GENDERED INVESTMENTS:
PARENTAL EDUCATIONAL INVESTMENTS IN JAPANESE FAMILIES*

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This research was supported by a dissertation grant from the Japan Foundation. I would like to thank Bing Han at the Penn State Statistical Consulting Center for his help with the generalized linear mixed models.

ABSTRACT

This research challenges existing exchange-based models of educational investment and proposes an alternative model of investment in Japanese families based on parental gender attitudes. Through an analysis of survey data from the National Family Research 1998 Survey, exchange-based models of educational investments arguing that boys drain resources away from their sisters are shown to be inadequate. Parents with conservative gender attitudes are found, overall, to invest less in their daughters than parents with more liberal attitudes. A similar relationship is not found for boys, however, nor are indicators of exchange motives found to play a significant role in the investment process. In families with conservative gender attitudes, girls with brothers are found to receive *larger* educational investments than girls without brothers. Exchange-based theories of investment are challenged and the parental gender attitudes underlying investments, revealed.

How do parents make decisions regarding their children's education? Are investment decisions made independently for each child or does the intended investment in one child shape the educational investment that another receives? Existing research argues that girls and boys are in a competitive market for educational resources with boys draining resources from their sisters (Becker 1991; Conley 2000; Ono 2004; Powell and Steelman 1989, 1990). I argue, however, that we must integrate both quantitative and qualitative methodology in an attempt to critically examine existing theories of investment and to build new models based on parents' narratives of their investment decisions.

EXISTING LITERATURE

The existing literature includes several theoretical models of parental educational investments. This paper focuses on the literature dealing with the relationship between sibship composition and educational attainment. The resource dilution perspective (Powell and Steelman 1995; Steelman and Powell 1991), or quantity-quality tradeoff hypothesis (Becker 1991), addresses the availability of resources for investment in children's education. This perspective suggests that the resources available for investment in education are inversely related to the number of family dependents. Empirical evidence supporting this perspective in US families shows that families with many children have fewer resources available to invest in each of their children (Powell and Steelman 1995; Steelman and Powell 1991).

An extension of the resource dilution perspectives looks specifically at the influence of the *sex* composition of the sibship on children's educational attainment (Conley 2000; Hauser and Kuo 1998; Ono 2004; Powell and Steelman 1989, 1990; Steelman, Powell, Werum and Carter 2002). According to this perspective, there is a competitive market for resources among children in a family. The sex composition models are based on the *exchange perspective* assumption that boys are "better" investments than their sisters. Boys are more likely to get higher paying jobs and consistently remain

in the labor force and therefore are more likely than their sisters to provide greater returns (either to the parents or the family as a whole) on the educational investments that they receive. Some empirical evidence suggests that the presence of sons negatively affects the investments that parents make in their children's education (Powell and Steelman 1989, 1990). However, other scholars caution that this negative effect of brothers is only for girls (Ono 2004; Conley 2000). In other words, *opposite* sex siblings drain resources away from a child. Others have not found any consistent, significant effect of the sex composition of the sibship on children's educational attainment (Hauser and Kuo 1998).

THE CASE OF JAPAN

Japan is a compelling case in which to study parental educational investments for several reasons. In Japan, parents favor sons over daughters in their educational investments. A 1994 survey of Japanese citizens[1] found that while 69% of Japanese parents aspired to at least a university education for their sons, only 34% held such aspirations for their daughters. Differences in aspirations are manifested in the actual enrollment of women and men in college. According to the 2003 Ministry of Education Basic School Survey, while 96% of male high school graduates continuing their education went on to a 4-year university, only 68% of female high school graduates pursuing a higher education did.[2] Children's educational attainment in Japan is largely dependent on parental investment, given the scarcity of public funds and scholarships for higher education.

Overall, the gender equity of educational attainment has increased across the 20th century in Japan. (Figure 1) Men still represent a larger portion of the university student population than do women, however. Significantly higher percentages of women attend junior colleges but junior colleges do not provide the institutional connections necessary to secure a career with promotion

[1] International Comparative Research on "Home Education;" Survey on Children and Family Life.
[2] 31% of female graduates continuing their education went to junior college. If we look at all high school graduates, 41% of men and 32% of women went to a 4-year university in 2003.

opportunities and therefore are not considered in the same category as 4-year universities. Even if a parent spends roughly the same amount of money on a 4-year degree for their son and a 2-year degree for their daughter, the investments are qualitatively different in terms of the labor market opportunities afforded by each. For this reason, "equity" in educational investments is achieved only when parents send both their sons and daughters to universities. Equity, for the purposes of this research, is not determined by the amount of money spent on sons and daughters' education but by the *level* of education attained by men and women. Before looking more closely at the micro-level transfers occurring between parents and children, however, we will first turn to the institution in which these transfers take place: the Japanese family.

THE JAPANESE FAMILY SYSTEM

According to Ochiai (1997), the Japanese *Ie* family system is "a corporate body which owns household property, carries on a family business, and emphasizes the continuity of the family line and family business over generations" (58-9). The *Ie* family system is a patriarchal family structure characterized by Confucian filial obligation, primogeniture, and the exit of adult daughters from the family of origin upon marriage.[3] Women's expected specialization in the household, provision of care to in-laws rather than their own parents and departure from their family of origin upon marriage limit the transfers made to daughters. Until recently, women had to change their name after marriage. Upon marriage, a daughter's name is removed from her father's family register because she cannot be listed in two different family registers. Similarly, a second or third-born son adopted by a family with all daughters would also be removed from his parent's register and added to his new wife's family register. The overwhelming majority of family exit cases, however, involve women joining their husband's family rather than vice-versa. In both cases, the child departs their family of origin, both figuratively and legally, upon marriage. Under the *Ie* family system, women are considered less

[3] As I defined it earlier, patriarchal family structure refers to a persisting organization of roles in the family facilitating men's economic and social power over women.

desirable candidates for receiving scarce parental resources. This system is unique to Japan; daughters in Korea do not face the same family system in that they retain their family name even after marriage. In Taiwan, daughters often provide remittances to their families after leaving the parental home, thereby providing more concrete returns to their families of origin than do their Japanese counterparts.

Japanese parents traditionally, especially in farm families, invested in the education of younger sons while transferring land and property to the eldest son who was expected to live with and care for his parents in old age (White 1987). Important changes have been made in the traditional *Ie* family system of Japan since World War II, including changes in the inheritance laws, increasing numbers of nuclear family households, women's declining fertility, and increasing female labor force participation and divorce rates. This research focuses on parental *educational* investment decisions made in this changing family context.

DATA AND METHODS

In examining existing models and building an alternative model of parental investment, use of both quantitative and qualitative methods is ideal. In this research, I employ a design strategy which Morgan (2004) has identified as "follow-up quantitative designs" in which "the substantive generalizability" of qualitative findings is demonstrated through a quantitative analysis. Through an integration of a qualitative analysis in which I build a new model of investment from respondents' in-depth narratives and a follow-up quantitative analysis to demonstrate the generalizability of the qualitative findings, I bring multiple methods and types of data to bear on the issue of parental educational investments in Japan. This method has the advantage of being theoretically motivated by existing theory, empirically grounded in *both* qualitative and quantitative data, informed and nuanced by narratives of the *meaning* of investment decisions, and tested using national survey data.

In 2002-3, I conducted interviews in Japanese with 104 respondents, first with respondents living in Tokyo and then with residents of Okinawa. (Table 1) These regions of Japan were selected because of their shared family structure and traditions regarding succession by the eldest son and yet their differences in family size and median family income and as urban versus rural areas. In both regions, I volunteered at a day service center for the aged, observing the daily functioning of these eldercare centers while gaining entré with the communities of older adults. To supplement the interviews with older adults, I also interviewed younger people in both locations. In Tokyo, members of a low-cost English conversation group and in Okinawa, members of a women's organization and a children's organization were interviewed. In all four of these sub-samples, respondents were asked essentially the same questions regarding their own educational attainment, that of their siblings, and that of their children. Open-ended questions about respondents' investment decisions were followed by more specific probes to capture their valuing of education for sons and daughters and their gender ideology. The qualitative analysis of written questionnaires, ethnography, and in-depth interviews provide invaluable insight into the motivations underlying parental educational investments. Such analysis of the meaning of investments and the conflict parents face in making investment decisions is not possible when analyzing quantitative data alone.

The quantitative data used in this analysis come from the Japanese Family Sociological Association's 1998 National Family Research (NFR98) survey.[4] This survey includes a nationally representative sample of 6985 respondents and questions regarding the educational attainment of up to three of the respondent's children in addition to measures of the respondent's gender attitudes. (Table 2) Using generalized linear mixed models, I examine the role of the sex composition of the sibship and parental gender attitudes in shaping the educational investments that parents make in their

[4] The data for this secondary analysis, "Nationwide Survey on Families, National Family Research Group, Japan Society of Family Sociology" were provided by the Social Science Japan Data Archive, Information Center for Social Science Research on Japan, Institute of Social Science, The University of Tokyo.

children. These data are remarkable for their inclusion of information about the respondent's siblings and three of their children. Such data are rare in Japan and provide the unique opportunity to analyze parental investment at the family level through a comparison of investments made in children in the same family. This paper begins with an analysis of in-depth interview data collected to address the gaps in the existing literature. From these data, a new model of parental educational investments is built based on respondents' own narratives of their investment decisions. The implications of this model are then tested using the nationally representative survey data.

Generalized linear mixed models are used in this paper to deal with the nonindependece of observations from the same family (sibling data) and because the dependent variable, child's educational attainment, is measured dichotomously and therefore does not have a normal distribution (Littell, Milliken, Stroup and Wolfinger 1996).[5] Since these are "mixed" models, they include both fixed and random effects and I am, therefore, able to assume that family differences are randomly distributed in the population. For this reason, I can generalize my results from this sample of families to other families in the population. This exciting and powerful methodology allows us to appropriately account for the non-independence of multiple observations from the same family. When such clustering is ignored, the standard estimates of the parameters in our models tend to be underestimated (Guo and Zhao 2000).

MEASURING PARENTAL EDUCATIONAL INVESTMENTS

In the qualitative portion of this research, parental investments in "shadow education" such as exam prep classes and home tutors (Stevenson and Baker 1992) and also the child's educational attainment were included as measures of parental educational investments. Although data were collected on the investments that the respondent and their siblings received, this analysis focuses on the

[5] These models were estimated using the GLIMMIX macro in SAS.

investments that the respondent made in his/her children. For this reason, respondents without children are excluded from the analysis.

In the quantitative analysis, the educational attainment of each of the respondent's first three children is used as an indicator for parental investment. Educational attainment is an appropriate proxy for parental educational investment in Japan because of the expense of a college education and the extremely limited availability of public funding for college. It is much more difficult for a Japanese student to attend college without parental support than it is for a student in the United States to do so. In this research, educational attainment is coded as a dichotomous variable: either the child graduated or did not graduate from a 4-year university. The rigid hiring policies and tracking of Japanese firms prevent 2-year college graduates from securing promotion-track positions within Japanese companies (Brinton 1988). For this reason, the employment implications of a 4-year university versus 2-year college educational investment are particularly salient in the case of Japan.

MEASURING PARENTAL GENDER ATTITUDES

Parental gender attitudes are examined in both the qualitative and quantitative analyses. In both, respondents were asked to respond whether they agree, somewhat agree, somewhat disagree, or disagree with the statement: "men should work outside the home and women should care for the family."[6] Respondents in the qualitative sample were also asked to explain their answer and whether this was an ideal or an attainable reality in their family. In addition to this measure, respondents in the qualitative sample were asked to respond to the following statements: "when a woman has a baby, she should quit her job," "when a daughter marries, she leaves her family of origin and joins her husband's family," and "it is more important for a son than for a daughter to attain a university degree."

[6] In the quantitative analysis, responses were recoded dichotomously with 1=strongly agrees that men should work outside the home and women should care for the family and 0=agrees-strongly disagrees with the statement. It is expected that those who strongly agree with this statement are most likely to shape their investment behavior accordingly.

Interviewees were also asked open-ended questions about their educational investments and their gender attitudes.

INDUCTIVELY DEVELOPING A NEW MODEL OF INVESTMENT

I set out to uncover the motives underlying parents' investment decisions through in-depth interviews. I began my interviews with Japanese respondents by asking open-ended questions about their investments in their children's education. I asked what level of education each child attained and why they continued on to higher education or stopped their schooling after completing compulsory education. I also asked about parental investment in "shadow education" (Stevenson and Baker 1992). I asked respondents to explain why certain children received higher levels of education and greater shadow education investments than their siblings. In this way, I hoped to uncover the motives underlying parental inequitable educational investments and to compare these motives with existing models of investment decisions. In the respondents' narratives of their investment decisions, I discovered two, sometimes conflicting, priorities. Parents made frequent references to both gender attitudes and a preference for equity among their children.

GENDER ATTITUDES

In their explanations of their investment decisions, parents often referred to issues of family membership and to appropriate gender roles. They discussed how their daughters are not lifelong members of their families and will someday leave their families to join their husband's and therefore should not be invested in. Many also expressed the belief that girls should focus on the domestic sphere while boys should achieve academically—these are their ascribed roles. While the first response may seem to represent *exchange* motives with parents investing the most in the children who will remain in the family and provide continued returns to the family and the second response

represents parental gender attitudes, in fact, I will show that *both* responses can most accurately be categorized as representing parental gender attitudes.

Several respondents mentioned that they thought it was less important to invest in their daughter's education because she is only a transitory member of the family. A 78 year-old Okinawan woman whose only son attained a college education while her daughters only finished junior high explained the discrepancy this way:

> The eldest son is his parent's successor. We spend our life protecting our own home and daughters leave to be brides in other households. In any household, the eldest son continues the family line… Because the eldest son is his parents' successor. Daughters marry and become part of another family. It's because the eldest son is the successor.

This woman argued that an investment in her daughters' education was not appropriate because they would leave the family as brides. However, based on her description later in the interview of her relationship with her daughters, it is clear that family membership is not an indicator of the provision of *returns* to parental investments. The respondent's daughters provide her with more emotional companionship and care than either her son or her daughter-in-law. She explained:

> If something comes up, they [her daughters] come to help. Also, if there is some food or something unusual, they put it in a lunch box or some Tupperware and bring it to me to try. And we get along better than I do with my daughters-in-law. We can talk about anything or nothing. To a lesser extent this is true of my daughter-in-law. My daughter-in-law has her own way of thinking. If my daughter-in-law leaves me untended and my daughters take care of me, then my daughter-in-law has negative feelings.

This woman explains that she underinvested in her daughters because they are only transitory members of her family and yet, from her own description of her relationship with her daughters, it is clear that she has a much closer relationship with her married daughters and receives more emotional care and support from her daughters than from her son. For this reason, I argue that the reference to daughters' transitory status in the household as a reason for underinvestment is an indicator of the respondent's gender attitudes and not of exchange motives.

Similar references to family membership were made by other respondents. Those that mentioned the transitory membership of their daughters in the family as a reason for underinvestment

went on to explain that they received the majority of their emotional and even physical care from these daughters.[7] An 82 year-old Okinawan woman explained her motives for underinvestment in her daughters as based on their transitory memberships:

> I spoiled my son and disciplined my girls. I did this because they would leave our family as brides… Girls leave as brides and, no matter what, must care for their families, so I think high school is enough for girls.

This woman went on to explain that each of her three children provides her with care, even though the daughters have married and left the family. She explained:

> I talk to the three of them the same…I'm very grateful. We treat each other well. Of course the girls cherish their parents. Even though they left as brides. I am very grateful that they always worry about me.

I argue that those parents citing women's transitory status in the family of origin as a motive for gender inequitable investments in children's education are motivated by conservative gender attitudes and not by exchange factors in their investment decisions. As we see, girls' transitory status does not prevent them from providing lifelong returns to their parents. Instead, this response represents parents' gender attitude that boys have a special status in the family as the successor and therefore should be educated accordingly. Providing their daughters with higher education may actually "spoil" them and make them unsuitable wives. For parents with traditional gender attitudes, girls do not hold such a special role in the family and instead should be "trained" to take on the domestic duties they will have as brides. In this way, gender attitudes about family roles and the gendered division of labor shape parental investment decisions. Exchange factors such as provision of care in old age or remittances to the family were not mentioned by respondents in their investment narratives, despite the emphasis in Japan on reciprocity in social relationships (Befu 1977). Some Japan scholars argue that this emphasis on reciprocal exchange transcends kin bonds to specifically shape interactions between parent and

[7] This was primarily an answer given by Okinawan respondents. Only one Tokyo respondent mentioned the daughter's transitory membership in the family of origin as a motive for gender inequitable investments.

child (Benedict 1989). I, however, did not find evidence that a concern with reciprocity shapes parental investment decisions.

When asked general, open-ended questions about their investments and about the value of education in general, respondents explicitly referenced gender attitudes. A 58 year-old woman explained the investments made in her family:

> For men, if they look for a wife, they have to feed their wife and their children and then themselves, right? But women don't have to do this. They are fed. So, I think it's ok if the wife is a little lower than the husband. Also, if a girl studies too much, she won't be able to find a man. That's the case in Okinawa… So that's why only so much education (is appropriate).

According to this woman, a college education is simply not appropriate for the roles women are raised to fill. In these open-ended questions about their investment decisions and about the value of education for girls and boys, it became clear that gender attitudes were playing an important role. An 83 year-old Okinawan woman also referred to gender roles in explaining why a son's education is more important than a daughter's:

> Because men go out in society. In our time, there was a difference between women and men and men had to be great. Parents encouraged the successful careers of boys over girls. Girls left as brides… These days it seems that men and women are equal but in my heart I understand that men prevail.

In response to the frequent mention of gender attitudes in the narratives of educational investment decisions, I began asking respondents more targeted questions regarding their own gender attitudes. Respondents that underinvested in their daughters tended to express more conservative opinions overall regarding gender roles. For example, the 58 year-old Okinawan woman quoted above also expressed attitudes regarding the gendered division of labor that are quite conservative. She said:

> I think that until children get big enough, their parent needs to care for them. You can't leave that to others. If a child doesn't receive love, if she is cared for by others, then they don't know when she's sick and has a fever. So, women should stay by their children until they're bigger and I think this gives the child peace of mind.

This woman went on to explain that, when financially feasible, men should work outside the home and women should care for the family. This conservative gender ideology is reflected in her opinion

(quoted above) that women do not need a higher education and that women are somewhat lower status than men in the family.

The gender attitudes of other gender-inequitable investors in the sample are similarly conservative. The 82 year-old woman quoted above about her opinions regarding the transitory membership of daughters in the family also expressed conservative attitudes about the gendered division of labor. In response to a question asking if women should quit their jobs after having children, she explained:

> After having children they must raise them and care for the home. If children are left untended while their parents work, it's sad for them… If a woman works outside the home, it's bad. It's natural to care for the home… People who have jobs can't do this. But of course some have to work.

Those with conservative gender attitudes were more likely to invest gender inequitably in their children than were those with liberal gender attitudes. Using data from a written questionnaire distributed to survey respondents, an average gender attitudes score was created for each respondent using the respondent's individual responses to questions about the importance of a son's education compared to a daughter's, the importance of a woman quitting her job after having children, married daughters' membership in their family of origin and a gendered household division of labor. Parents who agreed overall with these gender-conservative opinions invested less in their daughters than in their sons. Nearly a third of the respondents with conservative gender attitudes invested more in their sons than their daughters while only 1/7 of the parents with liberal gender attitudes did.[8]

From respondents' narratives of their investment decisions and their own gender attitudes, it is clear that gender attitudes play an important role in shaping investment decisions. At the other end of the ideological spectrum, respondents with *liberal* gender attitudes were likely to invest gender

[8] A total of 72 respondents were included in this analysis. Only respondents who answered the questions dealing with gender attitudes and their children's educational attainment were included.

equitably in their children. An 83 year-old Tokyo mother of a college-educated daughter explained why she thinks it's just as important for a daughter to attend college as for a son:

> Men and women are equal. Contemporary society is of course that way. The value (of education for men and women) is the same.

Similarly, a 69 year-old Okinawan mother of a female college graduate explained that she disagrees with a gendered division of labor and thinks that an equal sharing of household labor is better. When asked if she thought a son's education was more important than a daughter's, she replied:

> It's not really about being a boy or a girl. I want to support my kids to whatever level they can make it. For their job too, I will respect the job that they want to do.

A clear relationship between parental gender attitudes and the gender equity of investments in children emerged from the interview data that I collected. However, gender attitudes alone do not explain the variance in parents' investment decisions. Another theme emerged in the narratives of investment decisions: a preference for equity. For parents who expressed conservative gender attitudes, this preference for equity was often in conflict with their conservative gender beliefs.

PREFERENCE FOR EQUITY

In their discussions of educational investments and bequests, many parents expressed a preference for giving equitably to all of their children. Both parents with liberal and conservative gender beliefs expressed such a preference. For example, a 54 year-old Okinawan father explained his preference for equity this way:

> We, as parents, always talked about treating our children fairly, equally, so there was no distinction between them. We gave each of them the same opportunities, but now it's up to each of them individually (what they will do with the opportunities)

Similarly, an 84 year-old man from Tokyo described the importance of equity in his family:

> In my family, we don't discriminate. I think about fairness. I don't distinguish (among my children). Because of the extreme preferential treatment received (by my older brother), I feel strongly about this.

And yet, this man also expresses conservative gender beliefs. For example, he explained to me why he feels a college education is more important for a son than a daughter:

> In Japanese society, as long as men are the breadwinners, they have to finish college. …Today, there is increasing gender equality but for a woman, if her husband does well, she can live a life without much hardship… Because men for some reason are somewhat stronger, if a man has his act together, women are attracted to him. It's true in a majority of cases.

This man's attitudes regarding gender and his preference for equity are clearly in conflict. This man actually invested equitably in his sons and daughters, something that we would not have expected from his gender attitudes alone.

Other parents with conservative gender attitudes and a preference for equity among their children were similarly conflicted. An Okinawan mother of a son and a daughter explained that she thinks it's more important for a son to attend college than a daughter. But when pushed to explain this opinion, she brought up her preference for equity:

> It's not that my son is more important; I treat my children the same. It's not an absolute (difference) "because he is a son." They are the same.

This woman also was sending her daughter to college despite her belief that her son's education is more important and that her daughter has special responsibilities in the home as a girl. While this preference for equity is in synch with a liberal gender ideology (both support equal investment in sons and daughters), it is in conflict with conservative gender beliefs for parents with both sons and daughters. These parents must struggle with conflicting beliefs regarding the appropriate roles for boys and girls and with their preference to treat all of their children in the same way. For this reason, I argue, parental gender attitudes alone cannot explain parental investment patterns in mixed sex sibling sets. When faced with investment decisions for both sons and daughters, parents are confronted with the inequity of sending a daughter to only high school and a son to a university. While such an investment strategy is appropriate for a conservative gender ideology, it is in conflict with their preference for equity. In comparison, conservative parents of all boys or all girls, face no such conflict. Conservative parents of all girls can feel free to send their daughters to only high school or junior college without facing the unease associated with inequitable investments in their children. For this reason, girls in my interview sample received higher educational investments when they had a

brother than when they only had sisters. In my interviews, preferences for equity were particularly discussed in the context of investments in girls, with parents wanting to make investments in their daughters equitable to those made in their sons.

A 74 year-old Okinawan woman told me about the guilt she still feels over not sending her daughter to a university. This woman expressed conservative gender beliefs consistent with a pattern of underinvestment in girls. She explained her belief about a gender division of labor this way:

> Ideally, a wife would be at home, taking care of the house well, in the kitchen. The father would be a good provider, he would earn a good income. If he earns a good income then they can build a grand home.

Despite her conservative beliefs, she still feels uneasy about the inequity of the investments she made in her sons and daughters. She explained:

> I think studying expands your field of knowledge so I wanted my sons and my daughters to both study equally but when it was my daughter's time to go to school, conditions were bad and we couldn't send her. I always feel badly about this. I sent my sons to college like I had hoped.

In this way, preferences for equity have a powerful effect on the investment decisions that parents make. Parents with both sons and daughters in this sample chose to invest more in their daughters than did parents with only daughters in accordance with their preference for equity among their children—higher levels of investment in their sons actually bolstered the investments made in daughters. The question that remains is whether this surprising pattern of investment exists only in this small sample of respondents or if it is present, even after controlling for other family characteristics, on a national level.

Limitations of Existing Models and a New Model of Investment

Respondents simply did not refer to expectations of returns in their explanations of their investment decisions. None of the parents I spoke with suggested that they chose to invest the most in the child expected to care for them in old age or who they felt was most able to provide monetary returns on their investments. However, it is quite possible that respondents may be motivated by such considerations but not willing to admit to such motives or perhaps not even fully aware of such

motives. For this reason, a quantitative analysis of the patterns of investment in families is desirable to further bolster the claim that existing models of investment do not capture the complexity of investment decisions. In an analysis of survey data, we can test to see if boys and girls are in "competition" for scarce educational resources, as predicted by the exchange models of investment. In the quantitative section of this paper, this question is addressed.

Having shown that existing sex composition models are incomplete in their focus on family structure in explaining patterns of investment, I argue that we should examine parents' often conflicting preferences for traditional gender roles and for equity among their children. Most parents value equity among their own children and yet parents also have global gender attitudes that shape their investment decisions. From the in-depth interview data, it is clear that parents emphasize gender attitudes and preferences for equality over exchange considerations in their investment decisions and their patterns of actual investment support this with parents investing more in their daughters when they also have sons in whom to invest.

Based on these critiques of the existing models of investment, I turn to the National Family Research 1998 survey data to test the predictions of exchange models of investment against the model proposed here that emphasizes competing gender attitudes and preferences for equity. Using survey data, I will examine whether these factors influence investments in sons and daughters differently and will test this model of investment built on interview data.

FINDINGS

To begin the analysis of national survey data, I analyzed the simple relationship among parental gender attitudes, having a brother, and educational attainment separately for sons and daughters. (Figures 2 and 3) As I found in my qualitative analysis, in families with conservative gender attitudes, girls with brothers are statistically significantly more likely to attend a university than are girls without

brothers. This is consistent with the explanation that parental gender attitudes and preferences for equity are competing influences. A statistically significant relationship between having a brother and attending a university was not found for sons in conservative families but sons in families that have more liberal gender attitudes are statistically significantly *less* likely to attend a university if they have a brother than if they do not. This finding is consistent with a resource dilution model of investment in which children compete for scarce educational resources. This leads me to believe that investments are made differently in sons and daughters and therefore, in my multivariate analyses, interactions with the sex of the child will be included. In addition, this simple analysis casts further doubt on the explanatory power of exchange models of investment. Exchange models argue that sons and daughters are in a competitive market for resources. According to this finding, however, brothers actually bolster the investments made in girls.

In order to examine the investments made in sons and daughters in the same family, I turn to the findings from the generalized linear mixed models. After estimating a full model of investment with interactions by the child's gender, I chose to analyze investments in sons and daughters separately because of the clear differences in the factors influencing the investments in each. Of the ten covariates included in the model of investment, seven had a statistically significant (at the 5% level) interaction with the child's gender. When separate models are estimated by the child's gender, it becomes clear that different investment processes are occurring with respect to sons and daughters.

For sons, investment decisions seem to be made according to the predictions of existing models of investment. (Table 3) Being first born, from a family with a higher income, having fewer siblings, and living in a city all statistically significantly increase a boy's likelihood of attending a university. Having older parents also increased a boy's likelihood of attaining a university degree. These findings match the predictions of resource dilution models of investment. Boys receive more resources when there are fewer constraints on the family resources (i.e. more household income, fewer siblings to

compete with). The variable found to play a salient role in the interviews, gender attitudes, was not statistically significantly related to the educational investment that a boy received.

For girls, however, a different story of investment is apparent from the generalized linear mixed model results. For girls, the presence of a brother and parental gender attitudes are both statistically significantly related to the level of education that a girl attains (at the 5% level). Having a brother and having parents with liberal gender attitudes both increase a girl's chances of attaining a university degree. All else equal, a girl with a brother's odds of attending a university are 128% higher than a girl with no brother. Similarly, the odds of attending a university are 40% lower for girls with conservative parents than for girls with liberal parents. Girls who are first born, with fewer siblings, higher family income, and higher parental educational attainment are also relatively more likely to attend a university.

Overall, it is clear from these analyses that investment decisions are considerably more complex than portrayed by resource dilution models of investment. Resource dilution models reasonably approximate the investment process in boys but are simply inaccurate in the case of girls. Brothers and sisters are not in a competitive market for resources. Rather, because of parents' preferences for equity, brothers actually bolster the investments in girls. Parents seem to be more aware of the inequity of not sending a daughter to a university when they also have a son. In addition, parental gender attitudes are also related to the educational investments they make in girls but not in boys. For this reason, we must take into account more than just resource constraints in order to understand the complexity of parental investment decisions in both boys and girls.

CONCLUSION AND DISCUSSION

In this paper I have examined the explanatory power of existing models of parental educational investments in the context of Japanese families. Through an analysis of in-depth interview data with Japanese respondents, I learned that parental gender attitudes and preferences for equity are often competing motives for educational investments. Exchange factors did not emerge as an important theme in respondents' discussions of their investment decisions. In the generalized linear mixed models of educational attainment estimated using national survey data, it became clear that investment decisions are made differently for sons and daughters. While both sons' and daughters' educational attainment are related to family resources, girls' attainment is also statistically significantly related to parental gender attitudes and the presence of brothers in the sibship. The finding that brothers actually bolster the investments that daughters receive casts further doubt on the applicability of exchange-based models of investment in the case of girls and is consistent with the argument presented in this paper that parents are influenced by both gender attitudes and preferences for equity among their children in making investment decisions.

In drawing conclusions from these findings about the mechanisms underlying inequitable educational investments, it is important to keep in mind that the data are cross-sectional. I can only assess the respondents' current gender attitudes in relation to past educational investments in children but am unable to assess gender attitudes at the time of investment. It is unlikely, however, that there is reverse causality with educational investments shaping the respondent's gender attitudes. Research on sociopolitical attitudes suggests that such attitudes are relatively stable across the life course, after a period of fluctuation in youth (Alwin, Cohen and Newcomb 1991). While the intensity of such attitudes may change in later life, the individual's political orientation typically does not. For this

reason, I feel confident that the gender attitudes expressed by the respondents are a reasonable proxy for their attitudes at the time of investment in their children's education.

This research raises questions about the applicability of existing sex composition models of investment in explaining educational investments in Japanese families. In future research, better indicators of girls' expected labor market attachment and of individual scholastic ability are needed to include a full test of economic exchange models of investment as well. In this research, it is assumed that individual academic ability is uncorrelated with gender and therefore the observed gender disparities in parental educational investment cannot be attributed to individual differences in ability. Parents may, however, assess the ability level of their children differently depending on the child's gender. This issue will be left to future research. This paper is the first step in an attempt to challenge the explanatory power of economic exchange models of investment. Additional research is needed to examine the role of sibling sex composition and parental gender attitudes in other cultural contexts as well.

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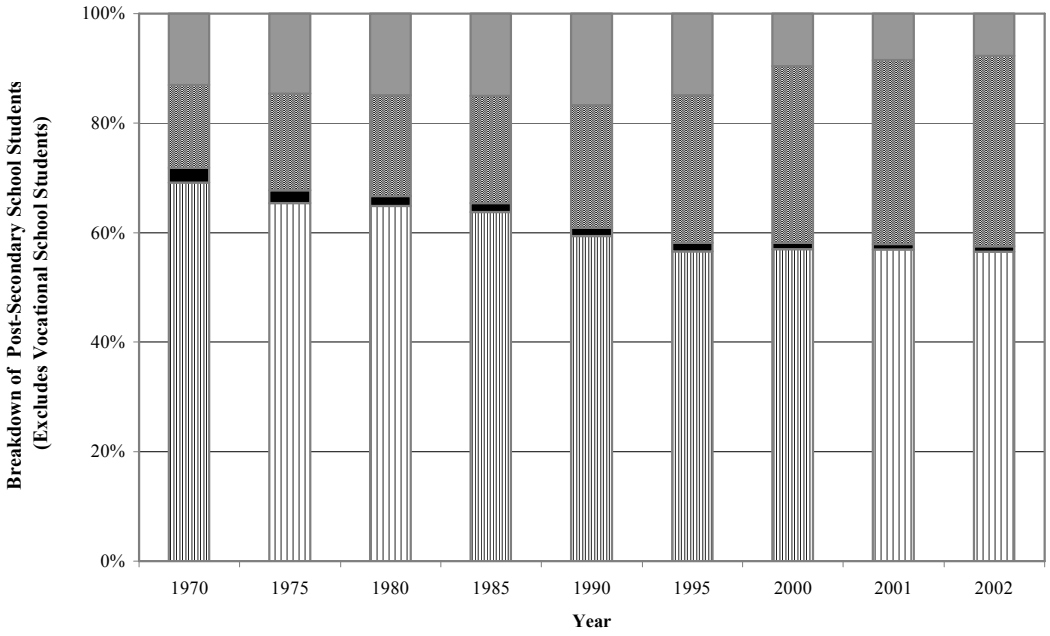

FIGURE 1: SEX COMPOSITION OF JAPANESE STUDENTS ATTENDING UNIVERSITY AND JUNIOR COLLEGE. Source: Lifelong Learning Policy Bureau and Higher Education Bureau, Ministry of Education, Culture, Sports, Science and Technology.

TABLE 1: QUALITATIVE RESEARCH SAMPLE DEMOGRAPHICS.

	Tokyo (N =38)		Okinawa (N=66)	
	Number	**%**	**Number**	**%**
Female	20	.53	56	.85
Never Married	10	.26	5	.08
Age				
20-30	3	.08	5	.08
31-40	5	.13	2	.03
41-50	5	.13	4	.06
51-60	5	.13	10	.15
61-70	3	.08	17	.26
71-80	5	.13	10	.15
81-90	11	.29	17	.26
Above 90	0	.00	1	.02
Missing	1	.03	0	.00
Education[9]				
4-Year Degree	19	.50	11	.17
Junior College	4	.11	7	.11
Technical School	1	.03	4	.06
High School	7	.18	16	.24
Junior High	5	.13	27	.41
No Schooling	1	.03	0	.00
Missing	1	.03	1	.02
	Average		Average	
Number of Siblings	3.3		4.3	
Number of Children[10]	2.2		3.7	

[9] For the pre-war generation, elementary school is recorded as junior high, junior high as high school, and high school as junior college in this table. The difference in educational attainment between the two samples is largely attributable to the younger cohort. Among the older cohorts, 15% of older people in the Tokyo sample and 11% of older people in the Okinawa sample attended a 4-year university.

[10] Among ever-married respondents.

TABLE 2: NFR98 SAMPLE DESCRIPTIVE STATISTICS. Children of Respondents; Born 1939-1977. 7798 children in the sample.

Variable	Mean	SD
Birth year	1964	8.73
Number of children in family	2.48	.72
4-year university graduate[11]	.25	.44
Male	.52	.50
Household Income (in millions of yen)[12]	6.95	3.51
Parental urban residence[13]	.50	.50
Father at least graduated from high school	.22	.42
Mother at least graduated from high school	.14	.34
Mother never worked[14]	.09	.28
Parent strongly agrees that men should work outside and women inside the home[15]	.27	.44

[11] Dummy variable for attending a 4-year university. The reference category is less than a university education.
[12] This mean was calculated by taking the midpoint of the each income category and averaging across all households. This is a parent-level variable and therefore all children from the same family will have the same response.
[13] Dummy variable for residence in a city of at least 100,000 inhabitants. Parent-level variable.
[14] Parent-level dummy variable for mothers who never worked. The reference category includes mothers who are currently working or who worked in the past.
[15] Parent-level dummy variable for the parent's agreement with a gendered household division of labor. The reference category is disagreement with a gendered household division of labor.

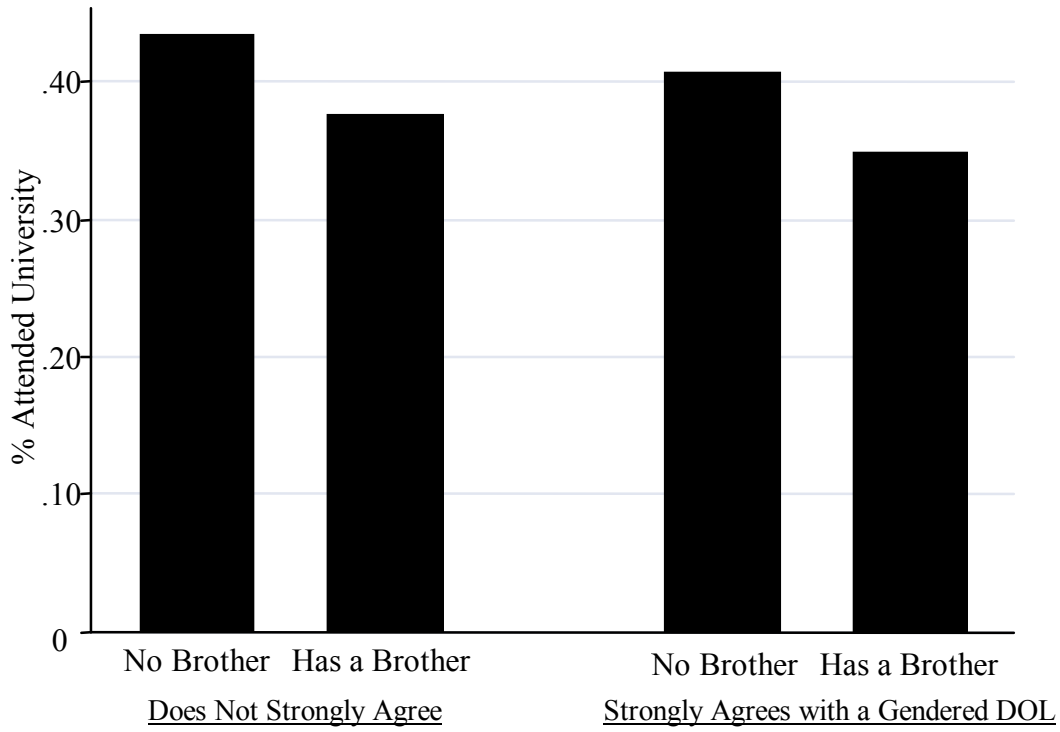

FIGURE 2: PROPORTION OF BOYS WITH A UNIVERSITY DEGREE BY PRESENCE OF BROTHERS AND PARENTAL GENDER ATTITUDES. (Parent "disagrees" or "agrees" with a gendered division of labor.) NFR 1998 data, N=3595. The difference in educational attainment between boys with and without brothers in families that *do not strongly agree* with a gendered division of labor is statistically significant at the 5% level.

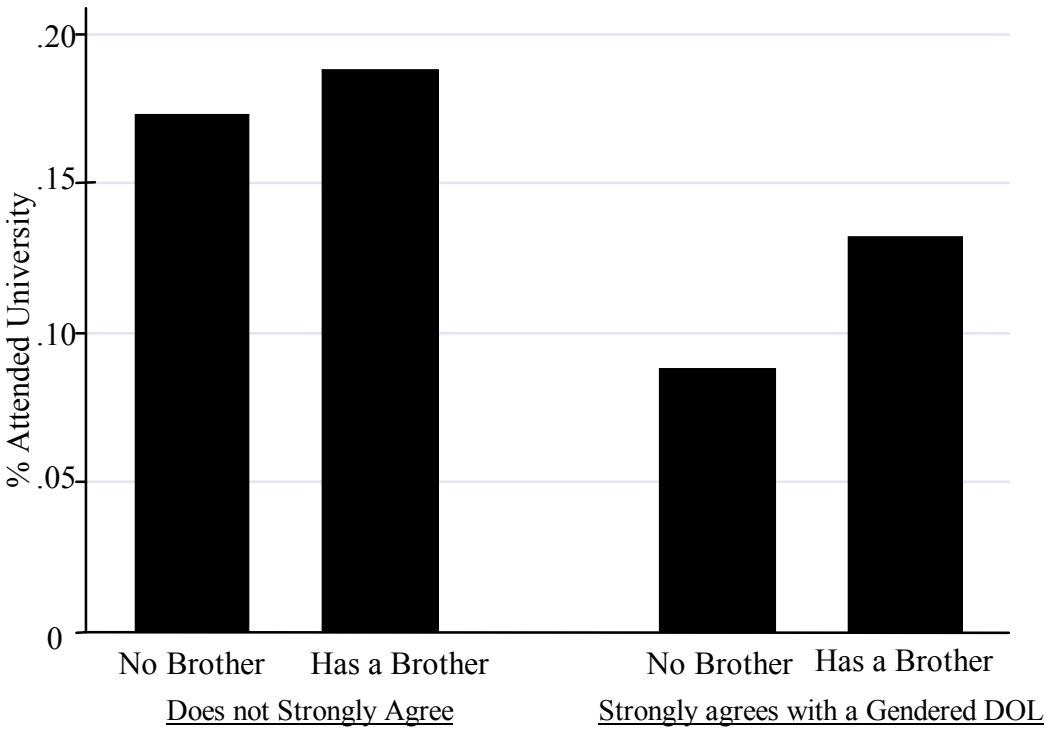

FIGURE 3: PROPORTION OF GIRLS WITH A UNIVERSITY DEGREE BY PRESENCE OF BROTHERS AND PARENTAL GENDER ATTITUDES. (Parent "strongly agrees" or "does not strongly agree" with a gendered division of labor.) NFR 1998 data, N=3355. The difference in educational attainment between girls with and without brothers in families that *strongly agree* with a gendered division of labor is statistically significant at the 5% level.

TABLE 3: GENERALIZED LINEAR MIXED MODEL COEFFICIENTS IN MODELS FOR PROBABILITY OF UNIVERSITY EDUCATIONAL.[16] National Family Research 1998 Survey Data. Separate models estimated for investments made in sons and in daughters.

	Sons[17]	**Daughters**
Child has one sibling[18]	1.24***	0.65*
	(.25)	(.34)
Child has two siblings	0.67*	0.19
	(.26)	(.36)
Not first born[19]	-0.42***	-0.21*
	(.09)	(.10)
Household Income is less than 2 million yen[20]	-1.69***	-1.31**
	(.30)	(.47)
Household Income is 2-7.99 million yen	-0.81***	-0.66**
	(.14)	(.20)
Rural residence as a child[21]	-0.33*	-0.26
	(.13)	(.19)
Parent born 1921-30[22]	1.16***	0.49
	(.18)	(.26)
Parent born 1931-40	0.66***	0.23
	(.15)	(.22)
Father has at least a high school education	1.50***	1.81***
	(.17)	(.22)
Mother has at least a high school education	0.65**	1.29***
	(.20)	(.26)
Child has a brother	-0.17	0.82***
	(.13)	(.21
Parent strongly agrees that men should work outside and women inside the home	-0.00	-0.51*
	(.15)	(.22)
Intercept	2.65***	0.01
	(.40)	(.55)
BIC	13682.6	14584.7
Covariance Parameter Estimates:		
Family	4.49	8.58
Residual	0.46	0.20

[16] Sample is restricted to children born before 1978.
[17] Sons N= 2758; Daughters N= 2566.
[18] Reference category is the child has 3+ siblings.
[19] Reference category is first born.
[20] Reference category is household income 8-12+ million yen.
[21] Reference category is urban residence.
[22] Reference category is parent born after 1940.
*p<.05 **p<.01 ***p<.001