(0.150)	(0.118)	(0.110)	(0.106)
Other	0.190	0.402**	0.204	0.441**
	(0.223)	(0.170)	(0.279)	(0.172)
Bilingual	0.089	-0.427***	0.060	-0.419***
	(0.293)	(0.101)	(0.282)	(0.090)
Mother HS Graduate	-0.232	-0.704	-0.250	-0.513
	(0.313)	(0.434)	(0.369)	(0.467)
Mother AA/Some College	-0.180	-0.729**	-0.163	-0.500
	(0.365)	(0.320)	(0.380)	(0.375)
Mother College	-0.267	-1.014***	-0.264	-0.797*
	(0.338)	(0.357)	(0.342)	(0.417)
Mother Graduate	0.113	-1.123***	0.138	-0.849**
	(0.401)	(0.316)	(0.400)	(0.392)
>25,000 & <=35,000	0.472	-0.007	0.474	-0.038
	(0.405)	(0.227)	(0.400)	(0.240)
>35,000 & <=50,000	0.153	-0.194	0.171	-0.164
	(0.214)	(0.197)	(0.151)	(0.206)
>50,000	0.321***	-0.348***	0.369***	-0.278**
	(0.109)	(0.113)	(0.084)	(0.110)
Household size		0.070		0.046
		(0.044)		(0.033)
Suburban	0.116	-0.231	0.195	-0.202
	(0.262)	(0.229)	(0.276)	(0.195)
Rural	-0.304	-0.024	-0.270	-0.044
	(0.435)	(0.312)	(0.437)	(0.300)
County poor, ages 5-17 (%), 2005	-0.010	0.007	-0.009	0.009
	(0.011)	(0.010)	(0.006)	(0.011)
Correct for funding per teacher	-0.212	-0.217**	-0.213	-0.241**
	(0.156)	(0.101)	(0.177)	(0.120)
Mother Part-time work	-0.022	0.158*		
	(0.062)	(0.093)		
Mother Full-time work	0.210	0.461***		
	(0.187)	(0.130)		
Head Start	0.007	-0.125		
	(0.245)	(0.215)		
Observations	1,163	1,163	1,163	1,163

*Note: Running these same estimations using a Heckman two-step procedure generated very similar results.
Robust standard errors in parentheses,*** p<0.01, ** p<0.05, *p<0.1
Excluded groups: White, Monolingual, Mother HS dropout, Income < 25,000, Mother non-working, Private (& hstart) center, Metro area.

As observed in the previous tables, female labor market participation decisions appear strongly related to program participation and/or to have an effect on the relation between household background characteristics and program participation. Consequently, we looked at a third approach, where we estimated a similar two-stage model in which we looked at the determinants of VPK participation, conditional on labor force decisions for mothers, such as the decision to work and do so full-time. These are shown in Table 6. For these estimations we used county-level data on educational attainment (percentage of the population having attained different education levels) as well as employment and wage data[4] in the first stage equation. The first stage equation in this case estimates the determinants of female labor market participation, taking into account that these may be related to labor market conditions.

Estimations of VPK participation conditional on the mother's work status show that various determinants of participation simultaneously relate to working and participation decisions, such as mother's education, household income and size, and location. Some local labor market conditions as represented by variables such as the average annual wage, average employment and the percentage of high school graduates, some college, and college graduates are associated with the decision to work, although less so with the decision to do so full time. It appears that higher average wages are negatively associated with the decision to work, while higher employment levels are positively associated with it.

In terms of family characteristics, we observe that, conditional on labor market participation, African American families are more likely to participate in the VPK. We also observe that this is the case as well for other ethnic groups. In addition, conditional on labor market decisions, bilingual families are less likely to participate in the VPK. The same is observed for families with mother's with a college or graduate degree, and for households with income over $50,000. Lastly, household size is negatively associated with the probability of working, or working full time, but conditional of this, more likely to induce VPK participation. All these findings are in par with the previous set of estimations.

Table 6. Households' Probit on Work Status and Participation on VPK (marginal effects).

VARIABLES	Work	Participates	Full Time	Participates
Average Wage	-0.000***		0.000	
	(0.000)		(0.000)	
Average Employment	0.005***		-0.000	
	(0.001)		(0.001)	
HS, %	-0.029***		-0.052**	
	(0.009)		(0.025)	
Some College, %	-0.001		0.012	
	(0.007)		(0.011)	
College, %	-0.017**		-0.035***	
	(0.008)		(0.011)	
County poor, ages 5-17 (%), 2005	-0.017		-0.006	
	(0.012)		(0.009)	
Correct for funding per teacher	-0.430***		-0.398***	
	(0.126)		(0.139)	
Hispanic	-0.115	-0.175	0.056	-0.174

	(1)	(2)	(3)	(4)
	(0.176)	(0.173)	(0.158)	(0.174)
African American	0.745***	0.257***	0.727***	0.252***
	(0.131)	(0.075)	(0.171)	(0.078)
Other	0.174	0.410**	0.337	0.405**
	(0.250)	(0.189)	(0.242)	(0.190)
Bilingual	-0.025	-0.508***	-0.136	-0.501***
	(0.208)	(0.095)	(0.236)	(0.094)
Mother HS Graduate	0.865***	-0.590	1.061**	-0.599
	(0.247)	(0.411)	(0.467)	(0.416)
Mother AA/Some College	1.156***	-0.534	1.291***	-0.541
	(0.300)	(0.352)	(0.493)	(0.354)
Mother College	1.100***	-0.874**	1.200**	-0.878**
	(0.291)	(0.360)	(0.486)	(0.362)
Mother Graduate	1.353***	-0.918***	1.544***	-0.923***
	(0.263)	(0.337)	(0.409)	(0.341)
>25,000 & <=35,000	-0.246*	-0.059	-0.096	-0.056
	(0.127)	(0.223)	(0.168)	(0.223)
>35,000 & <=50,000	0.079	-0.181	0.208**	-0.179
	(0.193)	(0.177)	(0.104)	(0.175)
>50,000	0.186	-0.340***	0.482***	-0.340***
	(0.221)	(0.118)	(0.097)	(0.118)
Household size	-0.229***	0.066**	-0.232***	0.067**
	(0.068)	(0.030)	(0.073)	(0.030)
Suburban	0.549***	0.011	0.474***	0.014
	(0.165)	(0.099)	(0.184)	(0.101)
Rural	0.223	0.204	0.360***	0.211
	(0.158)	(0.234)	(0.140)	(0.236)
Head Start	0.019	-0.076	-0.143	-0.071
	(0.299)	(0.219)	(0.145)	(0.221)
Observations	1163	1163	1163	1163

*Note: Running these same estimations using a SEM through FIML generated very similar results.
Robust standard errors in parentheses,*** p<0.01, ** p<0.05, *p<0.1
Excluded groups: White, Monolingual, Mother HS dropout, Income < 25,000, Mother non-working, Private (& hstart) center, Metro area.

Discussion and Conclusion

In 1995, Georgia's state preschool program became the first universal preschool program for 4-year-olds in the United States. The program, therefore, has had a long history of growth and development, which are evidenced in the large percentage of the households that know about the program relative to other, newer voluntary preschool programs like Florida's VPK (Nores, Barnett and Curenton, 2011). This program is very extensive, has recently started strengthening the monitoring of quality, currently meets nine out of 10 NIEER quality standards benchmarks, and serves 55 percent of the state's 4-year-olds (Barnett, Esptein, Carolan, Fitzgerald, Ackerman and Friedman, 2010). However, in the last year the program, which is funded with Georgia

Lottery Funds, has undergone a shortening of the school year from 10 months to 9 months, and therefore lost teachers to the K-12 system[5].

Given that participation in the program is and has been far from universal (and is estimated to have grown 8 percent between the 2007-2008 school year and the 2010-2011 school year, Barnett, Carolan, Fitzgerald and Squires, 2011), in 2007 we surveyed the characteristics of families, their choice to participate in the VPK program, and whether participation is in any way related to accessibility to information about the program. This study addressed these questions through a household survey and subsequent analyses of the household determinants of knowledge of and participation in the program. In this analysis we take into account that the decision to participate in the program simultaneously depends on having information about it, as well as other decisions such as female labor market participation, which are made either jointly or precede the participation decision. We find that knowledge about the program is not a strong issue, as about 90 percent of the families know of the state's preschool program. This study also shows that information about the program is nevertheless related to the participation decision, and that both of these are ultimately related to various household background characteristics such as race/ethnicity, education, and income.

Specifically, Hispanic and bilingual families are less likely to participate in VPK even when we take into account the probability that they know about the program or their labor market decisions. On the other hand, African American households in Georgia exhibit a higher propensity to take advantage of VPK, and this is evident even when we take into account the relation between the decision to participate in the labor market and the decision to demand VPK. This is consistent with African American families being more likely to opt for unpaid care when enrolling their children in alternative care.

Participation in VPK is also sensitive to maternal education levels, with the probability to participate in the program decreasing for higher education households. This negative association between participation and socio-economic background is less evident with income. When we take into account the propensity to know about the program, we observe a higher participation rate for higher income families only in estimations that account for mother's work status. When we take into account the labor market decisions, we observe a negative association between income above $50,000 and VPK participation. This suggests that households with a more educated mother who works outside the home are more likely to be able to afford alternative and presumably higher quality of care. This is not observed for household incomes below $50,000, who all share similar participation probabilities to families with income levels below $25,000.

Overall the findings indicate that families that do not participate may be doing so because they may be opting for alternative types of care, which they may be able to afford, given higher education and income levels. In addition, it suggests that the program is providing services for mothers in the labor market. Since we observe the same inclination for larger families, it may be argued that the program is allowing minority and larger family households to participate in the labor market and increase their disposable income.

Finally, we observe lower participation rates by rural households, which match the trend we observed for Florida in a similar study (Nores, Barnett & Curenton, 2011). Analogous to what

our conclusions were for Florida, we propose this may be due to a lower rural supply of preschool options in rural areas.

In sum, this study provides evidence that Georgia's pre-K program is serving lower socio-economic households and supplementing a need for full-day services so that mothers can fully participate in the labor market. As a consequence, it seems particularly pertinent, even more in periods of economic crisis, to understand the role that the VPK program serves in promoting household wellbeing by providing the possibility of increasing a household's total income by allowing mothers to work. In addition, in a similar fashion to the findings for Florida (Nores, Barnett & Curenton, 2011), information is an asset that is distributed across the population much like any other, with differences across ethnic and socio-economic levels, and that as such, defines the opportunities families have to in fact participate in the VPK program. Lastly, given that enrollment patterns for higher socio-economic families appear quite different than from the rest, this suggests that the VPK may be providing necessary preschool services that lag in quality behind the preschool choices of higher socio-economic households. As a consequence, it may be useful to study the quality of Georgia's universal voluntary preschool program and to evaluate it relative to alternative forms of care in the state.

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Appendix I: Model Estimation[6]

We estimate the determinants of the probability of participation of families in the VPK program for the 2006-2007 school year (using maximum likelihood methods) as the following equation[7]:

$$\Pr(VPK_i = 1 \mid X_i = x_i) = \Phi(x_i{}'\beta) \qquad (1)$$

where,
Φ = Cumulative distribution function of a standard normal distribution
VPK_i = Participation in the program
x_i = Family characteristics
β = Parameters

Measuring participation in VPK without taking into account that some families could not choose to participate simply because they did not know of the program (which is in itself not a random process, as information, and time, are both resources) would likely affect the estimates on participation, as the group that "learns" about the program might be "selective". That is, children from higher socio-economic and parental education backgrounds may in actuality evidence larger participation effects. This could be induced by access to information, rather than actual revealed choices[8].The observed participating sample would then fail to represent the whole school age population and analyses based on it can lead to wrong policy conclusions, particularly if the long-term goal is for everyone to have a choice of participation, and choices require information[9].

The selection problem can be thought of as a problem of missing observations: We do not know whether families that did not know about the program would have chosen to participate had they known about the program's existence and their eligibility. Consequently, "knowing" and "participating" may not be independent of each other (in a similar way that "participating in the VPK" and "deciding to have a full-time job" may not be independent of each other). We need to take this selection into account when estimating participation in the program. Thus, we complement the previous analyses by predicting VPK participation conditional on the probability of households knowing about the program. We identify knowing about the program as depending on the other determinants of participation (family background, location), as well as on lagged attendance to preschool, and supply characteristics defined by county level capacity in a system. As an alternative to equation (I) we estimate the probability of VPK enrollment, having corrected for selection on whether the household knew about the program, using a system of simultaneous equations. In this model, VPK enrollment is an observed binary variable for which there is an underlying latent variable that depends on the distribution of the function of knowledge about the program.

Therefore, we estimate by maximum likelihood methods (bivariate probit with sample selection) the probability of participation in VPK as:

$$\Pr(VPK_i = 1) = \Pr(VPK_i \cap I_i = 1) \qquad (2)$$

where,
VPK_i = Participation in the program

I_i = Information about the program

$$VPK_i = 1, \text{ if } y_{i1} > 0; VPK_i = 0, otherwise \qquad (3)$$

$$I_i = 1, \text{ if } y_{i2} > 0; I_i = 0, otherwise \qquad (4)$$

$$y_{i1} = x_{i1}\beta_1 + \varepsilon_{i1} \qquad (5)$$

$$y_{i2} = x_{i2}\beta_2 + \varepsilon_{i2} \qquad (6)$$

The participation probability assuming bivariate normal distributions for the errors in (5) and (6), and $Cov(\varepsilon_{i1,}\varepsilon_{i2}) = \rho$ would be estimated as:

$$\Pr(VPK_i = 1 \cap I_i = 1) = \Phi(x'_{i1}\beta_1, x'_{i2}\beta_2, \rho) \qquad (7)$$

where,

Φ = Cumulative distribution function of a standard normal distribution

x_i = Family characteristics

β = Parameters

ρ = Error correlation

We estimate the equation (7), presented in the results section and the participation probability independently together with the information probability independently presented in the appendix, in order to compare how participation and information equations in the selection estimation differ from the independent estimations.

Finally, in a methodology similar to equation (7) we estimated the probability of participation in the VPK program conditional on labor market participation by mothers. Similar to the previous equation, this method takes into account that the decisions to "work" or to "work full time" and the decision to "participate" are very likely dependent of each other, and even probably simultaneous. We take this dependency into account when estimating participation in the program, by accounting for the decision to work (and to work full-time), which is also determined by labor market conditions. This is therefore estimated as:

$$\Pr(VPK_i = 1 \cap LM_i = 1) = \Phi(x'_{i1}\beta_1, x'_{i2}\beta_2, \rho) \qquad (8)$$

where,

VPK_i = Participation in the program

LM_i = Labor market participation by mothers (Full-time versus Part-time)

Φ = Cumulative distribution function of a standard normal distribution

x_i = Family characteristics, labor market conditions

β = Parameters

ρ = Error correlation

[1] U.S. Census Bureau, http://www.census.gov//did/www/saipe/downloads/sd07/sd07_GA.txt

[2] 2008-2009 School Year Pre-K Providers' Operating Guidelines (2008) Bright from the Start: Georgia Department of Early Care and Learning, GA.

[3] Kids Count. Kids Count Data Center. http://datacenter.kidscount.org/data/acrossstates/Rankings.aspx?ind=103 Last Updated December 2010.

[4] Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW). Department of Labor.

[5] These cuts and its consequences were reported in media sources such as: Badertscher, N. (2011, October 11) Slower lottery sales hit Georgia's pre-k program. *The Atlanta Journal-Constitution.* Retrieved October 18th, from http://www.ajc.com/news/georgia-politics-elections/slower-lottery-sales-hit-1198400.html; and Shearer, L. (2011, May 15) School system patch wound of pre-K cuts. *Athens Banner-Herald.* Retrieved October 18th, from http://onlineathens.com/stories/051511/new_829283604.shtml.

[6] This analytical strategy is from our 2011 paper entitled *Determinants of Household Participation in Florida's Voluntary Prekindergarten Program.*

[7] Given the small sample size and cluster sampling design of the survey, we prefer probit to logit models within the family of generalized linear models (Hanh and Soyer, 2005).

[8] Alternatively, it could move in networks and therefore could depend on cultural and social capital (Bourdieu, 1986), which would increase with parental income but could also be clustered within race. However, we are not focusing on networks and cultural capital in this analysis.

[9] This is similar to what Cameron and Heckman (1998; 2001) define as a selective survival of the "fittest", when estimating transition probabilities (the probability of transitioning from one level to the next) which lead to an overstatement of the estimated effect of observables, such as family background, income. In this scenario, "surviving" would be reciprocal to "having information". There are much larger differences in education between those who do and do not know about the VPK program's availability than there are between those who do and do not participate.