科技部補助專題研究計畫成果報告
期末報告

雙向人脈資源累積與創業投資績效衡量: 以中國大陸，台灣及南韓等新興工業國家之教育網絡對高科技創業為例

計 畫 類 別 ：個別型計畫
計 畫 編 號 ：NSC 102-2410-H-004-020-
執 行 期 間 ：102 年 08 月 01 日至 103 年 07 月 31 日
執 行 單 位 ：國立政治大學經濟學系

計 畫 主 持 人 ：李文傑

計畫參與人員：此計畫無其他參與人員

報 告 附 件 ：移地研究心得報告
出席國際會議研究心得報告及發表論文

處 理 方 式 ：
1.公開資訊：本計畫可公開查詢
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中 華 民 國 103 年 10 月 29 日

中 文 摘 要 ： 目前既有的文獻在探討經濟體間的新創事業發展績效的差距時，完全忽略了創業投資投入對於創業績效所造成的影響。晚近的研究雖已考慮各經濟體間，創業投資產業投入所造成的創業家生產力改善效果，然而由於創業投資案的形成模式眾說紛紜，以及個別創業投資案細部資料、創業案兩造雙方的個別資料難以取得，此二原因造成探討不同程度的教育網絡連結關係對創業投資案的績效之研究仍付諸闕如。針對這個缺失，本研究計畫從新假設驗證的設定及建構創投案雙方的團隊個人資料庫著手改善，如:(1)定義狹義（創業投資連結)及廣義的創業投資案（第二輪持續注資）形成，以及狹義創業績效（被投資公司初次公開發行)和廣義的創業績效衡量(加入被投資公司的併購事件)的假設檢驗(2)本計畫對台灣的高科技創業投資案，建構創業投資案以及創投案雙方的教育網絡資料庫。如此，可以檢驗創業家以及創投經理人之教育網絡連接關係，其不同程度的雙向連結，是如何影響創業投資案之標的公司成功公開上市（IPOs），本文結果顯示－教育網絡衡量越緊密之創業投資案，其成功 IPO 之機率越高，因此本計畫研究成果也直接證實了教育網絡連結對創業投資案之資訊不對稱問題以及代理成本的解決有其不可或缺的地位。

中文關鍵詞： 創業投資、創業家團隊、創業投資經理人團隊、初次公開發行、創新能力、 教育網絡

英 文 摘 要 ： This project sets out to analyze the relationship between start-up entrepreneurial performance in the IT industry and venture capital investment. Most Taiwanese start-up entrepreneurs are experienced engineers repatriating from Silicon Valley during the 80s-90s. They receive sizable investments from either the domestic or Silicon Valley venture capitalists. Using a hand-collected sample of Taiwanese venture capital deals, the importance of social network ties and accumulated human capital is approved. Measures of educational link obtained by having the same degree at the same time better predict venture capital fund performance than do measures of educational link obtained through having undergraduate or graduate studies at the same school and obtaining the same degree. We also find the distinct demand over the team composition of the venture capital teams as well as start-up firm

management teams. Perhaps counter-intuitively, we find that fund management teams that have more general human capital in business administration, as measured by more managers having MBAs in either sides of venture capital teams or start-up firm management teams, manage funds with worse performance of portfolio company exits. Overall, measures of educational link having the same degree and IT industry-specific human capital are stronger predictors of fund performance than are measures of general human capital. This provides new insights on how the social network interactions as well as the accumulated human capital through education between start-up entrepreneurs and venture capitalists fuel the development miracles of the IT manufacturing industries in Taiwan.

英文關鍵詞： Venture Capital, Entrepreneurial Teams, Educational Network, Venture Capital Investment, High-technology Ventures.

行政院國家科學委員會補助專題研究計畫 □**期中進度報告**
■**期末報告**

雙向人脈資源累積與創業投資績效衡量:
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共同主持人：
計畫參與人員：王平

本計畫除繳交成果報告外，另含下列出國報告，共 2 份：
■移地研究心得報告
■出席國際學術會議心得報告
□國際合作研究計畫國外研究報告

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中　華　民　國 103 年 10 月 30 日

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Bilateral Network Link and Venture Capital Performance :

the Importance of Educational Network on High-Tech Ventures

in China, Taiwan and Korea.

李文傑
Wen-Chieh, Lee

摘要

目前既有的文獻在探討經濟體間的新創事業發展績效的差距時，完全忽略了創業投資投入對於創業績效所造成的影響。晚近的研究雖已考慮各經濟體間，創業投資產業投入所造成的創業家生產力改善效果,然而由於創業投資案的形成模式眾說紛紜,以及個別創業投資案細部資料、創業案兩造雙方的個別資料難以取得，此二原因造成探討不同程度的教育網絡連結關係對創業投資案的績效之研究仍付諸闕如。針對這個缺失，本研究計畫從新假設驗證的設定及建構創投案雙方的團隊個人資料庫著手改善,如:(1)定義狹義 (創業投資連結)及廣義的創業投資案 (第二輪持續注資) 形成，以及狹義創業績效 (被投資公司初次公開發行)和廣義的創業績效衡量 (加入被投資公司的併購事件)的假設檢驗(2)本計畫對台灣的高科技創業投資案,建構創業投資案以及創投案雙方的教育網絡資料庫。如此，可以檢驗創業家以及創投經理人之教育網絡連接關係，其不同程度的雙向連結，是如何影響創業投資案之標的公司成功公開上市 (IPOs) ，本文結果顯示－教育網絡衡量越緊密之創業投資案，其成功 IPO 之機率越高，因此本計畫研究成果也直接證實了教育網絡連結對創業投資案之資訊不對稱問題以及代理成本的解決有其不可或缺的地位。

關鍵詞: 創業投資、創業家團隊、創業投資經理人團隊、初次公開發行、創新能力、教育網絡

Abstract

This paper sets out to analyze the relationship between start-up entrepreneurial performance in the IT industry and venture capital investment. Most Taiwanese start-up entrepreneurs are experienced engineers repatriating from Silicon Valley during the 80s-90s. They receive sizable investments from either the domestic or Silicon Valley venture capitalists. Using a hand-collected sample of Taiwanese venture capital deals, the importance of social network ties and accumulated human capital is approved. Measures of educational link obtained by having the same degree at the same time better predict venture capital fund performance than do measures of educational link obtained through having undergraduate or graduate studies at the same school and obtaining the same degree. We also find the distinct demand over the team composition of the venture capital teams as well as start-up firm management teams. Perhaps counter-intuitively, we find that fund management teams that have more general human capital in business administration, as measured by more managers having MBAs in either sides of venture capital teams or start-up firm management teams, manage funds with worse performance of portfolio company exits. Overall, measures of educational link having the same degree and IT industry-specific human capital are stronger predictors of fund performance than are measures of general human capital. This provides new insights on how the social network interactions as well as the accumulated human capital through education between start-up entrepreneurs and venture capitalists fuel the development miracles of the IT manufacturing industries in Taiwan.

Keywords: Venture Capital, Entrepreneurial Teams, Educational Network, Venture Capital Investment, High-technology Ventures.

1. Introduction

One of the biggest problems faced by entrepreneurs especially those fall in high technology category is to get their start-up funding. In a complete financial market, a talented entrepreneur with a promising project and good reputation usually draws in a long queue of fund providers across all funding sources. However, studies on incomplete contracts by Grossman and Hart(1986) and Hart and Moore(1988) have proved the inability to specify the full contingencies regarding the unpredictable entrepreneurial process. The new entrepreneurs without sufficient backups (i.e. collaterals) would face gigantic borrowing constraints to fulfill the new investment plan. Questions regrading how to facilitate the information dissemination revealing the true qualities of entrepreneurs turn out to be the core in the new venture event. Cohen, Frazzini and Malloy(2008) has pointed out the importance of the educational network in the successful mutual fund performance. This paper; thus, bridges the gap between the researches on the successful entrepreneurial event and the social network in the venture capital market. We discuss the functioning of the educational network and accumulated human capital between venture capitalists teams and the start-up firm management teams. Among various factors leading to the entrepreneurial milestone (i.e. IPO), the educational networks building on top of the correct team composition would distinct out as an indispensable key to success.

Taiwan in the 80s falls in the developing category and decides to develop the IT industry roughly at the same time. The IT industry had long been thought of as a high-growth potential businesses for the upgrade of local industry structure. However, IT industry is so riskier that typically relied on financing from sources other than traditional lenders such as banks during their early growth phases. Saxenian (1994)

argues that venture capitalists can do well by providing capital to early stage ventures in fostering domestic economic growth. Altar (2009) talks about the determinant factors that determine venture capital firms' size distribution and how venture capital helps to enhance the production efficiency of invested industries. Moreover, in another empirical work of Altar (2009), the constructed structural estimation model empirically supports the idea that clustering of venture capital helps to improve venture capitalists' skills and productivities through network positive spillovers. Bernhardt and Krasa (2008) agree with venture capital's contribution to industry development by the fact that venture capitalists are the experts at identifying profitable projects and raising the profitability of the identified projects.

With the above mentioned works stressing the contribution of venture capital on the IT start-up entrepreneurship, the real question regarding the venture capital investments; however, falls on the identification of promising start-up ventures that can be publicly listed in the future. The identification of good venture investment projects should take heavy information flows bilaterally between venture capitalists and start-up entrepreneurs. How the information disseminates through agents in venture capital market and into final successful IPO events, though, is not as well understood. We study a particular type of this dissemination in the form of social networks. Social networks are network structures composed of nodes (usually people or institutions) that are connected through various social relationships ranging from casual to close bonds. In the context of information flow, social networks allow a piece of information to flow, often in predictable paths, along the network. Thus, one can test the importance of the social network in disseminating information by testing its predictions on the flow of information. One convenient aspect of social networks is that they have often been formed ex-ante, sometimes years in the past, and their

formation is frequently independent of the information to be transferred. In this paper we explore a specific type of social network that possesses exactly this feature: connections based on shared educational backgrounds. The nodes of our social networks are venture capital fund managers and senior officers of IT start-up companies in Taiwan between 1980-2010. We believe these two agents provide a useful setting because one side likely possesses private information, while the other side has a large incentive to access this private information.

This research focuses on educational networks as a basis of social networks. We use academic institutions attended for both undergraduate and graduate degrees as our network measure, and test the hypothesis that venture capital investment projects perform significantly better on these connected projects than on non-connected projects, and tend to have more exits (IPOs) on these investments. The use of educational institutions is motivated in the following sense. The connection of educational network could serve as a direct transfer from start-up firm officers to venture capital fund managers as well as the cost reduction of gathering information for venture capital fund managers. Thus the formed educational networks could make it cheaper to access information on start-up venture projects, and so assess managerial quality and new venture quality.

We test the hypothesis that the connected venture investment projects will perform better in terms of exits of the venture backed start-up firms. By the creation of a unique dataset, we overcome the limitation that no database contains comprehensive information on founders and VC partners education history. Our dataset allows us to quantify how close the educational backgrounds are to both venture funds and start-up entrepreneurial firms. Here, a connection to an academic university is defined as: (1)

for start-up firms, any of the major officers (CEO, CFO and Chairman) having attended the university and received a degree, and (2) for venture capital funds, any of the managers having attended the university for a degree. Therefore, we can have a numeric measure to define four types of connections between the venture capital managers and the startup firm, based on whether the venture capital managers and a senior official (CEO, CFO or Chairman) of the start-up firm: attend the same school (type 1 connection), attended the same school and received the same degree (type 2 connection), attended the same school at the same time (type 3 connection) and attended the same school and received the same degree at the same time (type 4 connection). Our results support the major hypothesis, that the connected venture investment projects will perform better in terms of exits of the venture backed start-up firms. In addition to the major result, we also observe that the accumulated team human capital functions differently in venture capitalists and the start-up management teams. The start-up management composed of more MBAs are believed to facilitate the better communication with venture capitalists. However, the general human capital embedded in MBAs are not sufficient indicators for venture capitalists to identify promising new ventures. It is legible to deduce that the proper team composition of education backgrounds in both VC and start-up firms generates remarkable synergy in the start-up venture capital investment.

The rest of the paper is structured as follows. Section 2 introduces the data and describes the characteristics of educational networks between venture capitalists and start-up entrepreneurs. Section 3 discusses the hypotheses to be tested and show the descriptive statistics of all the used variables. Section 5 presents the empirical analysis and the main findings. Section 6 concludes.

2. Data

The main empirical challenge with studying the educational network of VC entrepreneurial investment is that no database contains comprehensive information on founders and VC partners education history. To overcome this limitation we create our own data by first merging information from several sources and then hand collecting the variables relevant for our analysis. The dataset are constructed from several sources. The first data source we use is VentureXpert, which is one of the largest and most complete databases on VC investments. VentureXpert includes all the self-reported registered venture capital funds filing with the Taiwan Venture Capital Association (tvca). We focus on the analysis on actively managed Taiwanese venture capital funds by including funds with investment records listed in the VentureXpert. Additionally, we manually screen all funds and exclude those funds without any investment records in Taiwan. VentureXpert provides details on portfolio companies of VC investments by VC funds as well as firm level.

We focus on the historical investment link between VCs and start-up entrepreneurs in the Taiwan venture capital market. We obtain the names of individual board members of venture capital funds as well as venture-backed startups from Commerce Industrial Services Portal data link provided by the Ministry of Economic Affairs in Taiwan. The biographical information of venture capital managers as well as start-up company officers is collected from web pages, news reports, press releases and proprietary surveys from telephone interviews or in-depth personal interviews conducted by us. Our final dataset includes 79 active VC management firms and 162 VC funds. The constructed dataset comprises more than 1100 investment deals which includes more than 400 venture-backed start-up companies in Taiwanese venture capital markets.

Our dataset also includes the biographical information of more than 40000 personal Curriculum Vitae details in venture capitalists as well as company officers. The data contain all the undergraduate and graduate degrees received, the year in which the degrees were granted, and the institutions authorizing the degree. The social networks investigated in this paper are defined on educational backgrounds . Thus the social network link is made by the universities that the venture capital managers and the company officials have attended. Thus, we can match the universities and degrees in our dataset between January 1984 and December 2012. Our dataset allow us to quantify how close the educational backgrounds are to both venture funds and start-up entrepreneurial firms. Here, a connection to an academic university is defined as: (1) for start-up firms, any of the major officers (CEO, CFO and Chairman) having attended the university and received a degree, and (2) for venture capital funds, any of the managers having attended the university for a degree. Therefore, a given start-up firm or venture capital fund can be connected to more than one academic institutions.

3. Hypothesis

3-1、 Major Hypothesis

In this paper we assess the impact of educational link on the performance of venture capital investments. Venture capital managers may utilize the comparative advantage in collecting information through their network. Thus, our focus is the connected venture investment project tends to perform better in terms of exit (IPO events of the venture backed start-up firms). Here we can set up the following hypothesis for the further test.

Hypothesis : The connected venture investment projects will perform better in terms of exits of the venture backed start-up firms.

3-2、 The Descriptive Statistics

In order to examine the above hypothesis, we first need a metric to define “connected” venture investment deals. We define four types of connections between the venture capital managers and the start-up firm, based on whether the venture capital managers and a senior official (CEO, CFO or Chairman) of the start-up firm: attend the same school (type 1 connection), attended the same school and received the same degree (type 2 connection), attended the same school at the same time (type 3 connection) and attended the same school and received the same degree at the same time (type 4 connection). Here we do not take a strong stand on the relative strength of each type of connection due to the complexity of the interpersonal network link in the IT industry in Taiwan. For example, the National Chiao Tung university (NCTU) have a very well-functioning alumni reunion system at the school level. Thus, the NCTU alumni always share with each other the best IT industrial knowledge. However, we do view type 4 connection as the strongest type of link, and the one that previous classmates provides the most frequent social interactions at school as well as after the graduation.

The following Table 1 summarizes the educational network connection measures based on the hand-collected biographical data for the venture capital investment deals in Taiwanese venture capital market targeting at the IT start-up firms. Table 1 also summarizes the IPO events of the venture investment deals as well as the other controlled independent variables that we will use in the regression analysis.

The first column of Table 1 reports frequency of statistics across all the venture

investment deals. The second column of Table 1 reports the mean of each of the dummy variables except for firm age (fage), fMBA, fScience, vcMBA, vcScience, AR and IPO mkt. Dummy variables equal one if an individual venture investment deal possesses a particular characteristic. Details regarding the variable explanations can be found in the Appendix.

Focusing on the first and second column of Table 1, we see most of the venture capitalists and start-up teams comes from either one of the listed Taiwanese universities: NTU, NCTU, NTHU, and NCKU indexed as the f twtop for startup firms and vc twtop for venture capitalists. These four universities are the four best engineering academic institutions in Taiwan. However, venture capitalists are more US-linked with one of the managers graduating from the Ivy League schools and the University of California. The variables: ScienceDegree and MBADegree are computed as the ratio of managers holding Science or MBA degrees in the individual venture capital team or start-up firm.

[Insert Table 1 Here]

4. Regression and results

We now turn to the empirical tests of the hypotheses posited in Section 3. We regress the performance of venture investment in which a start-up firm exits and has IPO event in the Taiwan Stock Exchange (TSE) market, on the connection measures and other educational history controls detailed in the descriptive statistics as in Eq. (1).

$$IPO_i = constant + \underbrace{\sum_{j=1}^{J} b_j fd_{j,i}}_{founder} + \underbrace{\sum_{k=1}^{K} b_k VC_{k,i}}_{venture\ \ capitalist} + \underbrace{Type_{l,i}}_{connectiveness}, \quad (1)$$

$$\forall i \in \{1, 2, 3, 4\}$$

The subscript i indexes each venture investment deal in the sample. The main variables of interest in testing Hypotheses a are the Connection Measures variables that are summarized in Table 1 and defined in the code book presented in the Appendix. The other variables are venture capital fund-level and start-up firm-level controls - the educational history and the degree background variables on each venture investment i.

Table 2 reports regression results for Eq. (1) estimated using the sample of all the venture capital investments targeting at the IT start-up firms in Taiwan. Regression coefficients and standard errors are reported in each entry of the result of individual regression. The specification in column 1 to column 4 regresses the VC fund's portfolio companies that are exited on the educational history variables that are directly related to the main Hypothesis. Each of the regression specifications in Table 2 records the distinct measures of educational link between venture capitalists and start-up firm teams that variates in the bilateral connection in the school, degree and the time overlap. In particular, the second specification in Table 2 with regressor which measures whether the venture capital managers and a senior official (CEO, CFO or Chairman) of the start-up firm: attended the same school and received the same degree (type 2 connection). The last specification in Table 2 uses independent variable which measures whether the venture capital managers and a senior official (CEO, CFO or Chairman) of the start-up firm: attended the same school and received the same degree at the same time (type 4 connection).

[Insert Table 2 Here]

Table 2 presents an interesting fact that more human capital accumulated by having science and engineering education may have indeterminate effects on fund performance. The amount of general human capital as measured by having a degree from an ivy league university and the University of California does not significantly predict the portfolio company IPOs on the VC side. Having more IT specific human capital in science and engineering, as measured by having a degree in the area, negatively predicts the portfolio company IPOs in the start-up firm side in all the specifications. The strongest and most robust coefficient on the educational history variables is the coefficient on the fraction of fund managers with a MBA degree. However, contrary to our understanding which posits that more general human capital accumulated from having an MBA degree should be positively correlated with the portfolio company exits, the coefficient on the fraction of managers with an MBA is positive in the firm side while negative in the VC side. An increase in the fraction of fund managers with an MBA from zero to one worsens portfolio companies that exit with IPO and acquisition. Thus, the evidence on the impact of more general human capital on venture capital fund performance is mixed. In the competitive IT industry, the techniques equipped in the start-up firms do not guarantee the successful IPOs. The IPO event involves deep understanding of the capital market and the mere understanding of the techniques cannot be a effective predictor to successful business milestones in the start-up firm side. Alternatively, the educational knowledge brought about by having functional degrees matters less in the good performance of the investment projects. The high information asymmetry embedded in the new venture investments would requires either the risk diversification via syndications (positive syn) or step-wise evaluation based on the previous entrepreneurial performance

(positive AR). We can reaffirm the contributions of educational network on successful IPOs via the above-mentioned summarized effects of the accumulated human capital in start-up firms and Venture capitalists. The frictionless information flow between start-up management teams and venture capitalists would be best predictor to foresee the future successful IPOs in the stock trading markets.

Examining the second to the fifth column in Table 2, we see that the coefficients on the connection measures of educational backgrounds are similar across the four different specifications. The venture investment deals used in the regression here show that type 1 to type 4 connections explain most of the successful IPOs among the new venture samples used here. However, having tight type 4 link would signal less demand on risk diversification by having smaller coefficients attached to Syn and AR. Besides, close educational network link would complements top university educational history as we have decreasing coefficients attached to variable of f twtop. The impact of having close educational link is robust across different specifications in table 2.

The predicted sign of coefficients in Table 2 strongly support hypothesis , that the connected venture investment projects will perform better in terms of exits of the venture backed start-up firms. The closest educational link of type four connection effectively reduce the cost of information asymmetry as reflected from the smaller coefficients of Syn and AR. As shown in Table 2, the venture investment projects of type 4 connection held by venture capital managers and start-up firms outperforms the venture investment projects in terms of the less demand over risk diversifications. We can also observe in Table 2 that science degree or MBA degrees may not be positively related to the IPOs of venture capital investment. To illustrate an increase in the

fraction of fund managers with an MBA from zero to one worsens portfolio companies that exit with IPO and acquisition. Thus, the evidence on the impact of more general human capital on venture capital fund performance is still mixed as the traditional regression specification without educational link measure across all specifications , with only support that start-up management teams with more MBAs manage better IPO outcomes. Overall, the analysis of Table suggests that measures of past accumulated human capital are not strong predictors of venture capital fund performance than are measures of educational links.

5. Conclusion

Collecting and supplementing data on venture capital funds and their portfolio companies with data on the educational histories of the venture capitalists and start-up entrepreneurs, this paper investigated the hypotheses about the impact of educational network in both VCs and their portfolio companies. Measures of close educational link performs better than do measures of educational history obtained through attending top engineering schools. IT industry-specific human capital related to the science knowledge by more managers having science and engineering degrees are not strong predictors of superior fund performance in the IT entrepreneurial investment. IT Industry-specific human capital does not plays a necessary role in explaining venture capital fund performance here. Furthermore we find that close educational network links would serve as the facilitator over information flow that contributes successful IPOs in the sense of VC’s less demand over risk diversification.

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Table 1: Summary Statistics

	count	mean	sd	min	Max
IPO	6520	0.5086	0.5000	0.0000	1.000
Social network connectedness					
SN_T1	6520	0.4410	0.4965	0.0000	1.0000
SN_T2	6520	0.3890	0.4876	0.0000	1.0000
SN_T3	6520	0.2802	0.4491	0.0000	1.0000
SN_T4	6520	0.2026	0.4020	0.0000	1.0000
Firm feature					
f_twtop	6520	0.4910	0.5000	0.0000	1.0000
fNCCUBaep_1	6520	0.0684	0.2525	0.0000	1.0000
f_ustop	6520	0.1959	0.3969	0.0000	1.0000
fMBA	6520	0.1881	0.2303	0.0000	1.0000
fScience	6520	0.2887	0.3141	0.0000	1.0000
fAge	6520	12.8061	9.7754	0.0000	58.000
Vc feature					
vc_twtop	6520	0.5589	0.4966	0.0000	1.0000
vc_NCCUBaep_1	6520	0.0923	0.2895	0.0000	1.0000
vc_ustop	6520	0.4899	0.4999	0.0000	1.0000
vcMBA	6520	0.2560	0.2403	0.0000	1.0000
vcscience	6520	0.2011	0.2002	0.0000	0.8571
Marco environment					
IPO_mkt	6520	83.7462	107.0817	0.0000	489.0000
Other Control					
Syn	6520	0.2645	0.1547	0.0000	1.0000
AR	6520	1.4607	1.7435	0.0000	7.0000

Table 2: Regression Results

	(1) IPO	(2) IPO	(3) IPO	(4) IPO	(5) IPO
Social network connectedness					
SN_T1		2.047***			
		(0.286)			
SN_T2			0.502**		
			(0.227)		
SN_T3				1.219***	
				(0.228)	
SN_T4					1.029***
					(0.214)
Firm feature					
f_twtop	3.094***	2.434***	2.935***	2.809***	2.791***
	(0.300)	(0.319)	(0.309)	(0.304)	(0.303)
fNCCUBeap_1	-0.693*	-0.783*	-0.700*	-0.873**	-0.810*
	(0.414)	(0.407)	(0.414)	(0.421)	(0.420)
f_ustop	0.968***	0.951***	0.978***	0.967***	1.000***
	(0.203)	(0.207)	(0.204)	(0.205)	(0.205)
fMBA	2.710***	1.805***	2.553***	2.593***	2.753***
	(0.355)	(0.379)	(0.362)	(0.360)	(0.358)
fScience	-2.247***	-3.099***	-2.410***	-2.507***	-2.346***
	(0.409)	(0.436)	(0.419)	(0.416)	(0.411)
fAge	0.196***	0.209***	0.198***	0.209***	0.207***
	(0.0143)	(0.0147)	(0.0143)	(0.0148)	(0.0147)
VC feature					
vc_twtop	1.401*	0.608	1.248	1.335*	1.490*
	(0.800)	(0.771)	(0.796)	(0.788)	(0.793)
vcNCCUBeap_1	0.366	0.204	0.335	0.380	0.314
	(0.412)	(0.416)	(0.413)	(0.423)	(0.423)
vc_ustop	0.524	0.497	0.499	0.434	0.484
	(0.367)	(0.381)	(0.367)	(0.369)	(0.370)
vcMBA	-3.832***	-3.474***	-3.665***	-3.714***	-3.699***
	(1.083)	(1.038)	(1.073)	(1.064)	(1.071)
vcScience	0.225	-0.124	0.0892	-0.241	-0.484
	(1.005)	(1.000)	(1.005)	(1.004)	(1.016)
Macro environment					
IPO_mkt	0.00551***	0.00554***	0.00552***	0.00544***	0.00534***
	(0.000597)	(0.000605)	(0.000598)	(0.000604)	(0.000606)
Other Control					
Syn	0.645**	0.652**	0.646**	0.641**	0.603**
	(0.269)	(0.272)	(0.268)	(0.273)	(0.264)
AR	0.705***	0.721***	0.697***	0.672***	0.656***
	(0.0877)	(0.0915)	(0.0880)	(0.0896)	(0.0889)

Standard errors in parentheses
* p<.1, ** p<0.05, *** p<0.01

Appendix

Variable name	Variable explanation
Dependent variable:	
IPO	The invested company achieved IPO . True: 1 ; False: 0
Independent variable:	
-Social network connectedness	
SN_T1	At least one of the top five managers in the invested company and the venture capital firm graduated from the same school. True: 1 ; False: 0
SN_T2	At least one of the top five managers in the invested company and the venture capital firm graduated from the same school and received same degree. True: 1 ; False: 0
SN_T3	At least one of the top five managers in the invested company and the venture capital firm graduated from the same school at the same time. True: 1 ; False: 0
SN_T4	At least one of the top five managers in the invested company and the venture capital firm graduated from the same school and received same degree at the same time. True: 1 ; False: 0
-Firm feature	
M&A	The invested company was merged. True: 1 ; False: 0
LBO	The invested company was acquired by leverage. True: 1 ; False: 0
Close	The invested company was out of business. True: 1 ; False: 0
f_twtop	At least one of the top five managers in the invested company graduated from the National Taiwan University, National Tsing Hua University, National Chiao Tung University, and National Cheng Kung University. True: 1 ; False: 0
fNCCUBaep_1	At least one of the top five managers in the invested company graduated from Baep of the National Chengchi University. True: 1 ; False: 0
flvy_1	At least one of the top five managers in the invested company graduated from the Ivy League schools. True: 1 ; False: 0 The Ivy League schools include Brown University, Columbia University, Cornell University, Dartmouth College, Harvard University, University of Pennsylvania, Princeton University and Yale University.
fUC_1	At least one of the top five managers in the invested company graduated from the University of California. True: 1 ; False: 0
f_ustop	At least one of the top five managers in the invested company graduated from the Ivy League schools and the University of California. True: 1 ; False: 0
fMBA	The ratio of the top five managers having a MBA degree in the invested company
fScience	The ratio of the top five managers having an engineering degree in the invested company.

Appendix (cont.)

Variable name	Variable explanation
Independent variable:	
-Firm feature	
fTaipei	The registered place of the invested company is in Taipei. True: 1 ; False: 0
fHsinchu	The registered place of the invested company is in Hsinchu. True: 1 ; False: 0
fAge	Company Age(yr), the age of the company
f_1	Manufacturing industry, True: 1 ; False: 0
f_2	High-tech/Biotech Industry, True: 1 ; False: 0
f_3	Service/Financial Industry, True: 1 ; False: 0
AR	Accumulated Rounds, the accumulated times of investment for the invested company
-VC feature	
vc_twtop	At least one of the top five managers in the venture capital firm graduated from the National Taiwan University, National Tsing Hua University, National Chiao Tung University, and National Cheng Kung University. True: 1 ; False: 0
vcNCCUBaep_1	At least one of the top five managers in the venture capital firm graduated from Baep of the National Chengchi University. True: 1 ; False: 0
vclvy	At least one of the top five managers in the venture capital firm graduated from the Ivy League schools. True: 1 ; False: 0 The Ivy League schools include Brown University, Columbia University, Cornell University, Dartmouth College, Harvard University, University of Pennsylvania, Princeton University and Yale University.
vcUC	At least one of the top five managers in the venture capital firm graduated from the University of California. True: 1 ; False: 0
vc_ustop	At least one of the top five managers in the venture capital firm graduated from the Ivy League schools and the University of California. True: 1 ; False: 0
vcMBA	The ratio of the top five managers having a MBA degree in the venture capital firm
vcScience	The ratio of the top five managers having an engineering degree in the venture capital firm
vcTaipei	The registered place of the venture capital firm is in Taipei. True: 1 ; False: 0
vcHsinchu	The registered place of the venture capital firm is in Hsinchu. True: 1 ; False: 0
Syn	Syndication, more than two venture capital firms jointly fund in the same investment project. True: 1 ; False: 0
-Macro environment	
IPO_mkt	The number of IPOs approved

行政院所屬各機關因公出國人員出國報告書

(出國類別：其他)

「赴美國聖路易華盛頓大學執行多元入學研究」心得報告書

服務機關：國立政治大學經濟系

職稱：助理教授

姓名：李文傑

出國地區：美國密蘇里州聖路易市

出國期間：102 年 8 月 23 日

至 102 年 9 月 16 日

報告日期：103 年 10 月 30 日

出國成果報告書（格式）

計畫編號		執行單位	政大經濟系
出國人員	助理教授李文傑	出國日期	102年8月23日至102年9月16日，共25日
出國地點	美國密蘇里州聖路易市	出國經費	新台幣3萬元

報告內容摘要(請以200字～300字說明)

在國科會計畫以及王平院士的支持下，本研究團隊得以委派經濟系李文傑助理教授得以至聖路易華盛頓大學的動態經濟研究中心與王平院士共同針對國科會計畫「雙向人脈資源累積與創業投資績效衡量」，發展計劃中所需的人脈選擇網絡中的入學選擇相關之理論模型，並且進一步推導相關的參數動差估計式，此次研究成果豐碩，已完成理論模型設定並分析，透過第一階段學測錄取的學生(包括「推薦甄選」以及「申請入學」) 管道入學學生較優異學業成績的可能影響機制。根據理論模型縮減式之分析討論，我們認為有六個主要原因，包括了:學校排名差異，準備考試的成本，城鄉差距，考試設計及運氣成分，參與考試的學生成分組成，學生的風險趨避程度等。下一階段此計畫將延伸並且區分這六個原因，需要對一理論模型的參數加以估計以精確分析學生選擇推甄和考試的行為，如此方能深入瞭解「推薦甄選」學生成績優秀原因。

目　　錄

壹、前言:

本年度國科會計畫之子計畫「雙向人脈資源累積與創業投資績效衡量」,須以一精密理論模型支持主要推論,由於研究時程設定相當緊迫,因此研究團隊指派經濟系助理教授李文傑前往美國聖路易華盛頓大學動態經濟研究中心,與王平院士針對研究議題入學管道和學生學習及生活表現的關聯性探討,密集討論並設定一精密的理論模型以供後續政策分析建議及評估做一確實推估,在與王平院士的 25 天密切互動中,完成核心理論模型的推導,得出了與兩階段錄取學生素質息息相關的 6 大解釋因素以及其對應之個別參數,出國學者帶回的寶貴研究成果將供研究團隊後續之參數估計及供政策推論之用。除此之外,出國學者也得以將此一寶貴研究成果,廣泛徵詢聖路易華盛頓大學的著名學者,以確實改進本理論模型的可能缺失,在這 3 周的緊密研究形成中,相信對此一子計畫的品質及未來發表方向都有了更進一步的掌握,以下則針對與王平院士完成的研究成果做詳細說明。

貳、研究過程:

美國聖路易華盛頓大學的動態經濟研究中心為聖路易地區內動態經濟學領域的最高層級學術交流及研討中心,其成立主旨在於鼓勵方法及發展對於人力資本,區域經濟,國際經濟,經濟體內重要人力資本累積等各類美國及世界重要經濟體面對的當前重要經濟議題之關注及進一步提出解決方法之高階研究場所,因此本次國科會計畫研究團隊因子計畫「多元入學管道成果分析」,與動態經濟研究中心之研究主旨切合,故透過國科會計

畫主持人王平院士以及連賢明教授的申請，經半個多月的行政申請作業程序後，由動態經濟研究中心的秘書 Carissa 發給研究成員經濟系助理教授李文傑邀請函，即期動身前往美國密蘇里州聖路易市。

總計本次在美國動態經濟研究中心主要在與王平院士處理多元入學管道的 1. 各項文獻整理以及分析 2. 設定及發展兩階段入學的理論模型 3.推導理論模型的縮減式 4. 發展參數估計方法的動差估計式 5.提出目前現階段的結論及建議等。總歸來說，除了出國學者義務必須完全參與的與王平院士的討論及工作之外，仍盡力貢獻所學及研究知識與國際學者積極交流，了解最新發展人力資本累積的經濟學領域的明日之星，並在出國人研究領域資源錯置問題以及創業研究上讓與會的各國同領域研究者了解國科會計畫目前研究進展，使其他學者了解此際計畫的研究資料，獨有的模型設定，以及模型運算的結果，相信在同行加持下，研究成果會更加豐富。

參、本次出國研究目的:

在研究計畫發想之初，計畫主持人李文傑即針對目前各研究文獻及新聞媒體指出的申請入學對於錄取學生能力有正向提升的論點之因果關係相當存疑，此種事後諸葛的論斷，對於學校採行多元入學後的政策制定及校務的永續發展並沒有幫助，因此由民國 100 年時即發想一多元入學成效的研究提案，在國科會計畫的支持下，目前相關資料陸續到位，在本年度 102 年度度年中，以在校內各處室幫助之下將資料延伸至繁星計畫範疇之下，因此本子計畫在資料來源無虞之下，必須立刻進行理論模型的設定即

推導，以建立下一階段政策分析的準據，因此研究團隊立刻選定李文傑助理教授著手請假並動身至美國，並將此子計畫之目的進成列示如下。

教育和人力資本投資在每一個國家的經濟發展上，都扮演者舉足輕重的角色，其中高等教育更是重要的一環。台灣高等教育在過去二十年間內產生了巨大的變革，在「教育鬆綁」的理念下無論是在數量及品質方面皆解除了嚴格的管制。在數量方面，為了緩和升學競爭，大學院校數目從 1994 年的 50 所增至 2012 年的 162 所。而在學校品質層面，為了面對國內外學校間教學及研究的競爭壓力，各大專院校都根據本身特色與既有強項進行品質改革與創新。以本校而言，為吸引優秀學生就讀並提供更友善的學習環境，近年來實施許多重要政策諸如鼓勵多元入學、書院制度、加速國際化等，讓本校從學生的選擇至人才的培育皆更具效率性，期望在日益競爭的高教環境中能提供學生一個頂尖的學校選擇。

瞭解新制度的有效性能提供未來學校及政府政策更堅實的基礎。本研究計劃將使用本校完整的學生學習及生活層面的資料，透過嚴謹的計量分析和理論模型來研究兩個在理論和實務上皆非常重要的議題。例如入學管道和學生學習及生活表現的關聯性探討。

感謝王平院士及校內各單位的協助及支持，本研究計畫得以

使用政大完整的學生學習及生活資料，比較來自不同入學管道的學生，其在校學業及非學業表現、甚至畢業後在職場的表現的差異。我們目前仍先以在校期間表現為主要依據。過去文獻透過個別學校（例如清華大學、成功大學、中山大學等）的統計敘述結果主要觀察到經過學校推薦或個人申請入學的學生其在校成績表現優於指定考試分發入學學生，而我們的結果同樣顯示政大不同入學管道的學生有類似的現象。然而大學中智育並非唯一的教學目的，本研究進一步比較不同入學管道學生在生活其他層面的積極程度是否有差異。我們同樣發現學校推薦或個人申請入學的學生其工讀情形較普遍，且個人申請學生其擔任社團幹部的比例也明顯較高。上述結果似乎仍意味著學校推薦或個人申請入學的學生其生活積極度亦較高。

如何解釋不同管道入學的學生其在學表現的差異？為此我們建立一個理論模型討論這些採用不同管道入學同學的選擇行為，期望能藉由這個理論模型，瞭解現有「推薦甄選」入學學生具有相對優異表現的機制。在我們的模型架構下，學生在經歷過第一階段學測後得以選擇是否要接受申請入學的結果或是繼續參加接下來的指考分發，而學生選擇的依據主要取決於：其對於個人第一階段申請入學的主觀滿意程度、其準備大學指考的能力及成本、及各校系分配給不同管道入學的名額等。這些因子的強度會直接影響到各系所在兩階段間招收學生品質的差異。我們建構此一模型的目的主要是為了提供一個完整的分析架構幫助我

們瞭解學生入學的選擇行為，並提供未來校系設定各入學管道最適招收名額的基礎。

肆、此次出國研究之重要結論

一. 實證結果

既有文獻針對不同入學管道學生的比較，主要是從學業成績上進行評斷，而多數文獻以及各校研究團隊的研究結果中皆發現推甄生與申請生其學業表現大致上皆優於一般考試分發生。和既有文獻相比，政大資料庫的主要優勢在於學生資料的完整性，因此我們除了能針對學生的學業表現進行更細緻的分析外，因此以下本計畫針對政大學生在學校以及其他的生活層面進行分析，並整理結果如下。

1. 在學業表現方面，我們首先如一般文獻比較不同入學管道學生的平均成績和成績不及格比例。依據表一我們可以看出，平均而言透過「推薦甄選」管道入學學生平均成績最高且不及格比例最低，「申請入學」次之，而「大學聯考」則表現最差。除了平均數之外，我們增加對於不同入學管道學生的學測成績和在校成績其分配情形的探討，並進一步同時探討學生在校成績隨著在學期間的增加，其差異情形是否存在變化？我們的結果（圖一）顯示「申請入學」學生的學測成績之分配較其他兩種管道入學學生的學測分數存在一階隨機優勢（first-order stochastic dominance）的特性。其次，「推薦甄選」學生學測成績之分配僅較「大學聯考」

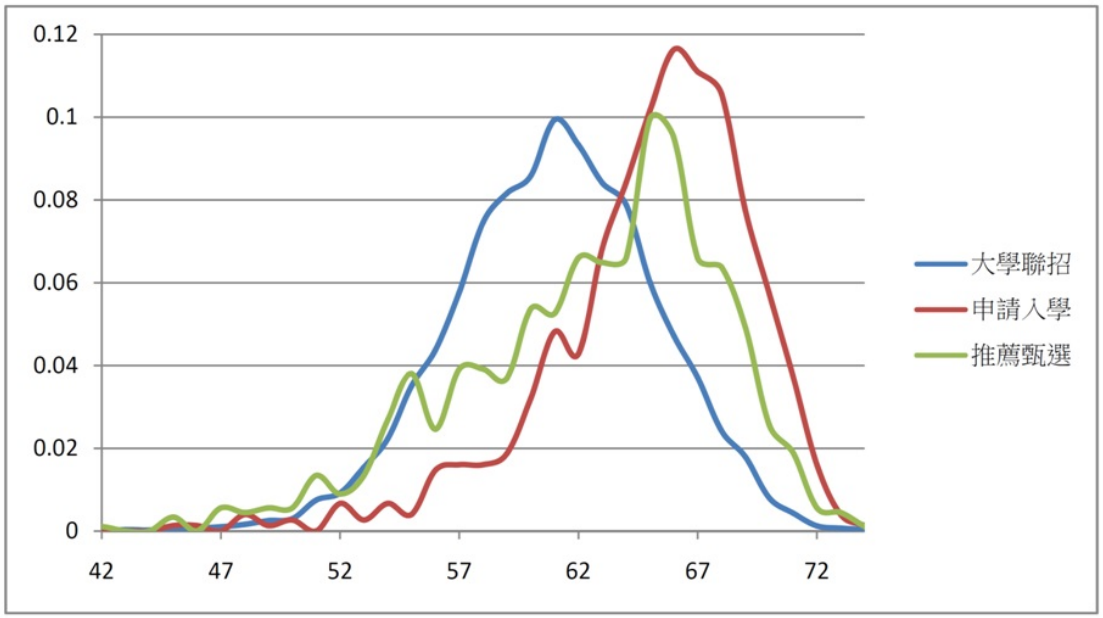
學生的學測分數存在一階隨機優勢。在校成績方面（圖二），我們則發現「推薦甄選」學生的在校成績之分配較其他兩種管道入學學生的在校成績存在一階隨機優勢（first-order stochastic dominance）的特性。我們另外發現學生的學期成績逐年上升，同時「推薦甄選」學生各學期的成績皆優於其他兩種管道入學學生的成績，而此差異程度則逐年減少（圖三）。而就大學總和成績而言，「推薦甄選」，以及「申請入學」學生之成績皆較偏向高分群，「大學聯招」學生中下成績分布者的比例較高 (圖四)。

2. 家庭背景: 以政大學生而言，「推薦甄選」，以及「申請入學」學生的家庭經濟狀況，據學生申請就學貸款比例來推論，應較為寬裕 (圖十)，而「推薦甄選」，以及「申請入學」的學生在爭取獎學金以及工讀機會的積極程度也勝過「大學聯招」入學的學生（圖八，圖九）。

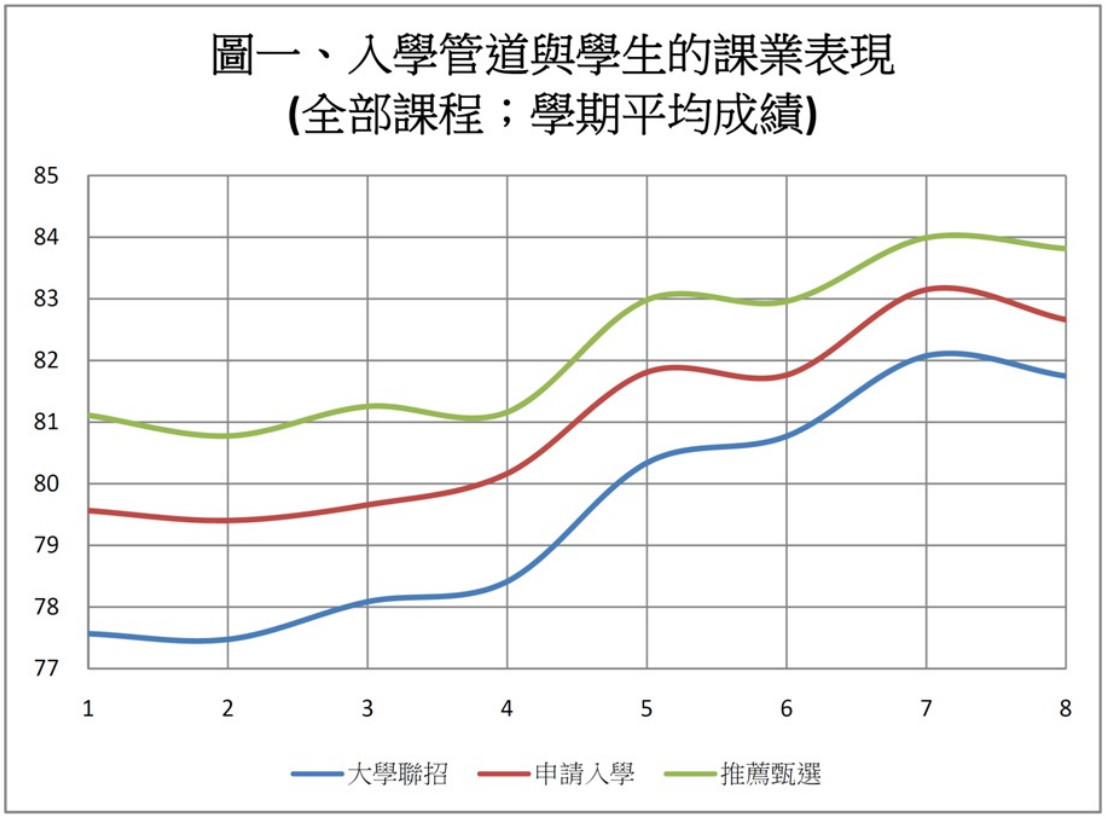
3. 課外活動參與:就政大資料而言，「申請入學」的學生表現較為積極，而「推薦甄選」以及「大學聯招」的學生無明顯區別(圖十一)。

據此，政大學生資料分布，我們可以之對應各校研究團隊以及現有文獻的研究成果，主要結果仍反映出第一階段 (推薦甄選以及申請入學)錄取的政大學生在各方面學業表現以及課外活動積極參

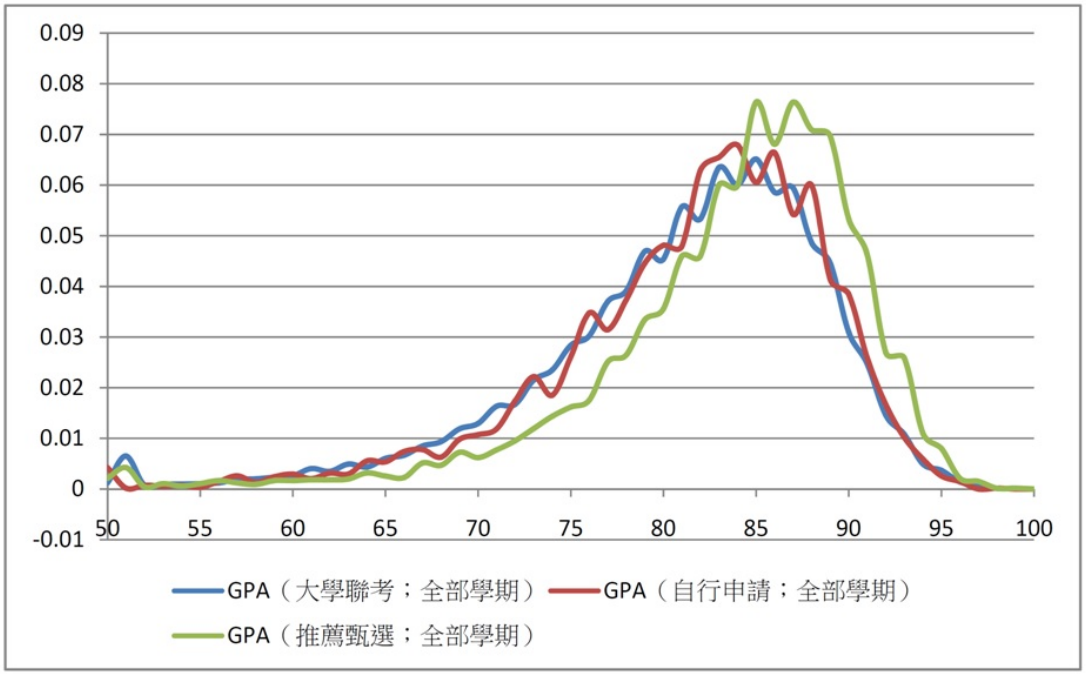
與程度都較第二階段聯招入學的政大學生表現優秀，但這仍然無法確切回答為何第一階段的學生的各方面能力指標皆較第二階段聯招錄取學生優秀的根本問題，所以我們於下一節簡介我們的理論模型的衡量面向，並將以建構完成待行模型參數估計的預期成果簡述如下。



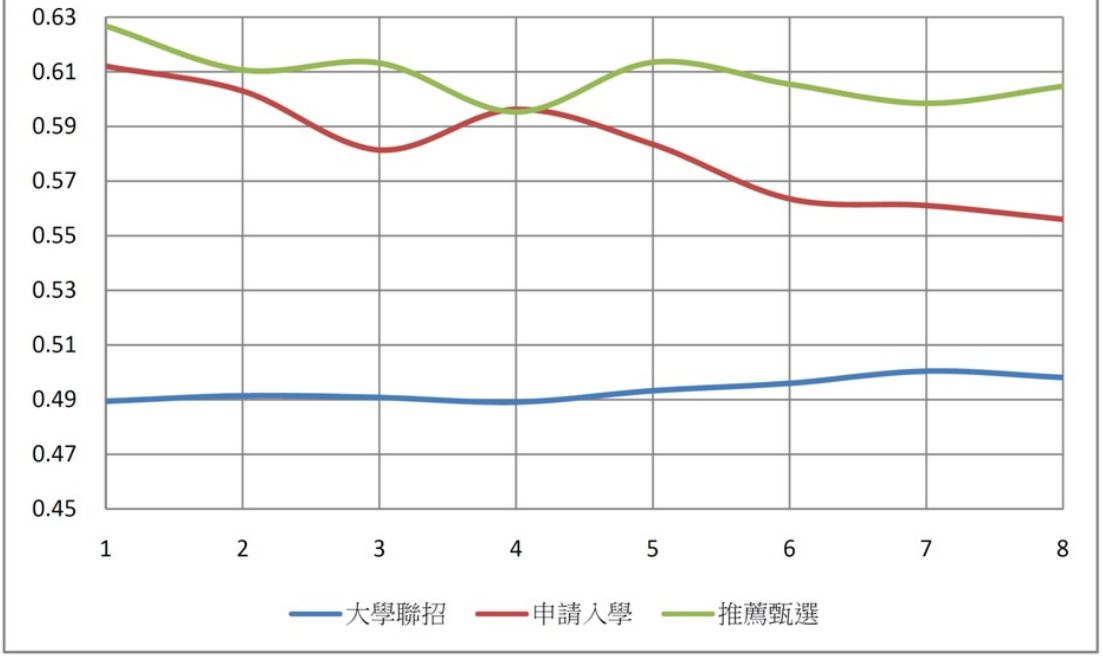
圖一、入學管道與學生的課業表現
(全部課程；學期平均成績)



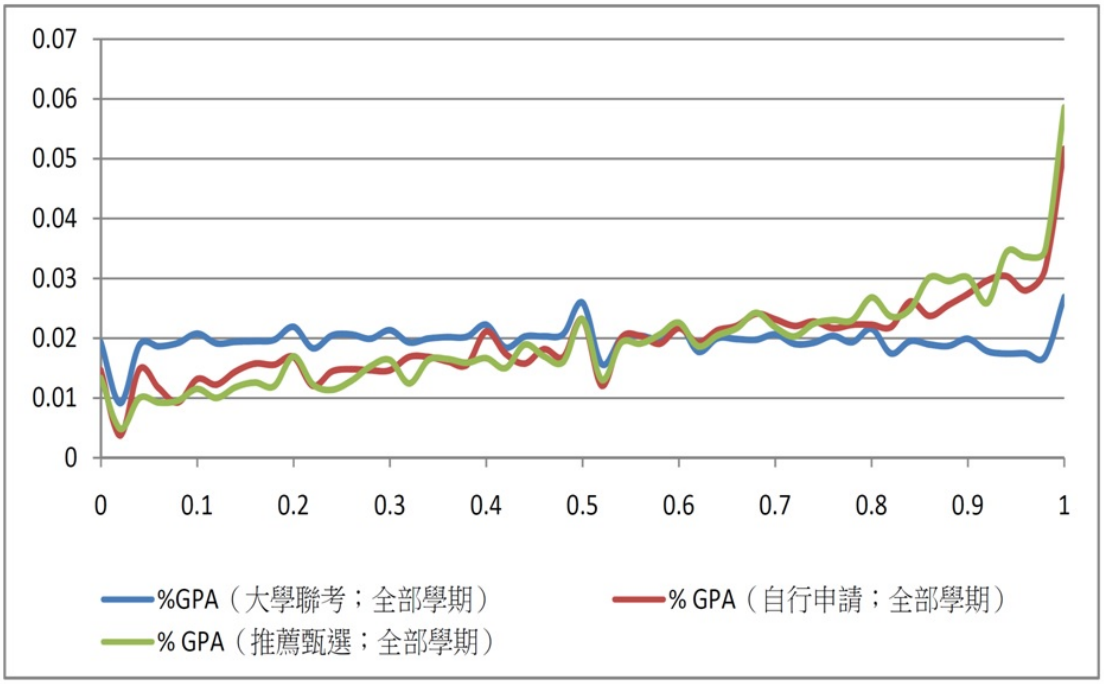
圖二: GPA Distribution (全部學期)

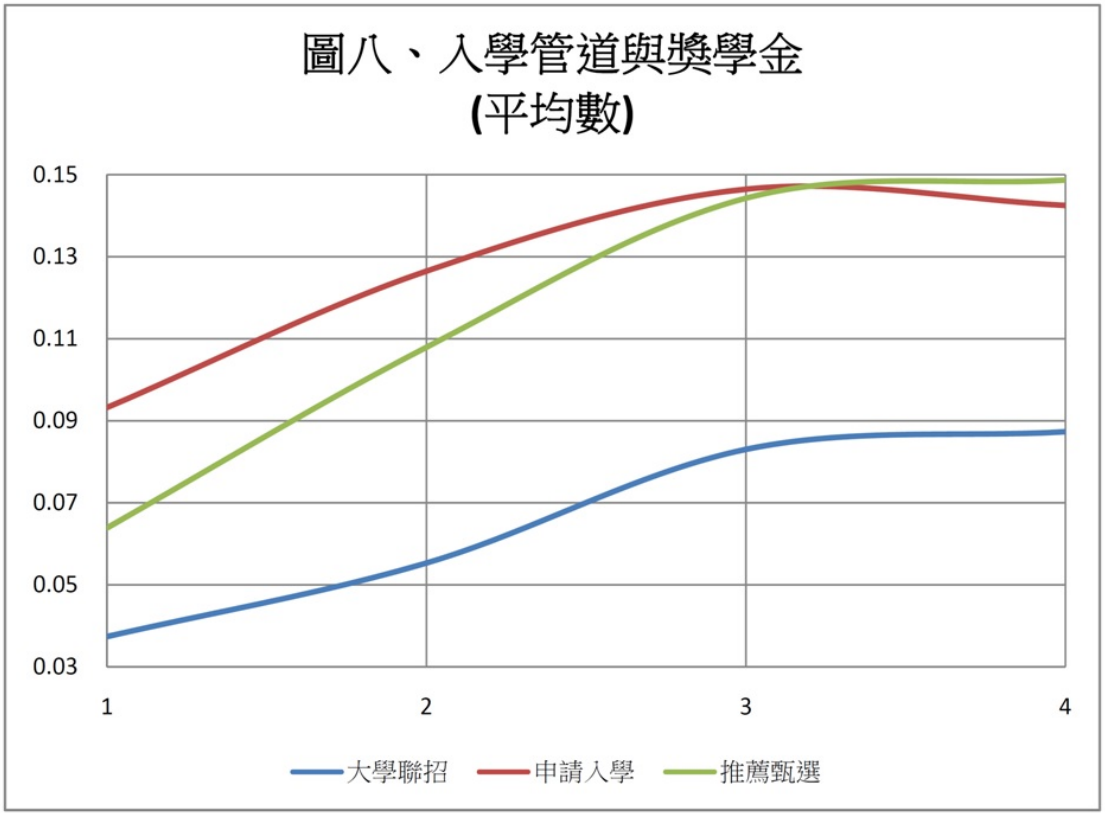


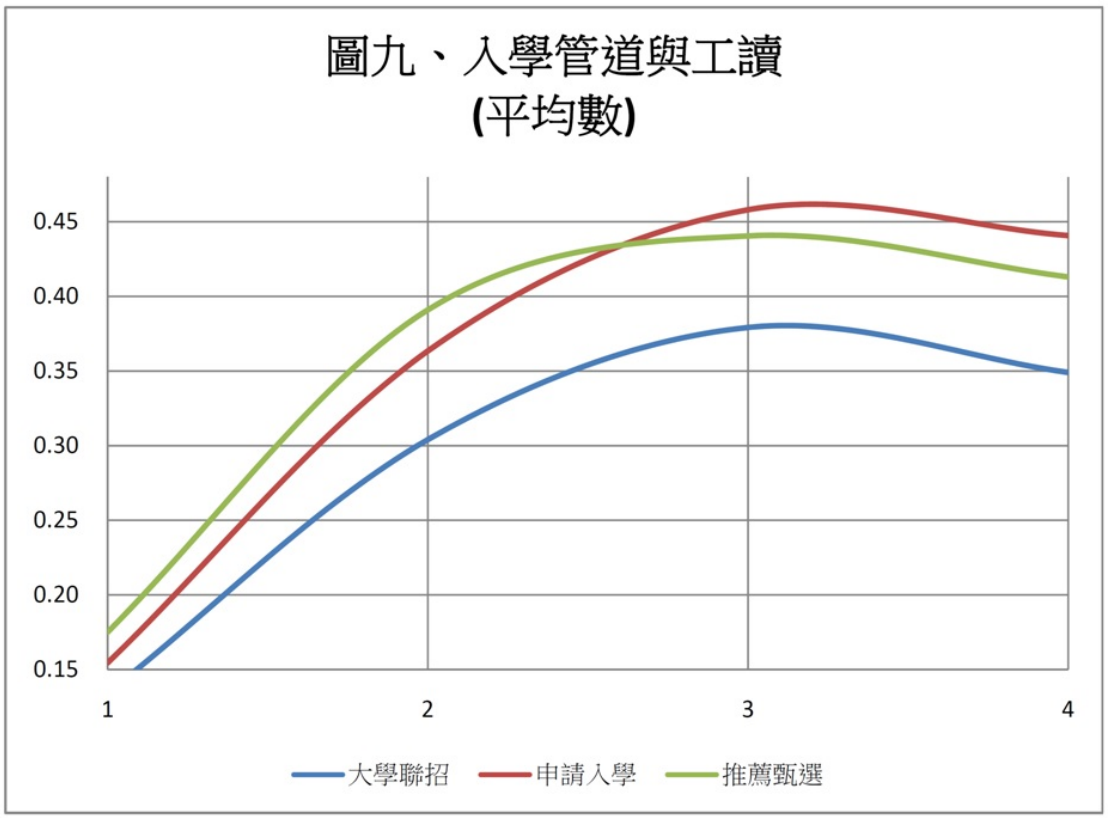
圖三、入學管道與學生的課業表現
(全部課程；學期平均成績百分比)

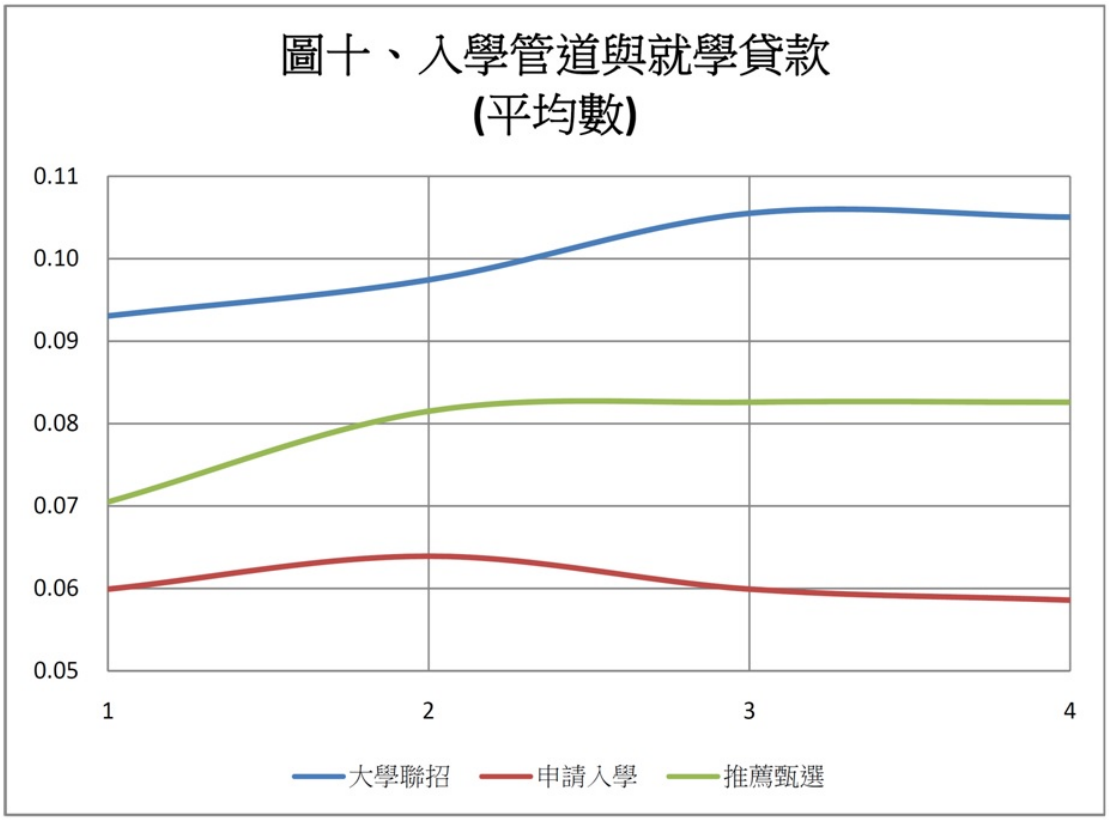


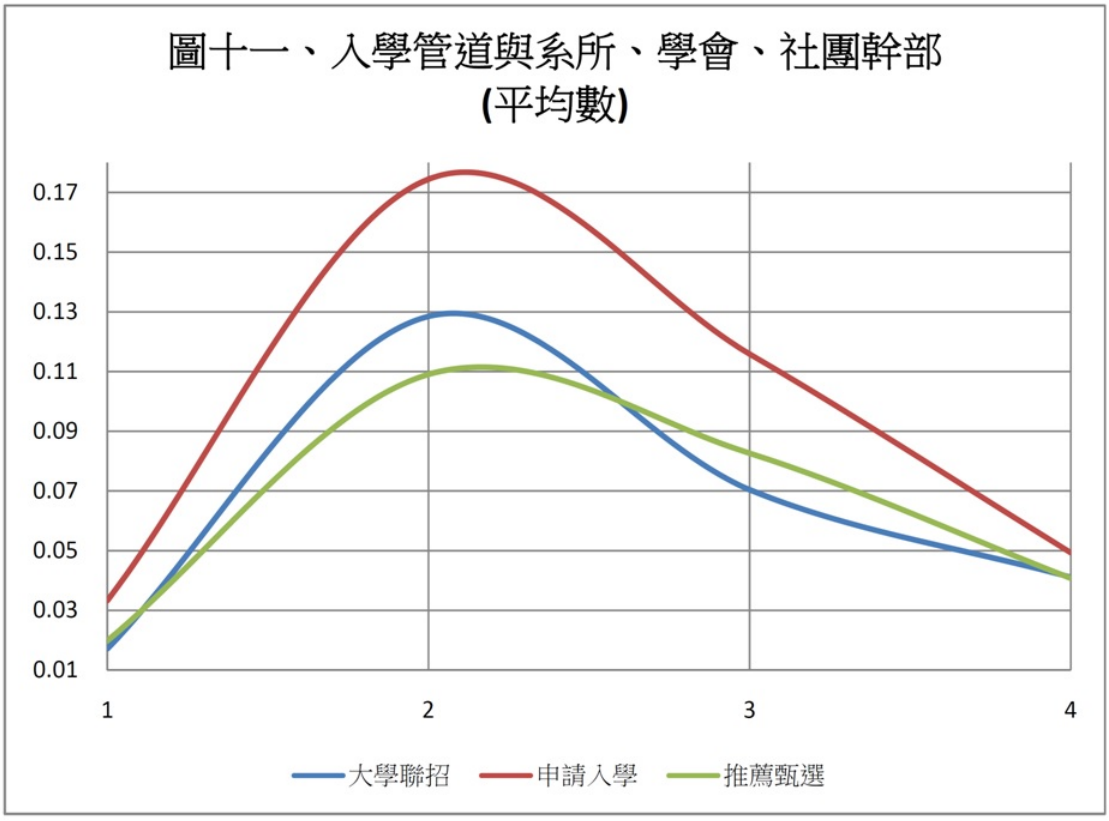
圖四: % GPA Distribution (全部學期)




圖八、入學管道與獎學金
(平均數)
0.15
0.13
0.11
0.09
0.07
0.05
0.03
1
2
3
4
大學聯招
申請入學
推薦甄選


圖九、入學管道與工讀
(平均數)
0.45
0.40
0.35
0.30
0.25
0.20
0.15
1
2
3
4
大學聯招
申請入學
推薦甄選


圖十、入學管道與就學貸款
(平均數)
0.11
0.10
0.09
0.08
0.07
0.06
0.05
1
2
3
4
大學聯招
申請入學
推薦甄選


圖十一、入學管道與系所、學會、社團幹部
(平均數)
0.17
0.15
0.13
0.11
0.09
0.07
0.05
0.03
0.01
1
2
3
4
大學聯招
申請入學
推薦甄選

二、兩階段入學的理論模型

除了透過實際資料呈現各類型學生的表現之外，我們另外設定理論模型來解釋臺灣地區開始實施大學多元入學制度，其中包含學科能力測驗（大學甄選入學）以及指定科目考試等入學管道對各大學錄取學生平均素質的影響。相較於民國 82 年以前實施的大學聯考，多元入學制度除了提供不同的入學管道之外，也提供了額外的入學機會。然而在分析多元制度上一個較複雜的因素在於透過不同入學管道獲得入學的時間是不一致的，因此我們必須在模型中考量學生在不同時間點的決策行為。這些決策將取決於學生在第一階段申請入學的成績結果及其對未來表現的預期。本研究團隊的目前設定的理論模型將可用以衡量兩階段入學學生能力的差異及其表現差異形成的原因，我們詳列模型指出的能力差異的解釋原因如下:

(1) 學校排名差異問題: 如果該校的排名越高，不管是在第一階段或是第二階段的優秀學生都會傾向接受最頂尖的大學院校的錄取，也因此，模型可以推估此類學校在第二階段招收的學生素質會與第一階段相近。學生對第一階段錄取學校排名的在意程度高低，直接影響了優秀學生參與第二階段考試的意願，也因此本模型可解釋為何中間等級的國立大學第一階段錄取的學生表現會較為優異。

(2) 準備考試的成本: 模型指出在第二階段考試的競爭激烈程度以及學生在第二階段的努力程度，會造成學生本身的準備成本大幅提高，因此學生也傾向接受第一階段錄取。

(3) 城鄉差距:偏遠區域的學生於準備指定科目考試的資源遠遜於都會區，因此於第一階段錄取的學生較傾向接受，因此第一階段錄取學生的素質將被拉高，此一推論與各地區學生準備考試的能力息息相關，也直接引導各區域學生是否較易於接受第一階段錄取結果而迴避參與大學聯招。

(4) 考試的運氣成分: 考試的設計機制會影響學生於考試時是否能充分發揮實力，因此試題設計要是不能精準測定學生能力，則學生考試表現的誤差將頗大，而造成兩階段入學的學生能力差距擴大。

(5) 參與各個階段考試的學生之能力分布: 頂尖學校在第一階段很容易收到表現優異的學生，因為學生即使在第二階段表現再好也是會選擇就讀此一頂尖學校，所以頂尖的學校在第二階段時的受試學生母體和第一階段時不同，有可能因為上述各類原因綜合，使得非特別優秀學生也能在第二階段錄取頂尖大學，因此容易在頂尖大學中造成兩階段錄取的學生能力差距頗大的問題。

(6) 學生的風險趨避程度: 風險趨避程度較高的學生較為傾向接受第

一階段考試的結果，而有所謂的「低就」的問題，因此也直接造成兩階段學生的素質差異。

伍、心得與建議

本次出國研究，發展以及推倒出的模型的強項在於可實際利用資料計算或估計出各項能力差異的解釋因子的強度如何，也可以用以衡量政大在兩階段入學的風潮下是否能真正招收到所謂的「適才適性」的優秀好學生，本模型設定在校長及學校各處室支持及通力合作下，已取得部分估計所需的學生資料，下一步將實際進入模型參數運算以及估計的程序，結合團隊成員各自專業以及一年來設定以及目前運算出的模型縮減式和動差估計式，這些差異成因的相對模型參數一但刻畫完成，預計將對各項差異成因有一通盤解釋，並進一步補足目前研究難以深入探討的兩階段學生表現差異的真正原因探討。因此統整此次研究心得即建議如下:

1. 主要心得:

透過第一階段透過學測錄取的學生(包括「推薦甄選」以及「申請入學」) 管道入學學生較優異學業成績的可能影響機制。根據團隊討論，此次出國研究推導出的模型，認為有六個主要原因，包括了:學校排名差異，準備考試的成本，城鄉差距，考試設計及運氣成分，參與考試的學生成分組成，學生的風

險趨避程度等。下一階段此計畫將延伸並且區分這六個原因，需要對一理論模型的參數加以估計以精確分析學生選擇推甄和考試的行為，如此方能深入瞭解「推薦甄選」學生成績優秀原因。

2. 建議事項:

在現有入學制度中，繁星計畫的成效一直是一個討論重點。一般新聞媒體指出，繁星計畫入學學生表現甚至優於按推薦甄選入學學生。礙於現有資料僅涵蓋至 2006 年，無法比較繁星計畫與不同推薦制度下的學生表現是否不同？這些成績差異機制為何？本年度學校已提供本團隊相關資料並將資料延長到 2009 年資料（仍不會包括在學學生資料），本研究計畫納入繁星計畫，瞭解不同入學管道的學生學習成效差異。

陸、附錄

理論模型附錄

臺灣地區自民國 82 年實施大學多元入學制度，包含學科能力測驗（大學甄選入學）以及指定科目考試等入學管道。相較於民國 82 年以前實施的大學聯考，多元入學制度除了提供不同的入學管道之外，也提供了額外的入學機會。我們打算比較在多元入學制度之下的學生平均素質和大學聯考的學生之平均素質，並設定了以下的理論模型來解釋。

假設測驗分數S_i服從常態分配，學校想要招收排名前x比例的學生。因此，我們可以求出學校錄取學生的分數門檻$\overline{S}$。亦即$\int_{\overline{S}}^{\infty} f(S_i)dS_i = x$，$1-F(\overline{S}) = x$，$-f(\overline{S})dS_i = dx$，$\overline{S} = \overline{S}(x)$。其中$F(\cdot)$表示累積分配函數。由此可知學校設定的分數門檻$\overline{S}$是其打算招收學生比例的函數。

當學校設立了錄取的分數$\overline{S}$之後，我們接著找出會選擇該校就讀學生的邊際素質。假設學生在第一階段選擇去該校就讀，他的錄取分數為$S_{i1} = q_i + \varepsilon_i$，其中$q_i$ 與ε_i 表示學生的素質和考試的隨機干擾。

學生i 獲得的效用為$U_i = \max\{AU, E[DU]\}$。如果學生在第一階段選擇該校就讀，他的效用為AU。如果學生拒絕該校的入學許可，他的效用$E(DU) = \beta[S_{i2} - C_i]$。其中$S_{i2} = (1+\delta p_i)q_i + \varepsilon_i$，$C_i = C_0 + \frac{p_i^2}{2\gamma_i}$。$C_i$為學生準備考試的成本，$p_i$為學生的努力程度。學生最適的努力水準為$\frac{\partial E(DU)}{\partial p_i} = 0$，$\delta q_i = \frac{p_i}{\gamma_i}$，$p_i^* = \delta p_i \gamma_i$。

若選擇在該校就讀，學生的效用為$AU^* = \overline{S}$。若選擇不去該校就讀，學生的效用為$E(DU^*) = \beta[q_i + \frac{1}{2}\delta^2\gamma_i q_i^2 - C_0]$。令$AU^* = E[DU^*]$ 就可以得到學生的邊際素質$q_i^* = \frac{-1+\sqrt{1+2\delta^2\gamma_i(C_0+\frac{\overline{S}}{\beta})}}{\delta^2\gamma_i}$。

最後，我們算出第一階段錄取學生的平均素質，

$E(q_i)=\int_0^{q^*} q_i \int_{\overline{S}}^{\infty} f(S_i,q_i)dS_i dq_i$。將聯合分配函數代入，即可得到下式。

$$\int_0^{q^*} q_i \int_{\overline{S_1}-q_i}^{\infty} \frac{1}{\sqrt{2\pi}\sigma_\varepsilon}\exp(-\frac{\varepsilon_i^2}{2\sigma_\varepsilon^2})\cdot\frac{1}{q_i\sqrt{2\pi}\sigma_q}\exp(-\frac{(\log(q_i)-\mu_{q_i})^2}{2\sigma_q^2})d\varepsilon_i dq_i$$

$$= \int_0^{q^*} q_i[1-F(\overline{S_1}-q_i)]\cdot\frac{1}{q_i\sqrt{2\pi}\sigma_q}\exp(-\frac{(\log(q_i)-\mu_{q_i})^2}{2\sigma_q^2})dq_i$$。

第二階段錄取學生的平均素質為

$$\int_0^{\infty} q_i[1-\theta\tilde{F}(\overline{S_2}-q_i)-(1-\theta)\tilde{F}(\overline{S_2}-q_i-\delta^2\overline{\gamma}q_i^2)]\frac{1}{q_i\sqrt{2\pi}\sigma_q}\exp(-\frac{(\log(q_i)-\mu_{q_i})^2}{2\sigma_q^2})dq_i$$。

給定q_i，$\overline{S_1}=\overline{S_2}$，$F(S_i)=\tilde{F}(S_i)$，得到

$F(\overline{S_1}-q_i)\geq\theta\tilde{F}(\overline{S_2}-q_i)+(1-\theta)\tilde{F}(\overline{S_2}-q_i-\delta^2\overline{\gamma}q_i^2)$。因此，

$1-F(\overline{S_1}-q_i)\leq 1-\theta\tilde{F}(\overline{S_2}-q_i)-(1-\theta)\tilde{F}(\overline{S_2}-q_i-\delta^2\overline{\gamma}q_i^2)$。兩邊同時乘$q_i$，

$q_i[1-F(\overline{S_1}-q_i)]\leq q_i[1-\theta\tilde{F}(\overline{S_2}-q_i)-(1-\theta)\tilde{F}(\overline{S_2}-q_i-\delta^2\overline{\gamma}q_i^2)]$。

根據積分的結果，得到參加多元入學學生的平均素質小於或等於參加大學聯考學生的平均素質。

行政院所屬各機關因公出國人員出國報告書

(出國類別：其他**)**

「**AMES2013** 年會」

心得報告書

服務機關：國立政治大學經濟系
職稱：助理教授
姓名：李文傑
出國地區：新加坡 Singapore
出國期間：**102** 年 **8** 月 **2** 日
至 **102** 年 **8** 月 **5** 日
報告日期：**103** 年 **10** 月 **30** 日

目　　錄

壹、前言:

本次研討會內容相當廣泛，除了各國各類經濟相關研究機構在計量經濟領域的最新發展、全球經濟政策的理論與實證分析、及各經濟體面臨的未來挑戰等一般性議題 外，其中個人研究領域為企業經濟學中的創業投資領域， 因而本人發表之 Venture Capitalism and Social Network 一 文的研究中認為社會網絡關係提供了一個可以讓投資方 (創投)及被投資方(新創事業)雙方達成連結的橋樑。如果 創投的研究團隊跟被投資新創事業的發起人團隊有某種 程度之社會網絡連結關係，那麼被該投資新創公司就更 容易被創投注資，更容易獲得資金能夠讓被投資公司持 續成長以備將來的初次公開發行(IPO)。除世界各經濟體 的知名大學內部研究人員與各財務私人機構部門主管外， 主辦單位也邀請到歐洲大學、哈佛大學、Bank of Italy、 European Bank 等主管演講。參加學員分別來自 80 餘國 的大學、研究機構及國際企業等。

貳、會議過程:

AMES2013 年 年 會 為 亞洲計量經濟學會 (Asian Econometric Society) 所舉 辦的經濟學領域的高層級學術交流及研討 會。本年度 AMES 2013 年會選擇於新加坡的新加坡國立大學舉行，時間為 2013 年 8 月 2 日至 8 月 4 日，但是在 8 月 2 日下午

舉行開幕之歡迎酒會及會議晚餐，論文發 表人李文傑因 機票行程設定，因此 8 月 2 日由台北搭機至新加坡的新加坡大學時，已經接近晚上 9 點半，所以未及參與 開幕酒會及大會晚餐。因此，本人直接於 8/3 清晨 至 會 場 ，發表文章及參與會議討 論。

本人發表文章本身呈現了在公司治理學領域中的創業投資基金績效，又由 於研究所用資料十分有價值，因此激起了與會成員強烈 興趣，一直追問資料蒐集細節以及研究的主要結果，因 此本篇文章的發表也使得相關領域的研究學者一致好 評，在此次 8 月 2 日至 8 月 4 日的連續會議行程中 (AMES2013 年會)皆被會議主持人大力讚賞。在此會議議程中本人亦積極參與另外兩篇發表文章的 討論，現場充滿了言論激烈交鋒，在 Farida Akhtar 的文章中，主要強調公司內部資本支出如何有效率執行， 其結論強調與人力資本效率結合才是真正的資本效率支出之最適途徑，而 Juan Pablo Davila 發表的文章，則 由金融市場的效率損失著眼，以一嚴謹的理論模型呈現 完全且效率的財務市場運作如何影響一經濟體的長期 成長率，如此，本人在參與的議程中積極發言並貢獻本 人專業於議程討論中，因此在本人專業領域中，亦了解 到結合市場效率探討以及理論模型配合實際資料運算 的市場效率損失研究乃是本人領域的明日之星，也進一 步增強了本人研究信心，持續往此一具前景的研究領域 邁進，貢獻本人研究成果於此一領域之最新發展。因為

本次會議發表文章超過 2 百餘篇，因此本人無法一一詳列參與的 10 餘個議程討論，但總歸來說，除了本人發表義務必須完全參與的議程之外，仍盡力貢獻所學及研究知識與國際學者積極交流，了解最新發展經濟學領域的明日之星，並在本人研究領域金融市場資源錯置問題以及創業研究上讓與會的各國同領域研究者了解本人目前研究進展，使其他學者了解本人研究資料，獨有的模型設定，以及模型運算的結果，相信在同行加持下，研究成果會更加豐富。 參、本次會議目的以及會議議程中相關領域簡介：

亞洲計量經濟學年會為此一領域之高端年度學術集會，因 此齊集了各方的領域研究精華，提供公共經濟領域的意見交流及國際集會討論的難得場合。著名學者如 Sérgio Rebelo (Northwestern University) 以及 Gareth Myles (University of Exeter)都在會議的高 階論壇 (Plenary Session) 中發表領域中尖端且最新 的研究成果，談論了政府租稅管制的利弊得失當然也計 算出租稅對人力資本累跡的長期效果以及最終經濟成 長率的影響。會議中有約 60 個於各個時段平行進行的 研討會議舉行，我們可以將之概分為以下數個領域：

(1). Competition and Innovation

(2). Development and Entrepreneurship

(3). Entrepreneurial Strategy

(4). Entrepreneurship and Household Behavior

(5). Human Capital in Innovation and Entrepreneurship

(6). Productivity and Entrepreneurship

(7). The Empirics of Entrepreneurial Venture Capital

(8). Venture Capital Financing 以下茲將本人參與發表的領域，Venture Capital Financing 之會議中目前最新研究進展詳述如下。

經濟成長是各國隨著經濟、技術、生產力或資源的使用效率的改善與發展而發生的現象，因此各國經濟學家也試圖提出各種理論來解釋為何經濟能夠成長、經濟如何地成長、影響經濟成長的可能因子有哪些。過去經濟學家在探討經濟成長時，大體皆將成長的要素歸因於外生變動的技術衝擊、政策衝擊等，如：Solow(1956)所提出之新古典成長理論便是將技術進步因子設定為外生參數來解釋經濟成長之現象。

而在近代經濟成長理論中，經濟學家在探討一國之成長潛力與動力來源時，往往會修正外生成長理論的缺失， 在生產函數中增加「人力資本要素」項或將技術因子內 生化，透過經濟體系內生的動力而出現經濟成長的現象， 如：Mankiw，Romer and Weil(1992)所提出之模型，便 是以設定生產函數是實體資本與人力資本之函數的方 法來解釋經濟成長的現象；另外，Romer 提供了經濟體 系可透過 Research and Develop (R&D)來作為另一種 成長的因子，該理論認為創新發明是一個需要實質資源 的重大經濟活動，並將「專利」因子引入模型裡以衡量 創新發明之能力。而上述這些引進內生成長要素的理論 被統稱為「內生成長理論」。

而由哈佛大學經濟系教授 Josh Lerner 領軍的創業經濟學(Entrepreneurial Economics) 也是內生成長 理論中的其中一支，該理論認為企業的發展與成長深受 該國的創業環境之影響。在 Josh Lerner 教授的經典著 作《Boulevard of Broken Dreams》中便以新加坡及牙 買加兩國作為比較，兩國的地理位置皆位於貿易航線的

重要據點上，且兩國皆擁有被殖民之歷史背景，該兩國在 1960 年代的每人所得大致相同在 2,500 美元水準，甚至牙買加比新加坡還要高一些。兩國政府政策所營造的創業環境之差距造成進入兩國的創業投資者規模與數量也有巨大的差距，故表現在 50 年後的今日，兩國的經濟發展勢必截然不同，在 2012 年新加坡的每人所得已逼近至四萬美元，而牙買加的每人所得僅有約 5,000 美元左右。因此，由此一案例可知一國的創業活動熱絡與否對其經濟成長扮演著舉足輕重的角色，而創業活動與環境是否熱絡可從在該國進行創業投資(Venture Capital, VC)的規模與產值來衡量。

什麼是創投呢？創業過程中創投又扮演著什麼樣的角色呢？依據兩位企業經濟學大師的著作 Paul Gompers and Josh Lerner(2006)《The Venture Capital Cycle》一書中提到，最早出現創投來解決資金的問題， 可追朔到漢摩拉比時期(time of Hammurabi)的巴比倫 合夥(Babylonian partnerships)。創業投資是指創業 投資業者對新創事業(Startup Company)進行股權投資， 於所投資之新創事業發育成熟或相對成熟後，透過股權

退出(Exit)來獲得資本增值的收益之投資方式。創業投資追求在高風險中能夠獲得高報酬，故特別強調新創事 業的高成長性，其投資對象通常都是不具備上市櫃資格 或目前仍處於發展階段的新創事業，有時甚至是僅僅處 在構思之中的事業。創業投資的目的並不是要掌握股權， 而是希望透過取得少數股權與提供資金方面之援助，促 進新創事業的發展，使資本增值。一旦新創事業成功發 展起來，股票成功上市櫃，創業投資業者便可在股票市 場出售股票，以獲取高額回報。創投在新創事業發展各 個階段中則扮演著不同重要的角色，第一個角色為新創 事業資金的供給者，同時也是新創事業的投資者，創投 資本家向社會大眾資金有餘單位募集資金，形成強大的 創業投資基金，將所募集的資金導向資金需求單位新創 事業，做最有效率的資金配置。創投資本家在一段特定 期間內募集資金，而該基金通常是以有限合夥的形式成 立，存續期間大約十年，時間一到再將資金返還給投資 大眾，並且著手進行下次創投基金的募集，然而在《The Venture Capital Cycle》一書中提到，美國的創投事 業所管理的資金不低於 1500 億美金，是一個相當龐大 的資本。

在台灣，創業投資就是私募基金，會鎖定它認為未來有成長潛力的發展中新創事業進行投資，甚至輔導與協助該被投資公司進行初次公開發行**(Initial Public Offering,** IPO，包含興櫃、上市櫃**)**，並把被投資公司成功的 IPO 當作是一筆成功的投資。

至於在本研究中，吾人首先懷疑創業投資業者如何判斷某一投資標的是否是好的標的、標的的選擇依據又是什麼及為何選擇某一被投資公司為標的等問題均是研究創業投資產業的經濟學家想了解的議題。本研究中認為社會網絡關係提供了一個可以讓投資方**(**創投**)**及被投資方**(**新創事業**)**雙方達成連結的橋樑。如果創投的研究團隊跟被投資新創事業的發起人團隊有某種程度之社會網絡連結關係，那麼被該投資新創公司就更容易被創投注資，更容易獲得資金能夠讓被投資公司持續成長以備將來的初次公開發行(IPO)。而這裡所提出的社會網絡連結是指透過「學歷」來達成雙方之連繫，如果創投團隊成員跟被投資公司的發起人以前曾就讀同一所大學或研究所，甚至是學長學弟或同班同學，那麼創

投團隊就很有可能將他的投資標的及資金投在那些跟他有人脈關係的新創公司，透過這樣的關係而取得資金的新創公司便更有機會可以在初級市場成功公開發 行。

肆、參與會議之相關發表論文的重要結論 茲將本次會議發表之相關領域的最新論文之重要結論整理並 條列如下:

1. 以教育網絡來衡量的社群網絡連結關係: 大學校友及同學，或是研究所校友及同學等，在日後創業投資案的績效表現上，唯一核心預測變數。

2. 台灣，大陸新創投資區(竹科，大陸上海開發區張江工業園區)的新創個案，以強調技術背景為主的新創團隊或是創投團隊的個別表現為佳

3. 以財務背景或是一般管理背景為主的新創團隊或是創投團隊，在 IT 產業新創投資案中表現差強人意或是具有不良效果。

伍、心得及建議

在此會議中，本人與各國學者多方交流創業投資領域之研究心得，並藉由各方知名學者之建議作為未來精進研究之主要參考依據，故此吾人將此次 AMES2013 年會之主要心得及建議 列示如下:

1. 藉本次 AMES 2013 年會發表以及討論研習結果，可建議不 同創業投資產業以及新創事業投入的配適策略，以供政府擬 訂鼓勵新創事業投入獎勵之政策依據。

2. 針對目前由國立政治大學引領的「學院及書院同儕學習效果」(peer effect)風潮下，我們也將了解到，學生時期培養的人脈關係，對未來創業及國家產業政策的重大影響

3. 將本研究之核心研究結果撰寫成的英文論文再經過更方學者建議改進而加以修正後，預計將投稿至一級國際期刊，並評述本計畫未來可能的推展方向。

4.經由次出國研討會之歷練，出國發表論文之發表人雖為新 進研究人員，但是可與相關領域的著名國外著名學者在會議 中密切互動，以從事此一開創性的研究，徹底探討東亞新興 工業國的不同「教育網絡連結」與「高科技新創事業績效」 做緊密結合，借以開拓創業研究領域中較為寬廣的研究視野。 本計畫之研究助理除了學習軟體的操作，亦可以熟習相關的

文獻、了解結構總體經濟學的模型設定方法及企業經濟學領域的研究方法以及相關的邏輯推理。本次發表之研究成果將在發表人持續努力之下，將可以刊登於經濟學門的國際著名學術期刊。同時，預期本計畫的研究成果將對於晚近有關人脈網絡對於區域創業環境差異之文獻發展有所貢獻，此計畫之新進研究人員亦可以實際回應審查人的評論，相信對新進研究人員的研究生涯將有很大的幫助。

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陸、附錄

- 相關創業投資領域的文獻探討

創業投資產業的研究是近年來頗受矚目的議 題，愈來愈多學者針對此議題投入資源研究影響創業投資注資新創事業的動機與績效之衡量，並試圖找出創業投資如何影響一國的經濟發展之原因。

大多數的創業家以前也都是受雇人 員，但由於對自己職涯的期許與未來的憧憬，或是不滿於現有職務的報酬與待遇，甚至希望能擁有自己的事業而選擇離開現有職位投入創業活動變成創業 家。Saxenian(1994)便指出員工是第一線面對供應鏈廠商與顧客的前線人員，相較於公司經營者，更有機會可發掘某一產品、概念或新型服務是有市場潛力的，因此創業的發生可能來自員工與供應鏈廠商或顧客有連結關係，選擇離開原屬公司並進行創業。

基於上述創業家投入創業之可能原因，Shane(2000)與Nanda and Sorensen(2010)進一步研究並發現在相同地點一起工作的員工中，若其中曾有其他員工有創業之經驗，這個經驗可能來自以前待過生產線知道如何調整製程才能增加效率、以前是第一線接觸客戶的員工甚至本身就是消費

者，因此該員工選擇了創業，而這些同儕的創業經驗將有助於同事投入未來創 業。Lerner and Malmendier(2012)也認為同儕效果對創業活動有正面的效果，如果朋友或同事以前曾是創業家，那麼無論他是否成功創業或後來結束營業回歸勞動市場，他的創業經驗都能刺激沒有創業的經驗的他人進行創業。

除 了「同儕效果」可以幫助未來想創業的員工投入創業外，Giannetti, Mariassunta and Simonov(2009)提出若創業家居住於創業活動愈頻繁、熱絡的經濟環境，他將更容易受到該環境的刺激而投入創業活動。 Gompers, Lerner and Scharfstein(2005)的研究結果也發現在美國的新創事業中，創業活動較活躍的麻薩諸塞州 (Massachusetts) 或矽谷 (Silicon Valley)是較容易孕育出成功創業的公 司，另外，擁有創投注資、具備良好專利品質或專注本業等條件之事業也較容易創業成功。

上面曾提過創業家創業的動機是為了滿足對未來的期許與對擁有自己的事業有所憧憬，因此 Hamilton(2000)透過實證研究發現大多數創業家投入創業的動機是來自創業可以帶來非金錢利益(如自行創業當老闆)大於金錢利益。儘管在創業初期預期的收入和所得的成長性不高，但創業

家仍願意堅持崗位持續當老闆，此一研究證明了創業家重視非金錢利益勝過金錢利益，即使投入創業並不一定能增加收入，但並不減創業家投入創業的誘因。Erik and Benjamin(2011)研究結果也認為絕大多數的新創事業所提供的產品或服務大都是市場上早已存在的且多半沒有誘因進行創新或成長，並表示非金錢因素的利益 (如：自行創業當老闆、彈性的工時、符合興趣等)是創業家投入創業的最重要的原因。

創業家能夠成功創業，背後勢必要有足夠的資金，但一般人通常都無法自行拿出如此龐大資金進行創業，且在無法提供足夠的擔保品以籌措所需資金下，金融機構為了避開違約風險，大多也不願貸款給創業家，因此創業家便必須另尋它路以謀得資金。創業投資此時便扮演著重要的角色，它透過專業與嚴格的審查與評估來判斷某一新創事業是否值得投資，若將來有成長潛力、預期可以帶來重大收益的公司，就容易被創投注資以創業。但創投業者要如何尋找投資標的、從何處尋找投資標的、該投資標的是否能符合創投業者的預期賺取收益，便衍生出另一個問題了。

Cohen, Frazzini and Malloy(2007)便提出了「學校連結」可能是影響創投與被投資公司取得連結的一個橋樑，經過

統計檢定後認為透過此一校友關係投資公司與被投資公司可以有效的連結，幫助投資方尋找良好的投資標的與被投資方獲得事業經營之資金來源。Lee(2012)更進一步以Cohen 該篇文章之模型基礎來驗證台灣的高科技產業是否也有透過創投投資而成功初次公開發行(IPO)，並以Information Technology Industry(IT 產業)為例證明「學校連結」是有助於幫助創投注資新創公司並輔助其初次公開發行。另方面，Bengtsson and Hsu(2012)提出另一個可能影響創投與被投資公司連結的橋樑，該篇文章指出在美國是個種族大熔爐，因此在美國的創投與新創公司的員工通常都會來自不同多國家與種族，因此若創投業者與新創公司的經理團隊有「種族」或「國籍」連結關係，創投團隊將有可能會基於「同根情誼」而投入資金給新創公司。

Kaplan, Sensoy and Stromberg(2009)在一篇探討賽馬賭局的論文中提出投資者應將賭金重押在騎士抑或是賽馬上，最後得出之結論認為經營完整的企業組織文化較雇用專業經理人團隊來的困難，儘管新創事業的企業組織文化跟經理團隊都是組成新創事業的重要因素，但創投業者應將更多的資金與資源投注在具有企業組織文化之新創事業上。

- **AMES2013** 簡報

Venture Capitalism

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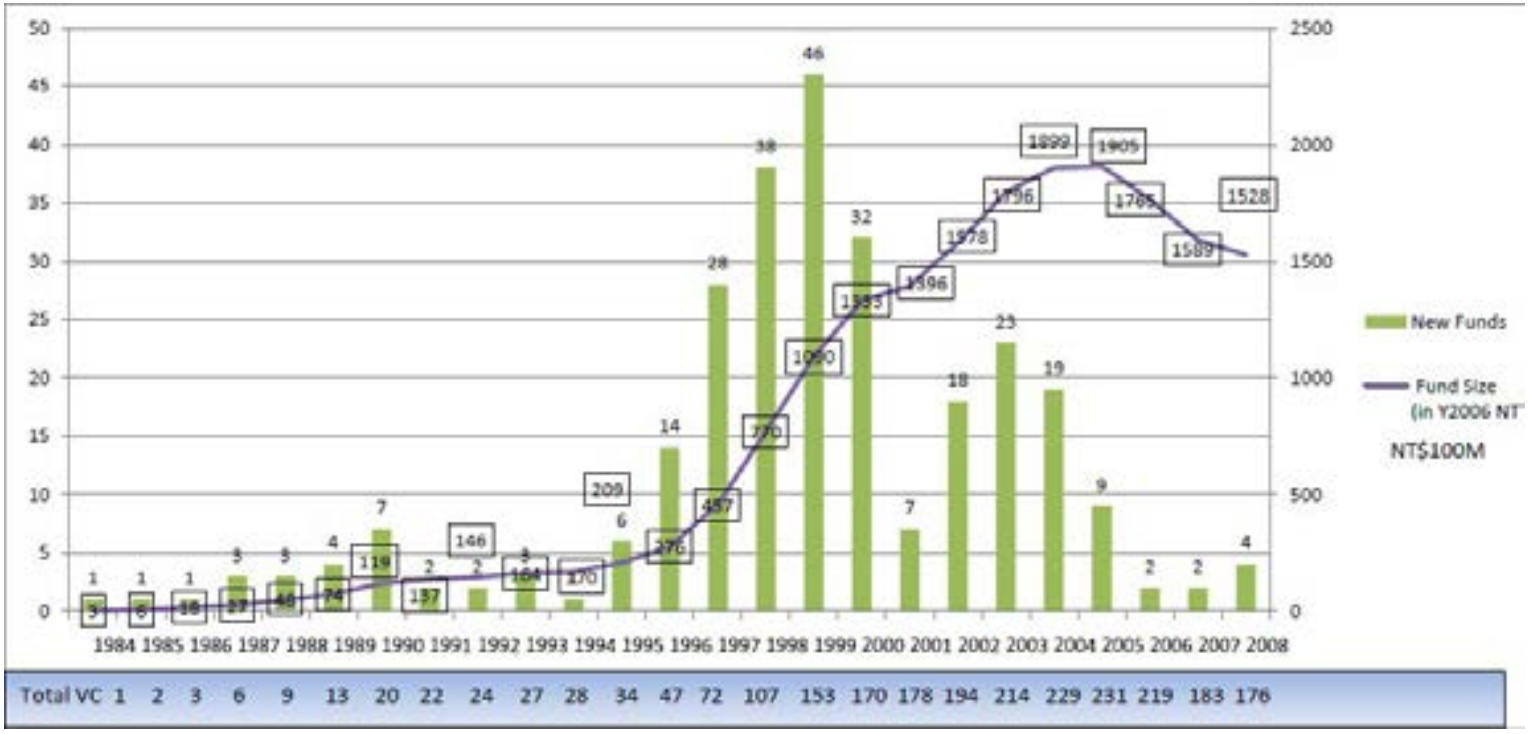
Aug. 3, 2013

General Trend

- Taiwan is the most active in Asia for venture investment (TVCA 2004)
- Over 97% companies are small and medium sized enterprises (SMEs)
- U.S. patents received by those new start-ups after 80s ranked 4th globally (USPTO 2005)
- Highly focus on electronics/IT (over 70%) (TVCA 2009), where the entreneurship and innovation milestones may be linked with venture capital.
- The entreneurship, and innovations milestones may be linked with the venture capitalism in Taiwan.

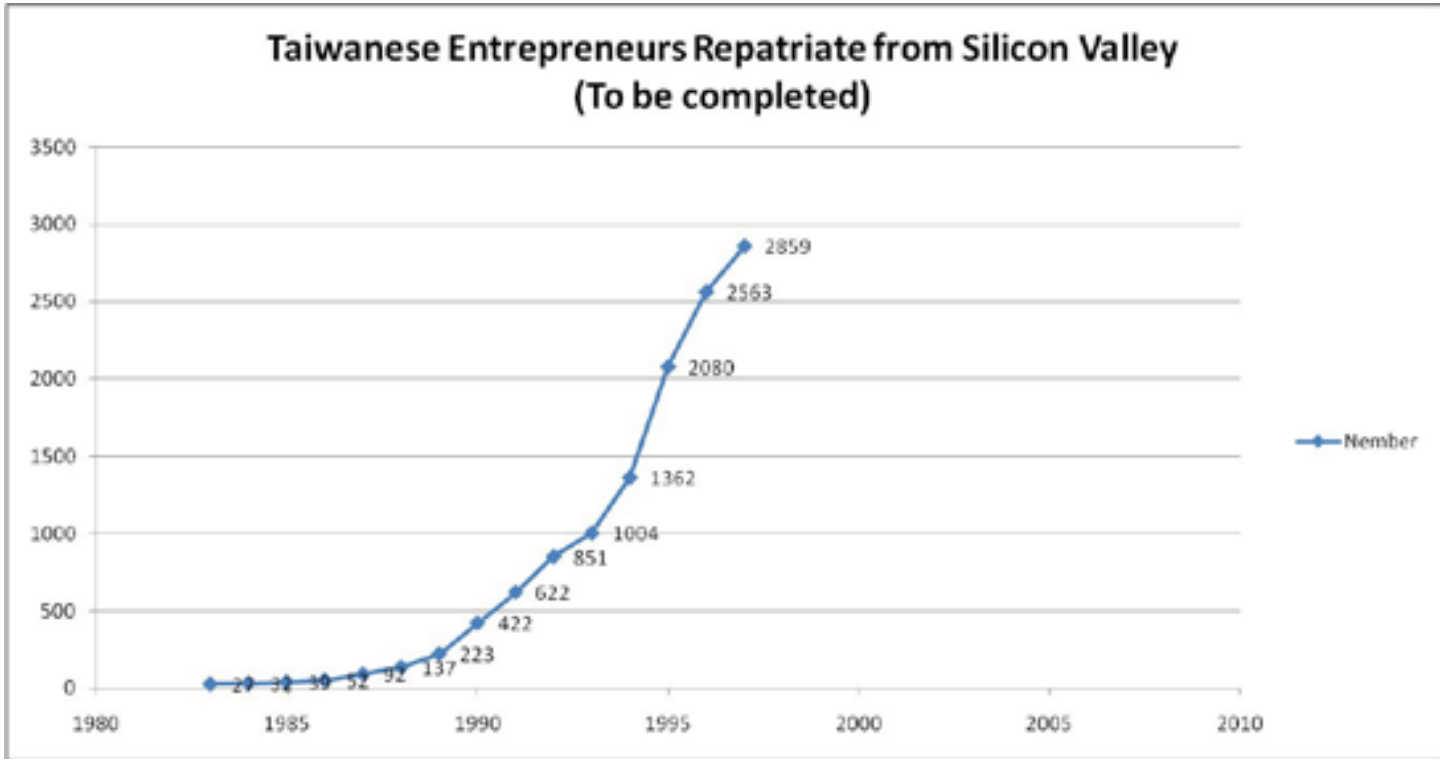
Venture Capital in Taiwan

- VC investments:



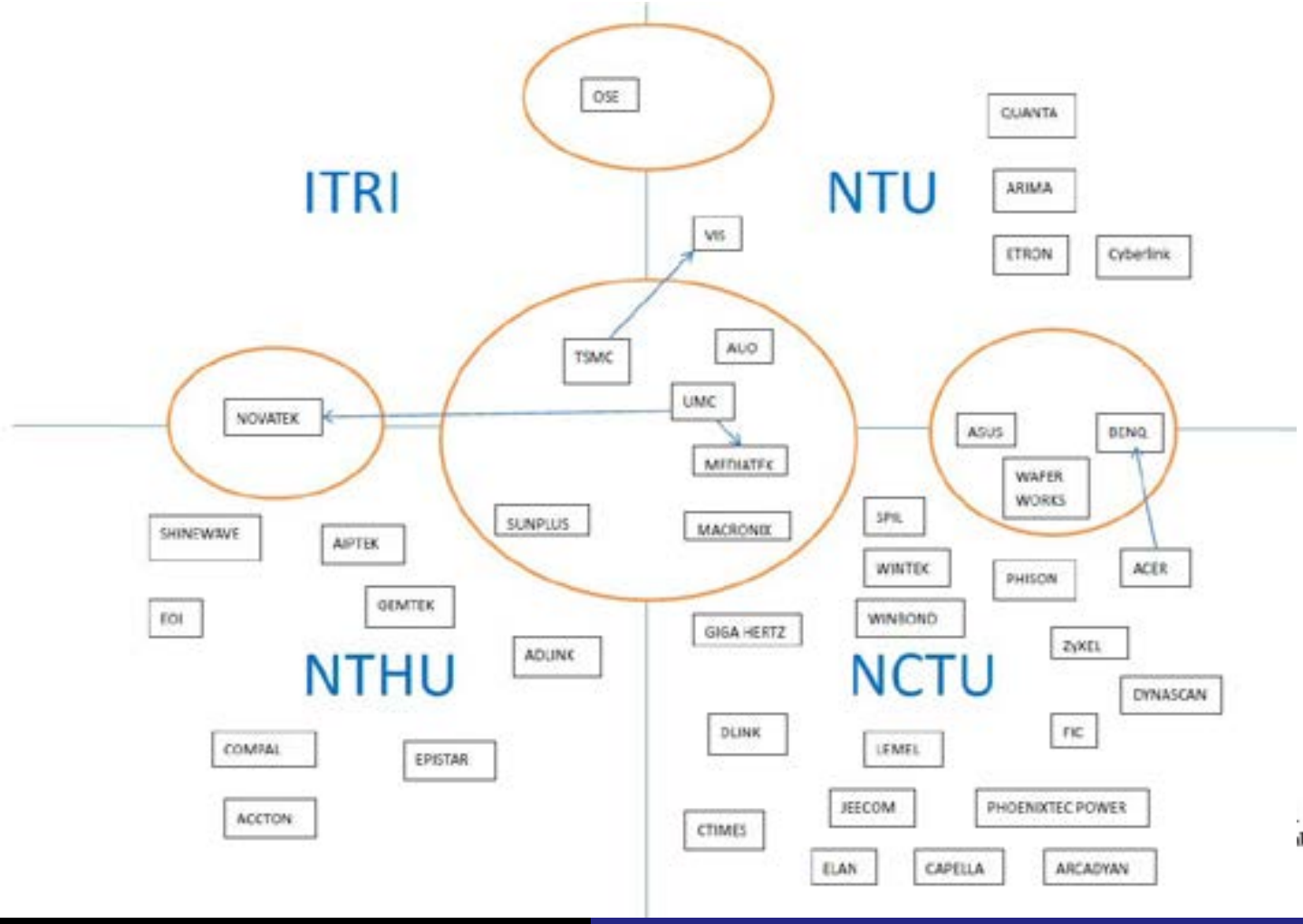
Venture Capital in Taiwan II

- Silicon Valley connection:



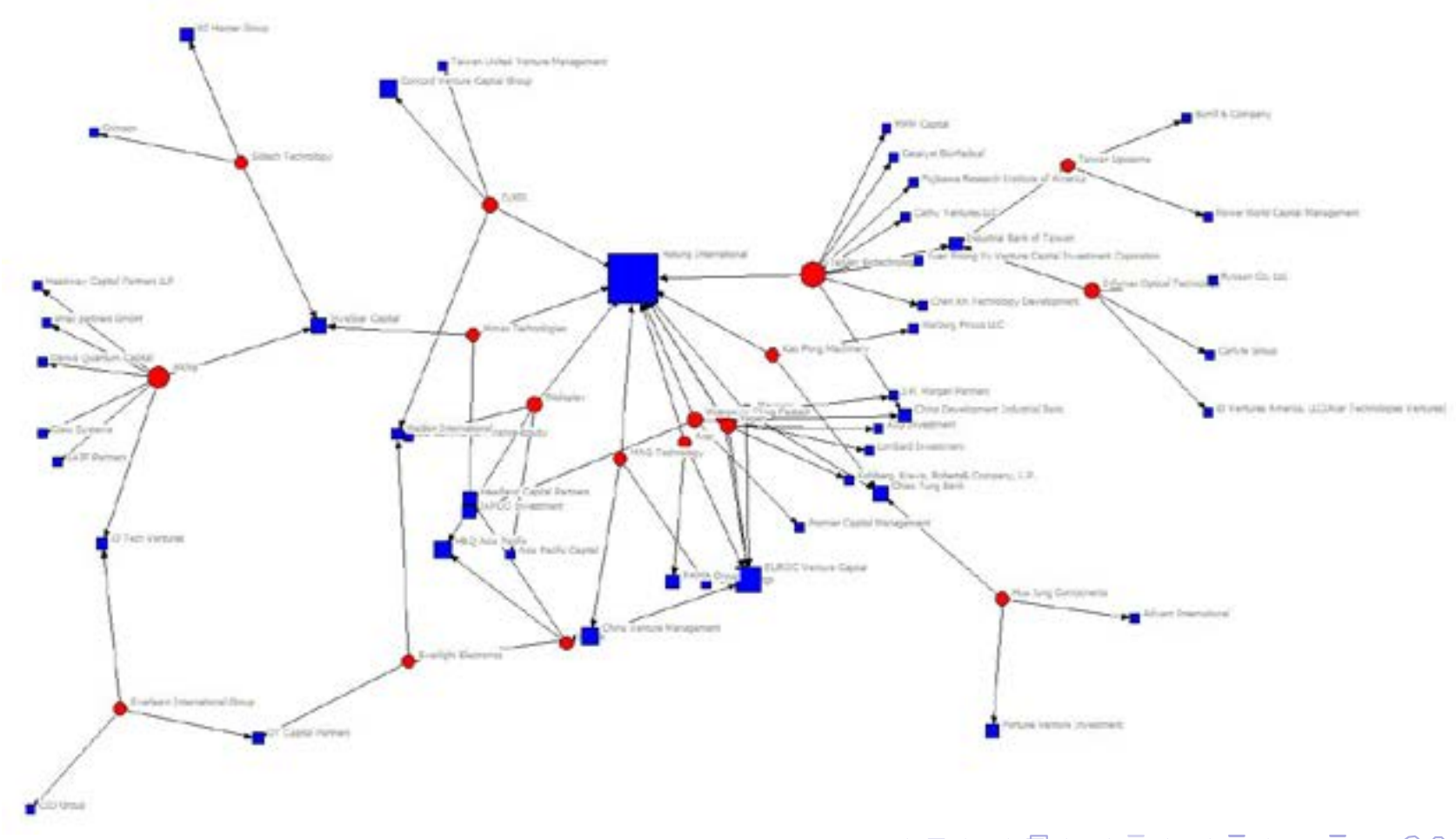
Venture Capital in Taiwan III

- IT entrepreneurs' educational affiliations:



Venture Capital in Taiwan IV

- The major investment links (≥ 3) between VCs and entrepreneurs:



Related Literatures

- VC team's composition:
  - Human capital: Zarutskie (2010)
  - Demographic: Chowdhury (2005)
  - Beckman, Burton, and O'Reilly (2007)
- Social network and investment choice, performance:
  - Insider's information in mutual fund: Cohen, Frazzini and Malloy (2008)
  - Matching between VCs and entrepreneurs: Stuart and Sorenson (2007), Bengtsson and Hsu (2010), Stuart and Yim (2010)
  - Evidence from European countries: Bottazzi, DaRin, and Hellmann (2007).

Constructed Dataset

- The venture capital investment in Taiwan from 1984.

  (i) The coevolution of VC industry and IT industry in Taiwan.

  (ii) The social network between Venture Capitalists and entrepreneurs facilitate the IPOs and Patents in USPTO.

  (iii) A hand-collected Dataset with >1000 VC deals (VentureXpert) and educational and work experience background in both VC and entrepreneurial side.

Summary Statistics I

- IPO and educational connections:

Dependent Variable:		
exit of venture investment	frequently	% of the samples
	61	65%
Independent Variables:		
Connection Measures		
Type 1 connection: Same School	64	68%
Type 2 connection: Same School, same degree	59	63%
Type 3 connection:Same School, same degree, year overlap	18	19%

Summary Statistics II

- Other controls:

Start-up firm: educational history variables		
fntu	53	56%
fnctu	31	33%
fnthu	20	21%
fncku	26	28%
USIvyDegree	5	5%
USnonivyDegree	45	48%
Start-up firm: Degree Background	Data type	Range
ScienceDegree	continuous	[0,1]
MBADegree	continuous	[0,1]
Venture Capital team: educational history variables		
VCntu	67	71%
VCnctu	48	51%
VCnthu	13	14%
VCncku	37	39%
USIvyDegree	48	51%
USnonivyDegree	81	86%
Venture Capital team: Degree Background	Data type	Range
ScienceDegree	continuous	[0,1]
MBADegree	continuous	[0,1]

Hypothesis

The connected venture investment projects will perform better in terms of exits of the venture backed start-up firms.

Regression

- Use the sample of 94 venture capital investments targeting at the IT start-up firms in Taiwan.
- Regression

$$Exit_i = constant + \underbrace{\sum_{j=1} b_j fd_{j,i}}_{founder} + \underbrace{\sum_{k=1} b_k VC_{k,i}}_{venturecapitalist} + \sum_{l=1} Type_{l,i} \quad connection \tag{1}$$

  - Type 1: undergraduate or graduate at the same school
  - Type 2: same school, related fields
  - Type 3: same school, related fields, overlapping cohorts

Empirical Findings

- Regression Estimations:

Type 2	+	2.89	**		
Type 3	+			2.74	**
fntu	+	1.53		2.75	**
fnctu	+	0.24		-0.67	
fnthu	(+/-)	-0.11		1.4	
fncku	(+/-)	-0.95		0.28	
fUSIvy Degree	(+/-)	0.45		0.12	
fUSnonivy Degree	-	-2.18	**	-1.85	*
Firm: ScienceDegree	+	2.03	**	1.6	*
Firm:MBADegree	(+/-)	-0.21		0.82	
VCntu	+	0.14		0.35	
VCnctu	(+/-)	-1.39		0.31	
Vcnthu	-	-0.22		-0.53	
Vcncku	+	1.12		0.25	
VCUSIvy Degree	(+/-)	-1.22		0.56	
VCUSnonIvy Degree	(+/-)	0.25		-0.82	
VC:ScienceDegree	+	1.63	*	2.76	**
VC:MBADegree	-	-1.69	*	-0.81	

Result

- Having undergraduate or graduate studies at the same school and receive the same degree better predicts venture capital fund performance.
- IT industry-specific human capital accumulated by more managers having science and engineering degrees are stronger predictors of superior fund performance.
- Fund management teams with more MBAs perform less well than others with science degrees

Avenues for Future Work

- Networks in non-IT sectors
- Government networks
- Cross-strait networks.

科技部補助計畫衍生研發成果推廣資料表

日期:2014/10/29

科技部補助計畫	計畫名稱: 雙向人脈資源累積與創業投資績效衡量: 以中國大陸，台灣及南韓等新興工業國家之教育網絡對高科技創業為例
	計畫主持人: 李文傑
	計畫編號: 102-2410-H-004-020- 學門領域: 經濟發展、技術變動與成長

無研發成果推廣資料

102 年度專題研究計畫研究成果彙整表

計畫主持人：李文傑	計畫編號：102-2410-H-004-020-
計畫名稱：雙向人脈資源累積與創業投資績效衡量: 以中國大陸，台灣及南韓等新興工業國家之教育網絡對高科技創業為例	

成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	0	1	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	1	1	100%		
		專書	1	1	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	5	5	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	1	1	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)	無

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

科技部補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

■達成目標

□未達成目標（請說明，以 100 字為限）

□實驗失敗

□因故實驗中斷

□其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：□已發表 ■未發表之文稿 □撰寫中 □無

專利：□已獲得 □申請中 ■無

技轉：□已技轉 □洽談中 ■無

其他：（以 100 字為限）

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以 500 字為限）

本文結果顯示－教育網絡衡量越緊密之創業投資案，其成功 IPO 之機率越高，因此本計畫研究成果也直接證實了教育網絡連結對創業投資案之資訊不對稱問題以及代理成本的解決有其不可或缺的地位。