Chapter 3 Data Description and Research

Methodology

In this chapter, we explain the data, hypotheses, and research design. Section 3.1 describes the data sources of financial, stock price, and announcement dates for M&As transactions. Hypotheses in this research are proposed in section 3.2. We demonstrate methodologies used in this paper in the last part of this chapter.

3.1. Data Description

3.1.1. Financial and stock price data

All financial data used in this paper are obtained from the Taiwan Economic Journal (TEJ) database. Since the research focuses on the behavior of earnings management before declaring a foundation of Financial Holding Company, we collect non-cumulative quarterly report of these substitutes from categories of banking, securities, insurance, and financial holding company in TEJ.

In terms of evaluating effects on stockholders’ wealth, we use stock price as a proxy for market value of each company. Stock price data are also collected from TEJ. Since stock market in Taiwan is a computerized exchange, and all trades are recorded by the Taiwan Stock Exchange (TSE), which is the source of TEJ. Data of outstanding shares of each sample company are obtained from the database of TEJ as well.

3.1.2 Announcement date

Because we are comparing the behaviors and stock performances before
and after the M&As transactions, we have to get the accurate date of announcing the merger event for each combination. Most researches define the announcement date as the first date reported in the newspapers; however, since it is the trend for mergers and acquisitions in Taiwan’s banking industry in recent years, there is too much false news that ended with nothing. As a result, announcement date in this paper is defined as the date formally declared by the board of directors for the decision of M&As transaction with other financial institutions.

3.2 Hypotheses

The main purpose of this study is to examine if there are incentives for managers to manipulate earnings before mergers and acquisitions in order to get more favorable exchange ratios when negotiating with counterparties. Therefore, the first null hypothesis can be formed as:

Hypothesis 1: Banks, which tend to have M&As transactions, do not have incentives to manage their earnings before the M&As.

After knowing the behavior of managers in banks before M&As, we further examine if financial institutions with higher level of earnings management indeed get much more favorable prices than those with lower level of earnings management when negotiating. So, the second null hypothesis is:

Hypothesis 2: Banks with higher level of earnings management will not receive comparative higher exchange ratios in M&As transactions.
At the last part, we would like to know whether investors in stock market can see through managers’ manipulations in earnings and further punish these financial institutions just by selling their stock in the open market. As a result, the third null hypothesis can be proposed as:

Hypothesis 3: Shareholders’ wealth of banks, which get more favorable prices by managing earnings, will not be affected after the completion of M&As.

3.3. Research Methodology

3.3.1. The Detects of Earnings Management

In this paper, we use Jones model developed by Jones (1991) to measure discretionary accrual (referred as DA hereafter), which could be a proxy for detecting the degree of earnings management in both acquiring and acquired banks.

In Jones model,

\[
TAC_{i,t} = \alpha_0 \frac{1}{TA_{i,t-1}} + \alpha_1 \Delta REC_{i,t} + \alpha_2 PPE_{i,t} + \varepsilon_{i,t} \tag{6}
\]

Where \( TAC_{i,t} \) stands for total accruals scaled by lagged total assets of i bank in time t,

\( TA_{i,t-1} \) stands for the amount of total assets of i bank in time t-1,

\( \Delta REC_{i,t} \) is for the change of revenue between time t-1 and t scaled by total assets at t-1 in i bank,

\( PPE_{i,t} \) stands for total amount of plants and equipments in time t scaled by total assets at t-1 of i bank,
\( \varepsilon_{i,t} \) is for the error.

Mostly, total accruals are calculated by subtracting cash flow from operating from net income after-tax. Given the definition of each variable mentioned above, we collect actual numbers from quarterly reports of all companies in the sample and run the OLS regression to get those coefficients. And then, non-discretionary accruals for each company could be calculated as:

\[
N\hat{DA}_{i,t} = \hat{\alpha}_0 + \hat{\alpha}_1 \Delta REC_{i,t} + \hat{\alpha}_2 PPE_{i,t}
\]  

(7)

Total accruals are supposed to equal non-discretionary accruals plus discretionary accruals, so we could get \( DA_{i,t} \) of each company easily by:

\[
DA_{i,t} = TAC_{i,t} - NDA_{i,t}
\]

(8)

The mean of \( DA_{i,t} \) in the sample is tested in a standard t-test to detect if there’s the phenomenon of earnings management in Taiwan’s banking industry.

3.3.2. The Determination of Exchange Ratios by Larson-Godenes model

The LG model is based on exchange ratio in which the pre-merger combinations of the market values of shares are compared with the post-merger wealth position. The model concentrates on the immediate impact on PE ratio that resulted from the merger. The post-merger PE ratio is a weighted average of the participant’s pre-merger PE ratios provided the post-merger growth rates and risk are also weighted averages.

The model assumes that the object of the merger is to increase
shareholders’ wealth. Thus, shareholders will not agree to a combination unless, at the very least, their wealth position is maintained.

Another assumption is that post-merger PE ratios reflect the risk-return characteristics of the merger participants. (i.e. share prices reflect the risk and anticipated returns on investment in the merging firms) In addition, the model assumes that earnings synergy will not arise immediately in the first year of the merger.

The pre-merger values of a share in the acquiring company, $P_A$, and of a share in the acquired company, $P_V$, are as follows:

\[
P_A = PE_A \times EPS_A
\]  
\[
P_V = PE_V \times EPS_V
\]

The expected post merger value of a share in the combined firm, $P_{AV}$, is defined by

\[
P_{AV} = PE_{AV} \times \frac{(E_A + E_V)}{(S_A + S_V \{ ER \})}
\]

Where:

$E_A$ = Earnings after tax of acquiring firms’ shareholders

$E_V$ = Earnings after tax of acquired firms’ shareholders

$PE_A$ = Price earnings ratios of acquiring firms, where italics denote expected values

$PE_V$ = Price earnings ratios of acquired firms, where italics denote expected values

$PE_{AV}$ = Price earnings ratios of combined companies firms, where italics denote expected values

$S_A$ = Number of shares acquiring firms
\( S_v \) = Number of shares acquired firms

\( ER \) = The exchange ratio, expressed as the number of acquiring company shares offered in exchange for each acquired company share

The wealth position of each shareholder in the acquired firm must be at least maintained for the merger to be acceptable:

\[
P_{AV} \geq P_A
\]  

(12)

Similarly, the wealth position of the acquired company shareholders must be at least maintained:

\[
P_{AV} \geq \frac{P_V}{ER}
\]  

(13)

Substituting (11) and (9) into the left and right hand sides respectively of (12), and using the equality relationship, allows us to re-arrange terms and solve for the maximum exchange ratio, \( ER_A \), acceptable to the acquiring accompany shareholders:

\[
ER_A = \frac{PE_A \times (E_A + E_V) - (PE_A \times E_A)}{PE_A \times E_A \times (\frac{1}{S_A}) \times S_v}
\]  

(14)

Similarly, we could substitute equation (11) and (10) into the equality relationship of equation (13) giving the minimum exchange ratio acceptable to the acquired company shareholders:

\[
ER_V = \frac{PE_V \times EPS_V \times S_A}{PE_{AV} \times (E_A + E_V) - (PE_V \times E_V)}
\]  

(15)

Since \( \frac{\partial ER_A}{\partial PE_{AV}} > 0 \) and \( \frac{\partial^2 ER_A}{\partial (PE_{AV})^2} = 0 \), we could conclude that \( ER_A \) is a linear function of \( PE_{AV} \). Provided the expected value of the combined
entity is greater than the value of the acquired company, \( \frac{\partial ER}{\partial PE_{AV}} < 0 \)

and \( \frac{\partial^2 ER}{\partial PE_{AV}^2} > 0 \) implies that the minimum exchange ratio will be a decreasing convex function of the expected price earnings ratio.

### 3.3.3. Wealth effects of mergers and acquisitions

The stock price reaction to those M&As transactions is tested by using event study methodology. The market model returns are estimated over the period \( t = -110 \) days to \( t = -11 \) days relative to the announcement date by the board of directors with the TSE weighted index as the proxy for the market portfolio.

We use market model, which uses data from estimation period by ordinary least square method, to establish a regression for predicting normal returns in the event period. The regression is as followed:

\[
R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (16)
\]

Where,

\( R_{it} \) represent the return for stock \( i \) in the period \( t \);

\( R_{mt} \) represent the return for the stock market in the period \( t \);

\( \varepsilon_{it} \) is the residual error; \( \alpha_i \) and \( \beta_i \) are coefficients.

We can get expected returns for the event period by

\[
E \left( R_{it} \right) = \alpha_i + \beta_i R_{mt} \quad (17)
\]

Therefore, abnormal returns can be calculated by subtracting expected returns in the event period from actual returns in the same time period. Since
abnormal returns can be not only rose by the event we want to research on but also by other disturbance items, hence, the average daily abnormal return (AAR) is applied for statistic tests (Sheng and Lee, 2000). AAR can be calculated as followed:

\[ AAR_i = \frac{1}{N} \sum_{t=1}^{N} AR_{it} \]  \hspace{1cm} (18)

Where,

\( N \) is the number of sample;

\( AR_{it} \) represents the abnormal return for stock \( i \) in the event period.

Finally, the cumulative abnormal return (CAR), which is tested against the null hypothesis of zero in the standard t test, is calculated by:

\[ CAR_{(t1, t2)} = \sum_{i=t1}^{t2} AAR_{i} \]  \hspace{1cm} (19)