# COST OF EQUITY CAPITAL FOR AN AIRLINE COMPANY: A CASE STUDY IN TAIWAN

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**Abstract:** The purpose of this study is to develop an APT model that can be used to predict the accounting cost of equity capital for airline companies in Taiwan. Through regressing macroeconomic variables -- interest rates, money supply, imports and GNP per capita, and residual market factor against returns on equity for each 100-sample firm listed in the Taiwan Stock Exchange, we produced a set of sensitivities for each firm and a set of market price of risks for each quarter. With these data, the China Airline's estimate returns on equity, 1.71%, for first quarter 2000 is quite closely with the reported 1.59%.

**Key Words:** airline, APT model, cost of equity capital, returns on equity, stock returns

## 1. INTRODUCTION

Cost of equity is the cost that a company recognizes for obtaining funds from stockholders. The demanders and suppliers of funds transact business through the capital market. In an efficient market, the cost of fund demanders will be equal to the return of fund suppliers. This means that a company's cost of equity capital will be equal to the return on stock of investors.

There are two principal approaches to determining a company's stock returns: (1) to use a discounted cash flow model such as the Gordon Growth Model, and (2) to use a model which attempts to determine the expected return of stock as a premium over some observable market rate. The first approach focuses on projections of future cash flows for a particular company and estimates the stock returns as the rate that equates the company's share price with the present value of these future cash flows. This approach has been criticized for being very sensitive to the estimated growth rate for a company and for not incorporating systematic influences that affect capital markets and the relative returns for other companies. Therefore, there is no space for the unexpected change in the company's earnings power in this approach.

The second approach includes the capital asset pricing model (CAPM) and the arbitrage pricing theory (APT). The CAPM was the first rigorous theoretical model that allowed us to estimate how the return of a specific company should differ from a benchmark rate called the market rate of return. However, the CAPM is not sufficient to explain the variation of real stock returns; a new theory is needed. The APT, then, was introduced by Ross (1976), as an alternative to the CAPM. Since then a number of studies have explored the types of macroeconomic variable that might be important in determining the expected rate of stock

returns, such as Chen, Roll and Ross (1986), Burmeister and McElroy (1988), Burmeister and Wall (1986), Elton, Gruber and Mei (1994), and Antoniou, Garrett and Priestley (1998). Empirically, the explanatory powers of the stock returns are more than that of the CAPM, so the APT model is used in this paper.

Chen, N. et al. (1986) indicated that the spread between long and short interest rates, expected and unexpected inflation, industrial production, and the spread between high and low grade bonds can affect stock-market returns systematically. Burmeister E. et al. (1988) used measured and unmeasured factors, to estimate the APT model. They showed that a January effect not explained by the set of factors used was an important determinant of expected returns. Elton, E. et al. (1994) included the return on the market and unexpected changes in the level of interests, the shape of the yield curve, exchange rates, production and inflation in the APT model, and described how it can be used to determine the cost of equity capital for any company.

The empirical studies in Taiwan's stock market by using APT model with macroeconomic variables to explain the expected rate of stock returns are similar with the studies in U. S. Zhu (1990) found the unexpected changes in money supply, exchange rate, export values, industrial production index, inflation, premiums risk, interests term structure, and residual market had good explanatory power. Yeh (1992) identified the unexpected changes in inflation, exchange rate, industrial production index, the difference between the rates of commercial papers and treasury bills, and residual market factor not explained by those four factors, can determine the stock returns. Goo Y. et al. (1996) showed macroeconomic factor, specifically, the unexpected changes in manufacture average salary and the unexpected changes in total stock trading volume, did affect all of the industrial sectors.

There is a tremendous of research examines the relationship between earning and stock returns. Ball, R. et al. (1968) evidenced the unexpected changes in earning was related to abnormal rate of returns significantly. Simkowitz M. et al. (1973) found that the returns on equity (earnings divided by stockholders' equity) of a firm affect its returns on stock. Easton P. et al. (1991) revealed both current and changes in accounting earnings had explanatory power on stock returns.

In Taiwan, Hwang (1996) showed, beside market factor, dividend payout ratio and debt ratio, the returns on equity can explain the rate of stock returns. In the study of Liu, T. et al. (1997), it suggested that with the increase in interval of cumulated earnings and returns the explanatory power of earnings for stock returns increased. Chu (1997) recognized that stock returns were associated with earnings positively each year, but varied from year to year. The possible reasons of changes in returns/earnings association were market size, interest rate, market variance and trading volume.

Although lost of studies use macroeconomic variables to predict stock returns and others reveal the positive relation between stock returns and earnings (or returns on equity), there is no research use macroeconomic variables to explain the returns on equity. The purpose of this study is, then, to develop an APT model to estimate the cost of equity of airline companies in Taiwan. Instead of rate of stock returns, the rate of equity returns will be used in this paper. This is because the stock of most airline companies in Taiwan are not traded on the Taiwan Stock Exchange and the market price of each stock is not available. Another reason is that we believe the relationship between the rate of stock returns and the rate of equity returns is strong as shown in previous research. In other words, we view the rate of equity returns of a company as "accounting" cost of equity capital of this company, and we

attempt to develop an APT model that can be used to predict the accounting cost of equity capital of airline companies in Taiwan.

## 2. THE APT MODEL

The APT states that the return on any security can be broken down into three parts: (1) the expected return on the security, (2) a set of systematic factors, and (3) an idiosyncratic return. In equation form

$$R_{it} = E[R_i] + \beta_{1i} f_{1t} + ... + \beta_{ki} f_{kt} + ... + e_{it} \qquad (1)$$

where

$R_{it}$ = the return on asset i in period t.

$E[R_i]$ = the expected return on asset i.

$\beta_{ji}$ = the risk exposure of asset i to the j systematic influence.

$f_{jt}$ = the value of systematic influence j at time t; all influences are designed to have a mean of zero.

$e_{it}$ = nonsystematic of idiosyncratic shock.

Equation 1 is called a return generating process that leads to a model of expected returns as follows (Elton, et al. [1997]):

$$E[R_i] = \lambda_0 + \lambda_1 \beta_{1i} + .... + \lambda_j \beta_{ji} \qquad (2)$$

where

$\lambda_j$ = the market price of the j-th source of systematic risk.

## 3. SAMPLE

The time period used in this study extended from the first quarter 1993 through the fourth quarter 1999. There are 533 stocks traded on the Taiwan Stock Exchange, but only stocks exchanged during the whole sample period were included in the population. A random sample of 100 listed stocks was selected to estimate the respective parameters $\beta_{ji}$ and $\lambda_j$ for determining the market price of different sources of risk from a broad spectrum of common stocks. After the market prices of systematic risks were obtained, the APT model can then be used to determine the necessary return on any type of company. In order to see the impact of the market price of risk on the cost of equity capital for the airline business in general, we also drew a sample consisting of 10 airline companies, which was only one company's stock listed in Taiwan Stock Exchange.

## 4. VARIABLES FOR SYSTEMATIC INFLUENCES ($f_j$)

For systematic influences, we concentrate on what will affect firms' earnings expectations. Firms need enough cash flows for daily operations and capital asset investment. To achieve high profit, it is expected that equipment and labor operate at full capacity, and products and services provided can be sold easily. In macroeconomics, many influences can systematically affect earnings, and then the returns on equity. Current market beliefs concerning influences are already incorporated in market price, and only unexpected changes in these influences will

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affect price and return on stock. Much research shows earnings and market price are related. Therefore, we also use the unexpected changes for modeling. The influences include the following:

## INTEREST RATES

Unexpected changes in interest rates may influence the size of cash flows. When interest rates are down, it is easier for firms to get the necessary capital inexpensively, therefore, increasing the earnings and returns on equity. The interest rates for 91-180 day commercial paper in the secondary market is used as a variable of change in interest levels. We also consider the term structure and risk differentials in debt investments. However, the government and corporate bond markets in Taiwan are not well developed through the whole

Table 1. Definition for Variables

| Independent variables: | | |
|---|---|---|
| Interest rates | $(INT_t - INT_{t-1}) / INT_{t-1}$ | * |
| Term structure | $BankD_t - Tbill_t$ | * |
| Default risk | $Cnote_t - Tbill_t$ | * |
| Money supply | $(M1B_t - M1B_{t-1}) / M1B_{t-1}$ | * |
| GNP deflator | $((GNPdef_t - Exp(GNPdef_t)) / GNPdef_{t-1}$ | ** |
| WPI | $((WPI_t - Exp(WPI_t)) / WPI_{t-1}$ | ** |
| CPI | $((CPI_t - Exp(CPI_t)) / CPI_{t-1}$ | ** |
| Imports | $((IMP_t - Exp(IMP_t)) / IMP_{t-1}$ | ** |
| Exports | $((EXP_t - Exp(EXP_t)) / EXP_{t-1}$ | ** |
| Exchange rate | $(EXG_t - EXG_{t-1}) / EXG_{t-1}$ | * |
| GDP | $((GDP_t - Exp(GDP_t)) / GDP_{t-1}$ | ** |
| GNP | $((GNP_t - Exp(GNP_t)) / GNP_{t-1}$ | ** |
| GNP per capita | $((perGNP_t - Exp(perGNP_t)) / perGNP_{t-1}$ | ** |
| Private final consumption exp. | $((PRI_t - Exp(PRI_t)) / PRI_{t-1}$ | ** |
| Nation income per capita | $((perNI_t - Exp(perNI_t)) / perNI_{t-1}$ | ** |
| Oil price | $(OIL_t - OIL_{t-1}) / OIL_{t-1}$ | *** |
| Dishonor checks | $(NSF_t - NSF_{t-1}) / NSF_{t-1}$ | * |
| | | |
| Dependent variables: | | |
| Market stock returns $R_{mt}$ | $(MIndex_t - MIndex_{t-1}) / Mindex_{t-1}$ | * |
| Returns on equity | $NI_t / (0.5 \times Eqt_t + 0.5 \times Eqt_{t-1})$ | **** |

\* Based on Financial Statistics Monthly, Taiwan District, ROC, Economic Research Department of the Central Bank of China.

\*\* Based on Quarterly National Economic Trends, Taiwan Area, ROC, Bureau of Statistics, ROC.
   The expected value at period t is a forecast made at period t-1 for the subsequent quarter.

\*\*\* Based on NCL database.

\*\*\*\* Based on TEJ database.
   Net income before tax is used in this study because income tax is irrelevant to performance of management.

sample period. Alternatively, we use the differential in rates between 91-day treasury bills and 2-year bank debentures and 31-90 day commercial paper in the primary market as the term structure and default risk variables, respectively. Theoretically, increasing money supply will decrease interest levels, then, the unexpected change in money supply M1B (= currency issued – cash in vaults + checking accounts + pass book deposits + pass book savings deposits) is also considered.

## INFLATIONS

Unexpected changes in inflation will affect the purchasing power of both firms and consumers, and the size of cash flow. The GNP deflator, wholesale price index, and consumer price index were chosen as our inflation variables.

## FOREIGN TRADE

With limited natural resources, Taiwan depends heavily on imports of materials and techniques and exports of goods and services to continue posting strong economic growth. Accordingly, unexpected changes in imports, exports and exchange rates are surely systematic influences that affect firms' earnings.

## AGGREGATE ECONOMIC ACTIVITY

Unexpected changes in business conditions might have impacts on firms' earnings and expected earnings. GDP, GNP, and GNP per capita represent the productivity. Private final consumption expenditure and national income per capita show the ability for consumption. The change in oil price affects the price of material inputs for firms, while any growth in the dishonor check ratio implies increased insolvency of firms in Taiwan.

The definition of variables mentioned above is shown in Table1. Some variables are closely correlated and some are insignificant in explaining returns at a market, so we adopt stepwise regression against market stock returns for selecting the independent variables. After this procedure, only four variables, unexpected change in interest rates, money supply, imports, and GNP per capita, are left for modeling, as shown in Table2. Except the insignificant constant, all of four variables are significant with $\alpha$ less than 0.1. The most significant variable is money supply (p-value = 0.0021) and the less significant variable is GNP per capita (p-value = 0.0539).

Table 2 shows a positive change in short term interest rate, money supply, and GNP per capita which will increase the average stock return. It is our expectation to have a positive sign of change in money supply and GNP per capita. Increasing in money supply means people will invest the extra money on stock market, and then increase the share price. While increasing in GNP per capita represent the increase in productivity and consumption ability that cause companies to generate more profit.

However, the positive sign of change in interest rate, which also shown in some empirical research in Taiwan, is against the theory that increase in interest rate will result a decrease in share price. It may be the reason that companies need more funds to expand their business in a prosperous economics. During the past decades, Taiwan experienced a fast economic growth. The average yearly economic growth rate during 1993 to 1999 was 6.2%. Many firms wish to be listed in Taiwan Stock Exchange because it is easier for them to raise the necessary funds from banks and stock market. The listed firms increased from 256 in 1992 to 533 in

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Table 2. Regression Result between a Market Stock returns
and Economic Variables

| Variables | Coefficients | T-value | P-value |
|---|---|---|---|
| Constant | 0.004 | 0.187 | 0.8532 |
| Interest rates | 6.802 | 2.750 | 0.0114 |
| Money supply | 1.509 | 3.469 | 0.0021 |
| Imports | -1.185 | -2.336 | 0.0286 |
| GNP per capita | 1.604 | 2.031 | 0.0539 |
| $R^2_{adj} = 0.443$ | | | |

1999. With the booming market, the expected benefits to raise funds exceed the cost of interest that makes the change in short term interest rate move the same direction with average stock returns.

The negative sign of unexpected in imports means an increase in imports will decrease the market stock returns because people spends more money in consuming imported goods will have less money left for investment.

For analyzing individual returns, we also need to remove the effect of these four variables from the market return as a residual market factor to measure any systematic influences not explained by other variables. This variable is estimated from the data in Table 2 as following:

$$(Residual\ Market)_t = R_{mt} - (0.004 + 6.802\ f_{1t} + 1.509\ f_{2t} - 1.185\ f_{3t} + 1.604\ f_{4t}) \qquad (3)$$

## 5. ESTIMATION OF EXPECTED RETURN

The procedure to estimate the expected return has two steps. First, for each of 100 randomly-selected firms, we regress quarterly returns on equity against the quarterly value of unexpected change in each of the four economic variables and the residual market factor by using the model described in Equation 1. This step produces a set of beta or sensitivities for each of 100 firms on each of the variables described earlier.

The second step is to regress the quarterly returns on equity of 100 firms against the five sensitivities for each quarter with the adoption of Equation 2. This produces an estimate of the market price of five risks for each quarter. We then average these quarterly estimates to obtain a single market price of five risks as shown in Table 3. The production risk premium of 0.0102 for 1999 means a firm require an extra 0.0102% per quarter in expected return for the sensitivity of unexpected change in GNP per capita.

Note that interest rate risk premium has a negative sign and the others are positive. A firm with a positive beta has an increase in returns on equity when interest rates are rising. Investors would prefer firms to hedge against the increasing interest rates and will offer a lower expected return. Thus, the negative sign is associated with interest risk premium.

When an increase in money supply result an increase in return, the firm will have a positive beta. Investors would require these firms to make more profits with sufficient fund, and the risk premium is positive.

Table 3. Estimate of Risk Premiums for 1999

| | |
|---|---|
| Interest Rate Risk | -0.0025 |
| Money Supply Risk | 0.0453 |
| Imports Risk | 0.0177 |
| Production Risk | 0.0102 |
| Residual Market Risk | 0.0023 |

Most importers will benefit through the increasing imports and have a positive beta. With a strengthen in import goods consumption ability; investors expect the return of these firms will be higher; therefore, the sign of the risk premium is positive.

Production risk measures the change in GNP per capita. The return of a positive beta firm will be higher when GNP per capita increases. The positive risk premium implies investors would prefer firms offer a higher expected return with the growing productivity.

Finally, investors would like stocks with positively related to market will have a higher return, accordingly, the risk premium of residual market is positive.

Table 4 shows the sensitivity of stock to the source of systematic risk for a 10-firm airline sample and four major airlines operating in Taiwan. Since the air deregulation of Taiwan in 1987, the air market has become so competitive both in international and domestic routes. Presently, there are 13 companies in the airline industry, and only 2 companies, China Airline and Eva Airline, operate in the international route. For these 10 samples, most quarterly returns on equity data are not obtainable because their stocks are not traded on the stock market during the whole sample period except the China Airline. Therefore, we divided the yearly returns on equity by four as a substitute by assuming the airline companies had stable earnings through the whole year.

We also include the sensitivity of textile, computer, bank and average industries in Table 4 for comparison. Textile industry is a traditional and fading industry in Taiwan, with a contrast to the growing star of computer industry. The bank industry accompanies with computer industry are the leading indices in the market.

Table 4 reveals firms will have a higher return when interest rates increase, except the airline and computer industries. This is because these two industries need relative high capital for investing in equipment comparing to the other industries. Thus, the rising interest rate will negative the expected returns on equity. The China Airline with more flight equipments shows a negative beta.

The increase in money supply will decrease the returns on equity except the bank industry. Bank provides the necessary fund to other industries and earn a profit, therefore, it has a positive beta. While other industries need fund from outsiders, when increase in money supply accompanies with increase in expansion, the cost recognized by firms will decrease the returns on equity, and result a negative beta in money supply. However, an increase in money supply implies people has more money for travel, and also with a good financial leverage that make the China Airline, Eva Airline, and Uni Airline to have a positive beta.

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Table 4. Relative Beta and $R^2$ for 1999

|  | Interest Rate | Money Supply | Imports | GNP per Capita | Residual Market | $R^2$ |
|---|---|---|---|---|---|---|
| China Airline | -1.869 | 4.805 | -3.814 | 33.182 | 1.560 | 0.266 |
| Eva Airline | 30.521 | -1.798 | 1.170 | 42.086 | -0.017 | 0.068 |
| Far Eastern | 47.831 | 1.288 | -2.799 | -42.574 | -3.257 | 0.168 |
| Uni Airline | 319.776 | 3.677 | -9.904 | -113.421 | -7.763 | 0.286 |
| Airline industry | -43.919 | -2.408 | -2.494 | -126.494 | -5.013 |  |
| Textile industry | 84.036 | -3.099 | -31.323 | -30.092 | 59.643 |  |
| Computer industry | -3.861 | -12.167 | -16.166 | -0.529 | 69.798 |  |
| Bank industry | 82.618 | 7.499 | -25.129 | 11.369 | 4.370 |  |
| Average industry | 12.592 | -6.661 | -10.626 | 0.083 | 35.757 |  |

The sign of imports beta for each industries are all negative. This mean an increase in imports will decrease the returns on equity because people distributes more money in the consumption of imported goods, and less money on investment.

The positive sign of beta for GNP per capita means the increasing productivity will increase the returns on equity. However, the signs for computer, textile and airline industries are negative. The computer industry enlarges its capacity promptly in the recent year, and the speed for generating profit is less than the growth in production that may be the reason to results a negative sign of beta, but the coefficient is quite small. While most companies in the textile and airline industries suffer an operating loss. Especially, the domestic route airlines due to the serious competition and airfare governance are continuous in loss that makes them have a negative beta. However, the China Airline, the biggest airline company operating in the international route in Taiwan, has an increase in returns on equity when the GNP per capita increases.

All but airline industry are quite positive related with the residual market influences, accordingly, it has a positive beta. However, the airline industry with the problems motioned above has a negative sign for beta.

Elton, E. et al. (1994) used six macroeconomic variables to determine the stock returns for nine utility companies. The $R^2$ shown in the study ranged form 0.16 to 0.40. Lev (1989) studied the past two decades of empirical research on earnings since 1968, and found that most studies revealed the existence of a relationship between earnings and stock price, but the averaged adjusted $R^2$ was about 0.05. In Chu's study (1997), the adjusted $R^2$ to examine the yearly associations between stock returns and earnings in Taiwan for the period of 1982 to 1992 varied from -0.0113 to 0.1463. In our study, we try to use macroeconomic variables to explain the returns on equity instead of stock returns, and this might be the reason that $R^2$ shown in the table 4 seem somewhat low.

## 6. ESTIMATING AN AIRLINE'S COST OF EQUITY CAPITAL

with the respective parameters $\beta_{ji}$ and $\lambda_j$ produced by the above steps, we can estimate a company's cost of equity capital by adding an estimate of the risk free rate to the sum of the

Table 5. Quarterly Premiums over Risk Free Rate

| China Airline | 0.497 | % |
| Eva Airline | 0.292 | % |
| Far Eastern | - 0.553 | % |
| Uni Airline | - 1.983 | % |

products of in Equation 2. The market price of risk shown in Table 3 express the expected cost of capital as

$$\bar{R}_i = R_f - 0.0025 \; \beta_{1i} + 0.0453 \; \beta_{2i} + 0.0177 \; \beta_{3i} + 0.0102 \; \beta_{4i} + 0.0023 \; \beta_{5i} \quad (4)$$

To estimate the cost of equity for China Airline in first quarter 2000, we should determine the betas of each systematic influence as shown in Table 4.

$$\beta_{1i} = -1.869 \qquad \beta_{2i} = 4.805 \qquad \beta_{3i} = -3.814$$
$$\beta_{4i} = 33.182 \qquad \beta_{5i} = 1.560 \qquad\qquad (5)$$

Then, with substitution of these betas in prior equation, we obtain

$$\bar{R}_i = R_f - 0.0025 \, (-1.869) + 0.0453 \, (4.805) + 0.0177 \, (-3.814)$$
$$+ 0.0102 \, (33.182) + 0.0023 \, (1.560) \qquad\qquad (6)$$

or

$$\bar{R}_i = R_f + 0.497 \qquad\qquad (7)$$

This means the quarterly cost of capital for China Airline should be 0.497% higher than the quarterly risk free rate. If we use the average 90-day Treasury bill rate (1.213%) for the year 2000 as risk free rate, the quarterly cost of equity capital would be 1.71% (1.213% + 0.497%), equal to an annual cost of equity capital 6.84%. But if we took the one-year Treasury bill rate as risk free rate (1.255%) for the quarterly cost of equity capital, it would have an estimate of 1.752% (1.255% + 0.497%) quarterly, or 7.01% yearly. The first semi-annual returns on equity reported by the China Airline in 2000 is 3.18% (before tax), and equal to the quarterly return of 1.59%, which is quite closely with the expected return 1.71%.

China Airline and Eva Airline were the only two companies operating in international route during the sample period. However, Eva Airline began to make profits since 1997. This is because Eva Airline is as like as most other companies joined the market after the air deregulation, and need to invest lots of funds in flight equipments and staffs training in early stages. The average reported quarterly return of Eva Airline on first quarter of 2000 was 2.43%, compared to the expected return 1.51% (1.213% + 0.292%). As reveal in Table 5, the Far Eastern and Uni Airline have negative sign on quarterly premiums over risk free rate. But with the serious competition and airfare regulation, the Far Eastern had a reported loss in 1998 and 1999. Fortunately, Far Eastern began to make profit in 2000. Its reported

average quarterly return on first quarter of 2000 is 0.97%, compared to the expected return 0.66% (1.213% - 0.553%). Uni Airline's expected quarterly return is –0.77% (1.213% - 1.983%), but its reported yearly returns of 2000 were unobtainable at the time of study since the company is not listed in Taiwan Stock Exchange or OTC (R.O.C. Over-The-Counter Securities Exchange).

Due to the special industrial environment and firm-related factors, the expected quarterly cost of capital for Eva Airline and Far Eastern is far beyond the returns on equity reported. However, the China Airline owning 51 flights and over 9,000 employees were in business since 1959. The APT model is quite suitable for estimating the expected cost of equity capital in an accounting base.

## 7. CONCLUSION

In this paper we attempt to develop an APT model that can be used to predict the accounting cost of equity capital of airline companies in Taiwan.

We use the stepwise regression to select macroeconomic variables that affect the market stock returns. A company's net income and stockholders' equity are strongly influenced by economic environment, and much research shows returns on equity is related with stock returns. Accordingly, the returns on equity, as an accounting cost of equity capital, was test to show how it was affect by chosen economic variables -- interest rates, money supply, imports, and GNP per capita, and the residual market factor.

By using the APT model, we produced a set of five sensitivities for each firm and a set of market price of five risks for each quarter. Through these data, the public held China Airline's estimated returns on equity for first quarter 2000 is 1.71%, which is quite closely with the reported 1.59%.

However, other airlines are not in the same case. It may be the reason that most airlines are still young, joined the air market since 1987, and cost investing in flight equipments and staffs training are not yet recovered. Another reason is that most airline is private owned that make them not so sensitive with economic environment. The third reason is due to the airfare governance and serious competition that makes most domestic route airlines in loss for years. All of these reasons have these private airlines not predictable through this model.

There are some limitations in our research. First limitation comes form the airlines samples. The airline industry is quite small, and there is only one company listed in Taiwan Stock Exchange and exist over 30 years. This makes us unable to obtain the quarter return for most airlines and have to divide the yearly returns on equity by four as a substitute. Accordingly, a bias might exist. Second, most airlines exist less than 10 years, so we can only choose the sample period from first quarter 1993 through the fourth quarter 1999. The regression of 28 samples for 17 independent variables against market stock returns might make some macroeconomic factors insignificant. Finally, we try to explain how macroeconomic variables affecting Taiwan's market as a whole can be used to determine the returns of equity for each company. However, except macroeconomic factors, a company's equity returns will be affected by industrial factors and firm-related variables, which we are not considered in our model. This explains why the $R^2$ in Table 4 is low.

In future, if most airlines become public held, and operate for a quite long time, we shall

continue our research to see how macroeconomic factors can predict the accounting cost of equity capital for whole airline industry. We may also include the industrial factors and firm-related variables in model to increase the prediction power.

## ACKNOWLEDGEMENTS

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