Characteristics that Influence Financially Risky Occupational Choice

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Abstract: Direct employment in agriculture has historically comprised a small percentage of the total population. Improvement of technology and productivity is one reason for this phenomenon, while another is that agriculture is inherently risky. As a result, reliance on agriculture as an occupation introduces additional risk relative to many non-ag occupations. This study determines the characteristics of individuals, who are willing to choose financially risky occupations, with an emphasis on agricultural occupations, compared to the characteristics of those involved in other, non-risky occupations. Data from the Bureau of Labor Statistics National Longitudinal Survey of Youth, are used to determine how demographic and risk preferences influence occupational choice. Results indicate that level of income, marital status, and gender has an impact on occupation choice for financially risky versus non-financially risky jobs. However, the results are improved when risk tolerance is included as a choice factor.

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CHAPTER I

INTRODUCTION

Problem statement

Throughout civilization, agriculture is always changing. In 1870, Patricia (1981) reported that in the U.S. About 50% of the population lived on farms where they could produce food for self-reliance. While now there are only 2% of American citizens working in agriculture to produce food for a growing domestic population, as well as global demand. (Bureau of Labor Statistics, 2015)

Even as the number of people who chose farming occupations decreased, the U.S. Department of Agriculture determined that agriculture was a base of manufacturing and commerce, in 1862, and they took many actions to protect agriculture, like agricultural subsidies. Agriculture is a major industry in the United States, which is a net exporter of food (U.S. Agricultural Trade Data, 2013). Meanwhile the area of agricultural land in America is very huge. As of the 2007 census of agriculture, there were 2.2 million farms, covering an area of 922 million acres (3,730,000 km^2), with an average of 418 acres (169 hectares) per farm (U.S. Census of Agriculture, 2007).

The production of food provides the basic human needs. There are more than 7.4 billion people around the world (U.S. Census Bureau). This number is expected to increase to

over 8.5 billion by 2030 and 9.8 billion by 2050 (Department of Economic and Social Affairs).

While agriculture has historically been a predominant industry in the US, the rapid urbanization creates a challenge as more people migrate to urban areas. As a result, agricultural entrepreneurs have to pay workers higher wages (Blanco, 2016). In addition, investments in agriculture typically have a longer payback period when compared to non-agriculture investment vehicles, while risks are also very high. Meanwhile, agricultural investments need a large amount of capital and cash-flow for renting lands, building, and other variables. For example, agriculture may have to face the risk from drought, flood, hail, tornado, earthquake and fire. So why do "agricultural entrepreneurs" still choose to invest in agriculture?

Based on these issues, this study will determine the reasons that people choose risky occupations, with an emphasis on agriculture.

Objectives

1) Determine the demographic factors that influence financially risky occupational choice.
2) Estimate how risk tolerance plays a role in financially risky occupational choices.

Outline of thesis

The remaining research is presented as follows. Chapter II includes an overview of previous studies that have quantified the kind of people that want to become self-employed and why people choose farming. Chapter III presents the methodology and

introduces the two datasets which are used in this analysis. Chapter IV summarizes the results from this research. Chapter V presents the final conclusions.

CHAPTER II

LITERATURE REVIEW

In the former chapter, it was presented that agricultural occupations often have financial risk. Furthermore, few people choose farming occupations (financially risky occupations). So why do some people choose farming occupations (financially risky occupations)?

Factors of Self-Employment

Blanchflower and Oswald (1998) asserted that the lack of money (indicates U.S. dollars) and capital (stocks, machine, and assets) were the barriers to entrepreneurship. Using survey and micro econometric methods, the authors study one class of entrepreneurs, namely, individuals who run their own business. They use the data from the National Child Development Study, in 1981 to 1991. From these different years, they studied cross-sectional patterns in the data. Blachflower's and Oswald's result —a shortage of capital and money is the most common reason of "why did you not become self-employed"— indicates that the large amount of money and capital required for agricultural investments is a factor that influences decisions .

Parker (1997) investigated the reasons that some people want to become self-employed while some people want to be paid employees. He designed three models where, in the first two, individuals chose the optimal proportion of their worktime spent in self-employment versus being a paid employee while the third one, as a contrast, had individuals choosing either self-employment or paid employment. His result of the greater the riskiness of income in a sector will reduces the likelihood that an agent chooses to participate in the sector explains that financial risk plays a role in the self-employment decision and is therefore, a factor that influences occupational choice. Furthermore, Segal, Borgia, and Schoenfeld (2005) found that risk tolerance had a significant positive effect on those individuals that decide to be entrepreneurs (the correlation coefficient of risk tolerance is 0.480 ($p<0.001$)). Their model, using their own survey data, tested the relationships between an individual's entrepreneurial self-efficacy, tolerance for risk, net desirability for self-employment and their intention to become an entrepreneur. They found that the higher risk tolerance a person had the more likely they wanted to be an entrepreneur.

Cho and Orazem (2011) found that less risk averse entrepreneurs are less likely to fail than are those that are more risk averse, which was opposite of their hypothesis that more risk averse entrepreneurs have a higher probability of survival than their less risk averse counterparts. They used the National Longitudinal Survey of Youth 1979 (NLSY79) data, from 1992 to 2002 and employed a log-likelihood model to test their hypothesis. However, Ekelund (2005) found that the measure of risk aversion had a statistically and quantitatively significant negative effect on an individual's probability of being self-employed.

Ekelund reports that for individuals in the 10th percentile of their risk aversion scale males have an 11.53 percent chance of being self-employed while females have a 6.32 percent chance. When risk aversion is in the 90th percentile, these two number are 7.35 percent and 3.95 percent. In his logit model the dependent variable is binary, paid employee and self-employed, while risk aversion, parents' experience, marital status, numbers of children, education level, home owner, vocational degree, and months of unemployment are independent variables. He concluded that the risk aversion had a negative relationship with being self-employed.

Hormiga and Bolivar-Cruz (2014) tested the proposition that the experience of migration affects risk tolerance. In this study, Global Entrepreneurship Monitor Spain 2009 Survey data were used by the authors. They especially focused on fear of failure, entrepreneurial activity, and immigrant condition. They concluded that a negative relationship exists between the risk of perception and business start-ups, thus confirming that tolerance to risk was an important characteristic of entrepreneurs. The outcomes of these studies indicate that it is evident that risk tolerance does influence occupational choice.

Additionally, in order to determine whether the individuals' attitudes of work effort, risk, independence, and income influence their jobs choices, Douglas and Shepherd (2002) used conjoint analysis and estimated a utility maximization model of career choice. They conclude that people generally expected the level of work effort required to be commensurate with income. Agriculture often involves heavy work, where individuals toil in fields, subject to extreme weather. The 2015 average income of farm households

was $76,735 which exceeds the average of all U.S. households, $56,516, in 2015 (USDA). However, Key, Prager, and Burns (2017) report that farm income is highly variable.

Ahn, (2010) tested the effect of how risk tolerance influences the probability of entering self-employment. Through the use of a logit model, which is based on National Longitudinal Survey Youth 79 data (NLSY79), Ahn found that individuals with a high risk tolerance — as determined by "income risk" survey questions, from the NLSY79 survey — tend to be self-employed.

Choosing Agricultural Occupations

As for agricultural employment, there are many factors leading to the situation where fewer people choose farming as an occupation. Perloff (1991) used the Bureau of Labor Statistics' Current Population Survey to estimate a model of occupations and wages to determine the impact of wage differentials on choosing to work in agriculture. He concluded that inducing more workers to switch to agriculture might not require a large wage increases. A 10 percent increase in wages might increase the share in non-urban male agriculture workers, with no more than a ninth-grade education, by one-fourth, according to Perloff's results.

During 1980s, entry of farmers aged 25-34 years old fell by 30 percent, as estimated by Gale (1993). To detect the reason, he tested the joint influence of economic and demographic factors on farm entry across states and over time. Using log-regression models, he found that financial variables (for example, commodity prices, and interest rates) played an important role in exacerbating the decline in entry during the 1980s. The

importance of demographic factors suggested that the entrance of young farmers might decline even if farm earning prospects were favorable. To summarize, there are many varied factors limiting agriculture occupation choice, primarily unstable prices of agriculture products and suppressed wages of agriculture workers

Wildman and Torres (2001) determined the degree of influence selected factors had on students' choice of agriculture as a major. They collected data by sending surveys to undergraduates who were enrolled at the New Mexico State University. They stated that experience influenced students the most when choosing an agricultural major. They found that "prior experience" in agriculture was the highest ranked influence for selecting an agricultural major. Under a similar premise, Outley (2008) used data from Minorities in Agriculture, Natural Resources and Related Sciences (MANRRS). Comparing the standard deviation of each variable, he concluded that "prior experience" influenced the career choice behaviors among students who were members of minority group in agriculture. Form these two articles, we know that the prior agricultural experience does effect an individual's choice of choosing farming occupation.

Kuhberger, Schulte-Mecklenbeck and Perner (1999) used a meta-analysis of Asian-disease (The Asian disease problem demonstrated behavior in contradiction to the invariance axiom of Expected Utility theory, introduced by Tversky and Kahneman (1981)) to identify the factors which determine risk preference. They concluded that bidirectional farming effects existed in Asian-disease like problems both for gains and for losses. Presenting outcomes as gains tended to induce risk-averse choices, and presenting outcomes as losses tended to induce risk-seeking choices. This tendency was not stronger

for losses than for gains. The risk preferences depended on the size and quality of the payoffs gained. Larger payoffs induced risk aversion. Probabilities were influential, but the direction of influence made it plausible that they worked in part indirectly by their confounding with payoffs. What these authors found supports another conceptual component to this paper regarding the risk preferences. As such, risk preferences are divided into as few levels as possible, and are included as different independent variables.

Gasson (1973) explored the subject of motivation of farmers and assumed that larger farms were more economically motivated while small farmers put more stress on intrinsic aspects of work, particularly independence. The author assumed some factors, like different jobs' environment, which influenced farming occupations. However, he did not prove his assumptions in his article nor consider risk, which is being included in this research along with other factors.

Occupational Choice Modeling

Blanchflower and Oswald (1998) use probit model for their analysis. They set self-employed as dependent variable which is binary and include inheritance, unforthcoming score, hostility score, acceptance anxiety score, father's employment information, gender and apprenticeship are independent variables.

In Segal, Borgia, and Schoenfeld's (2005) model, they also uses self-employed as binary dependent variable. The model include three independent variables: tolerance for risk, net desirability to become self-employed and entrepreneurial self-efficacy, which is measured by one question designed to assess an individual's self-confidence in his or her ability to perform the tasks and activities necessary to become an entrepreneur.

Ahn (2010) and Cho and Orazem (2011), they use the National Longitudinal Survey of Youth 1979 data (NLSY79) in their analysis. From this, they include independent variables related to demographic factors (for example, region, marital status, and income), while both of them choose the probit model for their analysis.

Summary

Self-employment is often associated with being financially risky job, because income is seldom stable. Many articles have examined what factor effected the choices of financial risky occupations by individuals. This research extends this literature to include agricultural occupations as being financially risky. We incorporate similar demographic variables along with risk tolerance variables. The methods employed in this study are discussed in the next chapter.

CHAPTER III

METHODS AND PROCEDURES

Conceptual Framework

Based on ideas from Perloff (1991) asserted that inducing more workers to switch to agriculture may not require large wage increases, and Ahn (2010), which tested the effect of risk tolerance on the probability of entering self-employment, we assume the occupation choice for financially risky occupations including farming will be influenced by gender, education level, age, region, race, married status and risk tolerance.

Using Douglas and Sheperd's (2000) framework that individual's maximize utility, however incorporating risk results in the following expected utility function.

$$MaxE(U) = f\left(Y_{ijt}\right) \tag{3.1}$$

In the presence of risky outcomes, an individual's decision is made by choosing the option with higher expected value investment. The risk attitude is related to the utility function. Based on Hamilton's (2000) article, we assume that individuals maximize their

expected utility and choose financially risky occupations if the yield the highest expected value of occupational earnings. The function is below:

$$MaxE[U(Y_{ijt})] = H_{it}\delta + f(R_{ijt}) + \epsilon_{ijt} \tag{3.2}$$

Where Y_{ijt} indicates the earnings of individual *i* in sector *j* at time t. H_{it} is a vector of individual demographic characteristics. R_{ijt} is a vector of individual's risk behavior. $f_j(\ )$ is the function of expected value of risk behavior. ϵ_{ijt} is the random error.

Then we get our general function which is below:

$$\text{OFC} = \text{F}(\text{Gender}, \text{Education}, \text{Age}, \text{Region}, \text{Race}, \text{Martial Status and Risk Tolerance}) \tag{3.3}$$

Where OFC indicates the choice of financially risky occupations.

Because the dependent variable, financially risky occupations, is non-numeric and binary (financially risky occupation or non-financially risky occupation), where 0 indicates non-financially risky occupations while 1 indicates financially risky occupations. Given this constraint, the logit model is chosen for analysis.

The logistic function σ(t) is defined as:

$$\delta(t) = \frac{e^t}{e^t + 1} = \frac{1}{1 + e^{-t}} \tag{3.4}$$

Assume the input *t* is linear function which is written as:

$$t = \beta_0 + \beta_1 x \qquad (3.5)$$

Then the logistic function is:

$$F(x) = \frac{1}{1+e^{-(\beta_0+\beta_1 x)}} \qquad (3.6)$$

The F(x) is interpreted as the probability of the dependent variable equaling a "success" which indicates "1" rather than a "failure" which indicates "0".

Hypotheses

Hypotheses a) to e) are formulated to test the objective 1 that the demographic factors that influence risky occupation choices.

These are:

a) H_O: Males will be more likely to choose financially risky occupations.

b) H_O: Increasing the Education level will increase the likelihood of choosing financially risky occupations.

c) H_O: Individual with children will be less likely to choose financially risky occupations.

d) H_O: Increased age will be less likely to choose financially risky occupations.

e) H_O: Married individuals are more likely to choose financially risky occupations.

Ahn (2010) found as individual's age, they become less risk tolerant. Limited education, those with less than 12 years, and increased education, those with some college education or more, are associated with high risk tolerance. Also people who

remain single and are in a favorable labor market situation have higher levels of risk tolerance. So we hypothesize that a higher education level, more numbers of children, and older age will decrease the OFC.

To test objective 2, we include risk tolerance as an independent variable and include the hypothesis:

f) H_O: Higher risk tolerance will increase the likelihood of choosing financially risky occupations

Segal, Borgia and Schoenfeld (2005) found that risk tolerance has an significant effect on which people to decide to be entrepreneurs. Ahn (2010) concluded that individuals with a high risk tolerance - as determined by the "labor risk" survey questions - tend to be self-employed. So we assume that the more risk tolerance will increase OFC.

Data

The data are from the National Longitudinal Survey of Youth 79 (NLSY79), collected by the Bureau of Labor Statistics since 1979 and Occupational Employment Statistics (OES), collected by the Bureau of Labor Statistics, Department of Labor. NLSY79 are a set of surveys which are designed to gather information at multiple points in time on American labor market activities and other significant life events of several groups of people, including number of children, education level, living region, marital status, along with many additional variables. In the past four decades, the NLSY79 data has proven to be an important tool for different research projects, including economics, sociology.

The NLSY79 is a longitudinal project that follows the lives of a sample of American youth born between 1957 and 1964. The cohort originally included 12,686 respondents

whose ages' ranged from 14 to 22 when first interviewed in 1979. Among all 12,686 original individual responses, there were 6,403(50%) males and 6,283(50%) females in the initial survey. The participants were chose to be a nationally representative sample. After two sub-samples were dropped (non-response and invalid data), there were 9,964 observations that remained for this analysis. NLSY79 surveys were conducted in each year from 1979 through 1994, then in each even year from 1996 through 2012. This study utilizes the survey responses from 2000 through 2010 due to limitations of salary data available from the Bureau of Labor Statistics' Occupational Employment Statistics (OES) data which is discussed later.

National Longitudinal Survey of Youth 1979 Example

An example of 2006 is provided in table 3.1.

Table 3.1 Sample of NLSY79 Data 2006 Survey Year

	Mean	Median	S.D	MIN	MAX
Total income					
	47,946.07	37,000.00	46,608.45	12.00	279,816.00
Age	43.89	44.00	5.86	0.00	49.00
Number of Jobs					
	11.45	10.00	6.40	1.00	55.00
Number of Children					
	1.93	2.00	1.39	0.00	10.00

Table 3.1 (Continued)

	Mean	Median	S.D	MIN	MAX
Highest Grade					
	14.34	13.00	6.58	3.00	20.00
Reg					
North East					
(NE)	0.15	0.00	0.36	0.00	1.00
North Central					
(NC)	0.07	0.00	0.25	0.00	1.00
South (So)	0.41	0.00	0.49	0.00	1.00
West (We)	0.37	0.00	0.42	0.00	1.00
SMSA					
Non-city					
(Ncity)	0.07	0.00	0.25	0.00	1.00
Unknown central city					
(UKCC)	0.58	1.00	0.49	0.00	1.00
Central city					
(CC)	0.33	0.00	0.47	0.00	1.00
Not in SMSA					
(NSMSA)	0.02	0.00	0.13	0.00	1.00
Race					
Hispanic	0.19	0.00	0.39	0.00	1.00
Non-Hispanic/Non-Black					
(NonH/NonB)	0.53	1.00	0.50	0.00	1.00
Black	0.28	0.00	0.33	0.00	1.00

Table 3.1 (Continued)

	Mean	Median	S.D	MIN	MAX
Gender					
Male	0.51	1.00	0.50	0.00	1.00
Female	0.49	1.00	0.50	0.00	1.00
Marital Status					
Never Married (NM)					
	0.15	0.00	0.36	0.00	1.00
Married (Ma)					
	0.62	1.00	0.49	0.00	1.00
Separated (Se)					
	0.04	0.00	0.20	0.00	1.00
Widow (Wi)					
	0.19	0.00	0.14	0.00	1.00
Risk					
Assessment	1.00	0.00	1.39	0.00	3.00

From the table, we can see that in 2006 the average of total individual's income is about $48,000 and average number of individual's kids is 2. The average age at 2006 is 44. The average education level is above high school. The populations of male and female are closed to 50 percent-50percent.

In this research, we used the NLSY79 from 2000, 2002, 2004, 2006, 2008, and 2010 survey years for the demographic only model. The total observations of these 6 years are 31,971. However, NLSY79 only has risk questions in 2002, 2004, and 2006. Therefore

demographic and risk variables from these three years are included in a second analysis, have 14,403 total observations in these three years.

Demographic Independent Variables

Total income indicates the individual's income per year. *Age* indicates the age of individual. *Number of Jobs* indicates number of different jobs ever reported as of interview date. Number of *Children* indicates that number of children the individual current has. *Highest Grade* indicates the highest education level of the individual. *Highest Grade* is discrete from 1 to 20, where 1 is first grade, 12 indicates completion of high school, 16 indicates completion of university, and 20 indicates four years of graduate or professional school. *NE*, *NC*, *We,* and *So* indicates the regional location of the individual where *NE* is northeastern U.S. (CT, ME, MA, NJ, NH, NY, PA, RI, and VT); *NC* is the north central U.S. (IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI; *So* is the southern U.S. (AL, AR, DE, D.C., FL, GA, KY, LA, MY, MS, NV, OK, SC, TN, TX, UA, and WV); and *We* is the western U.S. (AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, and WY). Table 3.1 shows that most individuals, more than 78 percentage of individuals, are from the South and West. *NM*, *Ma*, *Wi*, and *Se* indicates the marriage status: Never Married, Married, Widowed and Separated. The married status data indicates that more than 60 percent of observations are married. *Standard Metropolitan Statistical Areas (SMSA)* has four options: *Non-city*, *Unknown central city*, *Not in SMSA*, *and Central city.* Table 3.1 shows that only 2% individual are not included in SMSA. So it is an effective tool to judge whether individuals are from urban areas or rural areas. *Hispanic*, *Black*, and *Non-Hispanic/Non-Black* indicates race status: Hispanic. *Male* and *Female* indicates the gender of the participant.

Risk Tolerance

There are 4 risky levels, 0, 1, 2, and 3, used as proxies for risk assessment in our analysis. Zero indicates the lowest risk tolerance level, risk aversion, while 3 means the highest level, risk lover. A participant's level of risk tolerance can not be observed directly, however, the data used some income risk questions to determine risk tolerance. For example, whether the participant was willing to accept a 50 percent chance that their income would double or decrease by one-third. If the respondent said yes, the question would continue to whether they would choose to accept the 50 percent chance that their income would double or decrease by one-half. On the other hand, if the respondent said no to the first question, the next question would be whether they would choose to accept the 50 percent chance that their income would double or decrease by 20 percent. Figure 3.1 depicts how the questions were asked in the NLSY79 survey as well as the risk assessment value assigned.

Based on these survey data, we define a person who chooses all "no", his/her risk assessment level was 0, if the person chooses "no", in the first question and "yes", in the second one, his/her risk assessment level was 1 and if the person chooses "yes" in the first question and "no" in the second one, his/her risk assessment level should be 2 and if the responder chooses yes, in the first question and yes, in the second one, his/her risk assessment level was 3.

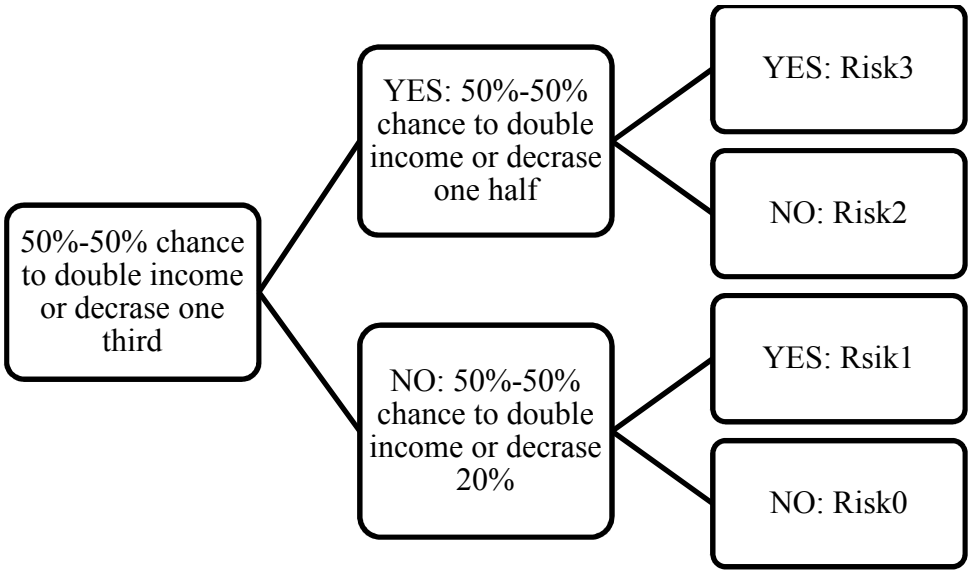

Figure 3.1 Flow Chart of Risk Tolerance Survey Questions

Occupational Employment Statistics

The OES program produces employment and estimates annually for over 800 occupations. These estimates are available for the nation as a whole, for individual States, and for metropolitan and nonmetropolitan areas. In this article, we use national OES occupation data from 2000 to 2010. We use the mean wage, 10th percentile wage, 25th percentile wage, 75th percentile wage, and 90th percentile wage data of each occupation to calculate the standard deviation and coefficient of variation for each occupation in each survey year.

Standard deviation is the square root of variance. The formula is:

$$\sigma_i = \sqrt{\frac{\left(x_{wagei,10th} - \mu(mean\ i)\right)^2 + \left(x_{wagei,25th} - \mu(mean\ i)\right)^2 + \left(x_{wagei,75th} - \mu(mean\ i)\right)^2 + \left(x_{wagei,90th} - \mu(mean\ i)\right)^2}{N}} \quad (3.7)$$

Where, wage *i*, 10^{th} is the wage for occupation *i* in the 10^{th} percentile; wage *i*, 25^{th} is the wage for occupation i in the 25^{th} percentile; wage *i*, 75^{th} is the wage for occupation i in the 75^{th} percentile; wage *i*, 90^{th} is the wage for occupation *i* in the 90^{th} percentile.

Coefficient of variation is the standard deviation divided by the mean. The formula is:

$$CV_i = \sigma_i/\mu_i \tag{3.8}$$

We define the top sixteen percent (The top 16 percent is chosen to include the right tail of the normal distribution for values greater than one standard deviation away from the mean [0.5 * (1.00-0.68)=0.16]) of occupations with the largest coefficient of variation as financially risky occupations. [1]

Methodology

To test the hypotheses a) through e), a logistic regression equation is estimated. This model, demographic only model, covers the demographic data, from 2000 to 2010. The independent variables were: Total individual income, number of jobs, age, number of children, region, race, married status, gender, education level and the dependent variable, financially risky job, was a binomial variable were 1 indicates financially risky jobs, while 0 indicates non-financially-risky jobs. We use the occupation wage data, from Bureau Labor Statistics, OES to define financially risky occupations as outlined in the

[1] Multiple transformations were tested, including: log, square, cube, square root, cube root, and sine. From these we found that, after log transferring, the whole occupation datasets from 2000 to 2010 fit a normal distribution.

previous section. Additionally, self-employment and agricultural managers are considered as financially risky occupations.

The model is specified as:

$$\begin{aligned}\Pr(Y_i = 1|X_i) = {} & \alpha + \beta_1 TIncome_{it} + \beta_2 NumJ_{it} + \beta_3 Age_{it} + \beta_4 Child_{it} + \beta_5 NE_{it} \\ & + \beta_6 NC_{it} + \beta_7 So_{it} + \beta_8 NM_{it} + \beta_9 Ma_{it} + \beta_{10} Se_{it} + \beta_{11} NS_{it} \\ & + \beta_{12} UKCC_{it} + \beta_{13} CC_{it} + \beta_{14} Male_i + \beta_{15} Hispanic_i \\ & + \beta_{16} NonH/NonB_i + \beta_{17} HSchool_{it} + \beta_{18} CSchool_{it} + \beta_{19} GSchool_{it} \\ & + \beta_{20} D2000_t + \beta_{21} D2002_t + \beta_{22} D2004_t + \beta_{23} D2006_t + \beta_{24} D2008_t \\ & + e_{it}\end{aligned} \tag{3.8}$$

Region for each participant, I, at survey year, t, includes *NE*, *NC* and *So (West dropped)*. For each participant, i, at survey year, t, *NE* indicates North-East; NC indicates North-Central; So indicates Southern; Marital status includes *NM, MA,* and *Se (Widow dropped)*. *NM* indicates Never Married; *Ma* indicates Married; *Se* indicates Separated; SMSA includes *NS*, *UKCC* and *CC (Not in central city dropped)*. *NS* indicates Not in *SMSA*; *UKCC* indicates Unknown Central City; *CC* indicates central city; For each participant, i, Race includes *NonHnonB* and *Hispanic (Black dropped)*. *NonHnonB* indicates *Non-Hispanic/Non-Black*, while *male* indicates that participant, i, is male (*female* is dropped). For each participant, i, at survey year, t, Education level includes *HSchool, CSchool*, and *GSchool (Pre-high school dropped)*. *TIcome* indicates total individual income; and *NumJ* indicates number of jobs.

Data employed in equation (3.8), described above, are cross-sectional time-series (CSTS) meaning they result from the survey responses of the same participants over time (i.e., panel data). Given that panel data contain information of the same observations over time, the error term in equation (3.8), e_{it}, contains information specific to each survey participant, information specific to each survey year, as well as information specific to each participant within a survey year. Thus, a more precise error specification is: $e_i + e_t + e_{it}$ (Maddala, 1987). As a result, the pooled data equation represented by equation (3.8) does not fully account for this which may lead to issues with heteroskedasticity and/or autocorrelation. The advantages of utilizing the specification in equation (3.8) are the computational ease and the ease of interpretation.

To test hypothesis f), a second logistic regression equation was estimated. This model, called demographic and risk model, takes into account the risk tolerance of survey participants, we add three risk variables in the functional form. However, the data only includes same risk questions in three years: 2002, 2004, and 2006, therefore we reduce the panel of observations to only these years. While this reduces full set of information available relative to equation (3.8), it allows the inclusion of risk tolerance by the survey participants. We use the logit model and demographic variables similar to equation (3.8), which bring about similar restrictive aspects highlighted earlier with respect to the error specification, resulting in the following:

$$\begin{aligned}\Pr(Y_i = 1|X_i) = \quad & \alpha + \beta_1 TIncome_{it} + \beta_2 NumJ_{it} + \beta_3 Age_{it} + \beta_4 Child_{it} + \beta_5 NE_{it} \\ & + \beta_6 NC_{it} + \beta_7 So_{it} + \beta_8 NM_{it} + \beta_9 Ma_{it} + \beta_{10} Se_{it} + \beta_{11} NS_{it} \\ & + \beta_{12} UKCC_{it} + \beta_{13} CC_{it} + \beta_{14} Male_i + \beta_{15} Hispanic_i \\ & + \beta_{16} NonH/NonB_i + \beta_{17} HSchool_{it} + \beta_{18} CSchool_{it} + \beta_{19} GSchool_{it} \\ & + \beta_{20} Risk1_{it} + \beta_{21} Risk2_{it} + \beta_{22} Risk3_{it} + \beta_{23} D2002_t + \beta_{24} D2004_t \\ & + e_{it}\end{aligned} \tag{3.9}$$

Summary

This chapter introduced the datasets used in the analysis. Five hypotheses were formulated. The models are estimated and hypotheses are tested, with results provided in the following chapter.

CHAPTER IV

RESULTS AND DISCUSSION

The previous chapter detailed the methods that are used to test the hypotheses that come from the objectives of this research. This chapter provides the results of these methods.

Equation 3.8 was estimated using a logistic limited dependent regression model. The results of the regression equation are presented in table 4.1.

Table 4.1. Results of Equation (3.8), the Influence of Demographic Factors, and Survey Year on Occupational Choice

Independent	Estimated Coefficient	P-value
(Intercept)	-2.16	5.14e-08***
Total Income	1.16e-07	0.04510*
Number of jobs	2.50e-03	1.72e-10***
Number of Children	2.53e-03	0.1850
Age	-5.41e-04	0.1976
Northeast	2.61e-02	0.0002***
Northcentral	-1.20e-02	0.5198
South	-3.73e-03	0.5030
Never married	2.86e-02	0.0012**
Married	2.12e-02	0.0015**
Separated	6.09e-03	0.6465

Table 4.2. (continued)

Independent variable	Estimated Coefficient	P-value
Unknown Center City	-1.74e-02	0.3112
Center City	-1.08e-02	0.5386
Male	-7.75e-02	<2e-16***
Hispanic	9.46e-03	0.2168
Non-Hispanic Non-Black	5.93e-03	0.3568
High School Graduate	-4.87e-02	0.0769.
College Graduate	6.23e-02	0.0231 *
Graduate/Professional Degree	1.54e-01	3.52e-08***
D2000	-6.04e-02	2.99e-10***
D2002	-1.35e-03	0.8815
D2004	-4.15e-02	3.73e-06***
D2006	-3.38e-02	0.01 ***
D2008	-3.63e-02	2.73e-05***
AIC: 32,493		R^2=0.042
Number of observations = 31,971		

***Indicates significance at the 0.001 level, **Indicates significance at the 0.01 level, *Indicates significance at the 0.05 level. Numbers in parentheses are P values. "." Indicates significance at the 0.1 level in z test.

From table 4.1, the independent variables (*Never married, Number of Jobs, Male, North-east U.S.A., Graduate School, D2002, D2006, D2008*) are significant at 0.001 level. Furthermore *Never married and Married* are significant at 0.01 level. *Total individual income and College School* are significant at 0.05 level. *High School* is weak significant at 0.1 level.

Total individual income has the positive effects on choosing financially risky jobs. This result (1.6E-07) shows that when individuals are able to get more money, they have the strong significant higher likelihood to choose financially risky jobs.

There is a significant positive relationship between the *Number of Jobs* (2.5E-03) and the probability of choosing a financially risky job. It can be explained by that many different jobs suggests that the individual's jobs are not stable and unstable jobs are closed to financially risky occupations.

Among all of the regions—*Northeastern, Northcentral, Southern, and Western* — only *Northeastern* is significant. Compared with *Western* people, *North Eastern* (2.61E-02) people are more likely to choose financially risky jobs.

For marital status, *Never Married* and *Married* are significant. Compared with *widow*, people who are *Married* (2.12E-02) or *Never Married* (2.86E-02) are more likely to choose financially risky jobs.

As the independent variable of *Male* (-7.75E-02) has the strong significant negative effect, it is exactly opposite to our former hypothesis. This result indicates that males are less likely to choose financially risky jobs.

Compared with *Black* people, *Hispanic* and *Non-Hispanic Non-Black* people are more willing to take financially risky jobs. However, both of them are not significant.

As for education, compared with *Pre-high school*, individuals who finish *Graduate school* (6.23E-02) and *College* (1.54E-01) are more likely to choose financially risky

jobs, while people get the *High School Graduate* (-4.87E-02) do not like financially risky jobs. This result shows that our hypothesis is correct.

Survey years 2000, 2004, 2006, and 2008 are significantly different from 2010. These outcomes indicate that individuals are more likely to choose risky occupations in 2010 compared to previous years.

From Table 4.2, we can know that there are about 78% predicted results from model 1 are true. There are only 28 observations are predicted as risky occupations while 24,836 observations are predicted as non-risky occupations. It implies that demographic factors only can't predict what kinds of people will choose financially risky occupations directly very well.

Table 4.2. Predicted Outcomes from Equation 3.8 Actual Values

Predicted True	0	1
0	24,836 (77%)	33 (0.1%)
1	7,074 (22%)	28 (0.1%)

Equation 3.9 was estimated using a logistic limited dependent regression model that risk tolerance is taken into account. We added risk assessment to equation 3.8. These risk questions were only available in 2002, 2004 and 2006, so we only utilized the data in these three years from the whole dataset. Thus, the number of observations of this model decreases from 32,493 to 14,403.

The results of the regression equation are presented in table 4.3. *Total individual income* and *Non-Hispanic/Non-Black* are significant at 0.001. *Number of jobs*, *South*, and *2002*

year are significant at 0.01 level in this model. Furthermore, *Risk 1, Northeast, Northcentral, Male, and Graduate school* are significant at 0.05 level. The *Risk3, Risk2*, and *High School* are significant at the 0.1 level.

Table 4.3. Results of Equation (3.9), the Influence of Demographic and Risk Factors, and Survey Year on Occupational Choice

Independent	Estimated Coefficient	P-value
(Intercept)	3.2650e-01	2.70e-07***
Total Income	1.6139e-06	<2e-16***
Number of Jobs	2.2315e-03	0.0031**
Number of Children	4.0435e-04	0.9111
Age	-2.23e-04	0.231
Risk3	2.4897e-02	0.0574.
Risk2	-3.271e-02	0.0512.
Risk1	3.5332e-02	0.0112*
Northeast	2.728e-02	0.0425*
Northcentral	-1.2611e-02	0.7564
South	-2.8826e-02	0.00605**
Never married	1.268e-02	0.4490
Married	1.3386e-02	0.2871
Separated	-4.041e-02	0.1293
Unknown Center City	-1.2468e-02	0.7489
Center City	-1.6918e-02	0.6677
Male	-2.3107e-02	0.0186*
Hispanic	1.7074e-02	0.2455
Non-Hispanic/Non-Black	4.8309e-02	8.81e-05***
High School Graduate	-8.5324e-02	0.0683.

Table 4.3. (continued)

Independent variable	Estimated Coefficient	P-value
College Graduate	3.8713e-02	0.4063
Graduate/Professional Degree	9.7262e-02	0.0411*
D2002	-3.1532e-02	0.0063**
D2004	8.4241e-03	0.4570
AIC: 16,578		R^2=0.046
Number of observations = 14,403		

***Indicates significance at the 0.001 level, **Indicates significance at the 0.01 level, *Indicates significance at the 0.05 level. Numbers in parentheses are P values, "." Indicates significance at the 0.1 level in z test.

Risk3 indicates that an individual has the highest level of risk assessment, while the *Risk0*, which we drop from the model, is the lowest level of risk assessment. From table 4.3, we find that there is not a sample linear relationship between risk attitude and choosing financially risky jobs. When individual is at risk level 1, he or she has the highest likelihood (3.5332E-02) to choose financially risky jobs. Then risk level 3 (2.4897E-02) has the little bit lower likelihood to choose risky occupations. Risk level 2 (-3.27E-02) has the negative relationship with risky occupations. This result implies that risk behavior does effect on the choice of financially risky occupations.

Total individual income (1.6139E-03) and *Number of jobs* (2.2315E-03) still have the positive relationships with financially risky occupations, similar to the demographic only model.

For region variables, *South* (-2.8826E-02), unlike "demographic only" model, becomes significant in the "demographic and risk" model and has the negative relationship with financially risky occupations. However, *North-east* (2.728E-02) still has the positive significant effect on the financially risky occupations.

Male (-2.3107E-02), even if is less strongly significant than "demographic only" model, still has the negative relationship with financially risky jobs, same as the results of "demographic only" model.

The race variables, *Non-Hispanic/Non-Black* people (4.8309E-02) are more willing to take financially risky jobs, compared to *Black***.**

High School Graduate (-8.5324E-02) resulted in a weakly significant negative effect on financially risky jobs. However, *Graduate/Professional Degree* (9.7262E-02), they are more likely to choose financially risky occupations.

The results of the table 4.4 shows that about 72% predicted results of "demographic and risk" model are correct. There are 311 predicted risky occupations observations which matched the actual data. Therefore after taking into account individual risk tolerance in the model, the model better predicts choices of financially risky occupations.

Table 4.4 Predicted Outcomes from Equation 3.9 Actual Values

Predicted True	0	1
0	10,015 (69.5%)	219 (1.5%)
1	3,858 (26.8%)	311 (2.2%)

CHAPTER V

SUMMARY AND CONCLUSIONS

The previous chapter offered specific results of logistic regression estimates. The following is a summary of those results along with implications of the current research and possibilities for future research.

From the results, males, were less likely to choose financially risky occupations, in both models, compared with females. This result contradicted previous studies, like Ahn's article. It may be because our dependent variable was financially risky occupation defined by OES data, while Ahn's dependent variable was only self-employment from the NLSY79 dataset.

The education outcome was the same for the two models' results which showed that there was a positive relationship between a higher education level and the likelihood of choosing a financially risky occupation. Therefore the hypothesis that increasing the education level would increase the likelihood of choosing a financially risky occupation was confirmed in our models.

The results of equation (3.9) failed to confirm the hypothesis that higher risk tolerance would increase the likelihood of choosing risky occupations. The results showed that

there should be non-linear relationship between risk behavior and the choice of financially risky occupations. When an individual responded with the highest risk level, the individual did not have the highest likelihood of choosing financially risky occupation. Conversely when the individual offered the lowest risk response, individual did not have the lowest likelihood of choosing risky occupations.

From tables 4.2 and 4.4, we show that the model which only included demographic factors provided a poorer predictor of correct outcomes, however, knowledge of individual risk behavior, improved the results of actual occupational choices matching predicted outcomes.

The limitations of pooling the NLSY79 data employed in equations (3.8) and (3.9), mentioned in Chapter 3 can be improved by way of a random effects specification (Maddala, 1987). In future research, this methodology will be utilized to ensure that estimates and standard errors of the model are efficient and more appropriately specified.

Another further research will be focused on whether we can find other factors, for example like family or parents impacts, which will have huge influences on risky occupations choosing. Or we can compare with the change of financially risky occupations between two generations of people, because now, NSLY97, another new dataset, is already started from the Bureau of Labor Statistics.

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VITA

Characteristics that Influence Financially Risky Occupational Choice

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