

# Wealth Constraints and Self-Employment: Evidence from Birth Order

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I revisit the question of whether entrepreneurs face liquidity constraints in business formation. The principle challenge is that wealth is correlated with unobserved ability, and adequate instruments are often difficult to identify. This paper uses the son's birth order as an instrument for household wealth. The instrument would likely not be useful in Western data, but it is in many non-Western cultures where primogeniture remains important. I exploit the data available in the Korean Labor and Income Panel Study, and find evidence of liquidity constraints associated with self-employment in South Korea.

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## 1. Introduction

A critical problem facing a would-be entrepreneur is whether he has enough capital to start his business. If his access to outside finance is restricted, his personal wealth certainly would play a significant role in meeting the initial capital requirement. As a result, a positive relationship between personal wealth and entry into self-employment provides *prima facie* evidence that financial constraints affect new business formation. Based on this logic, early empirical work, normally using net family assets to measure wealth, consistently finds evidence of liquidity constraints in entrepreneurship (Evans and Jovanovic [1989], Evans and Leighton [1989]). However, as widely noted in subsequent studies, household assets are not an exogenous proxy for wealth. They are positively correlated with unobserved entrepreneurial ability, which may have a dominant effect on a person's propensity to become self-employed. Studies that fail to account for this endogeneity overestimate the role of personal wealth, and therefore yield spurious evidence of financial market imperfections.

The ideal solution is, of course, to find an instrument for wealth. A popular choice has been inheritance, lottery winnings, or capital gains on housing (Blanchflower and Oswald [1991]; Holtz-Eakin, Joulfaian, and Rosen [1994a, 1994b]; Hurst and Lusardi [2004]; Lindh and Ohlsson [1996]; Georgellis, Sessions, and Tsitsianis [2005]). The underlying rationale for choosing these variables as an instrument for wealth is that inheritance, lottery winnings, or capital gains on housing are windfall gains, which one supposes should have no direct relationship with unobserved ability. One common feature of these three instruments is that they themselves are part of household assets, which gives rise to the possibility that these variables could be indirectly related to unobserved ability.

First, consider inheritance. As we know, the size of inheritance depends on the wealth of parents. Furthermore, a wealthy family is also like to have other characteristics favorable to successful business formation, including good education, successful career experience, and extensive social networks. All these factors may affect a person's entrepreneurial prospects. Dunn and Holtz-Eakin (2000) offer some direct evidence in their study of the intergenerational transmission of wealth and experience. First, they find that self-employed parents tend to be much wealthier than wage-employed parents. They further show that parents' entrepreneurial histories have a strong positive effect on a son's entry into entrepreneurship. In contrast, the impact of parents' financial capital is quite small. These findings suggest two separate effects that may be captured by inheritance on the entry of self-employment: a pure wealth effect and the effect of family-specific human capital, such as entrepreneurial skills, managerial human capital, or knowledge of business.

Hurst and Lusardi (2004) suggest a way to test the correlation between inheritance and these unobserved family-specific factors. The underlying mechanism is that if inheritance is simply a proxy for liquidity constraints, we would only expect a significant effect on the probability of starting a business of inheritance received in the past. In contrast, if inheritance also proxies for other factors such as entrepreneurial ability, then both past inheritance and future inheritance should predict current business entry. Their result shows almost equivalent effects of these two types of inheritance on the probability of starting a business, which proves again that inheritance is likely an invalid instrument for wealth.

Lottery winnings might appear to be less likely than inheritance to be related to any personal or family characteristics. Nonetheless, the problem with lottery winnings is that they are likely to be associated with low-ability or low-income people who wish to change the direction of their fortune wheel by buying lottery tickets. It is well-known that low-income and less-educated families buy lottery tickets at a much greater rate than do high-income educated families (see McCrary and Pavlak [2002] for a review). If income and education are mismeasured, then this alone would invalidate lottery winnings as an instrument. However, there is also evidence that lottery demand is related to characteristics that are likely unobservable to the econometrician even in the best of circumstances. Brenner (1986), for example, reports from a Canadian survey of 93 lottery winners that “[t]he image of the lottery ticket buyer that emerges . . . is of a person who, finding all other avenues of success closed because of one form or other of sudden adversity, turns to lotteries as a recourse.”

Hurst and Lusardi (2004) use capital gains on housing as an instrument for change in wealth. There are reservations about using capital gains on housing for two main reasons. First, the size of capital gains on housing depends on the size of the house, which, again, is positively related to the owner’s ability. Second, the appreciation of housing price is usually higher in densely populated cities with expanding economic opportunities, places where people are more likely to be attracted to entrepreneurship because of abundant opportunities. To ameliorate these problems, Hurst and Lusardi (2004) obtain regional variations in house prices after controlling for household demographics and regional economic activity. These unpredicted variations are then assigned to each household by region, and then used as an instrument for household wealth.

A recent study by Nanda (2008) examines the effect of a tax reform in Denmark on entry into entrepreneurship. Departing from the prior research which looks into the existence of liquidity constraints through the relationship between wealth and entrepreneurial entry, Nanda (2008) exploits an exogenous change in the cost of finance to distinguish the ef-

fect of wealth constraints on entrepreneurship from other unobservable factors that may affect a person's propensity to become an entrepreneur.

In this paper, I still follow previous studies that aim to find a suitable instrument for wealth, but take a new approach by using as an instrument an indicator variable recording whether the individual is the eldest son. This instrument is unlikely to be especially useful in countries such as the United States, where there is little correlation between birth order and inheritance. However, I carry out this study using South Korean panel data, exploiting a specific trait of Korean culture. South Korea has normally been regarded as a male-dominant society in which fidelity to one's parents is highly valued. Prendergast (2005) describes the traditional role of the eldest son in South Korea, which is extremely significant. In the past, the eldest son was expected to remain in the house, care for elderly parents, and take responsibilities of the whole family. In return, he would receive most, sometimes all, of the parents' bequest. Today, as more Koreans migrate from rural areas to the cities for either education or job opportunities, the traditional family tie between the son and his parents has weakened, and the traditional expectations for the eldest son is not as strict as before. However, the preference for the eldest son to be the primary heir remains strong among elderly South Koreans. Indeed, until 1990, it was written into law that the eldest son should receive an inheritance twice the amount of that received by other sons. In 1990 this rule was abolished and replaced with provisions requiring an equal share of inheritance among all siblings, regardless of sex. But this change in law is frequently circumvented in practice. A very common way is for parents to transfer much of their wealth to their sons, and especially to their eldest son, when the parents are still alive. This practice leads to the fundamental identifying strategy of this paper, that being the eldest son in Korea is positively correlated with an individual's wealth, through either inheritance or pre-mortem wealth transfer from parents. As a person's birth order is not, *ceteris paribus*, likely to be affected by unobserved family characteristics, and is not correlated with economic or regional factors, it is a promising candidate instrument for wealth.

There are two main concerns about the usefulness of this instrument. One relates to the eldest son's responsibility of taking care of elderly parents, which inevitably involves some substantial expenditure. Although nowadays this filial obligation tends to be shared by all offspring, in customary practice, it is still the eldest son or the well-off child who is expected to provide more financial support to the parents (see Prendergast [2005]). Thus, although the eldest son receives more wealth transfer from parents, his financial responsibility for the parents may reduce this pecuniary benefit, perhaps to the extent that it fully offsets the positive wealth effect of being the eldest son.

The second concern is associated with educational expenses. For many Korean parents, paying for a child's college education is considered as an alternative way of wealth transmission. Hence, in many cases, if the eldest son has a college education, parents prefer to leave more wealth to his siblings who did not go to college. This behavior of parents is based on two considerations. On the one hand, parents think they already paid for the eldest son's college education, which often cost a large part of family wealth. Thus, his siblings should have most part of the remaining wealth. On the other hand, it occurs to parents that life should be relatively easier for children with college education. Hence, children without college education should receive more help from the family.

Everything hinges on how to distinguish these two methods of wealth transfer and obtain a clear-cut wealth effect of being the eldest son. My strategy relies on sorting the eldest son into two types – with or without college education, and treating them separately. According to the issues discussed above, if the eldest son is college-educated, we expect him to receive relatively less wealth transfer from the parents, but instead provide more financial support to the parents and the family. Conversely, if the eldest son has no college education, he is expected to receive relatively more wealth transmitted from the parents while provide less financial support to the parents. Therefore, the subsequent hypothesis is that wealth effect is positive for the eldest sons with no college education, but negative for those with college education.

I implement the IV estimation using data from the Korean Labor and Income Panel Study. Without controlling for the number of siblings, the estimated effect of wealth instrumented with the son's birth order is positive for both the educated and uneducated groups of observations. But the result is not statistically significant. A plausible explanation for obtaining an insignificant result is the noise of the instrument caused by the variations in the sibling count. In my sample, the number of siblings an individual has varies from 0 to 16. This variation may give rise to two problems. First, if a family has too many children, the portion of wealth transferred to the children, even the eldest son, could be relatively small. As a result, its contribution to overall wealth is limited. Second, the chance of being an eldest son increases in families with fewer children. As the size of a family is often related to the parents' education, the variation in family size causes a potential endogeneity problem. These two problems can be alleviated by either adding controls for the sibling count or restricting the sample to individuals with a similar number of siblings. In this paper, I adopt the second strategy, limiting the sample to individuals who report having 3-5 siblings. The wealth effect generated in the restricted sample is positive and significant, and provides support for the existence of liquidity constraints.

The paper is organized as follows. The next section provides a brief description of the data construction and some summary statistics. To illustrate the key problems of the

analysis, section 3 presents the results from a baseline probit regression without instrumenting. Section 4 provides the cultural background that supports the intuition of the instrumental variable. Section 5 reports the IV estimates along with some robustness checks. Section 6 concludes.

## 2. Data and Descriptive Statistics

The data used in this paper come from the Korean Labor and Income Panel Study (KLIPS). The KLIPS is a longitudinal survey of originally 5,000 South Korean urban households and their family members. The data contain information on household and personal demographics, as well as individuals' employment history. Starting from 1998, the KLIPS has been completed up to 2005 (the 8<sup>th</sup> wave). In this study, I focus on the five survey years spanning from 2000 to 2004 (the 3<sup>rd</sup> Wave - the 7<sup>th</sup> Wave). This provides a sample of total 4,999 individuals who were either wage workers or self-employed workers throughout the period. Not all individuals remained in the sample for all five years. The mean participation in the sample is 2.1 years, providing me with 10,522 observations on these individuals.

In this section, I provide some of the descriptive summaries of the sample. A more detailed description of this data set and variable construction is presented in the appendix. Table 1 summarizes the sample demographics by employment status, while Table 2 summarizes the distribution of employment status by demographics. Sixty-eight percent is male; twenty-six percent is 35 years old or below, and 61 percent is aged between 36 and 55; around 35 percent of the sample had college degree; and the majority of the sample was married (88 percent). The fraction married is so large because the sample contains observations on household heads and their spouses if they have one—if spouses are excluded, the fraction married is 79 percent.

As Table 1 shows, male, non-college educated, married, and middle-aged individuals are more likely to be self-employed. The column and rows labeled “TRANSITION” provide information on observations recording a transition from wage employment to self-employment. Although 24.9 percent of the sample consists of self-employed individuals, only 0.8 percent of the observations involve a transition. This number may modestly underestimate the real rate of transition, as nearly four percent of the observations reported being self-employed the first time they entered the sample. Some of these observations may correspond to a switch from wage-employment to self-employment, but I am not able to identify them. Nonetheless it is clear that self-employment is both common and stable in South Korea. One percent of male respondents made at least one switch from wage-employment to self-employment,

TABLE 1

*Demographic Distribution by Employment Status and Transition into Self-Employment*

	TOTAL	SELF-EMPLOYED	WAGE-EARNER	TRANSITIONS
Male	68	73.9	66.1	78.8
College	35.4	26.8	38.2	38.8
Married	87.9	90.6	87	90.6
Age				
19-35	26.4	12.9	30.9	30.6
36-45	35.4	35.2	35.5	29.4
46-55	25.4	32.6	22.9	30.6
>56	12.8	19.2	10.7	9.4

Figures are percentages of each column falling into each row class. 10,522 observations.

compared to only 0.5 percent among female respondents. The probability of transition is also slightly higher among married and college-educated people. Although the rate of self-employment is highest among those over age 55, the great majority of transitions into self-employment occur at younger ages. This is consistent with the stylized fact that older people are less likely to switch to self-employment.

TABLE 2

*Distribution of Employment Status by Demographic Variables*

	TOTAL	AGE RANGE				
		19-35	36-45	46-55	>55	
SELF-EMPLOYED	26.2	12.2	24.8	32.1	37.3	
TRANSITION	0.81	0.9	0.7	1.0	0.6	
	GENDER		COLLEGE EDUCATED		MARITAL STATUS	
	MALE	FEMALE	YES	NO	MARRIED	SINGLE
SELF-EMPLOYED	27.0	20.4	18.9	28.2	25.7	19.3
TRANSITION	0.9	0.5	0.9	0.8	0.8	0.6

Figures are percentages of each column falling into each row class. 10,522 observations.

Table 3 summarizes the distribution of wage earners and the self-employed across major industries. Wage earners are more heavily represented in manufacturing, construction,

and education. The self-employed are more likely to be found in service industries, especially in retail and wholesale where over one third of the self-employed work.

TABLE 3  
*Summary Statistics by Industry*

	PERCENTAGE		
	TOTAL	SELF-EMPLOYED	WAGE-EARNER
Manufacturing	25.6	14.6	29.3
Wholesale and Retail	15.7	33.2	9.9
Construction	9.7	6.6	10.7
Transportation and Communication	7.4	8.8	6.9
Education	7.3	3.3	8.7
Hotels and Restaurants	6.5	11.8	4.7
Community, Repair, and Personal Service	5.8	8.7	4.8
Financial Institution and Insurance	4.7	1.3	5.8
Other	17.3	11.7	19.2
Total Observations	10,522	2,620	7,902

### 3. Self-Employment and Wealth Constraints: Probit Estimates

In the previous studies of liquidity constraints, a general baseline specification for the estimation is

$$selfe_i = \beta_0 + \beta_1 a_i + I_i' \beta_2 + X_i' \beta_3 + \varepsilon_i \quad (1)$$

where the dummy variable,  $selfe_i$ , indicates a transition into self-employment;  $a_i$  is household wealth;  $I_i$  and  $X_i$  are two sets of control variables.  $I_i$  is a vector of observed demographic characteristics, such as age, gender, marital status, and educational attainment, while  $X_i$  is a vector of employment variables, including previous wage earnings, years of work experience, indicator variables of employment and occupation, etc.<sup>1</sup>  $\varepsilon_i$  represents all other determinants of the transition into self-employment, including an individual's unobserved entrepreneurial attributes. Before proceeding to estimate equation

<sup>1</sup> Few studies actually control for all these terms. Most studies include some subset of these variables.



(1), assumptions about three key explanatory variables, household wealth, wages, and educational attainment, merit some discussion.

### 3.1 *Linearity in Wealth*

Equation (1) specifies a linear relationship between household wealth and the probability of becoming self-employed.<sup>2</sup> Previous work also tends to report results from nonlinear specifications. For example, Hurst and Lusardi (2004) estimate a nonlinear wealth model with a fifth-order polynomial in wealth. They conclude that the nonlinear specification fits the data better, as a simple linear relationship is likely to be driven by households at the top of the wealth distribution.

To decide which model is more appropriate for the South Korean sample, I first run several simple regressions using both linear and non-linear specifications. The variable of wealth is constructed based on the formula used by Evans and Jovanovic (1989) and Xu (1997): Net Assets=Investment in Real Estate + Financial Assets (including Savings, Stocks, Bonds, Insurance, Loans to friends or relatives, and other financial assets) – Debts (including balance of debt from bank/non-bank, balance borrowed from private route, balance from loans, and other debts). All these variables are originally measured in units of 10 million Korean won, approximately US\$10,000. Net assets are expressed in real value with the base year of 2000. The essential argument for using birth order as an instrument for wealth is the plausible relationship between being the eldest son and a person's household wealth. But this relationship may not be found in poor families, as parents do not have much to give, even to the eldest son. In this case, the instrument would be uninformative, which is the downside of this approach. The concern is substantiated in the unreported first stage analysis that is carried out separately among observations with positive or negative household assets. In the former case, being the eldest son increases a person's household assets by 9,200,000 won (around 8363 US dollars) among observations with positive household assets, and the result is significant at the one percent level. In contrast, among observations with negative household assets, which are also more likely to be associated with poor family background and low education, I find no significant relationship between wealth and a son's birth order. Based on the consideration of the relevance of the instrument, the current analysis only focuses on individuals with positive household assets. Respondents who reported negative household assets or had

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<sup>2</sup> Here I follow Hurst and Lusardi (2004) and refer equation (1) as the "linear" specification for wealth. In contrast, a model that involves the higher power of wealth is referred as a "nonlinear" specification for wealth.

missing information on assets are removed from the sample. This way also gives the convenience of using logarithm of wealth in the later analysis.

Column (1) in Table 4 shows the results from the linear specification. Consistent with previous findings, the effect of wealth on the probability of becoming self-employed is positive and significant at the ten percent level. However, the marginal effect is quite small: for each US\$100,000 increase in household assets, the probability of becoming self-employed increases by 0.3 percent. This number is close to the 0.5 percent reported by Hurst and Lusardi (2004) using the PSID data.

TABLE 4  
*Comparing Linear and Nonlinear Specifications for Wealth*

	DEPT. VAR: PROB. BECOMING SELF-EMPLOYED	
	(1)	(2)
LAGGED ASSETS/1000	0.01*** (4.26)	0.02** (2.97)
(LAGGED ASSETS/1000) <sup>2</sup>	---	-5.28e-05 (-1.51)
WAGE/1000	-1.56** (-2.65)	-1.65** (-2.73)
AGE	-0.01* (-1.73)	-0.01** (-2.03)
MARRIED	0.05 (0.32)	0.03 (0.19)
MALE	0.25** (2.37)	0.26** (2.42)
COLG	0.04 (0.41)	0.03 (0.27)
MARGINAL EFFECTS OF ASSETS	0.0003** (4.03)	0.0005** (3.06)
OBS.	6,355	6,355

In this and subsequent tables, number of observations varies as a result of missing data on selected regressors. Significance levels: \*\*\*0.01, \*\*0.05, \*0.1.

In Column (2) of Table 4, a quadratic in assets is added to the regression. The marginal effect of wealth on the probability of self-employment is 0.5 percent for each \$100,000 increase in household assets, which is slightly higher than the marginal effect obtained in

the linear model. The opposite signs of the two coefficients suggest that the effect of wealth on the probability of switching to self-employment declines as wealth rises, but the estimated coefficient on the squared term is not significant at the conventional ten percent level.

Bartus (2005) has suggested that, to find out whether the nonlinear effect is increasing at a decreasing rate or inversely U-shaped, we can check the value of the original term that maximizes the linear prediction. If the value is within the range of the original term, then the effect is inversely U-shaped. In this model, the linear prediction-maximizing value of assets is 285.92, which is higher than its maximum 225.84. This implies that the marginal effect of assets on the odds of starting a business is positive in general, but stronger, in particular, for people at the lower end of wealth distribution. Unsurprisingly, a \$10,000 increase of assets means more to the poor than to the rich, given they both want to start a business.

The conclusion is that although it is possible that the effect of wealth on the probability of becoming self-employed is not constant over the whole distribution of wealth, this nonlinear relationship does not seem to be prominent in this Korean data set. Meanwhile, a likelihood ratio test also does not reject the specification in which wealth enters linearly ( $p$ -value .12).

In this paper, I make a slight change of specification (1) by using logarithm of wealth, so the coefficient on wealth represents the overall effect of a one percent change in household assets on the probability of starting a business. Because of different currencies, it is more convenient to focus on the effect of percentage change for the purpose of comparing the results with those obtained in the US data.

### 3.2 *Wage Earnings*

Prior self-employment earnings in the wage-employment sector are usually considered as an important determinant of self-employment. Table 4 shows a negative relationship between previous wage earnings and entry into self-employment, which supports the common notion that people with lower earnings are more likely to choose self-employment because of lower opportunity costs (Georgellis, Sessions, and Tsitsianis [2005]).

Of course, interpretation of the wage effect is complicated by its correlation with unobserved ability. Several studies have shown that self-employment is made up of workers with the lowest or highest ability (Ohyama [2007], Åstebro, Chen, and Thompson [2008]). The former are pushed into self-employment because their poor performance limits their job opportunities in the wage sector, while the latter are attracted to self-employment by its higher returns. In this sense, if wage is positively related to workers'

ability, we would expect to see both high-wage and low-wage workers switching from wage sector to self-employment. Which group accounts for the larger proportion depends on the specific sample. Furthermore, if ability is also considered as being transferable across sectors, low-wage workers would be less likely to become self-employed since they cannot expect to do better in self-employment.

To partly address this endogeneity issue, I replace the level of wage with its growth rate in the model for two reasons. First, workers care about the prospect of their income more than their current earnings. Anticipating a further decrease of their wage income in the future is more likely to make them consider self-employment. More important, the negative growth of wage can often be attributed to an exogenous shock instead of a worker's own ability. Thus, workers who are experiencing decreasing earnings could expect to earn more in self-employment. Thus, I expect a negative relationship between the growth of wage and the probability of entry into self-employment. Using the growth rate of wage growth is certainly not a perfect way to solve the endogeneity problem. But it alleviates the severity of this issue.

### *3.4 Education*

The trouble with educational attainment is that it is closely related to several other covariates, such as earnings and occupation (Georgellis, Sessions, and Tsitsianis [2005]). After controlling for these variables, previous longitudinal studies show no significant effect of formal education on the probability of becoming self-employed.

Educational attainment is also correlated with wealth. This correlation arises in two ways. In the first, highly-educated people are better at accumulating wealth. In the second, even at the same level of wealth, highly-educated people may have easier access to external finance because of better credibility, networks, or perceptions of potential financiers about the chances for success. Thus, there is a possibility that highly-educated would-be entrepreneurs face fewer liquidity constraints compared to their less-educated counterparts. This difference, however, is neglected if education is added to the regression as a control variable, in which case the slope on wealth is forced to be the same for both educated and uneducated groups. The issue becomes even clearer in the present Korean data. As mentioned from the outset, the relationship between wealth and being the eldest son in Korea is likely to be negative if the son had a college education and positive if he did not. Although it is so far a hypothetical argument, I will show later the evidence in the data that supports this hypothesis. To distinguish these two cases, I drop the variable of education from all regression models in the following analysis. Instead, I split the sample into two sub-samples: one of observations with college education and the other without. Each regression is then estimated separately on each sub-sample.

### 3.4 A Modified Baseline Specification

My modified baseline specification is

$$selfe_i = \beta_0 + \beta_1 \ln(a_i) + \beta_2 pgw_i + X_i' \beta_3 + \varepsilon_i, \quad (2)$$

where  $selfe_i$  is still a binary variable that takes the value one if individual  $i$  switches from wage-employment to self-employment, and zero if otherwise;  $\ln(a_i)$  is the logarithm of net assets in the previous year;  $pgw_i$  is the growth rate of monthly wage in the previous year for individual  $i$ ; and  $X_i$  is a vector of demographic variables including age, gender, and marital status. At this stage, I do not control for occupation and industry. This experiment is left to the robustness check at the end of the analysis.

Table 5 reports the estimated effect of net assets on the probability of becoming self-employed in the modified baseline probit regression, (2).

TABLE 5  
*Probability of Becoming Self-Employed: Probit Regressions*

	DEPT. VAR=1 IF SWITCHED INTO SELF-EMPLOYMENT IN CURRENT YEAR.	
	(1) NO COLLEGE	(2) COLLEGE
LAGGED LOG ASSETS	0.09* (1.76)	0.01 (0.25)
GROWTH OF MONTHLY WAGE IN PREVIOUS YEAR	-0.04 (-0.26)	-0.45 (-1.49)
AGE	-0.01 (-0.78)	-0.01 (-0.80)
MARRIED	-0.32 (-1.55)	---
MALE	0.07 (0.43)	0.19 (0.76)
AV. LOG LIKELIHOOD	-0.06	-0.08
PSEUDO R2	0.02	0.02
OBS.	2,605	1,387

Z-scores are in parentheses. Significance levels: \*\*\*0.01, \*\*0.05, \*0.10. Variable MARRIED is dropped from the regression in column (2) because MARRIED=0 predicts self-employment perfectly.

Column (1) shows that in the non college-educated sample, there is a positive relationship between the odds of becoming self-employed and the amount of assets prior to the transition into self-employment. The coefficient on the variable of interest, *lagged log assets*, indicates that a ten percent increase in assets raises the probability of becoming self-employed by two percent. The result is significant at ten percent level. In column (2), the college-educated sample, the estimated coefficient on *lagged log assets* is positive, but it is much smaller and not significantly different from zero. Thus, the effect of assets appears to be stronger for the non college-educated people than their college-educated counterpart. The estimated results on other covariates suggest that men are more likely to switch from wage employment to self-employment; while people who are married or older are less likely to make this transition. Moreover, people are more likely to become self-employed when they experience declining earnings in the wage-employment sector. While the signs are consistent with intuition, none of these effects is statistically significant.

The main concern with these regressions is of course the expected positive correlation between assets and unobserved entrepreneurial ability. It is worth noting that this unobserved ability is not equivalent to formal education, and it is entirely possible that people with the same level of education differ in unobserved abilities. I turn now to IV estimations, using birth order as an instrument. The next section begins with a justification for using this instrument in Korean data.

#### **4. The Hypothesis and Cultural Background**

We don't have much to give, but the house will go to our eldest son. This is for two reasons. First our house was bought with some help from him. He deserves a share because of this. Second, my eldest son went through many difficult times looking after his younger brothers and sisters. We wanted them to go to school in Chonju so my first son and his wife took them into his house and cared for them there.

Prendergast (2005: 160)

This conversation comes from an interview of a Korean woman, who was asked about her plans for dividing the family's house and property. Her reply characterizes the basic role that the Korean society has defined for the son, especially the eldest son. In the old days, the social expectation was that the eldest son should remain within the family, even after married, and take care of parents in their old age. The eldest son should also take responsibility for helping the family's welfare and supporting younger siblings. In return,

the eldest son would receive the lion's share of any inheritance. According to pre-1962 legal code, the amount of inheritance the eldest son should receive was twice the amount received by other younger sons. Sorensen (1986) and Prendergast (2005) report that it was customary for the eldest son to receive at least half the estate regardless of the number of other sons. Married daughters were usually excluded from the division altogether.

This traditional inheritance system has been notionally weakened since legal changes in 1990 stipulating that all successors have equal shares of an inheritance regardless of sex or marital status. However, Sorensen (1986) and Yang (1998) note that the influence of patriarchal rules and obligations for sons continues through either traditions in Family Law or belief in the "moral value of filial piety". In Prendergast's (2005) survey of fifty elderly men in southwest Korea, almost half of the respondents preferred the eldest son to receive the largest share of inheritance. Prendergast (2005) also found that elderly people find a number of ways to avoid strictly following the equal inheritance rule. One of the avenues is through article 1008-2 of the Civil Code, which states that if a person has made a special contribution to family property, this contributory portion should be considered as his inherited portion and should be added to the amount he is supposed to inherit from the rest of the property. Because this clause tends to compensate those (often sons), who remain with parents and provide them with financial support, parents have considerable latitude to pass more property to their sons. Another common way to circumvent the law is through a family meeting, in which the parents declare their wishes to transmit property to specific recipients (such as the eldest son) before all family members. But the most important way to circumvent the inheritance law is to transmit property prior to death. In fact, because of this practice, many Korean parents also count dowries and other wedding expenses, investments in education, or donations for setting up businesses, as part of their pre-mortem transfer of property. In practice, this has provided justification for providing daughters little of the inheritance. At the end of his field study, Prendergast (2005) concludes that in modern Korea sons, especially eldest sons, remain highly favored in parents' decisions about the distribution of family wealth.

As the distribution of family wealth can be either prior to death or through bequests, it seems that being the eldest son in South Korea should be positively related to a person's wealth. However, this relationship may be rather complicated when parents are still alive. As mentioned above, the eldest son has the obligation of caring for elderly parents and for providing support to other siblings. Married daughters are also expected to contribute to their natal family, but the amounts and frequencies of money provided by them are typically far less than those provided by their brothers. From this perspective, the eldest son has the greatest financial burden of caring parents and siblings, though he is ulti-

mately rewarded more as well. As a result, the net effect of being an eldest son on wealth becomes a purely empirical question.

Because education frequently is counted as part of the pre-mortem transfer made to children, I conjecture that net financial transfers from the eldest son to his parents while they are alive are greater for the college educated. Table 6 presents summary statistics of net financial transfers made by eldest sons to living parents. During each wave's interview, respondents were asked about financial support they gave or received from parents in the previous year. The net transfer is the difference between the amount that is provided to their parents and the amount received from them. The numbers do not include real estate transfers or post-mortem inheritances. The mean net transfer among the college-educated sub-sample is, as conjectured, more than twice the mean among the non college-educated sub-sample. Moreover, the net amount provided by the eldest sons with college education is markedly higher at the 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentiles.

TABLE 6  
*Net Wealth Transfer to Parents by the Eldest Sons (unit: 10,000 won)*

	Non-College Educated	College Educated
MEAN	40.0	96.0
STD. DEV	181.7	829.7
25 <sup>TH</sup> PERCENTILE	0	0
50 <sup>TH</sup> PERCENTILE	0	0
75 <sup>TH</sup> PERCENTILE	10	80
95 <sup>TH</sup> PERCENTILE	300	440
OBS.	1,097	966

Table 7 reports the results from regressing the net transfer on a series of demographic variables. Being the eldest son is positively related to net wealth transfer, indicating that the eldest son, in general, provides more financial support to parents than other siblings. This relationship is even stronger for the eldest sons who had college education, as shown in columns (2) and (3). Thus, the results are consistent with the conjecture that the effect of being the eldest son on wealth may differ between these two educational levels.

To summarize, although the eldest sons often dominate the “wealth transmission” system, they are also the main provider of the aged parents’ income. This burden is even larger if the eldest son is wealthier or better educated, in which case his share of wealth transfer from parents might also be largely reduced. Hence, the hypothesis is that the relationship



between wealth and being the eldest son in South Korea is negative if the son is college educated, and positive if he is not.

TABLE 7  
*The Effect of Being the Eldest Son on Wealth Transfer*

	DEPT. VAR: NET INCOME TRANSFER TO PARENTS		
	ALL INDIVIDUALS	NON-COLLEGE EDUCATED	COLLEGE EDUCATED
MALE	-34.77** (-2.13)	-7.49 (-0.87)	-70.97* (-1.70)
AGE	0.44 (0.65)	-0.07 (-0.21)	-0.32 (-0.17)
MARRIED	-1.44 (-0.07)	-3.97 (-0.39)	7.74 (0.14)
ELDEST	39.92*** (2.67)	20.25*** (2.46)	74.93** (2.09)
NO. OF SIBLINGS	5.79* (1.61)	1.61 (0.87)	13.63 (1.41)
LAGGED LOG WAGE	54.64*** (4.89)	24.62*** (4.15)	108.58*** (3.54)
COLG	23.2* (1.66)	---	---
OBS.	4,852	2,995	1,857

t-statistics are in parentheses. Significance levels: \*\*\*0.01, \*\*0.05, \*0.10.

## 5. Self-Employment and Wealth Constraints: IV Results

In the 6<sup>th</sup> wave of the KLIPS, respondents were asked the following two questions:

- Do you have either brothers or sisters? a. Number of total brothers, b. Number of total sisters, c. Birth order.
- Do you have older brothers or sisters? a. Number of older brothers, b. Number of older sisters.

Based on respondents' answers, a male respondent can be defined as the eldest son if he does not have any older brothers. A binary variable, *eldest*, is then created, which equals one if a male respondent is the eldest son in the family, and zero if otherwise. Eldest sons account for thirty percent of total observations and 43 percent of observations on males.

Table 8 provides the distribution of the number of siblings of eldest sons, which varies from zero to sixteen. Five percent of eldest sons have only one sibling, 73 percent have two to five siblings, and 22 percent have more than five siblings.

TABLE 8  
*Distribution of Number of Siblings of Eldest Sons*

NO. OF SIBLINGS	PERCENT	NO. OF SIBLINGS	PERCENT
0	0	9	0.8
1	5.2	10	0.2
2	13.1	11	0
3	20.6	12	0
4	22.5	13	0
5	17.0	14	0
6	10.6	15	0
7	5.8	16	0.2
8	4.1		

Distribution based on 3,200 observations.

### 5.1 *Instrument Validity and Relevance*

The variable, *eldest*, is not a valid instrument if it is correlated with the disturbances in the baseline regression (2). This can happen if the variable turns out to be an omitted variable from equation (2), or it is correlated with some omitted variables, even if it itself is not part of the baseline regression. The test of *eldest* being an omitted variable is done by re-estimating equation (2) with *eldest* included as an additional explanatory variable. Columns (1) and (2) of Table 9 display the results. For both sub-samples, the estimated coefficients on *eldest* are not significantly different from zero, which relieves this concern.

The main advantage of using birth order as the instrument for wealth is its little correlation with any family or social factors. Nonetheless, one may argue that the chance of being the eldest son decreases with the number of siblings, while family size is commonly considered as a reflection of parents' education and household wealth. Then the question is whether or not would the size of siblings change the validity of this instrument and further affect the estimated result. Columns (3) and (4) of Table 9 show that the estimated coefficient on the variable of sibling number is not statistically significant, indicating that sibling size is not an omitted variable. This result excludes the possibility that the instru-

ment is correlated with a relevant variable omitted from the regression. Even so, the remaining concern is the implicit correlation between sibling size and unobserved ability, which may subsequently affect the validity of the instrument, *eldest*. This problem can be resolved by restricting the sample according to a certain sibling size, which is addressed in the later part of the analysis.

TABLE 9  
*Testing for Omitted Variables*

	DEP. VAR: = 1IF BECOMING SELF-EMPLOYED IN CURRENT YEAR			
	(1) NO COLLEGE	(2) COLLEGE	(3) NO COLLEGE	(4) COLLEGE
LAGGED LOG ASSETS	0.13** (2.11)	0.03 (0.42)	0.13** (2.19)	0.04 (0.65)
ELDEST SON=1	-0.02 (-0.08)	-0.08 (-0.42)	—	—
NO. OF SIBLINGS	—	—	-0.05 (-1.11)	-0.10 (-1.54)
WAGE GROWTH IN PREVIOUS YEAR	-0.23 (-0.93)	-0.55 (-1.58)	-0.22 (-0.91)	-0.55 (-1.58)
AGE	0.002 (-0.18)	-0.01 (-0.67)	0.00 (0.03)	0.00 (-0.22)
MARRIED	-0.48** (-2.20)	---	-0.48** (-2.20)	---
MALE	0.01 (0.04)	0.58 (1.56)	0.00 (0.00)	0.53 (1.48)
AV. LOG LIKELIHOOD	-0.06	-0.08	-0.06	-0.08
PSEUDO $R^2$	0.04	0.03	0.04	0.05
OBS.	2,017	1,155	2,017	1,155

Z-scores are in parentheses. Significance levels: \*\*\*0.01, \*\*0.05, \*0.10.

Murray (2006) suggests the use of reduced-form regressions to check the intuition of the instrumental variable. Table 10 reports results from estimating the reduced-form regression in which the dependent variable is the probability of switching to self-employment, *selfe*, and the independent variables include the instrument, *eldest*, as well as all non-troublesome explanatory variables in the modified baseline equation (2). The estimated coefficient on *eldest* is statistically insignificant in both college-educated and non college-educated sub-samples. According to Angrist and Krueger (2001), there are three possible implications based on this result: either the model is under-identified, or IV estimation is uninformative, or the troublesome variable, *lagged log assets*, does not matter

for the likelihood of becoming self-employed (i.e., there are no liquidity constraints). Under-identification should not be the case under the assumption that demographic variables (such as age, gender, and marital status) are not contemporarily correlated with the error term; the purpose of using the growth of monthly wage is also to avoid the endogeneity problem presented by wage levels. The question then pins down to whether or not the instrument, *eldest*, is relevant to wealth. If not, the instrument can not properly serve the purpose of the analysis and IV estimation is uninformative; otherwise, the results in Table 10 offer a sign of no liquidity constraints.

TABLE 10  
*Reduced-Form Probit Regressions*

	DEP. VAR: = 1IF BECOMING SELF-EMPLOYED IN CURRENT YEAR	
	(1)	(2)
	NO COLLEGE	COLLEGE
ELDEST	0.00 (-0.01)	-0.09 (-0.46)
WAGE GROWTH IN PREVIOUS YEAR	-0.25 (-0.99)	-0.54 (-1.56)
AGE	0.00 (-0.01)	-0.01 (-0.55)
MARRIED	-0.37 (-1.74)	---
MALE	0.01 (0.03)	0.57 (1.54)
OBS.	2,017	1,155

Z-scores are in parenthesis.

To examine the relevance of the instrument, *eldest*, I report in Table 11 the first stage regression estimates. It is not surprising to see in all three columns that household wealth is positively related to wage growth, age, and marriage. Column (1) shows no significant effect on wealth of the instrument, *eldest*, when controlling for college education. However, when splitting the sample by college education, I find opposite relationships between wealth and being the eldest son in the two sub-samples. In the non college-educated group (column (2)), being the eldest son increases the household assets by 14 percent. By contrast, in the college-educated group (column (3)), being the eldest son reduces the household assets by 19 percent. Both results are significant at around the five

percent level. Thus, I am confident that the variable, *eldest*, is an informative instrument for wealth. Also, the results again substantiate the previous hypothesis that the effect of being the eldest son on wealth differs between the college-educated group and the non college-educated group. This provides a foundation for the strategy of carrying out the analysis separately in these two groups.

TABLE 11  
*Testing for Relevant Instrument: OLS Regressions*

	DEPT. VAR: LOG LAGGED ASSETS		
	(1) ALL	(2) NO COLLEGE	(3) COLLEGE
ELDEST	-0.01 (-0.18)	0.14* (1.86)	-0.19** (-2.14)
WAGE GROWTH IN PREVIOUS YEAR	0.12** (2.85)	0.10** (2.08)	0.19** (2.25)
AGE	0.03*** (11.29)	0.01*** (3.67)	0.07*** (14.40)
MARRIED	0.80*** (9.16)	0.83*** (7.84)	0.63*** (4.11)
MALE	-0.06 (-0.88)	-0.04 (-0.51)	-0.23** (-2.16)
COLG	0.69*** (12.78)	---	---
ADJUSTED $R^2$	0.10	0.04	0.17
OBS.	3,267	2,017	1,250

*t*-statistics are in parenthesis. Significance levels: \*\*\*0.01, \*\*0.05, \*0.10.

It is worth mentioning that there are very few observations in the data that report living with parents. Recall from the overview of Korean culture, the distribution of property is strongly associated with the responsibility of caring elderly parents. In other words, a child other than the eldest son can receive a significant amount of bequest for living with and taking care of parents. In this case, living with parents would be an important explanatory variable that should be included in the regression. But this would not be case in the present data set, for there are at most 0.5 percent of respondents who reported living with parents during each wave of the interview.

## 5.2 IV Estimates

After establishing the validity and relevance of the instrument, *eldest*, we are finally ready to look at the results from the IV estimations. Table 12 reports the results of IV Probit regressions. Columns (1) and (2) show that the estimated coefficients on wealth—instrumented with the variable of being the eldest son—are positive in both the college-educated and the non college-educated sub-samples, but the estimates are not statistically significant.

Wage earning is the only employment-related variable that has been controlled for in all the regressions so far. But wealth effects may also vary across occupations: First, entry into self-employment in certain fields (such as lawyer, doctor, and salesperson) likely requires less capital; second, a person’s previous occupation is also, to some extent,

TABLE 12  
*IV Probit Regressions*  
DEP. VAR: = 1 IF BECOMING SELF-EMPLOYED IN CURRENT YEAR

	(1) NO COLLEGE	(2) COLLEGE
LAGGED LOG ASSETS	0.02 (0.01)	0.40 (0.63)
WAGE GROWTH IN PREVIOUS YEAR	-0.21 (-0.67)	-0.54 (-1.53)
AGE	0.00 (-0.01)	-0.03 (-0.81)
MARRIED	-0.39 (-0.30)	3.32 (0.00)
MALE	0.003 (0.02)	0.58* (1.77)
AV. LOG LIKELIHOOD	-1.85	-1.82
OBS.	2,017	1,250

Z-scores are in parenthesis.

TABLE 13  
*IV Probit Regressions (Controlling for Previous Occupations)*

DEP. VAR: = 1 IF BECOMING SELF-EMPLOYED IN CURRENT YEAR		
	(1) NO COLLEGE	(2) COLLEGE
LAGGED LOG ASSETS	-0.25 (-0.23)	0.41 (0.57)
WAGE GROWTH IN PREVIOUS YEAR	-0.17 (-0.46)	-0.53 (-1.38)
AGE	0.01 (0.38)	-0.04 (-1.07)
MARRIED	-0.19 (-0.15)	3.18 (0.00)
MALE	-0.03 (-0.13)	0.61 (1.71)
AV. LOG LIKELIHOOD	-1.83	-1.81
FIRST STAGE ESTIMATES		
	NO COLLEGE	COLLEGE
ELDEST	0.13* (1.74)	-0.16* (-1.83)
WAGE GROWTH IN PREVIOUS YEAR	0.10** (2.07)	0.18** (2.20)
AGE	0.02*** (4.18)	0.06*** (13.12)
MARRIED	0.80*** (7.60)	0.60*** (3.91)
MALE	0.03 (0.31)	-0.26** (-2.23)
OBS.	2,017	1,250

Z-scores are in parenthesis for IV estimation, and *t*-statistics are in parenthesis for first stage estimation. Significance levels: \*\*\*0.01, \*\*0.05, \*0.10.

related to the type of business he would start, which in turn determines different requirement for initial capital. Based on this consideration, I report in Table 13 the results from the IV estimation after adding controls for individuals' previous occupations. The correlation between household net wealth and the instrument, *eldest*, remains strong in the first-stage regression. As shown before, this correlation is positive in the non college-educated sub-sample and negative in the college-educated sub-sample. The IV estimation, again, shows no significant wealth effect on the probability of becoming self-employed.

Before drawing the conclusion that there are no liquidity constraints in South Korea, we should return to the issue of sibling counts. As discussed before, the probability of being the eldest son increases if the person has fewer siblings. As the number of children is commonly believed to be negatively related to parents' education, *eldest* is possibly correlated with unobserved ability through this avenue. Furthermore, if a family has too many children, we would expect the wealth inherited by, or transferred to, each child (even the eldest son) to be too small to have a significant effect on the child's own assets. From this perspective, having a large size of sibling may weaken the explanatory power of the instrument.

Although the number of siblings ranges between zero and sixteen, fifty-seven percent of the sample report having three to five. To maintain the validity of the instrument, my initial strategy is to restrict the sample to the 6,220 observations with three to five siblings and leave out those with too few or too many siblings. But there arises another problem that is noteworthy. Recall when the data set was constructed, both household heads and their spouses are included in the sample. The couple shares observations on household assets (from household data), but each partner has his or her own observations on work status and number of siblings. The instrument, *eldest*, is one if a male respondent was the eldest son; it is zero if a person was not the eldest son, which includes the case of being a female respondent. Imagine there is a female respondent whose husband was the eldest son. Since the husband and the wife share the same household assets, the effect of being the *wife* of the eldest son should be identical to the effect of being the eldest son on household assets. However, because the variable, *eldest*, is coded as zero for the wife, I am not able to capture the effect on assets of being the wife of the eldest son. In fact, there are 408 households of this kind in the 6<sup>th</sup> wave data set, where the variable *eldest* was initially constructed.

The easiest solution to this problem is to restrict the sample to males. A more sophisticated way is to identify each woman in the data whose husband was the eldest son, and then recode the variable, *eldest*, as one on these observations. The latter strategy allows



me to include more valuable observations in the regressions. I report results from both strategies here.

### *5.3 Estimation from Males Alone*

Table 14 presents the result from restricting the sample to the male who had three to five siblings. First-stage estimates show that restricting the sample by sibling size increases the effect on wealth of being the eldest in the uneducated sub-sample. In the new restricted sample, being the eldest son increases household assets by 28 percent, compared to 14 percent in the unrestricted sample. The result is significant at the one percent level. In the restricted educated sub-sample, the result shows that being the eldest son reduces household assets by 20 percent, which is similar to the 19 percent negative effect found in the unrestricted sample. More important, IV estimation yields strong evidence of liquidity constraints. In both sub-samples, a one percent increase in household assets increases the chance of becoming self-employed by about 65 percent for both groups.

It is worth noting that for the college-educated group the baseline probit regression predicts no significant correlation between wealth and the probability of becoming self-employed, but the IV estimation shows a positive and significant effect of wealth on self-employment. This disparity arises for two possible reasons. The first possibility is that among people with college degree, the low-ability ones are more likely to become self-employed. As wealth is positively related to unobserved ability, we cannot see any positive relationship between wealth and the odds of becoming self-employed without controlling for unobserved ability in the measure of wealth. This may not be a general case, but in the current Korean data set, nearly half of the observations on college-educated business owners were engaged in wholesale and retail business or manufacturing sector. This business distribution is very similar to that observed among non college-educated self-employers. Normally, we would expect a sharp difference in the fields where these two groups started their businesses, considering their distinct skill sets.

The second possibility, as suggested in Nanda (2008), is that individuals who are wealthy but have no college education represent the majority of self-employed workers in the data. If this is the case, a positive and significant relationship between wealth and self-employment entry may not be found in the baseline regression for the college-educated group. However, this explanation does not seem to be plausible in the present data. A comparative analysis (in results not shown here) suggest that, among people who switched to self-employment, pre-entry assets of college-educated workers are on average three times larger than those of workers without college degree. After adjusting for

TABLE 14  
*IV Probit Estimations in the Sample with Restricted Sibling Size (Male Only)*

DEP. VAR: = 1IF BECOMING SELF-EMPLOYED IN CURRENT YEAR		
	(1)	(2)
	NO COLLEGE	COLLEGE
LAGGED LOG ASSETS	0.63** (2.13)	0.64*** (3.80)
WAGE GROWTH IN PREVIOUS YEAR	-0.60 (-1.17)	-0.38 (-1.31)
AGE	-0.03** (-2.26)	-0.03** (-2.21)
MARRIED	-0.52 (-1.36)	1.45 (0.00)
AV. LOG LIKELIHOOD	-1.8	-1.78
FIRST STAGE ESTIMATES		
	NO COLLEGE	COLLEGE
ELDEST	0.28*** (2.85)	-0.20* (-1.89)
WAGE GROWTH IN PREVIOUS YEAR	0.09 (1.39)	0.15 (1.24)
AGE	0.03*** (6.23)	0.06*** (8.56)
MARRIED	0.69*** (4.06)	0.64*** (2.84)
BASELINE PROBIT REGRESSIONS		
	(1)	(2)
	NO COLLEGE	COLLEGE
LAGGED LOG ASSETS	0.20* (1.85)	-0.07 (-0.84)
AV. LOG LIKELIHOOD	-0.05	-0.1
OBS.	864	563

Z-scores are in parenthesis for IV and baseline estimations, and *t*-statistics are in parenthesis for the first stage estimation. Significance levels: \*\*\*0.01, \*\*0.05, \*0.10.

the percentage of each group among all the transitions, I still find that college-educated self-employers were two times wealthier than the non college-educated prior to the transition.

### *5.6 Estimation Including Wives of Eldest Sons*

Table 15 reports the results from the second strategy. The sample consists of all male respondents who had three to five siblings, as well as their spouses if there are observations. The first-stage regressions consistently show the same positive (negative) correlation between wealth and being the eldest son in the non college-educated (college-educated) subsample. IV estimations indicate that liquidity constraints exist in both subsamples. All the results are highly significant at the one percent level.

## **6. Conclusions**

If a person considers starting a business but has little access to external loans, he has to rely on his own assets at least to meet the initial requirement on capital. The wealthier he is, the more likely he would become self-employed. Thus, a positive effect of household assets on the probability of self-employment entry can serve as evidence of liquidity constraints in entrepreneurship. The idea is straightforward, but the analysis becomes complicated due to the endogeneity problem caused by the correlation between wealth and unobserved ability. Moreover, finding an instrument for wealth that is unrelated to any factor that might stimulate entrepreneurship is also a challenge. This paper proposes an instrument different from those used in previous literature, a son's birth order, to test the existence of liquidity constraints faced by entrepreneurs in South Korea.

Two prominent features of Korea culture, male-dominance and fidelity, determine a strong relationship between birth order and wealth. Eldest sons are more likely to receive larger wealth transferred from parents either through bequests or pre-mortem in-kind transfers. Pre-mortem, they are also supposed to provide more financial support to parents than are other siblings. Hence, the net effect of being the eldest son on his household wealth is ambiguous. The data show a positive effect for the eldest sons without college education, and a negative effect for those with college education. A likely explanation is that if the eldest son is college educated, he is less likely to receive a large wealth transfer from his parents as they already paid for his college education. In the meantime, he is more likely to be better situated so that he is able to provide his family with more financial support.

TABLE 15

*Probit IV Estimation in the Sample with Restricted Sibling Size (Both Male and Female)*

DEP. VAR: = 1IF BECOMING SELF-EMPLOYED IN CURRENT YEAR		
	(1)	(2)
	NO COLLEGE	COLLEGE
LAGGED LOG ASSETS	0.72*** (4.96)	0.65*** (4.69)
WAGE GROWTH IN PREVIOUS YEAR	-0.48 (-1.19)	-0.39 (-1.52)
AGE	-0.03*** (-2.89)	-0.04*** (-3.23)
MARRIED	-0.60** (-2.08)	1.43 (0.00)
MALE	0.24 (0.88)	0.41** (1.93)
AV. LOG LIKELIHOOD	-1.77	-1.77
FIRST STAGE ESTIMATES		
	NO COLLEGE	COLLEGE
ELDEST	0.24*** (2.77)	-0.24*** (-2.39)
WAGE GROWTH IN PREVIOUS YEAR	0.09 (1.58)	0.18 (1.51)
AGE	0.03*** (6.60)	0.07*** (10.05)
MARRIED	0.70*** (4.22)	0.60*** (2.70)
MALE	-0.07 (-0.65)	-0.42*** (-3.00)
BASELINE PROBIT REGRESSIONS		
	NO COLLEGE	COLLEGE
LAGGED LOG ASSETS	0.23** (2.22)	-0.06 (-0.74)
AV. LOG LIKELIHOOD	-0.05	-0.09
OBS.	1,062	673

Z-scores are in parenthesis for IV and baseline estimations, and *t*-statistics are in parenthesis for the first stage estimation. Significance levels: \*\*\*0.01, \*\*0.05, \*0.10.

The advantage of this instrument is that it is unlikely to be correlated with any family-specific variables, except that the probability of being the eldest is higher in a family with fewer children. Without controlling for sibling size in the IV estimation, I do not find any significant wealth effect on the probability of becoming self-employed. After restricting the sample to observations with three to five siblings, I find significantly positive wealth effect on self-employment entry in both college-educated and non college-educated sub samples. Thus, the IV results provide strong evidence on liquidity constraints.

It is reasonable to question whether the eldest sons generally possess some special characteristics as they grew up under different expectations. For example, parents may intentionally make more investment in the eldest son's education, expect him to be more responsible, or develop his ambition for achievement. Thus, it is possible that being the eldest is correlated with some personal-specific traits. However, the plausibility of this hypothesis needs further exploration. Moreover, whether these characteristics really have any influence on entry into self-employment is also uncertain. The evidence on the impact of the degree of risk-aversion, for instance, is still ambiguous in the literature. Most importantly, we know from the present results that being the eldest son per se has no impact on the probability of becoming self-employed. Future research can further explore the relationship between eldest sons' characteristics and self-employment, but this is not in the scope of the present paper.

## Appendix: The KLIPS Sample and Variable Construction

The Korean Labor and Income Panel Study (KLIPS) was first conducted in 1998 (Wave 1) as a panel survey of original 5,000 Korean urban household and their family members. It has been completed up to 2005 (Wave 8). There are two types of data in the KLIPS: household data and individual data. Household data set is compiled from household questionnaire, which contains questions on household demographics, income and consumption, as well as financial status. Individual data set is constructed based on individual questionnaire, which mainly focuses on individuals' economic activity, employment characteristics, and labor market mobility.

Based on this structure of the KLIPS, I construct one subset of personal data and the other subset of household data for each interview year from 2000 – 2004.

### *Personal Variables*

The subset of personal data contains ten primary demographic and employment variables from the KLIPS: age, gender, marital status, college education, relationship to household head, employment status, main industry (previous and current), main occupation (previ-

ous and current), hourly wage, and monthly average wage. Both types of wage are measured in terms of 10,000 Korean won (KRW).<sup>3</sup> In wave 6, the personal questionnaire adds additional questions on respondents' siblings. Based on respondents' answers, I create a dummy variable, *eldest*, in the subset of the 6<sup>th</sup> wave personal data. The variable equals 1 if a person is the eldest son and 0 otherwise.

Individuals included in each data set are either household heads or their spouses. Individuals who did not have information on hourly income or reported negative hourly income are removed from each data set to limit measurement error. All five sub samples are restricted to individuals who were either working as wage earners or self-employed at the time of interview. Moreover, people who were engaged in agriculture, forestry, fishery, or military were excluded from all five sub samples.

#### *Household Variables*

The subset of household data includes information on household wealth and parents of household heads or spouses. For each subset, twelve variables are constructed, which fall into three categories: net household assets, parents alive or not, living with parents or not (Heads or Spouses), and financial supports from / to parents if living apart (Heads or Spouses).<sup>4</sup>

Following Evans and Jovanovic (1989) and Xu (1997), the formula used to calculate wealth in each subset is: Net Assets=Investment in Real Estate + Financial Assets (including Savings, Stocks, Bonds, Insurance, Loans to friends or relatives, and other financial assets) – Debts (including balance of debt from bank/non-bank, balance borrowed from private route, balance from loans, and other debts). Respondents who reported negative or missing net household assets are dropped from the sample for reasons discussed in section 3.1.

#### *The combination of household and personal data sets*

For each interview year, the subsets of personal and household data are joined together using the household-specific identification number assigned to household in each wave (*hhid\*\**). The five joint subsets (five waves of interview) are then merged using the unique personal identification number (*pid*).

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<sup>3</sup> From 2000 to 2004, the exchange rate between won and dollars was about 1 dollar=1100 won.

<sup>4</sup> For waves 4-7, five variables are generated to record whether household heads and their spouses live apart from parents and the financial exchange between them and parents.

In the merged dataset, lagged values of log income, log net assets, industry, and occupation are generated. The key variable, *selfe*, is created so that it equals one if and only if the person was currently self-employed, but was a wage worker in the previous year. For example, *selfe* equals one if a person was self-employed in 2000 (Wave 3), but was a wage worker in 1999 (Wave 2). The reason for constructing this variable is to focus on the transition from wage employment to self-employment.

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