

# Effects of Financing on the Investment of Dutch SMEs during the Financial Crisis

Siraj Zubair

Department of Business Administration, University of Twente  
The Netherlands. E-mail: s.m.zubair@utwente.nl

## Abstract

In this study, I investigate how the availability of internal finance and external finance affected investments of Dutch SMEs during the recent financial crisis. It is hypothesized and documented that investments of SMEs significantly declined during the financial crisis. It is also hypothesized that during the financial crisis internal finance (cash flows) and external finance (bank debt) would affect investments positively and investment is more determined by internal finance than external finance. However, this study claims investment of SMEs is more determined by bank finance rather cash flows.

## Introduction

In recent years, an intense discussion is attracting researchers' attention which edifies the interaction between the availability of finance and firms' investment (Guarigila, 2008). A significant stand of empirical studies explore the relationship between financing and investment behavior of firms. These studies suggest the following findings: (1) financial constraints play a significant role in shaping the investment of firms; (2) investment is lumpy and the period of low investment is followed by large investment spikes; (3) small firms face more financing constraints than large and listed firms; and (4) small firms grow faster compared to their large counterparts. In the literature of Small and Medium-sized Enterprises (SME), scholars claim that investments of SMEs are restricted due to the difficulties in attaining external finance compared to large and listed firms because of market imperfections (e.g. adverse selection, moral hazards and agency problems) and high transaction costs (Berger and Udell, 1998; Beck et al., 2008). Private SMEs might be more affected by external financial constraints when a financial crisis is underway. This study investigates the effect of external finance and internal financial constraints on the investments of private Dutch SMEs during the recent (2007-2010) global financial crisis.

At the end of 2007, the world has seen one of the severe financial crises in the history since the 'Great Depression'. From an academic point-of-view the recent financial crisis is an interesting enigma which inspired research in many fields of finance and economics. In response to this crisis, a significant number of researches have been undertaken by exploring the causes of the crisis, the impact and consequence of the financial crisis, but however studies aimed at the effects of financing on investment during the financial crisis is limited and mostly based on publicly listed firms (Akbar et al., 2013). Nonetheless, studies aimed at investigating the effects of financing on the SMEs during the financial crisis are very limited. To our best knowledge, only two studies (i.e. Vermoesen et al., (2012) and Akbar et al., 2013) studied this phenomenon. Vermoesen et al., 2012 investigate the financing effects on Belgian SMEs and the effect of debt maturity during the financial crisis and is the first of its kind dealing with the effect of SME financing due to the financial crisis. Akbar et al., (2013) investigate UK private SMEs to find out the effect of financial crisis on investment. Taking

from there, this study aims to investigate the effect of financing on the investment of Dutch SMEs during the financial crisis to shed more light on this research area and further extend the knowledge-base. This study differs principally from the above mentioned studies by investigating the effects of internal finance and external finance on the investment of Dutch SMEs during financial crisis and not focused on debt maturity or focused on a market based financial based system.

It is worth to mention that, like the SMEs in other economies, Dutch SMEs are the growth drivers of their economy. During the financial crisis, SMEs in the Netherlands were knocked harder than large business (SBA fact sheet, 2010<sup>1</sup>). In the Netherlands the most common sources of external finance for the firms are bank loans, supplier credit and leasing (EIM, 2010)<sup>2</sup>. Over the past years, Dutch banks have continuously announced tightening credit conditions (Masselink and Noord, 2009). When bank finance is a significant source of finance for SMEs, a reduction in the availability of bank finance usually would have a significant impact on SMEs' planned investment and consequently growth. Furthermore, facing a difficult time in acquiring bank finance during financial crisis, Dutch SMEs would have been affected negatively in terms of investment. However, no previous academic studies have shed any light on this area of research.

This study is notable for various reasons. Firstly, this study would be one of the first studies which investigate the effect of financing on the investments of private SMEs during the 2007-2009 financial crises. Secondly, studying SME financing and investment during a financial crisis is interesting because the financing pattern of privately held SMEs differs from the large listed firms (Beck et al., 2008) and an exogenous credit supply shock may affect SMEs and large firms in different ways (Vermoesen et al., 2012). Thirdly, studying SMEs in the Netherlands allows using a unique dataset of private Dutch SMEs, which permits studying a creditor-oriented financial system rather than a market-oriented financial system such as in the USA or UK and therefore it will give us more insights in terms of the firm dynamics of such financial system.

### **Literature review**

Most economists link high rate of investment to long run growth. Fluctuations in investment can be responsible for the fluctuation in production and thus revenue of the firms. Most of the investment studies during the last three decades grounds on the simple investment models in which the assumptions are based on the perfect market conditions and information asymmetry. These studies gave birth of a new direction in the realm of finance-investment nexus which depicts the relationship between investment and financial constraints of firms. The study of Fazzari et al., (1988) is one of the first studies in this realm, which empirically tests the effect of financial constraints and market imperfections on investment. This study assumes that, an increase in asymmetric information might cause an increase in the cost of external finance (e.g. issuing new debt or new equity). This incidence creates a cost advantage for the firm as the cost of acquiring external finance is significantly higher compared to internal finance. This cost advantage bestows a firm the incentive to use internal finance for investment. When internal finance is not sufficient, a firm needs to use externally generated finance in order to continue its investment. Hence, the investment of a firm substantially depends on its internally generated finance (more precisely on its cash flows and earnings). Various studies support these findings (for more information please see, Hubbard, (1998).

Kaplan and Zingales, (1997) dispute the reliability of the findings in Fazzari et al., (1988). They claimed that, high sensitivity of investment to cash flow cannot be treated as an

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<sup>1</sup> [http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2010-2011/netherlands\\_en.pdf](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2010-2011/netherlands_en.pdf)

<sup>2</sup> <https://zoek.officielebekendmakingen.nl/blg-72052.pdf>

evidence of the financial constraints. With this conflicting view with Fazzari et al., (1988), Kaplan and Zingales, (1997) specify the possibility of a non-monotonic relationship between investment cash flow sensitivity and the degree of financing constraints. Cleary (1999) extends Kaplan and Zingales's (1997) classification approach and supports the findings of Kaplan and Zingales (1997). However, Moyen (2004) supports both of the previously mentioned views (i.e. Fazzari et al., 1988 and Kaplan and Zingales, 1997).

Even though the empirical findings of Fazzari et al., (1988) and Kaplan and Zingales (1997) are different but both studies suggest that investment is decreasing in financing constraints. In a conflicting view, Cleary et al., (2007) introduces a new notion that the relationship between investment and internal finance is non-monotonic and U-shaped. They show that, the investment cash flow sensitivity by analyzing the interactions between the cost and a revenue effect (for more information please see; Povel and Raith, 2001). On one hand, the cost effect is apparent when firms need to finance a higher level of investment. Higher level of investment generally associated with higher borrowing, higher repayment cost and higher risk of default when internal finance is not sufficient to cover the investment expenditure. This incidence suggests a positive relationship between internal finance and investment.

On the other hand, a revenue effect takes place when a higher level of investment generates higher revenue, which lowers the firm's default risk. Contrary to the cost effect model, the revenue effect model suggests a negative relationship between internal finance and investment (i.e. a decrease in internal finance leads to higher investment as higher investment improves the firm's ability to repay its debt, avoiding bankruptcy, and increases the lender's payoff in case of default). As both the cost and revenue effects exists in the economy and since these two effects lead to different predictions about the sensitivity of investment to internal finance, the exact relationship contingent on the dominant presence of one of the effects (Guariglia, 2008). If the cost effect dominates, then a positive relationship between investment and internal finance can be detected. But if the revenue effect dominates, a negative relationship between investment and internal finance can be identified.

### **Hypotheses development**

In an efficient capital market, finances flow efficiently to firms with profitable investment opportunities. As a consequence, firms with the same investment opportunities can undertake the same number of investment projects and on average will grow at the same rate (Kashara, 2008). However, due to market imperfections the investments of firms could be constrained by financing sources (Fazzari et al., 1988). The investment is expected to be lower of a firm which is more financially constrained then others because usually the firm which is financially constrained would less likely to invest more.

Fluctuation in the supply of external finance may play an important role in determining investment decisions. During a financial crisis the supply of bank finances become dry. Hence, bank credit supply shocks would affect the SMEs because these firms have limited access to alternative sources of finance (Bae et al., 2002). Therefore, when a financial crisis is underway, SMEs would face bank financing constraints. Alternatively during the financial crisis, the flow of internal finance also decreases because the flow of internal finance is expected to be extremely cyclical, and revenue falls during the period of recessions (Carpenter et al., 1994). A small fluctuation in revenue cause large proportionate changes in profits and thus internal finance (Carpenter et al., 1994). So it can be argued that, during the financial crisis SMEs have lower internal finance.

If the market is perfect, a shock to one source of finance has limited impact on firms as they can easily access substitute sources. However, firms which have restricted access to

capital markets are accumulating less or no finance because of the market imperfections would invest less. The later scenario is more profound for private SMEs as they are collaterally poor, highly levered, young, and not profitable, don't have good track records and mostly suffer with market imperfections. With both of these two effects (effect of financial crisis and being financially constrained) it is expected that, SMEs would invest less compared to the normal state of the economy, which leads us to hypothesis 1:

*'Investment of Dutch SMEs declined following the onset of the financial crisis.'*

It is well argued in the finance literature that, a firm should use internal finance over external finance because of market imperfections and transaction cost. If the internal finance is not sufficient to meet the investment expenditure, access to external finance might be indispensable to encourage the firm's planned investment. As a consequence, external financial constraints would play an important role in determining investment choices of firms.

Dutch SMEs are mostly dependent on bank for external finance. As a result, a small fluctuation in the supply of bank finance tends to have a varied effect on the investment of small, collaterally poor and highly leveraged firms (Holmstrom and Triole, 1997; Hancock and Wilcox, 1998). The effect of bank financing constraints would be profound on SMEs as these firms lack access to other alternative sources of finance (Bae et al., 2002). It can be argued that a firm would only use debt finance when it necessarily needs because debt finance is not a substitute to internally generated finance and acquiring debt finance would be difficult and costly. If external finance is not available for investment, firms will turn to internal finance for investment. However, during a financial crisis internally generated finance becomes a distinct source of finance for investment for SMEs as the external sources of finances for SMEs are dried up or becomes more difficult to obtain than the normal economic state. When external finance is costly or rationed, an additional dollar of internal finance permits an additional dollar of investment for firms (Carpenter et al., 1994). In line with the investment desire, during a financial crisis investment of SMEs would be highly dependent on internally generated finance rather on external finance. It is expected that, the effect of internal finance on the investment of Dutch SMEs are positive and more significant than the effect of external financing on investment. This leads us to hypothesis 2:

*'Investment of SMEs during financial crisis is more determined by internal finance than external financing.'*

## **Research methodology**

### **Sample and data collection**

The data used in this study are extracted from the REACH<sup>3</sup> database for the years 2004–2012. REACH contains detailed financial information of private and publicly incorporated businesses in the Netherlands. Since our objective is to investigate the effects of financing on the investment of Dutch Private SMEs during the period of financial crisis, only data from Dutch private SMEs are collected. The period 2004–2007 is considered as the pre-financial crisis period. To select the SMEs, we follow the definition of European commission<sup>4</sup>. It classifies firms into small category when it has between 10–49 employees and 2–10 million turnover or total assets and medium category when it has between 50–250 employees with maximum 50 million turnover or 43 million total assets.

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<sup>3</sup> Bureau Van Dijk

<sup>4</sup> <http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/> (last accessed on August, 2013)

Firms included in the sample are those which are alive or active during the sample period. Consistent with previous studies, firms that are operating in the financial sector are excluded from the analysis. Besides, non-profit firms and governmental enterprises are also excluded as Smith (1987) argued that, managers of these organizations may be influenced by government regulations and may have less discretion concerning investments and profits.

Following these sampling criteria, those SMEs for which the number of employees, total assets and turnover data are available in any of the sample year were selected. Companies with consolidated account are selected. The consolidated account are selected because they are considered to be the most suitable format for providing information about the financial situation of the parent company since the true financial boundaries of firms are at group level and not at individual plants. After applying all these filters, the final sample thus includes a total of 1115 unique firms. These are categorized under a few industries using one digit US SIC codes (see Table 1). Extreme values are eliminated to avoid multicollinearity.

Table 1: Industry classification based one digit US SIC code

Sic codes	Industry	No. of firms	% of firms
0,1	Agriculture, forestry, fishing, mining and construction	82	7,4
2,3	Light and heavy manufacturing	214	19,2
4	Transportation, communication, electric, gas etc.	431	38,7
5	Wholesale/retail trade	66	5,9
7	Services	322	28,9
	Total	1115	100

### Empirical Strategy

The main aim of this research is to investigate the effect of financing on SME investment during the recent financial crisis. In line with the objective this study, the following OLS regression model is used:

$$Y_{it} = \alpha_1 + \beta_1 X_{it} + \beta_2 Z_{it} + \beta_3 \text{Crisis} + \beta_4 (\text{Crisis} * \sum X_{it}) + \mu_{it} \quad \dots\dots \quad (1)$$

Equation (1) is the benchmark model for this study, Where,  $Y_{it}$  is the measure of the dependent variable,  $X_{it}$  is the set of main explanatory variables,  $Z_{it}$  is the set of firm specific characteristics of control variables.  $\beta_1$ ,  $\beta_2$  and  $\beta_3$  are the differential slope coefficient and indicate how much the slope coefficient of the explanatory variables influence dependent variable.  $\beta_3$  is the slope coefficient indicates how much the slope coefficient is differing from of the crisis period (2008-2012) than that of the pre-crisis period (2004-2007). Crisis is a dummy variable equal to '1' for the period 2008-2012 and 0 to indicate the non-crisis period. The interactive term  $\beta_4$  represent the change in terms of financing in response relative to the pre- crisis period.  $\mu_{it}$  is the error term in the regression.

In previous empirical studies, the sources of heterogeneity of firm specific factors have been used as control variables. Sources of heterogeneity (e.g. the size of the firm, age of the firm, leverage, growth opportunity) are used for the measure of control variables as suggested by various empirical studies.

Firstly, in order to investigate the component of SME investment and the effect of the financial crisis, the investment is used as dependent variables in the model (1). Thus the model (2) is as depicted as follow;

$$INV_{it} = \alpha_1 + \beta_1 Z_{it} + \beta_3 \text{Crisis} + \mu_{it} \dots\dots\dots (2)$$

Secondly, to find out the effect of internal finance and external finance on investment, the model (1) is extended by incorporating investment as dependent variables, which will be regressed against internal finance and bank financing, firm level control variables and crisis dummy as highlighted below:

$$INV_{it} = \alpha_1 + \beta_1 CF_{it} + \beta_2 LTBD_{it} + \beta_3 STBD_{it} + \beta_4 TBD_{it} + \beta_5 \text{Size} + \beta_6 \text{age} + \beta_7 GO_{it} + \beta_8 \text{crisis} + \beta_9 (\text{Crisis} * CF_{it}) + \beta_{10} (\text{Crisis} * LTBD_{it}) + \beta_{11} (\text{Crisis} * STBD_{it}) + \beta_{12} (\text{Crisis} * TBD_{it}) + \mu_{it} \dots\dots\dots (3)$$

The main coefficient of interest is  $\beta_9$ ,  $\beta_{10}$ , and  $\beta_{11}$ . A positive relationship is expected between investment levels, internal finance ( $CF_{it}$ ) and bank finance ( $LTBD_{it}$  and  $STBD_{it}$ ) But  $\beta_9$  is expected to be more significant than  $\beta_{10}$  and  $\beta_{11}$ . All the variables used in this study are defined in Table 2.

Table 2: Variable descriptions

Variable	Descriptions
INV	Change in tangible fixed assets plus depreciation over total tangible fixed assets
STBD	Short term bank debt over total assets
LTBD	Long term bank debt over total assets
TBD	Total bank debt (i.e. STBD+LTBD) over total assets
Lev	Total debt over total assets
CF	Operating income plus depreciation over total assets
GO	Growth opportunity (change in total sales)
Size	Natural logarithm of total assets
Age	Number of years since incorporation

**Descriptive statistics:**

Table 3 presents summary statistics. The average yearly investment is 17.7% of the total tangible fixed asset. The table highlights that the amount of bank debt (sum of short term bank debt and long term bank debt over total asset ratio) and leverage (total debt to total assets ratio) of the sample firms which is quite high and this implies that the capital structure of private SMEs includes more debt than equity. The high debt ratios of these firms could be due to the fact that these firms cannot access to the public markets. As a result, these firms rely heavily on debt financing. Table 3 further highlights that long term bank debt as a fraction of total assets is significantly lower than short term bank debt as a proportion of total assets. This suggests that Dutch private SMEs rely more on short term bank debt. Taken together, short term bank debt and long term bank debt constitute 60% of the sample of Dutch SMEs.

Table 3: Descriptive statistics

Variable	Obs	Mean	Median	SD	Min	Max
INV	2890	.177	.101	.409	-1	1
STBD	2904	.472	.449	.219	0	1
LTBD	1956	.209	.166	.185	0	1
TBD	2904	.603	.608	.224	0	1
LEV	2905	.637	.647	.218	-.509	1
GO	2184	-.018	.018	.271	-1	1
CF	2906	1.895	1.691	.989	.347	5.84
Size	2906	15,944	13,712	9,487	2,013	42,959
Age	1115	28	21	23.439	2	212

All variables are defined in table 2

In table 4, Pearson correlation coefficients between the variables are estimated. The results show that firms which invest more tend to use bank debt then cash flows. Short term bank debt negatively correlated to long term bank debt and size. Long term bank debt is negatively correlated cash flow and size.

Table 4: Correlation table

Variable	1	2	3	4	5	6	7	8	9
INV	1								
STBD	0,065*	1							
LTBD	0,076*	-0,216*	1						
TBD	0,106*	0,730*	0,511*	1					
LEV	0,021	0,012	-0,022	-0,002	1				
Size	-0,033	-0,254*	0,037	-0,134*	-0,037	1			
GO	0,185*	-0,005	-0,037	0,002	0,073*	-0,022	1		
CF	0,042*	0,380*	-0,245*	0,184*	0,011	-0,538*	0,074*	1	
Age	-0,168*	0,144*	-0,142*	-0,213*	-0,086*	0,104*	-0,067*	-0,040*	1

This table shows Pearson correlations coefficient. All variables are defined as before. \* significance at 5% level

## Results

Tables 5 and 6 present the regression results of the relation between investment and financing of Dutch SMEs during 2004-2012. In all regressions, the dependent variable is the level of tangible fixed assets scaled to total tangible fixed assets. First, we investigate whether the SMEs in the sample reduced their investments during the financial crisis period (2008-20012). Models (1) and (2) show that, investment has decreased over the crisis period. Age and growth opportunity are found to be statistically significant. Next, we investigate whether the investments of SMEs during financial crisis were dependent on internal finance, short-term bank finance, long term bank finance and total bank finance. We ran separate regression on these variables. The main objective of examining the financing sources individually may signify the exact crisis sock among the financing sources. Models (3), (4), (5) and (6) show that the effect of cash flows, short term bank debt, long term bank debt and total bank debt on investment is not statistically significant, where all these financing sources are positively related to investment. Besides, the effect of financial crisis is found to be negative as expected and statistically significant in all the six models. This result proves the claims in hypothesis 1.

Table 6 reports the models to test hypothesis 2. In model (9), crisis dummy with short term bank debt, long term bank debt found to be positive, and total bank debt found to be negative and is statistically significant. However, the interaction term of cash flow with crisis dummy is not significant. Surprisingly, the interaction term of short term bank debt with crisis dummy shows that the investment of SMEs is mainly driven by short term bank debt. The overall results suggest that the financial crisis has adversely affected the investment of private firms which may have long term effect of these firms. The findings are in line with previous studies (Dutchin et al., 2010; Vermoessen et al., 2012; Akbar et al., 2013). Our results add to this stand of research and provide evidence from the perspective of Dutch SMEs. Results from the estimations suggest that the Dutch SMEs cut back their investment in tangible assets in response to the financial crisis.

**Table 5: Effect of financing on investment during financial crisis**

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Crisis dummy	-0.055*	-0.085***	-0.054*	-0.083***	-0.099***	-0.081***
	(-2.08)	(-5.13)	(-1.99)	(-4.90)	(-5.45)	(-4.81)
CF			0.007			
			(0.38)			
STBD				0.046		
				(1.01)		
LTBD					0.034	
					(0.55)	
TBD						0.071
						(1.69)
Size	0.021	0.011	0.028	0.015	0.027	0.014
	(1.05)	(0.93)	(1.11)	(1.19)	(1.85)	(1.15)
Age	-0.052**	-0.052***	-0.057**	-0.05***	-0.058***	-0.048***
	(-2.67)	(-4.30)	(-2.62)	(-4.12)	(-4.17)	(-3.85)
Lev	-0.029		-0.028			
	(-0.49)		(-0.49)			
GO	0.266***	0.220***	0.265***	0.221***	0.245***	0.221***
	(4.15)	(5.20)	(4.12)	(5.21)	(4.86)	(5.21)
Industry effect	yes	yes	yes	yes	yes	yes
Intercept	0.122	0.203	0.047	0.138	0.061	0.117
	(0.57)	(1.59)	(0.16)	(0.97)	(0.40)	(0.85)
R-squared	0.064	0.066	0.065	0.066	0.094	0.067
Number of observations	838	1995	838	1994	1344	1994
F-statistics	5.19	14.25	4.82	12.89	13.83	13.14
Prob(F-statistics)	0.000	0.000	0.000	0.000	0.000	0.000

t statistics in parentheses

\* p<0.05, \*\*p<0.01, \*\*\* p<0.001

## Conclusion

The results suggest that the financial crisis has induced a negative credit supply shock which adversely affected the investment of private SMEs in the Netherlands. The results further highlight that the financial crisis has weakened the supply of short term bank financing and long term bank financing to Dutch SMEs. Overall, the results suggest that investment of private Dutch SMEs are vulnerable to variations in the supply of bank credit which may have long-term implications for the survival and growth of these firms, which in turn might have a negative effect in the economy. Our findings confirm that the supply of credit affects corporate behavior of privately held SMEs. The results signify that a financial crisis may restrict the SMEs ability to finance investment while this may not be a matter of concern in normal state of economy.

## Reference

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Table 6: Effect of financing on investment during financial crisis  
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Variable	Model 7	Model 8	Model 9	Model 10	Model 11
Crisis dummy	-0.0976*** (-5.27)	-0.194** (-2.75)	-0.043 (-0.62)	-0.101 (-1.66)	-0.194** (-2.75)
CF		-0.001 (-0.05)	0.004 (0.15)	-0.006 (-0.33)	-0.001 (-0.05)
STBD	-0.061 (-0.29)	-0.046 (-0.53)	-0.873** (-2.93)		-0.046 (-0.53)
LTBD	-0.051 (-0.26)	0.063 (0.64)	-0.661* (-2.42)		0.063 (0.64)
TBD	0.126 (0.58)		0.980** (3.01)	0.093 (1.33)	
CF*crisis dummy		0.023 (0.75)	0.021 (0.68)	0.025 (1.19)	0.022 (0.75)
STBD*crisis dummy		0.131 (1.13)	1.260** (3.23)		0.131 (1.13)
LTBD*crisis dummy		-0.018 (-0.14)	0.991** (2.76)		-0.018 (-0.14)
TBD*crisis dummy			-1.347** (-3.26)	-0.045 (-0.52)	
Size	0.030* (1.98)	0.039* (2.30)	0.0376* (2.24)	0.022 (1.45)	0.038* (2.30)
Age	-0.056*** (-4.00)	-0.056*** (-3.96)	-0.054*** (-3.84)	-0.047*** (-3.85)	-0.056*** (-3.96)
GO	0.246*** (4.89)	0.242*** (4.77)	0.237*** (4.62)	0.218*** (5.12)	0.242*** (4.77)
Industry effect	yes	yes	yes	yes	yes
Intercept	-0.007 (-0.04)	-0.040 (-0.20)	-0.151 (-0.77)	0.043 (0.24)	-0.040 (-0.20)
R-squared	0.095	0.099	0.113	0.069	0.099
Number of observations	1344	1344	1344	1994	1344
F-statistics	11.49	10.08	9.61	10.16	10.08
Prob(F-statistics)	0.000	0.000	0.000	0.000	0.000

t statistics in parentheses

\* p<0.05, \*\*p<0.01, \*\*\* p<0.001

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