



ELSEVIER

Contents lists available at ScienceDirect

# Research in Social Stratification and Mobility

journal homepage: <http://www.elsevier.com/locate/rssm>

## Influences of monetary and non-monetary family resources on children's development in verbal ability in China<sup>☆</sup>

Airan Liu<sup>a,\*</sup>, Yu Xie<sup>a,b,\*</sup><sup>a</sup> University of Michigan, United States<sup>b</sup> Peking University, China

### ARTICLE INFO

#### Article history:

Received 16 December 2013

Received in revised form 27 January 2015

Accepted 18 February 2015

Available online 3 March 2015

#### Keywords:

Economic resources

Non-monetary resources

Children's development

Education achievement

China

### ABSTRACT

This paper addresses the debate over the significance of family's monetary versus non-monetary resources for children's achievement and development, within the context of contemporary China. We use data from the 2010 baseline survey of the China Family Panel Study to examine the relevance of several proposed determinants in Chinese children's cognitive achievement. Our findings suggest that: (1) family income is significantly associated with children's achievement, but family's assets and direct measures of monetary resources are found to have little effect; (2) non-monetary resources, particularly parenting, are of great importance to children's achievement; (3) parenting practices do not vary greatly by family's economic resources.

© 2015 Elsevier Ltd. All rights reserved.

## 1. Introduction

Intergenerational transmission of family advantage or disadvantage via children's academic attainment is an important topic in sociology. It is well documented that children from low socioeconomic status (SES) families fare worse in terms of achievement and development than their counterparts from more affluent families (Duncan, Brooks-Gunn, & Klebanov, 1994; Duncan, Jean Yeung, Brooks-Gunn, & Smith, 1998; Duncan, Ziol-Guest, & Kalil, 2010). However, the underlying reasons for this empirical

pattern remain elusive. Efforts to explain the association between family SES and children's development have produced two perspectives.

The first perspective emphasizes families' economic resources, arguing that a family's economic position determines how much parents can invest in their children's education and development (Becker, 1991; Duncan et al., 1994; Kaushal, Magnuson, & Waldfogel, 2011). The second perspective emphasizes class-based cultural and social resources, represented by parenting practices. It maintains that differences in parenting practices between middle-class and working-class families, which may be associated with family income, are responsible for the observed class-based disparities in children's outcomes. This second perspective considers non-monetary parenting practices important to children's cognitive development, and children's habits, personality traits, and non-cognitive skills – all critical for their later achievement both in school and in the labor market (Mayer, 1997).

<sup>☆</sup> This study draws on survey data from the China Family Panel Studies (CFPS) conducted by the Institute for Social Science Survey of Peking University.

\* Corresponding authors at: Population Studies Center, Institute for Social Research, University of Michigan, 426 Thompson Street, Ann Arbor, MI 48106, United States.

E-mail addresses: [airanliu@umich.edu](mailto:airanliu@umich.edu) (A. Liu), [yuxie@umich.edu](mailto:yuxie@umich.edu) (Y. Xie).

As reviewed below, this large body of literature has not reached a consensus as to whether monetary or non-monetary factors are more important for the causal impact of family SES on children's academic development, although the underlying reasons for the observed achievement gap by family SES has important policy implications. If the SES gap is due to disparities in financial resources, then policies to reduce the gap should focus on equalizing family income. If, on the other hand, children's development is mainly affected by non-monetary factors and parenting practices, policy should focus on these elements.

So far, nearly all studies on this subject have used data from the U.S. and Western European countries, with little exploration outside these highly developed areas. However, East Asian societies differ substantially from Western societies institutionally, raising questions about the generalizability of findings to East Asian (Park, 2008a, 2008b; Park, Byun, & Kim, 2011).

Capitalizing on recently available data from the 2010 survey of the China Family Panel Studies, we examine the relationship between family's monetary resources, non-monetary resources and children's development in China. Our study, by extending research to East Asian social contexts, will enhance the understanding of the relationship between family's characteristics and children's development in a wider social context.

## 2. Theoretical motivation and research model

### 2.1. Monetary vs. non-monetary factors in children's development

Ever since Blau and Duncan's pioneering work showed a high correlation between respondents' educational attainment and job status of their fathers (Blau & Duncan, 1967), sociological scholars have set out to discover the mechanisms by which family characteristics influence the development of children. In social science, a family's socioeconomic status (SES) is a composite of its social, cultural, and economic resources, which are traditionally measured by parents' occupation and education and family income. Though these family resources (or characteristics) are correlated with one another, and the lineation is not always clear-cut, they can be roughly dichotomized into two groups: monetary and non-monetary. Monetary resources important to children's development include housing in desirable school districts (particularly in the U.S.), educational products such as books, toys, and musical instruments, and services such as private schools, tutors, and extracurricular lessons. Non-monetary resources include family's cultural, social capital and parenting attitudes and practices conducive to children's development. As higher-SES families tend to possess more of both monetary and non-monetary resources than lower-SES families, it is argued that these families transfer advantages to their children via their greater resources (e.g. Bourdieu, 1984; Coleman, 1966; Duncan et al., 2010, etc.). However, which set of resources, monetary or non-monetary, exerts more influences?

Originating in Becker's theoretical work, the first perspective assumes that parents, particularly those with

requisite economic resources, increase their children's human capital through "expenditures on their skills, health, learning, motivation, 'credentials,' and many other characteristics" (Becker & Tomes, 1986, p. 55). Family income is thus important to children's development as it directly enables parents to invest in children (pathway a→c in Fig. 1) (Becker, 1993; Kaushal et al., 2011). For instance, families with higher incomes are able to build a cognitive stimulating home environment by purchasing more and better education-related goods and services (such as books and piano lessons), enroll their children in good public school by residing in a rich community, or directly send their children to costly private schools, all of which increase their children's chances of success (Baharudin & Luster, 1998; Chin & Phillips, 2004; Garrett, Ngandu, & Ferron, 1994; Miller & Davis, 1997; Votruba-Drzal, 2003; Watson, Kirby, Kelleher, & Bradley, 1996).

This perspective also posits that income is associated with parents' mental ability to rear children properly. According to "role model" theory and "parental-stress" theory, parents with low or unstable incomes can experience more stress. This will negatively impact their emotional well-being, as well as their way of interaction and communication between them and their children (pathway b→e in Fig. 1). For instance, poverty and financial stress can make parents more harsh toward their children, which are detrimental to children's development (Smith, Brooks-Gunn, Kohen, & McCarton, 2001; Yeung, Linver, & Brooks-Gunn, 2002).

Research supporting the second perspective finds that non-monetary attributes and intangible assets such as parents' human capital, cognitive skills, social class, and culture have more comprehensive and far-reaching effects on child development than monetary resources (Mayer, 1997; Heckman, 2006). For example, parents' education is an important factor to children's academic achievement by formulating parent's achievement beliefs in children and stimulating home behaviors (Davis-Kean, 2005). In addition, compositional characteristics of the residential family also influence children's academic achievement and development (Tillman, 2008).

Under this perspective, parenting practices is a key function through which family's non-monetary resources influence children's development (d→g in Fig. 1). Both bioecological and transactional models of child development maintain that reciprocal interactions between children and the multiple environments in which they are embedded largely account for individual differences in children's development (Bronfenbrenner & Ceci, 1994; Sameroff, 1994). Proximal processes in children's home environments, particularly parenting, are thus critical. High-quality parenting can even mitigate developmental disadvantages resulting from low family income (Gertler et al., 2013).

Though some aspects of parenting may be correlated with financial resources, parenting consists mostly of numerous intangible characteristics that cannot be purchased per se (Bourdieu, 1984; Boudon, 1974). For example, it has been documented that parents' high expectations, which are not necessarily determined by parents' income, benefit children's academic performance

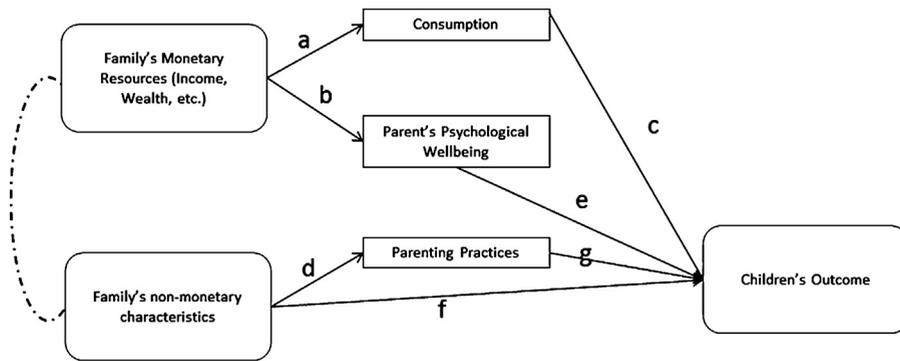


Fig. 1. Monetary resources, non-monetary characteristics and children's outcome.

(Alexander, Entwisle, & Bedinger 1994; Davis-Kean, 2005). Research also indicates that middle-class parents, by mobilizing their social and cultural capital, tend to engage in “concerted cultivation” and purposeful practices in interactions with their children, arranging their children’s daily lives and activities in structured ways to enhance development of both cognitive and non-cognitive skills (Calarco, 2011; Cheadle & Amato, 2011; Covay & Carbonaro, 2010; Heckman, 2006; Lareau, 2011). In contrast, lacking comparable cultural and social capital, working-class parents tend to intervene less in children’s growth, allowing their children grow naturally (Lareau, 2011), and are also less likely to enrich the home environment with cognitive and noncognitive stimulation (Heckman, 2006). As these differences in parenting practices have their roots in family’s and parents’ non-monetary characteristics and resources, such as education, cultural and social capital, they tend to remain stable even when a family’s economic resources fluctuate. For this reason, the influences of non-monetary factors on children’s development can be more comprehensive and far-reaching than those of monetary factors.

Most of the existing studies focus on western societies, such as the U.S. and Europe (e.g. Duncan et al., 1998; Mayer, 1997; Lareau, 2011), giving little consideration to how monetary and non-monetary resources may influence children’s development differently in different social contexts. Nevertheless, the ways family SES – and the associated monetary and non-monetary resources – affect children’s academic achievement may depend on the broader social context. For instance, when economic resources matter greatly for access to educational resources in a society, high-SES families will be more likely to mobilize monetary resources to pass on their family advantages to their children. When non-monetary resources matter the most, high-SES families may instead help children mainly through non-monetary resources and mechanisms. Thus, for specific contexts, it is imperative to carefully consider how the fundamental effects of SES on children’s development are channeled differently by monetary and non-monetary resources, and ultimately which set more strongly influences children’s academic outcomes. Understanding these relationships will inform

effective policy interventions to reduce SES-based inequality.

## 2.2. Monetary resources and parenting in the Chinese context

While the relative influences of monetary versus non-monetary resources on children’s academic outcomes are still subject to debate, there are good reasons to suspect that family’s monetary resources are of less importance to children’s development in China than in the U.S. and other western societies.

Monetary resources, like family income, affect children’s development and achievement in the U.S. because critical educational resources can be purchased with money (Coleman, 1966; Gamoran, 2001; Hanushek, 1997; Mayer, 1997). The most potent example is that higher-SES families can “purchase” better schools for their children by either sending children to private schools or spending money to reside in high-quality school districts. Better schools have more challenging curriculums, better-performing schoolmates, better physical resources, higher teacher-to-student ratios, and better-qualified teachers, all of which benefit children’s development notably (Chiu, 2010; Coleman, 1966, 1968; Fuller & Clarke, 1994; Greenwald, Hedges, & Laine, 1996; Rivkin, Hanushek, & Kain, 2005).

However, situations may be quite different in China. The very strong role of the state means that educational opportunities for all social groups are directly and deeply affected by state policies (Buchmann & Hannum, 2001; Hannum, 1999; Zhou, Tuma, & Moen, 1996). For example, primary and secondary educational curricula are designed by the central government and are uniform nationwide. This, in principle, gives children equal access to homogeneous learning materials. Although large variation in the quality of and access to educational resources does exist, these differences depend less on families’ monetary resources per se than on institutional factors, such as type of household registration (rural versus urban) and geographic location. Nearly all primary and secondary schools, including the best ones, are public and generally affordable. Entrance into good schools is largely based on exam

scores. In this system, though parents may better prepare their children academically indirectly by spending their income on extracurricular education services such as private tutoring (Park et al., 2011), family material resources alone do not directly ensure a child's entry into a high-quality school. Thus, in China, a family's monetary resources should only affect children's achievement limitedly.

Instead of monetary resources, families' non-monetary characteristics, particularly parenting practices, should be most important to children's development in China. As is known, the importance of children's achievement to a family and the family's primary responsibility for children's development is deeply rooted in Chinese culture. If a child excels academically, this brings pride to the family. Conversely, if a child fails academically, it brings embarrassment. Meanwhile, the family and parents are expected to provide a healthy emotional environment at home and to support the school's role in improving children's academic achievement (Stevenson & Stigler, 1992). Thus, Chinese families are highly motivated and involved in stimulating children's development, and particularly their cognitive and academic development. It is thus reasonable to project that parenting practices are more influential to Chinese children's development than family's financial resources.

As we discussed earlier, parenting practices are often associated with a family's monetary resources. However, the strength of this association may vary greatly by social context and social group. For a combination of reasons, it is plausible that the association between parenting practices and family's monetary resources may be weaker in China than in the U.S. As Stevenson and Stigler (1992) argued, Confucian cultures promote education-oriented parenting styles regardless of a family's socioeconomic status. Parents are influenced to raise highly educated children even if they do not have education themselves. Though there are few studies on East Asian countries on this subject, many studies have found supportive evidence to this point among East Asian immigrants in US, who share similar culture. For example, Asian immigrant parents in the U.S. invariably hold high expectations regarding their children's educational achievement, irrespective of their own socioeconomic status (Goyette & Xie, 1999; Hao & Bonstead-Bruns, 1998; Pang, 1990; Schneider & Lee, 1990; Sung, 1987). In addition, Asian parents tend to expend resources to enhance children's education as much as possible. For instance, they supervise children's extracurricular activities, assign homework tasks, help children with their school work, and purchase private lessons for their children (Kao & Tienda, 1995; Louie, 2001; Schneider & Lee, 1990; Stevenson & Stigler, 1992).

Combining these institutional and cultural features of China society, we propose that, in China, monetary resources and factors such as family's financial resources are less influential to children's achievement than family's non-monetary resources and factors, such as parents' education and parenting practices, etc. Besides, parenting practices in China is weakly dependent on family's financial resources.

### 2.3. Research questions

In this study, we wish to provide an empirical evaluation, in the context of contemporary China, of the relative importance of family's monetary versus non-monetary resources and factors to children's academic performance. We use newly available data from the nationally representative, longitudinal China Family Panel Studies (CFPS) to address the following research questions: (1) Do family-level monetary resources affect children's verbal development in China? If so, do these effects follow the same pattern as in Western countries? (2) How do non-monetary factors, particularly parenting attitudes and practices, influence children's development in verbal ability? (3) Do parenting attitudes and practices in China differ significantly by family monetary resources?

## 3. Data and measures

### 3.1. Data

This study draws on data from the 2010 baseline CFPS, which consists of five questionnaires that collected individual-, family-, and community-level information from 14,798 households in 25 provinces, along with 33,600 adults and 8990 children living in these households. This dataset has several strengths for our study. First, it is the only dataset in China that measures children's, adolescents', and adults' cognitive skills using standardized tests. Second, it contains voluminous information on families, parents, and children. In addition, its national representativeness and large sample size give us greater statistical power in making inferences and interpretations (Xie & Hu, 2014).

Our study is based mainly on data from the child questionnaire, as well as data pertaining to socioeconomic and demographic information on families and parents from the family and adult questionnaires. We restrict our sample to children 10–15 years old (adolescents), as younger children were not assessed cognitively. In addition, we limit our sample of adolescents to those for whom at least one parent completed a valid adult questionnaire. These restrictions yield a sample of 2949 cases. Table 1 describes the variables used in our study. Table 2 presents descriptive statistics for these variables. Given the few missing cases in our sample, we imputed missing values for the variables of interest by sample mean<sup>1</sup> and use a dummy variable to flag the missing cases for each missing variable in regression analysis.

### 3.2. Measures

#### 3.2.1. Children's verbal ability

We use the children's scores in a word test administered during the survey to capture their verbal abilities. The word test asked the respondent children to read out

<sup>1</sup> We also use other methods such as listwise to deal with missing values. Different methods yield similar and comparable results.

**Table 1**  
Descriptive of variables.

Verbal test score	Children's scores in the word test, ranging from 0 to 34.
Monetary resources	
Family annual income per capita	Annual Income per capita over the past year.
Family's asset	Including business assets, housing assets, financial assets, land, machine, durable goods, housing debit, financial debits, and other assets
Education expenses (in 1000)	The amount of money that families spent on their children's education during the past year
Parenting attitudes and practices	
Academic expectation	Parents' general expectation regarding children's academic scores in the current or the coming semester.
Educational involvement	Parents' efforts or devotion to their children's studies in daily life
Family environment	Interviewer-assessed family environment and the activeness of communication between parents and children.
Control variable	
Gender	Female coded as zero, and male coded as one
Grade	Level of education that children have received
Hukou	Urban coded as one, rural coded as zero.
Parents' cognitive scores	Averaged standardized cognitive test scores of both parents.
Parents' years of schooling	Averaged years of schooling of both parents.
Number of children	Number of children the parents have.

**Table 2**  
Descriptive statistics of the sample and variables.

Variable	Mean	SD	Missing (%)
Verbal test score	21.76	7.13	0.0
Family's (non-monetary) characteristics			
Parents' cognitive scores	53.32	20.09	0.0
Parents' years of schooling	6.17	4.04	0.0
Number of children	0.15	0.40	0.0
Family's monetary resources			
Family annual income per capita	6773.04	8911.12	4.2
Family's asset (in 100,000)	2.17	7.38	8.6
Education expenses (in 1000)	1.34	2.40	5.3
Parenting attitudes and practices			
Academic expectation	90.14	9.82	1.8
Educational involvement	3.24	0.78	0.7
Family environment	6.96	1.25	0.0
Control variable			
Gender (male = 1)	0.50	0.50	0.0
Grade	5.83	1.91	0.4
Hukou (urban = 1)	0.20	0.40	0.0
Sample Size	2949		

the characters presented to them. The test started with easy characters and moved on to more difficult ones. The starting point differed by age so that older children began with more difficult items than younger children, and each test ended when the number of 'missed' characters equaled three (Xie & Hu, 2014; Xie, 2013). We score a child's verbal ability in terms of the character of the highest difficulty he/she could recognize. The scores range from 0 to 34. We did not standardize the scores by age but chose to control for children's grade in the analysis to reduce the confounding effects of education.

The independent variables can be categorized into three groups: control variables, monetary factors, and non-monetary factors.

### 3.3. Control variables

#### 3.3.1. Gender and grade

The basic control variables in our analysis are gender and grade. For gender, female is coded as zero, with male coded as one. Grade represents the level of education that children have received, ranging from one to twelve.

#### 3.3.2. Hukou and province

We also control for institutional, or structural, factors, which exert a significant impact on social life in China (Xie & Zhou, 2014). One of the most prominent structural factors, the household registration system (hukou), divides the population into agricultural/rural and nonagricultural/urban sectors, which influences access to many critical resources and opportunities, such as jobs, education, housing, and health care (Wu & Treiman, 2004). Especially important to this study, urban areas in China are equipped with better and more abundant educational resources than are rural areas (Hannum, 1999). In addition, social life is influenced by socioeconomic disparities across provinces/regions in China (Xie & Hannum, 1996; Xie & Zhou, 2014), which parallel levels of economic development. Of note here is that the distribution and quality of educational resources vary greatly, with eastern provinces enjoying better access and better resources. We thus control for *hukou* (household registration) status and *province* in this study. *Hukou* is coded one for urban and zero for rural, with 20% of our sample being urban. The study covers 25 provinces and province-level municipalities, we use fixed effects to control for differences across provinces.

**Table 3**  
Regression of children's word test score on family's monetary resources and non-monetary characteristics.

	(1)	(2)	(3)	(4)
Family's (non-monetary) characteristics				
Parents' cognitive test score			0.06*** (0.01)	0.06*** (0.01)
Parents' education			0.22*** (0.03)	0.20*** (0.03)
Number of children in the family			-0.20 (0.25)	-0.15 (0.25)
Family's monetary resources				
Log(annual family income per capita)		0.66*** (0.12)		0.39** (0.13)
Log(family's asset)		0.08 (0.13)		0.03 (0.08)
Control				
Gender	-0.92*** (0.20)	-0.98*** (0.20)	-0.89*** (0.20)	-0.93*** (0.20)
Grade	2.04*** (0.05)	2.02*** (0.05)	1.96*** (0.05)	1.95*** (0.05)
Hukou (urban = 1)	1.77*** (0.27)	1.38*** (0.28)	0.82** (0.30)	0.69* (0.30)
Constant	11.62*** (1.88)	5.90** (2.19)	7.02*** (1.86)	3.84~ (2.14)
Fixed Province	Yes	Yes	Yes	Yes
Observations	2949	2949	2949	2949
R-squared	0.41	0.41	0.44	0.44

Standard errors in parentheses.

\*\*\*  $p < 0.001$ .

\*\*  $p < 0.01$ .

\*  $p < 0.05$ .

~  $p < 0.1$ .

### 3.4. Monetary factors

#### 3.4.1. Family income per capita

We measure a family's income by its annual income<sup>2</sup> over the prior year, and divide it by the number of people in the household, yielding a family per capita income. Missing values are imputed by predicted income using other available information on hukou, province, and parents' education. In addition, to control for the influences of outliers, income was both top-coded and bottom-coded. As shown in Table 2, the mean per capita family income in our sample is around 6700 yuan. Taking income's diminishing returns into account, and maintaining consistency with previous studies, we use the natural logarithm of the per capita income as the independent variable in our analyses. To be sure our results are not sensitive to this parametric specification, we also entered income into regression analysis as a linear function and dummy variables in alternative models, shown in Table 3. The three models yield comparable results.

#### 3.4.2. Logged family's assets

We measure family assets using a composite index by summing up family business assets; housing assets; financial assets; land, machines, and durable goods; housing and financial debts; and "other" assets in the unit of yuan. The mean of family assets in our sample is around 200,000

yuan. We impute families with negative assets by zero,<sup>3</sup> and impute sample mean to missing values. We further take the natural logarithm of this assets measurement.

#### 3.4.3. Education expenses

We measure education expenses by the total amount of money a family spent on all children's educations during the prior year. The major education expenses covered by this measurement include: administration fee, expenses on book and stationary, tutoring, boarding, and transportation. The mean for education expenses in our sample is 1300 yuan. Appendix Table C shows detailed descriptive statistics for education expenses by rural-urban hukou status.

### 3.5. Non-monetary factors

#### 3.5.1. Parents' non-monetary characteristics

We measure three non-monetary characteristics of parents: their education, their cognitive scores, and the number of their children.

For education, we use the self-reported years of each parent's schooling from the adult questionnaire and average them. If this information is missing for one parent, we use years of schooling for the other parent.

<sup>2</sup> If a family's major source of income is agricultural production, the annual income is measured by their net annual income.

<sup>3</sup> We also conducted a sensitivity check, in which we did not code the assets of families with large debts to zero, but left them as raw negative numbers. The results of the analysis do not change much. We thus do not include the interaction term in our main analysis.

Because past studies have shown that parents' cognitive ability is a strong predictor of children's development, net of other family socioeconomic characteristics (Parcel, Dufur, & Zito, 2010; Sastry & Pebley, 2010; Yeung et al., 2002), we use test scores from the adult survey of parents' math and verbal ability in our analyses. Adult respondents were asked to carry out basic arithmetic calculations in the math test, and to recognize Chinese characters in the verbal test. Since performance on these two tests is highly dependent on educational level, we standardize the score by respondents' attained education, allowing the score to better capture cognitive ability net of education. We add together the two standardized scores for each parent and then average them to proxy parental cognitive ability. The missing values are imputed with the mean of the sample.

### 3.5.2. Parenting attitudes and practices

We measure the quality of parenting – the key non-monetary factor in this study – using three measures designed to capture parents' attitudes and practices regarding child development: their academic expectations for children, their level of educational involvement, and the family environment they create.

In the adult survey, parents were asked the average scores (out of 100) that they expected their children to achieve in the current or the coming semester. We use these scores to measure parents' *academic expectations* for their children. A more traditional measure of expectations is parents' highest expected degree for their children, data available to us via the survey for only some of the parents with 10–15 year-old children. Thus, we chose to use the expected scores in our analyses, which we believe provide an accurate measure of parents' current academic expectations for children.

*Educational involvement* is measured using parents' answers to six survey questions about their efforts or devotion to their children's studies in daily life (summarized in Appendix Table A). After transforming the scoring system and imputing the missing values by sample mean, we sum the six scores (range = 6–30) and use this composite score as a measure of parents' involvement in their children's education, with higher scores indicating greater involvement.

*Family environment* is measured by interviewers' observations during the survey. Interviewers were asked to express level of agreement/disagreement with statements about the home environment reflecting parental interest in children's education and the parents initiating communication with children (see Appendix Table B). We impute missing values for the two items using the sample mean and generate a composite score ranging from 2 to 10, with a higher score indicating a more stimulating family environment.

## 4. Analysis and results

### 4.1. Economic resources versus non-monetary characteristics

Table 3 presents the results of regression models using children's scores in the word test as the dependent variable.

Model 1 is the baseline model, in which we control only for children's grades, gender, and structural factors (*hukou* and province). In Model 2, we add family per capita income and assets to examine the relationship between family's economic resources and children's development.<sup>4</sup> In Model 3, we add non-monetary measures to the baseline model to examine the effect of intangible family characteristics on children's development, net of demographic and structural variables. In Model 4, we include both monetary and non-monetary measures for comparison.

The coefficients for family income are significant in both Model 2 and Model 4, while the coefficients for family assets are not significant in either. The size of the association between income and children's verbal test score decreases from Model 2 to Model 4, the latter of which includes non-monetary characteristics.

Parents' cognitive test score and education have significant positive relationships to children's verbal score in both Model 3 and Model 4, and the size of these effects remains unchanged after family monetary resources are incorporated in Model 4.

The insignificant and near-zero coefficient for family assets and the decreasing significance of the coefficient for family income from Model 2 to Model 4, together with the stable significance of the coefficients for parents' cognitive test scores and education, suggest the importance of non-monetary characteristics to Chinese children's achievement.

### 4.2. Causal mechanisms: educational investment and parenting practices

In Table 4, we move on to test the effects of mechanism factors related to family resources and children's development. We are especially interested in educational investment and parenting practices.<sup>5</sup>

If family monetary resources are important to children's achievement, we should observe that educational investment is significantly associated with children's achievement – that is, we should see that educational expenses account for a large portion of the family wealth/income effects on children. To examine whether this is true for our sample, we first fit a regression model between education expenses and children's test scores that includes all other control variables and family income and assets. The results are shown in Model 1, Table 4. The small and statistically insignificant coefficient for education expenses indicates a lack of association with children's test scores. In addition, compared with our baseline model (Model 4, Table 3), the coefficient for family income does not change much when family's education expenses are

<sup>4</sup> Being aware that the effects of family's economic resources on children's development may vary across urban and rural areas, which represent two different institutional contexts, we further add an interaction term between family's monetary resources measurements and *Hukou*. The results are presented in appendix Table E. The coefficient of the interaction term is not significant. This suggests that the relationship between family's monetary resources and children's development are consistent across rural and urban areas.

<sup>5</sup> The baseline model for this part of our analysis is Model 4 in Table 3.

**Table 4**  
Regression of children's word score on monetary and non-monetary mechanisms.

	(1)	(2)	(3)	(4)
Family's (non-monetary) characteristics				
Parents' cognitive test score	0.06*** (0.01)	0.06*** (0.01)	0.06*** (0.01)	0.06*** (0.01)
Parents' education	0.20*** (0.03)	0.17*** (0.03)	0.15*** (0.03)	0.15*** (0.03)
Number of children in the family	-0.15 (0.25)	-0.11 (0.25)	-0.07 (0.25)	-0.07 (0.25)
Family's monetary resources				
Log(annual family income per capital)	0.37** (0.12)		0.33** (0.12)	0.31* (0.12)
Log(family's asset)	0.02 (0.08)		0.01 (0.08)	0.01 (0.01)
Education expenses (in 1000)	0.07 (0.05)			0.05 (0.05)
Parenting attitudes and practices				
Academic expectation		0.07*** (0.01)	0.07*** (0.01)	0.07*** (0.01)
Educational involvement		0.30* (0.14)	0.33* (0.14)	0.32* (0.14)
Family environment		0.44*** (0.85)	0.41*** (0.09)	0.41*** (0.09)
Control				
Gender	-0.93*** (0.20)	-0.81*** (0.20)	-0.83*** (0.20)	-0.83*** (0.20)
Grade	1.94*** (0.05)	2.00*** (0.05)	1.99*** (0.05)	1.98*** (0.05)
Hukou (Urban = 1)	0.66* (0.30)	0.59* (0.29)	0.47 (0.30)	0.46 (0.30)
Constant	3.93~ (2.14)	-2.75 (1.80)	-5.38* (2.34)	-5.20* (2.34)
Fixed Province	Yes	Yes	Yes	Yes
Observations	2949	2949	2949	2949
R-squared	0.45	0.46	0.46	0.46

Standard errors in parentheses.

\*\*\*  $p < 0.001$ .

\*\*  $p < 0.01$ .

\*  $p < 0.05$ .

~  $p < 0.1$ .

included. Moreover, the effects of family assets on children's test scores is insignificant, almost zero. In contrast to predictions based on traditional economic theory, these results suggest that the significant effects of family monetary resources on children's achievement are not mediated through direct investment in education. Put another way, Chinese children growing up in richer families do not have higher test scores than their peers in poorer families due to their parents' ability to buy more and/or better educational materials.

Turning now to parenting practice, we note that while it may not be wholly independent of family financial status, an issue we will examine later, it may be more deeply shaped by non-monetary family characteristics. To test this view, we fit a regression model between parenting practices and children's word scores that includes all control variables, family economic resources, and non-monetary characteristics. The results are shown in Model 3 of Table 4. The three coefficients for parenting practices are highly significant, indicating a strong correspondence between children's word scores and parents' academic expectations, educational involvement, and home environment. Though we cannot assert causality between parenting practices and

children's achievement, as parents may adjust parenting practice in response to their children's achievement, the results shed light on the positive relationship net of other potential finance-based effects.

Next we compare the effects of monetary and non-monetary resources on children's word scores to examine the comparative relevance of these different realms of family characteristics in child development. The results are shown in Model 4 of Table 4, which includes all variables of interest. Of the three monetary measures – family income, assets, and education investment – only income has a significant effect on children's achievement on the word test. In contrast, all non-monetary factors, and especially parenting practices, are significantly and positively associated with children's achievement. In addition, children's test scores are more responsive to changes in parenting behaviors than to changes in family income. For example, one standard deviation increase (1.25 points in a range of 2–10) in the family environment score is associated with 0.525-point increase in children's word scores (range 0–34). To achieve the same increase in word score, family income would need to increase by 145%. This is true when we compare income's effects with those of other non-monetary

**Table 5**  
Regression of parenting attitudes and practices on family's monetary resources and non-monetary characteristics.

	(1) Expected academic performance	(2) Educational involvement	(3) Family environment
Family's (non-monetary) characteristics			
Parents' cognitive test score	0.02 <sup>~</sup> (0.01)	0.00 <sup>***</sup> (0.00)	0.00 <sup>***</sup> (0.00)
Parents' education	0.16 <sup>**</sup> (0.05)	0.04 <sup>***</sup> (0.00)	0.06 <sup>***</sup> (0.01)
Number of children in the family	-0.62 (0.45)	-0.01 (0.03)	-0.09 <sup>~</sup> (0.06)
Family's monetary resources			
Log(annual family income per capital)	0.07 (0.15)	-0.02 (0.02)	0.16 <sup>***</sup> (0.02)
Log(family's asset)	0.03 (0.03)	0.01 (0.01)	0.24 (0.02)
Control			
Gender	-1.20 <sup>***</sup> (0.35)	0.01 (0.03)	-0.04 (0.04)
Grade	-0.56 <sup>***</sup> (0.09)	-0.04 <sup>**</sup> (0.01)	0.02 (0.01)
Hukou (urban = 1)	0.90 <sup>~</sup> (0.52)	0.11 <sup>~</sup> (0.04)	0.28 <sup>***</sup> (0.06)
Constant	91.83 <sup>***</sup> (3.77)	3.35 <sup>***</sup> (0.29)	4.94 <sup>***</sup> (0.46)
Fixed Province	Yes	Yes	Yes
Observations	2949	2949	2949
R-squared	0.08	0.15	0.15

Standard errors in parentheses.

\*\*\*  $p < 0.001$ .

\*\*  $p < 0.01$ .

\*  $p < 0.05$ .

~  $p < 0.1$ .

resources as well, indicating that non-monetary resources have more leverage than monetary resources in affecting word test scores.

#### 4.3. Social determinants of parenting and family's economic resources

One of the arguments for the importance of a family's economic resources in the current literature is that they frame the way parents interact with and raise children. Thus, one needs to consider the possibility that the significant association between parenting practices and children's achievement may be spurious – or just a mediator of income's significant effects. For instance, parents in better financial situations are less likely to suffer from the daily stresses and hardships that interfere with parenting capability. Therefore, we next take up an examination of the associations between family monetary/non-monetary resources and parenting practices.

First, in a correlation analysis of parents' characteristics, family's financial resources, and parenting attitudes and practices, we adjust children's test scores by grade and gender and control for institutional variables (*hukou* and province). The results shown in appendix Table D indicate that family income has almost no correlation to two measures of parenting attitudes/practices – academic expectations and educational involvement – and only a small (but significant) correlation to family environment. In contrast, the correlations between parents'

education/cognitive test scores and parenting practices are more significant.

As a second test, we regress three measurements of parenting practices on family income per capita, family assets, parents' non-monetary characteristics, and other extensive controls respectively. The results, presented in Table 5, show an almost nonexistent association between family wealth and parenting measures. The relationship between family income and parenting is significant solely in Model 3, where family environment is the outcome variable. This association is fairly small, however, compared to that between family environment and other parent characteristics. For instance, a 0.06 unit change in family environment is associated with a 1-year increase in parents' education, and an 18.6 percent increase in family per capita income. And higher income parents do not demonstrate greater academic expectations/educational involvement than lower income parents; in fact, the negative coefficient in Model 2 suggests that higher income parents are less involved with their children's education.

The regression analyses indicate that parenting practices among respondents in our sample are neither a function of family income nor family wealth. However, parents' characteristics, particularly their level of education, are all significantly associated with parenting measures, though the magnitudes of these associations are relatively small.

Together with the results from correlation analyses, our evidence indicates that these parents' expectations for and involvement with their children do not vary

systematically by the amount of money they possess. Put more broadly, Chinese parents who are economically disadvantaged tend to provide the same level of positive parenting as their richer counterparts. On the other hand, parents' non-monetary characteristics – their education and their cognitive abilities – are correlated with positive parenting. Better educated parents are more willing to pay attention to their children's development, communicate with them, and help them with their studies. However, as the correlations and associations between parents' education and parenting attitudes and practices are relatively small, we are hesitant to fully assert that education accounts for most of the differences in Chinese parenting practices. In addition, as we touched on earlier, Confucian culture promotes education-oriented parenting styles regardless of family socioeconomic background, and children's achievement is seen as honoring families in Chinese culture. We believe that the independence of parenting practices and family economic resources may be linked to this particular aspect of Chinese culture.

Going back to our starting point, little evidence indicates that the significant positive relationship between parenting practices and children's achievement merely represents the relationship between family monetary resources and children's achievement. Good parenting practices, and their positive outcomes, do not seem to depend on family economic resources in China.

## 5. Discussion and conclusion

It is well documented that children from families of lower socioeconomic status fare worse in terms of achievement and development than their counterparts from higher SES groups. To account for this, two perspectives have been developed, emphasizing the roles of, respectively, monetary and non-monetary family resources in children's development. Until now, the relative importance and nature of the effects of these two sets of resources on children have not yet been determined, and few studies have examined this topic outside of the U.S. Capitalizing on recent data from the Chinese Family Panel Studies, we compared the relevance of family's monetary and non-monetary resources to parenting practices and children's achievement. Our study yields findings that are different from those of previous studies in the U.S. and other Western societies.

Are family economic resources, such as income and wealth, crucial to children's achievement? Our analyses show that higher family income is associated with higher scores on children's word tests, and the significance of this relationship holds true even after we control for other variables. However, our results do not show a significant relationship between family assets and children's test scores. Moreover, our study offers evidence that does not fully support the traditional viewpoint derived from economic household reproduction theory that family's economic resources invest in children's development and education and strongly predict children's achievement outcomes. In fact, our results show that the amount of family

investment in educational goods and services is not associated with children's achievement in China, and thus fails to account for the observed significant association between income and children's achievement. These findings carry two implications: (1) the observed association of family monetary resources and children's achievement may have mechanisms in China that are not accounted for by current SES-child development theories; (2) the observed association between income and children's achievement may not be causal, reflecting instead causal effects of other latent factors. If our interpretation is correct, the importance of family's monetary resources needs to be qualified, because the mechanisms and the latent factors may well be non-monetary in nature. Unfortunately, we have been unable as yet to conduct an analysis to test these possibilities. As more data become available, we expect more nuanced studies will explore these questions further.

In conclusion, our results suggest that income in China has an independent positive effect on children's achievement that is unlikely to operate through the purchase of education resources and services. Furthermore, family assets have no significant effect on children's achievement. Compared to monetary resources, non-monetary resources, particularly parenting practices, are more consequential for children's achievement in the Chinese context, and are not associated with family wealth/income. These findings lend support to the traditional sociological view on the influential role of intangible familial assets in intergenerational mobility. The differences between our findings and those of previous studies are likely attributable to particular features of China's social context. In a society like China, where non-monetary resources have powerful leverage in social life, they are also more salient in channeling the effects of family SES on children's achievement.

Our findings also yield a policy implication that policies aimed at improving a family's non-monetary family features will be beneficial to children's development in China. Dedicated parenting is pivotal to children's well-being, achievement—and this is not obtainable merely by improving a family financial situation. More effective policies aimed to assist children growing up in disadvantaged families may need to focus on improving parental involvement and parenting quality at home, as well as providing the children with better resources outside the family to help them overcome barriers commonly associated with economic deprivation.

## Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.rssm.2015.02.003>.

## References

- Alexander, K. L., Entwisle, D. R., & Bedinger, S. D. (1994). *When expectations work: Race and socioeconomic differences in school performance*. *Social Psychology Quarterly*, 57(4), 283–299.

- Baharudin, Rozumah, & Luster, Tom. (1998). Factors related to the quality of the home environment and children's achievement. *Journal of Family Issues*, 19(4), 375–403.
- Becker, G. S. (1991). *A treatise on the family*. Cambridge, MA: Harvard University Press.
- Becker, G. S. (1993). *Human capital*. Chicago: University of Chicago Press.
- Becker, G. S., & Tomes, N. (1986). Human-capital and the rise and fall of families. *Journal of Labor Economics*, 4(3), S1–S39.
- Blau, P. M., & Duncan, O. D. (1967). *The American occupational structure*. New York: Wiley.
- Boudon, R. (1974). *Education, opportunity, and social inequality: Changing prospects in Western Society*. New York: Wiley.
- Bourdieu, P. (1984). *Distinction: A social critique of the judgment of taste*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U., & Ceci, S. J. (1994). Nature–nurture reconceptualized in developmental perspective: A bioecological model. *Psychological Review*, 101(4), 568–586.
- Buchmann, C., & Hannum, E. (2001). Education and stratification in developing countries: A review of theories and research. *Annual Review of Sociology*, 27, 77–102.
- Calarco, J. M. (2011). 'I Need Help!' Social class and children's help-seeking in elementary school. *American Sociological Review*, 76(6), 862–882.
- Cheadle, J. E., & Amato, P. R. (2011). A quantitative assessment of Lareau's qualitative conclusions about class, race, and parenting. *Journal of Family Issues*, 32(5), 679–706.
- Chin, T., & Phillips, M. (2004). Social reproduction and child-rearing practices: Social class, children's agency, and the summer activity gap. *Sociology of Education*, 77(3), 185–210.
- Chiu, M. M. (2010). Effects of inequality, family and school on mathematics achievement: Country and student differences. *Social Forces*, 88(4), 1645–1676.
- Coleman, J. S. (1966). *Equality of Educational Opportunity*. Project No. OE-38001. Washington, DC: United States Office of Education, National Center for Education Statistics.
- Coleman, J. (1968). The concept of equality of educational opportunity. *Harvard Educational Review*, 38(1), 7–22.
- Covay, E., & Carbonaro, W. (2010). After the bell: Participation in extracurricular activities, classroom behavior, and academic achievement. *Sociology of Education*, 83(1), 20–45.
- Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology*, 19(2), 294–304.
- Duncan, G. J., Brooks-Gunn, J., & Kato Klebanov, P. (1994). Economic deprivation and early childhood development. *Child Development*, 65(2), 296–318.
- Duncan, G. J., Jean Yeung, W., Brooks-Gunn, J., & Smith, J. R. (1998). How much does childhood poverty affect the life chances of children? *American Sociological Review*, 63(3), 406–423.
- Duncan, G. J., Ziol-Guest, K. M., & Kalil, A. (2010). Early-childhood poverty and adult attainment, behavior, and health. *Child Development*, 81(1), 306–325.
- Fuller, B., & Clarke, P. (1994). Raising school effects while ignoring culture: Local conditions and the influence of classroom tools, rules, and pedagogy. *Review of Educational Research*, 64(1), 119–157.
- Gamoran, A. (2001). American schooling and educational inequality: A forecast for the 21st century. *Sociology of Education*, 74, 135–153.
- Garrett, P., Ngandu, N., & Ferron, J. (1994). Poverty experiences of young-children and the quality of their home environments. *Child Development*, 65(2), 331–345.
- Gertler, P., Heckman, J., Pinto, R., Zanolini, A., Vermeerch, C., Walker, S., et al. (2013). *Labor market returns to early childhood stimulation: A 20-year followup to an experimental intervention in Jamaica* Working Paper No. 19185. Cambridge, MA: National Bureau of Economic Research.
- Goyette, K., & Xie, Y. (1999). Educational expectations of Asian American youths: Determinants and ethnic differences. *Sociology of Education*, 72(1), 22–36.
- Greenwald, R., Hedges, L. V., & Laine, R. D. (1996). The effect of school resources on student achievement. *Review of Educational Research*, 66(3), 361–396.
- Hao, L., & Bonstead-Bruns, M. (1998). Parent–child differences in educational expectations and the academic achievement of immigrant and native students. *Sociology of Education*, 71(3), 175–198.
- Hannum, E. (1999). Political change and the urban-rural gap in basic education in China, 1949–1990. *Comparative Education Review*, 43(2), 193–211.
- Hanushek, E. A. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis*, 19(2), 141–164.
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312(5782), 1900–1902.
- Kao, G., & Tienda, M. (1995). Optimism and achievement: The educational performance of immigrant youth. *Social Science Quarterly*, 76(1), 1–19.
- Kaushal, N., Magnuson, K., & Waldfogel, J. (2011). How is family income related to investments in children's learning. In G. J. Duncan, & R. J. Murnane (Eds.), *Wither opportunity? Rising inequality, schools, and children's life chances* (pp. 187–205). New York: Russell Sage Foundation.
- Lareau, A. (2011). *Unequal childhoods: Class, race, and family life, with an update a decade later*. Berkeley, CA: University of California Press.
- Louie, V. (2001). Parents' aspirations and investment: The role of social class in the educational experiences of 1.5- and second-generation Chinese Americans. *Harvard Educational Review*, 71(3), 438–474.
- Mayer, S. E. (1997). *What money can't buy: Family income and children's life chances*. Cambridge, MA: Harvard University Press.
- Miller, J. E., & Davis, D. (1997). Poverty history, marital history, and quality of children's home environments. *Journal of Marriage and the Family*, 59(4), 996–1007.
- Pang, V. O. (1990). Asian-American children: A diverse population. *Educational Forum*, 55(1), 49–66.
- Parcel, T. L., Dufur, M. J., & Zito, R. C. (2010). Capital at home and at school: A review and synthesis. *Journal of Marriage and Family*, 72(4), 828–846.
- Park, H. (2008a). Home literacy environments and children's reading performance: A comparative study of 25 countries. *Educational Research and Evaluation*, 14(6), 489–505.
- Park, H. (2008b). The varied educational effects of parent–child communication: A comparative study of fourteen countries. *Comparative Education Review*, 52(2), 219–243.
- Park, H., Byun, S.-y. Y., & Kim, K.-k. (2011). Parental involvement and students' cognitive outcomes in Korea: Focusing on private tutoring. *Sociology of Education*, 84(1), 3–22.
- Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica*, 73(2), 417–458.
- Sameroff, A. (1994). Developmental systems and family functioning. In D. Parke, & S. G. Kellam (Eds.), *Exploring family relationships with other social contexts* (pp. 199–214). Hillsdale, NJ: Erlbaum.
- Sastry, N., & Pebley, A. R. (2010). Family and neighborhood sources of socioeconomic inequality in children's achievement. *Demography*, 47(3), 777–800.
- Schneider, B., & Lee, Y. (1990). A model for academic-success – the school and home-environment of East-Asian students. *Anthropology & Education Quarterly*, 21(4), 358–377.
- Smith, J. R., Brooks-Gunn, J., Kohen, D., & McCarton, C. (2001). Transitions on and off AFDC: Implications for parenting and children's cognitive development. *Child Development*, 72(5), 1512–1533.
- Stevenson, H. W., & Stigler, J. W. (1992). *The learning gap: Why our schools are failing and what we can learn from Japanese and Chinese Education*. New York: Summit Books.
- Sung, B. L. (1987). *The adjustment experience of Chinese immigrant children in New York City*. Staten Island, NY: Center for Migration Studies.
- Tillman, K. H. (2008). Coresident sibling composition and the academic ability, expectations, and performance of youth. *Sociological Perspectives*, 51(4), 679–711.
- Votruba-Drzal, E. (2003). Income changes and cognitive stimulation in young children's home learning environments. *Journal of Marriage and Family*, 65(2), 341–355.
- Wu, X., & Treiman, D. (2004). The household registration system and social stratification in China: 1955–1996. *Demography*, 41, 363–384.
- Watson, J. E., Kirby, R. S., Kelleher, K. J., & Bradley, R. H. (1996). Effects of poverty on home environment: An analysis of three-year outcome data for low birth weight premature infants. *Journal of Pediatric Psychology*, 21(3), 419–431.
- Xie, Y. (2013). *China Family Panel Studies User's Manual*. Institute of Social Science Survey (in Chinese). <http://www.iss.edu.cn/cfps/d/file/wd/jsbg/2010jsbg/a16476476881bc46c90086fa1508880b.pdf>

- Xie, Y., & Hannum, E. (1996). Regional variation in earnings inequality in reform-era Urban China. *American Journal of Sociology*, 101(4), 950–992.
- Xie, Y., & Hu, J. (2014). An introduction to the China family panel studies (CFPS). *Chinese Sociological Review*, 47
- Xie, Y., & Zhou, X. (2014). Income inequality in today's China. *Proceedings of the National Academy of Sciences (PNAS)*, 111, 6928–6933.
- Yeung, W. J., Linver, M. R., & Brooks-Gunn, J. (2002). How money matters for young children's development: Parental investment and family processes. *Child Development*, 73(6), 1861–1879.
- Zhou, X., Tuma, N. B., & Moen, P. (1996). Stratification dynamics under state socialism: The case of Urban China, 1949–1993. *Social Forces*, 74(3), 759–796.