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2017년 2월  
석사학위 논문

# The Relationship between Cash Flow and Investment According to Economic Status

조선대학교 대학원  
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등 걸

# 경제상황에 따른 현금흐름과 투자의 연관성

The Relationship between Cash Flow and Investment  
According to Economic Status

2017년 2월 24일

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# The Relationship between Cash Flow and Investment According to Economic Status

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이 논문을 경영학 석사학위신청 논문으로 제출함

2016년 12월

조선대학교 대학원

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## 등걸의 석사학위논문을 인준함

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## Abstract

### 경제상황에 따른 현금흐름과 투자의 연관성

등 곁

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최근 경제 현상은 금융 및 실물 경제들 간의 지속적으로 다양한 채널을 통한 비선형 상호작용에 의해 더욱더 복잡해졌다. R.DAVID MCLEAN 및 MENGXIN ZHAO는 기업의 투자와 투자기회, 현금 흐름 (내부 금융), 금융 마찰 (외부 금융) 그리고 경제 상태 간에 상호 연관성을 관찰하였다. 본 논문에서 우리는 미국 발 금융 위기 전 후로 투자와 현금 흐름의 관련성을 실증적으로 검증하고자 전체기간 (1965~2015)을 네 기간 (1965~2003, 2004~2007, 2008~2009, 2010~2015)으로 세분화 하였다. 본 학위논문에서 관찰된 중요한 결과들은 아래와 같이 요약할 수 있다.

첫째, 검증 기간에 상관없이, 투자기회와 투자와는 양의 상관관계를 관찰 하였다. 그러나 글로벌 금융 위기 이전과 이후에 투자와 현금 흐름에서 유의미한 상관관계를 관찰할 수 없었다.

둘째, 우리는 각각 산업별로 이에 대한 관계를 측정하였다. 건설 및 제조 산업이 글로벌 금융 위기 이후에, 건설업과 제조업 분야에서 투자와 현금 흐름에서 음의 상관관계를 보여주었다.

## 1. Introduction

Recently, there are a lot of news shows that firms didn't invest in real economic. The existing research like R.DAVID and MENGXIN ZHAO (2014) show that investment is less sensitive with Tobin's  $q$  and more sensitive with cash flow during the recession periods but opposite in expansion periods. Here, we consider whether the relationship between investment and investment opportunity or cash flow is related to the economic status. Based on the previous studies, following P Petr, R Sirpal, and M Hondan (2012) we divide into the four periods such as normal period (1996–2003), pre-crisis period (2004–2007), subprime crisis period (2008–2009), and post crisis period (2010–2015).

We find that the overall relationship between investment and cash flows is positive and is similar to the previous studies. However, in the post-crisis period, investment is negative correlation with cash flow. It is difficult to be understood. Generally, the firms should prefer to have internal finance compare to the external finance because of financial cost. However our findings do not support such relationship. This result might be attributed to two possible causes. First, firm will be suffered from the uncertainty of future economics in spite of the increase in cash holding. Second, another cause should be related to the monetary policy with lower interest rate. Since 2000 year, the interest rate of U.S. market is approach to zero, it means there is no financial friction of external finance in these period. So firms can easily take the cash from external financial market. For example they can borrow the capital from banks than invest in real market but not use the cash which they hold. For the first assumption maybe we will guess whether because of the investment opportunity or others the firms didn't increase the investment compare with increase the cash holding. Tim Opler, Lee Pinkwize, Rene Stulz and Rohan Williamson,(1999)<sup>1)</sup> show firms willing to increase the cash holding



because of the high risk. So the study of find the reason become necessary .It is the main motivation of our research.

In order to find the reason of the negative relationship between investment and cash flow in the post-crisis period, we corrected our regression framework, we also analysis our result according to industries respectively. In other words it is to measure which industries contributed the negative relationship of our research. We defined the industries use the SIC code which is made in united state. We will explain how to defined it particularly and what are the characteristics of each industry in the Appendix.

We can summary that there are two main contributions of our study. First, following the existing researches only analysis the relationship in normal period and crisis period<sup>2)</sup> but we add the post crisis period. We are the first time to document the relationship between investment and financial variables such as the investment opportunity and cash flow according to industries, respectively. It is in order to find the reason of negative relationship between investment and cash flow during post-crisis period. We check which industries contributed the negative value of this relationship.

The rest of the paper is organized as follows. Section 2 shows the literature reviews. Section 3 and 4, the used data sets and methodology are described. We analyze about what is the factor to determine the investment decision and are presented in Section 5.

## 2. Literature Review

Recently, a research published by Brunnermeier, Eisenbach and Sannikov (2012), they shows macro economists are trying to show how real economics be affected by financial frictions.

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1) This paper is published in Journal of Financial economics 52 (1999), this paper explained the determinants and implications of corporate cash holdings

2) Like the research of David and Zhao (2014).

The papers in regard to business cycle are consistent with some macroeconomic models most of them argue that the uncertainty of collateral values reduces exacerbates economic downturns and lending. Such as Bernanke and Gertler (1989), Bernanke, Gertler and Gilchrist (1999), Shliefer and Vishny (1992), Brunnermeier, Eisenbach, and Sannikov (2012). This literatures provide the evidences of our research, for public firms, share issues plays a larger role periods than debt issuance during the recession periods. But this literatures only consider the effects in recession periods and expansion periods, and not consider it in each industries like us.

Our research is related to the paper of Sharpe (1994), it is an emerging literature that consistent of employment to financial constraints. Sharpe's study shows that the employment have be more changed of leveraged firms. In more detail, leveraged firms are more sensitive to the business cycle. The studies of Benmelech, Bergman, and Seru (2011), Pagano and Pica (2012), Campello et al. (2011) relate the various measures of the employment growth. R.David and Mengxin Zhao (2014) also linked the employment growth to internal finance, investment opportunity and investor sentiment. Our study is similar with David's paper. The reason of measure the employment growth to replace the investment is to robustness our main result.

### 3. Data and Sample

We use all of the U.S. firms' annual data it is comes from Compustat database. The period is from the year of 1965 to 2015. We delete financial firms and utility firms in my total database, (The financial firms with SIC codes between 6,000 and 6,999 and the utility firms with SIC codes between 4900 and 4999). Like Baker, Stein, and Wurgler (2003). In order to reduce the influence of outliers, we winsorize each of variables at the top 1% and bottom 1%.

We exclude the firms that book values of equity are not positive, and firms that have total assets are less than \$10 million.

### 3.1 Measures of Investment

If a firm's operating conditions are ideal the decision makers will consider to increase the investment. Firms can increase their investment by either buying other firm's assets or making new projects. These are reflected in M&A and capital expenditures. If a firm is face operating predicament maybe the managers will consider to reduce the investment such as sell the assets of it. So we can use the asset growth to measure investment growth.

In our paper, we use the total asset growth plus R&D spending to measure the investment. And all of these values need be scaled by lagged total assets. We can calculate it as following:

$$Investment_t = (Assets_t - Assets_{t-1} + RD_t) / Asset_{t-1}$$

This measure is broadest used to measure the investment in existing studies, like in David Mclean and Mengxin Zhao (2014).

### 3.2 Measures of Investment Opportunities

Following the investment literatures, firm's investment opportunity can be measured by Tobin's Q or sales growth. We favor the Tobin's Q, because it is widest used to measure the investment opportunity. For example, by Baker, Stein, and Wurgler (2003), and Rauh (2006). Tobin's Q is the ratio of the firm's market value to its book value. It also can be explained as: (market value of equity + market value of debt)/book value of asset. In our paper we measure it as follows:

$$Q = \log\left(\frac{MV\ of\ Equity + BV\ of\ Assets - BV\ of\ Equity}{BV\ of\ Assets}\right)$$

Here MV is means the market value and BV is means the book value. It is worth to noted that we use the log value of this ratio, in order to reduce the gap of maximum value and minimum value, let the distribution of it is more close to normal distribution.

### 3.3 Measures of Cash Flow

We use the cash flow to measure the internal finance. Firms have two ways to get the money, the first is use net income of its operating, and the other is issue debt or equity. We call the internal finance and external finance, respectively. We use the following equation to measure the cash flow:

$$Cash\ Flow_t = \frac{Net\ Income_t + Depreciation\ and\ Amortization_t}{Assets_{t-1}}$$

### 3.4 Measures of Other Variables

Employee Growth: we measure employee growth use the log growth of employment. It can be defined as:

$$Employee\ Growth_t = \log(Employment_t) - \log(Employment_{t-1})$$

Firm size: Firm size can be measured as log value of firm's total assets. It can be defined as:

$$Firm\ Size = \log(Assets)$$

Leverage: There are some methods to measure the Leverage Verouj A. Aivazian, Ying Ge and Jiaping Qiu(2005) use the total liabilities and long term debt to measure the leverage, following this paper we measure leverage as the total liabilities divided the total assets of a firm.

$$\text{Leverage} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

### 3.5 Summary Statistics and Correlations

Table 1 reports the summary statistics of the primary variables that we used in our study. We measure the mean, standard deviation, median, 25th percentile values, 75th percentile values and the number of observations.

**Table 1. Summary Statistics.**

	Mean	SD	25th Percentile	Median	75th Percentile	N
Q	0.3806	0.5642	-0.0094	0.2594	0.663	155265
Cash Flow	0.0703	0.1998	0.037	0.0907	0.1451	157093
Investment	0.2168	0.7094	0.0036	0.0987	0.2452	157307
Employee Growth	0.0519	0.3314	-0.0458	0.0298	0.1335	144358
Firm Size	4.8857	1.6575	3.5976	4.8127	6.3752	143666
Leverage	0.4912	0.2556	0.3256	0.4929	0.6434	145006

Table 2 shows the cross correlations of each variable. In my regression model Tobin's Q and cash flow are independent variables. Investment, employee growth is dependent variables. Firm size and leverage as the control variables. Because of the multi-collinearity problem we check the correlation value of independent variables. From the table 2 we know that the correlation among independent variables is approach to 0, (The correlation among Q and Cash flow is -0.0016).

**Table 2. Cross-correlation table.**

	<b>Correlation</b>					
	Q	Cash Flow	Investment	Employee growth	Firm Size	Leverage
Q	1					
Cash Flow	-0.0016	1				
Investment	0.2911	0.0276	1			
Employee growth	0.275	0.113	0.522	1		
Firm Size	0.0125	-0.1010	0.046	0.106	1	
Leverage	0.0256	-0.0071	0.0322	0.0911	0.068	1

## 4. Methodology

In this section, we will explain the models that be used in our paper. The only used multiple regression model in our study. We consider a cross-sectional, and yearly regression of investment, it is scaled by lagged assets on legged q and contemporaneous cash flow. In order to remove the yearly effects, we add the year fixed effect to control it.

$$\frac{I_{i \in Ind, t}}{A_{i \in Ind, t-1}} = \alpha_{i \in Ind} + \alpha_t + \beta_1 Q_{i \in Ind, t-1} + \beta_2 \frac{CF_{i \in Ind, t}}{A_{i \in Ind, t-1}} + \varepsilon_{i \in Ind, t} \quad (1)$$

$$\begin{aligned} \frac{I_{i \in Ind, t}}{A_{i \in Ind, t-1}} = & \alpha_{i \in Ind} + \alpha_t + \beta_1 Q_{i \in Ind, t-1} + \beta_2 \frac{CF_{i \in Ind, t}}{A_{i \in Ind, t-1}} + \\ & \beta_3 Size_{i \in Ind, t} + \beta_4 Leverage_{i \in Ind, t} + \varepsilon_{i \in Ind, t} \end{aligned} \quad (1.1)$$

Equation (1) is to estimate the relationship between investment and Tobin' s q and cash flow. In this equation investment as the dependent variable, Tobin' s q and cash flow are the independent variables. and are time series yearly estimated coefficients. and are measure the sensitivity that Tobin' s q and cash flow affect investment. It is worth to note that measure the relationship not only in total industry, but also estimate it according to industry, respectively.

$$\frac{Employee_{i \in Ind, t}}{A_{i \in Ind, t-1}} = \alpha_{i \in Ind} + \alpha_t + \beta_1 Q_{i \in Ind, t-1} + \beta_2 \frac{CF_{i \in Ind, t}}{A_{i \in Ind, t-1}} + \varepsilon_{i \in Ind, t} \quad (2)$$

$$\begin{aligned} \frac{Employee_{i \in Ind, t}}{A_{i \in Ind, t-1}} = & \alpha_{i \in Ind} + \alpha_t + \beta_1 Q_{i \in Ind, t-1} + \beta_2 \frac{CF_{i \in Ind, t}}{A_{i \in Ind, t-1}} + \\ & \beta_3 Size_{i \in Ind, t} + \beta_4 Leverage_{i \in Ind, t} + \varepsilon_{i \in Ind, t} \end{aligned} \quad (2.1)$$

Equation (2) use the employee growth, to replace the dependent variable



investment, respectively. The reason of make this estimate is to robustness the result of our measure. Employee growth is a similar factor with investment, but a little different, of example in some industries they can invest but don' t need to increase in employment, such as the industry of IT.

We also add some control variables such as firm size and leverage in our regression model, the models can be defined as the equation (1.1) and equation (2.1).

## 5. Results

### 5.1 Investment

Table 3 reports the estimates of regression model (1). In this model investment as the dependent variable. The coefficients of  $q$  and cash flow are significant and positive, both in the normal period, pre-crisis period and crisis period. It is similar with the findings in previous studies (e.g., Fazzari, Hubbard, and Petersen (1988)). From the table 3 we can find similar with existing studies the investment is robustness and significantly related with Tobin' s  $q$ . David and Zhao (2014) show investment is less sensitive with Tobin' s  $q$  during the recession periods but more sensitive in expansion periods. Our result also similar with their finds. In the crisis period the coefficient of Tobin' s  $q$  is 0.2273 it is nearly two times lower than normal period, pre-crisis and post-crisis period. But our result show that the cash flow is insignificantly related with investment during the post crisis period. And during the pre-crisis period (2004-2007) and crisis period (2008-2009) investment is less sensitive to cash flow. This find is very different with existing studies. And it seems difficult to understand. Following our results after the year of 2004 investment is less sensitive with cash flow both in expansion and crisis period. There are two reasons to explain it, the first after year of 2004 the firms didn't invest in real economic so the investment will with less

sensitive to cash flow. The other reason is that after the year of 2004 in U.S. market there are no frictions of external finance. As we known, in USA after 2000 the interest rate is approach to 0. It provides a forceful argument for the second suppose. Moreover, all of the interactions in regression model statistically significant, showing that these effects are robust.

**Table 3. The Relationship Between Investment Opportunity, Cash Flow and Investment**

This table reports the results of regression model (1). Investment is the dependent variable. Tobin' s q and cash flow are the independent variables. See Table 3 for variable definitions. All regressions include year fixed effects. The t-statistics are reported in the parentheses. \* indicates Significant at 10% level; \*\* indicates Significant at 5%; \*\*\* indicates Significant at 1%. R2 statistics reflect within firm variations.

	1965-2003	2004-2007	2008-2009	2010-2015
Q	0.4126 * * * ( 87.93 )	0.3935 * * * (36.11)	0.2273 * * * (22.15)	0.3725 * * * (37.11)
Cash flow	0.3426 * * * ( 26.65 )	0.0600 * * (2.55)	0.0804 * * * (3.27)	-0.0896 * * * (-4.19)
Observation	107061	12651	5723	13796
R <sup>2</sup>	0.0936	0.099	0.0399	0.0851

Because of the firms with some characters that they will affect the investment. We add the firm size and leverage variables which are widely used in papers as the control variables.

Table 4 reports the result that be estimated of regression model 1.1. The different with table 3 is that the table 4 add the control variables. From the table 4 we can find that the negative relationship between cash flow and investment is insignificantly. in other words, its means there is no relationship between cash flow and investment during the post-crisis period. It seems more reasonable than table 3.

**Table 4. The Relationship Between Investment Opportunity, Cash Flow and Investment**

This table reports the results of regression model (1.1). Investment is the dependent variable. Tobin' s q and cash flow are the independent variables. Firm size and leverage are the control variables. See Table 4 for variable definitions. All regressions include year fixed effects. The t-statistics are reported in the parentheses. \* indicates Significant at 10% level; \*\* indicates Significant at 5%; \*\*\* indicates Significant at 1%. R2 statistics reflect within firm variations.

	1965-2003	2004-2007	2008-2009	2010-2015
Q	0.3212 * * * ( 73.64 )	0.3826 * * * (31.70)	0.2067 * * * (17.33)	0.3549 * * * (30.31)
Cash flow	0.5447 * * * ( 42.71 )	0.0423 (1.58)	0.1931 * * * (6.72)	-0.4499 (-1.18)
Firm Size	-0.1383 * * * (-54.44)	-0.0776 * * * (-15.54)	-0.0437 * * * (-8.99)	-0.0510 * * * (-9.90)
Leverage	-0.1882 * * * (-14.88)	-0.0709 * * (-2.16)	-0.1052 * * * (-3.19)	-0.0048 (-0.14)
Observation	102764	11779	5129	13358
R <sup>2</sup>	0.1453	0.1608	0.0893	0.1319

## 5.2 Employment Growth

In this section, we use the employment growth to replace the investment of regression model, like the equation 2. It is to test whether the financing cost will affect firms' decisions of increase or decrease employment. Table 5 is reported our result of model (2), the results are similar with table 3 which we use the dependent variable is investment. In the first regression, we show that the cash flow is significantly less sensitive and negative related with investment during the post crisis period. During the pre-crisis period (2004-2007) and crisis period (2008-2009) investment is less sensitive to cash flow. It is showing that after the year of 2004, firms increase their investment didn' t related with their cash flow. From table 5, we find

in the post crisis period (2010–2015) the number of increase in employment is insignificant and less sensitive to cash flow, and during the pre-crisis period also similar with the first regression model, there are less sensitive relationship between employment growth and cash flow. A little different is in the 2008–2009 crisis period, employment growth is more positive sensitive with cash flow. We can think it in industry level, some basic industries like constriction and manufacturing the employment growth will more sensitive with cash flow. For the relationship between employment growth and Tobin' s q, same with table 3 employment growth has significant and positive relationship with Tobin' s q. The positive q sensitivity suggests that firms with strong growth opportunities increase their employment more. David and Zhao (2014) show employment growth has the same effect compare with investment when financing costs are low, employment growth is more sensitive to q and less sensitive to cash flow. Our result developed it, summary our result that we find after 2004, the relationship between cash flow and investment is less sensitivity and cash flow is less sensitive with employment growth during pre-crisis (2004–2007) and post-crisis (2010–2015) period.

We also use the control variables firm size and leverage in these regression model. Table 6 compare with the table 4 we can fined that the results are similar, they are show in the post crisis period cash flow is insignificantly related with dependent variable.

**Table 5. The Relationship Between Investment Opportunity, Cash Flow and Employee Growth**

This table reports the results of regression model (2). Employee growth is the dependent variable. Tobin's q and cash flow are the independent variables. See Table 5 for variable definitions. All regressions include year fixed effects. The t-statistics are reported in the parentheses. \* indicates Significant at 10% level; \*\* indicates Significant at 5%; \*\*\* indicates Significant at 1%. R2 statistics reflect within firm variations.

	1965-2003	2004-2007	2008-2009	2010-2015
Q	0.1508 * * * ( 61.21 )	0.1206 * * * (16.89)	0.1118 * * * (12.22)	0.1273 * * * (19.19)
Cash flow	0.2109 * * * ( 30.86 )	0.0319 * * (1.96)	0.1966 * * * (8.87)	0.00088 (0.06)
Observation	101706	12278	5499	12824
R <sup>2</sup>	0.0688	0.0177	0.0453	0.0307

**Table 6. The Relationship Between Investment Opportunity, Cash Flow and Employee Growth**

This table reports the results of regression model (2.1). Employee growth is the dependent variable. Tobin's q and cash flow are the independent variables. Firm size and leverage are the control variables. See Table 6 for variable definitions. All regressions include year fixed effects. The t-statistics are reported in the parentheses. \* indicates Significant at 10% level; \*\* indicates Significant at 5%; \*\*\* indicates Significant at 1%. R<sup>2</sup> statistics reflect within firm variations.

	1965-2003	2004-2007	2008-2009	2010-2015
Q	0.1264 * * * ( 49.69 )	0.1022 * * * (13.41)	0.1054 * * * (10.20)	0.1250 * * * (17.79)
Cash flow	0.2607 * * * ( 35.01 )	0.0423 * * (2.44)	0.2232 * * * (8.66)	-0.0122 (-0.88)
Firm Size	-0.0301 * * * (-23.56)	-0.0016 (-0.56)	0.0012 (0.29)	0.0016 (0.50)
Leverage	-0.1873 * * * (-25.75)	-0.1712 * * * (-8.40)	-0.1639 * * * (-5.89)	-0.2139 * * * (-10.85)
Observation	97988	11469	4936	12923
R <sup>2</sup>	0.0893	0.0276	0.058	0.0449

### 5.3 Analysis on Industry Level

In order to find the reason that the investment is negative related with cash flow during the post-crisis period. In other words, which industries contribute the negative relationship between investment and cash flow we also estimate our result according to industries, respectively. Table 7 and Table 8 are report the relationship on industry level. We defined the industries as SIC codes which are normally used to classifying industries by a four-digit code. The industry division and its related SIC codes are reported in Table 8, specifically. Table 7 use the first regression model which investment as the dependent variable, Table 8 use the second regression model which employment growth as the dependent variable.

Table 7 shows that the industries of construction and manufacturing contributed the negative relationship between investment and cash flow during the post-crisis period. We can explain that the firms of these two industries didn't invest in real economic in spite of holding more cash during post-crisis period. As we known, U.S. firms didn't invest in labor-intensive industries compare with others during this period.

Moreover, in the normal period (1965-2003), both Tobin's  $q$  and cash flow are positive related with investment on each industry, exclude the industry 9, here industry 9 is non-classifiable firms. So it's difficult to be explained. During pre-crisis period, Tobin's  $q$  also has positive relationship with investment in each industry. But for the cash flow, the industries of 4, 5 and 6 with the negative relationship. The industries of 4, 5, 6 are manufacturing, transportation communication electric gas sanitary and wholesale trade. Before subprime crisis they are much invest in financial, estate and others but didn't in basic industries. It is worth to note that in the industry of construction with the positive relationship, because before the subprime crisis, U.S. firms much invest in the real estate, it is explained in lots of existing studies. There is the unique negative

value of the relationship between Tobin's  $q$  and investment, it is in the industry of construction, we can explain it is because of the crisis.

The result of Table 8 is to robustness the result of Table 7. In Table 8's regression model we use employment growth to replace the dependent variable of investment. And the result is very similar with Table 7. During the post-crisis period the industries of manufacturing and construction also have the negative relationship between employment growth and cash flow. In Table 8 the industry of transportation communication electric gas sanitary service also with the negative relationship, but it has the positive relationship with investment. It is easy to understand in this industry like IT, firms can increase invest in spite of they didn't increase employment.



**Table 7. The Relationship Between Investment Opportunity, Cash Flow and Investment according to industries, respectively**

This table reports the results of regression model (1). Investment is the dependent variable. Tobin's q and cash flow are the independent variables. And we measure the relationship according to industries, respectively. All regressions include year fixed effects. The t-statistics are reported in the parentheses. \* indicates Significant at 10% level; \*\* indicates Significant at 5%; \*\*\* indicates Significant at 1%. R<sup>2</sup> statistics reflect within firm variations. We defined industry (1) to (9) in Table 9

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1965-2003									
Q	0.15*** ( 4.37 )	0.19*** ( 6.68 )	0.26*** ( 7.77 )	0.30*** ( 66.76 )	0.43*** ( 15.82 )	0.34*** ( 16.76 )	0.24*** ( 23.38 )	0.41*** ( 27.47 )	0.53*** ( 11.02 )
Cash flow	0.15 ( 1.19 )	1.28*** ( 15.05 )	1.53*** ( 12.69 )	0.36*** ( 26.71 )	0.73*** ( 13.13 )	0.97*** ( 13.24 )	0.68*** ( 17.19 )	0.69*** ( 18.08 )	-0.41*** ( -4.44 )
Firm Size	-0.08*** (-3.71)	-0.09*** (-7.30)	-0.02* (-1.90)	-0.09*** (-39.10)	-0.11*** (-10.13)	-0.10*** (-12.05)	-0.08*** (-17.31)	-0.21*** (-21.50)	-0.09*** (-3.57)
Leverage	-0.17** (-2.00)	-0.26*** (-3.92)	-0.22*** (-3.23)	-0.16*** (-12.45)	-0.36** (-5.46)	-0.20*** (-4.10)	-0.23** (-7.97)	-0.12** (-2.40)	0.07 (0.55)
Observation	522	5013	1964	57756	5866	5148	9962	15524	1009
R <sup>2</sup>	0.1887	0.1175	0.1919	0.1552	0.1406	0.1812	0.2043	0.1554	0.2453
2004-2007									
Q	0.02 (0.23)	0.48*** (4.70)	0.34*** (3.42)	0.37*** (25.71)	0.35*** (8.36)	0.84*** (9.15)	0.08*** (2.65)	0.31*** (13.95)	0.36*** (6.03)
Cash flow	0.94* (1.85)	1.49*** (7.31)	0.84*** (4.34)	-0.15*** (-4.94)	-0.22** (-2.27)	-2.29*** (-8.30)	0.40*** (3.63)	0.26*** (4.62)	0.63*** (3.32)
Firm Size	-0.06 (-1.42)	-0.28*** (-6.46)	-0.08*** (-3.05)	-0.05*** (-8.61)	-0.03** (-2.08)	-0.08*** (-3.05)	-0.05*** (-4.82)	-0.07*** (-7.83)	0.01 (0.02)
Leverage	-0.03** (-0.10)	-1.11*** (-4.53)	0.01*** (0.07)	-0.00 (-0.03)	0.03*** (0.32)	-0.03 (-0.13)	-0.23*** (-3.12)	-0.05 (-0.82)	-0.39** (-2.38)
Observation	48	598	175	6044	670	510	1058	2630	155
R <sup>2</sup>	0.2901	0.3419	0.294	0.1632	0.2235	0.2669	0.109	0.1678	0.2317

**Table 7 (Continued). The Relationship Between Investment Opportunity, Cash Flow and Investment according to industries, respectively**

This table reports the results of regression model (1.1). Investment is the dependent variable. Tobin's q and cash flow are the independent variables. And we measure the relationship according to industries, respectively. All regressions include year fixed effects. The t-statistics are reported in the parentheses. \* indicates Significant at 10% level; \*\* indicates Significant at 5%; \*\*\* indicates Significant at 1%. R<sup>2</sup> statistics reflect within firm variations. We defined industry (1) to (9) in Table 9

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2008-2009									
Q	0.18 (0.98)	0.30*** (6.22)	-0.18 (-1.26)	0.23*** (14.80)	-0.01 (-0.12)	0.05 (0.88)	0.03 (1.01)	0.11*** (5.78)	0.10 (1.00)
Cash flow	4.83*** (9.03)	0.59*** (6.98)	3.24*** (9.50)	-0.20*** (-5.59)	1.27*** (9.64)	1.61*** (8.46)	0.68*** (6.49)	0.81*** (15.54)	0.25 (0.85)
Firm Size	-0.31*** (-2.75)	-0.04** (-2.01)	-0.10** (-1.99)	-0.03*** (-4.22)	-0.19*** (-4.91)	-0.02 (-1.18)	-0.02* (-1.91)	-0.03*** (-5.24)	-0.00 (-0.09)
Leverage	0.58 (0.65)	-0.31** (-2.20)	-0.80** (-2.53)	-0.03 (-0.56)	-0.94*** (-6.23)	-0.21* (-1.85)	-0.16** (-2.09)	-0.14*** (-2.96)	0.13 (0.97)
Observation	23	345	65	2609	277	212	380	1143	75
R <sup>2</sup>	0.9896	0.396	0.8345	0.06	0.6105	0.3707	0.2049	0.2468	0.0038
2010-2015									
Q	0.09 (1.06)	0.42*** (6.07)	0.42*** (4.25)	0.38*** (24.82)	0.18*** (5.69)	0.15*** (2.60)	0.08*** (3.33)	0.37*** (15.63)	0.20*** (1.99)
Cash flow	0.31 (0.83)	0.30** (2.01)	-0.87*** (-5.44)	-0.15*** (-5.19)	1.06*** (13.80)	0.76*** (3.38)	0.71*** (8.01)	-1.49 (-0.42)	0.13 (0.87)
Firm Size	-0.03 (-0.68)	-0.08*** (-2.77)	-0.03* (-1.67)	-0.10*** (-13.29)	-0.02** (-2.03)	-0.04*** (-2.81)	-0.04*** (-4.33)	0.00 (0.02)	0.03 (0.57)
Leverage	-0.19 (-0.67)	-0.11 (-0.54)	-0.02 (-0.13)	0.02 (0.51)	-0.02 (-1.10)	-0.10 (-0.76)	-0.13** (-2.09)	-0.07 (-0.97)	-0.68*** (-2.60)
Observation	74	907	244	6877	739	582	977	2887	71
R <sup>2</sup>	0.117	0.1093	0.0638	0.1392	0.3659	0.1024	0.1941	0.3369	0.4274

**Table 8. The Relationship Between Investment Opportunity, Cash Flow and employment growth according to industries, respectively**

This table reports the results of regression model (2.1). Employment growth is the dependent variable. Tobin's q and cash flow are the independent variables. And we measure the relationship according to industries, respectively. All regressions include year fixed effects. The t-statistics are reported in the parentheses. \* indicates Significant at 10% level; \*\* indicates Significant at 5%; \*\*\* indicates Significant at 1%. R<sup>2</sup> statistics reflect within firm variations. We defined industry (1) to (9) in Table 9

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1965-2003									
Q	0.06 ( 1.37 )	0.08*** ( 4.74 )	0.10*** ( 3.32 )	0.10*** ( 35.77 )	0.19*** ( 12.22 )	0.14*** ( 8.30 )	0.15*** ( 16.34 )	0.16*** ( 24.12 )	0.16*** ( 3.97 )
Cash flow	-0.10 ( -0.58 )	0.43*** ( 8.43 )	0.96*** ( 8.35 )	0.30*** ( 33.91 )	-0.05 ( -1.58 )	0.75*** ( 12.17 )	0.26*** ( 7.18 )	0.19*** ( 11.83 )	0.04 ( 0.40 )
Firm Size	-0.03 ( -1.22 )	-0.02*** ( -3.46 )	-0.00 ( -0.05 )	-0.03*** ( -19.63 )	-0.03*** ( -4.87 )	-0.05*** ( -7.35 )	-0.04*** ( -9.25 )	-0.02*** ( -5.89 )	0.00 ( 0.23 )
Leverage	-0.18 ( -1.64 )	-0.18*** ( -4.83 )	-0.23*** ( -3.62 )	-0.19*** ( -23.42 )	-0.20*** ( -5.26 )	-0.23*** ( -5.76 )	-0.27*** ( -10.59 )	-0.11*** ( -5.56 )	-0.35*** ( -3.07 )
Observation	468	4586	1829	55630	5456	4828	9582	14703	906
R <sup>2</sup>	0.1467	0.0733	0.1395	0.1021	0.064	0.1158	0.1068	0.106	0.1036
2004-2007									
Q	0.00 (0.04)	0.19*** (4.54)	0.42*** (4.63)	0.09*** (9.54)	0.07 (1.37)	0.15*** (4.21)	0.05** (2.25)	0.11*** (7.42)	0.18 (1.40)
Cash flow	0.84** (2.22)	-0.12 (-1.20)	0.15 (0.82)	0.03* (1.70)	0.03 (0.24)	0.00 (0.01)	0.16** (1.97)	0.10** (2.56)	-0.60* (-1.65)
Firm Size	-0.02 (-0.46)	-0.01 (-0.97)	-0.03 (-1.35)	0.00 (0.53)	-0.02 (-0.99)	0.00 (0.07)	-0.02*** (-3.00)	-0.00 (-0.31)	0.12* (1.82)
Leverage	-0.28 (-0.94)	-0.17* (-1.66)	0.35** (2.14)	-0.20*** (-7.57)	-0.16 (-1.34)	0.11 (1.52)	-0.12** (-2.12)	-0.15*** (-4.09)	-0.74** (-2.11)
Observation	46	561	172	5943	625	475	932	2564	151
R <sup>2</sup>	0.3049	0.0602	0.0875	0.0276	0.0246	0.0315	0.0357	0.0366	0.0804

**Table 8 (Continued). The Relationship Between Investment Opportunity, Cash Flow and employment growth according to industries, respectively**

This table reports the results of regression model (2.1). Employment growth is the dependent variable. Tobin's q and cash flow are the independent variables. And we measure the relationship according to industries, respectively. All regressions include year fixed effects. The t-statistics are reported in the parentheses. \* indicates Significant at 10% level; \*\* indicates Significant at 5%; \*\*\* indicates Significant at 1%. R<sup>2</sup> statistics reflect within firm variations. We defined industry (1) to (9) in Table 9

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2008-2009									
Q	-0.02 (-0.30)	-0.00 (-0.04)	-0.27 (-0.76)	0.13*** (10.58)	0.01 (0.14)	0.07** (2.05)	0.03 (1.37)	0.11*** (5.67)	0.06 (0.39)
Cash flow	1.33*** (4.75)	-0.12 (-0.97)	3.21*** (3.96)	0.17*** (5.84)	0.26** (2.36)	0.22* (1.88)	0.21** (2.94)	0.16*** (2.76)	-0.23 (-0.49)
Firm Size	-0.10** (-2.42)	-0.02 (-0.74)	-0.15 (-1.43)	0.01 (1.16)	0.01 (0.46)	0.01 (0.98)	-0.01 (-0.99)	-0.01 (-0.82)	0.13*** (2.79)
Leverage	0.49 (1.55)	-0.33* (-1.78)	-2.55* (-3.39)	-0.11*** (-2.95)	-0.09 (-1.10)	-0.05 (-0.84)	-0.15*** (-3.65)	-0.10** (-2.13)	-0.40* (-1.83)
Observation	21	307	60	2540	261	188	374	1119	66
R <sup>2</sup>	0.9086	0.1913	0.66	0.0329	0.1207	0.164	0.0558	0.0554	0.0709
2010-2015									
Q	0.03 (0.94)	0.15*** (4.91)	0.26*** (3.50)	0.11*** (13.30)	0.09*** (3.90)	0.07*** (3.15)	0.10*** (4.47)	0.13*** (7.81)	0.28 (1.29)
Cash flow	0.49*** (3.79)	0.17** (2.40)	-0.80*** (-6.30)	-0.00 (-0.02)	0.05 (0.87)	0.24*** (2.54)	0.11 (1.59)	-0.13 (-4.31)	-0.01 (-0.04)
Firm Size	-0.03* (-1.77)	0.02* (1.95)	-0.02 (-1.25)	0.00 (0.65)	0.00 (0.30)	-0.00 (-0.08)	-0.05*** (-2.88)	-0.00 (-0.05)	0.09 (1.41)
Leverage	0.09 (0.91)	-0.22*** (-2.63)	-0.22** (-2.05)	-0.21*** (-8.67)	-0.04 (-0.87)	0.04 (0.75)	-0.36*** (-5.78)	-0.29*** (-5.86)	-0.36 (-0.75)
Observation	74	811	241	6718	706	524	954	2832	63
R <sup>2</sup>	0.0769	0.0705	0.1146	0.0398	0.0307	0.0658	0.1021	0.0693	0.1693

**Table 9**

This table reports the industry definition. We defined the industries as the SIC codes. SIC code: full name as standard industrial classification. It is normally used system for classifying industries by a four-digit code.

Industry Number	Division	Range of SIC Codes
(1)	Agriculture, Forestry and Fishing	0100-0999
(2)	Mining	1000-1499
(3)	Construction	1500-1799
(4)	Manufacturing	2000-3999
(5)	Transportation, Communications, Electric, Gas and Sanitary service	4000-4999
(6)	Wholesale Trade	5000-5199
(7)	Retail Trade	5200-5999
(8)	Services	7000-8999
(9)	Non-classifiable	9900-9999

## VI. Conclusions

The results in this paper suggest that during the post crisis period, investment is insignificantly and negative sensitive to cash flow but higher in Tobin' s Q. Our finding is much different with existing studies. R.David Mclean and Mengxin Zhao (2014) show investment is positive related with cash flow and Tobin' s Q both in expansion and recession periods.

In a recently paper, Bolton, Chen, and Wang (2013) study the financial management (e.g. cash accumulation, investment, equity issuance, risk management, and payout policies) of a financially constrained firm that

faces time-varying financing costs. The authors point out that virtually all earlier theoretical work in this area assumes constant or time invariant financing costs. Our findings and those in Ivashina and Scharfstein (2010), Campello, Graham, and Harvey (2010), and Campello et al. (2011) suggest that external finance costs do vary over time and have important effects on investment and hiring. Allowing external finance costs to exogenously time-vary could therefore enrich future work in this area.

In order to find the reasons, we measure the relationship on industry, respectively. Our result show that the industries of construction and manufacturing contributed the negative relation of investment and cash flow, in the post crisis period. Following in recently news that they show firms didn't invest in real economic, we think the firms of these two industries didn't invest in spite of they are increase of cash holding. The next work of our research is to prove our assumption.

## Appendix

### 1.1 Agriculture, Forestry and Fishing Industry

We defined this industry as SIC code from 0100 to 0999, we noted it to industry (1). It will be explained at the result section in detail. You can see the Table 11

The industry of agriculture, forestry and fishing as the primary industry plays a vital role in real economy. It can be divided to food products and non-food products. Food products supplies us foods and non-food products provide us like lumber, fibers and nursery items. The food products includes tow sectors their are animal products and crop products.

The occupations of these industry we can dominated as three parts: farmers and rancher; farm workers; the managers of agriculture forestry and fishing.<sup>3)</sup> Generally, farmers and rancher are owners and operators

we can call them self-employer. Farm workers are employed by farm owner or management they will work in farms but don't have the ownership. Similar with workers in other industry the farm workers only get the fixed wages. The management of agriculture forestry and fishing are organizer of a farm, the managers can be owners and be employed to operate the farm. They have the power to make decision such as how to sell their products and others.

We summarize seven characteristics of this industry:

- (1) Geographical effects much more than other industries, obviously. different regions have more suitable crops and agriculture structures.
- (2) Easy to be affect by weather.
- (3) The most of work is in outside, working condition is arduous.
- (4) Working hours is varying.
- (5) Income is subjected to seasonal restrictions, especially in crop production the growth of grain has a time period.
- (6) In developed countries agriculture mechanization degree is higher, labor demand is lower, but in the most of developing countries the degree of mechanization is much lower than developed countries so in developing countries labor demand is higher.
- (7) Affected by external factors. In general, the average income is lower than other industries.
- (8) In this industry, the labor has aging trend.

## 1.2 Mining Industry

Mining is the means the mineral or other geological materials exploration, extraction and the subsidiary of mineral processing, refining and other business.

Mining is the initial stage of social production, providing raw materials and power for social production, which is the material

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3) These definition is comes from Wikipedia.

foundation for the survival and development of human society. Because human beings to survive and develop can not be separated from the fuel and materials, both of which are hidden in the earth, as a fossil fuel coal, oil, natural gas, flammable shale and as a nuclear power of sodium, thorium, As a material and raw materials of ferrous metals, rare metals, chemical raw materials and building materials, all of the resource need to through the mining and than can play a important role. No matter how complex and advanced the sequencing of these minerals is, the mining industry, which is first to be mined from the shallow or deep parts of the earth, is inseparable of them. Therefore, the mining industry is one of the basic industries in the real economy.

Due to the exhaustibility and non-renewable nature of mineral resources, the exploitation of mineral resources, so that the national economy can grow, while at the same time paid the depletion of mineral resources and environmental damage.

There are four main characteristics of mining industry:

- (1) In this industry, the work is restricted by geological and mineral resources.
- (2) Exploitation of objects, mining tools and workers are continuous changed, there is no fixed place, working conditions change at any time, and the general processing industry is absolutely different.
- (3) Working conditions are arduous and dangerous.
- (4) Geological conditions are very complex, it is difficult to standardize the mining project.

For the investment of mining industry, we summarized three features:

- (1) Mining investment has its basic and strategic characteristic.
- (2) Mining investment need a large volume of money and investment period is longer.
- (3) Mining investment with a high risk and high returns.



### 1.3 Construction Industry

Construction is the process of constructing a building or infrastructure.<sup>4)</sup> It is specialized in civil engineering, housing construction, equipment installation, engineering survey and design work. Its products are buildings, structures and facilities of various factories, mines, railways, bridges, ports, roads, pipelines, houses and public facilities.

Construction is the material production of the national economy, it is an important basis of our lives. In the United States and other developed countries, the construction industry, iron and steel industry, and automobile industry as the three pillars of the real economy.

Construction is the production that workers use machinery, equipment and tools, according to the design requirements of the object processing to produce a certain product, which makes it has the characteristics of industrial production. However, it has many different from the general industrial production of technical and economic characteristics, thus it is an independent material production sector. Its main features are:

- (1) Fixed on the ground, can not move.
- (2) Complex and diverse, different from each other.
- (3) Large body, it's difficult to be separated.
- (4) it's production can be used at long time.

Because of the features of its products, caused a series of characteristics of the construction industry, mainly:

- (1) Production of mobility.
- (2) Producted it need a long period.

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4) Compare: "Construction, Merriam-Webster.com, Merriam-Webster, retrieved 2016-02-16, [...] the act or process of building something (such as a house or road) [...]."

- (3) Outside and high-altitude operations, subject to the impact of natural climatic conditions, quality and safety issues highlighted.

#### 1.4 Manufacturing Industry

Manufacturing refers to the physical changes or chemical changes have become a new product. Whether it is machinery manufacturing, or hand-made, and whether the product is wholesale sales, or retail sales, are regarded as manufacturing.

Manufacturing includes: product manufacturing, design, procurement of raw materials, storage and transportation, order processing. Manufacturing directly reflects the level of a country's productivity. It is an important factor to distinguish developing countries and developed countries. Manufacturing has a significant share of the real economy of the developed countries.

Manufacturing as the most important part of GDP, playing a critical role of economic growth. These industry can absorb a large number of labor, and for promoting employment, increase national income, promote social stability also play a vary important role.

The types of production in manufacturing:

- (1) According to product performance classification, can be divided into generic products and special products.
- (2) According to the classification of production process characteristics, can be divided into process-based and processing assembly.
- (3) According to production stability and repeatability classification, can be divided into mass production, mass production, single-piece small batch production and many varieties of mass production.
- (4) According to the characteristics of product demand classification, can be divided into order production and stocking production.

- (5) According to the characteristics of customer needs classification, can be divided into general-purpose services and special services.
- (6) According to the characteristics of the operating system classification, can be divided into technology-intensive and labor-intensive.

We also summarized five characteristics of manufacturing:

- (1) These industry requires a huge number of labors, so the labor costs is particularly important.
- (2) Manufacturing industry is easily to cause the environmental problems, most of countries have a huge expense of the environment to develop the manufacturing industry.
- (3) The pollutants of production process will affect the health of workers, the working environment is not good.
- (4) The production is more and more tend to internationalization and modularization, the division of works become more and more obviously. For example, the production of bulky products such as airplanes and cars is generally done by the final manufacturer in the global procurement of parts and then final assembly.
- (5) Intelligent trend is more and more obviously.

### **1.5 Transportation, Communications, Electric, Gas and Sanitary Service Industry**

This is a comprehensive industry, it includes transportation, IT, energy and sanitary services. For the industries of this division, the establishment include permanent office, station, shop, warehouse or terminal. Same with other industries, the establishments have workers, activities and physical facilities. Many of the industries are related activities, for example, establishment of communications, utility industries and pipeline.

This part of industries have some features:

- (1) High-tech is widely used in this industries.
- (2) There are no need to increase so many employment
- (3) R&D is greater than other industries, obviously.
- (4) Technological innovation is much quickly than other industries.
- (5) Higher income, the difference of income is tremendous, in spite of  
in same firm

## 1.6 Wholesale Trade Industry

What is the wholesale business?

The wholesale business is to sale the goods, merchandise or services to resellers, industries or business user. The so-called reseller refers to the second time wholesalers and retailers; The so-called industrial users engaged in production and service provision for profit organizations, namely, the first, second and third industries of enterprise users; The business users is means the purpose is not for re-sales, but for business or business needs to purchase equipment and materials, non-profit organizations. Broadly, wholesale business is a form of business that is aimed at large volume purchasers in relation to retailing.

Wholesale industry have the following characteristics:

- (1) The wholesale trade volume is generally larger. The wholesale industry is basically capital-intensive industries, the wholesale industry, the capital is more important than labor, capital management is the key to the success or failure of wholesalers.
- (2) The wholesale business district relatively large. Small wholesale business is generally concentrated in the local small and medium-sized cities, but the scope of business will be radiated to the surrounding areas; Large wholesale business is often distributed in large cities nationwide, its business scope can cover the entire domestic market, and some can carry out import and export business, Its business circle can also break through

national borders.

- (3) Relatively few services. As the wholesale business of its clients are mainly organizational buyers rather than individual consumers, so the firm number of wholesale services industry fewer than retail, and wholesale firms focus on communications, storage, information, financing, transactions are often rational.

According to the different nature of wholesalers, it can be divided into independent wholesalers, manufacturing wholesalers, common wholesalers, wholesale and retail wholesalers, Chain wholesalers.

The Trend of Wholesale:

- (1) Transformation, upgrading the traditional wholesale industry.
- (2) Promote and supply chain management.
- (3) Actively explore e-commerce wholesale transactions.
- (4) To promote and improve the agency system.
- (5) To carry out retail support.
- (6) Over to the modern logistics center.
- (7) Develop the economies of scale.

### 1.7 Retail Trade Industry

Retail refers to the industry that provides the necessary goods and ancillary services to the final consumers (including individuals and social groups).

There is no uniform definition of retailing. At present, there are two main definitions of the mainstream retail industry: the first is definition of the marketing point of view: that the retail industry is all of individuals or companies that engaged in from the producer to the consumer product marketing activities. This definition is commonly in nearly three decades of marketing literature. The other is the definition of the US Department of Commerce: the retail trade industry, including all of the entities that they sell less number of goods to the general public. They do not change the form of goods, the resulting

service is also limited to the sale of goods. The retail trade sector includes not only retailers but also non-store retailers.

Retail is also one of the most important industries in the country. Every change in the retail industry and progress, have brought people to improve the quality of life, and even lead to a new way of life.

The retail industry is a barometer of the economic performance of a country.

The retail industry is a major source of employment in a country and a region.

Modern retail industry is a combination of high investment and high technology industries.

Compared with other areas of marketing, the retail industry has the following characteristics:

- (1) The retail sales target is a direct consumer. Main consumers are residents of individual consumption, including collective consumers, such as organs. Groups, schools and other units. In order to attract customers, the retailer must take into account the various store locations, transportation facilities, hours of operation, color varieties, parking spaces and advertising factor.
- (2) The retail sales of goods, mainly in order to meet the needs of end consumers, not to resell or processing.
- (3) The retail industry has other features such as sales frequently, the number of sales sporadically, and lower average sales. This means that the cost of retail enterprises must be honest, the kind of goods must be complete. Credit management, inventory control, merchandise packaging and labeling, all of which must be strictly controlled by the retailer in order to improve efficiency.

The Role of Retail:

- (1) Retail plays an important role in the distribution of goods, it is

the intermediate between the manufacturer or wholesaler and the final consumer.

- (2) The retailer buys a limited kind of goods from manufacturers (or wholesalers) in large quantities, so that manufacturers (or wholesalers) can maximize their productivity.

### 1.8 Services Industry

The service industry refers to the collection of production departments and enterprises that produce and sell service products. The service industry is regarded as the tertiary industry. It play a very important rule of real economic.

The basic difference between the service industry and other industrial sectors is that the service industry produces service products, and the service products are characterized by non-physical, non-storage and simultaneous production and consumption.

The most basic feature of service industry is that the production, exchange and consumption of service products are very closely. We summarized its operating characteristics:

- (1) A wide range. There is no restriction on the variety of products. The service industry can do business anywhere and there are no geographical restrictions. In the social division of labor, it is the widest operational industry.
- (2) Integrated services. The needs of consumers are interlinked. Such as hotels not only provide accommodation, but also need to have communications, transportation, food, laundry, hairdressing, shopping, medical and other services. Large-scale service enterprises generally take the way of integrated management; Small service enterprises to take the form of professional management, and the same area of the professional services companies are bound to interrelated to form a comprehensive service capabilities.

We can divided this industry to modern service industry and traditional service industry.

The modern service industry is a sector that rely on high-tech and modern management methods, mainly provide intermediate inputs for producers. The core of modern service industry is modern producer services, such as financial services, business services, government services, information technology and network communications services, education and training services, logistics services.

Traditional service industry refers to the industry which provides various services for our daily life, such as trade, catering, lodging and tourism.

The main characterize of traditional service industry is that it is a labor-intensive industry, the workers do not need high technology or knowledge. It is to satisfy the basic demand of consumers.

How to transform the Traditional Service Industry and develop the Modern Service Industry? We summarized four points:

- (1) The modern service industry through technological innovation to transform the traditional service industry.
- (2) The modern service industry to promote the development of information technology and logistics technology to transform the traditional service industry.
- (3) The modern service industry through the development and accumulation of human resources to promote the development of traditional services industry.
- (4) The modern service industry provides advanced management concepts to the traditional service industry.



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