行政院國家科學委員會專題研究計畫 期末報告

「智慧資本之研究：管理議題探討」三年整合型計畫--子計畫六 ： 創新資本投入與產出品質之跨國分析(第 3 年)

計 畫 主 持 人 ： 詹凌菁
共 同 主 持 人 ： 金成隆
計畫參與人員 ： 碩士班研究生-兼任助理人員：楊凱傑
　　　　　　　　碩士班研究生-兼任助理人員：張明芬
　　　　　　　　碩士班研究生-兼任助理人員：林家儀
　　　　　　　　碩士班研究生-兼任助理人員：李柏廷
　　　　　　　　碩士班研究生-兼任助理人員：高郁婷
　　　　　　　　碩士班研究生-兼任助理人員：林珮華

報 告 附 件 ： 出席國際會議研究心得報告及發表論文

公 開 資 訊 ： 本計畫涉及專利或其他智慧財產權，2 年後可公開查詢

中 華 民 國　 103 年 01 月 14 日

中 文 摘 要 ： 隨著透過無實體知識基礎資源來創造價值的企業逐漸增加，
以致產生了傳統財務報表可能較為缺乏價值攸關性的論點。
在本研究計畫中，我們將以跨國分析的方式，檢視在不同監
理制度下，研究發展投入及專利權品質的相關程度。另外，
因國際財務會計準則無形資產的認列要件可能與各地的會計
實務不盡相同，故關於逐漸趨同於國際財務會計準則的議
題，也是本研究所欲探討的範疇。國際會計準則將重點放在
公平價值以及資產負債的評價上，只要符合特定的要件，則
允許將內部發展之無形資產或研究發展支出資本化。
在本研究計畫的第三年，我們以財務報導環境之變動，探討
權益帳面價值、盈餘、無形資產與創新指標在採用國際會計
準則前後之價值攸關性的變化，以及財務報導環境的變化是
否改變創新投入與產出的關聯並影響財務分析師盈餘預測的
行為。我們選用中國與英國高科技公司做比較。實證結果發
現，無形資產價值攸關性在兩個國家採用國際會計準則後皆
有提升的現象，但是無形資產對於改善財務分析師盈餘預測
的影響只出現在中國高科技產業的樣本。

中文關鍵詞： 創新資本、研究發展支出、專利、財務報導動機、分析師預
測特性、國際會計準則之落實

英 文 摘 要 ： Businesses are increasingly creating value through
knowledge-based resources that lack physical
substance which leads to the argument that
conventional financial statements may have become
less value-relevant. In this project, we conduct a
global study to investigate the extent to which R&D
inputs and patent quality are correlated in different
regulatory and institutional environments. In
addition, the ongoing international convergence
toward International Financial Reporting Standards
(IFRS) is also of interest to this project as the
recognition criteria of intangible assets may be
different from the local accounting practice. IFRS
emphasize fair values and balance sheet valuation and
allows capitalization of internally developed
intangibles or R&D if certain criteria are met.
In the third year, we focus particularly on the
change in financial reporting environment. We
investigate the value-relevance of book values of
equity, net income, intangibles, and innovation
indicators pre and post the regulatory change for

countries that recently converge toward IFRS and whether such a change of accounting regulation alters the relation between innovation input and output and influences analysts' forecast behavior. Specifically, we choose high-tech firms in China and UK to facilitate the comparison. The findings suggest that the value-relevance of intangibles increases in both countries and that analysts' forecast accuracy associated with intangibles improves in China after the mandatory adoption of IFRS.

A global Analysis of the Association between Innovation Capital Input and Output Quality

「智慧資本之研究：管理議題探討」三年整合型計畫－子計畫六 ： 創新資本投入與產出品質之跨國分析

第三年期末報告

(NSC 99-2410-H-004 -020 -MY3)

Abstract

Businesses are increasingly creating value through knowledge-based resources that lack physical substance, which leads to the argument that conventional financial statements may have become less value-relevant. In this project, we conduct a global study to investigate the extent to which R&D inputs and patent quality are correlated in different regulatory and institutional environments. In addition, the ongoing international convergence toward International Financial Reporting Standards (IFRS) is also of interest to this project as the recognition criteria of intangible assets may be different from the local accounting practice. IFRS emphasize fair values and balance sheet valuation and allows capitalization of internally developed intangibles or R&D if certain criteria are met.

In the third year, we focus particularly on the change in financial reporting environment. We investigate the value-relevance of book values of equity, net income, intangibles, and innovation indicators pre and post the regulatory change for countries that recently converge toward IFRS and whether such a change of accounting regulation alters the relation between innovation input and output and influences analysts' forecast behavior. Specifically, we choose high-tech firms in China and UK to facilitate the comparison. The findings suggest that the value-relevance of intangibles increases in both countries and that analysts' forecast accuracy associated with intangibles improves in China after the mandatory adoption of IFRS.

Keywords: Innovation capital, R&D expenditures, Patents, Financial reporting incentives, analysts' forecast properties, IFRS implementation

中文摘要

隨著透過無實體知識基礎資源來創造價值的企業逐漸增加，以致產生了傳統財務報表可能較為缺乏價值攸關性的論點。在本研究計畫中，我們將以跨國分析的方式，檢視在不同監理制度下，研究發展投入及專利權品質的相關程度。另外，因國際財務會計準則無形資產的認列要件可能與各地的會計實務不盡相同，故關於逐漸趨同於國際財務會計準則的議題，也是本研究所欲探討的範疇。國際會計準則將重點放在公平價值以及資產負債的評價上，只要符合特定的要件，則允許將內部發展之無形資產或研究發展支出資本化。

在本研究計畫的第三年，我們以財務報導環境之變動，探討權益帳面價值、盈餘、無形資產與創新指標在採用國際會計準則前後之價值攸關性的變化，以及財務報導環境的變化是否改變創新投入與產出的關聯並影響財務分析師盈餘預測的行為。我們選用中國與英國高科技公司做比較。實證結果發現，無形資產價值攸關性在兩個國家採用國際會計準則後皆有提升的現象，但是無形資產對於改善財務分析師盈餘預測的影響只出現在中國高科技產業的樣本。

關鍵詞：創新資本、研究發展支出、專利、財務報導動機、分析師預測特性、國際會計準則之落實

1. Introduction

International Financial Reporting Standards are accounting standards issued by the International Accounting Standards Board (IASB), an independent organization based in London. The objectives are to develop high quality, understandable and enforceable global accounting standards, promote the use and rigorous application of those standards, and bring about convergence. Ball (2006) interprets the quality of financial reporting as accurate depiction of economic reality, low capacity for managerial manipulation, and timeliness which is defined as recording all economic-value added eventually and timelier recognition of bad news than good news. Although accounting policy disclosures are required in most countries, there may be considerable variation in accounting policy disclosures within and across countries. The adoption of IFRS offers direct and indirect advantages to investors. Higher quality of financial reporting reduces information risk which would result in lower costs of equity capital and increase equity prices. In the final year of this project, we are concerned about the effect of IFRS on investors' ability to forecast earnings. Better accounting quality makes reported earnings less noisy and more value-relevant. This would make earnings easier to forecast and improve analysts' forecast accuracy, other things equal (Lang et al., 2003; Ashbaugh and Pincus, 2001). In contrast, others such as Ball et al. (2000) argue that managers in low-quality reporting regimes tend to smooth earnings to meet various objectives such as reducing the volatility of payouts to stakeholders including employee bonuses and dividends, reducing corporate tax payments, and avoiding recognizing losses. However, earnings are more informative and volatile in high-quality regimes. This is bolstered by the emphasis of fair value accounting in IFRS which aims to incorporate more-timely information about economic gains and losses. This induces volatility in reported earnings and may become a disadvantage to users of financial statements if it reflects managerial manipulation.

Despite increased globalization in accounting, most political and economic influences on financial reporting practices remain local (Ball, 2006). That is, IFRS enforcement may be uneven around the world. This argument is supported by recent studies investigating the roles of accounting

standards and incentives of preparers in determining financial reporting practice (Ball et al., 2000; Ball et al., 2003; Bushman and Piotroski, 2006; Leuz, 2003; Leuz and Oberholzer, 2006). The concern related to uneven implementation is that investors may be misled into believing that there is more uniformity in practice which may result in higher information processing costs (Ball, 2006). The movement toward fair value accounting in IFRS would rely more on manager and auditor judgment and therefore is subject to local institutional influence. For instance, the implementation of IAS 38 'Intangible Assets' and IAS 36 'Impairment of Assets' requires subjective assessments of future cash flows which is subject to a large degree of management discretion.

According to IAS 38, companies are required to recognize an intangible asset whether purchased or self-created if it is probable that the future economic benefits attributable to the asset will flow to the business and the cost of the asset can be measured reliably. If an intangible does not meet the criteria for recognition as an asset, the standard requires the expenditure on this item to be recognized as an expense when it is incurred. The predominant accounting practice of R&D is to require the immediate expensing of all research costs. The IASB has attempted to avoid some of the problems of differentiating between research costs and development costs by employing the terms research-phase costs and development-phase costs in IAS 38. According to IAS 38, if it is not possible to determine which phase a cost has been incurred in, it is considered to have been incurred in the research phase and is required to be immediately expensed. Hung and Subramanyam (2007) state that IFRS emphasizes fair value accounting and balance sheet valuation such as the use of fair value for financial instruments and recognition of internally developed intangibles. They find that using a sample of German firms, the adjustments related to intangibles and R&D increase the book value of equity and are economically significant, which is likely due to the capitalization of internally developed intangibles and development costs required by IAS 38.

We explore the impact of the adoption of IFRS on the reporting of businesses' innovation activities. In particular, we investigate the value relevance of intangible assets, and innovation input and output which are measured as R&D expenditures and patent-related attributes. Following the

first and second year projects, we further investigate the correlation between R&D expenditures and patent grants pre and post the adoption of IFRS. The findings have implications to accounting standard setters, management and investors with respect to the reporting of innovation activities in the financial statements.

2. Literature review and hypotheses development

The adoption of IFRS offers various advantages to equity investors. For instance, by providing timely financial statement information, it could lower the risk to investors and result in more-informed valuation in the equity market. In addition, by eliminating international difference in accounting standards, IFRS may remove many of the adjustments analysts historically have made in order to facilitate international comparisons. In other words, IFRS offer increased comparability and reduce information risk and adverse selection problems (e.g. Verrecchia, 2001). Extant literature on the consequence of IFRS adoption largely seeks to verify whether it brings about the economic benefit expected for equity markets and can be categorized into voluntary and mandatory adoption settings. Leuz and Verrecchia (2000) and Leuz (2003) find evidence of a reduction in information asymmetry proxied by bid/ask spreads, trading volume, and share price volatility among German voluntary adopters.

Despite the global convergence to IFRS, economic and political forces remain local. For instance, difference in the legal system (e.g. code-law vs. common-law), financial market structure (e.g. closeness of relationship between banks and client companies), and corporate governance system could all influence the implementation of rules. Ball (2006) argues that compared to the historically legalistic, political and tax-influenced standards in Continental Europe, IFRS are designed to reflect substance more than legal form, reflect economic gains and losses in a more timely manner, make earnings more informative, and reduce the tendency of managers to manipulate provisions, create hidden reserves, smooth earnings, and hide economic losses. Burgstahler et al. (2006) state that it is important to examine the role of institutional factors and

capital market forces in determining firms' incentives in financial reporting. Consequently, reporting incentives and the factors shaping them are likely to play an integral role for accounting quality. Burgstahler et al. (2006) interpret accounting quality in terms of the degree of earnings management and find a substantial variation in earnings informativeness between private and public firms in EU countries due to difference in reporting incentives, despite the effort of accounting harmonization. They also find that earnings management is more pervasive in countries with weaker legal systems and enforcement and that public firms engage less in earnings management among countries with highly developed equity markets.

As countries vary in history, development, and culture, they vary in corporate governance systems. Certain pressures from the governance mechanism may induce a firm to maintain a certain information quality level. Ball et al. (2000) investigate the difference in financial reporting quality between common-law and code-law countries. Common law arises from what is commonly accepted to be appropriate practice and tends to be more market-oriented. It originated from UK and spread to its former colonies (US, Canada, Australia, New Zealand). It assumes that investors rely on more timely public disclosures and financial reporting. In common-law based countries, earnings are more volatile and informative and closely followed by investors and analysts. In contrast, in the code law system, rules are coded in the public sector. It originated in Continental Europe and spread to the former colonies of France, Germany, Italy and Spain. These countries are less market-oriented, less litigious and more likely to solve information asymmetry through insider access. Consequently, earnings are less volatile and less informative. Ball et al. (2003) study four East Asian countries (i.e. Hong Kong, Malaysia, Singapore and Thailand) and argue that the companies in these countries are more likely to operate through an insider access model and there is less emphasis on public financial reporting and disclosures. The findings of these studies indicate that difference in financial reporting behavior is endogenous and is determined by local economic and political factors. Ball (2006) argues that the experience of Continental European countries, China and East Asia in importing international standards derived from a common law view of

financial reporting illustrates the difficulty of obtaining change in actual financial reporting practice by importing exogenously developed accounting standards into a complex political and economic environment.

There is extensive research on the economic consequences of the adoption of IFRS. Christensen et al. (2008) investigate voluntary and mandatory IFRS adopters in Germany and find that accounting quality improves only among voluntary adopters and attribute this difference to compliance incentives. Daske et al. (2007) classify IFRS adopters into "serious" and label" groups based on changes in the page number of annual report around the adoption year to account for the degree of compliance incentive among a sample of voluntary adopters. They find cost of equity capital reduction among "serious" but not "label" adopters. The evidence confirms their conjecture that financial reporting incentives determine economic benefits. Barth et al. (2008) find that the adoption of IFRS is associated with higher quality of accounting than application of non-US domestic standards. Karamanou and Nishiotis (2005) find positive abnormal returns for a sample of non-US firms announcing voluntary adoption of IAS. Others such as Ashbaugh and Pincus (2001) find that convergence efforts relating to IAS resulted in reductions in analyst forecast errors. Armstrong et al. (2009) examine the stock market reactions to events associated with the adoption of IFRS in Europe. They find a negative reaction for firms in code law countries and a positive reaction for firms with high quality pre-adoption information. The former finding is in support of investors' concern over the enforcement of IFRS in code-law countries while the latter result is consistent with investors' expecting net benefits from the adoption of IFRS. Investors may believe that the variation in the implementation and enforcement of IFRS could lead to greater exercise of opportunistic managerial discretion. Evidence shows substantial difference in information quality within Europe even after the convergence effort prior to the adoption of IFRS in year 2005.

According to IAS 38, development expenditures are required to be capitalized if certain criteria are met, while they more often are expensed as incurred in local accounting standards and an option to capitalize may be available. Gjerde et al. (2008) find that, in a sample of Norwegian firms, the

increased value-relevance of earnings after the adoption of IFRS comes from the reporting of intangible assets. As more intangibles are capitalized under IFRS, their finding supports the view that capitalizing intangible assets is more value-relevant than expensing them as incurred (Lev and Sougiannis, 1996; Lev and Zarowin, 1999). Gjerde et al. (2008) also show that the largest difference in reported income between IFRS and Norwegian GAAP is accounting for intangible including the non-amortization of goodwill and capitalization of development expenditures.

We develop the following hypotheses regarding the impact IFRS on the value-relevance of capitalized intangibles, and innovation inputs and outputs, the correlation between R&D inputs and outputs, and analysts' forecast properties.

$H1_a$: The value-relevance of intangibles is higher after the adoption of IFRS.

$H1_b$: The increase in the value-relevance of intangibles after the adoption of IFRS is more pronounced in weaker institutional environments.

$H2_a$: The correlation between innovation input and output varies between pre- and post-IFRS period.

$H2_b$: The difference in the correlation between innovation input and output pre- and post-IFRS period is more pronounced in weaker institutional environments.

$H3_a$: Analysts' forecast error and forecast dispersion associated with innovation input and output decreases after the adoption of IFRS.

$H3_b$: The decrease in analysts' forecast error and forecast dispersion associated with innovation input and output decreases after the adoption of IFRS is more pronounced in weaker institutional environments.

3. Research methods, sample and data

3.1 Research methods

To investigate the value-relevance of book value of equity, earnings, capitalized intangibles, and innovation inputs and outputs, we perform the following regressions:

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 NI_{it} + \alpha_3 IFRS_{it} + \alpha_4 IFRS_{it} * BV_{it} + \alpha_5 IFRS_{it} * NI_{it} + \alpha_6 SIZE_{it} +$$

$$\alpha_7 LEV_{it} + \alpha_8 ROA_{it} + \alpha_9 GRO_{it} + Year + \varepsilon_{it} \qquad (1)$$

$$P_{it} = \alpha_0 + \alpha_1 INTANG_{it} + \alpha_2 LOGPAT_{it} + \alpha_3 RD_{it} + \alpha_4 IFRS_{it} + \alpha_5 IFRS_{it} * INTANG_{it} +$$

$$\alpha_6 IFRS_{it} * LOGPAT_{it} + \alpha_7 IFRS_{it} * RD_{it} + \alpha_8 SIZE_{it} + \alpha_9 LEV_{it} + \alpha_{10} ROA_{it} +$$

$$\alpha_{11} GRO_{it} + Year + \varepsilon_{it} \qquad (2)$$

where P_{it} is share price three months after the fiscal year end t; BV_{it} is book value of equity; NI_{it} is earnings per share; RD_{it} is R&D expenditures per share; $INTANG_{it}$ is capitalized intangible assets divided by number of outstanding shares; and $IFRS_{it}$ is a dummy variable equal to one for the year after the convergence toward IAS 38 which allows for the choice of capitalizing development costs, and zero otherwise. Non-financial indicators include log of patent count (*LOGPAT*). Control variables include SIZE measured as log of total assets; the degree of leverage (LEV) measured as total liability divided by total assets; ROA is net income scaled by total assets; GRO is sales growth; and Year is year fixed effect. We predict that the coefficient of the interactive terms of IFRS with financial items *BV*, *NI*, and *INTANG* and the non-financial variables LOGPAT to be positive. Following the project from previous years, we would further compare the results between strong and weak institutional environments and expect that the improvement would be more pronounced in weaker institutional environments where information quality of financial reporting is considered to be poorer before the mandatory adoption of IFRS.

To investigate the choice of allowing the capitalization of development costs on the correlation between innovation input and output quality, we use R&D expenditures as innovation input indicator and patent counts as the innovation output quality indicator. We use the following regression to investigate whether the relation between innovation input and output has changed following the implementation of IAS 38:

$$\text{LOGPAT}_{i,t+x} = \alpha_0 + \alpha_1 \text{RD}_{it} + \alpha_2 \text{INTANG}_{it} + \alpha_3 \text{IFRS}_{it} + \alpha_4 \text{IFRS}_{it} * \text{RD}_{it} + \alpha_5 \text{IFRS}_{it} * \text{INTANG}_{it}$$

$$+ \alpha_6 \text{LEV}_{it} + \alpha_7 \text{SIZE}_{it} + \alpha_8 \text{MB}_{it} + \alpha_9 \text{CAPEX}_{it} + \text{Year} + \varepsilon_{it} \qquad (3)$$

where LOGPAT is the cumulated patent counts; MB is the market-to book ratio; and *CAPEX* is capital expenditure per share. Other variables are as previously defined. IAS 38 allows for the capitalization of development costs which may reduce the correlation between LOGPAT and RD in the post-IFRS period.

Following the results from the second year project, we further explore the influence of the adoption of IFRS on analysts forecast characteristics and whether analysts' forecast accuracy improves by applying the following regressions:

$$\text{AbFE}_{it} = \alpha_0 + \alpha_1 \text{RD}_{it} + \alpha_2 \text{LOGPAT}_{it} + \alpha_3 \text{INTANG}_{it} + \alpha_4 \text{IFRS}_{it} + \alpha_5 \text{IFRS}_{it} * \text{RD}_{it} +$$

$$\alpha_6 \text{IFRS}_{it} * \text{LOGPAT}_{it} + \alpha_7 \text{IFRS}_{it} * \text{INTANG}_{it} + \alpha_8 \text{SIZE}_{it} + \alpha_9 \text{EVAR}_{it} + \alpha_{10} \text{MB}_{it} +$$

$$\alpha_{11} \text{FOLLOW}_{it} + \text{Year} + \varepsilon_{it} \qquad (4)$$

$$\text{FD}_{it} = \alpha_0 + \alpha_1 \text{RD}_{it} + \alpha_2 \text{LOGPAT}_{it} + \alpha_3 \text{INTANG}_{it} + \alpha_4 \text{IFRS}_{it} + \alpha_5 \text{IFRS}_{it} * \text{RD}_{it} +$$

$$\alpha_6 \text{IFRS}_{it} * \text{LOGPAT}_{it} + \alpha_7 \text{IFRS}_{it} * \text{INTANG}_{it} + \alpha_8 \text{SIZE}_{it} + \alpha_9 \text{EVAR}_{it} +$$

$$\alpha_{10} \text{MB}_{it} + \alpha_{11} \text{FOLLOW}_{it} + \text{Year} + \varepsilon_{it} \qquad (5)$$

where *AbFE* is the absolute value of analyst forecast error calculated as the difference between actual earnings and mean financial analysts' earnings forecast; *FD* is forecast dispersion measured as standard deviation of financial analysts' forecasts for firm *i* in year *t* divided by mean financial analysts' earnings forecast; earnings variability (*EVAR*) is calculated as the standard deviation of reported earnings over the past five years; firm growth is measured as the market-to-book ratio (*MB*); *FOLLOW* is the natural logarithm of the number of analysts with earnings forecasts for the

current fiscal year. Other variables are as previously defined. We predict that the coefficients of IFRS*RD and LOGPAT*IFRS to be are negative in equations (4) and (5) as analysts' forecast accuracy may improve and forecast dispersion may be smaller after the adoption of IFRS.

3.2 Data and sample

We choose two countries to test the research questions, China and UK. The sample consists of Chinese high-tech firms listed on the Shanghai Stock Exchange and ShenZhen Stock Exchange, and UK high-tech firms listed on the London Stock Exchange. The accounting and market data for Chinese and UK listed companies are collected from CSMAR and Worldscope, respectively. Analysts' forecasts for Chinese and UK companies are from CSMAR and I/B/ES, respectively. The data for patents were collected from Global Patent Search (GPSA). The sample test period covers 4 years before and after the mandatory adoption of IFRS. For the Chinese high-tech firms, the test period is from 2003 to 2010. As the change accounting regime for Chinese firms start from year 2007, the IFRS dummy in equations (1) to (5) is set to 1 for years after 2007, and 0 otherwise. For UK high-tech firms, the test period is from 2001 to 2008. As the change accounting regime for UK firms start from year 2005, the IFRS dummy in equations (1) to (5) is set to 1 for years after 2005, and 0 otherwise. We argue that if there is an improvement in the value relevance of intangibles and analysts forecast accuracy associated with innovation indicators, such improvement would be more pronounced among Chinese companies as there is greater difference between Chinese accounting standards and IFRS and the institutional environment is weaker in China.

4. Empirical results

4.1 Descriptive statistics

Panel A of Table 1 presents descriptive statistics for Chinese companies listed in the Shanghai and Shenzhen markets. We include only high-tech sectors in our sample, which consists of 8,001 firm-year observations. As Chinese companies do not report R&D expenditures in the financial

statements, we rely on the notes in the financial reports to hand collect this item. Despite our effort, majority of Chinese firms still do not disclose this information. The median values of book value per share and earnings per share are 4.016 and 0.263. The average intangible assets per share is 0.294 and the average patent count is 14.123. There is great variability in granted patents as a large number of the sample firms do not have patents. To mitigate this concern, we take the log of one plus patent counts in performing regression analyses. The average ROA is 0.024. average sales growth is 0.152, and average leverage is 0.512. The mean values of MB and capital expenditure (CAPEX) are 0.003 and 0.554.

[TABLE 1 ABOUT HERE]

Panel B of Table 1 reports descriptive statistics for UK high-tech companies. The mean values of book value per share and earnings per share are 116.84 and 3.836. The average intangibles per share is 2.914. The mean value of patent count is 12.793 and the average R&D per share is 2.918. The mean values of MB and capital expenditure (CAPEX) are 1.376 and 12.122. These findings indicate that Chinese high-tech firms are larger in size and are more profitable. In addition, Chinese high-tech firms have higher sales growth and lower degrees of leverage.

4.2 Value relevance

Table 2 reports the regression results of the value relevance of book values, earnings, and intangibles before and after IFRS adoption for high-tech firms in China. In Panel A, we find that book value and earnings have higher value relevance after IFRS adoption. The adjusted R-square is 0.629 after controlling for firm characteristics and year fixed effect. Turning to intangible resources, Panel B shows that intangibles and R&D expenditures are value relevant in the pre-IFRS period and that booked intangibles and patent quantity has increased value relevance after mandatory IFRS adoption. The coefficients on IFRS*INTANG and IFRS*LOGPAT are both positive and significant

(0.442, *p-value* = 0.0062; 16.172, *p-value* = 0.0003). We further separate the sample into high-and low-innovative firms based on the median value of patent counts. The adjusted R-square of the highly-innovation sample is higher than that of low-innovation sample (0.505 vs. 0.335). The interactive terms of IFRS*INTANG and IFRS*RD are both positive and significant. This suggests that evidence of increased value relevance of booked intangible resources and innovation input (R&D investment) among both high- and low-innovative Chinese firms after the accounting regime switch to IFRS in year 2007.

[TABLE 2 ABOUT HERE]

Table 3 reports the regression results of the value relevance of accounting items and intangibles before and after IFRS adoption for UK high-tech companies. Panel A shows that only book values have increased value relevance in the post-IFRS period (0.007, *p-value* = 0.0418). Panel B reports the results of intangibles, patent counts, and R&D expenditures. The coefficient of IFRS*NI is negative probably due to the higher volatility of earnings after the adoption of IFRS. Panel B reports the value relevance of intangibles, and innovation inputs and outputs. The coefficient of IFRS*INTANG is significantly positive (0.15, *p-value* = 0.0006), suggesting that the value relevance of intangibles has increased from pre to post IFRS period. However, there is no difference in the value relevance of patent count and R&D expenditures before and after the mandatory IFRS adoption in year 2005. We further separate the UK sample into high innovative and low innovative firms based on the median patent counts. The adjusted R-square of the highly-innovation sample is higher than that of low-innovation firms (0.475 vs. 0.133). The interactive term IFRS*INTANG and IFRS*RD is positive and significant only among highly-innovative firms. These findings indicate that the impact of IFRS on the value relevance of R&D and intangibles exists mainly among those highly innovative firms.

[TABLE 3 ABOUT HERE]

Overall, the results in Tables 2 and 3 suggest that (i) the value relevance of both net income and earnings is higher among Chinese high-tech firms, while UK high-tech firms display greater relevance of book value only in the period after the mandatory adoption of IFRS; (ii) the value relevance of intangible assets of both Chinese and UK high-tech firms have improved after the mandatory adoption of IFRS; and (iii) the value relevance of granted patent has improved among Chinese high-tech firms in the post-IFRS period.

4.3 Relation between innovation inputs and outputs

Table 4 reports the results on the relation between R&D intensity and patents. Panel A shows that for Chinese high-tech firms, R&D expenditures are positively associated with innovation outputs in the pre-IFRS period (3.018, *p-value* = 0.0012), while this relation becomes weaker in the post-IFRS period. Untabulated results excluding firms without any R&D expenditures are also consistent with the reported findings. Similar to the findings in Panel A, UK high-tech firms also demonstrate that the association between R&D inputs and outputs is stronger in the pre-IFRS period (0.018, *p-value* = 0.0003). In addition, the interactive term IFRS*INTANG is negative, suggesting that the relation between booked intangibles and patent counts is stronger in the pre-IFRS period. Of the control variables, larger firms have more patents, while higher leverage firms are associated with less patent counts. Overall, these results are consistent with the conjecture that the adoption of IAS 38, which allows companies to recognize an intangible asset whether purchased or self-created if it is probable that the future economic benefits attributable to the asset will flow to the business and the cost of the asset can be measured reliably, has altered the relation between R&D expenditures and patent counts.

[TABLE 4 ABOUT HERE]

4.4 Analysts' forecast characteristics

Table 5 reports the regression results of analysts' forecast errors and forecast dispersion. After excluding firms with missing analysts forecast data, the Chinese sample consists of 4,507 firm-year observations, and the UK sample consists of 195 firm-year observations. Untabulated analyses show that the median values of forecast error for the Chinese and UK sample are 0.015 and 0.078, respectively. The median values of forecast dispersion for the Chinese and UK sample are 0.110 and 0.191, respectively. For high-tech firms in China (Panel A), we find that book intangibles significantly reduce forecast error after the mandatory adoption of IFRS (-0.016, *p-value* = 0.0122), while R&D and patent counts do not have any impact on forecast error. In addition, R&D expenditures and intangible assets are associated with lower forecast dispersion in the post-IFRS period. The adjusted R-squares in the regressions of analysts' earnings forecast and dispersion are 20.7% and 32.4% respectively. Of the control variables, earnings variability has a significantly positive effect on forecast errors and dispersion. MB and FOLLOW are positively associated with forecast error, while negatively associated with forecast dispersion. In Panel B, among the high-tech firms in UK, we find that patent counts reduce forecast error in the post-IFRS period, while R&D expenditures increases forecast dispersion in the post-IFRS period (0.485, *p-value* = 0.051). Of the control variables, SIZE is negatively associated with forecast error and dispersion, while EVAR and MB increase forecast error and dispersion. Overall, the findings imply that analysts in China benefit more from allowing firms to capitalize internally developed intangibles or R&D if certain criteria are met than those in the UK.

[TABLE 5 ABOUT HERE]

5. Conclusions

The findings of the third year project complement accounting research on the economic

15

consequences of IFRS by providing a comprehensive analysis on the adoption of IAS 38 on the value-relevance of R&D and intangibles, the relation between innovation inputs and outputs, and analysts' forecasting process. We argue that the emphasis of fair value accounting would require more judgment about future cash flow and that incentives of preparing financial statements which are influenced by local political and economic factors could result in difference in the implementation of IFRS and the quality of financial reporting. Overall, the evidence provides implications of the impact of IFRS on the equity markets, particularly among intellectual capital intensive sectors. The results suggest that despite differences in institutional environment across countries, the change of accounting regime to IFRS provides innovative-intensive firms with greater opportunities to demonstrate the values of their intangible resources in the financial statements.

6. Overall conclusions of the multi-year project

Businesses are increasingly creating value through knowledge-based resources that lack physical substance which leads to the argument that conventional financial statements may have become less value-relevant (Lev and Sougiannis, 1996). R&D investment is one of the most important corporate strategies that firms have to make despite that investments in R&D do not always result in immediate product innovation. The relatively scarce information about R&D contributes to information asymmetries between corporate management and outside investors. Patents are usually seen as the accomplishments of R&D activities as successful applicants have the right to exclude other competitors from making use of the patented invention and create a legal monopoly. Thus, patent-related measures are useful to assess the technological competitiveness of a firm's new products and processes and are good indicators of innovation output. In this project, we conduct a global study to investigate the extent to which R&D inputs and patent quality are correlated in different regulatory and institutional environments. In addition, the ongoing international convergence toward IFRS is also of interest to this project as the recognition criteria of intangible assets may be different from the local accounting practice. IFRS emphasize fair values

and balance sheet valuation, and allows capitalization of internally developed intangibles or R&D if certain criteria are met.

In the first year of the project, we examine whether difference in the incentives for earnings management influences the correlation between innovation input and output quality. In particular, we focus on the correlation between innovation inputs and outputs. We choose two countries, Taiwan and UK, to facilitate the comparisons. The results show that Taiwanese high-tech firms generate stronger relation between R&D inputs and patents than UK high-tech and that innovation efficiency improves future performance only among Taiwanese high-tech firms. In the second year, we further investigate the role of R&D and patent-related attributes in the decision process of sophisticated market participants across different institutional settings. We focus on financial analysts as information intermediaries as the ability of analysts to incorporate value-relevant information in their forecasts may impact security prices. Hope (2003) finds that strong enforcement of accounting standards is associated with higher forecast accuracy. We examine whether different institutional settings affect the characteristics of analysts' forecasts in incorporating financial and non-financial information. Specifically, we focus on the effect of innovation efficiency measured as patent counts scaled by R&D capital on analysts' forecast errors and forecast dispersion. Following the first year project, we choose Taiwan and UK high-tech companies as our test samples to facilitate the comparison between code and common law countries. The high-tech sectors include biotechnology and electronics. We find that there exists a positive association between innovation efficiency and analysts' forecast errors and dispersions among high-tech firms in Taiwan. However, there is no such evidence among high-tech firms in UK. Overall, the results imply that innovation activities generate asymmetric information between managers and investors and that investors are unable to fully incorporate innovation-related information in forecasting earnings. This is more pronounced in institutional environments where the degrees of transparency of information environment and investor protection are low. In the third year, we focus particularly on the change in the financial reporting environment. We investigate the

value-relevance of intangibles pre and post the regulatory change for countries that recently converge toward IFRS and whether such a change of accounting regulation alters the correlation between innovation input and output quality and influences analysts' forecast behavior. Specifically, we choose high-tech firms in China and UK to facilitate the comparison. The findings suggest that the intangibles have increased their value relevance in both countries and reduced analysts' forecast errors in China after the mandatory adoption of IFRS.

References

Armstrong, C., Barth, M. E., Jagolinzer, A. D., and Riedl, E. J. (2009), '' Market reaction to the adoption of IFRS in Europe''. *The Accounting Review*, forthcoming.

Ashbaugh, H. and Pincus, M. (2001), ''Domestic Accounting Standards, International Accounting Standards, and the Predictability of Earnings''. *Journal of Accounting Research,* 39: 417–434.

Ball, R. (2006), ''International Financial Reporting Standards (IFRS): pros and cons for investors''. *Accounting and Business Research*, 36: 5–27.

Ball, R., Kothari, S. P., and Robin, A. (2000), ''The effect of international institutional factors on properties of accounting earnings''. *Journal of Accounting and Economics*, 29: 1–51.

Ball, R., Robin, A., and Wu, J. (2003), ''Incentives versus standards: properties of accounting income in four East Asian countries''. *Journal of Accounting and Economics*, 36: 235–270.

Barth, M., Landsman, W., and Lang, M. (2008), ''International Accounting Standards and accounting quality''. *Journal of Accounting Research*, 46 (3): 467–498.

Burgstahler, D. C., Hail, L., and Leuz, C. (2006), ''The importance of reporting incentives: Earnings management in European public and private firms''. *The Accounting Review*, 81 (5): 983–1016.

Bushman, R. and Piotroski, J. (2006), ''Financial reporting incentives for conservative accounting: The influence of legal and political institutions''. *Journal of Accounting and Economics*, 42: 107–148.

Christensen, H., Lee, E., and Walker, M. (2008), ''Incentives or standards: What determine accounting quality change around IFRS adoption?''. Available at SSRN: http://ssrn.com/abstract=1013054

Daske, H., Hail, L., Leuz, C., and Verdi, R. (2007), ''Adopting a label: Heterogeneity in the economic consequences of IFRS adoption''. Available at SSRN: http://ssrn.com/abstract=979650

Gjerde, O., Knivsfla, K., and Saettem, F. (2008), ''The value-relevance of adopting IFRS: Evidence from 145 NFAAP restatements''. Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=966080

Hope, O.-K. (2003), "Disclosure practices, enforcement of accounting standards, and analysts' forecast accuracy: An international study''. *Journal of Accounting Research*, 41 (2): 235–272.

Hung, M. and Subramanyam, K. R. (2007), ''Financial statement effects of adopting International Accounting Standards: The case of Germany''. *Review of Accounting Studies*, 12: 623–657.

IASB (2009), "IAS 36 Impairment of Assets, International Accounting Standard Board''. Available at SSRN: www.iasplus.com/standard/ias36.htm

IASB (2009), ''IAS 38 Intangible Assets, International Accounting Standard Board''. Available at SSRN: www.iasplus.com/standard/ias38.htm

Karamanou, I. and Nishiotis, G. (2005), ''The Valuation Effects of Firm Voluntary Adoption of International Accounting Standards''. Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=676328

Lang, M., Smith Raedy, J., and Higgins Yetman, M. (2003), ''How representative are firms that are cross-listed in the United States? An analysis of accounting quality''. *Journal of Accounting Research,* 41: 363–386.

Leuz, C. (2003), ''IAS versus US GAAP: Information asymmetry-based evidence from Germany's new market''. *Journal of Accounting Research*, 41 (3): 445–472.

Leuz, C. and Verrecchia, R. (2000), ''The economic consequences of increased disclosure''. *Journal*

of Accounting Research, 38 (3): 91–124.

Leuz, C. and Oberholzer-Gee, F. (2006), ''Political Relationships, Global Financing, and Corporate Transparency''. *Journal of Financial Economics*, 81 (2): 411–439. .

Lev, B. and Sougiannis, T. (1996), ''The capitalization, amortization, and value-relevance of R&D''. *Journal of Accounting and Economics*, 21: 107–138.

Lev, B. and Zarowin, P. (1999), ''The boundaries of financial reporting and how to extend them''. *Journal of Accounting Research*, 37 (2): 353–85.

Verrecchia, R. E. (2001), ''Essays on disclosure''. *Journal of Accounting and Economics*, 32 (1-3): 97–180.

Table 1 Descriptive statistics

Panel A: High-tech companies in China (Obs. = 8,001)

	Mean	Q1	Median	Q3	Stdev
Price	12.096	4.440	7.910	14.700	12.550
BV	4.016	2.162	3.365	4.988	3.201
NI	0.263	0.048	0.200	0.470	0.530
INTANG	0.294	0.063	0.178	0.382	0.385
PAT	14.123	0.000	0.000	5.000	144.954
LOGPTAT	0.964	0.000	0.000	1.792	1.357
SIZE	21.312	20.574	21.194	21.926	1.095
LEV	0.512	0.340	0.487	0.623	0.342
ROA	0.024	0.010	0.033	0.063	0.097
GRO	0.152	-0.060	0.132	0.315	0.634
MB	0.003	0.001	0.003	0.004	0.004
CAPEX	0.554	0.108	0.309	0.697	0.737
EVAR	0.266	0.064	0.148	0.304	0.378
RD	0.037	0.000	0.000	0.021	0.091

Panel B: High-tech companies in UK (Obs. = 584)

	Mean	Q1	Median	Q3	Stdev
Price	2.251	0.022	0.121	0.508	6.545
BV	116.840	0.991	7.354	35.382	300.874
NI	3.836	0.006	0.503	3.295	85.037
INTANG	2.914	0.000	0.058	1.172	10.765
PAT	12.793	1.000	2.000	8.000	48.943
LOGPTAT	1.471	0.693	1.099	2.197	1.248
SIZE	15.102	11.231	15.609	18.101	3.995
LEV	0.607	0.404	0.600	0.788	0.308
ROA	-0.031	0.002	0.026	0.066	0.503
GRO	0.471	-0.037	0.053	0.162	6.680
MB	1.376	0.954	1.609	2.811	26.782
CAPEX	12.122	0.075	0.654	3.767	39.111
EVAR	10.467	0.062	0.413	3.183	68.328
RD	2.918	0.000	0.000	0.101	16.425

The table reports descriptive statistics of companies listed on the Shanghai Stock Exchange and Shenzhen Stock Exchange over the period 2003–2010 (Panel A) and London Stock Exchange over the period 2001–2008 (Panel B). Price is share price; BV is book value per share; NI is earnings per share; PAT is the quantity of granted patents; LOGPAT is natural log of one plus patent counts; LEV is leverage measured by the ratio of total liability to total assets at the fiscal-year end; SIZE is measured as natural log of total assets; LEV is total liability scaled by total assets; ROA is net income divided by total assets; GRO is sales growth; MB is the market-to-book ratio; CAPEX is capital expenditure per share; EVAR is the standard deviation of earnings per share over the last five years; and RD is R&D expenditures per share.

Table 2 Value relevance of accounting items and patent counts among Chinese high-tech firms

Panel A: Value relevance of book value of equity and earnings

	Coeff.	*p*-value	Coeff.	*p*-value
Intercept	6.251	<.0001	42.765	<.0001
BV	0.098	0.0252	0.040	0.5392
NI	3.117	<.0001	7.068	<.0001
IFRS	5.267	<.0001	5.259	<.0001
IFRS*BV	0.524	<.0001	0.540	<.0001
IFRS*NI	12.841	<.0001	12.247	<.0001
SIZE			-1.616	<.0001
LEV			-4.135	<.0001
ROA			-23.766	<.0001
GRO			-0.645	0.0003
Year fixed effect	YES		YES	
Adj. R^2	0.591		0.629	
Obs.	8,001		8,001	

Panel B: Value relevance of intangibles, patent counts, and R&D expenditures

	All		High-innovative firms		Low-innovative firms	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
Intercept	21.098	<.0001	8.527	0.0509	7.407	0.0064
INTANG	9.926	<.0001	8.201	<.0001	7.574	<.0001
LOGPAT	-0.274	0.2657				
RD	1.557	0.0064	1.408	0.008	-0.757	0.0033
IFRS	0.393	<.0001	1.725	0.0833	0.761	0.233
IFRS*INTANG	0.442	0.0062	12.527	0.1775	22.689	0.0005
IFRS*LOGPAT	16.172	0.0003				
IFRS*RD	2.925	0.5866	22.852	0.0189	13.625	0.0853
SIZE	-0.582	<.0001	0.159	0.4494	0.024	0.8486
LEV	-3.543	<.0001	-9.591	<.0001	-2.255	<.0001
ROA	25.884	<.0001	63.131	<.0001	16.530	<.0001
GRO	-1.169	<.0001	-5.320	<.0001	-0.077	0.7776
Year fixed effect	YES		YES		YES	
Adj. R^2	0.407		0.505		0.350	
Obs.	8,001		2,979		5,022	

Panel B divides companies into high- and low-innovative firms based on the median value of patent counts. Variables are defined in the notes of Table 1.

Table 3 Value relevance of accounting items and patent counts among UK high-tech firms

Panel A: Value relevance of book value of equity and earnings

	Coeff.	*p*-value		Coeff.	*p*-value
Intercept	0.721	0.174		-0.032	0.9626
BV	0.015	<.0001		0.015	<.0001
NI	0.003	0.4588		0.003	0.428
IFRS	-1.679	0.0078		-1.675	0.0074
IFRS*BV	0.007	0.0471		0.007	0.0418
IFRS*NI	-0.018	0.1261		-0.018	0.1203
SIZE				0.009	0.8022
LEV				1.054	0.0171
ROA				-0.002	0.9798
GRO				-0.002	0.4682
Year fixed effect	YES			YES	
Adj. R^2	0.764			0.765	
Obs.	584			584	

Panel B: Value relevance of intangibles, patent counts, and R&D expenditures

	All		High-innovative firms		Low-innovative firms	
	Coeff.	*p*-value	Coeff.	*p*-value	Coeff.	*p*-value
Intercept	-6.604	<.0001	-9.530	<.0001	-2.862	0.1508
INTANG	0.106	0.0025	0.086	0.0446	0.140	0.0119
LOGPAT	0.285	0.1103				
RD	0.089	<.0001	0.091	<.0001	0.058	0.4577
IFRS	-1.239	0.1539	-1.002	0.2953	-0.803	0.4396
IFRS*INTANG	0.150	0.0006	0.162	0.0006	-0.016	0.9063
IFRS*LOGPAT	0.148	0.676				
POST*RD	0.021	0.1789	0.019	0.2045	0.098	0.3153
SIZE	0.420	<.0001	0.554	<.0001	0.244	0.0561
LEV	2.406	0.0004	4.224	0.0141	1.128	0.0587
ROA	-0.465	0.1198	-2.090	0.2291	-0.263	0.1834
GRO	0.005	0.3044	0.010	0.3527	-0.007	0.5832
Year fixed effect	YES		YES		YES	
Adj. R^2	0.425		0.475		0.133	
Obs.	584		287		297	

Panel B divides companies into high- and low-innovative firms based on the median value of patent counts. Variables are defined in the notes of Table 1.

Table 4 The relation between innovation input and output

Panel A: High-tech companies in China

	LOGPAT$_t$		LOGPAT$_t$		LOGPAT$_{t\sim t+3}$	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	-5.666	<.0001	-5.717	<.0001	-16.354	<.0001
RD	3.018	0.0012	3.007	0.0012	17.620	<.0001
INTANG			0.084	0.2212	0.038	0.8802
IFRS	0.519	<.0001	0.557	<.0001	-2.806	<.0001
IFRS*RD	-1.211	0.1977	-1.198	0.2017	-13.672	0.0002
IFRS*INTANG			-0.134	0.1067	-0.337	0.2273
LEV	-0.296	<.0001	-0.295	<.0001	-1.104	<.0001
SIZE	0.312	<.0001	0.314	<.0001	0.974	<.0001
MB	4.453	0.1754	4.412	0.1778	17.705	0.081
CAPEX	-0.131	<.0001	-0.127	<.0001	-0.228	0.0011
Year fixed effect	YES		YES		YES	
Adj. R^2	0.167		0.167		0.139	
Obs.	8,001		8,001		8,001	

Panel B: High-tech companies in UK

	LOGPAT$_t$		LOGPAT$_t$		LOGPAT$_{t\sim t+3}$	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	0.826	0.0016	0.980	<.0001	4.365	<.0001
RD	0.018	0.0003	0.021	0.0012	0.085	<.0001
INTANG			0.052	0.2212	0.125	0.006
IFRS	0.013	0.9502	0.083	<.0001	-4.368	<.0001
IFRS*RD	-0.014	0.0005	-0.012	0.2017	-0.070	<.0001
IFRS*INTANG			-0.044	0.1067	-0.109	0.0175
LEV	-0.429	0.0002	-0.475	<.0001	-1.519	<.0001
SIZE	0.050	0.0003	0.037	<.0001	0.139	0.0011
MB	0.000	0.6521	0.000	0.1778	0.004	0.0083
CAPEX	0.004	0.1675	0.002	<.0001	0.006	0.2959
Year fixed effect	YES		YES		YES	
Adj. R^2	0.091		0.126		0.250	
Obs.	584		584		584	

Variables are as defined in the notes of Table 1.

Table 5 Analysts' forecast characteristics

Panel A: High-tech companies in China

	Forecast error				Forecast dispersion			
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	0.030	0.0575	0.067	0.0009	-0.849	<.0001	0.058	<.0001
RD	-0.011	0.7376	-0.023	0.6565	0.289	0.0569	0.150	0.0344
LOGPAT	-0.001	0.4788	-0.001	0.5545	-0.001	0.7149	0.004	0.9367
INTANG			0.006	0.3236			0.017	0.003
IFRS	-0.023	<.0001	-0.017	<.0001	0.050	<.0001	0.012	0.0003
IFRS*RD	-0.002	0.9565	0.010	0.8508	-0.209	0.1743	0.151	0.1148
IFRS*LOGPAT	-0.001	0.6591	-0.001	0.5834	0.004	0.3127	0.004	0.5211
IFRS*INTANG			-0.016	0.0122			0.018	0.0039
SIZE	0.001	0.299	-0.001	0.315	0.037	<.0001	0.003	<.0001
EVAR	0.072	<.0001	0.099	<.0001	0.274	<.0001	0.010	<.0001
MB	-1.557	0.0007	-3.001	<.0001	7.519	<.0001	0.907	<.0001
FOLLOW	-0.004	<.0001	-0.006	<.0001	0.051	<.0001	0.004	<.0001
Year fixed effect	YES		YES		YES		YES	
Adj. R^2	0.207		0.200		0.324		0.324	
Obs.	4,507		4,507		4,507		4,507	

Panel B: High-tech companies in UK

	Forecast error				Forecast dispersion			
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	59.565	0.0006	56.415	0.0025	45.014	0.0007	45.604	0.0005
RD	-0.177	0.571	-0.154	0.5772	0.425	0.0501	0.439	0.073
LOGPAT	5.165	0.2253	4.832	0.2181	-3.531	0.2775	-3.543	0.2971
INTANG			-1.040	0.4688			-0.192	0.8451
IFRS	5.982	0.6774	7.259	0.6385	-6.266	0.2772	-7.302	0.2646
IFRS*RD	0.678	0.1158	0.872	0.1005	0.485	0.051	0.337	0.1819
IFRS*LOGPAT	-10.810	0.0744	-10.471	0.0676	3.010	0.3686	2.999	0.3865
IFRS*INTANG			-0.107	0.9369			0.658	0.5497
SIZE	-2.902	0.0003	-2.564	0.0086	-2.599	<.0001	-2.646	<.0001
EVAR	0.077	0.0241	0.084	0.0293	0.029	0.0044	0.025	0.0046
MB	0.073	0.0081	0.071	0.0077	0.025	0.149	0.026	0.1418
FOLLOW	-2.929	0.1622	-3.016	0.1599	-1.346	0.3096	-1.196	0.3635
Year fixed effect	YES		YES		YES		YES	
Adj. R^2	0.083		0.078		0.145		0.136	
Obs.	195		195		195		195	

Forecast error is measured as absolute value of analyst forecast error calculated as the difference between actual earnings and mean financial analysts' earnings forecast. Forecast dispersion measured as standard deviation of financial analysts' forecasts for firm i in year t divided by mean financial analysts' earnings forecast. Other variables are as defined in the notes of Table 1.

Report of attending the American Accounting Association 2012 Annual Conference,

Washington DC, USA

I attended and presented two papers at the American Accounting Association (AAA) Annual Conference, August 4–8, Washington DC, USA. The first paper entitled "Board interlocks and auditor choice: Firm and partner level", coauthored with Professor Chen-Lung Chin, was allocated to the audit committee session in the morning of 7th August, 2012. I was the second paper in that session and the moderate is Leah Muriel from University of Tennessee. Around fifteen participants attended the session. The other two papers in the session are "How do clawback provisions and equity-based compensation affect audit committee effectiveness" presented by Yu-Chun Lin from National Chengchi University and "Audit committee expertise and early accounting error detection: evidence from financial restatements" presented by Michael Lacina from University of Houston-Clear Lake. I presented my paper for around 20 minutes followed by questions from the participants as the discussant of my paper did not show up. My research focuses on corporate decisions related to auditor choice, in terms of the appointment of industry experts. The sample includes companies listed on the Taiwan Stock Exchange during 1996–2009. We find that a firm is are more likely to retain audit specialists at *both* the partner and the firm level, if it has a director serving on the board of other firms that retain specialists at both levels. Moreover, audit quality is relatively higher for firms with director(s) on the boards of other firms retaining industry experts (at firm or partner level and the increased audit quality is most pronounced when the other firms retain industry experts at both the firm and partner levels. The participants made the following comments:

(a) Firms with similar characteristics such as in the same industry are likely to make the same auditor choice.

(b) It would be interesting to see if the board interlocks are mainly connected through independent directors.

(c) Further look at directors' expertise.

I responded to the participants who raised these comments. First, in the robustness tests of the paper, we address the potential problem of edogeneity by adding several additional control variables.

The results generally confirm our main findings. In addition, in the correlation analyses, we find that the percentage of independent directors is positively correlated with the number of interlock board. Finally, I appreciate the participant's suggestion and we could also consider directors' expertise in the additional analyses.

I presented the second paper entitled "Disclosure quality and IFRS adoption: A text mining approach" in the afternoon of 8th August, 2012. The paper is coauthored with Pei-Jun Laio and Professor Jia-Lang Seng. There are four papers in the session and I was the first presenter. The other three papers are mainly related to the disclosure and information quality of IFRS. They are: (i) "Factors influencing voluntary disclosures of estimates and judgments by European corporations using IFRS" presented by Christopher Hodgdon from Quinnipiac University; (ii) "Recognition versus disclosure: the case of employers' pension cost accounting" presented by Yong Li from King's College London; and (iii) "The relevance and price sensitive and non-price sensitive continuous disclosures" presented by Asheq Rashman from Massey University.

I presented my paper for 20 minutes. Our study focuses on the disclosure of intellectual capital before and after the adoption of IFRS among a set of UK high-tech companies. We compile a dictionary of intellectual capital terms based on the following sources. Common example of IAS 38 Intangible Assets, the intellectual capital (IC) standard model developed by Edvinsson and Malone (1997), the value chain scoreboard proposed by Lev (2001), the intangible assets monitor presented in annual report of Celemi, a Swedish company discussed in Sveiby (1997), and the example of an intangible assets monitor proposed by Sveiby (1997). Following Edvinsson and Malone (1997), we classify the items into four perspectives, i.e. customer focus, human focus, process focus and renewal and development. We find that the increased disclosures of intellectual capital are mainly related to customer focus. Moreover, the adoption of IFRS is positively associated with customer focus, process focus, and renewal and development focus and such improved disclosures of intellectual capital in the post-IFRS period are more evident among old companies. In the post-IFRS period, larger high-tech companies disclose more on items related to process focus and renewal and development focus, while smaller companies disclose more

information about customer relationships. The participants raise the following questions and suggestions:

(a) The sample selection process. Did we exclude voluntary adopters?

(b) Suggest to look at the consequences of these intellectual capital disclosures.

(c) Is there any particular accounting standard mentioning the disclosure of these intellectual capital terms?

I responded to these comments. First, we only consider mandatory adopters in our sample. This mitigates the concern that voluntary and mandatory adopters may have different disclosure incentives. Second, there is no single accounting standard prescribing the disclosure of the items that are included in our self-constructed dictionary. Finally, I believe that the suggestion to investigate the consequences of the disclosure of intellectual capital would be helpful in revising the paper.

I also attended several sessions, especially the plenary session presented by Raymond Ball and Phillip Brown. The speakers explained the rationale behind the Ball and Brown (1968) paper and concluded by giving some advices related to writing a good academic paper. First, the research question is novel, interesting to authors and others. Second, the outcome is believed to add knowledge. Third, a solid theoretical foundation is necessary. Fourth, rigorous, parsimonious, and fruitful models may be beneficial. Fifth, care in sample selection and data collection. Overall, by participating and presenting in the AAA 2012 Annual conference, I received several useful suggestions and learned some potential topics for future research.

國科會補助計畫衍生研發成果推廣資料表

國科會補助計畫	計畫名稱: 子計畫六 ： 創新資本投入與產出品質之跨國分析
	計畫主持人: 詹凌菁
	計畫編號: 99-2410-H-004-020-MY3　　　學門領域: 會計

無研發成果推廣資料

計畫名稱: 子計畫六 ： 創新資本投入與產出品質之跨國分析

計畫主持人: 詹凌菁

計畫編號: 99-2410-H-004-020-MY3　　　學門領域: 會計

99 年度專題研究計畫研究成果彙整表

計畫主持人：詹凌菁			計畫編號：99-2410-H-004-020-MY3			

計畫名稱：「智慧資本之研究：管理議題探討」三年整合型計畫--子計畫六 ： 創新資本投入與產出品質之跨國分析

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	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	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	2	2	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	1	1	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	

國科會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） 　　隨著透過無實體知識基礎資源來創造價值的企業逐漸增加，以致產生了傳統財務報表可能較為缺乏價值攸關性的論點。無形資產的會計處理在實務上以保守穩健為基礎，使得公司進行創新活動所生的價值無法適當的反應在財務報表上。國際會計準則將重點放在公平價值以及資產負債的評價上，只要符合特定的要件則允許將內部發展之無形資產或研究發展支出資本化。因此本計畫第三年以財務報導環境之變動，探討權益帳面價值、盈餘、無形資產與創新指標在採用國際會計準則前後之價值攸關性的變化，以及財務報導環境的變化是否改變創新投入與產出的關聯並影響財務分析師盈餘預測的行為。由於歐盟國家已於 2005 年全面採用國際會計準則，而中國亦於 2007 年導入國際會計準則。因此本研究以中國與英國高科技公司作為樣本進行測試。此研究之初步結果對於我國於 2013 年實施國際會計準則對資本市場之影響及無形資產之報導與衡量具有政策上之重要意涵。