Risk Attitudes of Investment Bankers: Are they risk-lovers?

Experiment and Survey on Investment Bankers

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Acknowledgement: We are grateful to Syngjoo Choi (Seoul National University) for detailed comments and suggestions. We would also like to thank the seminar participants and discussants at the Korean Securities Association for their valuable comments. Any errors and omissions are our own. Correspond to hyoungkang@hanyang.ac.kr

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ABSTRACT

This paper investigates the risk attitudes of investment bankers with experiment and survey. The experiment measures risk preferences through multiple risky lottery choices, and the survey questionnaire explores the willingness to take instrumental and stimulating risks. We consider both traditional economic and psychological dimension. The investment bankers in our sample are more willing to take instrumental risks than other groups. Within the investment banker group, traders and analysts, who put financial theory into actual practice, show markedly higher levels of risk preference converging near risk-neutrality. Our results suggest that the nature and nurturing environment of investment bankers matters as well as compensation schemes and organization structure.

Keywords: investment banker, trader, risk attitude, risk preference, risk aversion, instrumental risk taking, stimulating risk taking

1. **INTRODUCTION**

The increase in frequencies and scales of financial crises have led to heightened levels of interest in the banking sector and in investment bankers. Extant research on risk preferences tends to deal with a general sample, and not financial professionals. Our analysis from both economic and psychological approaches finds that investment bankers, in particular traders and analysts, do have a special type of risk preference – they are much less risk averse than control groups, and their risk preference levels converge near risk neutrality. These findings have important policy and managerial implications.

There seems to be widespread public opinion that investment bankers are liable for the recent global financial crises and scandals. Prominent figures such as Lord Turner, chairman of the United Kingdom Financial Services Authority, do not hesitate to denounce the investment banking industry for its "cynical greed" (BBC news, 3 July 2012). Influential media such as the Spiegel reports the bonuses of some investment bankers, mentioning "global rage at banker's bonus excesses" (20 Feb 2009). According to this view, investment bankers as individuals, or investment banks as entities (or perhaps both) do not act in the best interests of their clients as they officially claim to do – instead, they take on excessive levels of risk which are unjustified by any of their business activities. Investment bankers are overly paid in a time horizon that is much too short than is reasonable, and this type of compensation scheme generates greed and dishonest behavior, urging bankers to take on excessive levels of risk. This inevitably brings on financial turmoil.

Complementing this popular view that investment banking features such as compensation schemes 'nurture' investment bankers to take excessive risk, we analyze the 'nature' or 'identity' of investment bankers. It is important to understand the behavior of investment bankers from both the nature and nurture views. Depending on the view, we can arrive at very different

implications for policy making (e.g. regulations) and management (e.g. hiring, training and compensating bankers). We frame this idea using the decision-making theory, the core concepts of which are attitudes or preferences toward risk. We hypothesize that investment bankers have different risk attitudes as compared to the general public. If our hypothesis is right, the nature of investment bankers may indeed contribute to the global financial crisis.

Discovering investment bankers' risk preferences has another important implication in finance theory. General consumption decisions can be analyzed as the behavior of the homogeneous representative agent. However, investment decisions differ significantly in that a small number of professionals monopolize large-scale financial decisions. In financial markets, investment professionals are the ones directly involved in the price discovery process, while individual investors play a less important role. Therefore, financial theories need to focus more on the characteristics of investment professionals, who are responsible for most of the action in the market. For example, when studying how risk aversion properties of investors influence the price determination process, the risk preferences of investment bankers should be analyzed and taken into account, since they are the ones who in real life make the large-scale investment decisions.

Previous studies analyze risk attitudes and find significant heterogeneity in elicited individual risk attitudes. A survey of risk attitudes finds that the average subject is moderately risk averse, but there is also considerable heterogeneity in individual risk attitudes (Harrison and Rutström 2008). Part of the results may lie in the sample itself – in extant literature, most surveys and experiments work with a representative sample of a country's population. The samples usually have a great extent of heterogeneity in age, education, cognitive ability et cetera, which may contribute to findings that risk attitudes are variant or heterogeneous within populations.

Despite its importance, the literature on risk preferences hardly analyzes the risk attitudes

of investment bankers and the organizations they belong to. To the best of our knowledge, extant research on the topic mostly focuses on the non-professional public or students, and analysis of investment professionals who are the main players in financial markets is scarce. This is because the activities of investment bankers are under tight organizational control, and are mostly veiled from public sight. Hence, relevant data are not readily available. This paper seeks to fill this void in the literature. We measure and analyze the risk attitudes and behaviors of investment professionals (which also represent the risk attitudes of the organizations they belong to) using experiments and surveys. We compare the investment bankers to a matching sample with similar characteristics, except for their job functions.

The rest of the paper is organized as follows. Section 2 reviews the previous literature and our contributions to it. In Section 3, we develop testable hypotheses. Section 4 describes the experimental design such as procedures and subjects. Section 5 shows empirical results. In section 6, we discuss the implication of the results and its relation to the quality of financial decision-making by investment bankers, and explore how psychological risk attitude is associated with economic risk attitude. Section 7 concludes.

2. LITERATURE REVIEW

2.1. Eliciting Risk Attitudes

A canonical model of decision-making under uncertainty in economics, named expected utility theory (EUT), was developed mathematically by von Neumann and Morgenstern (vNM) in 1944. vNM prove several axioms including ordering, continuity and independence, which guarantee the existence of a utility index such that the ordering of lotteries based on individuals' expected utilities fully coincides with their actual preferences. The proof makes the case for modeling a person's behavior as if she acts to maximize expected utility, given that her

preferences satisfy these axioms. Expected utility has a very simple and appealing way of combining probabilities and monetary outcomes. Risk attitude is solely captured by the curvature of the utility function over monetary outcomes.

Standard economic and financial theories generally assume individuals' risk attitudes to be risk averse. However, many view the individual risk attitude as a free parameter, such as in subjective expected utility theory (Savage 1954) and prospect theory (Kahneman and Tversky 1979). These theories state that the individual's attitude toward risk may be variant or heterogeneous over populations and time.

The importance of understanding risk attitudes has led economists and psychologists to develop numerous methodologies to elicit and measure individual attitudes towards risk. Various forms of surveys and experiments have been used. Surveys usually ask individuals about their willingness or propensity to take risk. Subjects are expected to report their preferences on various point scales varying from 5 to 10. The methodology of surveys is simple and easy to understand. However, survey respondents are not directly incentivized. Hence, it has been questioned whether the survey is an effective way of eliciting individual risk attitudes, particularly in the domain of monetary or financial decision-making.

In addition, economists use incentivized gambles such as multiple price lists (MPLs) to elicit individual attitudes toward risk. This method involves providing a multiple price list of lotteries to experimental subjects, and analyzing their choices to define their risk preferences. In an influential research in this field, the multiple price list (MPL) is utilized to quantify the risk attitudes of experimental subjects through their lottery choices, and to estimate risk parameters of the power utility function (Holt and Laury 2002). This MPL method has been developed and used widely in subsequent research. It has allowed researchers to compare risk attitudes across various domains and to integrate the research of risk attitudes with the general approach. This study

implements the MPL type incentivized experiment on a sample of investment bankers working in core functions, the first of its kind in the literature.

2.2. Heterogeneity and Correlations of Risk Attitudes

As methodologies of elicitation continue to develop, the number of studies on heterogeneity and correlation of individual risk attitudes have increased accordingly. The literature examines how heterogeneity and correlations are associated with other socio-economic factors. The general finding is that individuals are moderately risk averse. An incentivized MPL experiment of farmers in India does not find any meaningful correlation between elicited risk preferences and most demographic variables (Binswanger 1981). A survey measurement of risk attitude finds that the average subject is moderately risk averse with considerable individual heterogeneity in risk attitudes (Harrison and Rutström 2008). The average representative sample of Dutch and Danish populations is found to be risk averse, and risk preferences are correlated with age and education (Harrison et al 2007; von Gaudecker et al. 2011).

A limited number of studies have investigated risk attitudes of targeted samples believed to be more sophisticated in decision-making than the average population. Survey measurements of risk attitudes of business executives discovers that their success is negatively correlated with risk aversion in the domain of financial risk taking, but have little association in other domains (Maccrimmon and Wehrung 1990).

Concerning decision-making in financial markets, there are previous studies that focus on the differences between investment professionals and the public or student groups. Investment professionals' behavior may differ from non-professionals' behavior due to experience, training, regulation, etc. (Burns 1985; Holt and Villamil 1986). Some biased financial decision-making may change significantly when real market players are put to the task (List 2002; 2003; 2004). A

classic Allais paradox experiment of students and professional traders from the Chicago Board of Trade finds that traders are caught into the Allais paradox less frequently than the student population (List and Haigh 2005). In particular, the validity of research that omits investigation of the decision-making processes of professional traders is questioned, as the public has very little influence in the price discovery process of financial markets (Locke and Mann 2000).

Even in the field of finance, existing experimental research does not focus on actual investment bankers, who are responsible for actually taking market risk and are accountable for the generated results. The sample size is often limited, and approaches the financial professionals as a homogeneous group. In contrast, we study 140 investment bankers in key roles, who are in charge of profit generation. We subdivide them according to their job functions, and observe their respective decision making characteristics.

Related to sophisticated decision-making, there are studies that examine the effects of experience, learning, or training. A field experiment finds that market experience can significantly reduce the endowment effect, a much studied market anomaly (List 2003). Individual investors can reduce or even eliminate the disposition effect – the reluctance to realize losses – by a combination of sophistication and experience (Feng and Seasholes 2005). The evidence suggests that individual behavior converges to that predicted by economic theory as personal market experience increases. We extend this research by analyzing investment bankers and their job functions.

Another important strand of related empirical literature points to the relationship between risk aversion and wealth. The relationship between risk aversion and wealth plays a central role in both standard economic theory and investment theory. A concave shaped utility function, synonymous with the law of decreasing marginal utility, implies that individuals are risk averse to some degree. Regarding the relationship between risk aversion and wealth, economic theories

posit that absolute risk aversion declines as wealth increases. In other words, the willingness to take a given absolute size of risk increases as the level of wealth rises (Arrow 1984).

There are several empirical studies supporting the economic theory of absolute risk aversion and wealth. Elicited absolute risk aversion coefficients from the Bank of Italy Survey of Household Income and Wealth on household willingness to pay for a hypothetical risk security show that risk aversion is negatively related with endowment (Guiso and Paiella 2008). Interviews of farmers in Nepal reveal that the subjects are generally risk averse, and their absolute risk aversion decreases with increases in wealth (Hamal and Anderson 1982). The Survey of Income and Program Participation data of the United States is analyzed to elicit the relative risk aversion index, which is the proportion of risky assets compared to total wealth. The results show that the risk aversion index decreases consistently to increases in both annual income and wealth (Riley and Chow 1992). We extend this line of research to discover how the risk aversion properties of investment bankers vary according to their income.

To emphasize, this study focuses exclusively on investment bankers, and compares them with a control group with similar characteristics except for their job functions. Most surveys and experiments in previous literature work with a representative sample of a country's population. These samples have a great extent of heterogeneity in age, education, cognitive ability, et cetera, which may contribute to findings that risk attitudes are variant or heterogeneous over populations and time. We target a smaller, more concentrated sample for our study, choosing a relatively homogeneous group of subjects in age, education, and work experience. The occupational groups such as investment bankers and accountants excluding the student group are between ages 30 to 45, all with university degrees, and 5 to 15 years of work experience. Any findings of diverse risk preferences from this homogeneous sample will generate new implications. In particular, to the best of our knowledge, studies attempting to measure and quantify the risk attitudes of

investment bankers do not exist yet, although investment bankers monopolize large-scale investment decisions and are directly involved in the price discovery process.

2.3. Investment Banker Characteristics

Recently, investment bankers and their characteristics have attracted much attention in financial and economic research. Since the 2008 financial crisis, the world has seen numerous financial crises and scandals, in which investment bankers and traders have been involved. Repeated reports of their actions (often to the distaste of the public) have led to unprecedented levels of interest on how investment bankers carry out their job functions, how they are compensated, and what their economic and social roles are.

Prior research argues that investment bankers conduct focal roles in financial markets, and enjoy very large compensations compared to other occupations. Investment bankers are "critical figures" in financial markets directly involved in almost all large-scale financial deals, and receive high compensation for their job performance (Oyer 2008). Financial workers enjoyed premiums of above 50% on average from 1990 to 2006 while they earned similar levels of education-adjusted wages compared to other sectors before 1990 (Philippon & Reshe 2012). Investment bankers are thus highly compensated in making large-scale investment decisions, but the difficulty of monitoring their actions creates moral hazard problems (Axelson & Bond 2015).

The high compensation enjoyed by investment bankers is not a result of their performance and contribution. Rather, it is a phenomenon strongly reliant on socio-economic factors. The careers and lifetime incomes of MBA graduates are strongly correlated with stock market performance (Oyer 2008). MBA students who graduate in bull markets find investment banking jobs more easily and enjoy higher lifetime incomes, whereas students who graduate in bear markets do not. Bolton et al. (2011) devise a model to answer the fundamental questions of

whether the financial sector contributes to the real economy, and what the optimal organization of the financial market is. In their model, too many agents seek to become dealers instead of entrepreneurs, which results in inefficiencies and excessive profits in financial markets.

In addition, investment banker job characteristics have some salient features. First, investment bankers tend to work very long hours, averaging 73.6 hours per week (Bertrand, Goldin, and Katz 2011). Second, the entry pattern into the industry is rigid. Most focal positions in investment banking are held by people who have worked in it since entry level, and it is unusual for an experienced worker from another field to carry out important roles (Axelson & Bond 2015). Third, the human capital structure is pyramidal and has an up-or-out promotion feature – investment bankers who do not show good performance and do not receive promotions in a certain period of time have to leave the firm (Axelson & Bond 2015).

To understand these distinct features of investment bankers and the importance of their actions, our approach is very different from previous approaches, as we directly observe the decision-making processes of investment bankers. Prior studies focus on compensation schemes and high monetary rewards of the investment banking industry and its related issues. Our study differs in that it studies the risk preferences of investment bankers, and how their decision making is characterized according to different job functions. In an effort to understand the fundamentals underlying investment bankers' characteristics, we design an incentivized experiment and a survey targeted at investment bankers as subjects. Through understanding their decision-making characteristics and behavior, we seek to gain deeper knowledge of investment bankers and draw meaningful implications.

2.4. Identity and Preference Formation Theory

We extend developmental psychology, identity formation and preference formation

theories in studying risk preferences. We suggest that job environments, functional characteristics, and performance management can influence the identities and preferences of investment bankers.

A study of the vocational identity formation of Danish bankers points out that the identity evolves with interactions of three factors – the level of loyalty to the organization they belong to, the relationship with clients, and the relationship with fellow employees. This identity does not remain merely as the product of past influences, but strongly impacts present and future choices and behavior (Smistrup 2007). Individuals learn through workplace practices and transform their working processes, and there is relational interdependency between workplace practices and individuals' identities (Billet and Somerville 2004). Preference formation theory explains how most preferences emerge from interaction between individuals and their environments, or are shaped during socialization, persuasion, advertising, and leadership activities (Etzioni 2014). More specifically, situated identities theory explains how individual decision-making and behavior can dramatically change according to the subject's situation, environment, or peer group. A simulation of social influence discovers that individuals perceptually structure their situation and environment, formulate normative expectations based on those definitions, and act according to the normative expectations thus formed (Alexander and Lauderdale 1977).

The developmental psychology literature provides us with a perspective in understanding the risk attitudes of investment bankers. If the risk taking nature of investment bankers arise in the process of socialization, simply changing compensation schemes to control the behaviors of investment bankers will not be effective. In addition, this paper, together with the existing literature on investment banker risk attitudes, can offer managerial and policy implications beyond those provided by a simple dichotomous nature or nurture view about investment bankers.

3. HYPOTHESES DEVELOPMENT

Our study extends the previous literature to analyze investment bankers and subgroups. Our hypotheses are as follows.

H1 (Investment-banker hypothesis): Investment bankers are more willing to take risk than non-investment bankers are.

H2 (Trader hypothesis): Traders are more willing to take risk than other subgroups of investment bankers.

H3 (Performance-factor hypothesis): Performance factors such as market prediction, interpersonal relations, practicing financial theory, and market news in evaluating investment bankers are positively correlated with the willingness to take risk.

H4 (Income hypothesis): The larger the annual income, the more the willingness to take risk.

H5 (Experience hypothesis): The longer the work experience, the more the willingness to take risk.

We denote the five hypotheses as follows. H1: Investment-banker hypothesis. H2: Trader Hypothesis. H3: Performance-factor hypothesis. H4: Income Hypothesis. H5: Experience Hypothesis. We develop the hypotheses using the literature on risk attitude theories in economics and finance, recent studies on investment banker characteristics, and identity and preference formation theory in developmental psychology. The following subsection explains how we develop the hypotheses in detail.

3.1. H1: Investment-banker hypothesis

H1 tests whether investment professionals have different risk preferences from control groups. H1 hypothesizes that investment bankers are more risk loving (or less risk-averse) than people who work in non-investment banking sectors. This hypothesis extends a common view prevalent among not only the masses but also by prominent figures in finance. Ben Bernanke, former Federal Reserve Chairman, mentioned that compensation practices at some banking organizations have led to misaligned incentives and excessive risk-taking, contributing to bank losses and financial instability (Federal Reserve Press Release, October 22, 2009). Alan Blinder, former Federal Reserve Vice Chairman, mentioned that perverse incentives encourage excessive risk-taking with other people's money (The Wall Street Journal, May 28, 2009). To verify if this common view has ground, H1 directly examines the risk preferences of investment bankers.

We develop H1 based on risk preference and decision-making theories in finance and on identity-formation and preference-formation theories in developmental psychology. In developmental psychology, identity-formation and preference-formation theories (Smistrup 2007; Billet and Somerville 2004; Etzioni 2014; Alexander and Lauderdale 1977), job environments such as functional characteristics and performance measurement methods can influence the formation of risk preferences. There is relational interdependency between workplace practices and individuals' identities when individuals learn through workplace practices and transform their working processes (Billet and Somerville 2004).

We extend this logic. Investment bankers are continuously exposed to an environment in which risk-taking is the norm and where performance measurement and incentive schemes are specific and quantitative. This influences the development of identities and preferences of investment bankers.

An investment banker, throughout his working day, is explicitly or implicitly required to

take risk. Although the various functions may differ in minutiae, all investment bankers are required to create profits by assessing and taking risk. There are explicit profit targets to be met, and the amounts of risk taken and expected profits are reported continuously to management. For example, a market-making trader is responsible for providing prices to clients on request, unless extreme market conditions prevail. A proprietary trader monitors forecasts market prices, and takes appropriate levels of risk regardless of client flows. Salespersons in charge of corporate clients bear client-related risks in competition with other institutions to win their deals, and earn as much profits as possible. If an investment banker is running no risk at all, it means he is neglecting his primary function as a profit generation center and is required to explain the reason to management. A popular adage goes: “Running no risk is the biggest risk to your job”.

Investment bankers are evaluated in explicit numerical form, which usually measures the level of their contribution to the profits of their organizations. Their salaries, and more importantly their bonuses, are a certain fraction or percentage of these numbers. As a result, most investment bankers have the incentive to increase their risk taking levels, in attempts to achieve higher levels of performance and reap their monetary rewards. These compensation structures and the magnitude of the investment banking industry have interacted to increase the incentives for risk-taking on an industry level (Sharma 2012). Such environments will induce the identity of investment bankers to develop in more risk loving (or less risk-averse) ways than those of workers in non-investment banking sectors.

3.2. H2: Trader Hypothesis

H2 hypothesizes that traders are more risk loving (or less risk-averse) than people who work in other functions within investment banking. Among investment bankers, traders are responsible for directly managing and trading risk in financial markets and regarded as more risk

loving than other job functions. Traders participate directly in the price discovery process of financial markets. The results of their trading translate directly into profit and loss numbers, which in turn relate explicitly to their compensation. The performance appraisal of traders is quantitative, as they are paid a certain percentage of the profits they have made as their bonuses. This is somewhat different from performance evaluations of other investment bankers, which depend importantly on qualitative factors as well. H2 is an extension of H1 on similar logic. Following identity/preference formation theory in developmental psychology, we can hypothesize that the acclimatization of traders to such job environments will result in more risk-loving preferences.

3.3. H3: Performance-factor hypothesis

H3 tests and analyzes the relationship between risk preference and four key factors contributing to investment banker performance. The four factors are 1) Market Prediction, 2) Interpersonal Relations, 3) Practicing Financial Theory, and 4) Market News. We test how the four factors influence risk preference development using the investment banker sample. Participants evaluate on a 7-point Likert scale the following four questions: (1) How predicting financial market movements accurately affects job performance? (Market Prediction) (2) How relationships with business partners inside or outside the company affect job performance? (Interpersonal Relations) (3) How understanding and applying financial theories precisely affect job performance? (Practicing Financial Theory) (4) How breaking news affecting financial markets affect job performance? (Market News). The four factors are common key items that appear in regular investment bank employee evaluation events such as year-end appraisals and 360 degree evaluations. Appendix 3 shows an actual performance appraisal form of core function employees at a global investment bank, with small details removed for anonymity. The appraisal

shows how banks evaluate aspects related to the key performance factors, and supports our case that such evaluations may act to define and structure job identities and norms in employees.

Extant literature on managerial risk taking indicates that the above performance factors can influence investment-banker risk preferences. How managers perceive and observe critical performance targets greatly affects their risk taking decisions (March and Shapira 1987). A behavioral agency model of managerial risk taking emphasizes the importance of 'behavioral evaluation criteria' and 'performance indicators' (Wiseman and Gomez-Mejia 1998). We find the theoretical grounds for H3 in the above discussions, and hypothesize that the four performance factors will impact risk preferences and risk taking of investment bankers.

Explicitly, if investment banker or trader risk preference is distinguishable, H3 tests how their job characteristics affect those risk preferences. Job environments and characteristics interact to formulate individual identities and preferences (Smistrup 2007; Billet and Somerville 2004). In this line of thought, we seek to find out which factors are relevant, instead of just classifying preferences by job functions. Whereas H2 is a form of testing risk preferences by job function, H3 investigates exactly what aspects determine these differences. More importantly, testing H3 also allows us to test from the perspective of identity formation theory and preference formation theory, how the unique working environment of investment bankers and traders affects the development of their risk preferences.

To summarize, H1, H2, and H3 extend and sophisticate the ongoing interests of behavioral economics and psychology, analyzing how heterogeneous and correlated the risk attitudes of finance professionals are. Our study attempts to measure and quantify the risk attitudes of investment bankers and their subgroups, who monopolize large-scale investment/trading decisions and are directly involved in the price discovery process. To the best of our knowledge, no such attempt has been made prior to this study.

3.4. Income Hypothesis

H4 (Income Hypothesis) is about the level of wealth or income and its relation to risk preference. H4 examines how the average annual income for the recent three-year period of investment bankers determines their risk preferences. In expected utility theory, risk aversion arises because the utility function over wealth is concave, or marginal utility diminishes over wealth. In a typical individual, absolute risk aversion decreases as her wealth rises. It means that an individual's willingness to take risk of a given absolute size rises as wealth increases (Arrow 1984). Many other studies provide evidence supporting this theory (Guiso and Paella 2008; Riley and Chow 1992; Hamal and Anderson 1982). As an addition to this line of research, H4 analyzes the relationship of the income and risk preference. Traders and investment bankers earn considerably high wages. H4 seeks to define how the high income levels are related to risk preferences.

3.5. Experience Hypothesis

H5 (Experience Hypothesis) analyzes the relationship of experience (or length of period worked in the investment banking sector) and risk preference. Economic theory states that any outlying behavior or preference of an economic subject will converge to average levels as the subject gathers higher levels of experience (Chew and Waller 1986; Camerer and Ho 1999). Such intuition also corresponds to developmental psychology literature.

Empirical evidence suggests that the behavior of investors should converge to those predicted by economic theory as they accumulate market experience. For example, the endowment effect decreases with increases in market experience (List 2003), and individual

investors can reduce or even eliminate the disposition effect in their trading behavior with a combination of sophistication and experience (Fend and Seasholes 2005).

4. DESIGN OF EXPERIMENT AND SURVEY

4.1. Subjects

Our sample consists of 352 subjects, who were recruited through four major routes. Compared to previous studies, our sample is a relatively homogeneous group, and the recruiting process in Korea may be more relevant for the purpose of the present study – how risk preferences may evolve according to job environments and norms. See APPENDIX 1: Concepts and Measurement for reference.

4.1.1 Sample Description

A total of 352 subjects participated in the experiment and survey for this study. The participants were recruited through four major routes.

First, we chose six global investment banks with operations in Seoul, three domestic securities houses, and the core business division of a global financial intermediary firm. We contacted the managers of each core business unit for their cooperation in the survey. The managers relayed the surveys directly to their subordinate staff. We asked the desk heads of the investment banks to relay or intermediate our experiment and survey. This is to bring to attention the importance of this experiment and survey to the staff, and to increase response rates and credibility. The number of respondents through this first route is 97, who are all in charge of core activities in the investment banking industry.

Second, we contacted two most active finance clubs of Seoul National University for

participation in the experiment and survey. Both finance clubs have over 15 years of history and wide alumni networks in the investment banking industry. 91 alumni and acting members participated, of which 43 are investment bankers, one is a certified public accountant, 16 are working in “other jobs”, and 31 are full-time students.

Third, 57 certified public accountants in a major global accounting firm took part in the experiment and survey. The accountants and investment bankers in our sample have similar undergraduate characteristics, both groups having large numbers of economics or business majors. However, their paths diverge after graduation, according to their career choices.

Fourth, students of Hanyang University’s graduate school and MBA course took part in the experiment and survey. 30 are full time students. 22 students are working and studying at the same time, whom we classified as belonging to the “other jobs” category. Of the Hanyang University sample, there are no investment bankers nor certified public accountants. As a supplementary measure, survey links were emailed to an alumni network of a domestic private university, and to employee networks of manufacturing firms. We obtained an additional sample of 55 respondents through this process. None of the respondents belong to an investment banking or accounting firm, and all of them are classified as “other jobs”. The recruiting channels and job classification of all survey subjects are summarized in Table I.

******* Insert **Table I** about here *******

There are 140 investment bankers in our sample, who are subdivided into four groups according to their job functions: (1) Trading, (2) Sales, (3) Research, Analyst, Quant, and (4) Corporate Finance. Traders are responsible for directly participating in financial markets, quoting and trading various instruments and products. Traders have clearly defined mandates as to what types of products they can trade and how much risk they can take. Traders are responsible for

generating profits while adhering to those limits. Traders usually do not face clients directly but have salespersons as middlemen; otherwise they are dedicated to trading in the interbank markets. Sales market the products of the investment bank to its institutional clients (financial institutions or corporates). When actual transactions take place, sales communicate prices and risk between clients and traders, and receive fees from the client and any internal sales credit allocated to them.

Research, analysts, and quants analyze financial markets and products, setup valuation models to correctly assess their values, and forecast future directions of the economy and predict market changes. Corporate finance division provides financial services such as mergers and acquisitions, and issuance of securities to corporates and institutions. The outlined classification and segregation of core businesses are common in most investment banks.

4.1.2 Recruiting Process for Korean Investment Bankers

In the context of the Korean recruiting culture, it is unlikely that the investment bankers or traders in our sample have atypical risk preferences to begin with. Most organizations recruit undergraduates with their university majors and GPAs as important criteria. Their university rankings are also important, which results in a larger part of the hopeful applicants in the banking sector being business or economic majors from top-ranking universities. Alumni networks are also thought of as being influential in the recruiting process.

This culture provides us with a stage where we can study the development and formation of risk preferences in special job environments, with the effect of personal choices much removed. When new recruits are assigned to their respective posts, it is not very likely that their preferences are reflected in the choices. More often, it is a matter of which departments have vacancies or headcounts, what university the recruits graduated from, what their GPAs are, and

where their alumni are situated within the organization. Therefore, we can carefully assume that individual risk attitudes play a minor role in the probability that the university graduate ends up in investment banking or trading. If salient features do emerge, we can infer that this is the product of preference formation or development from exposure to special job environments and norms. Being able to make such inferences is one of the strengths of our study, and why we carry out the study in a Korean setting.

4.2. Design

To measure and analyze the risk attitudes of participants, we follow the Multiple Price List (MPL) methodology of Holt and Laury (2002) and the Dual Nature of Risk-Taking (Instrumental Risk Taking and Stimulating Risk Taking) framework of Zaleskiewicz (2001) in designing the experiment and survey. In addition, four factors relevant to investment banker performance, annual income for the recent three-year period, and length of work experience are included in the survey.

We examine both economic and psychological risk attitude. Economics study risk preferences in a framework of probabilities (uncertainty), expected values and the shape of utility functions. Psychology, on the other hand, studies the specific factors and situations which induce monetary risk taking. Economic risk attitudes are defined by the curvature of the respective utility functions. Thus economic risk attitudes are usually defined as two-dimensional, and generally classified into risk-averse, risk-neutral, and risk-loving categories.

Psychology however, analyzes risk attitudes as a concept based on human nature or personality. Risk in psychology is fundamentally a multi-dimensional construct, therefore human behavior related with risk should be jointly considered with self-control (Timpop, Kerr and Kirkcaldy 1999). Cognitive-experiential self theory defines two modes that dominate human

thinking and information processes. One is the intuitive and sensual empirical mode, and the other is the rational, analytic and logical mode (Epstein et al. 1998). Risk attitudes are also under the rule of these modes, and individual risk attitudes are influenced by how individual situations influence the thinking and information processing modes. Risk can be classified into antisocial risk and anti-structural risk, the former associated with pleasure-seeking and reward-seeking motives, and the latter with prosocial, adventurous, and self-actualization factors (Levenson 1990).

To clarify, the classification of economic and non-economic/psychological risk attitudes are not strict in the academic sense; we have adopted the approach for the purposes of this study and for the convenience of the reader. The following subsections explain the design in detail.

4.2.1. Economic Risk Attitude

The Lottery-Choice experiment design is as follows. Participants are subjected to 10 consecutive lottery choices between lottery ticket A and B. The low-risk lottery ticket A has two possible payoffs of 200,000 KRW or 160,000 KRW, and the high-risk lottery ticket B has two possible payoffs of 385,000 KRW or 10,000 KRW. The probabilities of each state are initially set at 10% and 90%, which are adjusted incrementally for each decision phase. That is, the participant initially has a choice between choosing ticket A, which has 10% chance of winning 200,000 KRW and 90% chance of winning 160,000 KRW, and ticket B, which has 10% chance of winning 385,000 KRW and 90% chance of winning 10,000 KRW.

In the second stage, payoffs of the lottery tickets remain the same but the probabilities are changed at 10% increments – thus ticket A now has 20% chance of winning 200,000 KRW and 80% chance of winning 160,000 KRW, and ticket B has 20% chance of winning 385,000 and 80% chance of winning 10,000 KRW. Adjustments in probabilities are repeated until in phase 10

the probabilities become 90% and 10% for both tickets.

In the first decision-making phase, the expected value of low-risk lottery ticket A is overwhelmingly larger than that of high-risk ticket B. However, as subjects continue to make choices this difference gradually decreases, until at phase 5 the difference is reversed and high-risk ticket B has a larger expected value. Table II shows the payoffs, probabilities, and expected payoff differences of the low-risk and high-risk lottery tickets for each of the 10 decision-making phases. To ensure full participation and careful decision-making of participants, we stressed at the onset of the experiment that the cash rewards paid randomly to a selected number of participants would be the actual payout of the lottery ticket.

******* Insert **Table II** about here *******

As can be deduced from the expected payoff difference in Table II, a risk-neutral person will choose lottery ticket A in the first 4 experiment phases (the safe choice), and lottery ticket B in the remaining 6 phases (the risky choice). A risk lover will choose ticket B over ticket A 7 times or more, and a risk averter will choose the high-risk ticket 5 times or less. The degrees of risk preference are classified as in Table III. As mentioned, we measure the risk attitudes of subjects of this experimental survey through the number of times they choose lottery ticket B over ticket A.

******* Insert **Table III** about here *******

4.2.2 Psychological Risk Attitude

In analyzing the risk attitudes of individual investment bankers and investment banks as organizations, we adopt the psychological approach of classifying risk taking into instrumental risk taking (IRT) and stimulating risk taking (SRT) (Zaleskiewicz 2001). According to this

approach, IRT is related to risk preferences regarding investment decisions, future directivity, and rational thinking. SRT is related to risk preferences such as entertainment, ethics, health, gambling, and other matters regarding personal amusements. IRT is a long-term risk taking decision which is a controllable cognitive process, whereas SRT is a short-term risk taking decision which is an impulsive emotional process. This multi-dimensional approach of identifying risk taking as a process where diverse human personality traits are concerned deviates clearly from the traditional economic one.

While the lottery ticket choice experiment measures risk preferences through observing the decisions made for monetary incentives, Instrumental Risk Taking (IRT) and Stimulating Risk Taking (SRT) propensities are measured through surveys that do not provide any pecuniary benefit. In our design, subjects of the lottery ticket choice experiment are subsequently asked to answer 8 questions designed to measure SRT and IRT on a 7-point Likert scale.

The questions of the survey are specified in Table IV. The questions are modifications of the original ones in Zaleskiewicz's study (2001) to serve the purposes of this one. Except for Question 3, the higher the degree of agreement to the statement (the closer the score is to 7), the higher the IRT and SRT propensities of the survey subject. Thus the questions are labeled '+SRT' or '+IRT'. On the other hand, a higher score in Question 3 indicates a lower SRT propensity in the respondent, thus it is labeled '-SRT'. To quantify IRT and SRT propensities, the answers to the 8 questions in Table IV are converted into numeric values, summed according to IRT and SRT classes, and averaged for each class. The resulting averages are then used as measures of risk preferences.

******* Insert **Table IV** about here *******

4.2.3. Performance factors, income, experience and other variables

The investment banker samples in the survey are subjected to an additional survey, regarding the factors that affect their job performance. The questions ask the participants to evaluate on a 7-point Likert scale the following four questions: (1) How does predicting financial market movements accurately affect your job performance? (Market Prediction) (2) How do your relationships with business partners inside or outside the company affect your job performance? (Interpersonal Relations) (3) How does understanding and applying financial theories precisely affect your job performance? (Actual Practice of Finance Theory) (4) How does breaking news affecting financial markets affect your job performance? (Market News).

The last section of the survey questions subjects on their occupational and socio-economic variables. Job-related questions include recent three-year average annual income, average hours worked per week, total length of job experience, number of years worked in current job function, and total number of jobs held. Socio-economic questions include gender, age, height, religion, level of education, marital status, number of children, and length of stay abroad.

4.2.4. Procedures

The experiment and survey were created on the internet (web-base), and the survey links sent to potential subjects via email. The survey candidates follow the link if they agree to become subjects of the experiment, and complete their survey sessions on the web. Before going into the actual survey questions, it is made clear at the beginning of the survey process that there are monetary rewards which are dependent on survey choices made. To be more specific, it is emphasized that 20 respondents will be selected on a random basis, and one of their financial decisions randomly chosen for each individual. The actual payout to the selected persons depends

on the randomly chosen decision. For experimental questions that provide monetary incentives, respondents are again reminded of the fact at the beginning of the section. The experiment and survey are organized in the order of i) Lottery Ticket Choice Experiment, ii) Dual Nature of Risk-Taking (IRT and SRT) Experiment, iii) Factors Affecting Investment Bankers' Job Performance, iv) Occupational Questions, and v) Socio-Economic Questions.

After the deadline, we drew 20 participants randomly, as notified in the experiment and survey process. For the selected participants, again we randomly drew one answer with monetary incentive, and based the payout on the chosen answer. For example, one of the 11 lottery choice questions is arbitrarily chosen for a selected subject A. If A made a choice of 100% chance of receiving KRW 200,000 and 0% chance of receiving KRW 160,000, he is awarded the amount of KRW 200,000 based on his choice. The 20 winners were notified through cell-phone texts and email, and the 18 that replied with their bank account information were awarded a total of KRW 3,550,000 in cash. With such incentives, we induce respondents to answer truthfully and earnestly about their actual monetary utilities.

5. ANALYSIS AND RESULTS

5.1. Descriptive statistics

Table V describes the risk preferences of all 352 respondents. The first experiment measures economic risk preferences through lottery-choice MPL and offers monetary incentives. The average number of high-risk lottery choices for the total sample is 4.59 times, with a standard deviation of 2.08. 4.59 is smaller than the risk-neutral number of six. Thus, our sample display risk averse properties on average. The second experiment measures IRT and SRT propensities on a 7-point Likert scale. The average score for IRT is 4.51, which is slightly higher than the mid value of 4. The average score for SRT is 4.11, which is much closer to the mid value

of 4 compared to the average IRT score. For the definitions and measurements of IRT and SRT, see Table IV. For the other concepts, see Appendix 1. Appendix 2 shows other descriptive statistics.

******* Insert **Table V** about here *******

Table VI and Figure 1 summarize the results of 140 investment bankers' responses to questions regarding the factors that affect their job performance. The statistics show that the various job functions within the investment banking industry relate differently to the four factors. Traders associate highly with market prediction (6.20), market news (6.31), and practice of finance theory (6.13). Salespersons evaluate interpersonal relations (6.20) and market news (5.92) more importantly. Analysts regard practice of finance theory (5.95) as the most relevant. Corporate finance personnel rank interpersonal relations (5.92) as the most relevant factor in their job performance. To check whether the evaluation of the performance factors differs materially across the job functions, we run ANOVA. Table VI shows that all four factors show statistical differences in perceived importance across the various job functions. From the results, we can infer that classifying job functions into Trading / Sales / Analyst / Corporate Finance is relevant to job performance factors.

******* Insert **Table VI** and **Figure 1** about here *******

Table VII summarizes the socio-economic factors of the 352 survey subjects. 25.6% of survey participants are female, and the average age of the total sample is 33.44 years. Mean height is 172.74 cm, 44.9% of respondents have a religion, 46.0% are married and the average number of children is 0.57. Average period stayed abroad is 2.48 years, mean working experience of the sample excluding full-time students is 9.23 years, and average number of years worked in the current job is 5.94.

******* Insert **Table VII** about here *******

5.2. Results – Economic Risk Attitudes

To test H1, we classify survey subjects into Investment Bank, Accounting, Other Jobs, and Students. Table VIII presents the results of their lottery choices. Of a total of 10 lottery choices, investment bankers choose high-risk lotteries 4.77 times on average, accountants 4.33 times, other jobs 4.47 times, and students 4.57 times. The average of the total sample (352 subjects) is 4.59 times. The risk-neutral level of high-risk lottery choices is 6, therefore all 4 classes show risk aversion characteristics. Analysis of Variance (ANOVA) is run to discover any differences in risk aversion levels among the 4 classes. The results show no statistically significant differences in the number of choices made (p-value=0.516, ANOVA with p-value=0.522, test of homogeneity of variances). Hence, no difference in risk preference exists between investment bankers, accountants, workers in other groups of occupations, and students. We find no support for Hypothesis 1.

******* Insert **Table VIII** about here *******

To test H2, we divide the investment banker subsample into various job functions and analyze their risky lottery choices. On average, traders chose high-risk lotteries 5.47 times out of 10, sales 4.45 times, research 5.23 times, and corporate finance 3.71 times. Traders had the highest number of high-risk lottery choices, and their average number of 5.47 approaches closely the risk-neutral level of six. We run ANOVA as before to discover whether the various job functions within the investment-banking sector have different risk preferences. The statistics show that there are significant differences among four different divisions (p-value=0.003, ANOVA with p-value=0.096, test of homogeneity of variances). The main differences are

between trading vs corporate banking (p-value=0.009) and trading vs sales (p-value=0.118). On the other hand, trading and research show no significant difference (p-value=0.976) in their risk preferences. Within the investment-banking sector, we find that trading and research divisions are less risk-averse, while sales and corporate banking divisions are more risk-averse. This supports H2.

Although Research personnel do not directly participate in market trades, they are deeply involved in risk taking in another way. They must regularly publish their views on the economy, industry, or their relevant line of research. They need to 'bet' on the future movement of asset prices or economic indicators. For example, a stock analyst periodically publishes reports on the stocks that she covers including industry analysis, target stock price, and buy/sell recommendations. The markets keep track of her records, evaluating her accuracy and timeliness, and this type of system imbues the research function with risk taking characteristics. Like traders, market evaluation, market calls, and timely response are crucial for research personnel.

******* Insert **Table IX** about here *******

To test H3, we run OLS regressions with the number of high-risk lottery choices as the dependent variable, and the four factors affecting investment banker performance as independent variables. Table X shows the regression results – models A and B analyze the whole sample, model C analyzes the 291 subjects with job experience (excluding only the student samples with no income or work experience), and model D analyzes the subsample of 140 investment banking professionals. The results of model C show that the number of risky lottery choices is significantly associated with actual practice of financial theory, which has a positive coefficient (0.492, OLS coefficient, p-value=0.000), and with interpersonal relations, which has a negative coefficient (-0.479, OLS coefficient, p-value=0.001). The results of model D show that the

number of risky lottery choices is weakly associated with actual practice of financial theory, which has a positive coefficient (0.251, OLS coefficient, p-value=0.082). The coefficients of other performance factor variables are negligible. This supports H3. Table X also shows that the ANOVA results on H1 and H2 remain robust in the multivariate regression in which investment banker dummy is insignificant, but trader dummy is significant. Therefore, among the subjects with work experience, those with functions that have higher degrees of involvement with implementation of financial theory tend to be less risk averse. Those whose job performances are more related to customer relationships tend to be more risk averse.

The intuition of the results are as follows. In light of investment-banker job characteristics, the results seem natural. Investment bankers whose job performance is highly related with the implementation of financial theory, are more likely to embrace risk-neutrality as a norm in their decision making. For example, a person looking for profit opportunities based on financial models and its calculated fair prices, must make decisions based on risk-neutrality. On the other hand, a worker whose job depends materially on good relationships with customers may not strictly adhere to risk-neutral criteria in his decision making process. The identity/preference formation theory also implies that in the long run, the risk preferences of investment bankers who continuously strive to adapt to risk-neutrality norms and pursue improved performance may conform more strongly to these standards.

Table X also shows results for tests H4 and H5. In model C, there is no meaningful relationship between levels of annual income and risk preference (-0.012, OLS coefficient, p-value=0.314). On the other hand, model D shows that for investment bankers, the number of high risk lottery choices – or the level of risk preference – decreases as annual income increases (-0.032, OLS coefficient, p-value=0.054). Hence, H4 is rejected both for the sample of workers (excluding only students) and for investment bankers.

Regarding H5, in model C, we can see that the total length of work experience and current function have no meaningful relationship with risk preference (0.057 and -0.021, OLS coefficients, p-value= 0.176 and 0.479). In model D run on investment bankers only, again we see insignificant association between work experience and risk preference levels (0.016, OLS coefficient, p-value=0.890). However, for investment bankers, the level of risk preference rises as the total number of years worked in the current function increases (0.098, OLS coefficient, p-value=0.081). Therefore, for the sample excluding students, H5 is rejected. However, for the sample of investment bankers only, H5 is accepted with the period of work experience in the current function as the relevant variable.

******* Insert **Table X** about here *******

5.3. Results – Psychological Risk Attitudes

We analyze the test results of the hypotheses on psychological risk attitudes while the previous section is about economic risk attitudes. Table XI presents the results of sample subjects' willingness to take 'instrumental' and 'stimulating' risks.

First, in the test for H1 on IRT, investment bankers score 4.76 on average, accountants 4.38, other jobs 4.38, and students 4.24, on a 7-point Likert-type scale. The average score of the total sample (352 subjects) is 4.51. The median of 7-point Likert-type scale is 4.00, therefore all 4 classes show more willingness to take risk than the neutral level. Analysis of variance (ANOVA) is run to discover any differences in the levels of willingness to take instrumental risk among the four classes. The statistics show that there are significant differences among the four different classes (p-value=0.001, ANOVA with p-value=0.221, test of homogeneity of variances). The main differences are between investment bankers and the other three groups of occupations. No difference in IRT is found between accountants, workers in other groups of occupations, and

students. This supports H1.

Second, in the test for H1 on SRT, investment bankers score 4.22 on average, accountants 4.14, other jobs 4.01, and students 3.98, on a 7-point Likert-type scale. The average score of the total sample (352 subjects) is 4.11. The median of 7-point Likert-type scale is 4.00, therefore all three groups with any work experience show slightly more willingness to take risk than neutral levels. Students are very close to the neutral level. We run ANOVA to analyze any differences in the levels of the willingness to take stimulating risk among the four classes. The results show no statistically significant differences in the SRT scores among the different groups (p-value=0.177, ANOVA with p-value=0.345, test of homogeneity of variances). No difference in SRT is found between investment bankers, accountants, workers in other groups of occupations, and students. This rejects H1 on SRT.

We can see that levels of IRT differ significantly between investment bankers and other three groups of occupations, but no such differences exist for SRT. This phenomenon is in line with previous studies, which finds SRT to be uncontrollable, being related to personal preferences and emotions regarding interests and amusement factors (Zaleskiewicz (2001)). Therefore, SRT does not vary between different job functions. On the other hand, IRT is controllable, being related to rational processes and cognitive procedures such as investment decisions and logical factors. It can be influenced by job environments and norms, and can vary according to job functions. Our tests support this aspect by showing investment bankers have higher IRT propensities compared to other groups.

Our analysis has the following implications. The investment banking function may be more suited for individuals with comparatively higher IRT propensities, and the organizations in the industry are composed of a larger fraction of those people than in an unbiased sample. The results may be amplified by the fact that investment bankers are trained much more than other

jobs to take risks and view them from a long-term perspective.

******* Insert **Table XI** about here *******

To test H2, we classify investment bankers into various job functions and analyze their IRT and SRT scores. Table XII shows the results. First, for IRT, traders score 4.89, sales 4.85, analysts 4.56, and corporate finance 4.50 on average, out of a 7-point Likert-type scale. The risk-neutral level on this scale is 4, the average score of the total sample (352 subjects) is 4.76, and all four subdivisions show more willingness to take instrumental risk than is neutral. The ANOVA results show no statistically significant differences in IRT scores among different groups of traders, sales, analysts, and corporate finance (p-value=0.198, ANOVA with p-value=0.544, test of homogeneity of variances). This rejects H2 on IRT.

Second, for SRT, traders score 4.24 for on average, accountants 4.32, other jobs 4.01, and students 4.15, likewise on a 7-point Likert-type scale. The average score of the total sample (352 subjects) is 4.22. The median of 7-point Likert-type scale is 4.00, therefore all 4 subdivisions show slightly more willingness to take risk than is neutral. The ANOVA results show no statistically significant differences in SRT scores (p-value=0.470, ANOVA with p-value=0.862, test of homogeneity of variances). This rejects H2 on SRT.

******* Insert **Table XII** about here *******

To test H3 on IRT, OLS regressions are run with the score for instrumental risk taking as the dependent variable, and the 4 investment banker performance factors as independent variables. Panel A of Table XIII shows the regression results - model C analyzes 291 subjects with job experience, excluding only the student samples with no income or work experience, and model D analyzes the sample of 140 investment banking professionals. In model C, none of the four performance factors are significantly associated with the scores of IRT. Results from model

D show that the scores for IRT are significantly associated with the prediction of future market direction factor which has a positive coefficient (0.102, OLS coefficient, p-value=0.093), while the coefficients of the other three variables – interpersonal relations, practice of finance theory and market news – are negligible. It implies that investment bankers whose job functions have higher degrees of involvement with predicting how market parameters move in the future tend to be more willing to take instrumental risk.

Table XIII shows the test results for H3, H4, and H5. Panel B shows the results for H3 for SRT – the model specifications being similar to the previous regression for IRT (Panel A). In model C, we find that none of the four performance factors are significantly associated with the scores for SRT. Model D shows that the significant explanatory variables for IRT scores are prediction of future market direction factor (coefficient = 0.096, p-value = 0.090), and interpersonal relations (coefficient = 0.154, p-value = 0.013). The other two variables, practice of finance theory and market news, are insignificant.

For H3, these results imply that certain factors of investment banker performance contribute to some degree on the willingness to take psychological risks – IRT and SRT. In particular, prediction of future market direction is relevant for both IRT and SRT, with statistical significance.

Panel A of Table XIII shows results of testing H4 for IRT. IRT score is the dependent variable, and demographic and occupational factors are independent variables. Both models C and D show that there is no statistically meaningful relationship between the level of annual income and IRT (0.006 and 0.009, OLS coefficients, p-value= 0.270 and 0.192). H4 on IRT is rejected both for the sample of workers (excluding only students) and for investment bankers.

Panel B of Table XIII tests H4 on SRT. The dependent variable is the SRT score, with independent variables similar as in the test for IRT. Models C and D show that there is no

significant relation between levels of annual income and SRT (0.005 and 0.004, OLS coefficients, p-value=0.364 and 0.480, respectively). H4 on SRT is rejected both for the sample of workers (excluding only students) and for investment bankers.

Taken together, the results for H4 imply that annual income influences neither IRT nor SRT for the workers and investment bankers in our sample.

To test H5 for IRT, we refer to Panel A of Table XIII again. Model C shows that the IRT score increases as the total length of total work experience increases (0.033, OLS coefficient, p-value=0.089). However, it does not increase with the length worked at current function (-0.002, OLS coefficient, p-value=0.899). From specification D, we can see that neither the total length of work experience nor the length of years at the current job function has any meaningful relationship with IRT (-0.024 and 0.014, OLS coefficients, p-value= 0.624 and 0.538, respectively). Hence, we reject H5 on IRT for the subsample of investment bankers, but accept H5 for the sample of workers (excluding only students); the IRT score increases as the length of total work experience increases.

Panel B of Table XIII shows results of H5 for SRT. The results of model C show that the total length of work experience and the length worked at the current job function has no meaningful relationship with SRT (0.004 and 0.001, OLS coefficients, p-value=0.805 and 0.954, respectively). Model D is run on investment bankers only, which shows no meaningful relationship between work experience (the total length of work experience and the number of years worked in the current job function) and SRT scores (-0.006 and 0.000, OLS coefficients, p-value=0.891 and 0.994, respectively). H5 is rejected for SRT, for both the sample of workers (excluding only students) and for investment bankers.

The results for H5 imply that neither IRT nor SRT are significantly related to work experiences of the workers in the sample, measured either by the total length of work experience

or the length of years worked at the current job function.

5.4. Result Summary

Table XIV summarizes the hypotheses and the results of tests for both economic risk attitudes and psychological risk attitudes. It also describes how we relate our hypotheses to existing literature and develop them.

Risk preferences measured by the number of high risk lottery choices through the MPL method do not vary according to job category. But interestingly, the trading and research subdivisions within investment banking show markedly higher risk-loving propensities or preferences close to risk-neutrality. These are the functions that consider the actual practice of financial theory very important. Investment bankers show higher IRT scores than other occupational groups, but the subgroups do not show any differences within. In tests for SRT, we do not find any support for our set of hypotheses. This result implies that SRT is a risk attitude that is more universal, and has little to do with job functions or environments. On the other hand, IRT is more of an acquired attitude, that is influenced by norms and surrounding conditions.

******* Insert **Table XIII** and **Table XIV** about here *******

6. DISCUSSIONS

6.1. Risk Neutrality and Financial Decision-making Quality

What are the economic and financial implications of the fact that traders and analyst groups (among investment bankers) show more risk-neutral attitudes in making investment decisions?

The decision-making rationality of economics based on the theory of utility maximization accommodates heterogeneity in preferences, constraints, information, and beliefs.

This means that due to this heterogeneity, the choices of economic agents may differ even though all make rational decisions. In this context, behavioral finance focuses on the fact that the decision-making ability (DMA) of individuals may be heterogeneous, and as a result the decision-making quality (DMQ) can also be heterogeneous. Risk preference or risk aversion tendencies are at the core of economic and financial decision-making theories, and if these tendencies vary from individual to individual, then resulting investment decisions can also vary.

The results of this survey show that the risk aversion tendencies of the investment banking sector as a whole do not differ significantly from those of other control groups. But on a closer look at investment banker groups by job function, there is evidence that traders and analysts are relatively more risk loving than other groups. In addition, traders and analysts show risk attitudes which are very close to risk neutrality. The essence of the analyst group function lies in modeling economic or investment theory and evaluating fair market prices for financial products. The core competence of traders consists of comparing theoretical prices with market prices, and taking market risk based on the evaluations. This process is directly related to the price discovery process of financial markets. The fact that the two groups whose job functions are directly related with market prices show relatively more risk neutral attitudes, implies that the actual decisions they make are likely to be different from those made by control groups. The decisions made by traders and analysts may not show the behavioral biases shown by individual investors (or their set of biases may be different), and to verify this point the decision-making processes and resulting decisions of these two professional groups need to be studied closely.

Our study provides empirical evidence on the need to investigate the behavior of investment professionals in detail. The results show that it is not reasonable to bundle all investment professionals into a single group and assume homogeneity within. Whereas there is no discernable difference between the risk attitudes of control groups and the investment

professional group as a whole, a detailed breakdown shows that the risk preferences of traders and analysts are significantly closer to risk neutrality than other groups within investment banking. Special note should be made that these two groups are the ones that value actual practice of financial theory importantly in their job functions. The fact that total years of job experience are not significantly related to risk attitudes, but the number of years in the current job function are negatively correlated to risk aversion, states the role of experience and training on risk attitudes.

Trader and analyst groups who actively embrace the practice of financial theory are likely to think of risk neutrality as an essential norm when carrying out their job functions. The tendency is likely to increase with the number of years worked in the job function, as repetitive cases of risk-averse investment decisions are likely to result in loss of profit opportunities and negatively affect performance. When monetary outcomes such as wages and bonuses are directly related to job performance (which translates into utility), risk preferences inherent in individual utility functions can converge to risk neutral levels.

6.2. Distinguishing Power: Economic Risk Preference vs. Psychological Risk Preference

Measures can be appreciated for having enhanced distinguishing power if they are capable of distinguishing dominantly or significantly how individuals differ in their attitudes towards risk. When economic risk attitudes are criticized as being too narrow and oversimplified compared to psychological risk attitudes, it implies that the former has weaker distinguishing power than the latter.

To analyze the distinguishing powers of economic risk attitudes and psychological risk attitudes, the correlations between high-risk lottery choices and IRT and SRT are calculated. The results in Table XV show that risk preference (measured by the number of choices in high-risk

lottery tickets) is positively related to IRT (Pearson correlation 0.192, p-value=0.000), but insignificantly related to SRT (Pearson correlation 0.029, p-value=0.593). IRT and SRT are positively correlated with each other (Pearson correlation 0.432, p-value=0.000). This implies that IRT and SRT are not perfectly exclusive of each other, and that risky lottery choices lie in the domain of rational and cognitive processes of IRT, but not in the domain of impulsive and emotional processes of SRT.

******* Insert **Table XV** about here *******

Our study does not find any evidence that the psychological approach (through IRT and SRT) has advantages in distinguishing the heterogeneity of risk attitudes over the economic approach (risky lottery choices). The results of regression analyses performed with elicited or measured risk attitudes as dependent variables and socio-demographic and occupational factors as independent variables show how the categories of risk attitudes are distinguished. Regressions run with the number of high-risk lottery choices as the dependent variable find that economic risk attitudes are significantly associated with occupation, job functions and performance factors of investment bankers. In contrast, regressions run with IRT and SRT as dependent variables show lower association with occupation, job functions and performance factors of investment bankers, but broader association with socio-demographic factors such as gender and marital status. It implies that the economic approach to risk elicits a special type of risk preference that is rarely distinguished by the psychological approach such as IRT and SRT. Economic risk attitudes are simple, distinct, and two-dimensional, and may be viewed as a special type of preference responding to certain human traits, rather than being inferior to other risk attitude definitions. Economic risk attitude is more related to occupation, function, and characteristics of job functions while psychological risk attitude is more related to socio-demographic factors.

6.3. Sample Selection Bias

This section addresses concerns about sample selection bias. Because our sample is concentrated on investment bankers, it may be contested that the results we derive are from the natural inclinations of the persons attracted to the profession. In this view, investment bankers, traders, and analysts are likely to be individuals born with higher levels of risk preferences, rather than the profession nurturing the traits within them.

We do not completely rule out that personal risk attitudes (individual nature) influence the career choices of individuals. But for the purposes of our study, these concerns will not materially influence our results for the following reasons.

First, in the Korean recruiting culture, individual preferences are not actively reflected in employee staffing. Both hiring and staff allocation in investment banks are heavily dependent on available headcount, which is pretty much random. The preferences of employees are of secondary importance, and re-allocation to another division is rare. Complementing this phenomenon is the strong stratification of Korean universities. University rankings are very fixed, and it is the norm for students to apply to universities that match their high school scores. Investment banks (not to mention most other industries) consider the university rankings as one of the top priorities in recruiting. The link between university rankings and risk preferences does not seem important – therefore it is unlikely that new recruits in investment banking have higher levels of risk preference than other industries. We attest to this by including in our sample a group of accountants who have similar undergraduate backgrounds, but diverge in their risk preferences when compared with the investment banker group.

Second, risk preferences do not seem to play a major role in the choice of career paths in Korean university graduates. Rather it seems that factors such as compensation and lifestyle are

influential. In the 1990's, before the growth of the financial sector in Korea, a typical elite course was to enter the civil service and become a high-ranking government official. However, as investment banking attracted spotlight with its high compensation and lifestyle, it became one of the careers that attracted the most hopefuls. It is difficult to find any risk preference at play in the pattern of fashionable jobs.

Third, entry patterns in investment banks in Korea show similar characteristics to its global counterparts (Alexson and Bond (2015)). Recruitment of entry level employees are greatly affected by business cycles, especially to stock market moods, which can be very irregular. This is another factor that weakens the link between high risk preference individuals entering the investment banking sector.

Last but not least, one of our main hypotheses tests how the length of work experience is related to risk preference. Tests of H5 tell us that the number of years worked in the current role increases the level of risk preference. This points in the direction that risk preferences are under the influence of nurture.

7. CONCLUDING REMARKS

Are investment bankers risk-lovers or risk-seekers as popular belief deems them to be? And to what degree do they seek risk, compared to the general public? The results of our experiment and survey show that the allegations of the media are not totally unfounded – the sample of our study shows that investment bankers are noticeably more willing to take instrumental risks than other groups. Instrumental risk taking (IRT) is the controllable and cognitive process related long-term risk taking propensity, which is associated with investment decision-making, forward directivity, and rational thinking. The higher propensity of IRT in investment bankers compared to stimulating risk taking (SRT) sheds new light on the nature of

their risk taking. Whereas investment bankers have higher levels of IRT compared to control groups, they do not differ in their levels of SRT. SRT is the uncontrollable and emotional process related to short-term risk raking propensity, which is associated with entertainment, ethics, health, gambling, and other personal interests. Of the two psychological modes governing human thinking and informational processes, investment bankers do not differ in the intuitive, emotional and experimental mode, but differ from other groups in the rational, analytical, and logical mode.

Another interesting conclusion of our study lies in the discovery of the economic risk attitude of investment bankers. From the risky lottery choices experiment, there is no observable difference between the risk attitudes of the investment banker group as a whole and control groups. However, when investment bankers are subdivided into their job functions, traders and analyst groups show markedly higher levels of risk preference which converge on risk-neutrality. The reason for this salient low level of risk aversion seems to be coming from fact that the job performance of traders and analysts are closely related with actual practice of financial theory. The longer the period worked in the current job function, the lower their levels of risk aversion become.

This discovery is particularly relevant to developmental psychology, especially with regard to identity or preference formation theories. Traders and analysts work with financial theory and apply them to the real world. As the period of their work experience lengthens, the more they embrace risk-taking and risk-neutrality as functional norms. It can be inferred that their occupational identities and risk preferences will develop in line with these conditions.

The aggregate investment banker group differs from the public in their psychological attitude toward risk, and traders and analysts differ from the public in their economic risk attitude. These major findings of our research have the following important implications. First, from the practical point of view, traders and analysts who actually practice financial theory are

likely to evaluate ‘risk-neutrality’ itself as a norm for their job functions. The longer the period worked in their respective job functions, the stronger this propensity is likely to become. This fact is a double-edged sword for their employers and for the society as a whole – the fact that people who can take market risk most efficiently to generate revenues are working in their appropriate functions is good. But the fact that these people (who are close to risk-neutral in their attitudes) handle the risk of financial firms directly in markets state that in a world with inadequate regulations and controls, they can endanger entire financial and economic systems. The second implication is for financial theory. This study shows that the small number of investment professionals responsible for all the major investment decisions and for almost all of the price discovery process are much less risk-averse than other groups, and fairly close to risk-neutrality. This means that the validity of financial theories based on the assumption of risk-averse attitudes of investors stand to be questioned.

The main contribution of this study is that it identifies and analyzes the distinct characteristics of investment professionals. Exactly how these characteristics come to be is area for further study, but the fact that accountants with similar undergraduate backgrounds in business and finance show different risk attitudes from investment bankers suggest that the risk attitudes of the latter may be a result of nurturing. Investigating further on how the particular risk attitudes of investment bankers are formulated and structured will suggest new ideas for effective and healthy regulations and controls for the financial industry.

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Table I
Experiment Subjects: Recruitment Route and Job Classification

This table shows which routes the experimental subjects were recruited through, and their job classifications. Of a total of 352 survey participants, 97 were recruited from investment banks, 91 from SNU finance clubs, 57 from accounting firms, 52 from Hanyang University Business School (MBA and Graduate programs), and 55 from industries other than banking. Of these subjects, 140 are investment bankers, 58 are Certified Public Accountants, and 93 have other occupations. 61 are full-time students with no job affiliations.

Recruiting Route	Investment Bankers	CPAs	Other Occupations	Students	Total
Investment Banks	97	0	0	0	97
SNU Finance Clubs	43	1	16	31	91
Accounting Firm	0	57	0	0	57
HYU Biz School	0	0	22	30	52
Non-banking industry	0	0	55	0	55
Total	140	58	93	61	352

Table II
Ten Paired Lottery-Choice Decisions

This table shows the experimental design that elicits the subjects' risk attitudes toward economic risk based on Holt and Laury (2002). A multiple price list of ten paired lottery-choice decisions is presented. Each choice has two options of safe vs. risky lotteries and the difference of expected payoffs decreases as the round of choice proceeds. The payoffs are in KRW.

Lottery A (Safe)	Lottery B (Risky)	Expected payoff difference
1/10 of 200,000, 9/10 of 160,000	1/10 of 385,000, 9/10 of 10,000	116,500
2/10 of 200,000, 8/10 of 160,000	2/10 of 385,000, 8/10 of 10,000	83,000
3/10 of 200,000, 7/10 of 160,000	3/10 of 385,000, 7/10 of 10,000	49,500
4/10 of 200,000, 6/10 of 160,000	4/10 of 385,000, 6/10 of 10,000	16,000
5/10 of 200,000, 5/10 of 160,000	5/10 of 385,000, 5/10 of 10,000	-17,500
6/10 of 200,000, 4/10 of 160,000	6/10 of 385,000, 4/10 of 10,000	-51,000
7/10 of 200,000, 3/10 of 160,000	7/10 of 385,000, 3/10 of 10,000	-84,500
8/10 of 200,000, 2/10 of 160,000	8/10 of 385,000, 2/10 of 10,000	-118,000
9/10 of 200,000, 1/10 of 160,000	9/10 of 385,000, 1/10 of 10,000	-151,500
10/10 of 200,000, 0/10 of 160,000	10/10 of 385,000, 0/10 of 10,000	-185,000

Table III
Risk-Aversion Classification based on Lottery Choices

This table shows the degrees of risk aversion classified on the number of risky lottery choices made from the ten rounds. This is different from the methodology of Holt and Laury (2002), who base their classifications on the number of safe lottery choices made.

Number of Safe Choices	Relative Risk Aversion for U(x)=(x^(1-r))/(1-r)	Risk Preference Classification
0-1	r < -0.95	highly risk loving
2	-0.95 < r < -0.49	very risk loving
3	-0.49 < r < -0.15	risk loving
4	-0.15 < r < 0.15	risk neutral
5	0.15 < r < 0.41	slightly risk averse
6	0.41 < r < 0.68	risk averse
7	0.68 < r < 0.97	very risk averse
8	0.97 < r < 1.37	highly risk averse
9-10	1.37 < r	stay in bed

Table IV
Dual Nature of Risk-Taking: Instrumental Risk Taking vs. Stimulating Risk Taking

This table demonstrates the survey questions that are designed to measure psychological risk attitudes – Instrumental Risk Taking (IRT) vs. Stimulating Risk Taking (SRT). They are rewritten adaptively and presented to the survey subjects by using the original questionnaire of Zaleskiewicz (2001).

Q1	If I play a card game, I prefer to play for money.	+SRT
Q2	At work I would prefer a position with a high salary which could be lost easily to a stable position but with a lower salary.	+IRT
Q3	I take risk only if it is absolutely necessary to achieve an important goal.	-SRT
Q4	If there is a big chance of profit, I take even very high risks.	+IRT
Q5	I make risky decisions quickly without an unnecessary waste of time.	+SRT
Q6	If there was a big chance to multiply the capital, I would invest even in a new and uncertain firm.	+IRT
Q7	I am attracted by dangerous sports or activities.	+SRT
Q8	The reasonable risk taking is an important managerial skill.	+IRT

Table V
Descriptive Statistics of Risk Attitudes

This table describes the subjects' attitudes towards risk that are elicited and measured by risky lottery choices, instrumental risk taking, and stimulating risk taking. It indicates risk neutrality if (a) equals 6, risk aversion if (a) smaller than 6, and risk-loving if (a) bigger than 6.

Category	Measure	Scale	Original Literature	Monetary Incentive	# of Subjects	Mean
Economic Risk attitude	Risky Lottery Choices	MPL of 10 lotteries	Holt&Laury 2002	yes	352	4.59 (a)
Psycological Risk attitude	Instrumental Risk Taking	Likert scale - 7 point	Zaleskiewicz 2001	no	352	4.51
Psycological Risk attitude	Stimulating Risk Taking	Likert scale - 7 point	Zaleskiewicz 2001	no	352	4.11

Table VI
Evaluation of Key Factors in Investment Banker Performance

This table summarizes how investment bankers evaluate the importance of each of the four key performance factors on a 7-point Likert-type scale. The results of ANOVA show that the importance of the factors do vary among the investment banking functions.

Job Function	Traders	Sales	Research/Analyst	Corporate Finance	Total
Number of subjects	45	49	22	24	140
Market Prediction	6.20	5.35	5.09	5.13	5.54
Interpersonal Relations	5.42	6.20	5.55	5.92	5.80
Practicing Finance Theory	6.13	5.10	5.95	5.25	5.59
Market News	6.31	5.92	5.46	5.29	5.86

- ANOVA rejected null hypothesis that 'Market Prediction' does not vary between functions with p-value of 0.004.
- The homogeneity of variances was accepted with p-value of 0.145.
- ANOVA rejected null hypothesis that 'Interpersonal Relations' does not vary between functions with p-value of 0.013.
- The homogeneity of variances was not accepted with p-value of 0.017.
- ANOVA rejected null hypothesis that 'Practicing Finance Theory' does not vary between functions with p-value of 0.001.
- The homogeneity of variances was accepted with p-value of 0.328.
- ANOVA rejected null hypothesis that 'Market News' does not vary between functions with p-value of 0.009.
- The homogeneity of variances was not accepted with p-value of 0.014.

Table VII
Descriptive Statistics of Demographic Factors

This table shows the descriptive statistics of socio-demographic factors of the sample. For working experience (years) and working at current function (years), the full-time students are excluded. Panel A shows Investment Bankers as one group, and Panel B provides the breakdown of the group according to various job functions.

Panel A

	Investment Bankers	CPAs	Other Occupations	Full-time Students	Total
sex (% female)	19.9%	22.4%	29.4%	36.1%	25.6%
age	34.51	33.22	37.26	25.38	33.44
height (cm)	174.26	172.78	172.29	169.89	172.74
religion (% religious)	42.6%	34.5%	54.4%	45.9%	44.9%
marriage (% married)	58.2%	53.5%	50.0%	4.9%	46.0%
children	0.72	0.38	0.81	0.02	0.57
Overseas residence (yr)	2.71	1.59	2.67	2.50	2.48
working experience (yr)	8.95	6.61	11.43	0.00	9.23 (a)
working at current function (yr)	5.97	5.88	5.99	0.00	5.94 (b)

Panel B

	Investment Bankers			
	Traders	*Sales*	*Research*	*Corporate Finance*
sex (% female)	*11.1%*	*20.4%*	*31.8%*	*29.2%*
age	*35.47*	*35.02*	*31.86*	*34.13*
height (cm)	*175.38*	*174.14*	*173.23*	*173.25*
religion (% religious)	*42.2%*	*42.9%*	*36.4%*	*54.2%*
marriage (% married)	*64.4%*	*53.1%*	*59.1%*	*54.2%*
children	*0.80*	*0.71*	*0.45*	*0.83*
Overseas residence (yr)	*2.32*	*2.61*	*3.33*	*3.13*
working experience (yr)	*9.62*	*9.62*	*6.20*	*8.82*
working at current function (yr)	*7.12*	*6.42*	*4.40*	*4.35*

Table VIII
Risky Lottery Choices by Occupation

This table summarizes the risky lottery choices made by occupation and analyzes Hypothesis 1 that investment bankers are less risk-averse than other occupations. ANOVA fails to reject the null hypothesis that the number of risky choices made are homogeneous among different occupational groups – that is, we do not find any evidence of differences in risk attitudes among different occupations.

Occupations	I-Bankers	CPAs	Other occupations	Students	Total
number of subjects	140	58	93	61	352
mean of risky lottery choices	4.77	4.33	4.47	4.57	4.59
standard deviation	2.10	2.01	2.18	1.94	2.08

Table IX
Risky Lottery Choices of Investment Banker Job Functions

This table summarizes the number of risky lottery choices made by different job functions of investment bankers. This analyzes Hypothesis 2 that traders are less risk-averse than other job functions. ANOVA rejects the null hypothesis that the number of risky choices do not vary across different job functions of investment bankers. Pairwise comparison of job functions confirms that traders are less risk-averse compared to sales and corporate finance and that the differences are statistically significant.

Panel A: Summary

Job Function	Trader	Sales	Research/Analyst	Corporate Finance	Total
number of subjects	45	49	22	24	140
mean of risky lottery choices	5.47	4.45	5.23	3.71	4.78
standard deviation	1.63	2.06	2.05	2.49	2.10

Panel B: Multiple Comparisons of ANOVA (Scheffe)

	difference of \risky choices	Std Error	p-value
Trader vs Sales *	1.02	0.443	0.118
Trader vs Research	0.24	0.524	0.976
Trader vs Corp Finance **	1.76 **	0.509	0.009 **
Sales vs Research	-0.78	0.521	0.521
Sales vs Corp Finance	0.74	0.538	0.538
Research vs Corp Finance *	1.52 *	0.594	0.094 *

Table X
Regression of Economic Risk Attitudes on Occupational/Socio-demographic Factors

This table shows the results of OLS regression analyses performed with economic risk attitude as the dependent variable and sociodemographic/occupational factors as independent variables. Dependent variables is the number of high risk lottery choices made. Independent variables include occupations, job functions of I-Bankers, I-Banker performance factors, and demographic/occupational factors. There are four models, denoted A, B, C, and D. Models A and B are run on all 352 subjects, C on 291 subjects with job experience, (excluding the student sample), and D on 140 investment bankers only. Omitted categories are 'Other occupations' (only in models A, B, and C), 'Corporate Finance' of Job Functions of Investment Bankers (only in model D), female, non-religious, and unmarried. Standard errors are in parentheses. *, **, and *** indicate 0.1, 0.05, 0.01 significance levels, respectively.

		Economic Risk Attitudes - Risky Lottery Choices			
		Model A	Model B	Model C	Model D
	# of Subjects	352	352	291	140
Occupation	Investment Bankers	0.365 (4.230)			
	Accountants	-0.050 (0.373)	0.004 (0.368)	-0.174 (0.373)	
	Other	Omitted	Omitted	Omitted	
	Students	0.387 (0.446)	0.390 (0.441)		
Job Function of Investment Bankers	Traders		**1.054 *** **(0.385)**	0.188 (0.467)	**1.316 **** **(0.577)**
	Sales		0.035 (0.368)	0.001 (0.418)	0.631 (0.535)
	Analysts		**0.99 *** **(0.517)**	-0.052 (0.545)	**1.108 *** **(0.635)**
	Corporate Finance		-0.607 (0.477)	**-1.018 **** **(0.486)**	Omitted
Performance Factors of Investment Bankers	Market Prediction			-0.019 (0.087)	0.046 (0.147)
	Interpersonal Relations			**-0.479 ***** **(0.095)**	0.027 (0.159)
	Practicing Finance Theory			**0.492 ***** **(0.092)**	**0.251 *** **(0.143)**
	Market News			-0.013 (0.099)	0.048 (0.167)
Occupational Factors	Annual Income (KRW10mm)			-0.012 (0.012)	**-0.032 *** **(0.017)**
	Working Hours (Weekly)			0.01 (0.007)	0.01 (0.01)
	Total Work Experience (Years)			0.057 (0.042)	0.016 (0.117)
	Length of Current Job Function (Years)			-0.021 (0.03)	**0.098 *** **(0.056)**
	# of Change of Workplaces			-0.016 (0.096)	0.037 (0.155)
Demographic Factors	Sex (Male)	0.178 (0.41)	0.117 (0.404)	0.251 (0.415)	0.407 (0.68)
	Age	**0.057 **** **(0.028)**	**0.058 **** **(0.028)**	0.003 (0.045)	-0.011 (0.107)
	Height (Cm)	0.02 (0.024)	0.019 (0.024)	0.011 (0.024)	0.003 (0.035)
	Religion (Religious)	0.216 (0.233)	0.17 (0.230)	**0.408 *** **(0.232)**	0.23 (0.375)
	Marital Status (Married)	-0.152 (0.338)	-0.281 (0.336)	-0.029 (0.313)	0.255 (0.497)

# of Children	**-0.439 ***	-0.372	-0.298	-0.444
	(0.236)	(0.233)	(0.221)	(0.357)
Length of Overseas Residence (Years)	0.088	0.093	**0.083 ***	0.1
	(0.042)	(0.042)	**(0.046)**	(0.071)
Constant	-0.013	-0.958	1.963	0.326
	(4.230)	(4.169)	(4.321)	(6.561)

Table XI
Dual Nature of Risk-Taking by Occupation:
Instrumental Risk Taking vs. Stimulating Risk Taking

This table summarizes the scores of Instrumental Risk Taking and Stimulating Risk Taking by occupation and analyzes Hypothesis 1 that investment bankers are more willing to take risks relative to other groups of occupations. ANOVA rejects the null hypothesis that the propensities are equal for Instrumental Risk Taking but does not reject it for Stimulating Risk Taking. Pairwise comparison confirms that Investment bankers are more willing to take Instrumental Risk than other occupations and students at statistically significant levels.

Occupations	I-Bankers	CPAs	Other occupations	Students	Total
number of subjects	140	58	93	61	352
mean of IRT	4.76	4.38	4.38	4.24	4.51
mean of SRT	4.22	4.14	4.01	3.98	4.11
standard deviation of IRT	0.89	1.05	0.91	0.90	0.95
standard deviation of SRT	0.80	0.81	0.86	0.98	0.85

- ANOVA rejected null hypothesis that IRT do not vary between occupations with p-value of 0.001.
- The test of homogeneity of variances is accepted with p-value of 0.221.
- ANOVA failed to reject null hypothesis that SRT do not vary between occupations with p-value of 0.177.
- The test of homogeneity of variances is accepted with p-value of 0.345.

IRT - Multiple Comparisons of ANOVA (Scheffe)

	mean difference of IRT	Std Error	p-value
I-Bankers vs CPAs *	0.37 *	0.143	0.081 *
I-Bankers vs Other occupations **	0.38 **	0.123	0.026 **
I-Bankers vs Students *	0.51 ***	0.15	0.005 ***
CPAs vs Other occupations	0.00	0.153	0.999
CPAs vs Students	0.01	0.177	1
Other occupations vs Students	0.14	0.16	0.999

SRT - Multiple Comparisons of ANOVA (Scheffe)

	mean difference of SRT	Std Error	p-value
I-Bankers vs CPAs	0.08	0.129	0.94
I-Bankers vs Other occupations	0.21	0.111	0.294
I-Bankers vs Students	0.12	0.135	0.847
CPAs vs Other occupations	0.13	0.139	0.823
CPAs vs Students	0.04	0.159	0.996
Other occupations vs Students	-0.09	0.145	0.938

Table XII
Dual Nature of Risk-Taking In Investment Banker Subgroups: Instrumental Risk Taking vs. Stimulating Risk Taking

This table summarizes the scores of Instrumental Risk Taking and Stimulating Risk Taking by investment banker job functions and analyzes Hypothesis 2 that traders are more willing to take risks relative to other groups of job functions. ANOVA fails to reject the null hypothesis that the propensities do not differ for both IRT and SRT.

Occupations	Trader	Sales	Research/Analyst	Corporate Finance	Total
number of subjects	45	49	22	24	140
mean of IRT	4.89	4.85	4.56	4.50	4.76
mean of SRT	4.24	4.32	4.01	4.15	4.22
standard deviation of IRT	0.79	0.89	0.86	1.02	0.89
standard deviation of SRT	0.77	0.82	0.75	0.86	0.80

- ANOVA failed to reject null hypothesis that IRT do not vary between occupations with p-value of 0.198.
- The test of homogeneity of variances was accepted with p-value of 0.544.
- ANOVA failed to reject null hypothesis that SRT do not vary between occupations with p-value of 0.470.
- The test of homogeneity of variances was accepted with p-value of 0.862.

Table XIII

Regression of Psychological Risk Attitudes on Occupational/Socio-demographic Factors

The table shows results of OLS regressions with psychological risk attitudes as dependent variables and sociodemographic/occupational factors as independent variables. Dependent variables are IRT scores and SRT scores. Independent variables include occupations, job functions of I-Bankers, I-Banker performance factors, and demographic/occupational factors. There are four models for each regression, denoted A, B, C, and D. Models A and B are run on all 352 subjects, C on 291 subjects with job experience (excluding the student sample), and D on 140 investment bankers only. Omitted categories are 'Other occupations' (only in models A, B, and C), 'Corporate Finance' of Job Functions of Investment Bankers (only in model D), female, non-religious, and unmarried. Standard errors are in parentheses. *, **, and *** indicate 0.1, 0.05, 0.01 significance levels, respectively.

Panel A		Psychological Risk Attitudes - Instrumental Risk Taking			
		Model A	Model B	Model C	Model D
	# of Subjects	352	352	291	140
Occupation	Investment Bankers	**0.391 *** (0.121)**			
	Accountants	0.081 (0.154)	0.085 (0.154)	0.158 (0.174)	
	Other	Omitted	Omitted	Omitted	
	Students	0.037 (0.184)	0.025 (0.185)		
Job Function of Investment Bankers	Traders		**0.473 *** (0.162)**	0.304 (0.174)	0.297 (0.237)
	Sales		**0.446 *** (0.154)**	**0.329 * (0.218)**	0.327 (0.22)
	Analysts		**0.360 * (0.216)**	0.25 (0.255)	0.242 (0.261)
	Corporate Finance		0.155 (0.200)	0.054 (0.227)	Omitted
Performance Factors of Investment Bankers	Market Prediction			0.023 (0.044)	**0.102 * (0.06)**
	Interpersonal Relations			-0.004 (0.043)	0.089 (0.065)
	Practicing Finance Theory			0.037 (0.046)	0.057 (0.059)
	Market News			-0.013 (0.194)	-0.091 (0.069)
Occupational Factors	Annual Income (KRW10mm)			0.006 (0.006)	0.009 (0.007)
	Working Hours (Weekly)			0.002 (0.003)	0.003 (0.004)
	Total Work Experience (Years)			**0.033 * (0.019)**	-0.024 (0.048)
	Length of Current Job Function (Years)			-0.002 (0.014)	0.014 (0.023)
	# of Change of Workplaces			0.067 (0.045)	0.096 (0.064)
Demographic Factors	Sex (Male)	**0.565 *** (0.169)**	**0.553 *** (0.169)**	**0.698 *** (0.194)**	**0.677 ** (0.28)**
	Age	**0.028 ** (0.011)**	**0.026 ** (0.012)**	-0.01 (0.021)	0.002 (0.044)
	Height (Cm)	0.003 (0.01)	0.003 (0.01)	-0.004 (0.011)	-0.008 (0.014)
	Religion (Religious)	-0.007 (0.096)	-0.015 -0.096	0.013 (0.109)	**-0.260 * (0.154)**
	Marital Status (Married)	**-0.371 ** (0.139)**	**-0.380 ** (0.141)**	**-0.362 ** (0.146)**	**-0.401 * (0.204)**
	# of Children	-0.064 (0.097)	-0.051 (0.098)	-0.086 (0.146)	0.078 (0.147)
	Length of Overseas Residence (Years)	**0.051 *** (0.017)**	**0.053 ** (0.017)**	0.026 (0.021)	-0.006 (0.029)
	Constant	2.628 (1.743)	2.695 (1.746)	4.289 (2.019)	4.45 (2.696)

Panel B		Psychological Risk Attitudes - Stimulating Risk Taking			
		Model A	Model B	Model C	Model D
	# of Subjects	352	352	291	140
Occupation	Investment Bankers	0.14			
		(0.115)			
	Accountants	0.08	0.075	0.066	
		(0.146)	(0.147)	(0.159)	
	Other	Omitted	Omitted	Omitted	
	Students	-0.135	-0.149		
		(0.175)	(0.176)		
Job Function of Investment Bankers	Traders		0.138	0.009	0.053
			(0.154)	(0.199)	(0.221)
	Sales		0.226	0.116	0.115
			(0.147)	(0.178)	(0.205)
	Analysts		-0.024	-0.145	-0.052
			(0.206)	(0.232)	(0.243)
	Corporate Finance		0.083	-0.042	Omitted
			(0.190)	(0.207)	
Performance Factors of Investment Bankers	Market Prediction			0.032	**0.096 ***
				(0.037)	**(0.056)**
	Interpersonal Relations			0.056	**0.154 ****
				(0.04)	**(0.061)**
	Practicing Finance Theory			0.053	0.057
				(0.039)	(0.055)
	Market News			-0.064	-0.056
				(0.042)	(0.064)
Occupational Factors	Annual Income (KRW10mm)			0.005	0.004
				(0.005)	(0.006)
	Working Hours (Weekly)			0.000	-0.003
				(0.003)	(0.004)
	Total Work Experience (Years)			0.004	-0.006
				(0.018)	(0.045)
	Length of Current Job Function (Years)			0.001	0.000
				(0.013)	(0.021)
	# of Change of Workplaces			-0.020	0.038
				(0.041)	(0.059)
Demographic Factors	Sex (Male)	**0.410 *****	**0.407 *****	**0.508 *****	0.364
		(0.161)	**(0.161)**	**(0.177)**	(0.26)
	Age	-0.003	-0.004	-0.014	-0.025
		(0.011)	(0.011)	(0.019)	(0.041)
	Height (Cm)	0.000	0.000	-0.003	-0.004
		(0.010)	(0.010)	(0.010)	(0.013)
	Religion (Religious)	0.179	0.179	0.098	0.027
		(0.09)	(0.092)	(0.099)	(0.143)
	Marital Status (Married)	-0.182	-0.169	-0.153	-0.314
		(0.132)	(0.134)	(0.133)	(0.19)
	# of Children	0.033	0.034	0.022	0.045
		(0.092)	(0.093)	(0.094)	(0.137)
	Length of Overseas Residence (Years)	0.033	**0.034 ***	0.025	0.005
		(0.017)	**(0.017)**	(0.02)	(0.027)
	Constant	3.739	3.794	4.345	4.235
		(1.659)	(1.662)	(1.839)	(2.511)

Table XIV
Summary of Hypotheses and Test Results

Panel A of this table summarizes how the hypotheses of this paper are related to previous literature and extends from them. And Panel B summarizes the results of tests. H1 – H5 are as follows: H1: Investment bankers are more willing to take risk, relative to other groups of occupations. H2: Traders are more willing to take risk, relative to other investment banker subgroups. H3: The importance of performance factors in investment bankers' evaluation is positively correlated with the willingness to take risk. H4: The amount of annual income is negatively correlated with the willingness to take risk. H5: The length of work experience is positively correlated with the willingness to take risk.

Hypothesis ID	Related Literature	Extension of Literature	Test I MPL	Test II IRT	Test III SRT
H1	Burns (1985), Holt and Villamil (1986), Maccrimmon and Wehrung (1990), Lock and Mann (2000), List (2002, 2003, 2004), List and Haigh (2005). Smistrup (2007), Billet and Somerville (200	Based on related literature, we posit that the job environment of investment bankers in which risk taking is the norm will result in development of higher levels of risk preference. H1 and H2 are hypotheses to test the validity of the view that investment professional s have a special type of risk attitude. And H3 is to analyzes the relationship of the four key factors contributing to investment bankers' performance and their risk attitude. They extend and sophisticate ongoing interests of behavioral finance and developmental psychology in that they analyze how heterogeneous and correlated the risk attitudes of a targeted sample are. Our study attempts to measure and quantify the risk attitudes of investment bankers, who monopolize large-scale investment decisions and are directly involved in the price discovery process, which does not exist yet to the best of our knowledge.	rejected	accepted	rejected
H2			accepted	rejected	rejected
H3			accepted	rejected	rejected
H4	Barberis, Huang and Thaler (2006), Paravisni et al (2009).	Previous studies suggest that people are averse to risks that are small relative to their wealth. We test whether such conjecture is valid for investment bankers and traders. This is particularly important as investment bankers play a crucial role in financial markets.	rejected	rejected	rejected
H5	List (2003), Feng and Seasholes (2005).	Previous studies suggest that individual behavior converges to that predicted by neoclassical theory as personal market experience increases. We test whether such conjecture is valid for investment bankers and traders.	accepted	accepted	rejected

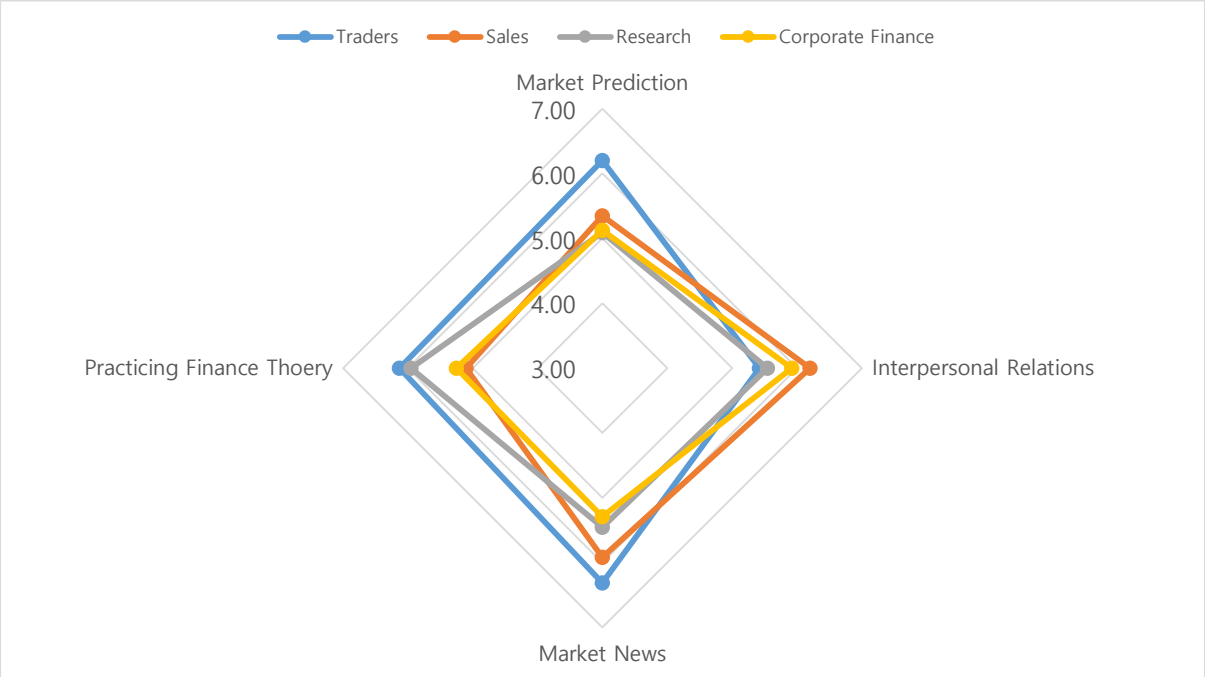
Table XV
Pearson Correlations: Risky Lottery Choices vs. IRT vs. SRT

This table summarizes the Pearson correlations of the number of risky lottery choices vs the scores of instrumental risk taking vs the scores of stimulating risk taking.

		Risky Choices	IRT	SRT
Risky Lottery Choices	correlation	1		
	(p-value)			
IRT	correlation	0.192 ***	1	
	(p-value)	(0.000)		
SRT	correlation	0.029	0.432 ***	1
	(p-value)	(0.593)	(0.000)	

Figure 1
Key Factors of Investment Bankers' Performance

The figure shows the evaluations of key factors of their performance by investment bankers. As can be expected, Sales evaluate interpersonal relations most strongly as a key factor that influences their performance, and Traders score market prediction and reaction to market news as key factors in their performance.



APPENDIX 1: Concepts and Measurement

Concepts	Definition	Measurement
Instrumental Risk taking (IRT)	Risk attitude related to investment decisions, future directivity, and rational thinking. A long-term risk taking decision which is a controllable cognitive process. (Zaleskiewicz 2001)	7-point Likert-type scale
Stimulating risk taking (SRT)	Risk attitude related to entertainment, ethics, health, gambling, and other matters regarding personal amusements. A short-term risk taking decision which is an impulsive emotional process. (Zaleskiewicz 2001)	7-point Likert-type scale
Economic risk attitude	Risk attitude in a framework of probabilities (uncertainty), expected values and the shape of utility functions. (Holt & Laury 2002)	Number of choices of high-risk lotteries out of total 10 lottery choices
Psychological risk attitude	Risk attitude derived from a person's self-evaluation of the goodness between a wide range of choices.	7-point Likert-type scale of IRT and SRT
MPL	Multiple Price Lists	Lottery Choices
Market Prediction	How does predicting financial market movements accurately affect your job performance?	7-point Likert-type scale
Interpersonal Relations	How do your relationships with business partners inside or outside the company affect your job performance?	7-point Likert-type scale
Practicing finance theory	How does understanding and applying financial theories precisely affect your job performance?	7-point Likert-type scale
Market News	How does breaking news affecting financial markets affect your job performance?	7-point Likert-type scale

APPENDIX 2: Descriptive Statistics

Panel A

Category	Measure	Scale	Mean	Min	Max	Std Dev.
Risk Attitude	Risky Lottery Choices	MPL of 10 Lotteries	4.585	1	10	2.078
	IRT	Likert scale - 7	4.507	1	7	0.946
	SRT	Likert scale - 7	4.109	1	7	0.850
Performance Factors of Investment Bankers	Market Prediction	Likert scale - 7	4.540	1	7	1.874
	Interpersonal Relations	Likert scale - 7	5.464	2	7	1.313
	Practicing Finance Theory	Likert scale - 7	4.680	1	7	1.605
	Market News	Likert scale - 7	5.124	1	7	1.616
Occupational Factors	Annual Income	KRW (million)	106.74	60	700	109.10
	Weekly Working Hours	Hours	48.26	10	130	17.752
	Length of Total Work Experience	Years	9.23	0.4	32	6.441
	Length of Current Job Functions	Years	5.94	0.4	26	4.955
	# Change of Workplace	Numbers	2.272	0	6	1.478
Demographic Factors	Sex	Female=0, Male=1	0.744	0	1	0.437
	Age	Years	33.44	18	52	7.07
	Height	Centimeter	172.74	155	190	7.249
	Religious	Religious=0	0.449	0	1	0.498
	Married	Marries=1	0.46	0	1	0.499
	# Children	Numbers	0.57	0	3	0.817
	Length of Overseas Residence	Years	2.477	0	11	2.752

Panel B

Correlation	# Risky Choices	IRT	SRT	Market Prediction	Interpersonal Relations	Practice Finance	Market News	Annual Income	Work Hours	Total Career	Current Function	#Workplace Change	Sex	Age	Height	Religious	Married	# Children	Overseas Residence
# Risky Choices	1																		
IRT	.19**	1																	
SRT	.03	.43**	1																
Market Prediction	.14*	.22**	.11	1															
Interpersonal Relations	-.35**	.02	.12*	.2	1														
Practice Finance Theory	.39**	.18**	.10	.41**	-.11	1													
Market News	0.12*	.17**	.06	.64**	.06	.40**	1												
Annual Income	-.02	.17**	.08	.26**	.12*	.11	.19**	1											
Work Hours	.08	.18**	.05	.01	.03	.05	.03	.05	1										
Total Career	.03	.08	-.08	.08	-.08	-.02	-.01	.32**	-.14*	1									
Current Function	.04	.08	-.04	.08	-.11	.09	.05	.22**	-.07	.58**	1								
#Workplace Change	.06	.05	-.05	.15*	-.12	.04	-.01	.30**	-.03	.52**	.24**	1							
Sex	.08	.17**	.19**	.13*	.02	.03	.01	.07	.09	.07	.06	.04	1						
Age	.02	.28**	-.00	.05	-.10	-.03	-.10	.29**	-.13*	.089**	.61**	.50**	.23**	1					
Height	.1	.12*	.18**	.14*	.05	.05	.02	.04	.11	-.10	-.08	-.06	.74**	.09	1				
Religious	.05	.24**	.09	.00	.11	-.03	.07	-.12*	-.09	-.21**	-.53	-.15**	.01	-.12*	.07	1			
Married	-.05	-.01	-.03	.03	.01	.05	.00	.22**	-.09	.49**	.43**	.23*8	.18*	.62**	.07	-.14**	1		
# Children	-.07	.05	-.00	.07	.33	.01	-.02	.27**	-.11	.70**	.47**	.34**	.20**	.72**	.07	-.17**	.70**	1	
Overseas Residence	.10	.12*	.08	.07	.12*	.10	.02	.26**	.14	-.06	-.14*	.11	-.11*	-.10	-.04	-.10	-.01	-.04	1

APPENDIX 3: Sample Appraisal Form of an Investment Bank

APPRAISAL FORM

APPRAISAL INTERVIEW REPORT FOR THE PERIOD	
INTERVIEW DATE	

Identity		
LAST/FAMILY NAME	FIRST NAME	LOCAL ID
CORE BUSINESS:	TERRITORY	
ENTITY OR ACTIVITY:		
JOINED XXXX ON:		
POSITION:	SINCE	
TITLE:	SINCE	

Description of position occupied
RESPONSIBILITY OF POST: KEY POINTS

SKILLS

*Key: A=Outstanding - B=Exceeds job requirements - C=Meets job requirements - D=Needs improvements - E=Unsatisfactory

Management Skills			
Managing role			
	Evaluation *		Evaluation *
- Commitment to the strategy of the Function - Ability to communicate - Ability to motivate - Ability to delegate - Ability to train		- Forward thinking - Reliability of judgement - Decisiveness - Sense of responsibility - General interest in managing colleagues	

Professional Skills			
Business role (where applicable)		*Technical role*	
	Evaluation *		Evaluation *
- Ability to generate profits - Ability to identify and develop commercial - Quality of service / follow-up - Ability to Use Market News - Technical knowledge - Risk - Ability to promote services and products of the Function - Ability to create and develop long term client relationships		- Technical knowledge - Reliability and quality of work - Productivity - Ability to adapt - Achievement of deadlines - Initiative and creativity - Handling client (internal and/or external)	

Professional Behavior			
	Evaluation *		Evaluation *
- Works to support group/team decisions - Interest for his/her Function and XXXX comes above personal interest		- Shares information, contacts and expertise - Leverages internal resources	