The Cost of Homeschooling:

The Effect of Income and Maternal Education on the Decision to Homeschool

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Abstract

Despite that fact that over 2 million children in the US are home schooled each year, very little is known about the factors that influence the decision to home school children. I use data from the 2003, 2007, 2012, and 2016 National Center for Education Statistics (NCES) Parent and Family Involvement in Education Survey, specifically the National Household Education Survey (PFI-NHES) to examine the characteristics of parents that decide to homeschool. Using a logit regression model with year and region fixed effects, and controlling for various demographic factors, I determine that homeschooling is more likely to occur in larger families with lower levels of income and with mothers who have received higher levels of education.

I Introduction

The nationalization of modern homeschooling began with the 1970s movement under the direction of John Holt, an educational theorist and supporter of school reform, who argued that formal schools caused an oppressive classroom environment which taught students to become compliant employees. While at the time, there were several states which allowed parents to teach their children at home, it was not a popular choice at the time. The legalization of homeschool occurred at the state level, and by 1989, there were only three states (Michigan, North Dakota, and Iowa), which outlawed home education, and by 1993, home education was legal in all 50 states (Somerville 2001).

While there are several different forms of homeschooling in the United States and elsewhere, this paper will use the term 'homeschool' the same way as NCES, which state in their website: "Homeschooled students are school-age children (ages 5–17) in a grade equivalent to at least kindergarten and not higher than 12th grade who receive instruction at home instead of at a public or private school either all or most of the time." Figure 1, shown below, shows the number of enrolled homeschool students from 1999-2016.

Figure 1: Number of Students in a Homeschool from 1999-2016
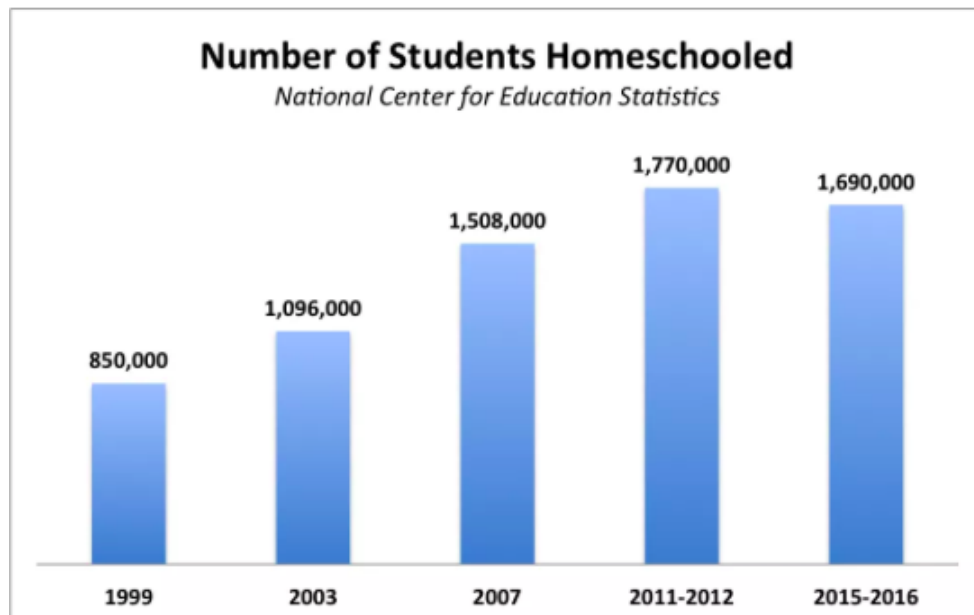
Data and figure by National Center for Education Statistics

The decision to homeschool has become increasingly popular over the cthese of the past couple of decades. According to the earliest NHES survey in 1999, approximately 850,000 of students nationwide (1.7%) were being instructed at home. According to NHES and the Census Bureau, approximately 2.2% of children were homeschooled in 2003, 2.9% in 2007, and 3.4% 2012 (Smith 2013). While their 2016 survey is not yet publically available, various statistics have been shared. According to this survey, the number of homeschooled students has remained nearly stagnant at 1.7 million. Given that the government spends approximately $10,600 in education per student per year, the current savings of the government due to homeschooling is approximately 18 billion dollars per year (Vo 2017).

Parents gave a number of different reasons for homeschooling their children. In the 2011–12 school year, 91 percent of homeschooled students had parents who said that a concern about the environment of other schools was an important reason for homeschooling their child, which was a higher percentage than other reasons listed. The most popular reasons for homeschooling among the sample were due to dissatisfaction in academic instruction or so that the child may be provided with religious or moral instruction. I find that around 70% of the parents agreed with at least one of these reasons. This notion of religiosity being a primary factor in the decision to homeschool children has been shown in previous studies to be a significant factor (Cai, Reeve, and Robinson, 2002). These authors claimed that, at that time, approximately 75% of homeschool educators were conservative Christians who believed that public schools are unable to properly instruct the morals they want their children to learn.

As a whole, parental involvement in homeschooling has also been linked to the age of the child: as the child grew older, there is less parental involvement in child education (Green, Hoover-Dempsey, and Sandler, 2007). According to the 2016 NHES survey, the major concern among parents has turned from providing religious instruction to concern about the school environment, which includes safety, drugs, or negative peer pressure.

II   Data

Every four or five years since 1999, the National Household Education Surveys Program, developed by the National Center for Education Statistics, has collected data via telephone surveys or through the postal system on a variety of measures related to homeschooling including the motivations,

practices, and public support behind families who homeschool their children. The data are ideal for the analysis as they demonstrate changes in homeschooling patterns over time for a broad set of households, which cover all 50 states. The NHES Parent and Family Involvement in Education surveys cover learning from early childhood to school age and includes parental data as well. Since there has been very little research on the factors that contribute to the decision to home school, the empirical work will be largely descriptive.

For purposes of anonymity, the participants of the study were not asked for their exact income. Rather, they were only to provide the bracket of income they belonged to. The specific brackets varied slightly between each year, but most brackets were small enough that I was able to use the median of the upper and lower brackets to estimate the relative effect of income on the child's probability of being homeschooled. Unfortunately, this creates some bias in the estimates from measurement error.

For the 2003, 2007, and 2012 NHES surveys, parents were prompted to report which of several possible reason(s) for homeschooling matched their particular circumstance as well as the most important reason for them choosing to homeschool their children. I recognize there were likely other reasons for parents choosing to homeschool their children and perhaps certain situation in which parents did not accurately report their responses. However, it is still possible to determine which of the reasons were more popular, and how these values have changed over the cthese of the decade. Common reasons for parents to homeschool their children include were to provide religious or moral instruction, concern about negative peer pressure or child safety, and dissatisfaction with academic instruction.

The final dataset includes approximately 45,000 individuals, with approximately 822 (1.8%) coming from families in which the child was homeschooled. It is important to note that this NHES survey intentionally over-represented the percentages of Black and Hispanic responses, especially in 2012, so the predictive power in estimating the true effect of various demographics on the probability of homeschooling was slightly affected. Unfortunately, only 76 of the roughly 10,500 students sampled in 2016 were homeschooled, which may bias the parameter estimates for that year.

Table 1: Summary Statistics for Homeschoolers and Non-Homeschoolers, by Year

	Homeschoolers				Non-Homeschoolers			
	2003	2007	2012	2016	2003	2007	2012	2016
Child is Male	50.4%	45.3%	51.9%	49.6%	51.0%	51.5%	49.0%	51.4%
Race of Child								
White	79.4%	78.5%	50.2%	51.7%	67.3%	65.4%	56.0%	58.8%
Black	7.3%	5.1%	9.4%	12.6%	12.5%	9.8%	10.6%	8.9%
Household	57,538	64,735	64,219	76,322	76,009	77,326	78,115	93,751
Income	(39,685)	(42,115)	(45,852)	(63,315)	(49,016)	(49,108)	(59,402)	(63,745)
Child's	11.5	11.1	11.8	11.5	11.3	11.46	11.9	12.0
Age	(4.2)	(4.1)	(4.1)	(4.2)	(3.8)	(3.9)	(3.9)	(3.8)
Number of	1.8	1.6	1.1	1.1	1.4	1.2	1.1	1.1
Siblings	(1.4)	(1.3)	(1.1)	(1.0)	(1.0)	(1.0)	(1.0)	(0.9)
Mother's Ed	15.2	15.6	14.8	16.0	14.7	15.3	15.4	16.5
(Yrs.)	(2.7)	(2.4)	(3.5)	(3.8)	(3.1)	(3.1)	(3.2)	(3.4)
Religious	65.3%	73.1%	57.9%	62.1%	53.2%	57.3%	54.6%	53.9%
N	245	268	233	76	10,809	9,058	13,863	10,685

Surveys collected by United States Department of Education: National Center for Education Statistics. Populations not meant to accurately estimate the socioeconomics of the United States during survey period but rather to obtain relatively larger samples of minority groups (especially the Hispanic and Black populations). See the NCES website for more details. Midpoint estimation used for determining income based off of bracketed income levels (except for the 0-10,000 range). Statistics only include households with exactly one mother and whose respondent answered the questions of whether or not the child was homeschooled. Note small sample of homeschooled children in 2016.

III   Empirical Strategy

This research will focus primarily on the effect of income on a family's disposition to homeschool. I will do this through the use of a logit regression model with fixed effects that account for variations within each year included in the analysis as well as the region in which the participant lived at the time they took the survey. This also allows us to determine, to an extent, how some of the predictors included in the regression have changed over time. I begin the analysis by summarizing the statistics, which looks at income, maternal education, and select demographic characteristics between homeschoolers and non-homeschoolers (see Table I).

In the model, I account for several additional demographic factors which may mediate the relation between income and homeschooling or maternal education and homeschooling. Such demographics include the age of the mother and child, the child's race, and whether or not the child was born in the United States. Because I include year fixed effects, in this situation I need not include other macroeconomic factors which may influence the parents' decision to homeschool because they would

already be considered within the year fixed effects. Hence, following framework will be used to estimate the effect of income on the probability of homeschooling:

$$\frac{\Pr(\text{Homeschool}_i = 1)}{1 - \Pr(\text{Homeschool}_i = 1)} = \beta_0 + \beta_1 \text{HH\_Income}_i + \beta_2 \text{Mother\_Ed}_i + ... + \gamma_1 \text{year} + \gamma_2 \text{Demographics}_i$$

(1)

Where the value of Homeschool$_i$ is 1 if the child attended a homeschool at the time of the survey, and a 0 otherwise. I report the results in terms of odds ratios so that coefficients below 1 are characteristics associated with being less likely to homeschool and coefficients above 1 are characteristics associated with being more likely to enroll their child in homeschool. In order to determine how income and mother's education affect the likelihood of the child being homeschooled, I used several demographic and household controls provided by the corresponding NHES surveys. In this survey, religiosity was measured by determining whether or not the family had attended a religious service in the past month. This does not necessarily connote, however, that the family regularly participated in church services as a significantly higher proportion of the United States population will attend church services during holiday seasons, especially Easter and Christmas. Thus, in many circumstances, the response to this question may be in part determined by the month the survey was completed.

IV   Results

The regression table presented in Table 2 below shows that a doubling (100% increase) in income decreases the probability that the child will be homeschooled by about 30-35%. This value is robust across each model, . In classical economics, opportunity cost refers to the value of the next best alternative. In this case, I find that households with higher levels of income are also those who are less likely to homeschool their children. It would be reasonable at this point to assume that parents with better-paying jobs would find it too expensive to leave their job to homeschool their children, while the poorer households either do not have enough money to send their children to

a formal school or otherwise have a much lower opportunity cost. However, I also find that as maternal education increases, the likelihood of the child being homeschooled increases. This result complicates the original assumption of opportunity cost because as maternal education increases, so does her earning capabilities.

Table 2: Odds of Homeschooling

Regressor	2003	2007	2012	2016	2003-2012	All Years
Log(HH Inc)	0.64**	0.63**	0.78**	0.75**	0.70**	0.71**
	(0.05)	(0.05)	(0.05)	(0.09)	(0.03)	(0.03)
Mother's Ed. (Yrs.)	1.17**	1.08**	1.01	0.95	1.05**	1.04**
	(0.08)	(0.02)	(0.03)	(0.04)	(0.01)	(0.01)
Mother is Married	2.12**	2.59**	0.88	1.08	1.59**	1.60**
	(0.45)	(0.55)	(0.15)	(0.31)	(0.17)	(0.16)
Mother's Age	1.05**	1.02**	0.99	1.023	1.01**	1.01**
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.005)
Child Number of Siblings	1.51**	1.40**	1.03	0.99	1.32**	1.29**
	(0.09)	(0.09)	(0.08)	(0.11)	(0.05)	(0.05)
Family is Religious	1.48**	1.82**	1.23	1.52**	1.48**	1.50**
	(0.21)	(0.26)	(0.26)	(0.36)	(0.12)	(0.11)
N	11,052	9,298	14,096	10,761	34,446	45,207
Region Control	✓	✓	✓	✓		✓
Other Demographics	✓	✓	✓	✓		✓
Year Control					✓	✓

$^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$

Dependent variable: Probability of child being homeschooled. Data provided by the National Center for Education Statistics Parent and Family Involvement in Education Survey (NHES-PFI) years 2003, 2007, 2012, and 2016. Both the partial model and the full model include all of these years. Data are in terms of odds ratios. Mother's Education is defined as approximate years of education. Year fixed effects included in overall (combined) model to control for variations across years. Region fixed effects control for differences between national areas and community types across students.

I argue that the mothers with higher levels of education receive greater levels of utility by homeschooling their children than their expected increase in household income. This may be due to a number of driving factors, including family pressure, beliefs about the educational system, or other household characteristics. This may also be an indicator of the personality characteristics of the women who want to homeschool their children. Previous research suggests that parents who homeschool are oftentimes motivated by a strong sense of efficacy for helping the child learn (Green and Hoover-Dempsey, 2007). In this perspective, it would make logical sense that better-educated

mothers are more capable of providing better instruction to their children.

Of the demographics tested, the three strongest, singular demographic predictors of the decision to homeschool are: parental education, the race of the child, and the religious activity of the family. However, I find that the age and gender of the child as well as whether or not the child was born in the United States is not a significant predictor of the decision to homeschool. I also find that the marital status of the mother when included as a singular predictor is not statistically significant.

Previous research suggests that various demographic variables have no impact on the choice of parents to homeschool their children, and thus the group of people who decide to homeschool their children are highly diverse (Collom, 2005). I find, however, that while the pool of homeschooled students are heterogeneous in terms of demographics or socioeconomic status (see Table 1), that there are at least a couple of significant demographic predictors which affect the probability that the parents will homeschool their children, including the number of siblings and religion. The race of the child is, in fact, a statistically significant predictor. For example, children who are White are slightly more likely to be homeschooled whereas children who are Black are roughly 38.4% less likely to be homeschooled than similar children who are Hispanic, Asian, or of other ethnicities. However, whether the child was born in the United States or not is not significant, and neither is the sex or age of the child, given that the child is between 5 and 19 years old. In general, the probability that any given child will be homeschooled is small; in fact, the mean estimated probability of a child being homeschooled was just 1.8%, and the greatest estimated probability of any single child in the all-years model was 17.2%.

V   Conclusion

Based on the results, there are now several implications to consider based off of the results of the more fully-informative model in Table 2. First, I have found several important factors which affect the probability of a child being homeschooled. It appears that mother's education has a slightly positively effect of the child's likelihood of being homeschooled, and that income is negatively correlated with the probability of homeschooling. Perhaps more interestingly, I have also found that on average, mothers with higher levels of education receive greater utility through homeschooling their children than through the additional income it would otherwise provide.

One interpretation of the results is that as parents' wealth increase, the opportunity cost of

homeschooling their child or enrolling them in a homeschool becomes more costly. Thus, the parents choose to work and send their children to a formal school instead. However, it could also be the case that the more wealthy parents are able to afford for their child to enroll in a formal school. Additional research would be necessary to declare any sort of statement regarding the opportunity cost of homeschooling.

The result that the effect of mother's education on the decision to homeschool has steadily decreased over the years is fascinating. This could occur for a variety of reasons. One of the stronger arguments for this occurrence regards the feminist movement and the role of mothers in the household. Specifically, the idea of mothers working rather than staying home has become much more popular over the decades, and has continued to rise between 2003 and 2016 (citation). As more females who otherwise would be at home teaching their children are out in the workforce, and as the stigmatization and gender-based inequality of working females decrease, the opportunity cost of women homeschooling their children increases.

This scenario would predict not only that the effect of mother's education on the probability of homeschooling would become less significant over time, but in fact that it would decrease, so that in future years, the effect would become negative. In other words, it would be expected that, over time, that as mother's education increases, less homeschooling would occur, since both the opportunity cost and social costs of working is decreasing (citation stating that wage discrimination is decreasing for women). This notion is further supported by the fact that there were only strict decrease in the coefficients of mother's education in Figure 2. If this is indeed the case, then a decrease in the number of children being homeschooled should also be expected. Indeed, while there was a slight increase in the percent of children homeschooled between 2003 and 2007 in the NHES sample (2.22% vs 2.87%), there was a steep decrease from 2012 to 2016. In fact, by 2016, the estimated proportion of homeschooled children had decreased to just over half of a percent. Further research could be aimed at determining the reason(s) why the significance of so many demographic variables became insignificant between 2007 and 2012. While the above proposition is logical, another reason for this change is the Great Recession.

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