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Affect of Uncertainty Avoidance on Venture Capital Investing Activities in Asian Countries

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Abstract

This research aims to use country–level uncertainty avoidance degree to explain the variation of venture capital investing activities across different Asian countries. The analysis of venture capital activity done for 11 Asian countries in period from 2003 to 2012 shows that country-level uncertainty avoidance degree have a significant negative impact on venture capital activity. Specifically, countries with higher degree of uncertainty avoidance degree, has a less developed venture capital market (a smaller-sized market with smaller venture capital deals).

Keywords: venture capital, national culture, uncertainty avoidance

1. Introduction

In recent years, the internationalization of venture capital has become trendy. Particularly, emerging and developing markets in Asia have attracted a lot of attention from international venture capital. The venture capital markets in Asian countries are still characterized as under-developed which possess various risk and challenges to international investors such as information asymmetry and moral hazard (Dai, Jo, & Kassicieh, 2012). Those risks mainly due to the geographical distance and culture difference between the home countries and Asian countries. Despite those conditions, the venture capital inflows to Asia have still been increasing, largely due to the attractiveness of fast-growing economies in Asia. However, those venture capital inflows are not equal among different Asia countries which can be explained by various determinants such as the difference in financial development, economic growth or legal conditions between countries (Da Rin, Hellmann, & Puri, 2011). This research will look at another aspect that can affect venture capital investments in Asia countries which is culture, particularly the uncertainty avoidance dimension as defined in the study of Hoftede (1983). The research will aim to examine where the difference in uncertainty avoidance level affect the venture capital investing activities in different Asian countries.

Uncertainty avoidance dimension is defined by Hofstede (1983) as the way a nation or a society deals with uncertainties or unknown future. “Weak Uncertainty Avoidance” societies have the tendency to accept uncertainty and not become up-set by it, they take risk rather easily. However, some societies try to beat the future through creating security and avoiding risk, which are call “Strong Uncertainty Avoidance” societies.

Uncertainty avoidance or risk attitudes are emphasized in various studies about the success of the largest and the most developed venture capital market in the world – Silicon Valley. According to Saxenian (1994), among various factors, the success of Silicon Valley mainly due to its culture and the structure of the organizations which provided much flexibility and adaptability. Or as stated by Aoki (2000) (cited in Koh & Koh, 2002) and Wonglimpiyarat (2006) the factors that had contributed to the success of the venture capital market in Silicon Valley include a stable social and political environment, acceptance of immigrant talent and a culture of risk taking.

Therefore, risk-taking is considered to be one of the attribute of a success venture capital market. However, previous literature when examining factors that affect the venture capital investment activities mainly focuses on a country's legal and institutional structure, size and liquidity of the stock market, investor sophistication and ability to supply VC finance to entrepreneurial firms (Cumming, Fleming, & Suchard, 2005). Other studies look at specific factors like the study of Black and Gilson (1999) which focus on IPOs regulation; the study of Jeng and Wells (2000) focusing on IPOs, Labor market rigidities, Financial reporting standards, Private pension funds,

Macro Economic Variables, and Government programs; or the studies of Cumming, Flemming and Schwienbacher (2006) which focuses on Legality factor (the quality of a country's legal system).

Thus, this research aim to explore uncertainty avoidance as a determinant of venture capital investment activities in different countries, the context of this research is set within Asian area.

2. Literature Review

2.1 Overview of Venture Capital

The venture capital (VC) concept used in this paper refers to one type of private equity investment. Private equity investments, according to Jeng and Wells (2000), are investments made by institutions and wealthy individuals in both publicly quoted and privately held companies. As defined by European Private Equity and Venture Capital Association, investments under private equity forms can range from investing in a business plan or a start-up company, to financing a public company in the middle of turning point, to taking part in a leveraged buyout (Naqi & Hettihewa, 2007). There are two main types of private equity investment including venture capital and management and leveraged buyouts.

The National Venture Capital Association of the United States [NVCA] (2011) clearly defined venture capital investments as investments that involve in the three development stages of the company receiving the investment: seed, start up and expansion; and do not involve in buyouts.

The very first type of venture capital financing is seed capital. Seed capital is used for financing newly founded company with the purpose of providing funds for initial product research and development and the assessment of commercial potential of the idea. The investments made in companies that have moved pass the idea stage and start to produce, market and sell their products are called startup capital. When the company have move pass the seed and startup phase, venture capital investments in the period are expansion stage investment. The funding in the expansion period are usually used for increasing the manufacturing and distribution capacity of the company or for additional product research and development.

According to the NVCA (2011), the primary focus of venture capital is companies with significant growth potential. Those companies normally involve in developing significant innovations, such as new software, new type of machinery or new drugs that can cure cancer. During the investment process, the venture capitalist does not only provide money to the company but also provide to the company with strategic counsel regarding production, development, sales and marketing or hiring key managements. The ultimate goal of the venture capitalist is to grow the company to a point that it can go public or can be acquired by a larger corporations at a price that far exceed the initial capital investment. Going public or being acquired by another corporation are two of the "exit" strategies of venture capital.

There are five main types of venture capital exits (Cumming et al., 2006):

(1) IPOs – the firms received VC is listed on the stock exchange for the first time;

(2) Acquisitions – the company is purchased by a larger firm, both of the venture capitalist and the entrepreneur sell their interest in the company;

(3) Secondary sales – the venture capitalists sell their interest in company but the entrepreneurs do not sell their interest to another firm or venture capital fund;

(4) Buyback - the venture capital fund sell its interest to the founding entrepreneur; and

(5) Writeoffs – the investors walk away from the investment with little or no return.

According to Gompers and Lerner (1999), successful exit from the venture capital investment is the key component of the venture capital cycle. Only if the venture capitalists notice that a profitable exit strategy exists, they can invest with confidence knowing that possible return can be realized if the investment develop successfully. On the other hand, Jeng and Well (2000) state that, in a company where the entrepreneurs and managers are compensated with equity, a successful exit exist would encourage their effort of fulfilling their tasks and also provide them with an incentive to align their objectives with those of the VC.

2.2 Factors that Affect Venture Capital Investment in Asia Countries

In literature, there has been number of researches that examine factors that affect venture capital investment of countries all around the world. In this paper, only factors that are considered important are presented, including:

2.2.1 Initial Public Offerings

As mentioned earlier, a viable exit routes is the key component in the investment decision of VC. According to

Black and Gilson (1998), Cumming and MacIntosh (2003) and Schweinbacher (2005), IPOs is ranked to be the highest quality exit vehicle among the five VC exit strategies. The main principle underlying this ranking relates to information asymmetries. Barry, Muscarella, Peavy and Vetsuypens (1990) state that when information asymmetries are lowest, the new owners would be willing to pay more for the company. Hence, in order to maximize the value of the VC at the exit point, the exit vehicle which presents the lowest information asymmetry to the new owners would be chosen. Compare to other exit vehicles apart from buybacks, IPOs represents the least information asymmetry to the new owners. In contrast, although buybacks involve no information asymmetry to the new owners, which is the founder of the company, it is rarely used among firms with significant growth potential as it does not bring any new capital to the firm (Cumming & Flemming, 2002).

Therefore, whether a nation has an active stock market is a very important factor that affects the development of the venture capital market due to the potential for VC exit through an IPO (Black & Gilson, 1998).

The subject of IPO and the venture capital investment has been widely studied by various authors, however their research provided mixed results. In theory, the relationship between the size of IPO's market and the supply & demand of venture capital funds amount is expected to be positive. However, Barry et al. (1990), Gompers and Lerner (1998), Stuart, Hoang and Hybels (1999) did not find statistical significant effect of IPO's market size and the supply and demand of venture capital investment. On the other hand, more recent studies of Jeng and Wells (2000), Farag, Hommel, Witt and Wright (2004), Da Rin, Nicodana and Sembenelli (2006) and Banerjee (2008) found statistically significant effect of stock market on VC activity.

2.2.2 Legality

On another perspective, although agree with the assumption of the relationship between IPOs and venture capital investment, Cumming et al. (2006) argue that compare to IPOs' market size, the quality of a country's legal system (or Legality) is a much more directly connected factor to facilitate IPO exits of VC. Hence, the legal system quality of a country can significantly affect the development of its venture capital market.

In literature, there are several studies examine the relation between a country's legal system and VC. The study of Da Rin et al. (2006) provides information on potential impact of legal frameworks on VC structures and governance. Cumming, Schmidt and Waltz (2010) have examined the effect of a nation's legal system on different governance structure by adopting the Legality Index introduced by Berkowitz, Pistor and Richard (2003). The recent study of Bonini and Alkan (2011) has examined and found statistical significant impact of social and political environment of a nation on the development of VC investment.

The Legality Index is constructed from Berkowitz et al. (2003), a country with a higher number for each of the factors is considered to have a better legal system:

$$Legality = 0.381 \times (Efficiency\ of\ Judiciary) + 0.5778 \times (Rule\ of\ Law) + 0.5031 \times (Corruption) + 0.3468 \times (Risk\ of\ Expropriation) + 0.3842 \times (Risk\ of\ Contract\ Repudiation). \quad (1)$$

2.2.3 Labor Market Rigidities

Similar to IPOs, the effect of labor market rigidities on venture capital investment has been studied for long time. Labor market rigidities, as defined by Hurd (1996, p. 12), "are employment practices and work-related financial arrangements that constrain or limit the volume of work with respect to hours per day, days per week, or weeks per year" with the current employer or when changing employers. Also "rigidities also include situations in which the volume of work can be varied, but the change requires a disproportionate sacrifice in compensation, job satisfaction, mental or physical requirement, or location". On other words, in a societies with higher labor market rigidity level, if an individual changes from an employer to another employer, he or she has to make more sacrifice compare to an individual comes from a lower labor market rigidity. Thus, in higher labor market society, it is more difficult for an individual to change his or her job.

Hence, labor market rigidities is considered to be obstacle to venture capital growth. According to Jeng and Wells (2000), countries with higher labor market rigidities would have lower demand for venture capital funds. Specifically, countries with stricter labor laws would make it difficult for companies in general and entrepreneurial firms in particular, to hire people and let people go later on. Furthermore, Jeng and Wells (2000) state that, a high labor rigidities market typically go with large benefit payment systems which make the hiring process more expensive for companies.

The research results of Jeng and Wells (2000) show that there is statistically significant effect of labor market rigidities on early stage venture capital in different countries, but do not affect the later stage venture capital. Similarly, Schertler (2003) has found significant correlation between labor market rigidities on early stage VC

investments by examining VC investment across 14 European countries in the period of 1988 - 2000. Da Rin et al. (2006) also found the similar correlation. However, study of Van Pottelsberghe de la Potterie and Romain (2004) did not find significant relationship between the two factors when examining 16 OCED countries in the period of 1990 – 2000.

In order to determine the level of labor market rigidity across different countries in the world, there have been many researches from various authors.

In the study of Botero, Djankov, Laporta, Lopez-de-Silanes and Shleifer (2004), the authors have presented the characteristics of labor market in 85 different countries through measuring the labor regulation in each country. Botero et al. (2004) has constructed the indices of employment laws, collective relations laws and social securities laws for each country. The index of employment laws is constructed based on its four aspects: alternatives to standard employment contracts, the cost of increasing hours worked, the cost of hiring workers and the dismissal procedure. The index of collective relations laws, which refers to laws that protect workers through collective actions, is constructed by two measures: the power that labor unions is grated by the law and the laws that govern collective disputes. The index of social securities laws refers to the costs of covering risks of old age, disability and death; sickness and health; and unemployment. The way each index is calculated is by averaging the measures of its sub-indices. However, Botero et al. (2004) has not yet proposed method to construct a overall labor market rigidity index by integrating the 3 individual indices.

Another approach to measure the level of labor market rigidity is presented in the study of Jeng and Wells (2000). Jeng and Wells (2000) used two measures: the first measure is the average tenure of individuals with some tertiary education, which presents the amount of flexibility of a country's skilled labor force; and the second measure is the percentage of labor force that has job tenure of 10 years or more, which concerns with the whole labor market. In other words, a country with greater job tenure presents itself as a society with higher level of labor market rigidity. This approach is can be well applied when collecting data for OECD countries (provided by the OECD database), however statistical data has not yet been systematically collected for other countries outside of the OECD.

The third approach to measure the level of labor market rigidity is found in the study of Forteza and Rama (2006). Forteza and Rama (2006) measure the labor market rigidity index by including the following indicators: (1) the number of ILO (International Labour Organization) conventions ratified by a country; (2) the ratio of minimum wages to average labor costs in large manufacturing firms; (3) the ratio of minimum wages to income per capita; (4) the percentage of salaries that employers and employees have contribute to the social security administration; (5) the legal number of days of maternity leave with full pay for a first child born without complications; (6) the membership of the labor movement measured in percentage of the labor force; (7) the right to bargain collectively; (8) employment in the general government; and (9) employment in the central government as a fraction of labor force. The approach of Forteza and Rama (2006) includes some important indicators found in the approach of Botero et al. (2004), however the approach of Forteza and Rama (2006) has resulted in a unified index for labor market rigidity (the index includes data for 119 countries which is broader than the indices provided by Botero et al. (2004).

2.2.4 Macroeconomic Variables

According to Jeng and Wells (2000), macroeconomics condition could affect the venture capital investment in early stage. Specifically, macroeconomic expansion are expected to lead to an increase in the number of startups. Jeng and Wells (2000) use GDP growth to measure the macroeconomic fluctuations and market capitalization growth as an explanatory factor for venture capital investing. The two factors are considered to have positive correlation with venture capital investment.

The underlying reasons for choosing market capitalization growth as an explanatory factor for venture capital investing activity, according to Jeng and Wells (2008) are quite similar to the GDP growth. Specifically, the increase of market capitalization presents the expectations about the economy from the investors, in other words, the investors have good expectation about the economy. The increase in market capitalization also presents a more favorable investment environment for investors and clearly the supply of fund for investments in stock market has increased; this likely to corresponds to the increase in fund supply for VC capital investments. Therefore, as the investors are confident about the future economy, the supply of investment funds has increased, Jeng and Wells (2000) expect that the demand for funds for VC capital investment would increase.

However, the research in the area provide mixed results. Jeng and Wells (2000) did not find significant impact of GDP and market capitalization growth on VC investment. Where as, Gompers and Lerner (1998) found significant correlation between GDP and Equity Market Return and VC investing activities; and Felix,

Gulamhussenb and Pires (2013) found significant positive relationship between GDP growth and high-tech VC investments. On the other hand, Schertler (2003) focus on the liquidity of the stock market and found positive impact on early stage venture capital investment. Van Pottelsberghe de la Potterie and Romain (2004) noticed that there exist negative impact of labour market rigidity on the positive influence of GDP growth and positive influence of knowledge capital stock on VC activities.

2.2.5 Government Program

According to Kenney, Han and Tanaka (2002), the government can help to establish and develop the VC industry in the early stage by implementing monetary and fiscal policies that create a stable macroeconomic environment.

One of the important policies that can affect the VC investment activities is the taxation policy. Gompers (1994) states that the decrease in capital gain taxes could have some positive effect on the supply of venture capital funding. In addition, Da Rin et al. (2006) notices that lower capital gain taxes help investor to achieve higher returns and the difference between the capital gain tax and the income tax would make the cost of leaving one's job and starting a company lower. Another important policy of the government that can benefit VC is policy that supports the funding of University research. The encouragement of investing in University research in the US has created a efficient supply of well-trained graduates in science and engineering along with innovations (Kenney et al., 2002). In addition, the government can support VC investment directly or indirectly through issuing new legislations or new incentive schemes such as low-interest rate loan scheme or tax relief scheme. However, O'Shea (1996) points out that there may be negative effect of government program on the VC investing activities. For example, the increasing spending of government on venture capital may hinder the development of VC sector.

2.3 Uncertainty Avoidance and VC Investment Activities

2.3.1 Uncertainty Avoidance

Uncertainty avoidance is one of the five dimension of national culture identified by Hofstede (1984). Uncertainty avoidance refers to the degree to which members of a society feel uneasy towards uncertainty and ambiguity. In other words, uncertainty avoidance express the way that people deal with unknown future, do they just let the future happen or try to control it. "Weak Uncertainty Avoidance" societies have the tendency to accept uncertainty and not become up-set by it, they take risk rather easily. However, some societies try to beat the future through creating security and avoiding risk, which are called "strong Uncertainty Avoidance" societies.

Specifically, Hofstede (2011) presented the detailed differences between a "weak uncertainty avoidance" and a "strong uncertainty avoidance" culture:

Table 1. Differences between weak and strong uncertainty avoidance cultures

Weak uncertainty avoidance	Strong uncertainty avoidance
The uncertainty inherent in life is accepted and each day is taken as it comes	The uncertainty inherent in life is felt as a continuous threat that must be fought
Ease, lower stress, self-control, low anxiety	Higher stress, emotionality, anxiety, neuroticism
Higher scores on subjective health and well- being	Lower scores on subjective health and well-being
Tolerance of deviant persons and ideas: what is different is curious	Intolerance of deviant persons and ideas: what is different is dangerous
Comfortable with ambiguity and chaos	Need for clarity and structure
Teachers may say 'I don't know'	Teachers supposed to have all the answers
Changing jobs no problem	Staying in jobs even if disliked
Dislike of rules - written or unwritten	Emotional need for rules – even if not obeyed
In politics, citizens feel and are seen as competent towards authorities	In politics, citizens feel and are seen as incompetent towards authorities
In religion, philosophy and science: relativism and empiricism	In religion, philosophy and science: belief in ultimate truths and grand theories

Source: Hofstede (2011, p. 10)

According to Hofstede (1984), people can create security in three ways: (1) technology, (2) laws and rules, and (3) religion. The study of Hofstede shows that Latin countries, Mediterranean countries, Japan and Korea are countries with strong degree of uncertainty avoidance; other Asian countries are ranked medium to weak uncertainty avoidance; and some countries that present weak uncertainty avoidance are Denmark, Sweden, Great Britain and Ireland.

2.3.2 Measuring Uncertainty Avoidance Degree

a. Hofstede's method

The work of Hofstede (1984) is based on his access to a large survey database about values and related sentiments of people in over 50 different countries back in the 1970s. The database was build upon surveying (one or twice in the period of 4 years) people who worked in local subsidiaries of IBM – one large multinational corporation, resulting in a database of more than 100,000 questionnaires. Hofstede (1984) had developed his approach to measure the correlations between the mean scores of survey items at a level of countries and had found significant differences between cultures and developed the four dimensions of national culture (Power Distance, Uncertainty Avoidance, Individualism vs. Collectivism, Masculinity vs. Femininity) and later the fifth dimension – long term vs. short term orientation - was added (Hofstede, 2001). According to Hofstede's method, each country has been scored for each dimension and has been positioned in relation to other countries. Specifically, for the uncertainty avoidance dimension, Hofstede (1984) has done the measurement for each country based on the combination of three different factors including (1) rules orientation, (2) employment stability and (3) nervousness or stress at work. The formula used to calculate uncertainty avoidance dimension is as following:

$$\textit{Uncertainty avoidance} = 300 - 30 \times (\textit{rule orientation} - \textit{mean score}) - (\%\ \textit{employees intending to stay less than 5 years}) - 40\ (\textit{stress at work} - \textit{mean score}) \quad (2)$$

In which:

(1) The rules orientation factor refer to the responses of employees to the statement: "Company rules should not be broken – even if the employee thinks it is in the company's best interests" (Hofstede, 1983, pp. 118-119). The rules orientation factor was measured using a five-point Likert scale with 1 point representing "strongly agree" and 5 point representing "strongly disagree". Hence, lower point in the Likert scale refers to higher beliefs of employees to follow the rules; and higher point in the Likert scale refers to lower beliefs of employees to follow the company rules.

(2) The employment stability factor refer the responses of the employees to the statement: "How long do you think you will continue working for this company?" (Hofstede, 1983, p. 119). The score for this factor is not based on Likert scales as in the rules orientation factor but based on the percent of individuals that have the intention to stay with their current employers for the time period of no more than 5 years. The possible responses available for the respondents are: "(1) Two years at the most; (2) From two to five years; (3) More than five years (but I probably will leave before I retire) and (4) Until I retire" (Hofstede, 1983, p. 119). Therefore for the employment stability factor, the longer the employees intend to stay with the current employer have a higher value, and the shorter the employees' intentions to remain with the current employer have a lower value.

(3) The nervousness or stress at work factor refers to the responses of employees to the statement: "How often do you feel nervous or tense at work?" (Hofstede, 1983, p. 119). Similar to the method used to score the rules orientation factor, the nervousness or stress at work factor is scored based on a five-point Likert scale with the minimum point of 1 representing "I always feel that way" and the maximum point of 5 representing "I never feel that way". Hence, for the nervousness or stress at work factor, the higher value on the Likert scale refers to lower feeling of being nervous, and the lower value on the Likert scale refers to higher feelings of being stress at work.

b. Criticism of Hofstede's Method

The criticisms of Hofstede's method of measuring the five national culture dimensions in general and the uncertainty avoidance dimension in particular are mainly about Hofstede's data. For example, Smith, Peterson and Schwartz (2002), Janvidan, House, Dorfman, Hanges and Sully de Luque (2006) and McSweeney (2002) criticized that the work of Hofstede was based on old data which is collected during 1968 and 1972 and in only one multinational organization (IBM) and the data of Hofstede was mostly collected by surveying white marketing and salesmen. Hence, the validity and generality of Hofstede's culture dimension measurements are questioned.

However, later studies of national cultures have confirmed the validity and generality of Hofstede's work. According to Hofstede (2011), after his research at IBM, he had also done the same surveys and questionnaires

to nearly 400 management trainees from about 30 countries in an international program that is unrelated to IBM. The results from the program show consistency with the results that Hofstede obtain from IBM – the mean scores for each country significantly correlated with the country level scores obtained from IBM database. For the criticism of using time-worn data, Hofstede argued that the dimensions measured in his research focus on describing the differences between cultures. Although the national cultures do evolve, but according to Hofstede, they tend to evolve in more or less the same direction which means that the difference between cultures would not necessarily lost (Minkov & Hofstede, 2011). Hence, the validity of Hofstede's work still remains. The study of Inglehart (2008) has supported this point. From analyzing data of Western European countries collected from the period from 1970 to 2006, Inglehart (2008) concluded that although Western culture did evolve, their paths never crossed at any point during the period of 36 years.

c. Other approaches

Besides the work of Hofstede, other researchers have been developing and measuring different national culture dimensions. Two of the most recognized other approaches in the field are from the study of Schwartz (1994) and House, Hanges, Javidan, Dorfman and Gupta (2004), which are summarized as in Table 2.

Table 2. Other approaches to measure national culture dimensions

Authors	Contributions	Methodology
Schwartz (1994)	7 national culture dimensions: (1) Conservatism; (2) Intellectual autonomy; (3) Affective autonomy; (4) Egalitarian; (5) Mastery; (6) Hierarchy; (7) Harmony	Using the Schwartz value survey on 35,000 teachers and students from 67 countries
GLOBE project (House et al., 2004)	9 national culture dimensions: (1) Assertiveness orientation; (2) Gender egalitarianism; (3) Institutional collectivism; (4) Family collectivism; (5) Power distance; (6) Uncertainty avoidance; (7) Future orientation; (8) Performance orientation; (9) Humane orientation.	Surveying 17,370 respondents from 62 countries and from 3 different industry: telecommunication, food processing and finance.

Shwartz (1994) has developed 7 national culture dimensions including: (1) Conservatism emphasizes the maintenance of the status quo, propriety and the inclinations that might disrupt the traditional orders that are embedded in the society. (2) Intellectual autonomy emphasizes the ability of an individual in pursuing their own ideas and intellectual directions freely and independently. (3) Affective autonomy emphasizes the extent to which an individual can freely pursuing their affective desires. (4) Egalitarian refers to the extent to which an individual can voluntarily give up their own interests to promote the benefits of other people. (5) Mastery emphasizes the importance of being self-assertiveness of individuals in order to get ahead. (6) Hierarchy refers the extent to which the unequal distribution of power and resources is considered legitimate. (7) Harmony refers to the importance of fitting harmonily into the environment of individuals. The work of Schwartz (1994) provides results that quite independent from the work of Hofstede (1984). Specifically, according to the earlier explanations of Shwartz's 7 dimensions, the dimension of uncertainty avoidance was not included in the author's work.

Unlike the work of Schwartz (1994), the GLOBE project replicated the work of Hofstede (1984) and has expanded the five Hofstede dimensions to nine dimensions (House et al., 2004). The dimension Power Distance and Uncertainty Avoidance are maintained. The collectivism dimension is split into Institutional Collectivism and In-group Collectivism. The masculinity vs. femininity dimension is split into Assertiveness and Gender Egalitarianism. The Long-term vs. short-term orientation dimension is replaced by Future Orientation. Furthermore, two new dimensions are added: Humane orientation and Performance orientation. In the work of House et al. (2004, p.13), Uncertainty avoidance dimension refers to the extent that individuals within a society strive to avoid uncertain future through relying on established social norms, rituals and bureaucratic practices. Hence, the individuals living within a high uncertainty avoidance culture will actively try to seek for solution to decrease the probability of unpredictable future event that could bring adverse effects later. This definition of uncertainty avoidance that House et al. (2004) provided though is similar to what Hofstede defines, however the

two definitions are not completely the same. According to Hofstede (2001, p.148), uncertainty avoidance goes with anxiety, uncertainty has no probability and uncertainty is the situation that anything can happen. However, the largest difference between the two dimensions are their measurements. While Hofstede's surveying method is asking individuals of what they think of themselves; the surveying method used in the GLOBE project in addition of asking individuals of what they think of themselves (describing their culture), also asking what they think other people should do (judging what their culture should be) (House et al., 2004). The method used in the GLOBE project has created controversy and received vast criticisms. According to Smith (2006) and Minkov and Blagoev (2011), when asking individuals of what are considered important to themselves would yield a completely different results compare to when asking individuals what they think other should or should not do. The first question will yield results about personal values (Smith, 2006) and the second question will yield results about social norms (Minkov & Hofstede, 2011); and the two cannot be mixed.

Therefore, in the purpose of this research, to avoid complexity, the author adopts the most well-established and tested method to measure uncertainty avoidance from the landmark study of Hofstede (1984).

2.3.3 Uncertainty Avoidance and Venture Capital Investment

According to Hofstede (1984, p. 132), "high uncertainty avoidance connotes less achievement motivation, less competitiveness, more emotional resistance to change, more worry about the future, less risk taking". As discussed earlier, the main focus of VC is on innovations and significant growth potential which can be achieved only by change acceptance and risk taking behaviour. Hence, all of the characteristics of a high uncertainty avoidance refer to the resistance to changes which suggest that the society with high uncertainty avoidance degree would have lower VC investment level. In addition, Institutional Theory suggest that the culture, history and policy of a specific country or region in which a VC operates, play a essential role in the success or failure of that VC (Lingelbach, Murray, & Gilbert, 2009). Therefore, the degree of uncertainty avoidance is expected to have significant impact on VC investment activities in a particular country.

In literature there has been recognition of the important of culture as an factors that affects many actions and outcomes observed in finance (Frijins, Gilbert, Lehnert, & Tourani-Rad, 2013). For example, Siegel, Licht and Schwartz (2011) found that the international investment flows are influenced by a society's culture or Anderson, Fedenia, Hirschey and Skiba (2011) found that culture does affect foreign investment decisions. Furthermore, research on the cultural difference between nations as one of the main determinants of a country's entrepreneurial development have been carried out since the 90s; for examples, the studies of McGrath (1992) and Mueller and Thomas (2001) have found significant correlation between national culture (including uncertainty avoidance level) and entrepreneurial development.

However in literature, there has been limited researches about culture as an determinant of VC capital investing in different countries. There are two recent research that focus on this issue. The first research is of Li and Zahra (2012, 51) which has found correlation between higher levels of collectivism (one dimension of national culture by Hofstede (1984)) and lower levels of VC activity. The second research is of Antonczyk and Salzmann (2012) which show similar results with Li and Zahra (2012) that individualism is positively associated with VC activity. In addition Antoczyk and Salzmann (2012) also found that the degree of uncertainty avoidance is negatively correlated with VC investing activity.

Furthermore, uncertainty avoidance or risk attitudes are emphasized in various studies about the success of the largest and the most developed venture capital market in the world – Silicon Valley. According to Saxenian (1994), among various factors, the success of Silicon Valley mainly due to its culture and the structure of the organizations which provided much flexibility and adaptability. Or as stated by Aoki (2000) (cited in Koh & Koh, 2002) and Wonglimpiyarat (2006) the factors that had contributed to the success of the venture capital market in Silicon Valley include a stable social and political environment, acceptance of immigrant talent and a culture of risk taking.

Hence, based on these above literature, uncertainty avoidance level of a country is expected to negatively correlate with the venture capital investment activities in that country. Specifically, a country with a higher degree of uncertainty avoidance is expected to have a less developed venture capital market and the size of the venture deals in that country are expected to be smaller than another country with lower degree of uncertainty avoidance.

To examine the relationship between the uncertainty avoidance degree and VC activity in a particular country, these following hypotheses would be tested:

H1: A country with higher degree of uncertainty avoidance have a less developed Venture Capital market.

A country with lower degree of uncertainty avoidance have a more developed Venture Capital market.

H2: Countries with higher degree of uncertainty avoidance have smaller VC deal sizes.

Countries with lower degree of uncertainty avoidance have larger VC deal sizes.

3. Methodology

3.1 Ordinary Least Squares (OLS)

To estimate the relationship between Venture capital investment and its variables, the ordinary least squares method and linear regression model are used.

$$y_i = \beta_0 + \beta_1 x_i + u_i \quad (3)$$

Where: y is the dependent variable, x is the independent variable and u is the error

However, this method is the best estimation method only when the following assumptions are satisfied (Verbeek, 2008):

A1: Zero mean: E(ui) = 0

A2: Independence: E(ui|xi) = 0

A3: Homoscedasticity (constant variance): V(ui) = σ2

A4: Non autocorrelation: Cov(ui, uj) = 0, i≠ j

a. Assumption 1

Assumption A1 ($E(u_i) = 0$) required that the average value of the regression errors is zero. To test Assumption 1, t-test is used.

b. Assumption 3

Assumption A3 means that the model is homoscedastic.

To test for heteroscedasticity, Goldfeld-Quandt test or White's test can be used. One way to reduce heteroscedasticity is to use variables expressed in logarithm (e.g., log(y) instead of y). If the form of heteroscedasticity is known, Generalized Least Squares (GLS) can be used to estimate the model. When heteroscedasticity is suspected, we can use the White's procedure which produces the OLS estimator with Heteroscedasticity Consistent standard errors (also known as robust standard errors).

c. Assumption 4

Assumption 4 means that the residuals are not autocorrelated.

Durbin-Watson test is used to test for first-order autocorrelation. Estimation of this model can be performed by using GLS-type estimators such as Cochrane-Orcutt estimator (which does not use the first transformed observation t = 1) or Prais-Winsten estimator (which uses all transformed observations).

When autocorrelation (even of higher-order) is suspected, the Newey-West procedure can be used to obtain the OLS estimator with Heteroscedasticity and Autocorrelation Consistent (HAC) standard errors.

d. Assumption 2

Assumption 2 means that the error terms ui are uncorrelated with explanatory variables xi. This means that xi is an exogenous regressor.

Assumption 2 is crucial for the consistency of the Ordinary Least Squares (OLS) estimator. When this assumption fails, for example when the error terms are correlated with some or all explanatory variables (which are known as endogenous regressors), the OLS estimator is inconsistent and alternative estimators should be considered. There are two alternative methods: Instrumental Variables (IV) and Generalized Method of Moments (GMM) (Wooldridge, 2006).

3.2 Simple Regression and Multiple Regression Model

In the above model, simple regression analysis is used to explain the dependent variable y as a function of a single independent variable x. According to Wooldridge (2006), the major weakness of this estimation is the difficulty to reach a clear conclusion of how x affects y because the assumption that all other factors that might affect y are not related to x is normally realistic. Hence, if other factors are added to the simple regression model which are useful for explaining y, then we can explain more of the variation in y. When adding more independent variables in the simple regression model, we construct a multiple regression model. Multiple regression analysis is considered to help building a better models for predicting the dependent variable y (Verbeek, 2008).

The general multiple regression model which contain k independent variables can be expressed as following:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u_i \quad (4)$$

where: β_0 is the intercept;

β_1 is the parameter associated with x_1;

β_2 is the parameter associated with x_2 and so on

3.3 Panel Data Models – Fixed Effects and Random Effects Model

Panel data refers to a type of data that comprises both time series and cross-sectional elements. In other words, we have repeated observations over the same units collected over a number of periods (Verbeek, 2008).

The model of panel data is as follows

$$y_{it} = \propto + \beta \ x_{it} + u_{it}, \quad i = 1,2, \dots, N, t = 1,2, \dots, T \quad (5)$$

A usual panel data model assumes the existence of individual effects

$$u_{it} = \mu_i + v_{it}$$

Where: μ_i is the standard residual term; v_{it} is the individual effect

μ_i encapsulates all factors, specific to individual I and time-invariant, that are not included in the regressors x_{it}. When μ_i is considered as fixed, we have the fixed effects model. When μ_i is consider random, we have the random effects model.

3.3.1 Fixed Effects Model

Consider the model

$$y_{it} = \propto + \beta \ x_{it} + u_{it}, \quad i = 1,2, \dots, N, t = 1,2, \dots, T$$

where $u_{it} = \mu_i + v_{it}$

FOR EACH i, average this equation over time

$$\bar{y}_i = \propto + \beta \ \bar{x}_i + \bar{u}_i$$

Hence, by construction β can be estimated by OLS applied on the following demeaned model. This case β is called the *within estimator* or *fixed effect estimator* - $\hat{\beta}_{FE}$.

$$y_{it} - \bar{y}_i = \beta \ (x_{it} - \bar{x}_i) + v_{it} - \bar{v}_i$$

$\propto$ can be estimated by: $\hat{\alpha}_{FE} = \bar{y} - \hat{\beta}_{FE}\bar{x}$

Adding more explanatory variables to the equations, we have the original unobserved effects model:

$$y_{it} = \propto + \beta_1 x_{it1} + \beta_2 x_{it2} + \cdots + \beta_k x_{itk} + u_{it}, \ i = 1,2, \dots, N, t = 1,2, \dots, T \quad (6)$$

TO ESTIMATE β_j we simply use the time-demeaning on each explanatory variable and then do a pooled OLS regression using all time-demeaned variables.

3.3.2 Random Effects Model

Consider the model

$$y_{it} = \propto + \beta \ x_{it} + u_{it}, \quad i = 1,2, \dots, N, t = 1,2, \dots, T$$

where $u_{it} = \mu_i + v_{it}$

Assumptions of this model are that μ_i has zero mean and variance σ_μ^2 , which is independent of v_{it} and independent of explanatory variables x_{it}. Furthermore, μ_i and v_{it} are assumed to distribute independently and identically.

The estimation of β can be performed by estimating the following model by GLS (which is the OLS estimator applied to the quasi-demeaned model)

$$y_{it} - \psi\bar{y}_i = \alpha(1 - \psi) + \beta \ (x_{it} - \psi\bar{x}_i) + (v_{it} - \overline{\psi v}_i) \quad (7)$$

where

$$\psi = 1 - {\sigma_v}\Big/{\sqrt{T\sigma_\mu^2 + \sigma_v^2}}$$

According to Wooldridge (2006), as the fixed effects model allows arbitrary correlation between $\propto$ and x_{itj} while random effects does not, fixed effects is considered to be a more convincing tool for estimating ceteris paribus effects. However, in some certain situation, random effects are obviously more useful than fixed effects. The most obvious example is when the key explanatory variable is constant overtime, we cannot used fixed effects to estimate its effect on y_{it}. Hence, if using random effects, we can include as many time-constant control variables as possible among the explanatory variables. Hausman (1978) has developed a test (called Hausman test) which has the main idea that one can use the random effects estimator unless the Hausman test rejects.

3.4 Methods

H1: To test the relationship between uncertainty avoidance and the size of venture capital market, the following model is used:

$$\begin{aligned} Size\ of\ VC\ market_{it} = {} & \beta_0 + \beta_1\, IPOs_{it} + \beta_2\, GDP\ growth_{it} + \beta_3\, Market\ capitalization\ growth_{it} + \beta_4 \\ & Labor\ market\ rigidities_i + \beta_5\, Legality_i + \beta_6\, Uncertainty\ avoidance\ degree_i \end{aligned} \quad (8)$$

H2: To test the relationship between uncertainty avoidance and the size of venture capital deals, the following model is used:

$$\begin{aligned} Size\ of\ VC\ deals_{it} = {} & \pi_0 + \pi_1\, IPOs_{it} + \pi_2\, GDP\ growth_{it} + \pi_3\, Market\ capitalization\ growth_{it} + \pi_4 \\ & Legality_i + \pi_5\, Uncertainty\ avoidance\ degree_i \end{aligned} \quad (9)$$

As the key explanatory variable - Uncertainty avoidance degree – in addition with Labor market rigidities and Legality variables, are time-constant; the model used to estimate the effect of the explanatory variables on dependent variable is random effects model.

3.5 The Data

The above hypotheses are tested using data collected from VentureXpert database, which according to Li and Zahra (2008), provides the most consistent and comprehensive data of venture capital overtime and across countries. The data is collected across 11 Asian countries, and focuses on the period from 2003 – 2012. The countries included in the sample are: Australia, China, Hong Kong, India, Japan, South Korea, Malaysia, New Zealand, Singapore, Taiwan and Thailand.

For the variables related to investment values of the venture capital market, their valued are normalized by the respective GDP value for each country in a given year. This approach is adopted by many authors such as Jeng and Wells (2000), Marti and Balboa (2001), Van Pottelsberghe de la Potterie and Romain (2004). According to these authors, this adjustment is to prevent heteroscedasticity effect from the sample. For example, it is quite normal that a country with a higher economic level would have a higher value of venture capital investment value, hence, to control this problem the investment values need to be normalized by the GDP. Furthermore, if the variable values are expressed in nominal values, then overtime, due to inflation, the values can increase. By normalize the variable by GDP, the inflation effect on the variables would be removed.

The dependent variables in the above mentioned model are Size of VC market and Size of VC deals. The data are obtained from www.venturexpert.com.

The independent variables

+ IPOs is the volume of IPOs in % of GDP in each country at a specific time which is obtained from the database of Thomson One Banker.

+ GDP growth: is the growth rate of GDP in each country at a specific time which is obtained through the database of World Bank

+ Market capitalization growth: is the growth rate of market capitalization in each country at a specific time which is obtained through the database of World Bank.

+ Labor market rigidities is obtained through the study of Forteza and Rama (2006).

+ Legality is obtained through the study of Berkowitz et al. (2003).

+ Uncertainty avoidance degree is obtained through the website of Hofstede (2013).

4. Findings and Analysis

4.1 Descriptive Statistics

Table 3 displays summary statistics of the number and amount of venture capital investments for each country in the sample. The data in Table 3 shows that there exists substantial variation of venture capital investing level

between Asian countries. Based on the mean annual number of deals and annual amount of venture capital investment, the countries that have the most developed venture capital market in the samples are China, India, South Korea, Australia and Japan. Based on the mean annual amount of venture capital investment as a fraction of GDP, the countries that have the more developed venture capital market in the samples are China, India, Singapore and Hong Kong.

Table 4 presents the score for level of uncertainty avoidance measured for each country in the sample by Hofstede (1984). The data in table 4 shows that Japan and South Korea are two of the most uncertainty avoidance in the world. Taiwan and Thailand have high preference for uncertainty avoidance. Australia and New Zealand are considered to be fairly pragmatic cultures in terms of uncertainty avoidance. India, Malaysia, China and Hong Kong are country with low preference for uncertainty avoidance. Finally, Singapore with a score of 8, presents itself as a very low preference country for uncertainty avoidance. Hence, at the first glance, if based on the number of deals and annual amount of venture capital investment, the most developed venture capital markets are found in countries with very high (South Korea and Japan), medium (Australia) and low (China and India) score of uncertainty avoidance. If based on the amount of venture capital investment as a fraction of GDP, the most developed venture capital markets are found in countries with low (China, India and Hong Kong) and very low (Singapore) level of uncertainty avoidance; this shows support for the hypotheses developed earlier in this research.

Table 5 presents the descriptive and summary statistics for each variable measures. Table 5 shows that there are significant negative correlation between VC investments (including early stage VC investments, later stage VC investments and Non-high tech VC investments) and uncertainty avoidance degree. In addition, negative correlation also exists between the average VC deal size and the degree of uncertainty avoidance degree.

Table 3. Summary of country-level venture capital investments

Country	Years of data	Mean annual number	Mean annual amount ($mil)	Mean annual amount (% of GDP)
Australia	10	72.5	253.8	0.029
China	10	461.5	5451.4	0.107
Hong Kong	10	7.5	75.9	0.040
India	10	140.5	1398.6	0.091
Japan	10	36.5	132.1	0.002
Malaysia	10	3.5	8.9	0.005
New Zealand	8	9.5	21.8	0.019
Singapore	10	18	87.9	0.050
South Korea	10	189	178.3	0.023
Taiwan	10	11.5	23.7	0.006
Thailand	10	1.5	3.6	0.001

Table 4. Summary of country-level uncertainty avoidance degree

Country	Uncertainty avoidance degree	Country	Uncertainty avoidance degree
Australia	51	New Zealand	49
China	30	Singapore	8
Hong Kong	29	South Korea	85
India	40	Taiwan	69
Japan	92	Thailand	64
Malaysia	36		

Source: Hofstede (2013)

Table 5. Descriptive statistics

No.	Variables	Mean	SD	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	Amount of VC investments	0.075	0.196	0.00	1.620	1.00											
(2)	Early stage VC investments	0.011	0.049	0.00	0.49	0.49[a]	1.00										
(3)	Later stage VC investments	0.063	0.177	0.00	1.620	0.97[a]	0.27[a]	1.00									
(4)	High tech VC investments	0.032	0.153	0.00	1.598	0.79[a]	0.00	0.88[a]	1.00								
(5)	Non-high tech VC investments	0.042	0.119	0.00	0.970	0.62[a]	0.80[a]	0.50[a]	0.02	1.00							
(6)	Average deal size	0.0043	0.013	0.00	0.0996	0.58[a]	0.68[a]	0.45[a]	0.04	0.90[a]	1.00						
(7)	IPOs	1.89	2.68	0.00	19.72	0.08	0.05	0.07	-0.01	0.14	0.18[c]	1.00					
(8)	GDP growth	4.77	3.69	-5.53	14.78	0.20[b]	0.19[b]	0.17[c]	0.02	0.30[a]	0.14	0.26[a]	1.00				
(9)	Market capitalization growth	23.98	47.45	-64.5	210.76	0.05	-0.02	0.06	0.01	0.07	-0.05	-0.02	0.27[a]	1.00			
(10)	Legality	17.61	2.96	12.80	21.55	0.09	0.06	0.08	0.04	0.09	0.11	0.15	-0.18[c]	-0.10	1.00		
(11)	Labor market rigidity	0.22	0.11	0.07	0.43	-0.23[b]	-0.03	-0.24[b]	-0.15	-0.17[c]	-0.17[c]	-0.28[a]	-0.36[a]	-0.03	0.43[a]	1.00	
(12)	Uncertainty avoidance	50.29	24.55	8.00	92.00	-0.29[a]	-0.22[b]	-0.26[a]	-0.12	-0.33[a]	-0.30[a]	-0.46[a]	-0.43[a]	-0.07	-0.19[b]	0.17[c]	1.00

Note: In the table, the correlations matrix for the variables used in the research is presented. The correlation is significant to levels of: [a] significance at 1%; [b] significance at 5%, [c] significance at 10%.

4.2 Results

The results for the Amount of VC investments and Average deal size are presented in Table 6a, 6b and Table 9 respectively. The Wald Chi square suggest that all the models are significant.

The results from table 6a and 6b show that there exists significant negative correlation between IPOs and the amount of VC investments, especially the Later stage VC investments. This result means that the size of VC market in one Asian country with a less active stock market is actually bigger than a country with a more active stock market, which is against expectation from literature. This result does not support the empirical evidence from the study of Jeng and Wells (2000), Farag et al. (2004), Da Rin et al. (2006) and Banerjee (2008). This results are probably due to the sample in this paper is collected only for Asia countries while the samples in the above mentioned studies are collected for OECD or developed countries. Compare to the OECD or developed countries, the stock markets in Asian countries are less developed and the venture capital exit method of IPOs is not necessary the most popular or efficient among all exit strategies. Evidences can be seen at the study of Cumming et al. (2006), the authors of the study have collected data about venture capital exits in 12 Asian countries as in Table 7.

Table 6a. Empirical results with random effects models for the amount of VC investments, early stage and later stage VC investments

Potential determinants	Amount of VC investments		Early stage VC investments		Later stage VC investments	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
IPOs	-0.008 (0.008)	-0.014[c] (0.008)	-0.0015 (0.002)	-0.0015 (0.002)	-0.008 (0.007)	-0.0134[c] (0.007)
GDP growth	0.005 (0.006)	0.005 (0.006)	0.002 (0.001)	0.002 (0.0015)	0.0036 (0.0054)	0.003 (0.006)
Market cap growth	0.00002 (0.0004)	0.0001 (0.0004)	-0.00008 (0.0001)	-0.00008 (0.0001)	0.0001 (0.0004)	0.0002 (0.0004)
Legality		0.014 (0.009)		0.0001 (0.0021)		0.013 (0.01)
Labor market rigidity		-0.531[b] (0.252)		0.005 (0.059)		-0.537[b] (0.25)
Uncertainty avoidance	-0.0024[b] (0.001)	-0.002[c] (0.001)	-0.0004[c] (0.0002)	-0.0004 (0.0425)	-0.002[b] (0.068)	-0.0017 (0.001)
R-squared	0.097	0.16	0.07	0.07	0.08	0.15

Note: The data has been collected by the authors, generating 108 observations. In the table the dependent variable is Amount of VC investments, Early stage VC investments, Later stage VC investments and the independent variables vary from model to model. The set of independent variables is: IPOs, GDP growth, Market cap growth, Labor market rigidity and Uncertainty avoidance. In the table, the results of random effects panel data models are presented. The t-statistics values are significant at the following levels: [a] significance at 1%; [b] significance at 5%; and [c] significance at 10%.

Table 6b. Empirical results with random effects models for the high tech and Non-high tech VC investments

Potential determinants	High tech VC investments		Non- high tech VC investments	
	Model 1	Model 2	Model 1	Model 2
IPOs	-0.005 (0.006)	-0.009 (0.006)	-0.0012 (0.005)	-0.0033 (0.005)
GDP growth	-0.001 (0.005)	-0.0032 (0.005)	0.0065[c] (0.0034)	0.0064[c] (0.0036)
Market cap growth	0.00002 (0.0003)	0.00008 (0.0003)	0.00002 (0.0002)	0.0002 (0.0002)
Legality		0.0066 (0.0062)		0.0064 (0.0044)
Labor market rigidity		-0.356[b] (0.175)		-0.17 (0.125)
Uncertainty avoidance	-0.001 (0.0007)	-0.001 (0.0007)	-0.0012[b] (0.0006)	-0.0011[c] (0.0005)
R-squared	0.02	0.06	0.14	0.15

Note: The data has been collected by the authors, generating 108 observations. In the table the dependent variables are High tech VC investments and Non-high tech VC investment; and the independent variables vary from model to model. The set of independent variables is: IPOs, GDP growth, Market cap growth, Labor market rigidity and Uncertainty avoidance. In the table, the results of random effects panel data models are presented. The t-statistics values are significant at the following levels: [a] significance at 1%; [b] significance at 5%; and [c] significance at 10%.

Hence, according to Table 7, the dominant exit strategies of venture capital investments in Asia is private exits,

IPO only accounts for major part of exit strategies in Australia and Taiwan.

In term of macroeconomic variables, significant positive relationship was found between GDP growth and the amount of VC invested in non-high technology sector in both models tested; which do not support the results of Jeng and Wells (2000) but do support the results from the study of Gompers and Lerner (1998). This result means that, for a country with higher rate of economic growth, the amount of VC invested in non-high technology sector is higher compare to a country with lower rate of economic growth.

However, the results present no significant relationship found between Market capitalization growth and venture capital investment activities which support the results from study of Jeng and Wells (2000) but do not support the results of Schertler (2003).

Also, no significant relationship found between venture capital investment activities and legality which do not support the results from the study of Cumming et al. (2010).

From table 6a and 6b, the results also show that there exists a stronger significant negative correlation between the Labor market rigidity degree and the amount of VC investments, especially the Later stage VC investments. In other words, the size of VC market in one Asian country with a lower degree of labor market rigidity is bigger than a country with a lower degree of labor market rigidity, which is what expected from literature. This result supports the view that labor market rigidity is considered to be obstacle to venture capital growth. However, while the study of Jeng & Wells (2000), Schertler (2003) and Da Rin et al. (2006) found the significant effect of labor market rigidity on early stage venture capital and do not find the effect on the later stage of venture capital investment; whereas, this research has found the statistical significant relationship between labor market rigidity and later stage venture capital investment. The reason for this results can be seen when looking closely at this research's sample. As shown in table 8, most of venture capital deals (more than 70% of the deal) in the samples are later-stage venture capital investments; and as shown in table 5, the correlation between the amount of VC investment variable and the amount of later-stage VC investment variable are very high (the correlation coefficient is 0.97). Hence, due to the major distribution of VC deal to later-stage VC, it is more likely to find significant correlation between labor market rigidity degree and VC investments.

Focus on the main variable in this paper, table 6a and 6b report the existance of significant negative relationship between venture capital investments and the degree of uncertainty avoidance in each Asian country. That is, a country with a higher degree of uncertainty avoidance (lower degree of risk-taking) has a smaller venture capital market compare to a country with a lower degree of uncertainty avoidance (higher degree of risk-taking). When controlling just 3 variables which are IPOs, GDP growth and Market capitalization growth, significant relationships are found in both early-stage VC investment and later-stage VC investments. However, when controlling 2 additional variables which are legality and labor market rigidity, the significant relationship is found only for the whole sample. Furthermore, when the sample is divided into different sectors of High technology and Non-high technology, significant negative relationship is only found between uncertainty avoidance degree and non-high technology VC investments. That means, a country with a higher degree of uncertainty avoidance, tends to invest more into non-high technology sector compare to a country with a lower level of uncertainty avoidance. This result confirms Hypothesis 1 and supports the research of Antoczyk and Salzmann (2012).

The results on Table 9 similarly show significant negative relationship between labor market rigidity and uncertainty avoidance degree with the dependent variable, as the results on table 6a and 6b.

The results found significant negative relationship between labor market rigidity and the average venture capital deal size. That is, a country where labor market is more rigid, the average deal size in the VC market is generally smaller compare to a country where labor market is less rigid.

However, the stronger significant relationship found in this model is the relationship between the uncertainty avoidance degree and the average VC deal size. That is, a country with a higher level of risk-taking characteristic, the average VC deal size is generally larger than a country with a lower level of risk-taking. This result helps to confirm Hypothesis 2.

Table 7. Exits strategies of VC investments in Asia

Countries	No. of IPOs in the data set	No. of private exits in the data set	No. of acquisition in the data set
New Zealand	4	10	7
Australia	27	43	18
Singapore	1	7	0
Hong Kong	2	11	1
Malaysia	0	1	0
India	2	1	0
Thailand	0	9	1
China	2	12	0
Taiwan	31	39	1
South Korea	0	3	0
Indonesia	0	14	0
Philippines	0	1	0

Source: Cumming et al. (2006, p. 225)

Table 8. Early-stage and later-stage VC investments

Countries	Years of data	Mean annual amount ($mil)	
		Early-stage VC	Later-stage VC
Australia	10	40.10	208.00
China	10	701.90	4798.30
Hong Kong	10	15.20	63.70
India	10	157.10	1259.50
Japan	10	33.70	72.30
Malaysia	10	0.00	8.00
New Zealand	8	1.60	10.00
Singapore	10	6.90	83.80
South Korea	10	43.20	141.00
Taiwan	10	7.60	19.60
Thailand	10	0.00	3.50

Table 9. Empirical results with random effects model for the average deal size

Potential determinants	Average deal size	
	Model 1	Model 2
IPOs	-0.0002 (0.0005)	-0.00008 (0.0005)
GDP growth	0.0001 (0.0004)	0.00003 (0.0004)
Market capitalization growth	-0.00002 (0.00003)	-0.00002 (0.00002)
Legality		0.0006 (0.0005)
Labor market rigidity		-0.0235[c] (0.00006)
Uncertainty avoidance	-0.00015[b] (0.0046)	-0.00013[b] (0.00006)
R-squared	0.097	0.13

Note: The data has been collected by the authors, generating 108 observations. In the table the dependent

variable is Average deal size and the independent variables vary from model to model. The set of independent variables is: IPOs, GDP growth, Market cap growth, Labor market rigidity and Uncertainty avoidance. In the table, the results of random effects panel data models are presented. The t-statistics values are significant at the following levels: [a] significance at 1%; [b] significance at 5%; and [c] significance at 10%.

5. Conclusion and Further Research

5.1 Conclusion

This research examines if uncertainty avoidance is one of the determinants of venture capital investments in Asia countries. In order to analyze the relationship, this research uses random effects models on a data set with 11 Asian countries for the period from 2003 to 2012. On the models used in this paper, other potential determinants of venture capital investments which were already tested in previous literature, are included as control variables; the main explanatory variable is uncertainty avoidance degree of each country.

The empirical results of this research has confirmed the theory developed in previous literature. Specifically, significant negative correlations have been found between the uncertainty avoidance degree and the size of venture capital market (particularly the size of venture capital investments in the non-high technology sector); and between uncertainty avoidance degree and the average venture capital deal size. The results confirmed the hypotheses that a country with a higher uncertainty avoidance degree, has a less developed venture capital market (a smaller-sized market with smaller venture capital deals).

The connection found between venture capital investments and uncertainty avoidance (a dimension of national culture) shows important implication not only for policy makers but also for venture capitalist. From the perspective of policy makers, in order to promote the venture capital investing activity within a nation, it is important to account for cultural values and norm when making policies incentives. From the perspective of venture capitalists, it must be understood that cultural values can account for the efficient operation of the venture. As venture capital concept and practices have been initially developed in the US (Li & Zaha, 2012) and rapidly spreading all over the world; venture capitalists may use the exact best practices adopted from US or use the same information factors to make their investment decisions (Zacharakis, McMullen & Shepherd, 2007); however, if cultural factors (including uncertainty avoidance degree) are forgotten, it may result in failure.

In addition with the results for the main variable – uncertainty avoidance degree – other results for control variables that have also confirmed the theory developed in previous literature. This research has found significant positive correlation between GDP growth and venture capital investments in non-high tech sector; which confirms that GDP growth does affect the level of venture capital investments. Furthermore, a significant negative correlation has been found between labor market rigidity degree and venture capital investments; which confirm that countries with higher level of labor rigidity do have a smaller venture capital market with smaller deals. However, interestingly, a significant negative relationship has been found between IPOs and venture capital investments instead of a positive relationship as expected in literature; the result suggests that countries with a less developed stock market, have a more developed venture capital market.

5.2 Limitations and Further Research

The results from this research have raised several issues that needs further research. Specifically, the research is limited by the data available. For two constant explanatory variables that are labor market rigidity and legality, one might raise the question that if the measurements for each variable are actually time-variant as the labor policies and legal conditions of countries do evolve over time. Using time-constant data for these two variables might make the model results less accurate.

For the main explanatory variable – uncertainty avoidance degree, although the measurements are also time-constant, but it is reasonably explained by Hofstede that cultures if evolve, will evolve in the same directions, and his measurements are still valid to the difference between national cultures (Minkov & Hofstede, 2011). However, recent research of House et al. (2004) has raised a new issue about the method to quantify cultures; each culture dimension (including uncertainty avoidance) can be conceptualized and measured as “as is” – practices or as “should be” – value. Hence, further research needed to concentrate on this issue, empirical research can be done to examines the relationship between culture practices and culture value with venture capital investment activities.

In addition, this study only focus on the country-level of uncertainty avoidance factor to explain venture capital investing activities in different countries. However, the culture of uncertainty avoidance can vary between different regions of a country or even vary between different organization. The cultural difference between

regions and organizations can affect the supply and demand of VC funds (Li & Zahra, 2012). Hence, the results from this research only explain the different levels of VC investments between countries but cannot explain at regional or organizational levels. Hence, future research can focus on examining if the difference between regions or organizations can affect the VC investments variation between a country.

Furthermore, some findings in this research can suggest further research. Particularly, the negative significant relationship found between IPOs and venture capital investments, and the fact that IPOs still accounts for small fraction of VC exits in Asia VC capital market; implies that other factors that control other VC exit strategies might be the determinant of VC investments. According to Cumming et al. (2006), private exits play an important role in VC exits in Asia; hence, future research can examine the control factors of private exits which might have significant effect on VC investments in Asian countries.

Finally, as this research only focus on testing the relationship between uncertainty avoidance degree and VC investment activities in Asian countries, further research can be done for other country clusters.

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