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HOW THE GDP WILL AFFECT M&A DEALS IN U.S.

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With the rapid development of the economy, Merger and Acquisition deals reach another wave nowadays. Most economists are focused on how M&A deals affect the profit and welfare. There is seldom research regarding the relationship between Gross Domestic Production and the value of Merger and Acquisition deals. In this paper, I utilize an empirical application to test the relationship between them and find out that Gross Domestic Production has significant positive relation to the value of Merger and Acquisitions. Companies are more willing to get involved in Merger and Acquisition deals when the economy is booming, and less willing to get involved in those deals when the economy is depressed.

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CHAPTER 1

INTRODUCTION

With the rapid development of technology and the trend of economy globalization, merger and acquisition (M&A) has become an efficient way for companies to obtain and exploit new opportunities (Zhong, 2016). For example, it can help managers to deal with critical and ongoing interdependencies with others in a firm's environment, expand current product lines and markets, enter new business, and maximize and utilize financial capability (Barney & Walter, 1990). Therefore, the numbers and value of M&A deals got a new wave in recent years. As the Institute for Mergers, Acquisitions and Alliances (IMAA) released on their website, "In 2015, companies announced over 44,000 transactions with a total value of more than 4.5 trillion USD (4.1 trillion USD/2.9 trillion GBP). Compared to 2014, the numbers of deals grew only marginally by 2.7% while the value rose at 16%".

Since M&A plays a more important role in modern economy, it triggers different parties to pay attention to M&A. The government has started to intervene some big M&A deals to protect tax revenue and competition. Such as, the Obama administration torpedoed Pfizer's takeover of Dublin-based Allergan and Comcast's takeover of Time Warner Cable (Crow & Jopson, 2016). The Federal Trade Commission (FTC) established the premerger notification program and merger review to protect consumers. At the same time, much more scholars and managers start to focus on the research in the topic.

In this paper, I want to focus on how the waves of M&A deals are related to Gross Domestic Product (GDP).

CHAPTER 2

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Since M&A is a hot topic for decades, there are numerous research regarding it. Lim and Lee provide a better understanding of how decision maker to decide and lead M&A completion or abandonment (Lim & Lee, 2016). Feld et al. are focus on how M&A will affect the corporate taxation also is an important area for scholars to explore (Feld, Ruf, Schreiber, Todtenhaupt, and Voget, 2016). As what I have read, there are 3 major topics of M&A.

2.1 The types of M&A

Depends on the different types and industries of companies, the 4 types of M&A can be illustrated to vertical, horizontal, concentric, and conglomerate (Walter & Barney, 1990). Walter and Barney (1990) interviewed all professional M&A intermediaries to explored that in vertical mergers to deal with critical and ongoing interdependencies is the top goal for managers, in horizontal mergers there are several goals for managers, in concentric M&A to expand current markets is the major goal for managers, in conglomerate mergers to get into new businesses is the main goal for managers.

In those types of M&A, horizontal merger is the one that has the most debates and economic theories because it affects competition directly (Tichy, 2001). Ramaswamy (1997) utilized hierarchical regression analysis to find out that it will be better performance if mergers happened between similar strategic firms in U.S banking industry. Shahrur (2004) examined 463 horizontal takeovers to analysis the wealth effects on rivals, suppliers, and corporate consumers. It showed that industry

consolidations can increase efficiency (Shahrur, 2004). FTC also published Horizontal Merger Guidelines to enforce federal consumer protection laws (FTC, 2010).

Compare with the large amount of research regarding horizontal merger, there is little empirical work on vertical mergers (Fan & Goyal, 2006). Fan & Goyal (2006) utilized industry commodity flows information to measure vertical relations and found out that compare with horizontal mergers, vertical mergers also will result in positive wealth effects.

Conglomerate mergers are becoming more popular nowadays. Miller (2012) illustrated that conglomerate mergers may improve competition by using four examples: risk reduction and inverse relationships, cost efficiency, financial gain through stock transfers, and reciprocity for competitive behavior.

2.2 The impact to profit and welfare

Levin (1990) had studied the consequences of a horizontal merger under a Cournot industry. By using the basic method to maximize the profit for company and get the unique industry output at Cournot Nash Equilibrium (CNE) condition and also maximize the profit get the post-merger CNE for firms that stay out of the merger, he found out that "profitable horizontal mergers that start with less than 50 percent of premerger market share are welfare-enhancing "(Levin, 1990, p1244).

However, Levin's (1990) work is established in Cournot industry, so it means that after merger the industry is still in Cournot condition. To perfect Levin's (1990) theory, Pape and Zhao (2014) modeled a standard Stackelberg game in a homogeneous oligopoly industry, which has 4 cases: merger between two leaders, merger between two followers, merger between two followers resulting in a leader, and merger between

one leader and one follower resulting in a leader. Pape and Zhao (2014) found that the merger between leaders will enhance welfare, however they are focus on the merger between 2 companies not included the case within 3 firms or more.

Except for the research about merger in general, also there are some research in the specific industry. Fikru & Lahiri (2012) formed a theoretical framework for mergers under a pollution-intensive sector and showed that environmental agencies can affect the market structure and provide incentives to merge. At the same time, Head and Ries (1997) had studied the welfare consequences of horizontal mergers in different nations and Sun, Peng, Ren, and Yan (2012) studied the comparative ownership advantage framework for cross border M&As.

2.3 The effect to economy

The majority of the research are about how M&A deals affect to companies and consumers. There are little research of how GDP will triggers M&A deals. Kummer (2006) studied the M&A deals in pharmaceutical industry in South America and found out that "the numbers of M&A transactions correlates with the development and size of an economy measured in the form of GDP". Doytch, Cakan, Upadhyaya (2011) studied the M&A sales by different sectors and how those deals in different sectors affect economy growth. Their study showed that cross-border M&A lead to slow down the domestic economy (Doytch, Cakan, Upadhyaya, 2011). Furthermore, Doytch (2012) studied the correlation of M&A deals and economic growth in OECD countries, found out that M&A in service sector has positive effect on growth of service.

As we can see from literature review, even though there are some researches regarding the relationship between M&A deals and economic condition, I seldom see

researches using the total actual value of M&A deals in specific country data to analysis the relationship of GDP. Figure 1 and 2 shows the real GDP and M&A deals number/value in Untied States (U.S.) from 1985-2015, it is easily to find out that the movement of real GDP and the number and value of M&A in U.S. are in the same pattern. Therefore, my hypnosis in this paper will be value of M&A deals has positive correlation to GDP moreover GDP will affect the value of M&A deals.
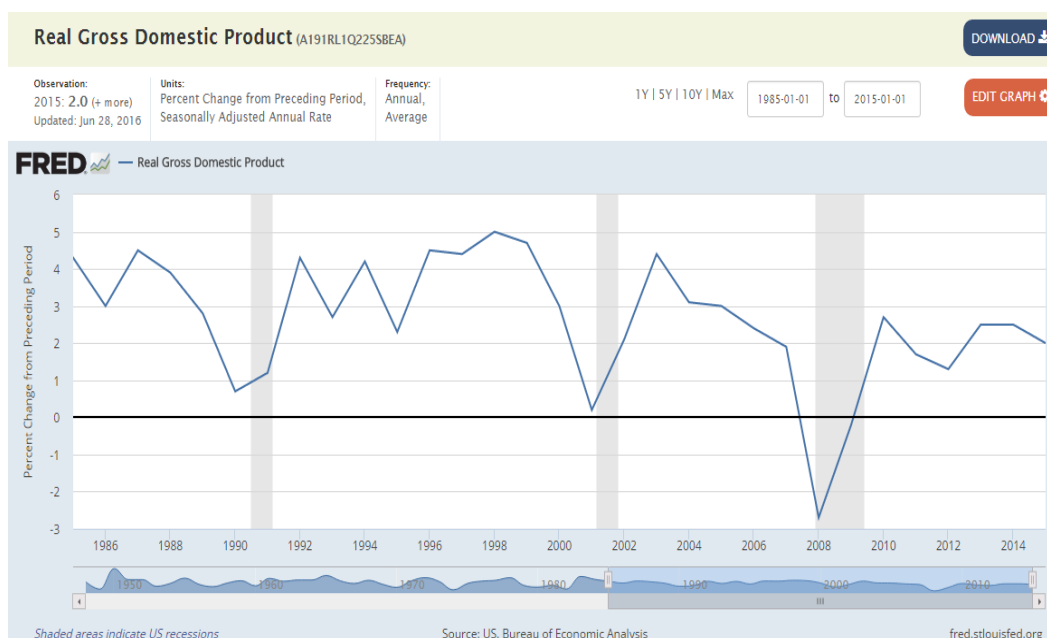

Figure 1

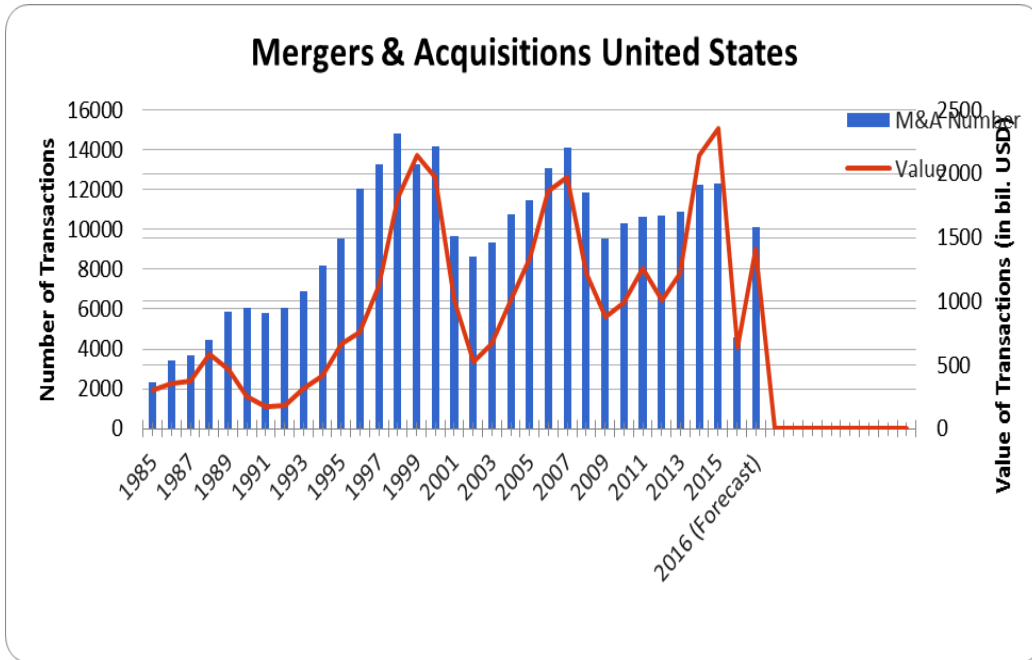Data Source: Fred & U.S. Bureau of Economic Analysis

Figure 2

Data Source: Institute for Mergers, Acquisitions and Alliances

Figure 3

Data Source: Fred & U.S. Bureau of Economic Analysis

CHAPTER 3

METHODS

I focus my empirical application on the annual total U.S. dollar value of M&A and

GDP from 1985 to 2015 in U.S. The data source of the M&A value are from 1985 to

2015 from IMAA, which is the institute to offer the newest data for M&A. The data

source of the GDP is from the FRED, which has numerous economic data and is

established by the Federal Reserve Bank of St. Louis. Table 1 shows the summary of

data that I have collected. ma represents the annually total value of M&A deals in U.S.

from 1985-2015, which is in billion USD. gdp represents the annually GDP in U.S. from

1985-2015, which is in billion USD.

Table 1

. summarize

Variable	Obs	Mean	Std. Dev.	Min	Max
ma	31	1011.419	658.8053	178	2356
gdp	31	10501.63	4252.564	4346.8	17947

.

- ma: in billion USD

- gdp: in billion USD

I am not using the real GDP in this empirical application is because the real GDP

is the percentage change that compare the current GDP with previous GDP, therefore it

cannot be compared with both the dollar value of M&A deals and the numbers of M&A

deals. At the same time, the numbers of M&A deals is not able to compare with GDP in U.S. dollars. Therefore, I will focus on how GDP will affect the value of M&A deals.

First of all, I would like to predict a linear regression model for M&A and the GDP. M&A is the dependent variable. GDP is the independent variable, which will affect dependent variable.

$$ma = \beta 0 + \beta 1 * gdp + \varepsilon$$

ma represents the value of M&A deals during 1985-2015. gdp represents the gdp in U.S. during 1985-2015. $\beta 0$ is the constant of the regression model. $\beta 1$ is the

coefficient of the regression model. $\beta 1$ represents the change of ma when the gdp

change in one unit. ε is the error term of the regression model, representing the errors.

In this paper I will use Stata 13.1 SE, which is the software of data analysis to get the ordinary lest square (OLS) regression model:

$$E[(ma|gdp)] = \beta 0 + \beta 1 * gdp$$

I will utilize T test (Studenmund, 2011) to test if gdp is significant related to ma. The t-test is the test that econometricians usually use to test hypotheses about individual regression slop coefficients.

$$t = \frac{\beta k}{SE(\beta K)}$$

βk is the estimated coefficient of independent variable and SE(βk) is the standard error of the coefficient of the independent variable. The null hypothesis and alternative hypothesis of t-test are:

$$H0: \beta k = 0$$

$$HA: \beta k \neq 0$$

Reject the null hypothesis H0 if |t| exceeds the critical value of t:

$$|t| > t_{\frac{\alpha}{2}, n-k-1}$$

It means that there is significant relationship between the independent variable and dependent variable.

Fail to reject the null hypothesis H0 if |t| less than the critical value of t:

$$|t| < t_{\frac{\alpha}{2}, n-k-1}$$

It means that there is no significant relationship between the independent variable and dependent variable.

CHAPTER 4

RESULTS

Table 2

```
. regress ma gdp

      Source |       SS       df       MS              Number of obs =      31
-------------+------------------------------           F(  1,    29) =   26.29
       Model | 6191795.44       1 6191795.44           Prob > F      =  0.0000
    Residual | 6828936.11      29 235480.555           R-squared     =  0.4755
-------------+------------------------------           Adj R-squared =  0.4574
       Total | 13020731.5      30 434024.385           Root MSE      =  485.26

------------------------------------------------------------------------------
          ma |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp |   .1068309   .0208337     5.13   0.000     .0642212    .1494406
       _cons |  -110.4794   235.5084    -0.47   0.642    -592.1481    371.1894
------------------------------------------------------------------------------
```

After utilize Stata, I got the OLS model from table 1:

E[(ma | gdp)] = -110.48 + 0.11*gdp

β0 equals -110.48 and β1 equals 0.11. The model means that there is positive

relationship between gdp and ma. With the increase of 1 unit of GDP, the value of M&A

deals will increase by 0.11 (see graph 4).

From table 1 we can get the t value of gdp. To test if there is any significant

relationship between gdp and ma, we need to use t-test:

H0: βk = 0

HA: βk ≠ 0

Since the number pf parameter is 2, the sample size is 31, from the table of critical

value of the t-distribution (Studenmund) the critical value is 2.045. As table 1 showed, |t|

is equal to 5.13, which is exceeds the critical value 2.045. Therefore, reject the null

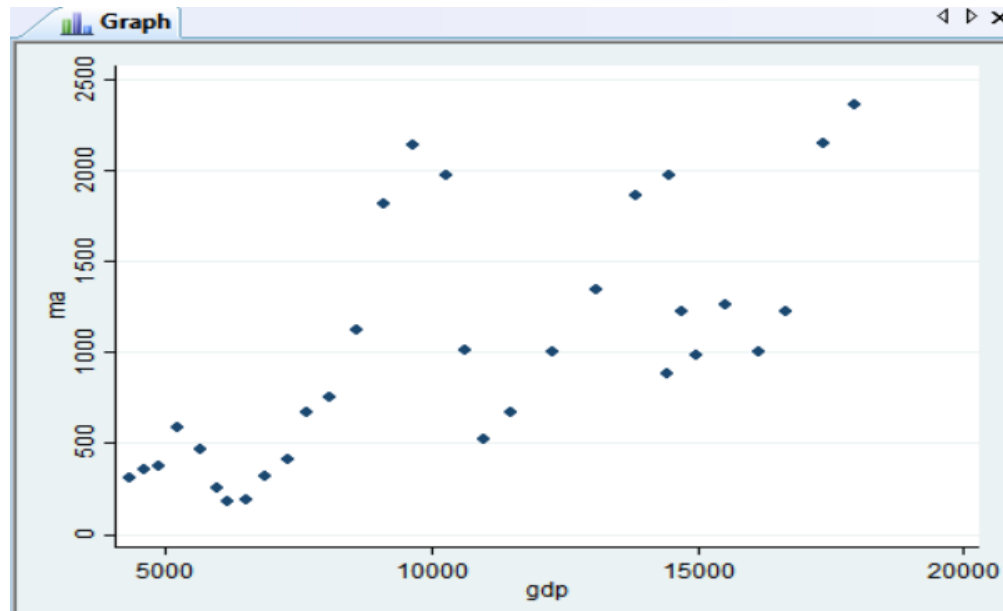hypothesis. GDP is significant relate to the value of M&A deals.

Figure 4

From my result, it is easily to see that the GDP is significant positive to the value

of M&A deals. It shows that with the economy growth, companies are more willing to

invest and expand their business. However, with the economy slow down, companies

are more willing to stick on their current condition, which means that they are not willing

to invest and expand. Also, it shows that in the boom economy, people are more

confident of their business and willing to take challenges.

CHAPTER 5

CONCLUSION

From the empirical application, I found out that the value of M&A deals has significant positive relationship to GDP. With the increase of one unite of GDP the value of M&A deals will increase by 0.11. It means that when the economy of U.S. is booming, companies are more willing to get involved in merger and acquisition, and when the economy is in depressed condition, companies are less willing to get involved in M&A.

However, there are some limitations of my research. The data sample is not big enough. It will be better if there is monthly or quarterly average value of the GDP and M&A deals included in my data set. At the same time, I just use t-test to test the significance, it will be better if include more test.

For future research, we can study about how different type of M&A deals will affect GDP. Such as, how horizontal, vertical, concentric, and conglomerate mergers will affect GDP. I just study about how GDP in the U.S. will affect the value of M&A deals in U.S. We can analyze what is the reason to trigger the value of cross-board mergers increase or decrease.

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