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Abstract

This paper presents a theoretical model of the way mothers (or primary caregivers) allocate their time and money resources toward the production of child quality and other commodities. Using data collected through 29 open-ended interviews of parents with elementary school age children, I describe parents' strategies for choosing an elementary school. The example of elementary school choice is used to highlight parents' ability to substitute time for money in the production of child quality. In particular, many parents use their time to negotiate the public school bureaucracy to receive the public school and/or the teacher of their choice. The ability to work the public school system to one's children's benefit is strongly associated with socioeconomic background, with poorly educated single mothers appearing to be the least able advocate for their children. Wealthy and busy parents usually do not make big efforts to negotiate the public school system either, because they are able to purchase private school education for their children. Parents who opt for private schools have chosen to use more money (or market good) resources relative to their time to provide their children with a quality education.

Introduction

Both time and money are important in providing for the needs of children. Unfortunately, these two things come into direct conflict with each other for many parents. In order to pay for necessities, as well as any extras such as lessons or preschool, parents must spend time at work; in order to spend time caring for their children, parents must spend time away from work. To understand and evaluate the choices parents make between devoting time to their children and devoting time to paid work, we must learn how parental time and income affect resources available to children.

This paper addresses the following questions: How do parents allocate time and money to secure their children's well-being? What factors are likely to influence the strategies used by parents? In the specific context of providing education for elementary school age children, how effectively can parental time and money be substituted for each other in the provision of high-quality education?

Throughout this paper, I use data I collected through open-ended interviews to try to answer these questions. During the spring of 1998, using a snowball sampling technique, I completed 34 interviews of Bay Area parents with children under the age of 13 from a wide range of socioeconomic backgrounds. Twenty-nine of these families contained children who were at least elementary school age. I interviewed 11 single mothers, 1 single grandmother, 1 married father, 16 married mothers, and 5 married couples. All of the single mothers (and the single grandmother) were in school or working. Of the 21 married mothers, 16 were working or in school. The father I interviewed was retired and the primary caregiver of his children. Thirteen of the families were white, 5 were black, 2 were Latino, 4 were Asian, and 10 were of mixed race. All the respondents were English speaking. Parents' answers detail how they make decisions about their use of time and money and, thus, how they influence what types of care, education, and other experiences are available to their children.

In the next section of this paper, I present a theoretical model for mothers' decisions surrounding their use of time and the purchase of market goods. In section 3, I discuss some empirical findings focusing on the strategies (if any) parents use to ensure quality elementary school

education for their children. In the last section, I conclude with a discussion of my plans for future research.

Theory

Theoretical Model

In Gary Becker's model of time allocation (Becker 1965), households are assumed to combine both time and market goods to produce commodities. Willis (1974) and DeTray (1974), in their models of fertility decisions, adapt Becker's model by separating "child services" (C) from other commodities (Z) and assuming that parents maximize utility equal to U(Z,C), where C is a function of both the number of children and the "quality" of children. In the model presented here, the fertility decision is assumed given and is removed from the analysis, and only child quality (Q) is separated from all other commodities (Z). Child quality refers to child well-being in a very general sense and includes emotional and psychological well-being, behavior, health, and cognitive ability. Q can be viewed as the average quality of children within one family. The production functions for Q and Z are

$$) \; i = 1 \ldots. M, j = 1 \ldots. N \quad (1)$$

$$k = 1 \ldots. R, l = 1 \ldots. V \quad (2)$$

where are market good inputs and are the mother's time inputs in the production of Q; are market good inputs and are the mother's time inputs in the production of Z; S is the socioeconomic background of the parents and includes such things as social networks, race, and education levels; F is the amount of child care from fathers available to mothers; and O is a vector of children's characteristics, including the age and number of children and their innate ability. Q is assumed to be increasing in and and quasi-concave, and Z is assumed to be increasing in and and quasi-concave. Mothers are assumed to maximize the utility function

(3)

subject to the money and time constraints

(4)

(5)

where and are the prices of and , respectively, for all i and k; T^w is the mother's paid labor time; W is the mother's wage rate; A is the mother's non-labor income, including the earnings of the father; and T is the total time available to the mother.

Equations 4 and 5 can be combined into one constraint called the full-consumption, full-income constraint

(6)

Both the money and time costs of producing Q and Z are shown on the left-hand side of equation 6, and total possible income if mothers spend all their time in the labor force is shown on the right-hand side.

Maximizing equation 3 subject to equation 6, we get the following standard first-order conditions:

for all i, j, k, l (7)

where the equality sign will hold for mothers who are in the labor market. This equation tells us that mothers will equalize the price-adjusted marginal productivities of their market good and time inputs. In other words, in equilibrium, the amount of utility a mother will gain from working an additional hour and increasing commodities and child quality through market inputs (and) should be equal to the amount of utility she will gain from not working that additional hour and increasing commodities and child quality through time inputs (and). Women who do not work cannot increase their time inputs any further, so the price-adjusted marginal productivity of their time inputs will be higher than the price-adjusted marginal productivity of their market good inputs.

Focusing only on child quality, equation 7 can be simplified to

for all i, j (8)

where again the equality holds as long as the mother is in the labor market. Equation 8 shows us that as the price of time inputs increases (i.e., wages increase), mothers will reduce their time inputs relative to their market inputs to child quality, thus increasing the marginal productivity of their time inputs relative

to market inputs until the equation is once again equalized. If wages decrease or the price of market inputs increases, the opposite would happen. Of interest is how differences in the amount of time fathers are available for child care (F), socioeconomic background (S), and the characteristics of the children (O) affect and and thus affect mothers' allocations of time and market goods to their children.

Assumptions of the Model

The model presented contains seven implicit assumptions. First, the only choice variables in the model are and . Unearned income (A), socioeconomic background (S), father's child care time (F), and characteristics of the children (O) are assumed to be exogenous.

This assumption can be disputed on a number of grounds. Unearned income and father's child care time may be endogenous because father's and mother's work schedules may be decided jointly. In addition, among poor households, hours at work and unearned income may be negatively related because of welfare programs. Ex ante, the age and number of children are unlikely to be exogenous because women have a large amount of control over their fertility. Ex post, however, the number of children is given. Idiosyncratic tastes for children that lead some women to have more children and to spend less time at work could bias estimates of how children affect women's work decisions. In addition, if mothers who self-select out of work spend time with their children in ways that are both different *and* unobservable compared to mothers who do work, then the estimates of the relationship between market good and time inputs and child quality could be biased.

Second, the prices of market goods (and) are constant across families. This assumption does not hold if financial aid or in-kind benefits reduce the prices of certain goods for low-income families. For example, my open-ended interviews with parents show that financial aid can significantly lower the price of private schools and preschools for low-income families.

Third, mothers are assumed to know the relationship between market and time inputs and child quality. If mothers are unsure of these relationships, however, they may not be able to choose perfectly between time and market inputs in the production of child quality. Parents' goals for their children are often long term in nature, so they do not have an immediate feedback mechanism to gauge the effects of their choices. Interviews confirm that parents are unsure of the relationship between time and market inputs and child outcomes. In discussing the benefits of paid child care, James said, "I've read studies that if you go into a good child care, it's actually better. They actually get more interaction, they learn better, they get more

socialization, contact, simply because a day care center may have all kinds of finger paints and all that stuff that we don't have here." Another parent, June, disagreed: "I don't think I've really seen any research that socializing the kids with these early programs is that much more helpful. I mean, some research says yes and some says no. I'm not sure." These parents are both well-educated and are presumably better informed about the relationship between time and market inputs and child quality than less-educated parents. They come to different conclusions about the benefits of day care, however, confirming that the exact relationship between time and market inputs and child quality is not known.

Fourth, the model assumes that mothers have complete control over their work hours and their market and time inputs into children. Mothers may not be able to choose optimal levels of time and market inputs, however, because of inflexible work or day care hours or the lumpiness inherent in the purchase of certain market goods.

Fifth, this model assumes a unitary utility function, where fathers have no influence on the decision-making process. Mothers are assumed to maximize utility for both parents. However, some research suggests that men and women have different preferences and that outcomes are determined by the relative power of the husband to the wife (see Lundberg, Pollak, and Wales 1997; Browning, Bourguignon, Chiappori, and Lechene 1994; Thomas 1994). Power is often measured in these studies by relative earnings or education levels. This model assumes that power relations within the family will not alter family decisions of how to allocate time and money to produce child quality and other commodities. If power relations between parents do affect the allocation of resources to their children, these relations should not change the underlying relationship between time and market inputs and child quality, but instead just the levels observed across families.

Sixth, this model assumes that parents cannot produce commodities (Z) at the same time they produce child quality (Q). If the time spent producing commodities includes secondary child care time (i.e., time spent doing other activities while also looking after children), this time may affect child quality. The appropriate measure of time inputs may depend on which child outcome is being studied. For example, children's cognitive abilities may be affected by the amount of time mothers spend directly

interacting with them, but their emotional well-being may depend on the overall amount of time mothers spend at home.

Lastly, the model assumes that parents care only about the average level of child quality across their children. It seems certain, however, that most parents wish for each of their children to attain a certain level of well-being. Beyond that point, parents may wish to invest additional resources where the returns are likely to be highest. The level of equality with which parents treat their children is likely to vary across socioeconomic groups and cultures. For example, it may make sense for a poor family to devote considerable resources to its brightest child in the hopes that she can be relied upon to support the rest of the family in later years. Parents in other cultures invest a disproportionate share of resources in their oldest child. In the United States, among middle-class families, parents appear to prefer a certain level of equality among their children.

The Effects of Socioeconomic Background

Socioeconomic background influences the resources parents can provide for their children. Socioeconomic background affects mothers' wage rates and thus affects children through the resource constraint (equations 4 and 6). Differences in wages affect the relative cost of time and market inputs to child quality. Wage changes have both a substitution and an income effect working in opposite directions. Thus, the effect of wage changes on the allocation of mothers' time is ambiguous.

Socioeconomic background also influences what parents consider to constitute child quality. For example, Melvin Kohn (1969, 1979) found that middle-class parents value autonomy, while working-class parents value obedience to authority. If parents have different goals for their children, then they will provide them with different resources in order to obtain those goals.

Related to the last point is that the social norms of people from different socioeconomic backgrounds are likely to affect the strategies they use to produce child quality. These norms shape parents' beliefs about the effectiveness of different inputs into child quality, and these beliefs will be more important than the actual effectiveness in determining mothers' choices between inputs. For example, Phyllis lets her children spend the afternoon playing in the backyard because "children should have a

childhood, so I just let them play." In contrast, June is very concerned that her children be fully occupied. Every afternoon, weekend, and summer is booked solid because "if you're not kept busy, god knows what you can get involved in, just for boredom's sake."

In addition, the ability to provide certain types of time inputs in the production of child quality depends on socioeconomic background. An extreme example is that illiterate parents cannot read to their children. A less extreme example is provided by Cindy, one of the mothers I interviewed. Cindy is a highly educated but time constrained single mother who complained about the time she had to invest in order to deal with the problems in her daughter's public school. However, she noted,

> I probably have more advantages than a lot of people because I'm educated. And I sort of have certain expectations, but I think all of these other kids, not all of them, but … not everybody has it. They may not have the language skills. They may not have the expectations. They'll take what the teacher says.

> Community resources available to parents differ by socioeconomic background. Fuller, Coonerty, Kipnis, and Choong (1997) have found that Latino neighborhoods in California have fewer day care and preschool institutions available to them than other communities. They conjecture that differences in child care slots across communities may be related to "variation in local counties' historical commitment to expanding child-care availability."(p. 27) Latino communities may not have been able to organize as effectively as black communities to bring Head Start and other preschool programs into their areas (Fuller et al. 1997, p. 29). Such a supply side phenomenon (rather than a demand side one) affects the work decisions of the parents in these communities and thus the amounts of time and market

goods available for their children.

The value and extent of social networks – including friends, neighbors, relatives, and institutions – are influenced by socioeconomic background. Social networks provide parents information and resources that would require time or money to obtain without such networks. Many people get information on child care, schools, and financial aid opportunities from their family and friends. Open-ended interviews show that working-class and poor families are more likely to live near relatives and thus rely on them for child care. More professional families are less likely to live near their families (they have frequently moved for school or employment reasons) and thus cannot rely on their families for child care. Relatives are also used for financial assistance by parents from a wide variety of socioeconomic backgrounds. Parents gain access to information through institutions with which they are affiliated. For example, the University of California at Berkeley has an email parents' list where staff, students, and faculty who have children can write in and ask questions that are then answered by other parents. The list provides information on a variety of subjects, including local public and private schools, child care and family day care centers, housing, doctors, and parenting practices. This email list is an enormous resource for parents associated with the university.

Because of factors such as those discussed, the productivity of mothers' time inputs will vary across socioeconomic background. The productivity advantage should lie mostly with highly educated mothers. However, the relationship between mothers' education levels and the productivity of time inputs is unlikely to be linear. In addition, the productivity differences in time inputs may exist largely because of

differences in the types of activities mothers do with or for their children, rather than in differences in productivities within specific activities. For example, Hill and Stafford (1980) found that, among married women, more educated mothers perform a wider variety of tasks with their children, including reading and talking to, playing with, and teaching them. In contrast, Stafford (1987) found that mothers' education levels do not appear to affect child outcomes once income levels are controlled for, suggesting that education increases productivity in the marketplace but not at home.

The Amount of Available Child Care from the Father

The real wage rates of mothers are reduced by the hourly cost of their child care. If the child(ren)'s father can provide child care, the real wage rate of the mother is the same as her market wage rate. Higher real wages increase the price of time inputs, and thus mothers will substitute away from time inputs and toward market inputs in the production of child quality and other commodities. The higher real wages caused by fathers' child care time also have an income effect, however, because the resources available to mothers are greater the more time fathers are available for child care (holding mother's unearned income constant). Mothers with more resources can choose higher levels of child quality and other commodities, but their production requires the time of mothers outside of work, causing the mother to work less. Thus, the income and substitution effects work in opposite directions and offset each other. Because of these offsetting effects, economic theory tells us that mothers who have free child care available to them from the fathers of their children are more likely to be in the labor force than mothers who do not (holding everything else constant), but the effect of this free child care on their total hours of work is uncertain.

The Number, Age, and Ability of Children

The relative productivities of time and market good inputs to child quality are also likely to vary with the number, age, and innate abilities of children. Previous studies have assumed parents will use more time relative to market goods in producing children or child quality than they do to produce other commodities (see, for example, Willis 1974). The model presented previously does not make any assumptions about the time intensity of child quality relative to other commodities. However, it is likely that the time intensity of producing child quality decreases as children age. For example, an infant may require high levels of time relative to market goods, but a college-aged child requires very little time and relatively high levels of market inputs.

In addition, because of joint production possibilities, additional children may change the productivity of time inputs relative to market inputs. For example, it takes the same amount of time to read to two children as it does to one child, making time inputs more productive (at least if the children agree on the book). However, market inputs may also be more productive because only one book is required to read to two children. How the productivity of market inputs relative to time inputs changes as the number of children increases is unknown a priori. How the number of children affects the use of market and time inputs is often most relevant when parents decide whether to work and pay for child care or to have one parent stay at home. The cost of child care generally rises proportionally with the number of children, but the cost of having one parent stay home does not. Therefore, mothers should be less likely to work the more children they have. Maddy is a stay-at-home mother of a five-year-old and three-year-old twins. "When I knew I was pregnant with twins, I pretty much decided I was going to leave the job, but I didn't … I told

them I was going on leave … 'cause I really didn't know what would happen. I mean I might have lost one." Once she had had the twins, she "decided it was totally impractical [to work]. I just wouldn't have taken home enough money."

Heterogeneity in innate ability across children may affect parental choices of time and market goods and bias the relationship found between time and market inputs and child quality. Margaret is the mother of a son with severe dyslexia. "When the problems with our older son started to surface and we had him evaluated, we looked at the public schools, and at the time we were advised not to put him in public school because of the funding issues for special ed." Margaret and her husband had moved to a town specifically because of the high-quality public schools in the area, but ended up sending their child to private school because of his learning disability. If problem students are more likely to attend private schools or get extra time and market inputs, this could bias down estimates of the effects of market and time inputs on child quality.

On the other hand, parents may try to give extra time and/or market inputs to especially talented children. For example, one mother, explaining why she had put her "gifted" son into private school, said, "You can't put a gifted kid in with a slow kid and expect that child to not be completely bored out of their mind. I think the gifted children need, they need extra care too. I don't think that happens in the public schools." If parents give extra time and market inputs to the brightest children, estimates of the effects of these inputs on child quality will be biased upward.

Choosing an Elementary School: Findings from Open-Ended Interviews

Over the past 25 years, starting with the Serrano v. Priest court decision and ending with Proposition 13, California has transferred the financing of public schools from cities and towns to the state. City and towns' property tax revenues are redistributed by the state in order to equalize per pupil expenditures

across cities and towns. In reality, large disparities still exist because schools get money from other sources, most often from Parent Teacher Associations (PTAs). Therefore, in general, wealthy school districts are still able to spend more on their students than poor school districts. This phenomenon can even be seen within school districts. For example, Maddy noted the difference in the amount the PTA for her neighborhood school was able to raise compared to the PTAs for other elementary schools in her city. "Their PTA [for her neighborhood school] raises less than $20,000 a year. They can't even raise enough for a new play structure. And other PTAs are raising $90,000 and above. They're paying for after school Spanish classes and everything." Since the Serrano v. Priest decision, per pupil expenditures in California have fallen dramatically - and with them, test scores. The public schools in California have a reputation for poor quality and the result, at least in the Bay Area, has been a move to private schools.

It is important to note that private school is a "lumpy" good, meaning its purchase is all or nothing in nature. Parents cannot purchase a few days of private school a week; they have to choose between sending their children to private school or public school, not some combination of the two. The lumpiness may not allow parents to perfectly optimize their choice of school quality and has implications for the allocation of time and money resources in the provision of education for children. For example, if private school tuition increases, economic theory predicts that both the income and the substitution effect would cause parents to use more public school and less private school. In the aggregate, these two effects would be seen because some parents would move their children to public schools. But on an individual basis, parents cannot marginally decrease their use of private schools and increase their use of public schools. Therefore, higher tuition costs could

have opposite effects on different women's labor supplies. If higher tuition costs do not cause a move to public schools, then mothers might work more in order to pay for the higher tuition. If higher tuition costs do cause a move to the public schools, then mothers might work less and devote more *time* toward producing a quality education for their children.

The effects of the lumpiness of the purchase of private school and higher prices can be seen as children transition from elementary school to high school. In the Bay Area, private high schools generally cost more than private elementary and middle schools, forcing parents to either work more in order to pay for tuition costs or to switch to public schools. Margaret, a stay-at-home mother, noted that the tuition for the private school her children currently attend is "roughly $8,000, $8,500 a year. To go from that up to twenty is a huge jump, and we have two kids who are relatively close in age…. I don't know what will happen. They may very well wind up in public high school." She added, however, "If Jeremy winds up going to a high school that costs $20,000 a year, I'll be going back [to work] sooner rather than later."

The parents I interviewed generally invest time, money, or both in ensuring quality education for their children. Those who choose higher levels of market inputs relative to time inputs send their children to private schools. Thirteen of the families I interviewed have children in private schools. Some of these families are low income but manage to afford private school through financial aid either from the school or from relatives. The decision to send children to private school is generally made out of a concern that the local public schools are of poor quality and will not provide an adequate education unless the parent carefully monitors them. Lydia

described why she and her husband chose private school for their children instead of the local public school:

> The public school in our area is not terrible, but we felt there would need to be a lot of oversight to make sure, since there were large classes and so on, that our children weren't being lost … We in a way felt like we were buying some measure of insurance that our child get more attention, that things would be brought to our attention, and that overall, the academic level would be more challenging [in the private school].

Lydia and her husband are both lawyers working more than 40 hours a week. She did not feel that they could make the time investment needed to ensure that their children's education in the public schools would be adequate. She implies that the public schools would have been an option if she or her husband had more time to oversee the job these schools were doing.

In contrast, Maddy, who lives in the same city, described the time-intensive research she did to learn about the quality of the local public schools and how to get her first choice of school. She said that not working allowed her

> to organize parent meetings to find out how other people worked the system. [Not working] gave me a lot of flexibility to do this research, and this is like my job. That's what I sort of saw it as. This was like an assignment for me to research this whole school issue and be an advocate for my daughter and do everything I could to make sure that she got an assignment we were comfortable with.

Her school district lets parents request schools outside their residential zone. These requests are granted if the parents have a valid reason for the transfer. Examples of valid reasons are that parents have child care

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