THE DETERMINANTS OF CORPORATE CAPITAL STRUCTURE: EVIDENCE FROM JAPANESE MANUFACTURING COMPANIES

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ABSTRACT

The debates regarding determinants of corporate capital structure have been progressing for a few decades since the first capital structure theory was found by Modigliani and Miller in 1958. Their theory evolved into two main theories; static trade off theory by Krauz & Litzebnerger (1973), and pecking order theory by Myers & Majluf (1984). The studies related to corporate capital structure often use firms in developed countries as their sample data. Japan, which is one of the largest economies in the world, regularly becomes a part of these studies.

In this study, we aim to determine the relations between the firm specific experience and debt level in Japanese firms. We choose manufacturing companies as the subject of study because the sector is vital to the Japanese economy. Moreover, Japanese manufacturing companies are also very influential in the global economy. With this study, we intend to contribute to the literature by examining the determinants of corporate capital structure in Japan, one of the major developed markets.

We use panel data and multiple regression to analyze the relationships between the dependent variable, namely leverage, and the independent variables, tangibility, profitability, non-debt tax shield, size, growth in fixed assets, and growth in total assets. We find that size, growth in fixed assets, and growth in total assets are not significant. However, we also reveal that the variable tangibility, profitability, non-debt tax shield are statistically significant. Tangibility has a positive relation with debt level while profitability and non-debt tax shield have negative relation with debt level. These relationships are predicted in either static trade off theory and pecking order theory but none of the theories show a more dominant predictive capability over the other. Therefore, we propose the Trade-off adjusted Order Theory, which combines the elements of the latter theories, as a possible explanation for this behavior.

INTRODUCTION

A firm’s capital structure is the combination of a firm’s equity, debt, and hybrid securities which finances the whole business operation. A capital may be composed of equity, debt or even hybrid securities. The comparison ratio between the equity and the debt is usually known as the leverage.

The pioneers of the determinants of corporate capital structure are Modigliani & Miller (1958), which published their work almost half a century ago. Their main theory, widely known
as the Modigliani-Miller Theory, explains that the value of a firm is unaffected by how that firm is financed. This simple theory is probably quite acceptable fifty years ago when the business environment and condition, especially the finance and capital market, was not as complex and as complicated as the current capital market. This theory said that the capital structure of the company hold no importance or relevancy to the company’s value at all. That is why this theory is also known as capital structure irrelevance principle.

Following on from the pioneering work of Modigliani and Miller (1958), capital structure has aroused intense debate in the financial management arena for the last fifty years.

Even though there are other theories that tried to explain the determinants of capital structure, the number of factors that have the possibility to influence the decision making process is overwhelmingly large that a single theory is not able to explain the whole capital structure. Moreover, in spite of the continuing theoretical debate on capital structure, there is relatively little empirical evidence on what factors could influence the firm’s capital structure.

As the capital structure becomes more complex, the factors that influenced the determination of a capital structure have been studied thoroughly by the researchers over the years. Japan, as one of the most developed economics in the world, has often been included in such research as a comparison to other industrialized countries, but the researches that focus on Japanese firms are rarely found.

This paper aims to provide a more focused perspective on what factors influence the financing decision on Japanese Manufacturing Companies, to compare the result to earlier studies, and to seek the possibility of a theory that best explains the result of the research. We choose Manufacturing Industry in Japan because its importance to the national and global economy. The research studies 21 top Japanese Manufacturing companies listed in Tokyo Stock Exchange for the period of 2001 – 2010 inclusive.

**LITERATURE REVIEW**

The theory that becomes a base for modern thinking of capital structure is Modigliani & Miller’s (1963) hypothesis of capital structure irrelevance.

Perfect market conditions are the fundamental conditions for this theory. It means that the arbitrage is unrestricted; there is no possibility of bankruptcy, and no tax. In this conjectural market condition, the total market value of a firm is independent of the amount of debt it issues.

There are two main parts in this theory, which tried to prove that the value of firms with equity capital, debt capital, or mixed capital is actually the same. First part of the theory does not take tax into account while the second part does. The main point of this theory is that debt and equity are perfect substitutes for each other. In short, there is no opportunity cost in choosing between using debts or using equity as the source of the capital.

This theory was later criticized by scholars and researchers as hypothetical. Angelo & Masulis (1978) argue that Modigliani & Miller’s theory is very sensitive to the change in the corporate tax code which can offer the firm a unique interior optimum leverage decision. The traditional models used by Modigliani and Miller require unrealistically large expected marginal
bankruptcy costs to offset the expected marginal corporate tax savings of debt at observed debt-equity ratios.

Added by Scott (1976), Modigliani & Miller actually recognize the tax deductible property of interest payments, but it fails to capture the fact that increasing debt will increase the probability of bankruptcy itself. By this process, the debt is overvalued and the equity is undervalued, making the decision of optimal capital structures somehow inaccurate.

Two main capital structure theories which later evolved from Modigliani & Miller’s theories also reject the idea that the value of a firm is not related to its capital structure. (Kraus & Litzebnerger, 1973; Myers & Majluf, 1984)

As stated above, in the modern era, there are two basic schools of thoughts regarding firms and their capital structure. The first theory is the static trade off theory. This theory was developed by Kraus & Litzebnerger (1973). This theory suggests that firms choose their optimal capital structures by trading off the benefits and costs of debt and equity. Using debt to finance a firm’s operation has its own advantages (such as its tax benefit) and disadvantages (such as its agency costs). Firms always calculate the marginal profit of loss for utilizing debt to decide its optimal capital structure. In short, the firm is a ‘black box’ operated so as to meet the relevant marginal conditions with respect to inputs and outputs thereby maximizing profits or more accurately present value. (Jensen & Meckling, 1976)

Agency costs explained by Jensen & Meckling (1976) consist of: (1) the opportunity costs caused by the impact of choosing debt on the investment decisions of the firm; (2) The monitoring and bonding costs expended by the principal and agent; (3) The bankruptcy and reorganization costs.

The existence of agency costs, which is caused by asymmetric information, is considered important by quite a few of researchers. If investors have less information than equity holders, there is a tendency that the interest rate will go up because they are more pessimistic. (Robichek & Myers, 1966; Baumol & Malkiel, 1967; Baxter, 1967; Bierman & Thomas, 1972; Rubinstein, 1973; Stiglitz, 1972).

Kayhan & Titman (2003), however, doubted the importance of optimal capital structure. They argue that even if the tradeoffs between the costs and benefits of debt financing can lead to an optimal capital structure, there is a possibility that the relation between the debt ratio and corporate value is weak, so that the cost deviating from the optimum is quite small.

The second theory is the pecking order theory. Contrary to the static trade off model, this theory developed by Myers & Majluf (1984) assumes that there is no target level of leverage, and companies use debt only when their internal funds are insufficient.

Most research models use both pecking order theory and static trade off theory to gauge the result of their researches. The results were divided strictly into the pecking order theory or the static trade off theory but none of the results fall into the category between the two theories. Consequently, a new theory that merges the elements of the two main theories might be found.

A study by Rutherford (1998) regarding firm’s capital structure evidence from Organization for Economic Co-operation and Development (OECD) countries, suggests that Japan has high level of leverage. They argue that the main reason to the high level of leverage in Japan is caused by crossholding between companies. Due to crossholding, there is a small risk of
hostile takeover between Japanese companies and Japanese firms can easily raise external capital without the fear of being forcibly occupied by other firms. Related to the results from Rutherford (1998), Berger & Udell (1994) suggest that firms with close relationship with its creditors need to provide less collateral because the relationship can substitute for physical collateral. The results of their research also suggest that the size of the firm is important in Japan and strongly positively related with leverage while profitability is negatively related to leverage.

Some scholars find that profitability and industry effects are the major determinants on Japanese Company debt ratios (Kester, 1986 and Titman & Wessels, 1988). In a study which examines the different between the use of short term and long term debt, it is found that Japan makes heavier use of short term debt in their capital structures than firm from other countries (Khrisnan & Moyer, 1996).

Lastly, in a research observing the relations between the ownership structure and debt level in Japanese Firms, Kim & Piman (1998) suggest that equity ownership of the financial and foreign institutions has a significant negative effect on the debt level. Consequently, in Japan the distant relation between the shareholders and the management side and may create greater asymmetric information between the two parties. (Deesomsak et al, 2004)

**DATA AND METHODOLOGY**

**Hypotheses**

1. **Effect of tangibility on leverage**

Supporting the static trade off theory, Rajan & Zingales (1995) and Titman & Wessels (1988) stated that assets tangibility will have a positive relationship with debt ratio because greater collateral may alleviate the agency costs of the debt itself. While according to pecking order theory, Debt ratio and assets tangibility have a negative relationship because firms holding more tangible assets will be less prone to asymmetric information problems.

Rajan & Zingales (1995) use public firms in major industrialized countries as their unit of analysis, while Titman & Wessels (1988) use manufacturing companies in United States as their sample data. In conclusion, we think the results of their researches are applicable to my study because the sample data are quite similar in nature.

Japanese Companies, in this case, have been under the scrutiny of both local and international investors for their non-transparent stance toward the stockholders and this caused a large asymmetric information problem even in large companies. Japanese companies showed low level of disclosure in a disclosure level survey results (Radebaugh, Gray and Black, 2006). This problem may later cause a forced takeover, often by foreign institutional investors, such in the case of Steel Partners (an American based institutional investor) and Aderans Holding (a Japanese Manufacturing Company) (Harding, 2009). So, Japanese Companies may issue more debt instead of equity because there is little incentive to issuing equity.
Therefore, we hypothesize:

\[ H1 \quad \text{Asset tangibility positively impacts leverage.} \]

2. **Effect of profitability on leverage**

According to the *static trade off theory*, firms will acquire more debt to prevent managers from wasting cash free flows gained from profits. High level of profit will also allow firms to have higher debt capacity and further easing the obtainment of debt. So, a positive relationship between Profitability and debt level can be expected. However, according to *pecking order theory*, profitable companies will choose to use internal financing because it is cheaper than borrowing from external sources. Profitable companies tend to issue their stock repeatedly to reduce the divergence between the book value and the market value of their stock (Allen & Mizuno, 1989). This will results in the negative relationships between the profitability and debt level. Negative relationships have been confirmed by Titman & Wessels (1988) in manufacturing companies in United States.

Therefore, we hypothesize:

\[ H2 \quad \text{Profitability negatively impacts leverage.} \]

3. **Effect of non-debt tax shield on Leverage**

According to the *static trade off theory*, non-debt tax shield provided by depreciation expense can serve as a substitute for debt tax shield so the tax reducing property from debt is no longer needed. A negative relationship between non debt tax shields was confirmed Bradley, Jarrel and Kim (1994) on firms classified according to the two-digit SIC code.

Therefore, we hypothesize:

\[ H3 \quad \text{Non-debt tax shield negatively impacts leverage.} \]

4. **Effect of size on leverage**

Rajan & Zingales (1995) supporting *static trade off theory* stated that bigger companies have lower chance of bankruptcy. Thus, the company will be able to borrow more money because the creditors are also willing to lend money. Moreover, in most cases large companies have the luxury of government safety net which allows them to take more risk by increasing debt. According to *pecking order*, however, the incentives for issuing equity are bigger because the asymmetric information will be smaller between the companies and the investors. A positive relationship between size and leverage was confirmed by Sayilgan et al (2006) on Turkish manufacturing firms.
Therefore, we hypothesize:

\[ H4 \quad \text{Size positively impacts leverage.} \]

5. Effect of growth on leverage

According to research supporting \textit{static trade off theory}, the leverage of companies with high growth level will be smaller because both the company and creditors are unwilling to lend and borrow money. Growing companies may feel that their maneuverability will be limited if they use debt as their source of funding. Creditors, for the similar reason, want to limit companies to invest only in safe projects to lower the chance of bankruptcy and may be reluctant to lend to growing companies which undertake a lot of risky projects. On the other hands, according to the supporters of \textit{pecking order theory}, growing companies need a huge amount of funding and may turn to creditors to gain more fund. In Japanese companies’ situation, the risk of borrowing is lessened with the close relationship nature between the creditors and the firms. So, in case the needs of funding arise, Japanese companies will be expected to increase their debt. Sayilgan et al (2006) confirmed positive results on Turkish manufacturing firms.

Therefore, we hypothesize:

\[ H5 \quad \text{Growth positively impacts leverage.} \]

Measurement of Variables

The dependent variable in this study is leverage level. The leverage as the dependent variable is calculated as follows:

\[
LEV_{f,t} = \frac{\text{Total debt}}{\text{Total equity}}
\]

Following the hypotheses above; size, profitability and growth opportunities in plant, property and equipment, growth opportunities in total assets, non-debt tax shields and tangibility serve as independent variables in this study.

The proxies for the independent variables are:

- \( TANG_{f,t} = \) Total Fixed Assets divided by Total Assets of company \( f \) at year \( t \)
- \( PROF_{f,t} = \) Earnings before Interest and Tax divided by Total Assets of company \( f \) at year \( t \)
- \( NDTS_{f,t} = \) Total Depreciation Expense divided by Total Assets of company \( f \) at year \( t \)
- \( SIZE_{f,t} = \) Natural log of the Total Revenues of company \( f \) at year \( t \)
- \( GR_{1,t} = \) Percentage Change in Total Fixed Assets of company \( f \) at year \( t \)
- \( GR_{2,t} = \) Percentage Change in Total Assets of company \( f \) at year \( t \)
The six independent variables above are consistent with those used by Sayilgan et al (2006), except that we modify some proxies to be able to accommodate the information available in the data set. It is impossible to obtain the complete information for particular proxies, because the complete information is not available in the database. Those proxies might not be as representative as those used by Sayilgan et al (2006), but they are the best available.

**Sample Selection Methods**

We obtain the data in this study from the Business Industry Compustat Database. This study covers a sample of 21 Japanese Manufacturing Companies selected from the compilation of 34 top Japanese Manufacturing companies listed in the Tokyo Stock Exchange. First, we make a compilation of 60 companies listed in 50 Most Actively traded stock from Tokyo Stock Exchange Factbook 2007, 2008 and 2009. After that, we take only Japanese Manufacturing Companies from the list. We choose Japanese manufacturing company due to its size and relevance to the global market. The final sample consists of 21 companies because some companies were omitted because of the lack of available data. Table 1 summarizes sample statistics of the companies covered by the data set.

<table>
<thead>
<tr>
<th>Panel A. Initial Data Sample</th>
<th>Type Of Companies</th>
<th>Number of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banks, securities and financing</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Automotive</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Electric appliance</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Wholesale &amp; Retail Trade</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Information and Communication</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Manufacturer &amp; Machinery</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical &amp; Chemical</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Marine Transportation</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Real Estate</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Electric power &amp; gas</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Insurance</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Foods</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B. Sample after imposing Manufacturing Companies requirement</th>
<th>Type Of Companies</th>
<th>Number of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Electric appliance</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Manufacturer &amp; Machinery</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical &amp; Chemical</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Foods</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td></td>
</tr>
</tbody>
</table>
Table 1: Business Industry Compustat Data Set Summary Statistic

| Panel C. Final Sample after the elimination of companies with missing data |
|-----------------------------|-----------------|
| Automotive                  | 3               |
| Electric appliance          | 10              |
| Manufacturer & Machinery    | 4               |
| Pharmaceutical & Chemical   | 3               |
| Foods                       | 1               |
| **Total**                   | **21**          |

Notes: Table 1 summarizes the Compustat data set with the sample used in this study. Panel A summarizes sample statistics of 60 Companies listed in 50 Most Actively traded stock list from Tokyo Stock Exchange Factbook 2007, 2008 and 2009. Panel B summarizes sample statistics of the companies after eliminating companies with SIC Codes with first digit other than 2 or 3. Panel C is the final sample and it summarizes the sample statistics of the companies after eliminating companies which are missing the data needed for empirical analysis. Type of Companies represents the type of business each companies belong to according to their SIC code. Number of Companies represents the number of companies belong to each group.

Research Method

In this research, we use quantitative approach as our main analysis tool. In this part of the research, a set of sample data from 2001-2010 periods will be evaluated using correlation coefficient model. Panel data Regressions are run in order to test the strength of the relationship between capital structure and its potential determinants. The Data are grouped into their respective source (Panel Variable: Company) and listed according to their respective time period (Time Variable: Years)

The panel data regressions will take the following form:

\[
LEV_{f,t} = \beta_1 TANG_{f,t} + \beta_2 PROF_{f,t} + \beta_3 NDTS_{f,t} + \beta_4 SIZE_{f,t} + \beta_5 GR_{1f,t} + \beta_6 GR_{2f,t} + \epsilon_{f,t}
\]

Afterward, we use a qualitative approach to analyze the statistical results according to Japanese business conditions in those periods.

RESULTS AND DISCUSSIONS HYPOTHESES

We summarize the regression coefficients with their respective \(t\)-statistics as well as the number of observations, adjusted \(R^2\), and \(F\)-statistics in Table 2. We present the result of panel data regressions for 10 year period from year 2001 to year 2010. Additionally, to capture the effect of the economic recessions in 2008, we also present the results of panel data regressions from the period before the economic recessions, namely year 2001 to year 2007, and after the economic recession, namely year 2007 to year 2010.
Table 2: Panel Data Regression Coefficients

<table>
<thead>
<tr>
<th>Variables</th>
<th>Predicted Sign</th>
<th>Year 2001-2010</th>
<th>Year 2001-2007</th>
<th>Year 2007-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TANG</strong></td>
<td>+</td>
<td>0.7689084</td>
<td>1.105501</td>
<td>.1717752</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4.93)</td>
<td>(5.93)</td>
<td>(1.33)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[0.000] *</td>
<td>[0.000] *</td>
<td>[0.000] *</td>
</tr>
<tr>
<td><strong>PROF</strong></td>
<td>-</td>
<td>-1.110607</td>
<td>-0.6113205</td>
<td>-1.393406</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-4.50)</td>
<td>(-1.84)</td>
<td>(-4.40)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[0.000] *</td>
<td>[0.067]</td>
<td>[0.000] *</td>
</tr>
<tr>
<td><strong>NDTS</strong></td>
<td>-</td>
<td>-4.211084</td>
<td>-4.178837</td>
<td>-3.998178</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-4.69)</td>
<td>(-3.59)</td>
<td>(-3.47)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[0.000] *</td>
<td>[0.000] *</td>
<td>[0.000] *</td>
</tr>
<tr>
<td><strong>SIZE</strong></td>
<td>+</td>
<td>-0.0062695</td>
<td>-0.0096518</td>
<td>0.0255615</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.43)</td>
<td>(-0.55)</td>
<td>(1.22)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[0.669]</td>
<td>[0.582]</td>
<td>[0.233]</td>
</tr>
<tr>
<td><strong>GR1</strong></td>
<td>+</td>
<td>-0.1091282</td>
<td>0.025118</td>
<td>-0.0689437</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.96)</td>
<td>(0.11)</td>
<td>(-0.60)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[0.339]</td>
<td>[0.916]</td>
<td>[0.198]</td>
</tr>
<tr>
<td><strong>GR2</strong></td>
<td>+</td>
<td>-0.3138373</td>
<td>-0.8863475</td>
<td>-0.0803814</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.49)</td>
<td>(-2.45)</td>
<td>(-0.34)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[0.139]</td>
<td>[0.015]*</td>
<td>[0.783]</td>
</tr>
<tr>
<td><strong>No. of obs.</strong></td>
<td>210</td>
<td>147</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td><strong>Adj. R²</strong></td>
<td>0.2677</td>
<td>0.3236</td>
<td>0.2629</td>
<td></td>
</tr>
<tr>
<td><strong>F-statistic</strong></td>
<td>13.73*</td>
<td>12.64*</td>
<td>5.93*</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Table 2 summarizes the results of panel data regressions, estimated during the 2001-2010, 2001-2007, and 2007-2010 sample period. Coefficient values are reported as percentages with t-statistics at the second row and the P value at the third row. The dependent variable is LEV. LEV = Total debt divided by total equity. TANG = Total Fixed Assets divided by Total Assets. PROF = Earnings before Interest and Tax divided by Total Assets. NDTS = Total Depreciation Expense divided by Total Assets. SIZE = Natural log of the Total Revenues. GR1 = Percentage Change in Total Fixed Assets. GR2 = Percentage Change in Total Asset. * shows that coefficient is significant at 5% level.

The coefficients for SIZE, GR1, and GR2 are not statistically significant in the ten year period. We see some possible explanations for this finding. Firstly, our study focuses on Japanese Manufacturing companies, while Sayilgan et al (2006) studies Turkish Manufacturing Companies. Secondly, I use a different sample period. Our model is estimated between 2001 and 2010, while the model used by Sayilgan et al (2006) is estimated between 1993 and 2010. Thirdly, we use different calculation method for several proxies compared to calculation method used by Sayilgan et al (2006) in calculating proxies.

The variable TANG is significant and positively related to the dependent variable leverage. According to this model, it means that if a company has more tangible assets, it is more likely for them to acquire more debt. This result is consistent with Titman & Wessels (1988), Harris & Raviv (1991), and Rajan & Zingales (1995). This behavior is explained by Leland (1974), Jensen & Meckling (1976), and Myers (1977). They theorize that greater number of fixed assets or collateral may lessen the agency cost of debt. Less costly debts may stimulate the company to utilize more debt and conserve internal equity for urgent situation.
The variable \( PROF \) is significant and negatively related to the dependent variable leverage. According to this model, it means that the more profit a company gains, the less debt it will use to finance its operations. This result is coherent with Titman & Wessels (1988), Rajan & Zingales, (1995), Krisnan & Moyer (1996), and Bevan & Danbolt (2000). This behavior is explained by Donaldson (1961), Titman & Wessels (1988), and Myers (1989). They theorize that equity is less costly than debt, so company may choose equity over debt if the profit is abundant. Another view related to this result is that a profitable company may choose to issue their equity repeatedly to reduce the difference between their market value and their book value.

The variable \( NDTS \) is significant and negatively related to the dependent variable leverage. According to this model, it means that the more depreciation expense a company has the less debt it will utilize. This result is coherent with Sayilgan et al (2006). This behavior is explained by Angelo & Masulis (1980). They theorize that depreciation expense can substitute interest expense offered by debt as a tax shield. Therefore, if depreciation expense is bigger, the incentive for the company to utilize interest expense from debt as a tax shield will be smaller.

The F statistic for the period 2001 to 2010 is significant, which means that the model for period 2001 to 2010 has a predictive capability as a whole. However, the adjusted \( R^2 \) value is quite low at 26.77 percent which means only 26.77 percent of the variations in the leverage is explained by this model. This indicates that this data set may not be the most compatible data set to predict leverage level in Japanese Manufacturing companies.

If we take a look at results of regression variables prior to economic recessions and after the economic recessions, we can notice several differences. Before the economic recessions, variable \( TANG \), \( NDTS \), and \( GR_2 \) are significant. We think that in this period, most companies were having considerable growth and investing in numerous projects, both risky and not risky. That is why the \( TANG \) variable is significant, because if a company wants to finance their investment through debt, the company needs to provide more collateral to gain the trust of debtors, thus lessening the agency costs of debts. However, we can see that variable \( GR_2 \) is negative. That means, as the company grows, it uses less debt. I conclude that in a healthier economic period like this, companies and investors were more optimistic about the future. Since the stock market was more optimistic, the demand and price of stock are higher and companies may want to exploit this condition by issuing more equity.

After, the economic recessions variable \( PROF \) and \( NDTS \) become significant. We think that in this period, debtors naturally become more cautious to lend their money. Thus, the agency costs of debt become high in economic recessions. That is why, even though a company possess a great deal of tangible asset as collaterals, it will not reduce the costs of debts that are naturally high in economic recessions. So, the variable \( TANG \) in economic recessions become insignificant. Subsequently, companies that want to finance their business with debt in the economic recessions have to consider whether they will be able to generate enough profit to cover the high cost of debt. Hence, the variable \( PROF \) becomes more significant. Lastly, as most companies stop expanding their business and become more conservative in economic recessions, the variable \( GR_2 \) become insignificant.

The results from both models show us that external variables such as macroeconomic conditions may influence the financing decision of a company, especially in extreme condition...
such as economic recessions. The influencing capacity of external variables has been confirmed by Demirgue-kunt & Maksimovic (1996), La porta et al (1998), Gleason et al (2000), and Korajczyk & Levy (2003).

The F statistic for both model; 2001 to 2007, and 2007 to 2010, are significant, showing that both of this model have predictive capability as a whole. However, both models have low level of adjusted $R^2$, at 32.36 percent for period 2001 to 2007 and 26.29 percent for period 2007 to 2010, meaning the data set in this model is not the strongest data set to predict leverage in Japanese Manufacturing Companies.

We can see from the results of this study that both trade off theory and the pecking order theory are able to explain the relation between firm specific experience and debt level in Japanese Manufacturing companies. We can also see from table 3 that none of both theories are more dominant than the other. Accordingly, both theories may be used to explain the phenomena.

<table>
<thead>
<tr>
<th>Table 3: Comparison Of Test Results With The Expectation Of Theories</th>
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</thead>
<tbody>
<tr>
<td><strong>Variables</strong></td>
</tr>
<tr>
<td>Tangibility ($TANG$)</td>
</tr>
<tr>
<td>+</td>
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<tr>
<td>Profitability ($PROF$)</td>
</tr>
<tr>
<td>Non-debt tax shields ($NDTS$)</td>
</tr>
<tr>
<td>Size ($SIZE$)</td>
</tr>
<tr>
<td>Growth in Fixed Assets ($GR_1$)</td>
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<tr>
<td>Growth in Total Assets ($GR_2$)</td>
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</table>

**CONCLUSION**

The panel data regressions results reveal that not all of the independent variables of the study; namely Tangibility, Profitability, Non Debt Tax shield, Size, Growth in Fixed Assets, and Growth in Total assets, are significant. We notice that Tangibility, Profitability, and Non Debt Tax shield are showing significant results. The dependent variable leverage increases as Tangibility increases but decreases as Profitability and Non Debt Tax Shield Increases.

We assume that the set of variables used by Sayilgan et al (2006) is still applicable to predict the leverage level of Japanese Manufacturing Companies but somewhat weak in explaining it, because of the high level of F statistic and low level of adjusted $R^2$.

However, this study may still be able to provide a slightly better understanding to what factors are capable of influencing the capital structure decision in Japanese Manufacturing decisions.

According to the result of this study, in which none of both concepts are more dominant than the other, we want to suggest a new theory as a combination of the two ideas. In our model, companies will keep comparing the cost of the debt and the equity such as in the *static trade off theory*. But, if the difference between the cost of equity and the cost of debt does not reach a certain level, even if the cost of the equity is higher, companies will keep using equity as their main source of fund such as in the *pecking order theory*. We name this theory *Trade-off Adjusted
Order theory because the order of the use of equity is still the same but it is subject to a change if the difference between the cost of debt and the cost of equity passes a certain threshold.

We find some limitations on our study. Firstly, because we focus on Japanese Manufacturing Companies only, the size of the sample data become small. The size of final data becomes 65% smaller compared to the initial sample. So, the results of this study may not be comparable to studies with large number of samples. Also, because of the limitation of the data available on the database, we have to modify the calculation of few proxies for the variables. These modified proxies may not be well representative, but they are the best available. Lastly, the results of this study may not be comparable to other studies with different data set or variables.

From these limitations, we can expand the potential for future studies. Future studies may utilize larger sample size to fully capture the correlation between the independent variables and the dependent variables. Another possible future study is by using a different set of proxies that are more compatible with the object of the study.

REFERENCES


