

THE INVESTMENT DETERMINANTS FOR UNITED KINGDOM COMPANIES

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Abstract

The objective of this research is to determine some factors that affect the investment in United Kingdom companies. For investment, the capital expenditure was used as proxy. For a sample of 2865 companies from London during 2005-2013, the determinants of investment were obtained using some regression models. The following groups of explanatory variables were identified: 1) sales, book to market ratio, cash flow, leverage and cash to asset, 2) sales and book to market ratio, 3) sales, 4) leverage. The investment depended on sales and book to market ratio during the crisis (2008-2013). In this period, sales and market to book have a positive impact on investment changes while during 2005-2013 only book to market had a positive impact on investment.

Keywords: investment, capital expenditure, book to market ratio, sales

JEL Classification: G11, C51, C53

REL Classification: 11D, 10B, 10G

Rezumat

Obiectivul cercetării este de a determina factorii care influențează investițiile în companiile din Anglia. Pentru investiții, s-au folosit cheltuielile de capital ca variabilă proxy. Pentru un eșantion de 2865 firme londoneze în perioada 2005-2013, determinanții investițiilor au fost obținuți folosind modele de regresie, rezultând următoarele grupuri de variabile explicative: 1) vânzări, book to market ratio (raportul dintre valoarea de piață și valoarea contabilă), fluxul de numerar, efectul de levier și numerar activ; 2) vânzări și book to market ratio; 3) vânzări; 4) efectul de levier. Investițiile au depins în perioada crizei (2008-2013) de vânzări și rezerva de piață. În această perioadă, vânzările și raportul dintre valoarea de contabilă și valoarea de piață au avut un impact pozitiv asupra investițiilor, în timp ce în perioada 2005-2013 doar variabila book to market ratio a influențat pozitiv investițiile.

Cuvinte-cheie: investiții, cheltuieli de capital, book to market, vânzări

Cod JEL: G11, C51, C53

Cod REL: 11D, 10B, 10G

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1. Introduction

Corporate finance theory mostly relies on the assumption that market is imperfect. According to Modigliani and Miller (1958), if the market is perfect and there is no tax, then the cost difference will disappear. Imperfect market and information asymmetry raises the cost of external finance because of underdeveloped financial and legal system (Islam R., 2006, pp. 45-67). As most of the time capital market is imperfect firms could face financial constraint in case of their investment and limited access to finance force them to depend on their internal cash flow. With an improvement in the financial market and better allocation of easier access to external fund would help to enhance the investment scenario and growth prospect. Fazzari, Hubbard and Peterson, Henceforth (1988), Gilchrist and Himmelberg (1995) and Hubbard (1998) studies suggest that small firms have more limited access to external finance than large business firms. A higher investment - cash flow sensitivity has been traditionally taken as evidence of more severe financing constraints (Fazzari, Hubbard and Peterson, 1998, pp. 141-206).

However, on the other hand, Kaplan and Zingales (1997) challenged the findings of FHP (1988) and found the opposite that less financially constrained firms had higher investment cash flow sensitivity. Allayannis and Mozumdar (2004) have exhibited that the empirical results in KZ (1997) are mainly caused by financially distressed firms. It is generally thought that asymmetric information between insiders and outsiders about the firm's growth opportunities may drive a wedge between the cost of internal and external financing; hence, for firms lacking sufficient internal funds to finance investment, expenditures are adversely affected (Myers, 1977; Myers and Majluf, 1984). So, higher is the firm's internal wealth, smaller is the impact of external finance on investment. Iona, Leonida and Ozkan (2006) conducted a research and found that the Degree of Financial Constraints (DFC) is a factor to the Investment Cash Flow Sensitivity; however, it is not the only factor affecting this. To recognize the true, extent of a firm's Financial Constraint is very difficult due to the firm's incentive not to reveal such information which may have serious consequences to the firm value, and this is important which leads to having a joint hypothesis. In this writing, I want to find out the relationship between investment and other variables related to financial constraints and microeconomic aspects. I intend to use a large sample from 2005 to 2013 and then a subsample corresponding to crisis period (2008-2013) to figure out the crisis consequences on the relationship between investment and other variables.

2. Methodology

The sensitivity to cash flows of a firm's investment is one of the major unresolved problem of the corporate finance. The sensitivity might be generated by a firm's financing constraints (fact which show the existence of imperfections in the capital markets), by problems of the agency, or by the non-problematic factors. Previous papers did not succeed in disentangling the causal relationships because the variables like cash flows, company's financing constraints and investment are endogenous.

The modifications in economic and business conditions place constraints on managers and small-business owners. The globalization implies that the economic problems of a certain region or country can spread quickly to the other world regions. A recent example is the recession that started in 2008 in the United States and that affected the businesses everywhere. The successful firms plan for these constraints and immediately

learnt how to adapt fast to these changes. The financial constraints refer to high interest rate, inflation and to inadequate access to the venture capital. In order to solve the adverse changes in the financial conditions the small businesses have to construct contingencies into their cash flow budgets. The startups must not rely on venture capital funding for the business plans or bank loans, especially not in the first few months. The Inflation could determine labor costs and increased raw material, these aspects affecting the profitability. The high interest rates suppose higher interest payments, fact that affect the company's ability to pay its dividends or its plans for growth.

I want to find out the true answer first hand, whether Investment is affected by some economic variables determined by firms financial constraints or by firm size. Some regression models will be estimated for two periods 2005-2013 and 2008-2013. The variables' values are registered for more than 2000 firms from United Kingdom. Actually, I will work with panel data and I will define a Pool object which is characteristic to this type of data. I will check more types of models (cross-section model, fixed-effect model, random-effect model) and in the end I will select the best type of model for my data. The panel data approach solves the problem of a low set of data. The data existence in both the time and cross sectional dimensions, there are new challenges regarding the inference opportunities and the estimation process. In general, we expect to have heteroscedasticity across the cross sections and the autocorrelation problem over time. The observations availability over time allows the estimation of error covariances across the cross sections. Therefore the spatial autocorrelation be encountered. Eviews solves these problems and it has options for estimation with pooled data. The pool object includes these data with two dimensions: spatial and temporal dimension.

Chen (2015) started from a standard investment model:

$$\left(\frac{I}{K}\right)_{it} = \beta_1 x Q_{it} + \beta_2 x \left(\frac{CF}{K}\right)_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where i - firm and t - time, I - investment, k - firm's capital stock, as commonly, proxied by the firms total assets, Q - Tobin's Q , CF - cash flow, β_1, β_2 – parameters, μ_i - individual effect and λ_t - year fixed effects and ε_{it} -white noise disturbance term.

However, I am conditioned by my data base to use other variables in my model. My dependent variable is represented by capital expenditure which is a proxy for investment (INV). The regressors are: book to market- BTM, cashflow- CASHFLOW, cash to asset- CASH-TO-ASSET, leverage-LEVERAGE and sales- SALES.

In finance, the investment supposes creating or buying an asset and you expect the capital appreciation, profit or dividends, rents, interest earnings or these returns combination. Almost all types of investment supposes a form of risk like investment in property, equities, and even fixed interest securities that are also affected by inflation risk. The project investors have to identify and solve these risks regarding their investment. The proxy for investment in this paper is capital expenditure.

Capital expenditures are those expenditures that alter the business future. The capital expenditure is incurred at the moment when the business spends money but not in order to add value to a fixed asset or to buy other fixed assets.

Cash Flow supposes that the money moves into or out of a project, business, or financial product. Cash flow is calculated as (income before taxes + depreciation) / total asset.

Market to book is the ratio used to determine a company's value by making the comparison of the book value with the market value. The book value is determined by considering the company's historical cost, or its accounting value. The market value is computed in the stock market by the market capitalization.

The leverage is a method used to multiply the gains and losses. Usually, it implies buying more of an asset by using the borrowed funds, considering that an asset income or asset price appreciation will be higher compared to the borrowing cost. In most cases it implies the risk that borrowing costs will be higher compared to the asset income or the asset value will fall, generating incurred losses.

A sale represents a commodity exchange for a service or money in return for money or it means the fact of selling something.

3. The Investment in UK companies

The data used refers to 2865 firms from the United Kingdom from a period of 2005 to 2013 and from a period of 2008 to 2013. The data sources are the Datastream, Bloomberg and Wharton Research Data Service.

The description of the data series for the following variables is made: capital expenditure- a proxy for investment- INV , book to market- BTM, cash-flow- CASHFLOW, cash to asset- CASHTOASSET, leverage- LEVERAGE and sales- SALES.

Table 1. Descriptive statistics

	INV	BTM	CASHFLOW	CASHTOASSET	LEVERAGE	SALES
Mean	0.060094	0.779304	0.167217	0.032063	0.388093	418483.3
Median	0.062492	0.787005	0.172555	0.035155	0.371371	420350.0
Maximum	0.069660	0.899516	0.187196	0.043735	0.522673	461700.0
Minimum	0.046969	0.631946	0.128661	0.012729	0.304520	377200.0
Std. Dev.	0.008581	0.086443	0.020737	0.011013	0.080247	27203.94
Skewness	-0.360632	-0.334173	-0.761562	-0.618387	0.457421	0.036320
Kurtosis	1.503623	2.095268	2.291855	1.989191	1.752934	2.045681
Jarque-Bera	1976.396	906.2191	2020.812	1827.399	1713.347	656.0857
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	1033.011	13396.23	2874.465	551.1626	6671.313	7.19E+09
Sum Sq. Dev.	1.265744	128.4416	7.391640	2.084790	110.6900	1.27E+13
Observations	17190	17190	17190	17190	17190	17190
Cross sections	2865	2865	2865	2865	2865	2865

Source: author's calculations

The median and the mean have very close values for all the variables. Excepting leverage and sales, the data series for the other variables are negatively skewed. Moreover,

all the distributions are platykurtic. All the data sets do not follow a normal distribution, according to Jarque-Bera test, even if we have a large number of observations.

Simple and multiple regressions are run to explain the investment. However, the problem of multicollinearity is checked for explanatory variables and the matrix of correlation shows that there are not significant correlations between these variables.

Table 2.Matrix of correlation for explanatory variables

C	SALES	BTM	CASHFLOW	LEVERAGE	CASHTOASS ET
2.16E-23	5.22E-29	-2.87E-23	-1.82E-22	-2.74E-23	6.25E-22
5.22E-29	5.50E-34	-2.20E-28	-1.19E-27	-1.67E-28	4.76E-27
-2.87E-23	-2.20E-28	9.28E-23	5.03E-22	7.14E-23	-1.98E-21
-1.82E-22	-1.19E-27	5.03E-22	2.89E-21	4.10E-22	-1.10E-20
-2.74E-23	-1.67E-28	7.14E-23	4.10E-22	5.90E-23	-1.56E-21
6.25E-22	4.76E-27	-1.98E-21	-1.10E-20	-1.56E-21	4.31E-20

Source: author's calculations

The dependent variable is represented by investment, for which capital expenditure is used as proxy. The independent variables are: book to market, cash flow, cash to asset, leverage and sales which are proxy for firm dimension.

First of all, the stationary character is checked using unit root tests. According to Levin-Lin-Chu test, there are not common unit roots for all variables.

Table 3. Unit root tests

INV, BTM, CASHFLOW, CASHTOASSET			Cross-	
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t^*	-2.37942	0.0087	4	27
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.51646	0.3028	4	27
ADF - Fisher Chi-square	11.6036	0.1698	4	27
PP - Fisher Chi-square	4.19191	0.8394	4	29
** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.				
INV, LEVERAGE, SALES			Cross-	
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t^*	-2.35198	0.0093	3	20
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.03119	0.4876	3	20

ADF - Fisher Chi-square	6.32118	0.3882	3	20
PP - Fisher Chi-square	2.90013	0.8213	3	21
** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.				

Source: author's calculations

More regressions were run, but only some of them were valid. From the first output of EViews, the following conclusions can be drawn:

- There is a positive correlation between investment and sales, respectively cash to asset;
- There is a negative correlation between investment and book to market, leverage respectively cash flow;

99% of the variation in investment is explained by the exogenous variables. In the case of 5 explanatory variables and for a very large set of data the critical values of Durbin-Watson are around 1.9. DW statistic is quite far from 2, so we suspect the errors serial correlation.

Table 4. The investment depending on sales, market to book, cash flow, leverage and cash to asset

Dependent Variable: INV				
Method: Pooled Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.107818	4.64E-12	2.32E+10	0.0000
SALES	7.16E-07	2.35E-17	3.05E+10	0.0000
BTM	-0.186453	9.64E-12	-1.94E+10	0.0000
CASHFLOW	-1.976611	5.38E-11	-3.68E+10	0.0000
LEVERAGE	-0.225506	7.68E-12	-2.93E+10	0.0000
CASHTOASSET	6.730380	2.08E-10	3.24E+10	0.0000
R-squared	0.990000	Mean dependent var		0.060094
Adjusted R-squared	0.990000	S.D. dependent var		0.008581
S.E. of regression	7.79E-12	Akaike info criterion		-48.31869
Sum squared resid	1.04E-18	Schwarz criterion		-48.31598
Log likelihood	415305.1	Hannan-Quinn criter.		-48.31780
F-statistic	4.17E+21	Durbin-Watson stat		3.433701
Prob(F-statistic)	0.000000			

Source: author's calculations

The coefficients of the regression that links investment by book to market and sales are statistically significant for a level of significance of 5%. The DW statistic for the next regression is almost 2 and the errors are not serial correlated. There is a positive correlation between book to market and investment and a negative and low one between investment and sales. This indirect correlation between sales and investment, contrary to

economic theory might be explained by the economic crisis started in 2008/2009. 68.93% of the variation in investment is explained by book to market and sales.

Table 5. The investment depending on sales and market to book

Dependent Variable: INV				
Method: Pooled Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.015521	0.001042	14.89320	0.0000
SALES	-3.38E-08	1.73E-09	-19.56733	0.0000
BTM	0.075324	0.000543	138.7323	0.0000
R-squared	0.689379	Mean dependent var		0.060094
Adjusted R-squared	0.689343	S.D. dependent var		0.008581
S.E. of regression	0.004783	Akaike info criterion		-7.847380
Sum squared resid	0.393166	Schwarz criterion		-7.846027
Log likelihood	67451.23	Hannan-Quinn criter.		-7.846934
F-statistic	19072.08	Durbin-Watson stat		1.927476
Prob(F-statistic)	0.000000			

Source: author's calculations

The coefficients of the regression between investment and cash flow are statistically significant for a level of significance of 5%. The DW statistic for the next regression is almost 2 and the errors are not serial correlated. There is a positive correlation between cash flow and investment. Only 10.69% of the variation in investment is explained by cash flow.

Table 6. The investment depending on cash flow

Dependent Variable: INV				
Method: Pooled Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.037477	0.000503	74.56182	0.0000
CASHFLOW	0.135251	0.002983	45.34014	0.0000
R-squared	0.106826	Mean dependent var		0.060094
Adjusted R-squared	0.106774	S.D. dependent var		0.008581
S.E. of regression	0.008110	Akaike info criterion		-6.791287
Sum squared resid	1.130529	Schwarz criterion		-6.790385
Log likelihood	58373.12	Hannan-Quinn criter.		-6.790990
F-statistic	2055.728	Durbin-Watson stat		2.123003
Prob(F-statistic)	0.000000			

Source: author's calculations

The coefficients of the regression between investment and leverage are statistically significant for a level of significance of 5%. The DW statistic for the next regression is around 2 and the errors are not serial correlated. There is a positive correlation between leverage and investment. Only 15.65% of the variation in investment is explained by leverage.

Table 7. The investment depending on leverage

Dependent Variable: INV				
Method: Pooled Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.043676	0.000297	147.1182	0.0000
LEVERAGE	0.042305	0.000749	56.47311	0.0000
R-squared	0.156509	Mean dependent var		0.060094
Adjusted R-squared	0.156460	S.D. dependent var		0.008581
S.E. of regression	0.007881	Akaike info criterion		-6.848519
Sum squared resid	1.067644	Schwarz criterion		-6.847617
Log likelihood	58865.02	Hannan-Quinn criter.		-6.848222
F-statistic	3189.213	Durbin-Watson stat		2.357370
Prob(F-statistic)	0.000000			

Source: author's calculations

I redid the regressions for a smaller sample that covers the crisis period (2008-2013). In this period, sales and book to market have a positive impact on investment changes while for the large sample only book to market had a positive impact. It is very interesting, but this behavior might be explained by the fact that the continuation of the crisis was not anticipated and a slow increase in sales determined the firms to make more investment changes.

Table 8. The investment depending on sales and market to book during 2008-2013

Dependent Variable: INV				
Method: Pooled Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.246941	5.87E-14	-4.21E+12	0.0000
MTB	0.159581	3.30E-14	4.84E+12	0.0000
SALES	4.28E-07	8.65E-20	4.94E+12	0.0000
R-squared	0.9900000	Mean dependent var		0.052242
Adjusted R-squared	0.9900000	S.D. dependent var		0.004723
S.E. of regression	8.58E-14	Akaike info criterion		-57.33554
Sum squared resid	6.32E-23	Schwarz criterion		-57.33308
Log likelihood	246402.5	Hannan-Quinn criter.		-57.33470

F-statistic	1.30E+25	Durbin-Watson stat	1.936475
Prob(F-statistic)	0.000000		

Source: author's calculations

However, a number of other factors also affect investment expenditures: interest rate, expectations, prices or technology.

4. Conclusions

All in all, during 2005-2013 for the 2865 firms from UK, the investment sensitivity is affected by: book to market and firm dimension approximated by sales, but also by leverage, respectively cash flow. For a smaller period that corresponds to the crisis period (2008-2013), sales and book to market have a positive impact on investment changes while for the large sample only book to market had a positive impact. This behavior might be explained by the fact that during the crisis the investment sensitivity is higher, the people being more cautious.

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THE USE OF MARKOV CHAINS IN FORECASTING EMPLOYED POPULATION PERCENTAGE

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Abstract

Within the Europe Strategy 2020 has been established that one of the target indicators to be represented by employment rate. The target proposed by Romania seems difficult to achieve, but in the present paper we forecast the share of employed population in the Romanian economy, in order to seize the activities in economy with growth potential, since in the last four years the number of employed people experienced a fluctuating trend. Markov chains allow predicting the employment share on the main economic activities. Calculations made for 2015 show increases in the share of employment in industry, trade and health.

Keywords: Markov chains theory, labor market, employed population, employment rate

Rezumat

În Strategia Europa 2020 s-a stabilit ca unul dintre indicatorii țintă să fie reprezentat de către rata de ocupare. Ținta propusă de România pare greu de atins, dar în lucrarea de față prezivionăm ponderea populației ocupate la nivelul economiei românești, pentru a sesiza activitățile din economie cu potențial de creștere, deoarece în ultimii patru ani numărul persoanelor ocupate a cunoscut o evoluție fluctuantă. Lanțurile Markov permit previziunea ponderii populației ocupate pe principalele activități ale economiei. Calculele realizate pentru anul 2015 arată creșteri ale ponderii populației ocupate în industrie, comerț și sănătate.

Cuvinte-cheie: teoria lanțurilor Markov, piața muncii, populație ocupată, rată de ocupare

JEL Code: C1, J2

REL Code: 8C, 10B

1. Introduction

Employment is simultaneous a factor and a target for sustainable development. Efficient use of labor resources implies full employment, considering the requirements arising from the organic relationship between labor market and other specific markets in an economy. (Ciucur et al, 2010, p. 108)

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