# EXCESS CASH HOLDINGS, INVESTMENT OPPORTUNITY AND SHAREHOLDER VALUE: EUROPEAN EVIDENCES

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## Abstract

In this paper, we examine the marginal value of extra liquidity for a sample of excess cash listed companies (i.e. ECs) operating in the five largest E.U. economies (France, Italy, Germany, Spain and UK). After had shown that these companies are generally penalised by the market, in line with previous literature, we show that extra cash held is not detrimental to shareholder value when it is combined with high investment opportunities leading, hence, in a premium of 1€ extra held. This relation is even stronger during the financial crisis of 2008. These results confirm that the main reason why ECs are generally valued less by the market is the concern that their managers may deploy excess cash in value-destroying activities. However, EC firms are not penalized ceteris paribus when there are investment opportunities. In addition, such relation is stronger with the presence of financial constraints and lack of liquidity, as explained by the transaction and precautionary motive for holding cash.

**Keywords:** Cash Holdings, Excess Cash Firms, Marginal Value Of Cash, Financial Crisis, Investment Opportunities
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## 1. INTRODUCTION

Literature shows that companies hold significant amount of cash and cash equivalents in their financial statements (Kim et al.1998; Opler et al. 1999; Harford, 1999; Dittmar and Mahrt-Smith, 2007; Lee and Powel 2011). Several factors may lead managers to decide to maintain cash availability. Substantial theoretical and empirical evidence has been found to support multiple rationales for excessive cash holdings. In this regard a determinant role is played by both the transaction motive - which considers the high costs deriving from raising cash as an incentive to hold excessive cash - and the precautionary motive, according to which maintaining sufficient cash reserves is necessary to effectively cope with future financial emergencies or constraints without selling assets or raising external financing (Keynes, 1936). Opler et al. (1999) argue that the likelihood of holding excess cash increases when managers feel safe from takeovers. Takeover risk is lowered, for example, when shareholders are not organised; companies are large, assuming that size is a takeover barrier, and country laws provide a defence against takeovers. Conversely, managers who are aware that a high level of cash is attractive to predators may organise excess cash holdings to increase the firm's market value. Furthermore, several authors have found that a positive relationship exists between cash holdings and the degree of asymmetric information. Indeed, asymmetric information makes obtaining funds difficult and expensive, and companies prefer to retain cash, thus reducing the costs associated with the external dependence on financing (Kim at al., 1998).

This paper analyses the impact of holding excess cash on shareholder wealth with the focus on excess cash companies (hereby ECs) and investment opportunities. Previous literature on this topic mostly examined the relationship between the amount of cash held by a company and its marginal value in the US market (e.g. Faulkender and Wang, 2006; Dittmar and Mahrt-Smith, 2007), whereas others conducted similar research for the Australian market and took into consideration persistence of excess cash (e.g. Lee and Powell, 2011) or the relation between marginal value of cash and

investment opportunities (e.g. Chan et al., 2013).

According with Lee and Powell (2011) the marginal value of cash declined with larger cash holdings and excess cash persistence. Harford (1999) argued that managers of excess cash companies may deploy excess cash in value-destroying activities. This conclusion is supported by Jensen and Meckling's agency theory (1976) stating that because of the separation of ownership and control, negligence often prevails in the management of listed companies. However, Chan et al. (2013), found that Australian firms with higher growth rates exhibit a higher marginal value of cash holdings consistent with the explanation that excess cash holdings are not necessarily detrimental to firm value. Nonetheless, Chan et al. (2013) tested such relation without making *a priori* distinction between firms with extra level of cash held and none. Indeed, since EC firms are generally more penalized by the market according with a higher level of agency costs our paper wants to test whether the market is able to discriminate in this specific circumstance and rewards ECs with high level of investment opportunities (hereby IO). In addition, our paper wants to investigate whether such relation is strengthen during financial constraints period.

Using a sample of EC listed firms with domicile in France, Italy, Germany, Spain and UK during 2001-2014, we document that excess cash is not necessarily detrimental to shareholder value supporting the idea that ECs are not penalised *ceteris paribus*. ECs with high level of IO reports a marginal value of 1.4€ for 1 extra euro held suggesting, thus, that the market is able to discriminate on the basis on investment opportunities. In addition, this relation is even higher during financial crisis, 1€ extra values 1.26€ before the crisis whereas it becomes 1.51€ during the crisis suggesting that the marginal value of extra liquidity held is higher during financial constraints period.

Our paper contributes to the state of the art of ECs literature by providing evidence on the positive influence of ECs investment opportunities on the current marginal value of extra cash held, extending such analysis during financial crisis period and on a European setting. Indeed, different from previous studies (e.g. Chan et al., 2013; Huang et al., 2015) our study is the first, to the best of our knowledge, which investigates the relation between investment opportunities and marginal value, during and before financial crisis, on a sample of ECs.

This article proceeds as follows. Section 2 reviews the previous literature on cash holdings and the marginal value of cash and discusses the research questions to be tested. Section 3 describes the sample construction process and explains the empirical models employed in the research. Section 4 reports on the univariate tests and presents the primary results of the regression models and the impact of cash on shareholder value. Section 5 concludes the paper.

## 2. THEORETICAL BACKGROUND AND HYPOTHESES

### 2.1. Cash holdings and their marginal value

The optimal cash holdings for firms have been studied extensively in the literature (Punter, 1992; Kim et al., 1998; Olper, 1999; Mikkelson and Partch, 2003; Tong, 2014). The premise of the literature on optimal cash is that in Modigliani and Miller's "perfect market", holding cash does not make any difference (Modigliani and Miller, 1958) because firms can obtain the necessary funds to substitute for an unpredicted low cash flow without any cost. Consequently, in such a scenario, low cash holdings have little impact on interest rates and shareholder wealth and do not imply an opportunity cost.

However, in the real world, it is costly for a firm to be short of liquid assets, and holding additional cash helps reduce potentially high interest rates and address financial constraints. There are several issues that can affect a firm's decision to hold a low or high level of cash. Tong (2010) found that companies with higher CEO risk incentives have less cash holdings. Boubaker et al. (2015) found that firms with efficient boards, i.e., including independent directors, and with separate chief executive officer and chair positions accumulate less cash reserves than those with less efficient boards. Conversely, Harford et al. provide evidence suggesting that less controlled managers "choose to spend cash quickly on acquisitions and capital expenditures, rather than hoard it" (Harford et al., 2008, 535). Iskandar-Datta and Jia (2014) recently find that firms under weak governance systems hold less cash than firms operating under strong governance. That is, firms ruled by weaker governance structures, consistent with Albuquerue and Wang (2008), have incentives to over-invest to obtain more private benefits in the future. That behaviour is magnified when investors are not well protected (Iskandar-Datta and Jia, 2014).

A number of articles estimated the value of cash holdings, and a stream of literature investigated the more convenient strategies for reducing the agency costs derived from holding excess cash. Most authors focused on the comparison and analysis of additional dividend distributions or stock repurchases and their marginal value (Von Eije and Megginson, 2008; Oswald and Young, 2008; Skinner, 2008; Renneboog and Trojanowski; 2011; Abuaf, 2012).

In this respect, Pinkowitz et al. (2006) show that cash is worth less when the agency problems between inside and outside shareholders are greater. Faulkender and Wang (2006) found that the marginal value decreases for firms with a high level of cash, high leverage and easy access to capital markets. They also provide evidence that the marginal value decreases over time when a company decides to redistribute excess cash through dividends rather than by repurchasing stock.

The marginal value of cash held by a firm is often dependent on shareholder and governance characteristics. Attig et al. (2013) concluded that the presence of multiple large shareholders, with an even distribution of blockholders' voting rights and a higher contestability of the largest shareholder's control, enhances the valuation of firms' cash holdings whereas Schauten et al. (2013) proved that 1€ extra cash held by European ECs worth 0.78€ (1.10€) for firms with low (high) level of governance. In addition, they found that the bad governed firms that spend current excess cash to make investments present a negative influence on future operating performance.

## 2.2. Marginal value and investment opportunities

Sheu and Lee (2012) used a study sample of Taiwanese companies to show that capital expenditure is significantly sensitive to excess cash. O'Connor Keefe and Tate, using a volatility measure based on firms' cash flows, find that "cash holdings play an important role in buffering a firm's investment policies from cash flow shocks" (O' Connor Keefe and Tate, 2013, 944).

Pinkowitz and Williamson (2004) maintain that the marginal value of cash is higher for firms with greater investment opportunities or adopting riskier investment strategies. The primary reason that companies holding excess cash are valued less by the market is the concern that their managers may deploy excess cash in value-destroying activities (Harford, 1999). However, this concern is eliminated when cash is promptly used to make investments, in accordance with Lee and Powell's claim that "the marginal value of cash decreases the longer firms hold on to excess cash" (Lee and Powell, 2011, 571). In fact, Chan et al. (2013), using a sample of Australian firms, found that firms with higher growth rates exhibit a higher marginal value of cash holdings. Nevertheless, this study did not test such relation with a special focus on ECs which are generally more penalized by the market according with a higher level of agency costs. Indeed, we expect that the market is able to discriminate in this specific circumstance and rewards ECs with high level of IO. Therefore, based on the above arguments, we ask the following research question:

$HP_1$: *Excess cash companies with a high level of IO have a marginal value of cash higher than excess cash companies with a low IO.*

## 2.3. Marginal value and financial crises

The amount of cash held by a company is, under the precautionary motive, dependent on the specific financial conditions of the company. Kim studied the relation between a company's decision to hold liquid assets and the cost of external financing, finding that "the optimal investment in liquidity is increasing in the cost of external financing and the variance of future cash flows" (Kim et al., 1998).

The precautionary motive also implies that the level of cash held by a company is dependent on general macroeconomic conditions. Baum et al. (2006) state that the "macroeconomic environment within which firms operate could be an equally important determinant of their demand for liquidity". Ivashina and Scharfstein (2010) show that during the 2008 financial crisis, companies increased their cash holdings, and Pinkowitz et al. (2013) measured a huge increase in the abnormal cash holdings of US firms after the onset of the crisis. Lian et al. (2011) empirically confirm that Chinese firms hold more cash in periods of down markets.

Similarly, Neamtiu et al. show that, when ambiguity increases, firms decrease investment and increase cash holdings. This finding appears to be consistent with the ambiguity theory, which "suggests that, in the presence of ambiguity, ambiguity-averse individuals behave as if they assume 'worst-case' outcome scenarios – i.e., they incorporate the worst possible pay-off probability measure in their consideration set into their decision" (Neamtiu et al., 2014, 2). In such cases, individuals reduce their investments and shift to holding riskless assets (Dow and Werlang, 1992; Epstein and Schneider, 2010). Based on this literature, it can be assumed that during down markets, companies are unlikely to invest excess cash due to their aversion to risk.

Regarding the value of cash, Faulkender and Wang (2006) find that the marginal value of cash holdings is greater for financially constrained firms. Accordingly, Chan et al. examine the impact of financial constraints on the marginal value of cash holdings, finding that more financially constrained companies exhibit a higher marginal value of cash holdings. "These findings are consistent with the explanation that excess cash holdings are not necessarily detrimental to firm value. Firms with costly external financing and that also save more cash for current operating and future investing needs find that the market values these cash hoarding policies favourably" (Chan et al., 2013, 339).

Although there is no specific study on the marginal value of cash holding after the onset of the 2008 financial crisis, on the basis of the above-mentioned literature, it is assumed in this study that markets have valued any additional increase in excess cash more, in terms of marginal value, since the onset of the financial crisis. Connecting the first hypothesis with these new arguments, we ask the following hypothesis:

$HP_2$: *Excess cash companies with a high level IO have a marginal value of cash higher during financial crisis period than before.*

## 3. EMPIRICAL TESTS

### 3.1 Identification of excess cash companies

Opler's transaction costs model, which identifies an optimal level of cash for each company (Opler et al., 1999) and examines the key determinants of cash holdings, has been widely used in the literature (Dittmar and Mahrt-Smith, 2007; Oswald and Young, 2008; Lee and Powell, 2011; Schauten at al., 2013). We identify EC firms as those with positive difference between cash and cash equivalent at time *t* less the optimal level of cash estimated through the residual from Oswald and Young (2008) as follows (firm subscripts are suppressed) (See Appendix 1 and 2 for details on sources and descriptions. Consistent with Faulkender and Wang (2006), we set a 0 value for those companies that report a missing value for R&D because otherwise we would have lost approximately half of the sample.) :

$$Cash\_Holding_t = \alpha_0 + \beta_1 NWC_t + \beta_2 MtB_t + \beta_3 Op\_Cash_{t-1} + \beta_4 Net\_Debt_t + \beta_5 R\&D_t + \beta_6 Size_t + \beta_7 Dividend\_D_t + Year\ FE + Industry\ FE + Country\ FE + \varepsilon_t \quad (1)$$

where:

$Cash\_Holding_t$ = is the ratio between cash and cash equivalent and lagged value of total asset;

$NWC_t$ = is the value of total current assets less cash and cash equivalent and current liabilities, deflated by lagged value of asset;

$MtB_t$ = is the ratio between market capitalization, plus total book value of debt, and total book value of equity;

$Op\_Cash_{t-1}$ = is the ration between lagged value of cash flow from operations and lagged value of total asset;

$Net\_Debt_t$ = is total liabilities net of cash holdings deflated by total assets minus cash and cash equivalents;

$R\&D_t$ = is research and development expenditures over total value of sales;

$Size_t$ = is the natural logarithm of market capitalization;

$Dividend\_D_t$ = dummy variables which is 1 if dividends are paid (i.e. negative Cf_dvd_paid), 0 otherwise.

In the above model, all continuous variables winsorized at 1% and 99% tail to avoid outliers influence. Model (1) uses OLS estimation method with standard error clustered by firm and with year, industry and country fixed effect controls.

## 3.2. The marginal value of cash

The Faulkender and Wang (2006) model was used, on the excess cash sample as obtained from the residual of model (1), to investigate how a change in cash influences the excess stock market return as follows (firm subscripts are suppressed) (Changes (i.e. Δ) are *t* minus *t*-1):

$$ADJ\_Ret_t = \alpha_0 + \beta_1 \Delta Cash_t + \beta_2 \Delta Earnings_t + \beta_3 \Delta Net\_Asset_t + \beta_4 \Delta R\&D_t + \beta_5 \Delta Interest_t + \beta_6 \Delta Dividend_t + \beta_7 Cash_{t-1} + \beta_8 Lev_t + \beta_9 \Delta Net\ Financing_t + \beta_{10} (\Delta Cash_t \cdot Cash_{t-1}) + \beta_{11} (\Delta Cash_t \cdot Lev_t) + \beta_{12} IO + \beta_{13} (IO \cdot \Delta Cash_t) + \beta_{14} (IO \cdot \Delta Cash_t \cdot Cash_{t-1}) + \beta_{15} (IO \cdot \Delta Cash_t \cdot Lev_t) + Year\ FE + Industry\ FE + Country\ FE + \varepsilon, \quad (2)$$

where:

$ADJ\_Ret_t$ = is the difference between firm's stock market raw return at time t and value weighted corresponding returns for the intersections of 5 ME and 5 BE/ME of European Fama & French portfolios[10];

$\Delta Cash_t$ = is the change in cash and cash equivalent;

$\Delta Earnings_t$ = is the change in earnings before interest and taxes;

$\Delta Net\_Asset_t$ = is the change in total asset value net of cash;

$\Delta R\&D_t$ = is the change in R&D;

$\Delta Interest_t$ = is the change in Interest expenses;

$\Delta Dividend$ = is the change in dividend paid;

$Cash_{t-1}$ = is the value of cash and cash equivalent at the end of year t-1;

$Lev_t$ = is the ratio between total liabilities and book value of equity;

$\Delta Net\ Financing_t$ = is the change in cash flow from financing activities;

$\Delta Cash_t \cdot Cash_{t-1}$ = is the interaction term between the change in cash and cash equivalent and the value of cash at the end of year t-1;

$\Delta Cash_t \cdot Lev_t$ = is the interaction term between the change in cash and cash equivalent and the value of leverage;

IO= is 1 if the firm has a level of TobinQ at time t higher than the median value by industry and year, 0 otherwise (together with the interaction term: $\Delta Cash_t$; $\Delta Cash_t \cdot Cash_{t-1}$ and $\Delta Cash_t \cdot Lev_t$);

We measure the marginal value of 1 extra € as the linear combination between the change in cash and cash equivalent ($\Delta Cash_t$), the interaction term with the lagged value of cash ($\Delta Cash_t \cdot Cash_{t-1}$) and with the leverage ($\Delta Cash_t \cdot Lev_t$). Model (2) uses OLS estimation method with standard error clustered by firm and with year, industry and country fixed effect controls. All continuous variables, where not differently declared, are scaled by lagged value of market capitalization to avoid heteroskedasticity and the largest firms' influence while all continuous data are winsorized at 1% and 99% tail to avoid outliers influence.

## 3.3. Sample selection

For the purpose of our analysis, we select a restricted sample of European firms. In particular, European firms from the 5 largest E.U. economies (i.e. France, Italy, Germany, Spain and UK – Eurostat, 2015) listed during the period 2001-2014. Banks, insurance companies, and other financial institutions are excluded because they retain cash, fundamentally, for different reasons when compared to other enterprises (Opler et al., 1999; Oswald and Young, 2008; Fresard and Salva, 2010; Lee and Powell, 2011; Schauten et al., 2013; Huang et al., 2015).

We select companies from the above markets because most previous studies investigate the effect of cash holdings and marginal value (separately) on the US, AU or Taiwan markets (e.g. Fresard and Salva, 2010; Sun et al., 2012; Huang et al., 2015; Sheu and Lee, 2012; Chan et al., 2013; Tong, 2014). Schauten et al. (2013) use a similar sample as the one we use made of ECs included into the FTSEurofirst 300 Index. However, their study focused on the influence of Governance mechanism on the marginal value of cash while our focused on the marginal value of cash for those ECs with high IO.

Accounting and market data are from the Bloomberg database[11]. From the initial sample of 49,350 firm-year observations during 2000 to 2014 (i.e. 3,290 firms), we eliminate all observations missing a value for at least one accounting variable as reported in the table 1 resulting in an intermediate sample of 16,808 firm-year observations.

After running model (1), we identify 1,486 ECs (6,996 firm-year observations) spanning from 2001 to 2014.

[10] Following Faulkender and Wang (2006), we use 5x5 European Fama & French portfolios formed on market capitalization and book to market ratio as provided from the Kenneth R. French internet site (i.e. data library: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html). For each fiscal year, we sort firms into 25 size and book to market portfolios based on their market capitalization (size goes from 1 to 5 where percentiles have been calculated by industry year) and book to market ratio (book to market ratio goes from 1 to 5 where percentiles have been calculated by industry year). Then, adjusted return is calculated by subtracting annualized stock raw returns less the correspondent annualized benchmark portfolio returns.

[11] Accessed on the 21st of July 2015. We created the panel sample based on the listed firm available on that date. Accounting and market data are expressed in Euro.

**Table 1.** Sample selection procedure

| *Observations* | *Sample selection criteria* |
|---|---|
| 49,350 | Listed companies with domicile in: UK, IT, ES, FR, DE available in Bloomberg [i.e. 3,290 firms from 2000 to 2014] |
| ***n* observations dropped** | **Reason for dropping** |
| 25,638 | missing market data |
| 6,904 | missing accounting data |
| **16,808** | **Intermediate sample Firm-year observations** |
| 9,812 | Negative difference between *Cash Holding* and *Predicted Cash Holding* from model (1) |
| **6,996** | **Excess cash final sample Firm-year observations** [i.e. 1,486 firms from 2001 to 2014] |

## 4. RESULTS

### 4.1. Identification of Excess Cash companies

Table 2 presents the descriptive statistics including the mean and the standard deviation for each variable of model 1. Panel A shows that the cash holdings variable exhibits a mean (median) value of 12% (7%), which is lower than Dittmar and Mahrt-Smith (2007), who report a mean (median) value of 22% (6%), in line with Sun et al., (2012), who report 13% (10.6%) and higher than that proposed by Kim et al. (1998) of 8.1% (4.7%). Correlation coefficients are reported in Panel B.

**Table 2.** Summary statistics and correlation coefficients of the dependent and independent variables employed in model (1)

***Panel A***

| *Variable* | *N. Obs.* | *Mean* | *St. Dev.* | *0.25* | *Median* | *0.75* |
|---|---|---|---|---|---|---|
| ***Cash_Holding*** | 16808 | 0.1263 | 0.1525 | 0.0328 | 0.0746 | 0.1562 |
| ***NWC*** | 16808 | 0.0322 | 0.2052 | -0.0822 | 0.0228 | 0.1498 |
| ***MtB*** | 16808 | 4.0202 | 5.1059 | 2.0276 | 3.1185 | 4.7872 |
| ***Op_Cash*** | 16808 | 0.0499 | 0.1477 | 0.0242 | 0.0708 | 0.1161 |
| ***Net_Debt*** | 16808 | 0.4658 | 0.4103 | 0.3296 | 0.5258 | 0.6793 |
| ***R&D*** | 16808 | 0.0588 | 0.3059 | 0 | 0 | 0.0113 |
| ***Size*** | 16808 | 5.2237 | 2.3809 | 3.4894 | 5.0446 | 6.8666 |
| ***Dividend_D*** | 16808 | 0.7194 | 0.4493 | 0 | 1 | 1 |

*Continuous variables winsorized at 1% and 99% tail in order to avoid outliers.*

***Panel B***

| | *#* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* |
|---|---|---|---|---|---|---|---|---|---|
| ***Cash_Holding*** | 1 | 1 | | | | | | | |
| ***NWC*** | 2 | -0.0889*** | 1 | | | | | | |
| ***MtB*** | 3 | 0.0299*** | -0.0827*** | 1 | | | | | |
| ***Op_Cash*** | 4 | -0.1907*** | 0.0803*** | 0.0382*** | 1 | | | | |
| ***Net_Debt*** | 5 | -0.6059*** | -0.2866*** | 0.067*** | 0.1084*** | 1 | | | |
| ***R&D*** | 6 | 0.2681*** | 0.0238*** | 0.0404*** | -0.3695*** | -0.3311*** | 1 | | |
| ***Size*** | 7 | -0.1542*** | -0.0326*** | 0.1639*** | 0.3291*** | 0.1734*** | -0.0857*** | 1 | |
| ***Dividend_D*** | 8 | -0.2122*** | 0.1296*** | 0.0212*** | 0.4403*** | 0.1443*** | -0.2302*** | 0.4578*** | 1 |

*Continuous variables winsorized at 1% and 99% tail in order to avoid outliers. * p < 0.10, ** p < 0.05, *** p < 0.01.*

Table 3 presents the results of regression model (1). Market to book ratio is the sole variable positevly correlated a positive coefficient (p<0.01), whereas *NWC*, *Op_Cash*$_{t-1}$, *Net_Debt* and *Dividend_D* are negatively correlated (p<0.01).

**Table 3.** Regression predicting the firm optimal liquidity level (Oswald and Young, 2008)

| | ***Cash_Holding*** | ***T-Stat*** |
|---|---|---|
| ***NWC*** | -0.2036*** | (-16.68) |
| ***MtB*** | 0.0017*** | (4.12) |
| ***Op_Cash*** | -0.0787*** | (-4.22) |
| ***Net_Debt*** | -0.2435*** | (-32.44) |
| ***R&D*** | 0.0070 | (0.89) |
| ***Size*** | -0.0000 | (-0.01) |
| ***Dividend_D*** | -0.0138*** | (-3.25) |
| ***Year Control*** | Yes | |
| ***Industry Control*** | Yes | |
| ***Country Control*** | Yes | |
| ***Constant*** | 0.2401*** | (25.20) |
| ***N*** | 16808 | |
| ***Adj. R²*** | 0.474 | |
| ***F*** | 100.04 | |
| ***VIF - Average*** | 2.04 | |

*This table reports regression results of model (1). Accounting variables are calculated as reported in Appendix. We estimate the regression with standard errors clustered by firm and we add industry, country and year dummies. Continuous variables winsorized at 1% and 99% tail in order to avoid outliers. T statistics in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01*

Because of the predicted values provided by model (1), we obtained 6,996 firm-year observations distributed as reported in table 4.

**Table 4.** Distribution of the EC sample

| *Year* | *2001* | *2002* | *2003* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *2011* | *2012* | *2013* | *2014* | *Total* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ICB Industry Name* | | | | | | | | | | | | | | | |
| *Basic Materials* | 23 | 25 | 25 | 19 | 28 | 31 | 30 | 30 | 39 | 49 | 49 | 42 | 41 | 36 | 467 |
| *Consumer Goods* | 84 | 83 | 88 | 57 | 69 | 63 | 68 | 77 | 82 | 96 | 97 | 96 | 100 | 102 | 1,162 |
| *Consumer Services* | 64 | 65 | 65 | 58 | 82 | 83 | 83 | 89 | 89 | 85 | 99 | 106 | 108 | 97 | 1,173 |
| *Health Care* | 15 | 12 | 9 | 12 | 19 | 19 | 30 | 29 | 31 | 43 | 49 | 44 | 35 | 52 | 399 |
| *Industrials* | 139 | 142 | 136 | 118 | 131 | 146 | 154 | 193 | 192 | 177 | 185 | 188 | 188 | 169 | 2,258 |
| *Oil & Gas* | 5 | 7 | 10 | 12 | 12 | 15 | 20 | 31 | 27 | 30 | 33 | 28 | 26 | 35 | 291 |
| *Technology* | 37 | 50 | 55 | 46 | 51 | 49 | 57 | 45 | 66 | 83 | 94 | 81 | 94 | 95 | 903 |
| *Telecommunications* | 4 | 6 | 5 | 3 | 4 | 4 | 4 | 5 | 8 | 7 | 5 | 11 | 8 | 7 | 81 |
| *Utilities* | 3 | 10 | 10 | 6 | 11 | 13 | 17 | 25 | 24 | 22 | 28 | 29 | 35 | 29 | 262 |
| *Country* | | | | | | | | | | | | | | | |
| *Germany* | 55 | 58 | 65 | 49 | 48 | 62 | 69 | 86 | 100 | 121 | 135 | 136 | 142 | 138 | 1,264 |
| *Spain* | 0 | 0 | 0 | 2 | 11 | 14 | 13 | 26 | 28 | 32 | 30 | 32 | 36 | 28 | 252 |
| *France* | 121 | 134 | 131 | 84 | 94 | 89 | 92 | 111 | 105 | 99 | 122 | 112 | 120 | 97 | 1,511 |
| *Great Britain* | 157 | 168 | 169 | 173 | 215 | 219 | 241 | 242 | 279 | 298 | 304 | 295 | 281 | 304 | 3,345 |
| *Italy* | 41 | 40 | 38 | 23 | 39 | 39 | 48 | 59 | 46 | 42 | 48 | 50 | 56 | 55 | 624 |
| *Total* | *374* | *400* | *403* | *331* | *407* | *423* | *463* | *524* | *558* | *592* | *639* | *625* | *635* | *622* | *6,996* |

## 4.2. Univariate results

Table 5 exhibits descriptive statistics and correlation coefficients for the independent and dependent variables employed in models (2). Starting from panel A, we observe that on average the mean value of the Adj-Ret value (equal) weighting is 4.1% (2.6%). The mean (median) value of ΔCash is 5.1% (2.5%); ΔEarnings before interest and taxes is 2.2% (1%), and the change in net assets is 8.9% (4.7%). The change in R&D, Interest and Dividends is on average zero, while the mean (median) lagged level of cash is 25 % (16%), and the value of leverage is 1.8 (1.4).

**Table 5.** Summary statistics and correlation coefficients of variables employed in models (2)

***Panel A.*** ECs sample

| | *N. Obs.* | *Mean* | *St. Dev.* | *0.25* | *Median* | *0.75* |
|---|---|---|---|---|---|---|
| $ADJ\_Ret_{,Value}$ | 6996 | 0.0414 | 0.5376 | -0.2810 | -0.0202 | 0.2603 |
| $ADJ\_Ret_{,Equal}$ | 6996 | 0.0260 | 0.5443 | -0.2967 | -0.0272 | 0.2509 |
| $\Delta Cash_{,}$ | 6996 | 0.0507 | 0.1602 | -0.0139 | 0.0251 | 0.0936 |
| $\Delta Earnings_{,}$ | 6996 | 0.0215 | 0.1683 | -0.0184 | 0.0102 | 0.0462 |
| $\Delta Net\_Asset_{,}$ | 6996 | 0.0885 | 0.4717 | -0.0391 | 0.0474 | 0.1903 |
| $\Delta R\&D_{,}$ | 6996 | 0.0006 | 0.0168 | 0 | 0 | 0 |
| $\Delta Interest_{,}$ | 6996 | -0.0004 | 0.0232 | -0.0024 | 0 | 0.0033 |
| $\Delta Dividend$ | 6996 | 0.0001 | 0.0231 | -0.0047 | -0.0001 | 0 |
| $Cash_{,,}$ | 6996 | 0.2531 | 0.2779 | 0.0743 | 0.1601 | 0.3185 |
| $Lev_{,}$ | 6996 | 1.7750 | 2.9830 | 0.5578 | 1.3210 | 2.5260 |
| $\Delta Net\ Financing_{,}$ | 6996 | 0.0310 | 0.2848 | -0.0485 | 0.0014 | 0.0859 |
| $\Delta Cash_{,} \cdot Cash_{,,}$ | 6996 | 0.0050 | 0.0808 | -0.0016 | 0.0019 | 0.0134 |
| $\Delta Cash_{,} \cdot Lev_{,}$ | 6996 | 0.0996 | 0.4866 | -0.0147 | 0.0259 | 0.1406 |

*Continuous variables winsorized at 1% and 99% tail in order to avoid outliers.*

***Panel B.*** Correlation Analysis

| | | *1* | *2* | *3* | *4* | *5* | *6* | *7* |
|---|---|---|---|---|---|---|---|---|
| $ADJ\_Ret_{,Value}$ | 1 | 1 | | | | | | |
| $ADJ\_Ret_{,Equal}$ | 2 | 0.9947*** | 1 | | | | | |
| $\Delta Cash_{,}$ | 3 | 0.2027*** | 0.1967*** | 1 | | | | |
| $\Delta Earnings_{,}$ | 4 | 0.2655*** | 0.2675*** | 0.1081*** | 1 | | | |
| $\Delta Net\_Asset_{,}$ | 5 | 0.172*** | 0.1778*** | 0.0148 | 0.1485*** | 1 | | |
| $\Delta R\&D_{,}$ | 6 | 0.0047 | 0.0108 | 0.0047 | -0.0801*** | 0.0874*** | 1 | |
| $\Delta Interest_{,}$ | 7 | 0.0063 | 0.0198* | 0.0409*** | 0.0237** | 0.2837*** | 0.026** | 1 |
| $\Delta Dividend$ | 8 | -0.0684*** | -0.0784*** | 0.0279** | -0.0519*** | -0.1411*** | -0.0318*** | -0.0873*** |
| $Cash_{,,}$ | 9 | 0.0739*** | 0.0644*** | -0.1296*** | 0.0932*** | -0.0646*** | -0.0418*** | -0.1235*** |
| $Lev_{,}$ | 10 | -0.0121 | -0.0145 | 0.0248** | 0.0183 | 0.0745*** | 0.0019 | 0.0201* |
| $\Delta Net\ Financing_{,}$ | 11 | 0.0793*** | 0.0787*** | 0.2686*** | -0.0358*** | 0.2694*** | 0.0237** | 0.0536*** |
| $\Delta Cash_{,} \cdot Cash_{,,}$ | 12 | 0.1393*** | 0.136*** | 0.8213*** | 0.0568*** | 0.0081 | 0.0147 | 0.0642*** |
| $\Delta Cash_{,} \cdot Lev_{,}$ | 13 | 0.0893*** | 0.0841*** | 0.5247*** | 0.0911*** | 0.009 | -0.0037 | 0.025** |
| | | 8 | 9 | 10 | 11 | 12 | 13 | |
| $\Delta Dividend$ | 8 | 1 | | | | | | |
| $Cash_{,,}$ | 9 | 0.094*** | 1 | | | | | |
| $Lev_{,}$ | 10 | 0.0211* | 0.1014*** | 1 | | | | |
| $\Delta Net\ Financing_{,}$ | 11 | 0.0768*** | -0.0516*** | 0.0045 | 1 | | | |
| $\Delta Cash_{,} \cdot Cash_{,,}$ | 12 | -0.0029 | -0.1598*** | 0.0284** | 0.1731*** | 1 | | |
| $\Delta Cash_{,} \cdot Lev_{,}$ | 13 | 0.0239** | -0.0131 | 0.1409*** | 0.1063*** | 0.4539*** | 1 | |

*Continuous variables winsorized at 1% and 99% tail in order to avoid outliers. * p < 0.10, ** p < 0.05, *** p < 0.01*

Our results are higher to those reported in previous studies. For instance, Faulkender and Wang (2006) find a mean (median) value for the change in cash position of 0.3% (-0.5%) between 1972 and 2001, whereas Lee and Powell (2011) show a mean (median) value of 0.7% (-0.02%) from 1990 to 2008. However, our descriptive statistics are in line with Chan et al. (2013) who reported a change in cash of 3.9% (0.3%) during 1990-2007.

The correlation analysis (Panel B) shows that dependent variables are negatively correlated with the change in dividend paid (p<0.01) and leverage whereas the coefficients become positive with the reminder of the variables (statistically significant at 1%, except for R&D and interest).

### 4.3. Multivariate results

Table 6 reports the results of the marginal value analysis in which the extra return is calculated using the value benchmark. The model has good fit: the value of $R^2$ is coherent with previous studies (i.e. Chan et al., 2013; Schauten et al., 2013) while VIF values denote that multicollinearity does not influence our estimations (Hair et al., 2009).

**Table 6.** Regression results of marginal value – Value benchmark

| | *(1)* | *(2)* | *(3)* | *(4)* |
|---|---|---|---|---|
| | ***ADJ_Ret***$_{t}$ | ***ADJ_Ret***$_{t}$ | ***ADJ_Ret***$_{t}$ | ***ADJ_Ret***$_{t}$ |
| ***ΔCash***$_{t}$ | 0.8463*** | 0.6810*** | 0.3512** | 0.8385*** |
| | (8.71) | (6.28) | (2.31) | (6.05) |
| ***ΔEarnings***$_{t}$ | 0.6517*** | 0.5703*** | 0.6921*** | 0.5247*** |
| | (10.56) | (9.49) | (6.76) | (7.00) |
| ***ΔNet_Asset***$_{t}$ | 0.1552*** | 0.1835*** | 0.1566*** | 0.1963*** |
| | (7.53) | (8.14) | (4.89) | (6.73) |
| ***ΔR&D***$_{t}$ | 0.0481 | 0.0349 | -0.5166 | 0.5053 |
| | (0.10) | (0.07) | (-0.83) | (0.78) |
| ***ΔInterest***$_{t}$ | -1.2304*** | -1.1828*** | -0.1930 | -1.6078*** |
| | (-3.16) | (-3.01) | (-0.27) | (-3.51) |
| ***ΔDividend*** | -1.0012*** | -0.6157* | -1.5634*** | -0.1637 |
| | (-3.01) | (-1.93) | (-3.14) | (-0.42) |
| ***Cash***$_{t-1}$ | 0.2151*** | 0.4083*** | 0.4293*** | 0.3967*** |
| | (5.77) | (9.04) | (6.55) | (7.78) |
| ***Lev***$_{t}$ | -0.0035* | 0.0010 | 0.0025 | -0.0006 |
| | (-1.69) | (0.49) | (0.70) | (-0.21) |
| ***ΔNet Financing***$_{t}$ | -0.0074 | -0.0341 | 0.0293 | -0.0929* |
| | (-0.20) | (-0.97) | (0.61) | (-1.94) |
| ***ΔCash***$_{t}$ ***· Cash***$_{t-1}$ | -0.3474* | -0.0353 | 0.4689* | -0.2409 |
| | (-1.95) | (-0.19) | (1.66) | (-1.02) |
| ***ΔCash***$_{t}$ ***· Lev***$_{t}$ | -0.0336* | -0.0483** | -0.0204 | -0.0611** |
| | (-1.80) | (-2.06) | (-0.58) | (-2.01) |
| ***IO*** | | 0.2631*** | 0.3000*** | 0.2327*** |
| | | (17.74) | (14.03) | (12.52) |
| ***IO · ΔCash***$_{t}$ | | 0.8909*** | 1.4198*** | 0.6899*** |
| | | (4.48) | (3.89) | (2.90) |
| ***IO · ΔCash***$_{t}$ ***· Cash***$_{t-1}$ | | -0.8648** | -2.1593*** | -0.3456 |
| | | (-2.04) | (-2.72) | (-0.67) |
| ***IO · ΔCash***$_{t}$ ***· Lev***$_{t}$ | | 0.0788** | -0.0280 | 0.1309*** |
| | | (2.20) | (-0.46) | (2.91) |
| ***Year Control*** | Yes | Yes | Yes | Yes |
| ***Industry Control*** | Yes | Yes | Yes | Yes |
| ***Country Control*** | Yes | Yes | Yes | Yes |
| ***Constant*** | -0.0078 | -0.1757*** | -0.1278*** | -0.1686*** |
| | (-0.23) | (-5.02) | (-2.58) | (-4.78) |
| ***Years*** | 2001/2014 | 2001/2014 | 2001/2007 | 2008/2014 |
| ***N*** | 6996 | 6996 | 2801 | 4195 |
| ***Adj. R²*** | 0.195 | 0.270 | 0.284 | 0.272 |
| ***F*** | 26.38 | 36.19 | 25.14 | 26.54 |
| ***VIF – average*** | 1.98 | 2.25 | 2.17 | 2.24 |
| ***Linear Combination*** | | | | |
| ***Baseline*** | 0.70*** | 0.59*** | 0.43*** | 0.67*** |
| ***High Investment Opp.*** | | 1.40*** | 1.26*** | 1.51*** |

*Accounting variables are calculated as reported in Appendix 1 and 2. We estimate the regression with standard errors clustered by firm and with industry, country and year dummies. Continuous variables winsorized at 1% and 99% tail in order to avoid outliers. T statistics in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01*

Starting with column (1), we can see that the estimated marginal value of an increase in cash for a firm with zero initial cash and no leverage is 0.85€ (i.e. discount applied); however, if we consider that the firm has an initial level of cash, the value of an additional euro of cash decreases because of the negative coefficient of the two interaction terms. This finding is in accordance with previous results: "firms with little or no cash on hand are likely to raise costly external funds and therefore would receive the highest benefits from having additional internal funds" (Faulkender and Wang, 2006, 1972). Therefore, assuming an initial level of cash and leverage of 25% and 1.8, respectively, (mean result reported in table 5, Panel A), we observe that the marginal value of 1 extra € becomes 0.7€ [i.e. 0.84 + (-0.3474 x 0.25) + (-0.0336 x1.8)], statistically significant at 1%. This result confirm previous results (e.g. Schauten et al., 2013) providing evidence of the discount applied on EC firms.

However, our study's primary hypothesis is that ECs with high IO receive a premium in the marginal value of one extra euro held. Results in column (2) support our HP1. As a first, by adding the investment opportunity variable (i.e. IO) we can see that the marginal value of change in (i.e. ΔCash) increase of about 0.89€ respect to those with low IO ($p<0.01$). In addition, assuming the initial level of cash and leverage of 25% and 1.8, respectively, then we can see that an increasing of 1€ for ECs with high IO worth 1.4€ in contrast with the 0.59€ of ECs with low IO. That said, excess cash companies are penalised by the market because of agency conflicts and information asymmetry (i.e., lower marginal value of an increase of cash); however, if the extra liquidity level held is correlated with IO then the market applies a premium (e.g. Pinkowitz and Willimson, 2004).

### 4.4. Marginal value of cash during bear markets

Because the recent credit crunch is considered to be, according to several analysts, as acute as the '29 Crisis in the US (Krugman, 2009), we expect that the marginal value for ECs will be higher because liquid assets can be viewed as 'options' exercisable in adverse economic conditions (Baum et al., 2006). Therefore, we replicate the analysis above divididng the period in before the crisis (i.e. 2008) and during the crisis (i.e. after 2007). Our assumption is that, because the financial crisis has changed market behaviour and expectations, in a down market period (i.e., 'adverse economic conditions'), financial markets will be less corrective with ECS if these present a high level of IO.

At a glance, during the financial crisis the marginal value of cash is higher because of the low availability of external financing. Indeed, the linear combination reported in columns (4) is higher than the one in column (3). In other words, 1 extra euro held by ECs with high IO worth 1.26€ before the crisis ($p<0.01$) while it becomes 1.51€ after its outbreak ($p<0.01$). Taken together, these results confirm our second hypothesis: the marginal value of excess cash companies increases during financial constraints period.

### 4.5. Alternative measure of EC firms

In this section, we present a few thoughts regarding the robustness of our coefficient estimates. The goodness of our results depends solely on the specification of model (1) used to identify ECs and Non-ECs. We consider that this specification would be the sole source of bias because the marginal value regression implemented in model (2) has been heavily tested and confirmed in previous literature (Faulkender and Wang, 2006; Lee and Powell, 2011; Chan et al., 2013). As a first, differently from Lee and Powell (2011), we implemented model 1 according to Oswald and Young's (2008) model and not Opler et al.'s (1999). In our model, we either scaled independent variables by the lagged value or used a directly lagged value (not scaled); we believe this does not lead to endogeneity because independent variables are not jointly estimated (Lee and Powell, 2011, 570).

However, since most of our results can be dependent on the definition of EC, we decided to follow the approach of Lee and Powell (2011) and we define ECs as those that maintain cash greater than the predicted model for any year as follows (firm subscripts are suppressed)[12]:

$$\text{Excess\_Cash}_t = \text{Cash\_Holding}_t - (\text{Predicted\_Cash\_Holding}_t + \sigma) \quad (3)$$

where *Excess_Cash* is 1 if equation (3) reports a positive results. In this equation $Cash\_Holding_t$ is the level of actual cash held by company *i* in time *t*, $Predicted\_Cash\_Holding_t$ is the optimal level of cash obtained by model 1 and $\sigma_i$ is the standard deviation of $Cash\_Holding_t$ during the entire period. In doing so, we restrict the sample of EC firms to 3,139 firm-year observations. Untabulated results, corroborate our previous findings: that is, ECs with high IO report a marginal value of 1 extra euro of 1.36€ ($p<0.01$), which is 1.17€ ($p<0.01$) and 1.53€ ($p<0.01$), respectively, before and during the financial crisis.

## 5. CONCLUSIONS

The optimal cash holdings for firms have been studied extensively in the literature (Punter, 1992; Kim et al., 1998; Olper, 1999; Mikkelson and Partch, 2003; Tong, 2014). Previous studies also investigated the reasons why managers decide to maintain cash availability, identifying the transaction motive and the precautionary motive as the primary reasons for holding excess cash. Furthermore, literature shows that companies holding excess cash are valued less by the market because of the concern that their managers may deploy excess cash in value-destroying activities (Harford, 1999).

In this article, using a sample of non-financial excess cash listed companies from United Kingdom, Spain, France, Germany and Italy, during the period 2001 to 2014 we examine the marginal value of the liquidity making a distinction between firms with high investment opportunity before and during the outbreak of financial crisis.

We find that, in accordance with the previous literature, that markets apply a discount to ECs *per se.* Our results suggest that the market penalises excess cash firms because agency theory costs increase with the increase in extra liquidity while at the same time, the market is also able to discriminate among ECs on the basis of their investment opportunities. Indeed we find that an increasing of 1€ extra leads to a marginal value of 1.4€. Moreover, during financial crisis the marginal value of extra cash held by ECs with high IO becomes 1.5€ from 1.26€ before the crisis. This means in other words, that EC are not penalised *ceteris paribus*, which is even strengthen during financial constraints period because of a low availability of external funds.

This study contributes to the existing literature testing the validity of the excess cash theory with different firms' investment opportunities and during different economic conditions. These results can have several implications for investors in evaluating their investment decisions on excess cash companies and for boards of directors and managers in evaluating the appropriate level of cash reserves in different market conditions. In addition, the results

[12] Differently from Lee and Powell (2011) we did not multiplied standard deviation by 1.5, as this will reduce drastically our final ECs sample.

can also be useful by helping analysts to be more aware of the valuation of high capital expenditure companies.

It should be noted that our study has several limitations. First, this article does not consider the role played by the quality of corporate governance on the marginal value of cash. Second, this study focuses on five specific markets, the France, Italy, Germany, Spain and UK, when different levels of market efficiency can affect the results. For this reason, a further analysis of how these conclusions can vary across markets should be interesting and relevant.

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## APPENDICES

**Appendix 1.** List of variables (Bloomberg Code)

| *Variable* | *Bloomberg Code* |
|---|---|
| Industry | Icbindustryname |
| Market Capitalization | Historical_market_cap |
| Number of Shares | Bs_sh_out |
| Cash & cash equivalent | Bs_cash_near_cash_item |
| Total Asset | Bs_tot_asset |
| Total Equity | Total_equity |
| Current Asset | Bs_cur_asset_report |
| Current Liabilities | Bs_cur_liab |
| Total Liabilities | Bs_tot_liab2 |
| Sales | Sales_rev_turn |
| EBIT | Ebit |
| R&D | Is_rd_expend |
| Interest expenses | Tot_int_exp |
| Dividend paid cash flow | Cf_dvd_paid (negative as provided by Bloomberg) |
| Operating Cash Flow | Cf_cash_from_oper |
| Cash flow from financing activities | Cf_cash_from_fnc_act |

**Appendix 2.** Variables definition (Bloomberg Code)

| **Variable** | **Numerator** |
|---|---|
| CashHolding | Bs_cash_near_cash_item / Lagged Bs_tot_asset |
| Mtb | [(Bs_tot_asset – Total_equity)+ Historical_market_cap] / Total_equity |
| NWC | [(Bs_cur_asset_report – Bs_cash_near_cash_item) – Bs_cur_liab] / Lagged Bs_tot_asset |
| Op_Cash | Lagged Cf_cash_from_oper / Lagged Bs_tot_asset |
| NetDebt | (Bs_tot_liab2 – Bs_cash_near_cash_item) / (Bs_tot_asset – Bs_cash_near_cash_item) |
| R&D | Is_rd_expend / Sales_rev_turn |
| Size | Natural Logarithm of Historical_market_cap |
| Dividend_D | 1 if Cf_dvd_paid < 0 ; 0 otherwise |
| Price | Historical_market_cap / Bs_sh_out |
| Return | [(Price/Lagged Price) – 1] |
| ΔCash | Δ Bs_cash_near_cash_item / Lagged Historical_market_cap |
| ΔEarnings | Δ EBIT / Lagged Historical_market_cap |
| Net_Asset | (Bs_tot_asset – Bs_cash_near_cash_item) |
| ΔNet_Asset | Δ NA / Lagged Historical_market_cap |
| ΔR&D | Δ Is_rd_expend / Lagged Historical_market_cap |
| ΔInterest | Δ Tot_int_exp / Lagged Historical_market_cap |
| ΔDividend | Δ Cf_dvd_paid / Lagged Historical_market_cap |
| Intial Cash | Lagged bs_cash_near_cash_item / Lagged Historical_market_cap |
| Lev | Bs_tot_liab2 / Total_equity |
| ΔNet Financing | Δ Cf_cash_from_fnc_act / Lagged Historical_market_cap |
| TobinQ | [(Bs_tot_asset – Total_equity)+ Historical_market_cap] / Bs_tot_asset |