諾貝兒寶貝公司合併新店的財務評價方法

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摘　　要

本文探討台灣一家連鎖藥局合併新店的評價方法. 該連鎖藥局允許兩種所有權型態的門市店同時存在; 一種是完全由公司擁有的直營店, 一種是獨立註冊的獨立店. 獨立店主要還是由主要股東按比例投資但保留相當部份由該店員工參與投資; 因此其財務為獨立於母公司之外的. 除此之外其採購後勤支援, 管理系統, 員工訓練, 品牌行銷等則與直營店無異. 獨立店若經營符合公司期望, 則經過合理的評價後, 在該店投資者同意下, 即可被母公司合併. 如此作法有雙重目的, 一者近似內部創業, 提高員工衝勁; 二者確保母公司的直營店皆是績效優良的.

因此如何有效客觀的評價一家獨立門市店至為重要. 因為母公司獨立店與直營店的經營內容, 目標市場極為類似, 同質性沒有問題, 適合用相互比較法來決定價格. 而經本研究發現最終要比較的是其淨利率. 經驗顯示門市店的淨利率起伏甚大, 不適合以單一年的淨利做為比價指標, 而應以前後數年之平均淨利率做為比計價基準較為穩當. 相對之下, 母公司是由為數較多的直營店組合而成, 其淨利之變動幅度較小.

本文接著探討幾種預估淨利的方法, 最後提出了間接預估淨利的結構分析法

Valuation of a Single Drugstore to Merge with NB-chains

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Abstract

A chained drugstores in Taiwan has implemented a strategy of expanding new stores by allowing employee internal ventures. This internal venture allows a store to be chartered independently as a separate company entity. It follows the same operating procedure and assumes the same logo. Its finance is independent of the mother company. After years of operation, the store is evaluated. If qualified, the store will be merged back to the mother company. A fair valuation of the store is crucial to the merger process, unlike the ordinary cases of intra-company transfer of assets. The valuation determines the price of the store employee-owner's shares, which the mother company will buy back.

The valuation can take advantage of the homogeneity among the franchised entities. The study has found out that the determining factor is the earnings of the store. And several valuation models are actually boiled down to the same one. However, there are extra considerations to be given to the valuation of a single store. One of the major considerations is the fluctuation of its earnings on year-to-year basis. The resulting earnings figure is to overcome such anomaly and provides sustainable value indicator. The forecasting methods tailored to this situation are presented with empirical data analyzed. Finally the forecast models' performances are discussed in terms of Bias analysis.

Acknowledgement

Without the support of Dr. Huimin Chung, this paper will not be possible. In addition to the excellent academic support he gave to me generously, Dr. Chung's encouragement is the best motivation I can get toward the exploring of the topics. Meanwhile, I will like to give my special thanks to C.H. Chang, the Chairman of NB Corporations. He has provided valuable information and insight into the operation of the NB corporations, which is the target of the study. I also like to thank my classmates of the NCTU EMBA program. They have inspired me in the curriculum including this interesting Finance Course.

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1. Introduction

1.1. Motivation

The first NorbelBaby(NB) drugstore was established in 1991 in the city of Kaoshiung, in southern Taiwan under the name of Ding-Ding(丁丁藥局). As the store achieved great success, new stores were duplicated one after another. Now there are more than 50 stores throughout Taiwan. Initially each newly opened store was an independently registered company with similar, but somewhat different investor profile, which includes the original investors as well as employees from that store. Although each store is registered independently, they are actually operated like a wholly owned store in that the personnel, finance, logistics, and customer support are all linked. A corporate structure has been introduced several years after the first store was opened. The NB corporate management provides extensive personnel training, marketing, centralized logistics, finance, as well as Electronics data system, in addition to the creation of the store.

After years of operations, two types of stores were formed in terms of ownership, the directly-owned store, and the independently-registered stores. The directly-owned stores, unlike the independently-registered stores, are not registered as separately companies. A customer will not be able to tell the difference between these two types of stores. However, the employees of the stores feel and act somewhat differently when works in the different stores. NB has employed seasonal bonus system based on store's performance. However, in the independently-registered stores, the employee-shareholders are eligible for the extra of dividend payout each year, which are closely tied to the store performance. As the independent stores provide more management-motivation to employees than the directly-owned stores do, the system will continue to operate for the foreseeable future. Namely, both store types will exist in the system. In comparison, the directly-owned stores provide no such extra dividend incentives. But they are simpler in terms of accounting and taxation. As the company grow, the need to integrate the independent stores into corporations become more obvious. Firstly, it is to simplify the internal operations; Secondly, a single company with all the revenues combined will make it more qualified to apply for IPO. When valuating the stores for merger, NB imposes certain criteria to the candidates. Through this qualifications procedure, NB ensures that only the well-performed stores be merged. And the qualified stores are rewarded by better stock value for their shareholders, especially the store employees, as well as obtaining internal recognition for the employees.

When trying to merge the independent stores to NB, a “fair” valuation of the store is crucial. For both the shareholders of NB and stores, the value shall be objective enough so that the merged store will continue to generate expected profit to NB system after merger. And the value shall be a true reflection of their merits for the store employees. The valuation of stores needs to be materialized to a stock exchange ratio between NB and the stores.

1.2. Objectives of The Study

Depending on the ownership, there are many types of chain store franchise system exist in the business world now. Some franchises may support one type, or another, or even support both types at the same time. In executing the store expansion strategy, NB need to convert ownership of a single store to the corporation. Although it may sound simple, the conversion of ownership actually is similar to what a corporate acquisition and merger may involve. Therefore, a fair way of valuing the store and NB corporations is required. Based on the valued outcome, a stock conversion scheme can then be devised in terms of a stock exchange ratio. The most important requirement in valuing the store is to be as accurate as possible. Therefore, the study will evaluate all the potential methods. And then come up with a suitable one, either with or without modification tailored to NB needs. It is expected that the proposed method will be equally applicable to other cases in the business world too.

1.3. Research Limitations and Assumptions

This research is carried out specifically for the NB Drugstore Chains systems. The empirical results of the study are based on the following assumptions:

a. The accounting data available for this study are accurate
b. From the share owners’ view, the supreme objective of a store is to make money. A store’s value is equivalent to how much money it can earn throughout its life.
c. The accounting practices for the independent store and NB corporations are the same.
d. The stores to be valued are those Ding-Ding stores, which are created with separate ownership and company registration.

1.4. Research Framework

The remainder of this research is organized into the following chapters

II. Literature Review, which presents the related studies on the valuation, and introduction to the target company, NB drugstores.

III. Store Valuation Methodology, which discusses the potentially suitable methodologies and makes selection on the appropriate ones. A customized method is also presented.

IV. Empirical Result and Analysis, where the actual franchise and stores data are analyzed by the proposed methodology

V. Conclusion and Suggestions, which conclude the study and suggest the future study on this subject

2. Literature Review

Valuing a single store within a drug-store franchise requires knowledge about the target business and the valuation method available in the industry. In this chapter, many of the available valuation methods are reviewed and evaluated. As the valuation is to be conducted for the NB corporations, the related information on the company are presented.

2.1 Survey on Valuation models

Pertaining to different needs of business valuation, there are many valuation methods being developed throughout the business history. Both academic and business world have many studies and comments on how those methods performed. This section briefly summarized the available methods and comments.

2.1.1. Stanley J. Feldman(2005)

The valuation methods could be classified into three categories: Asset Method, Income-based Method, and the Method of Multiples. Out of these three categories, Feldman emphasizes on the Income-based Approach and the Method of Multiples. The specific income-based approach he stressed is Discounted Free Cash Flow method.

2.1.1.1 The Asset Approach

This method first identifies a firm's tangible and intangible assets and values. The sum of these values is then equated to the value of the firm

2.1.1.2 The Income-based methods

These methods project a firm's cash flow for valuation purposes over some period of time,

discount these values to present, and then sum these present values to obtain the value of the firm

2.1.1.3 The Methods of Multiples

This method first identifies a set of firms that are comparable to the firm being valued. For each comparable firm, the ratio of its market price to revenue or earnings is calculated. These ratios are averaged, and/or the median value is determined. The value of the target firm is then equal to comparable ratio multiplied by the target firm's revenue/earnings

2.1.2. Timothy A. Luehrman(1997)

In general, corporate managers may encounter the needs to value its current asset, future investment project, and equity. With the computer power ever increasing, the valuation approaches can be re-engineered to be more accurate with more detailed adjustments.

2.1.2.1 Adjusted Present Value

In valuing the premium generated by the current assets, it divides the company cash flows into two parts: Real cash flow generated by operation, and Side-Effect cash flow generated from financing activities. These cash flows are then discounted to present value by its relative risks

2.1.2.2 Option Pricing

This method is used to value an investment. The value of investment opportunity is determined by time, cash flow, and risk. The author thinks this method still needs further perfection. It can be used complementary to Cash Flow method.

2.1.2.3 Equity Cash Flow

It estimates the cash flow generated by each share of stock in the future, and discount to present value. This method focuses on the equity part of the investment.

2.1.3. Aswath Damodaran(1994)

Damodaran has emphasized on three valuation approaches. He presented the criteria in selecting the right method for valuation. In addition to the Method of Multiple, which he called it Relative Valuation approaches, two are presented here.

2.1.3.1 Discounted Cash Flow

This method implies that the value of an asset equals the present value of future cash flows. The future cash flows are discounted to present value by a risk factor. Valuation can be based on either the equity value, or firm's value. If based on equity value, the cash flow generated from equity is discounted by the equity capital cost. Two approaches are further developed from the equity valuation, the Dividend Discounted Model, and the Free Cash-to-equity Discounted Model. If based on a firm's value, the cash flow of a firm is discounted by the weighted average cost of capital (WACC). This present value of cash flow then deducts the market value of debt to become the firm's value. This is called Free-Cash-Flow-to-Firm Model

2.1.3.2 Option Pricing

The share owners' equity can be treated as a call option, with target being a firm's value. The execution day is the maturity day of debt. And the execution price is the debt's value. On the maturity day, if the firm's value is greater than value of debt, share owners will be willing to execute the option, by paying back the sum of debt and incurred interest. The excess after payback becomes the value of owner's equity. If the firm's value is less than the value of debt, owners may give up execution of the option by liquidating the firm.

2.1.4. Copeland, Koller and Murrin (1994)

As argued by the authors, there are only two valuation approaches worth look, the Accounting approaches, and the DCF approach. The accounting approaches are the Methods of Multiples in principle, represented by P/E. Corporate managers are often misguided by the Earnings per share. Instead, if managers want to maximize the shareholder's value, they should look at Discounted Cash Flow. The cash flow methods are further separated into two types: The Entity Cash Flow, and the Economic Profit Model

2.1.4.1 Equity Discount Cash Flow

The entity DCF model values the equity of a company as the value of a company's operations less the value of debt and other investor claims that are superior to common equity. The values of operations and debt are equal to their respective cash flows discounted at rates that reflect the riskiness of these cash flows. As long as the discounted rates are selected properly to reflect the riskiness of cash flow streams, the entity approach will result in exactly the same equity value

2.1.4.2 Economy Profit Model

In this model, the value of a company equals the amount of capital invested plus a premium equal to the present value of the value created each year going forward.

2.1.5. Bradford Cornell(1993)

Cornell classified the valuation methods into four categories. In addition to the Method of Multiples and DCF models, two approached are emphasized.

2.1.5.1 The Adjusted Book Value Approach

The net assets listed in Balance Sheet are adjusted according to inflation, technology advancement, and organization capitals. Without such adjustment, the book value as listed in Balance Sheet will be deviated from market value very much.

2.1.5.2 The Stock And Debt Approach

Also called Market Approach, this approach is based on the Market Efficiency hypothesis. A company's intrinsic value is reflected by its publicly traded security price. Therefore, a company's value is the sum of its public traded securities. Although this method seems to be limited to public traded companies, it actually can serve as the base for the Methods of Multiples.

2.1.6. Francis, Olsson, And Oswald(2000)

In addition to the above DCF and direct comparison methods, the REM and DDM methods are discussed.

2.1.6.1 Discounted Dividend Model

The Discounted Dividend method measures a firm's value as the sum of its expected dividends discounted to present values.

2.1.6.2 Residual Earnings Model

This method is also called Discounted Abnormal Earnings model. It measures the value of a firm's equity as the sum of its book values and discounted the forecasted values of all its abnormal earnings. If a firm can only earn a normal rate of return on its book value, the investors will not be willing to pay more for the stock. A firm's book value reflects the costs of its book equity plus the present value of future growth opportunity.

2.2. Applicability of the valuation methods

Various studies have been made by the academia ever since. Some of the findings are excerpted below.

Sorensen and Williamson(1985) conducted study on 150 stocks from S&P 400 in December 1980, using four valuation models: P/E, DDM of constant growth, two-stage growth, and three-stage growth models, testing the performance from 1981 to 1983. They showed all the undervalued portfolios outperform the market value. It implied that the valuation methods can really reflect the intrinsic values of firms, which were not sufficiently represented by the stock market.

Kaplan and Ruback compared the performance of Cash flow based methods, and methods of multiples, by busing 51 HLT (High leveraged Transactions) between 1983 and 1989.. Their findings :"Although some of the "comparable" or multiple methods performs as well on an average basis, the DCF methods were more reliable in the sense that the DCF estimates were "Clustered" more tightly around actual values. Nevertheless, we also found that the most reliable estimates were those obtained by using the DCF and the comparable methods together".

O'Shaughnessy(1997) studied the performance of all stocks from COMPUSTA databases, which covered from year 1952-1994. His conclusion: P/E ratio is a reliable performance indicator to distinguish stocks. Second, P/S ratio is a more reliable "fundamental" statistics. And company with high P/B ratio should be avoided.

Penman(1998) studied DDM, DCF and REM for 4192 non-financial firms from 1973 to 1990 in America. His conclusion: the estimation errors in DCF and DDM were relatively less than REM.

Copeland, Koller and Murrin(2000) made comparison studies on the accounting methods(mainly Multiple methods) , DCF method, and Economic Profit model. They become strong provoker of DCF model: "The Equity DCF model is the best suited valuation model for financial institutions such as banks and insurance firms"

Francis, Olsson and Oswald(2000) studied the reliability of DDM, DCF, and REM during 1989 and 1993. They found that REM outperformed other models. In addition to the fact that REM has smaller absolute deviations, REM is able to explain more of the variation in observed values.

Richter and Hermann(2002) studied 524 largest US companies and 830 European companies in the end of 1998. They found that P/E is a good valuation tools for non-financial services sectors,

The P/B and P/S, on the other hand, showed smaller value accuracies. In addition, the selection of comparable companies is better to be based on relevant fundamentals rather than SIC code.

Yang(2004) conducted comparisons on the performances of P/E, P/B, P/S, REM, DDM, DCF, and EVA on the Fortune 1000 which covers the major companies in the world, from 3 continents, 19 countries, and many market sectors. The conclusion: there is no single method that can serve better than others across the different market sectors, and countries. Specifically, The PE performed best for Capital goods, Conglomerates, and Energy; P/B performs well for Consumer, financial and Services; P/S is good for Auto and health care; DDM is good for Technology; And EVA is best for Communications and Consumer(Par with P/B). Surprisingly, the DCF model does not perform well in all sectors.

The following table summarizes the research findings.

Table 1 Study on Applicability of Various Valuation Models

Authors	Year	Findings
Sorensen & Williamson	1985	P/E, and DDM leads to better value estimation accuracy
Hickman, Kent, Petry and Glen	1990	Methods of multiples are better than DDM in company intrinsic value valuation
Kaplan & Ruback	1995	DCF is better than methods of Multiples in valuing a company. Using both DCF and P/E produce even better valuation accuracy
Biddle, Bowen and Wallace	1997	P/E is more highly associated with stock return and firm value of a company than EVA, DCF, REM
Oshaughnessy	1997	P/E is good indicator of value for smaller company, and P/S is most reliable fundamental statistics for both small and larger company in valuation.
Penman	1998	DCF and DDM are more accurate than REM model for non-financial companies in US
Gibson, Hotchkiss and Ruback	2000	For risky companies(chapter 11), Methods of multiples are more accurate than DCF
Francis, Olsson, Oswald	2000	REM model outperforms DDM and DCF
Copeland	2000	Equity DCF is the best suited model for financuial companies. And Equity DCF and EVA will result in same value
Haugen	2001	For long term valuation, DDM provide good accuracy
Richter ad Herrmann	2002	For both US and Europe larger companies, P/E multiple perform better than P/S and P/B
Liu and Nissim	2003	P/E provide remarkably accurate valuation in 10 countries including Taiwan
Yang	2004	Different industries, countries, continents, market sectors have different valuation models that perform best

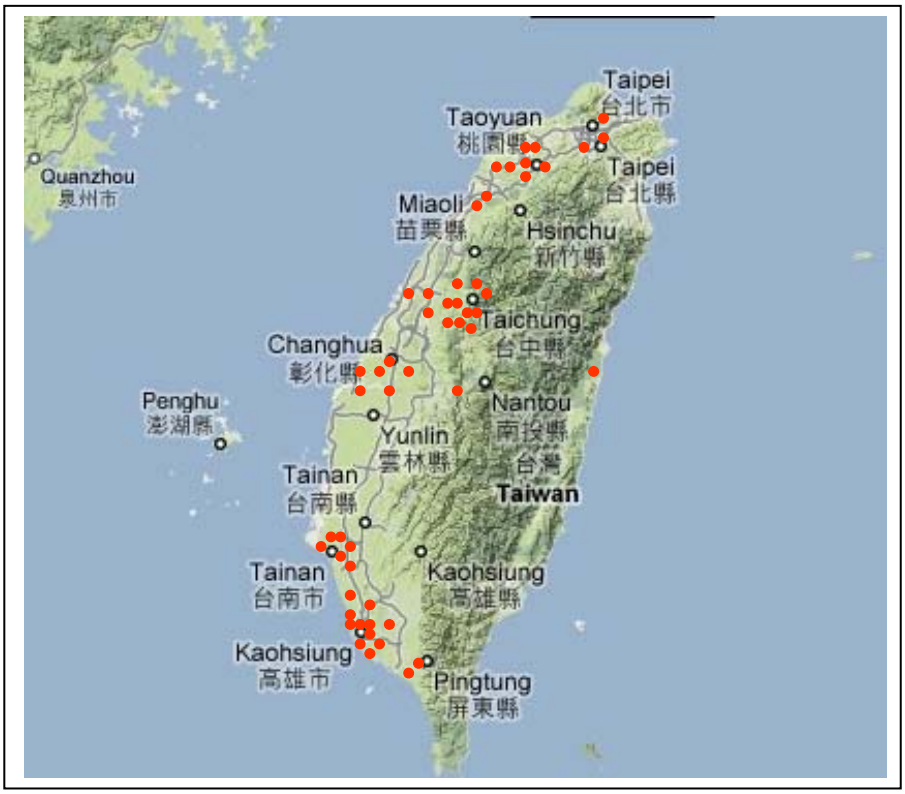
2.3 NB Drugstores

2.3.1 NB Drugstore Background

The first Ding-Ding Pharmacy was opened in 1991 in Kaoshiung, Taiwan, by Chang, a Pharmacist. The drugstore was soon expanded to cover female and infant goods, in addition to the pharmaceutical items. Transition from pharmacy to drugstore soon achieved a quick success; Then Chang, with financial and physical support from Hsu and several pharmacist friends, created more stores with the larger store footprint ranging from 150 Pings(about 500 square meters) to 400 Pings. The Ding-Ding drugstore looks like the hybrid of American drugstores, and Japanese P+C Stores (Pharmacy +Cosmetic store). Among the Taiwanese pharmacy or drugstore chains, Ding-Ding store is the largest in terms of store space. In addition to ordinary store attendants, each Ding-Ding store employs as many as four pharmacists, who provide professional medicine and nutrition consultation services to the customers. In 1995, a company is formed, NorbelBaby Drugstore Corporations(NB), to centralize the logistic, accounting, MIS, customer service and Training systems for all the stores. NB corporations as well as all the stores previously opened, use Ding-Ding brand name.

As the centralized company system works well, new stores were created at the rate of 3-6 stores per year. Now there are more than 50 stores across the island. The following picture illustrates the geographic distributions of NB stores in Taiwan.

Picture 1. Geographic Distribution of NB Stores



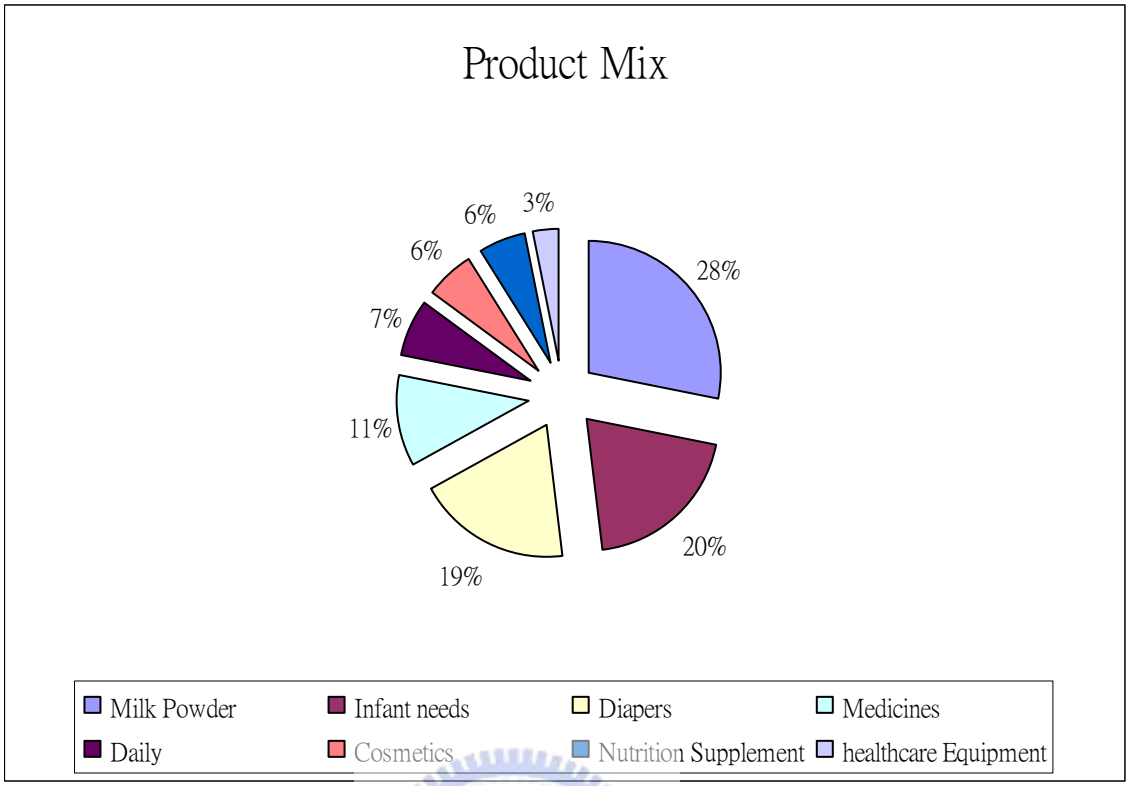
The stores are distributed around the west coast of the island, but mainly confined to five clusters at this moment of time: Kaohsiung, Tainan, ChangHwa, Taichung, and Taoyuan, with Taipei as the next cluster to develop.

2.3.2 Operating data

2.3.2.1 Product mix

NB's on-shelves items are largely composed of Infant needs, Milk Powder, Diapers, Medicines, Nutrition supplement, Cosmetic, Health equipment, and daily goods. The pharmaceutical items demands most of the pharmacist's time, although they only take up around 11% of the total revenue. The following chart depicts the product weights of NB:

Picture 2. NB Product Mix



2.2.2. Operating Data

As of 1Q of 2008, there are totally 52 stores across the island. The 2007 Total revenue is about 3.7 Billion NT dollars, with store average revenue of 70 Million NT$. Its revenue grows about 15% yearly, for the last 6 years. And its EPS for the past 5 years has ranged from 3.3$ to 4.1 per share, which is the highest among the drug-related chained stores island-wide. Its market share of diapers and infant milk powders exceed 20%, and are the number ones in Taiwan.

2.3.3 Strategy on Store Expansion

The Ding-Ding stores were created and operated as independent stores before NB Corporations was chartered. After NB corporations were established, two type of store-ownership exists in parallel: the independently-created store, and the NB-owned stores. In addition to the independent Ding-Ding stores, the NB-owned stores have ever since grown to 20 stores. The NB stores expand by either creating new stores or merging independent Ding-Ding stores. Most of the new stores are created as independent stores, with only a few exception of new stores created under NB due to registration difficulty. The reasons for new stores to be created as independent stores are two folds, for employee motivation of internal venture, and for better qualification of stores to be merged to NB. Although there are performance reward package available, which

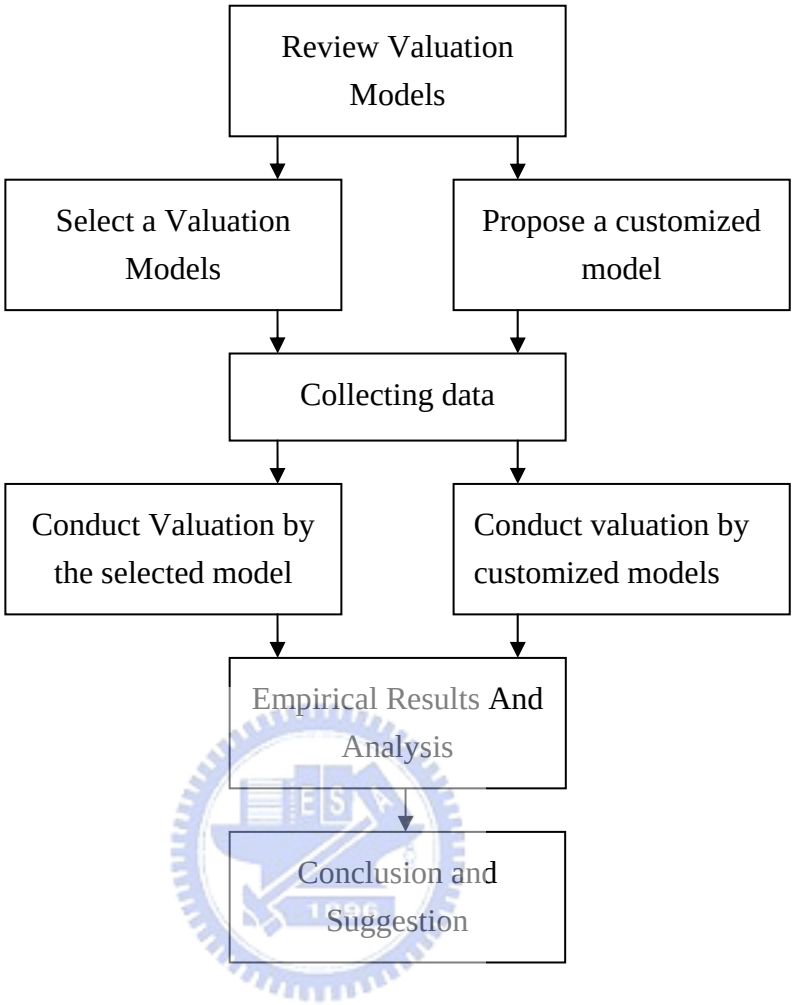
allocates performance bonus quarterly, the independent stores allow the store employees to be significant investors of that store. This is actually an internal employee joint venture program. This store qualification system allows only qualified new stores to be merged into NB corporations, ensuring that NB corporations get the better of the breeds.

The independent stores, although registered as independent companies, are still under NB Corporate managing, and share same MIS, logistics, market promotions, and accounting procedure. After years of operation, once the independent store is qualified, it will be absorbed into the NB Corporate. This merger actually is proven to be beneficial for both the store employees and the corporate. First, NB Corporate needs to take in new bloods in order to keep up growth, and second, the independent stores after being through the new venture challenge, need to be compensated for their performance. The merger package, if done fairly, will compensate employees by good ratio of stock swapping. This provides good motivation for the employees. Through the qualification procedure, it is ensured that only the well-performed stores were absorbed into NB Corporations. Therefore it requires a fair way to valuate the independent stores, in balance of its potential, risk, and employee motivations. Currently, there are more than 30 independently-registered stores, and 20 direct stores under NB. By end of 2008, more than 10 qualified independent stores will be merged into NB.

3. Valuation Methodology

The valuation of an independently-registered franchised store is similar to that of a company in that the store follows the Taiwan standard accounting procedure. The valuation is based on operating data of both the merging and merged companies. The merger is realized by converting the store shares to NB shares. In this chapter, the classical valuation models are reviewed first. Then an applicable valuation model is elected. Based on the valuation model, data are collected and applied. In the meantime, customized valuation approach is devised to best suite the case. As the valuation involves forecasting of future operating results, related forecasting models are surveyed and picked. Finally, a Bias analysis is conducted to measure the performance of the forecast methods. The following diagram summarizes the research methodology.

Picture 3. Research Methodology



3.1. Valuation Models

In this section, the detailed methodology of each method is discussed.

3.1.1. Income-Based Approaches

3.1.1.1 Discounted Free Cash flow Model

The Equity DCF model values the equity of a company as the value of a company's operations less the value of debt and other investor claims that are superior to common equity. The values of

operations and debt are equal to their respective cash flows discounted at rates that reflect the riskiness of these cash flows. The value of operations equals the discounted value of expected future cash flow. Free cash flow is equal to the after-tax operating earnings of the company, plus non-cash charges, less investments in operating working capital, property, plant and equipments, and other assets. The discount rate is WACC, Weighted Average Cost of Capital, reflecting the opportunity cost to all the capital providers weighted by their relative contribution to the company's total capital. The business value is assumed to be indefinite life, which can be represented by two periods, the explicit forecast periods and the period after:

Value = Present Value of Cash Flow During forecast period + Present Value of cash flow after explicit period(Continuing Value)

$$= \sum_{i=1}^{n} (NOPLAT_i - NetInvestment_i) + \frac{NOPLAT_n}{WACC} \qquad (4.1\text{-}1)$$

As analyzed by Copeland, The fundamental drivers for company's value are ROIC(relative to WACC) and Earning growth. When ROIC exceeds WACC, a company can assume higher growth rate by raising higher investment rate. This will eventually create higher value for the company. If, however the ROIC is less than WACC, higher investment rate will result in less value for the company.

For the retail industry, if a average store's ROIC exceed the WACC, the faster it expand new stores, the higher value it will create for the whole company. The net investments are mostly for the new branch store it created.

Three DCF models are presented, the Constant Growth DCF, Two-stage Growth DCF, and Three-stage DCF

a. Constant Growth(g) DCF Model: assume a constant cash growth rate g, which is less than WACC, the weighted average cost of capital.

$$V_0 = \frac{FCF_1}{WACC - g} \qquad (4.1\text{-}2)$$

b. Two-stage Growth DCF Model: assume there are two growth rate g1, and g2 during the life span of the entity

$$V_0 = \sum_{i=1}^{n} \frac{FCF_i}{(1+WACC_1)^n} + \frac{1}{(1+WACC_1)^n} * \frac{FCF_{n+1}}{WACC_2 - g_2} \qquad (4.1\text{-}3)$$

c. Three-Stage Growth DCF Model: assume 3 different cash flow growth rates throughout the lifespan of the entity.

$$V_0 = \sum_{i=1}^{n} \frac{FCF_i}{(1+WACC_1)^n} + \sum_{j=n+1}^{p} \frac{FCF_j}{(1+WACC_2)^j} + \frac{1}{(1+WACC_1)^n (1+WACC_2)^{p-n}} * \frac{FCF_{p+1}}{WACC_3 - g_3}$$

(4.1-4)

The DCF model is widely used among the financial institutions. It is good for companies with steady operation for years, such as very large publicly trading companies. The above parameters can be confidently estimates, so that the DCF model can achieve certain degree of accuracy. For smaller companies, if they are in somewhat stable state, they can apply this model too.

3.1.1.2 Economic Profit Model

In this model, the value of a company equals the amount of capital invested plus a premium equal to the present value of the value created each year going forward.

Economic Profit = Invested Capital X (ROIC – WACC), (4.1-5)

= NOPLAT – Capital charge value of a company equals the amount of capital invested, plus a premium or discount equal to present value of projected economic profit

This model was first brought out by Merton Miller and Franco Modiglianni in 1961. Further development was done by Stern Stewart in 1990, to provide as the corporate profitability measurement metrics.

$$\text{Value} = \text{Invested Capital} + \frac{NOPLAT}{WACC} + \frac{I*(ROIC - WACC)*T}{WACC*(1+WCC)} \qquad (4.1\text{-}6)$$

Where $\frac{NOPLAT}{WACC}$ represent the discounted present value of future profit by the current investment, assume no growth. And the latter part of the above formula $\frac{I*(ROIC - WACC)*T}{WACC*(1+WACC)}$

represents discounted present value of the future growth. The I in the above formula represents the discounted present value of all future investment.

An advantage of the Economic Profit model over the DCF model is that it is a useful corporate profitability metrics in any single year, while Free Cash Flow model is not. Management can easily delay investments simply to improve cash flow in a given year at the expense of long term value creation

3.1.2. Direct Comparison Approaches

Similar assets shall sell at similar prices in a similar business environment. Therefore, given comparable companies, which can provide the value information and the underlined contribution factors to the price, the target company's value shall be able to be estimated from it. The simple mathematic equation of

$$\frac{V_{target}}{X_{target}} = \frac{V_{Comparable}}{X_{Comparable}} \tag{4.1-7}$$

leads to the estimation of a target company's value

$$V_{target} = X_{target} * \frac{V_{Comparable}}{X_{Comparable}} \tag{4.1-8}$$

Where $V_{Comparable}$ is a comparable company's value, and $X_{Comparable}$ is the variable that affects the price of comparable company, such as Net Earning(EBIDT), Sales, Book value, which are directly related to the market value of a company. Once the ratio of comparables V/X is known, it will be rather simple to estimate the value of a target company by multiplying the target company's variable with the comparable ratio.

Therefore, in applying these approaches, it is very important to make sure

a. Appropriate "Comparable" companies are selected, so their ratios are applicable for the comparison. Criteria exist in assessing comparability, such as SIC, reports from Moody's, Standard & Poor's, and Value Line presents many financial ratio of this purpose.

b. Appropriate Value Indicator(V) and Observable Financial variable(x) be chosen. The financial variables mostly likely to produce a constant V/x ratio will be closely

associated with the value of the firm. Because the ultimate source of corporate value is cash produced for security holders, financial variables that measure potential payouts, such as Earnings, and Cash Flow are obvious potential choices for x. Variables that indirectly measure the earning power of a firm, such as Sales and Book Value of equity are also potential choices. The choice of financial variable shall also match with an appropriate value indicator. If a gross indicator such as EBIDT is selected, then it should be matched with total firm value.

3.1.2.1 Price-To-Earning(P/E)

To estimate a target company's stock price, P/E ratio is the most commonly used one. Once a comparable company's P/E ratio is available, the stock price of the target company can be estimated by multiplying the earning of the earnings per share by the comparable company's P/E ratio. P/E is very much related to the fundamental performances of net profit growth, dividend payout, interest rate, business risk level, and so on. A reasonable P/E ratio can be derived by calculations of the discounted present value of future dividends. Based on different assumptions on dividend growth types, two estimation methods have been developed: the Steady-Growth method and Multi-staged Growth method

a. Constant Growth Method

$$\frac{P}{E_0} = \frac{b(1+g)}{k-g}; \frac{P}{E_1} = \frac{b}{k-g} \qquad (4.1\text{-}9)$$

Where b is the dividend payout rate
g is the dividend growth rate
K is the equity capital cost from year 0 to year n

b. Multi-Stage Growth Method

$$\frac{P}{E} = \frac{PAYOUT_1 * (1+g_1) * \left[1 - \left(\frac{1+g_1}{1+r_1}\right)\right]}{r_1 - g_1} + \frac{PAYOUT_2 * (1+g_1)^n * (1+g_2) * \left[1 - \left(\frac{1+g_2}{1+r_2}\right)^m\right]}{(r_2 - g_2) * (1+r_1)^n}$$

$$+ \frac{PAYOUT_3 * (1+g_1)^n * (1+g_2)^m * (1+g_3)}{(1+r_1)^n * (1+r_2)^m * (r_3 - g_3)} \qquad (4.1\text{-}10)$$

Where $PAYOUT$ is the Cash Dividend Payout Ratio for Stage 1,2, or 3

g_i : earning growth rate of period i

n: number of years in first stage

m: number of years in 2nd stage

The above formula tell us that

a. P/E is directly related to Earning growth rate

b. P/E is directly related to Dividend payout ratio

c. P/E is directly related to the umber of years of high growth rate

d. P/E is reversely related to the capital return rate

3.1.2.1 Price-To-Sales(P/S)

Similar to P/E, this valuation method use the ratio of stock price divided by sales per share. The gross margin rate is the key here. Stock price increases along with the margin rate. P/S will be higher for a company with higher margin rate. There are other factors that contribute to the P/S: Brand value, market reach, monopoly, services, to name a few. Those companies with high debt ratio and high non-core revenue rate should avoid to use P/S ratio for valuation. Same as P/E ratio, the calculations of P/S are categorized by Steady growth, and Multi-stage growth types:

a. Constant Growth Method

$$\frac{P}{S} = \frac{m * b}{k - g} \qquad (4.1\text{-}11)$$

Where S: Sales per share

b: Dividend Payout ratio

m: Net profit rate after tax

g: Dividend growth rate

: Equity Capital Cost

b. Multi-Staged Growth Method

$$\frac{P}{S} = MARGIN_1 * \frac{PAYOUT_1 * (1+g_i) * \left[1 - \left(\frac{1+g_1}{1+r_1}\right)^n\right]}{r_1 - g_1}$$

$$+ MARGIN_2 * \frac{PAYOUT_2 * (1+g_1)^n * (1+g_2) * \left[1 - \left(\frac{1+g_2}{1+r_2}\right)^m\right]}{(r_2 - g_2) * (1+r_1)^n}$$

$$+ MARGIN_3 * \frac{PAYOUT_3 * (1+g_1)^n * (1+g_2)^m * (1+g_3)}{(1+r_1)^n * (1+r_2)^m * (r_3 - g_3)} \qquad (4.1\text{-}12)$$

Where $PAYOUT$ = Cash Dividends Payout rate for Stage 1,2,or 3

$MARGIN$ = Net profit rate after tax for Stage 1, 2, or 3

r_i = Discount rate for period i

n: the first stage of high growth, for n years

m: the 2nd stage growth period of m years

Unlike P/E , the P/S is always positive. It can be applied in wider scope than P/E. Sales is not subject to manipulation by different accounting practices. In addition, the Sales number is much more stationary than Earning or Book value. The major issues with P/S are the expense structure, which may vary widely among the comparable companies. Furthermore, using P/S to value a company may result in big valuation error if the company is in negative profit or negative equity value.

3.1.2.1 Price-To-Book-Value(P/B)

This method uses a company's stock book value as the denominator to compare stock price. Similar to P/E, and P/S, there are two valuation models

a. Constant Growth Method

$$\frac{P_0}{BV_0} = \frac{ROE * b}{k - g} = \frac{ROE - g}{k - g} \qquad (4.1\text{-}13)$$

Where ROE: Return on Equity

b: Dividends Payout Ratio

k: Equity capital cost

G: Dividends growth rate

b. Multi-staged Growth Method

$$\frac{P}{B} = ROIC_1 * \frac{PAYOUT_1 * (1+g_i) * \left[1 - \left(\frac{1+g_1}{1+r_1}\right)^n\right]}{r_1 - g_1}$$

$$+ ROIC_2 * \frac{PAYOUT_2 * (1+g_1)^n * (1+g_2) * \left[1 - \left(\frac{1+g_2}{1+r_2}\right)^m\right]}{(r_2 - g_2) * (1+r_1)^n}$$

$$+ ROIC_3 * \frac{PAYOUT_3 * (1+g_1)^n * (1+g_2)^m * (1+g_3)}{(1+r_1)^n * (1+r_2)^m * (r_3 - g_3)} \qquad (4.1\text{-}14)$$

Where $PAYOUT$ = Cash Dividends Payout rate for Stage 1, 2 or 3

$ROIC$ = Return on Invested Capital for Stage 1, 2 or 3

r_i = Discount rate for period i

n: the first stage of high growth, for n years

m: the 2nd stage growth period of m years

This method is advantageous as of the Book value id relatively stable. The equity calculation is rather simple, even cross country borders. This method can be applied to companied with negative cash flows, as long as their equities are still positive. However, if different accounting rules are used, such as depreciation amortization, the book value will be subject to change. For companies with high percentage of intangible assets, such as IC design house, software house, this method may not be equally applicable.

3.1.2 Asset Approach

This method first identifies a firm's tangible and intangible assets and values. The sum of these values is then equated to the value of the firm.

3.2 Selecting Valuation Models

To value single private-owned franchised store is likely to be different to that of a public company. Most of the above valuation models are devised to valuate the intrinsic equity value of a company. The purposes of such valuations are for stock investment, acquisition/merger, joint

venture, spin-off, joint-venture, and so on. In this study, however, the purpose is for internal merger within a franchise. This intra-franchise merger can be characterized by the follows

a. The franchised Store has the same market segment as the mother company. Namely, they are drugstores that serve same segment of customers with same product and service offering.

b. The store assumes same retail branding, similar marketing promotions

c. The store utilizes the same logistics system as mother company's

d. The Store and mother company practice the same accounting procedure and rules. Therefore the operating results are on the same bases and subject to no manipulation.

e. The stores pay out dividends as much as possible, namely 100% if possible.

A franchised store, just like a home in a community, is a microcosm of the mother company. Although they are different in size, they are actually "comparables" as defined by financial terms. Table 1 indicates that two of the mostly popular valuations models are DCF and P/E. To derive cash flow for valuation purposes, several set of adjustments to the valued company's Income Statement need to be made, and then a number of financial parameters regarding the valued company need to be forecasted, depending on which valuation model is chosen: Constant Growth Valuation Model, Non-constant Growth Valuation model, or multiple stage growth model. The following parameters are most likely needed to be obtained first: Depreciation an amortization growth rate, Revenue growth rate, Cost of Capital (WACC), ROA in perpetuity, Retention rate, Long-term Growth rate.[Feldman, pp 60]. However, in the scope of valuing a single store under a franchise, together with the assumption made above, the DCF method can be boiled down to the task of estimating net profit, similar to the Multiple method.

The Assets method requires fair valuation of all tangible and intangible assets of a company. However, if the value of a store is the sum of a fixed assets, inventory of the store plus, and intangible assets including branding value, store location, etc, which are very subjective and unconvincing. Therefore this method is not recommended for the study.

Although the three Multiple methods approach values by looking at different variables, as we will see next, they are all boiled down to the estimations of Earning, and therefore are the same in our application to value the franchised stores under NB system..

The Formula (4.1-9) to Formula (4.1-14) describes the Price ratio based on steady growth or

multiple staged growth of dividend payout ratio, dividend growth rate, and profit margin rate.. As the characteristics of franchised store, item e in the above discussion, there is only a single stage in the NB case, and the payout rate is almost 100%. That leads to

$$g = 0, \quad \text{and}$$
$$b = 100\%$$

The P/E formula (4.1-9) now becomes

$$P = \frac{E}{k} \tag{4.1-15}$$

The P/S formula (4.1-11) becomes

$$P = \frac{S * m}{k} \tag{4.1-16}$$

The P/B formula(4.1-13) becomes

$$P = \frac{BV * ROE}{k} \tag{4.1-17}$$

The S*m in formula (4.1-16), Sales per share times net margin rate equals net profit, which equals earning per share after tax, same as the E in formula (4.1-15). The BV * ROE in formula (4.1-17), book value per share times return on equity per share, equals earning per share, same as E in formula (4.1-15).

Therefore, the Methods of Multiples are boiled down to P/E method in a nut shell. This study will be based on this method, with addition of some forecasting technique to customize to our application.

By the same token, with WACC equivalent to k, and g = 0, the DCF Constant Growth model becomes

$$V = \frac{FCF}{k} \tag{4.1-18}$$

Let V and FCF divided by number of shares in the company, it become s the stock price, same as above formula (4.1-15), (4.1-16), and (4.1-17).

That is to say, DCF model and Methods of Multiples are all boiled down to the Net profit

estimation in the scope of the study. Since the ultimate goal is to find a ratio to convert the share, P/E is a good representation of the methods. Therefore, The study will be based on P/E, and specifically use the estimated earnings to compare.

The next section will focus on how to estimate the Earnings of a store within NB franchise.

3.3 Forecast of Future Earnings

As said earlier, the purpose of the valuation study is to come up with a valuation scheme to provide the base for merger with NB. It is the policy of NB to merge those franchised stores when they meet the criteria:

a. Turn profit for at least 2 consecutive years

b. With relative stable or growing revenue

It is expected that the age of the stores to be merged are relatively young, say less than 5 years old. If a franchised store is unable to reach the above status within 5 years, it is a candidate to be restructures and relocated, ending up to be a new store. In general, the stores are relatively young in age. This implies that the data available may not be able to support an accurate estimation of earnings.

The earning data may fluctuate widely for a store at relative young ages. This makes the P/E multiple less usable. Therefore, a store would need an "Averaged" earning figure, to compare with P/E of NB. Average of six years' earning will be a more stable figure of earning, provided that the 6 years are composed of 3 years in the past and 3 years in the future. The challenge is how do we obtain good three years of earnings forecast in this case?

There are a couple of techniques that will be applied to the estimation of earning in the study.

First, the study will use Multiple Regression Analysis to understand which are the (independent) variables, and how does the variables affect the earning results (dependent variables). The choices of variables are based on years of experiences in operating the drugstores. The Multiple Regression will generate a formula, which can then be used to forecast the earning of the coming years of stores and NB Corporations.

Alternatively, a different approach can be taken to forecast the earning. This approach is not based on the causal-factor analysis. Instead, it is based on the simple Income-statement structure

of

Earnings = Revenue – Cost Of Goods Sold – Expense

= Revenue * Gross Margin Rate - Expense (4.3-1)

In studying the income statements of the stores, it is found that the Revenue, Gross Margin Rate, and Expense are appearing to be relatively stationary, in contrast to the Earning data. Namely, the forecasting of Earnings is now further divided into three variables. This method is called Structured Income Methods, or SIM, through out this paper.

Please remember that the estimated Earning by either ways, are to be used as the representative, or "average" earnings, for valuation purpose. The estimated earnings is to get rid of the fluctuation phenomenon of earnings ratio, which will make P/E method less accurate.

3.4 Earning Forecast by Multiple Regression Analysis

The Multiple Regression will be applied in two ways

a. General Regression, or Company-wide Regression. As many as 36 stores data are input to the regression model. This will come up with a general formula that describe how the factors contributing to the earnings of a store.

b. Store-specific Regression. This model only use a single store's, but many yearss data to analyze. The resulted model is only pertaining to the specific store, no other store.

These two regression models are based on same sets of regression variables..

3.4.1. Selection of Regression Variables

Through the years of experiences in running the stores, the most significant variables that contribute to the performance of the store are selected as follows (parenthesis indicates the variable range):

a. Store Age(1 to 10)

b. Quality of store employees(1 to 10)

c. Customer Services(1 to 10)

d. Market coverage area population(in 10,000 unit)

e. Birth Rate in the market coverage area(times 1000)

f. Income level of the market area(in 10,000$ unit)

g. Personal expenditure(in 1,000$ unit)

h. Store Visibility(1 to 10)

i. Competition level in that market area(1 to 10)

j. Store size($100\,m^2$)

k. Parking lots(0-20)

l. Shelf layout(1 to 10)

m. Store atmosphere(1 to 10)

n. Promotions(1 to 10)

The store performances to be measured are Revenue and Earnings. In fact, the Revenue information can also be used as an independent variable to regress Earnings.

3.4.2 Regression models

The first regression is to estimate revenue data. The regression model will in the following format:.

$$R = a_0 + a_1 * X_1 + a_2 * X_2 + ... + a_{14} * X_{14} \qquad (4.4\text{-}1)$$

Where X_i, i = 1..14 are the expected performance drivers.

And the earnings can be analyzed by a different regression model:

$$E_1 = b_0 + b_1 * X_1 + b_2 * X_2 + ... + b_{14} * X_{14} \qquad (4.4\text{-}2)$$

As revenue can be treated as a contributing factor to earning performance, it can be added as a contributing variable to the regression of Earnings. This will result in the following model:

$$E_2 = b_0 + b_1 * X_1 + b_2 * X_2 + ... + b_{14} * X_{14} + b_{15} * R_f \quad (4.4\text{-}3)$$

Where R_f is the forecast revenue derived from (4.4-1)

3.4.3 Forecast period

As pointed out by Kopland [Valuation, pp 214], a 3 to 7 years' forecast will be accepted. This will cover the cyclic pattern of a business if any. Our use of 2-3 years of historic data, and another 2-3 years of forecast data will be able to remove the cyclic pattern, and provide a good average indicator of earnings.

3.5 Valuation Model Performance

The performance of the regression model can be measures by calculating the Bias data.

$$\text{Bias} = \frac{ForecastValue - ActualValue}{ActualValue} \quad (3.5\text{-}1)$$

By comparing the bias from each model, we will be able to tell which one is more accurate than the other.

4 Empirical Results and Analysis

4.1 Real P/E value for Valuation

In calculate the price of a target company, the median P/E ratio of the comparable companies is multiplied by the earning of the target company. If the comparable company(s) is not public traded, as in our case, the ratio of earnings per share of the target and comparable companies can be used to indicate the ratio of share prices.

Take a store of NB, DL, as an example. Store DL has the actual Earning of 1.8$/share in year 2007. Meanwhile NB has a earning of 3.0$/share. In merging DL store to NB, each shares of DL can be exchanged by 1.8/3.0 = 0.6 share of NB stock. It is very straight forward. However, this method has too many underlined assumptions:

a. The value of an entity is proportionate to its earning per share.

b. The current earning of 1.8$/share by DL will sustained.

c. The current earning of 3.0$/share will sustain

The assumption a can be proven by looking at the DCF formula 4.1-2, 4.1-3. 4.1-4. By all these formula, the cash flow of each year appears in the numerators. Therefore, cash flow is proportionate to the company's value.

However, the assumption b tends to be invalid. An individual store's earnings are more fluctuated than a collection of stores, as multiple store's earning can mutually average out each other's fluctuation. This problem can be corrected by using the "average" earning data of the store, as discussed earlier.

4.2 Earnings Forecast by Company-wide regression

4.2.1 Data Input

The information of 36 stores with running records of more than 3 years are input to the regression model. Some of the data: Age, size, parking spaces, revenue, market area Birth rate and population, and income statistics are actual figures(Birth rate, population and income are approximated figure derived from Taiwan Government Statistics), the rest of the factors are subjective figures with expert endorsement. The data reflect the year of 2007.

4.2.1.1 Regression Results

4.2.1.1.1 Revenue Regression

Table 2 Revenue Regression Result-by General Regression

Summary Of Output

Regression Statistics	
R Value	0.93074
R Square	0.86627
Adjusted R :	0.77712
Standard De	11.424
# of Obserse	36

ANOVA

	Deg. of F	SS	MS	F	ignificance
Regression	14	17753.6	1268.12	9.71675	3.1E-06
Residual	21	2740.67	130.508		
Sum	35	20494.3			

	Coefficien	Std Dev	t-statistics	P-Value	LB 95%	UB 95%	LB 95.0%	UB 95.0%
Intercept	-29.91	47.4205	-0.63068	0.53506	-128.523	68.7094	-128.523	68.7094
Store Age	1.35	1.03093	1.30787	0.20505	-0.79562	3.49228	-0.79562	3.49228
Emp. Qualit	-4.31	5.59769	-0.77032	0.44969	-15.953	7.32901	-15.953	7.32901
Cust. Svc	0.55	3.23319	0.16939	0.86711	-6.17611	7.27146	-6.17611	7.27146
Population	0.99	0.45943	2.16059	0.04243	0.0372	1.94809	0.0372	1.94809
Birth Rate	1.61	2.55418	0.63223	0.53406	-3.69688	6.92651	-3.69688	6.92651
Personal Ex	-1.58	2.45141	-0.64321	0.52705	-6.67475	3.52121	-6.67475	3.52121
Family Inco	0.97	3.94694	0.24512	0.80874	-7.24063	9.17559	-7.24063	9.17559
Visibility	4.23	2.89931	1.45984	0.15913	-1.79693	10.262	-1.79693	10.262
Competition	4.65	2.28035	2.03916	0.05422	-0.09225	9.39224	-0.09225	9.39224
Store size	7.30	1.98677	3.67377	0.00141	3.16722	11.4307	3.16722	11.4307
Parking Lot:	0.33	0.81174	0.40199	0.69175	-1.3618	2.01443	-1.3618	2.01443
Display	1.81	3.38412	0.53462	0.59853	-5.22843	8.84689	-5.22843	8.84689
Atmosphere	-0.87	4.55223	-0.19146	0.85001	-10.3384	8.59532	-10.3384	8.59532
Promotion	-2.36	3.80876	-0.61904	0.54255	-10.2785	5.56299	-10.2785	5.56299

Revenue = (-29.91 + 1.35 * X1 -4.31*X2 + 0.55*X3 +0.99*X4 +1.61*X5 -1.58*X6 +0.97*X7 +4.23*X8 +4.65*X9 +7.3*X10 +0.33*X11 + 1.81*X12 -0.87*X13 -2.3 6*X14) * 1,000,000 (4.1-1)

Where X1…X14 are Age, Employee quality, …, and Promotion respectively

The above regression model is 86.6% explantory

As suggested by the t-statistics of the above regression result, the significant variables are Store Age(X1), Population(X2), Visibility(X3), Competition(X4), and Store size(X5). If we take these 5 variables to input, the regression model becomes

Revenue = -47.05 +1.219*X1 +1.015*X2 +2.619*X3 +6.370*X4 +6.119*X5 (4.1-2)

This model can explain 84.16%, which is very close to the 86.6% of the above model. Therefore, it is reasonable to conclude that the significant variable to the store performance are those 5 variables.

4.2.1.1.2 Earning Regression: Using same Variables

Table 3. Earnings Regression Result-by General Regression

Summary Of Output

Regression Statistics	
R Value	0.9124
R Square	0.8325
Adjusted R !	0.7208
Standard De	17.699
# of Obersei	36

ANOVA

	DoF	SS	MS	F	ignificance
Regression	14	32696	2335.4	7.4555	3E-05
Residual	21	6578.2	313.25		
Sum	35	39274			

	Coefficient	Std Dev	t-statistics	P-Value	LB 95%	UB 95%	LB 95.0%	UB 95.0%
Intercept	-104.01	73.467	-1.4157	0.1715	-256.79	48.772	-256.79	48.772
Store Age	3.99	1.5972	2.4963	0.0209	0.6655	7.3086	0.6655	7.3086
Emp. Qualit	-8.70	8.6723	-1.0037	0.3269	-26.739	9.3306	-26.739	9.3306
Cust. Svc	6.23	5.009	1.2428	0.2276	-4.1917	16.642	-4.1917	16.642
Population	1.25	0.7118	1.7519	0.0944	-0.2333	2.7272	-0.2333	2.7272
Birth Rate	7.45	3.9571	1.8838	0.0735	-0.7748	15.684	-0.7748	15.684
Personal Ex	-2.43	3.7979	-0.641	0.5284	-10.333	5.4636	-10.333	5.4636
Family Inco	-3.86	6.1148	-0.6314	0.5346	-16.577	8.8556	-16.577	8.8556
Visibility	2.13	4.4918	0.4748	0.6398	-7.2084	11.474	-7.2084	11.474
Competition	7.92	3.5328	2.2429	0.0358	0.5767	15.271	0.5767	15.271
Store size	7.34	3.078	2.3859	0.0265	0.9428	13.745	0.9428	13.745
Parking Lot	0.90	1.2576	0.717	0.4813	-1.7137	3.517	-1.7137	3.517
Display	4.07	5.2429	0.7756	0.4466	-6.8368	14.969	-6.8368	14.969
Atmosphere	-6.06	7.0526	-0.8587	0.4002	-20.722	8.6109	-20.722	8.6109
Promotion	-1.30	5.9008	-0.2207	0.8275	-13.573	10.969	-13.573	10.969

The Regression Formula can be described as follows:

Earning = (-104.01 +3.99*X1 -8.7*X2 +6.23*X3 +1.25*X4 +7.45*X5 -2.43*X6 -3.86*X7

+2.13*X8 +7.92*X9 +7.34*X10 +0.9*X11 +4.07*X12 -6.06*X13 -1.3*X14) * 100,000$

(4.2-1)

This model is 83% explanatory, with 17% unexplained.

If we take the significant variables: Age, Service, Population, Birth Rate, Competition and Store Size to regress, the result is 74.7% explanatory, which is much less than the 83.2%. Therefore the formula 4.2-1 stays.

4.2.1.1.3 Earning Regression: Using 14 variable + Revenue

Table 4. Regression Result of Earning-36 Stores, with Revenue Factor

Summary Of Output

Regression Statistics	
R Value	0.97687442
R Square	0.954283633
Adjusted R Square	0.919996358
Standard Deviation	9.474842961
# of Oberservation	36

ANOVA

	DoF	SS	MS	F	Significance
Regression	15	37478.29	2498.553	27.83201	3.82E-10
Residual	20	1795.453	89.77265		
Sum	35	39273.75			

	Coefficient	Std Dev	t-statistics	P-Value	LB 95%	UB 95%	LB 95.0%	UB 95.0%
Intercept	-64.50	39.70032	-1.624735	0.119875	-147.3158	18.31089	-147.3158	18.31089
Store Age	2.21	0.889177	2.480789	0.022121	0.351071	4.060651	0.351071	4.060651
Emp. Quality	-3.01	4.70774	-0.638982	0.530085	-12.82833	6.812009	-12.82833	6.812009
Cust. Svc	5.50	2.683372	2.050311	0.053672	-0.095665	11.09916	-0.095665	11.09916
Population	-0.06	0.421273	-0.152789	0.880096	-0.943125	0.814394	-0.943125	0.814394
Birth Rate	5.32	2.138445	2.48837	0.021767	0.860526	9.78196	0.860526	9.78196
Personal Expe.	-0.35	2.053077	-0.171249	0.865748	-4.634229	3.931053	-4.634229	3.931053
Family Income	-5.14	3.278188	-1.567608	0.132659	-11.97709	1.699262	-11.97709	1.699262
Visibility	-3.46	2.523695	-1.370407	0.185747	-8.722821	1.805843	-8.722821	1.805843
Competition	1.78	2.070066	0.860338	0.399799	-2.537123	6.099036	-2.537123	6.099036
Store size	-2.30	2.111928	-1.08819	0.289451	-6.703582	2.107223	-6.703582	2.107223
Parking Lots	0.47	0.675828	0.696308	0.49425	-0.939167	1.880335	-0.939167	1.880335
Display	1.68	2.825753	0.593216	0.559686	-4.218132	7.570696	-4.218132	7.570696
Atmosphere	-4.90	3.778818	-1.297872	0.209101	-12.7869	2.978049	-12.7869	2.978049
Promotion	1.81	3.187601	0.568624	0.575941	-4.836671	8.461763	-4.836671	8.461763
Revenue	1.32	0.180985	7.299033	4.66E-07	0.94349	1.698547	0.94349	1.698547

With the variable Revenue added, the significant variable that affect Earnings are: Age, Customer

Service, Birth Rate, and Revenue. Revenue carries most of the weight. This model is 95% explanatory, with only 5% unexplained. The regression can be represented as the following formula:

Earning = (-64.50258 + 2.21*X1 -3.01*X2 +5.5*X3 -0.06*X4 +5.32*X5 -0.35*X6 -5.14*X7 -3.46*X8 +1.78*X9-2.3*X10+0.47*X11+1.68*X12-4.9*X13+1.81*X14+1.32*X15) * 100,000$

(4.2-2)

This model is 95.4% explanatory

4.2.1.2 Analysis

4.2.1.2.1 Bias Analysis

The bias can be calculated for both revenue and earnings based on the Bias formula (3.5-1)

The calculated Bias data are listed below:

Table 5. Bias Analysis of Regression data-36 Stores

Target Variable	Revenue	Earning-14 Variables	Earnings-14 Variables + Revenue
Bias(% of stdev)	11.0%	30.9%	17.9%

(Note: Standard Deviation is 3,349,787)

The Bias is the average of all 36 stores.

4.2.2 Store-specific Regression model

4.2.2.1 Regression Result

4.2.2.1.1 Data Input

The CH store is selected as target store to be analyzed. The CH store has been in operation more than 10 years. The last 10 years' data including revenue, earning, and 14 factors are input. In fact, it has little changes over the year in Store size, Parking space, Visibility, Store layout, and even competitions (there is no significant competing stores opened over this 10 years period of time).

Therefore, only 6 variables can be used for the regression.

4.2.2.1.2 Revenue Regression

Table 6. Revenue Regression, Individual Store(CH)

Summary Of Output

Regression Statistics	
R Value	0.942243
R Square	0.8878219
Adjusted R Square	0.6634658
Standard Deviatior	8.3994159
# of Oberservation	10

ANOVA

	DoF	SS	MS	F	Significance
Regression	6	1675.0868	279.18114	3.9571991	0.1431358
Residual	3	211.65056	70.550188		
Sum	9	1886.7374			

	Coefficient	Std Dev	t-statistics	P-Value	LB 95%	UB 95%	LB 95.0%	UB 95.0%
Intercept	81.13	371.65111	0.2182884	0.8412103	-1101.634	1263.8879	-1101.634	1263.8879
Store Age	2.64	14.124521	0.1867371	0.8637813	-42.313	47.588143	-42.313	47.588143
Emp. Quality	29.40	19.20167	1.5312958	0.2232047	-31.7049	90.511776	-31.7049	90.511776
Birth Rate	2.06	5.2260014	0.39351	0.7202421	-14.575	18.687968	-14.575	18.687968
Personal Expe.	-7.13	32.64759	-0.218462	0.8410868	-111.0315	96.767052	-111.0315	96.767052
Family Income	-10.67	17.629522	-0.605004	0.587874	-66.77099	45.439129	-66.77099	45.439129
Promotion	11.83	11.773394	1.0051622	0.3888732	-25.63406	49.3024	-25.63406	49.3024

Where the variables X1… X6 are Store age, Employee Quality, Birth Rate, Personal expenditure, family income, and promotion respectively.

The regression Formula is:

Revenue(of CH) = 81.13 +2.64*X1 +29.4*X2 +2.06*X3 -7.13*X4 -10.67*X5 +11.83*X6

(4.1-4)

4.2.2.1.3 Earning Regression-Without Revenue Input

Table 7. Earning Regression-Individual Store(CH)

Regression statistics	
R-value	0.946633
Square	0.896114
Adjusted R Square	0.688341
Std Dev	22.34763
# of Observations	10

ANOVA

	DoF	SS	MS	F	Significance
Regression	6	12923.75	2153.958	4.31295	0.128908
Residual	3	1498.249	499.4165		
Sum	9	14422			

	Coefficient	Stdev	t-Statistics	P-Value	LB 95%	UB 95%	LB95%	UB 95.0%
Intercept	331.16	988.8212	0.334903	0.759748	-2815.71	3478.033	-2815.71	3478.033
Store Age	23.27	37.57994	0.619248	0.579599	-96.3249	142.8676	-96.3249	142.8676
Emp. Quality	-30.16	51.08829	-0.59039	0.596454	-192.748	132.424	-192.748	132.424
Birth Rate	9.21	13.90439	0.662083	0.555235	-35.0441	53.45587	-35.0441	53.45587
Personal Expe.	-1.93	86.86273	-0.02217	0.983702	-278.362	274.5102	-278.362	274.5102
Family Income	-12.79	46.90541	-0.27271	0.802767	-162.066	136.4823	-162.066	136.4823
Promotion	-32.33	31.32449	-1.03212	0.377934	-132.019	67.35806	-132.019	67.35806

The regression formula for CH store's Earning is:

Earnings (of CH) = 331.16 +23.27*X1 -30.16*X2 +9.21*X3 -1.93*X4 -12.79*X5 -32.33*X6)*100,000 (4.1-5)

This model is 89% explanatory.

4.2.2.1.4 Earning Regression-With Revenue Input

Table 8 Earning Regression-Individual Store(CH), With Revenue Factor

Summary

Regression	
R-value	0.9573855
Square	0.91658699
Adjusted R Square	0.62464146
Std Dev	24.5253177
# of Observations	10

ANOVA

	DoF	SS	MS	F	Significance
Regression	7	13219.018	1888.4311	3.1395822	0.2627617
Residual	2	1202.9824	601.49121		
Sum	9	14422			

	Coefficient	Std Dev	t-statistics	P-Value	LB 95%	UB 95%	LB 95.0%	UB 95.0%
Intercept	426.98	1093.7621	0.3903783	0.7339124	-4279.101	5133.0629	-4279.10098	5133.062904
Store Age	26.39	41.480956	0.6361144	0.5897864	-152.0916	204.86491	-152.091637	204.8649057
Emp. Quality	4.57	74.83631	0.0610325	0.9568836	-317.4274	326.56232	-317.427431	326.5623232
Birth Rate	11.63	15.648179	0.7435264	0.534644	-55.69389	78.963563	-55.6938936	78.96356309
Personal Expe.	-10.35	96.08243	-0.107721	0.9240495	-423.7597	403.05949	-423.759746	403.059493
Family Income	-25.39	54.526102	-0.465642	0.6872577	-259.9967	209.21741	-259.996681	209.2174101
Promotion	-18.35	39.7464	-0.461749	0.6896197	-189.3679	152.66223	-189.367922	152.6622324
Revenue	-1.18	1.6857956	-0.700637	0.5560691	-8.434528	6.0722681	-8.43452844	6.072268104

With Revenue added as a contributing variable to the earning, there are totally 7 variables used. The formula is now:

Earnings (of CH) = 426.98 +26.39*X1 + 4.57 * X2 + 11.63 * X3 -10.35* X4 -25.39 * X5 -1.18*X6 (4.1-6)

This model has 91% explanatory power, 2% higher than previous one without revenue variable added.

4.2.2.2 Analysis

4.2.2.2.3 Bias Analysis

Table 9. Bias Analysis-Store Specific

Target Variable	Revenue	Earning-W.O Revenue Input	Earnings-With Revenue Input
Bias(%)	2.11%	21.72%(19.37%)	21.47%(15.69%)

The Earning Bias percentage data of the above table is calculated by using standard deviation of earning as denominator. If the actual earning is used as the denominator, the Bias become 19.37% and 15.69% respectively. It is quite obvious that the fluctuation of Earning is much higher than the revenue. This makes the prediction of earning rather difficult.

4.2.2.2.4 Test Regression Performance by applying historic data

To understand how well the above forecasting formula work, each model will be used to forecast year 2007's revenue and Earnings, using historic data. The forecasted data is then compared to the actual data. The following table summarizes the calculated data.

Table 10. Performance Comparison between General Regression model and Store Regression model

2007 Data Forecast	Revenue		Earnings (14 variable)		Earnings(15 Variables)	
	General Model	Store Model	General Model	Store Model	General Model	Store Model
Forecast	146,188,520	169,129,900	11,581,540	14,715,250	14,470,528	14,879,690
Actual Data	168,169,452$		14,672,180$			
Bias	-13.07%	0.57%	-21.06%	0.29%	-1,37%	1.41%

From this table we can see that the Store-Specific model achieves better prediction errors than General model in all three exercises. The same exercise can be repeated to other stores. However, the earning forecast errors do fluctuated widely. And there is no clear indication on which model is superior in terms of earning forecasting. Notably, the Revenue forecast by Store Regression model is much more accurate than the General Model, as suggested by Table 5 and Table 9. This is also evidenced by Table 10 On the forecasts of earnings, there is no significant difference

between using the company-wide regression formula or by using the individual store formula. And the error of around 20%(Table 5, 9) is non-trivial at all.

4.2.3 Multiple years' Forecast Result using Store Regression Mode

Three years of revenue and earnings forecast are conducted using the more accurate Store Regression model for CH store. The resulted are listed as follows.

Table 11. CH Store 3 years forecast by Store Regression Model

CH Store	Year 1	Year 2	Year 3
Revenue (1,000,000)	168.5	174.1	176.4
Earnings(1,000,000)	16.4	17.4	18.8

4.3 Forecast by SIM method

As discussed earlier, the direct forecast of earnings using Multiple Regression analysis is still subject to big extent of in accuracy, especially in earnings forecast. The inaccuracy will become even more un-bearable when the business environment becomes more complicated. It is quite interesting how the SIM method will forecast the earnings in comparison to the above direct regression models.

The SIM method suggests that three variables should be derived to calculate the earnings: Revenue, Gross Margin Rate, and Expense.

Revenue is a relatively predictable item. As evidenced in the CH store example, it can be forecast with pretty narrow level of variation (within 1% of deviation). The historic data of Gross Margin Rate also suggest that it is also relatively stationary. It may vary through the years, but will not fluctuate bumpily. Expense is a budgetary item, which is should be under store management's strict control. Therefore, forecast, by using these three relative stationary variables, shall provide higher level of confidence. With the rationale said, does the SIM method really deliver? Let's take a look, using DL store as example. The data of DL are listed below;

Table 12. DL store operating data

DL Store	2003	2004	2005	2006	2007
Revenue (1000,000)	12.48	62.83	63.00	64.05	61.96
Gross Margin Rate(%)	19.2	18.5	19.0	19.01	18.98
Expense (1,000,000)	3.87	10.31	10.70	10.81	10.15
Earning	-1.46	1.31	1.27	1.36	1.61

Note that Year 1 is the opening year, with only 2.5 months in execution.

4.3.2 Revenue Forecast

As discussed earlier, the Revenue data can be forecast with narrower level of variation by using regression models in Section 5.1.1.2.1., the General Regression Model, or Section 5.1.2.1.1, the Store-Specific Regression Model. Here the Store-Specific regression model is used. The revenue forecast is generated as follows

Table 13. Revenue Forecast by General Regression

Year	2003	2004	2005	2006	2007	2008 (Fcst)	2009 (Fcst)	2010 (Fcst)
Revenue	12.48	62.83	63.00	64.05	61.96	**62.04**	**63.50**	**65.4**

4.3.3 Expense Forecast

Expense is rather a budgetary item, which is generally a result of budget plan for a particular year. In operating a store, this item shall be controlled within limited allowance. If a company practices budget control strictly, the budgetary expenses plan will be pretty meaningful for forecast purpose. Conservatively, the company can estimated the expense to be the budgetary number plus a maximal allowance allowed for the store, as determined by the corporate management. It is least recommended to use the statistic estimation on the expense item.

The following table is the actual and expense budget planned for DL:

Table 14. Expense Budge plan

Year	2003	2004	2005	2006	2007	2008 (Fcst)	2009 (Fcst)	2010 (Fcst)
Expense Budgeted	3.6	10.0	10.5	11.0	10.5	**10.0-**	**9.5-**	**9.0**
Actual Expense	3.87	10.31	10.70	10.82	10.15	-	-	-

4.3.4 Gross Margin Rate Forecast

The gross margin rate, GMR, as observed by historic data, is relative stationary in nature. In one direction, the market competition may drag GMR downward. In another direction, the company may tries very hard to provide good customer service, better product mix, and better sales training to raise the GMR. As a store become mature, however, the GMR become steady.

The Gross Margin Rate in Table 12 may not have an obvious trend, and does not seem to have cyclic effects. In this case, we have several choices to forecast GMR:

4.3.3.1 Expert Guess

Gross margin rate is affected by service, brand image, market promotion, revenue goal, competition, product mix, balance of demand and supply, and sales skills. Some of factors are attributed to external environment, such as market competition, balance of demand and supply. Equally or more important are the internal factors. Such internal factors are determined by management aspiration and skills. Therefore, it is suitable to use the “Expert Guess” technique to come up with estimation. Namely, both corporate level and store level managers can jointly determined the expected value for the coming years based on the market situation and past data.

4.3.3.2 Linear Regression

It seems perfectly ok to use a linear formula to approach the GMR’s of the past years. By a simple regression on actual GMR’s, the expected data as predicted by the regression model is derived:

Table 15. GMR forecast using Linear Regression

Year	2003	2004	2005	2006	2007	2008 (Fcst)	2009 (Fcst)	2010 (Fcst)
Actual GMR (%)	19.32%	18.5%	19.00%	19.01%	18.98%	-	-	-
Regressed GMR(%)	19.00%	18.98%	18.96%	18.95%	18.93%	**18.91%**	**18.89**	**18.88**

The average Bias is 1.02% in comparing with actual GMR data, a pretty close estimation.

4.3.3.3 Time Series(Exponential Smoothing)

Exponential Smoothing technique is especially applicable for non-trendy data analysis. Each data is mostly affected by its previous data. If we take the carrying-weight of 30%(30% of previous estimate, and 70% of last data), the following table summarized the output:

Table 16. GMR forecast using Time Series(Exponential Smoothing)

Year	2003	2004	2005	2006	2007	2008 (Fcst)	2009 (Fcst)	2010 (Fcst)
Actual GMR (%)	19.32%	18.5%	19.00%	19.01%	18.98%	-	-	-
Time Series GMR(%)	19.00%	18.98%	18.96%	18.95%	18.93%	**18.98**	**18.98**	**18.98**

The average Bias is 1.56% when comparing with historic data. However, the gap is narrowing for the most recent years. In fact it converges to 18.98 for the forecasting years.

4.3.4 Results by SIM

The Earning forecast data for year 2008,2009, and 2010 can now be calculated from Table 14, 15 and 16. The results are shown as follows

Table 17. Calculate Earning using SIM output

	2008	2009	2010
Forecast Revenue	62.04	63.50	65.4
Forecast GMR	18.91%	18.89%	18.88%
Calculated margin	11.73	11.99	12.34
Forecast Expense	10.0	9.5	9.0
Calculated Earning	1.73	2.49	3.34

4.3.5 Price of A Single Store Shares

With the above estimation of the earnings for the next 3 years, we can then calculate the value of the single store in terms of the stock price.

Table 18. Single Store Share Price Calculation

	NB (242,127 shares)		DL (5,500 shares)	
	EBIT	EPS	EBIT	EPS
2005	85,129,419	3.51	1,490,582	2.71
2006	83,039,204	3.43	1,615,235	2.94
2007	99,406,274	4.11	1,721,922	3.13
2008(Est)			1,730,000	3.14
2009(Est)			2,490,000	4.52
Average		3.68		3.29
Ratio		0.89		1

That is, the share price of a DL store is equal to 0.89 share of NB share.

4.3.6 SIM vs. Multiple Regression

Take DL store as an example. The average earning of DL store is 2.2% of Revenue. That means the estimation error of GMR will be expanded 45 times in calculating the gross

margin(100%/2.2%). The example of multiple regression, as described in 5.1.1.3.1 and 5.1.2.2.1, indicates the estimation error of earnings is 18%~22%., or 20% in average. This error is equivalent to 20% /45 = 0.44% of estimation error in GMR forecasted value. As the example indicated in 5.2.3, the GMR has an average bias of 1.02% by using the linear regression method or of 1.56% by using the Time Series technique. If we take 1.56%, the expanded estimation error is 1.56% * 18.98%, equal to 0.296%. This bias is smaller than the 0.44% by the direct regression using multiple regression variables. The difference of 0.296% and 0.44% may not be significant enough to tell which model is superior, since this study use limited number of samples. The decision on which methods, SIM or Multiple Regression, to forecast the earnings for the stores, can be based on the following considerations:

a. How closely the budget plans were executed before by the targeted entity. The better it executed budget plan, the more accurate the SIM model will work.

b. The Multiple regression models require as much data as possible to forecast accurately. But a target entity with limited years of existence is likely to provide very limited data for the regression purpose. Therefore the accuracy from Multiple Regression may not be convincing enough to use, especially the Store-Specific model. However, the General Regression model still can be applied.

5 Conclusion and Suggestions

In the scope of merging a store into a franchise, there are several finding from the study

1. Earning is the utmost store-value indicator for the NB stores. No matter which model of the DCF, P/E, P/B, or P/S is used, the earnings end up to be the intrinsic value indicator of a store.

2. A store's value is indicated by the average earning of several years, not a single year. The 2~3 years of historic earning data and 2~3 years of forecast earning data are averaged out to be the representative earning data.

3. This paper proposes to use the Structured Income Method, SIM to forecast the earnings of a store for the upcoming 2~3 years. The SIM method leverage budgetary estimations of the revenue, expense, and gross margin rate to derive the earnings

4. Alternatively, if the input data can be more accurate enough, a Store-specific regression model can be used to forecast the earnings

5. As a side benefit, the Multiple Regression model indicates which variables are significant contributors, and which others are not significant contributors to the performance of a store's performance. Such information is very useful for the management decision making in locating a new store.

In order to carry out the model proposed in the study forward, more efforts are required:

1. Collecting of data regarding to a store environment should be conducted since it is first created.

2. The stores shall implement budget control system. This will make the SIM method more workable in terms of accuracy.

3. Performance metrics of a store shall be established and implemented. Such metrics will provide a good indication of how the store if perceived by customers.

The goal is to establish an effective earnings estimation model for a specific store. It is the goal of the study to extend the application of the model to other business areas.

4. This study proposes two approaches to estimate the earning of a store. These approaches can be applied to general business entities with similar business patterns, especially for the franchised businesses. In order to fine-tune the models, wider scope of applications is welcomed. The performance–driving factors, as used by the study should be observed and recorded periodically, not only for the fine-tuning of forecasting model, but also for the company management to get insight into the significance of the factors. This will lead to a better management of the entity.

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