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REGULATORY DETERMINANTS OF CORPORATE CASH HOLDINGS: ASSESSING THE EFFECTS OF EU CRD IV AND NFRD ON CASH HOLDING POLICIES OF FIRMS

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PHD THESIS STRUCTURE

PAPER 1:

CSR DISCLOSURE AND LIQUIDITY MANAGEMENT: MEASURING THE IMPACT OF 2014/95/EU DIRECTIVE ON FIRMS'CASH HOLDINGS

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PAPER 2:

CAPITAL REQUIREMENTS AND CORPORATE CASH HOLDINGS: ASSESSING THE SPILLOVER EFFECTS OF BANK CAPITAL REGULATIONS ON CASH HOLDING POLICIES OF FIRMS

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CAPITAL REQUIREMENTS AND CORPORATE CASH HOLDINGS: ASSESSING THE SPILLOVER EFFECTS OF BANK CAPITAL REGULATIONS ON CASH HOLDING POLICIES OF FIRMS

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ABSTRACT

Worldwide corporate liquidity holdings are reaching unprecedented levels. Despite the costs (opportunity, agency, etc.) associated with an excessive accumulation of cash, the existence of capital market frictions, not allowing a flexible management of liquid assets, may justify the trends of recent years. Having cash on hand in fact may be crucial for a business, especially during crisis periods or when the characteristics of the financial environment are modified by particular events which make it very costly to access external funds. Our paper fits within this context and aims at assessing the spillover effects of the new European bank capital regulations (CRD IV-Basel III) on cash holding policies of firms. Assuming a reduction in bank lending in the aftermath of a capital requirements' reinforcement, we document an increase of 0.64% in cash holdings retained by firms on average. In particular, small firms accumulate more than big firms; then the effect persists for cash-poor firms which generically hold less liquidity and have more difficulties in accessing credit, but becomes negative when looking at cash-rich firms that instead possess a higher amount of cash and enjoy a privileged relationship with banks. Results highlight the short-term negative consequences of the implementation of a bank capital norm at corporate level. As such, the evidence is consistent with the hypothesis that a reduction in credit supply fosters corporate cash stock.

INTRODUCTION

Worldwide corporate liquidity holdings are reaching unprecedented levels. According to Moody's, companies across Europe, the Middle East and Africa held almost €1.1 trillion in cash at the end of 2018, a 15% rise from the €941 billion presented on their balance sheets a year earlier. Only in Europe, Bloomberg reports that the amount of liquidity companies are hoarding tripled respect to a decade ago[1]. Such data justify without great difficulties the increase of academic research in this area. Some authors have repeatedly emphasized the costs associated with an excessive retention of cash (Darnell and Evans, 1988) and how substantial liquidity holdings may be a signal of an inefficient business management (Harford 1999; Dittmar, Mahrt-Smith, and Servaes, 2003). Since cash is a permanent feature of the company's balance sheet, investors should be able to follow its course and, if in excess, should worry about its employment. Cash could be there because management is willing to pursue private benefits, has run out of investment opportunities or is too short-sighted and does not know what to do with the money.

In all of the latter cases, holding cash becomes negative element for shareholders and represents an opportunity cost. In a frictionless world a firm would not have to bother about cash or the opportunity costs associated with its holding. In absence of any market disturbance in fact, there would be no optimal cash level because a firm could easily raise outside funds whenever needed (Modigliani & Miller, 1958). In reality, however, transaction costs exist (Greenwald, Stiglitz, and Weiss, 1984) and can put a strain on the flexible mechanism of resources readily available on request.

Thus, in spite of the costs associated with its holding, cash can turn out to be one of the main strategic assets for a business. Cash if well exploited can not only provide a competitive advantage to firms, allowing them to invest in the right way and at the right time, but may also help in dealing

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[1]Bloomberg (2018)

with situations of financial crises or market difficulties without excessive worries. Many of these aspects have been well emphasized in some of the previous works in the field, which, focusing on credit crunches, indicate banks' moves and individual firms' characteristics as being main factors bearing on corporate cash holding strategies. For example, Campello, Graham and Harvey (2010) in their study on U.S., European and Asian companies, find that financially constrained firms planned to cut down more investments during the crisis and were also forced to burn out a sizeable portion of their cash savings. Similarly, Lian, Sepehri and Foley (2011) show that compared to normal times, Chinese firms tended to increase their cash holdings during the decade coincident with the Asian financial crisis. Still, Azmata and Iqbalb (2017) show that during 2008 crisis, financially constrained Pakistani firms increased their cash holdings when cash flow while financially unconstrained firms did not.

Despite the substantial development of the literature on corporate cash holdings, however little attention has been paid so far to the effects of banking regulatory shocks on liquidity reserves of firms. Seizing the opportunity, this paper constitutes an attempt to identify the spillover effects generated by a strengthening in capital requirements and assess their influence on the cash holding policies of firms. For the purpose, the study considers the launch of the new Capital Requirements Directive (CRD IV package) which implements the Basel III Accord at European level. In particular, the attention is focused on Options and National Discretions (ONDs)[2] which allow each member state to set additional buffers of capital above the standards required.

Scope of the analysis is to understand how and to which extent enterprises react to a change in banking regulations which, at least in the first years of adoption, it is expected to reduce the amount of suppliable loans by financial institutions (Furlong, 1992; Haubrich and Wachtel, 1993; Martinez-Miera and Suarez, 2014; Fraisse, Lé and Thesmar, 2020) on average. The expectation is based on the awareness that, given the structure of the regulatory capital reference index (i.e. TIER), a

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[2]Directive 2013/36/EU; Regulation (EU) N. 575/2013; LCR delegated regulation (EU) 2015/61

misalignment of financial institutions with the enforced parameters[3] (Basel III at the moment of writing) forces the latter to reduce their loan portfolio (risk-weighted assets - RWA) or in alternative to issue new equity. Raising new capital however may be hard to be accomplished for several reasons, thus a less costly and immediate solution would be a reduction in the amount of RWA, in order to adjust the TIER ratio.

As far as known, the research is one of a kind because it examines the impact that a net capital regulatory shock may trigger on bank borrowers' liquidity hoardings. It is indeed undeniable that financial institutions' schemes may generate consequences which intensively affect the global corporate system. In this regard, even the genuineness of banking requirements, implemented to moderate the risks of banking activity (Basel Regulations), has often been questioned within the political and scientific environment. Most of the critics agree that regulations' direct and indirect spillover effects may negatively impact the overall functioning of the economic system, even distorting competition. In fact, as the majority of banking rules has focused on the setting-up of certain minimum capital requirements, different studies have demonstrated how these rules, when implemented in a context presenting market imperfections and even more in the event of macroeconomic shocks (Van den Heuvel, 2002; Gambacorta, 2004), impose some costs in terms of foregone bank lending (Chiuri, Ferri and Majnoni, 2001; Cosimano and Hakura, 2011; Suturova and Teply, 2013; Covas and Driscoll, 2014). Such findings brought professionals to reconsider the massive role of capital in driving banks' activities and, relatedly, in exerting influence on corporate strategies.

Mechanisms above described enable to infer that a drop in bank lending is expected to reduce the immediate availability of credit for firms, shaping their investments' policies. This assumption becomes even more powerful when firms are unable to substitute credit supply of banks with other

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[3] The threshold to be considered is TIER 1+TIER2 over risk weighted assets > 8% (Basel III). TIER 1 is composed by equity capital and disclosed reserves; TIER 2 defined as revaluation reserves, hybrid instruments, and subordinated term debt. Assets are risk weighted based on the following coefficients: 0 for cash and government bonds, 20 per cent for bank claims on other banks, 50 per cent for mortgage lending, 100 per cent for other loans to the private sector, 200 percent for participations in highly risky non-financial firms (firms that have recorded losses in the last two years).

sources of finance such as equity or other forms of debt. Within this framework, cash holding policies may play a crucial role, moderating the impact of bank loans' shrinkage and acting as a primary source of liquidity for firms facing financial troubles.

Using a large sample of European firms' data drawn from Orbis Bureau Van Dijk between 2014 and 2019, this study shows a significant and positive influence of more stringent capital requirements on cash and liquid assets accumulation of firms. Such findings in general suggest that corporate management is aware of possible hardships indirectly spawned by bank capital rulings and tries to run for cover. The effect reveals itself especially valid for small firms. The latter in fact have several difficulties in accessing credit, even more when it is scarce, and thus tend to build-up own funds to carry on their activities. In this regard, the analysis shows that also firms' relative cash-position is a predictor of liquid assets' accrual.

The research adds on the current understandings related to the transmission of shocks from banks to firms, by looking at the indirect effect of a regulatory tightening in capital requirements on cash management policies of firms. In this sense, the paper contributes to the stream of research on corporate cash holdings, considering a peculiar banking legislation potentially possessing financially restraining nature and which consequently may foster firms to increase their liquid assets during a specific period.

The paper is structured as follows: Section 2 presents a literature review related to the study; Section 3 reports the hypothesis of the research; Section 4 contains a description of the data and the empirical setting; Section 5 presents the results of the analysis; Section 6, provides other possible explanations for the findings and further tests; Section 7 concludes the overall.

LITERATURE REVIEW

The Ambiguity of Cash Holdings

Past studies portray an ambiguous role for cash holdings, principally highlighting positive but also negative aspects of hoarding cash. Which of the approaches would predominate may depend on a series of aspects such as corporate peculiarities and context of action.

Keynes (1936) reports three major benefits of cash holdings. First, a firm can save transaction costs by using cash to make payments without having to deploy assets (Transaction costs motive). In line with the transaction costs' motive, Miller and Orr (1966) show that brokerage costs could induce firms to hold more liquid assets. Myers and Majluf (1984) argue that raising external financing is more costly than using internally generated funds in presence of asymmetric information. Second, liquidity could be exploited for undertaking valuable investment projects, particularly in the presence of financial constraints (Speculative motive). It could be optimal for firms to hold a certain level of cash in order to meet investment expenditures (Almeida et al., 2004; Arslan, Florackis and Ozkan, 2006; Duchin-Ozbas and Sensoy, 2010). Third, cash holdings can serve as a shield in response to increases in cash flow volatility and so to hedge against future liquidity shortages (Precautionary motive), especially for constrained firms (Minton and Schrand, 1999). In general, holding cash for precautionary motives can be justified by the uncertainty and by the instability of the financial environment (Kim, Mauer and Sherman, 1998; Opler, Pinkowitz, Stulz and Williamson, 1999; Han and Qiu, 2007; Song and Lee, 2012; Sun and Wang, 2015; Shiau, Chang and Yang, 2018).

The recent literature also establishes that other motives matter too such as the tax motive (Foley et al., 2007) and the diversification motive (Duchin, 2010; Tong, 2011). Other economic determinants include product market competition (Fresard, 2010), the firm life cycle (Dittmar and Duchin, 2011) and the customer relationship (Itzkowitz, 2013).

On the other hand, on the costs side, Harford (1997), Shin and Kim (2002) and Kalcheva and Lins (2007) point up the role of agency costs in reducing firm value when too much cash is available for managers. In this regard, Jensen (1986) suggests that free cash at hand makes it easier for managers to pursue negative NPV projects that grant the accomplishment of private benefits. Overall, storing too much cash represents anyway an opportunity cost (Von Wieser, 1914).

Banks, Firms and Spillover Effects

The literature relating the bank activity's spillovers on firms is quite recent and for this reason not exhaustive. Actually, most of the papers in the field focus on the indirect influence of financial crises on enterprises' strategies (Iyer, Da Rocha-Lopes, Peydrò, and Schoar, 2014; Ongena, Peydrò and Van Horen, 2015; Cingano, Manaresi and Sette, 2016), with just few authors assessing the impact of bank capital requirements' policies and uniquely on corporate investments. Among them, De Marco and Wieladek (2021) analyzing the effects of bank-specific capital requirements on small and medium enterprises (SMEs) in U.K. within the period 1998-2006, evidence that a 1% increase in capital requirements leads to an asset growth contraction of 6.9% in the first year of a new bank-firm relationship. On the same line, Fraisse et al. (2020) considering Basel II framework, report that a 1 percentage point increase in capital requirements reduces lending by 2.3%–4.5%. The resulting reduction in borrowing capacity has been found to significantly affect firms whose fixed assets are reduced by 1.1%, capital expenditures by 2.7%, and employment by 0.8%.

RESEARCH HYPOTHESIS

Several authors provide evidence that a tightening of capital requirements may shortly have negative effects on the bank lending (Chiuri, Ferri and Majnoni, 2001; Suturova and Teply, 2013; Bridges, Gregory, Nielsen, Pezzini, Radia and Spaltro, 2014). In general, it has been seen that

institutions are strongly pushed to reduce their loan portfolio or better their risk-weighted assets[4] when not in line with the enforced parameters (Basel III at the moment of writing). An alternative could be the issuance of new equity which however in practice may be hard to be accomplished. Raising equity is expensive because of frictions: issuing equity may require substantial discounts when incumbent investors and managers have information about the firm that new equity investors do not have (Myers and Majluf, 1984), but also when agency costs of bank management are high (Diamond and Rajan, 2000). In addition, some of the costs associated with more equity stem from the fact that deposits and other debt liabilities often benefit from subsidized safety net protections, including deposit insurance and too-big-to-fail subsidies that value bank debt more than bank equity (Arshadi and Kane 1989). As a result, banks' overall costs of funding may increase with greater equity finance. Lastly, equity issuance is subject to non-negligible underwriting fees, usually between 5 and 7 percent[5].

If we assume a reduction in loans, we cannot expect that such an event will have no impact outside the banking system. Bank lending in fact is the most common source of external finance for many firms which use debt to fulfill their cash flow and investment needs. In this sense, debt is often preferred to equity which may be riskier, more expensive, slower to secure and less beneficial in terms of taxation. Thus, within a credit restrained context, we suppose that firms, principally the ones dependent on bank funding, begin to rush in search of alternatives to bank debt. The latter in fact may struggle to survive if they do not possess adequate means to run their activities. It is exactly in these cases that cash may turn out to be precious. Cash holdings can not only be exploited by the company to invest in value-creating projects (investments are sensitive to cash holdings), explore growth opportunities and pay dividends, but could also constitute a sort of insurance against future volatility and operating risk (Minton and Schrand, 1999; Han and Qiu, 2007). Moreover, cash

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[4] As said, TIER 1+TIER2 over risk weighted assets must be > 8% (Basel III).
[5] IMF (2016)

holdings may be value increasing for a firm (Denis and Sibilkov, 2010) and could also enhance its progress in terms of financial performance (Jabbouri and Almustafa, 2021).

Considering all of the previous assumptions, the nature of the event exploited and the likely willingness of firms to secure some liquidity for unanticipated needs, we hypothesize the following:

H1: WHEN CAPITAL REQUIREMENTS ARE TIGHTENED FIRMS START TO HOARD CASH HOLDINGS

EMPIRICAL SETTING

Data

The source of data functional to this research is the Orbis database. The database is operated by Bureau Van Dijk and provides accounts and equity data for global companies and stock indices. Chosen data are characterized by yearly frequency and are collected for active firms operating during the period between 2014 and 2019. This interval allows tracing the difference in cash holdings after the baseline year corresponding to the implementation of the CRD IV package comprising the OND under scrutiny for each treated country.

Overall, the sample includes all firms incorporated in the EU 28 countries, excluding public authorities and financial firms. We exclude these companies because they may be able to better shelter from a reduction in loans thanks to their strict relationship with public funds or state authorities and their privileged position in negotiating with banks. The included firms are prevalently independent ones and must possess available financial data for the entire six years interval considered. This process yielded 9,531,884 firm-year observations, for a total of 1,733,623 unique firms. Table 1 and Table 2 report the distribution of observations over the sample period.

<<INSERT TABLE 1 HERE>>

<< INSERT TABLE 2 HERE >>

Research Design

Empirically assessing the impact of bank capital regulatory norms and their spillover effects is not an easy task. Difficulties in this sense concern obstacles in controlling for concurrent shocks of different nature than one considered and dealing with the structure of norms' package (CRD IV).

The CRD IV package, in force from 2014, it is one of a kind because comprises a series of mandatory requirements not only in terms of capital but also liquidity, leverage and corporate governance (EU regulation 575/2013 and EU Directive 2013/36). The capital section of the regulation in particular considers two mandatory (TIER 1 and TIER 2)[6] and three additional measures of capital evaluation (Capital Conservation, Countercyclical and Systemically Important Financial Institutions – SIFI - buffers). Useful feature of the buffers it is their flexibility of

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[6]Starting from Basel II implementation banks are required to maintain a TIER 1 of 6% (Additional Tier 4.5%+CET1 1.5%) plus a TIER 2 of 2% over Risk Weighted Assets.

application, which enables each national central bank to ask for their implementation during particular periods of economic distress[7]. We exploit the peculiarity of this framework to test whether the settlement of additional buffers of capital above standards may induce firms to accumulate more cash. The supplementary requirements are prescribed within a set of 64 voluntary norms embracing a vast array of subjects which are called Options and National Discretions (ONDs)[8]. Between the latter, OND n.133(18) which gives member states the option to apply a systemic risk buffer (SIFI) to all banks' exposures, constitutes the independent variable of main interest for our analysis. Table 3 reports the year of OND implementation for the different countries.

<< INSERT TABLE 3 HERE >>

In order to test the research hypothesis, we ran the following OLS model:

$$CashHoldings_{i,t} = \alpha_0 + \alpha_1 ONDs + \delta Controls + fixed\ effects + e \qquad (1)$$

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[7] In particular, Capital Conservation buffer is designed to anticipate the negative consequences of a potential financial downturn; Countercyclical buffer is designed to build up additional capital during periods of excessive credit growth when risks of system-wide stress are observed to be growing markedly; SIFI buffer is designed to reduce the systemic risk between financial institutions. Capital Conservation and Countercyclical buffers may be activated through a further increase of CET 1 (TIER 1 over RWA) requisite which ranges between 0 and 2.5%; SIFI buffer's increase may instead vary from 1% to 2.5%.

[8] Full list of ONDs it is available in the final part of the Appendix.

where the dependent variable $CashHoldings_{i,t}$ is the total amount of cash holdings over assets retained by firm i in year t; ONDs is a dummy variable which equals to 1 when a country chooses to adopt OND 133 and 0 when OND 133 is not adopted; $\delta Controls$ captures three conventional control variables for each firm such as *Leverage*, measured as non-current Liabilities over Total Assets; *Performance*, defined as EBIT over Total Assets and *Size*, which is the logarithm of Total Assets; *Fixed effects* include firm and year fixed effects. All variables are winsorized at the 1st and 99th percentile. Table A in the appendix reports an exhaustive overview of variables' definitions.

Table 4 reports the descriptive statistics of main model variables. The summary statistics show that, on average, the sample firms hold 23.16% of their assets in cash and cash equivalents. The average Size is 12.28, suggesting that the majority of firms are medium and big.

<<INSERT TABLE 4 HERE>>

Table 5 discloses correlations among the main variables of the regression model. Not unpredictably and in line with comparable analyses, Size and Leverage are negatively related with Cash Holdings suggesting that the bigger or the more indebted the firm, the lower is the percentage of cash that it has the necessity or possibility to accumulate for future operations. More in general, larger firms are less likely to be financially constrained and can continue to work without specific liquidity needs. Different insight lies behind leverage whose peculiarities usually hinder any prospect to hold cash. Inversely, Performance is positively associated with cash holdings, confirming that well-operating companies manage to set aside some money in order to capture upcoming growth opportunities.

<<INSERT TABLE 5 HERE>>

RESULTS

Results of the analysis are presented in Table 6. Consistently with our hypothesis, the coefficient of the dummy OND is positive and statistically significant ($\alpha1 = 0.006$; $p < 0.001$). This result implies that the voluntary adoption of a SIFI buffer by a national government, to whom banks had to comply, boosts firm cash holdings by 0.64% on average and all else equal. More precisely, the intuition suggests that firms' management recognizes the immediate drawbacks of a strengthening in capital requirements for banks, and moves to secure own funds in order to deal with possible credit shortages. Coefficients of the control variables Size, Performance and Leverage are in turn significant, revealing the validity of the model.

<<INSERT TABLE 6 HERE>>

ADDITIONAL ANALYSES

Financial Constraints

In order to test whether the magnitude of previous results changes on the basis of specific sample characteristics, we perform a further cross-sectional analysis based on firm-level measures of financial constraints. In fact, as cash holdings are indisputably useful when credit starts to run low, this does not mean that liquidity accumulation patterns are the same for each company. Financially constrained firms for example, given their greater hardship in ensuring funding, usually have the necessity to stock a higher amount of liquid assets with respect to unconstrained ones.

To evaluate the role of financial constraints in shaping firms' propensity to cash hoarding, we adopt one proxy commonly used in the academic literature, i.e. the size of the firm (ex. Joseph et al., 2020). More precisely, we categorize firms into small or large on the basis of their total assets[9] in 2013; then, we estimate the regression for our base model. The partitioning is better understood in the following way: small firms have generically more troubles in operating when credit is rationed because they usually do not possess adequate means to obtain part of the limited liquidity banks may be willing to loan. The reasoning behind lies upon the fact that small firms present a higher volatility of cash flows and less financial guarantees with respect to larger ones. At this point, lending represents a high risk for banks. Direct consequence for companies is a situation of financial restraints. Results of the model estimation are presented in Table 7. For brevity, we only display the parameters of our main regressor (OND).

<<INSERT TABLE 7 HERE>>

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[9] Small firms are those in the lowest quartile of the Total Assets distribution while Large firms are those in the highest quartile.

As shown, results are significant for both small (constrained) and large (unconstrained) group of firms analyzed, but in the latter case we assist to a reversal in the relationship between the OND coefficient and cash holdings. Small firms indeed tend to accumulate 1.61% more on average after a OND implementation; on the contrary large companies seem to actually reduce the amount of cash on hand by 0.59% (difference is significant at 1%). These outcomes are consistent with our hypothesis and suggest that while small companies pursue a cash savings policy in order to cope with future commitments; large companies instead mobilize their resources. Actually, firms that have bigger amount of liquid reserves and possess the necessary linkages to eventually borrow, seem to invest in order to reinforce their own competitive position. In other words, big companies would take advantage of the situation to cannibalize part of market share and exclude competitors from the business (Froot, Scharfstein and Stein, 1993).

Relative Cash position

To deepen our knowledge on the drivers behind cash holdings' policies and also to guarantee the validity of our inference on the behavior of firms, we perform a conclusive analysis based on an industry-level index of firms' relative cash position. An evaluation of this kind is useful to understand if the amount of cash that an enterprise detains before the OND implementation is a predictor of the behavior a firm will follow when the discretionary norm is applied.

Firstly, we proceed by splitting firms into high cash-endowed and low cash-endowed on the basis of their pertinence to the highest or to the lowest quartile of the distribution of cash holdings relative to competitors in the same industry (NACE2 rev)[10]. Then we regress using model (1). All variables are measured in 2013.

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[10]Specifically, we follow Joseph et al (2020) and compute Relative Cash by subtracting from the firm's cash holdings its industry mean and divide the difference by the industry standard deviation in 2013.

Table 8 below shows our findings. For brevity, we only display the parameters of our main regressor (OND). As it can be seen, only the coefficient of cash-poor is significant at 1%. This means that whilst cash-poor firms raise their liquidity holdings by 2.24% on average after the OND implementation; for highly cash endowed firms the discretionary norm seem to have no impact on their liquid reserves. The difference between coefficients is statistically significant at 1% level.

<<INSERT TABLE 8 HERE>>

Not surprisingly, these data are aligned with the outcomes of some of the previous studies on size as a proxy of corporate financial constraints (Opler, Pinkowitz, Stulz and Williamson, 1999; Bigelli and Vidal, 2012). The capacity of a firm in fact, may be even measured in terms of the amount of liquid assets it owns and can dispose of when acting on the market. Big firms are usually the ones that hold the highest percentage of liquidity and can more easily continue to seize profitable investment opportunities despite the tightening of lending. As the ability of cash-poor firms to operate declines after a bank capital reinforcement, cash-rich firms can satisfy the market demand at the expense of these shrinking or failing firms. Thus, even if credit offering contracts when capital measures are implemented, the market for cash-rich firms may actually expand.

Having cash on hand enables firms to invest strategically (Campello, 2006), even by lowering prices (Gilchrist, Schoenle, Sim and Zakrajsek, 2017) and thus deterring rivals from entering the business (Benoit, 1984). These policies are especially fruitful when credit conditions deteriorate and external finance becomes more costly. Cash rich firms in this respect, given the market

dominating position acquired through past investments, can even more increase their profits leaving rivals seeing their competitive positions weaken further.

CONCLUSIONS

Exploiting a large set of European data drawn from Orbis Bureau Van Dijk during the period 2014-2019, this paper investigates the consequences of a reinforcement in bank regulatory capital requirements on corporate cash holdings. We focus our attention on CRD IV, a package of norms applying the Basel III Accord in Europe, and show that the member states' voluntary adoption of additional buffers of capital (OND 133) over the standards has a positive impact on firms' liquidity hoardings. The effect is more persistent for small firms as hypothesized but it reverts for big ones. Perfectly consistent with these outcomes, cash accumulation is greater for companies that at the moment of CRD IV execution possess relatively low cash with respect to competitors, whereas basically does not exist for cash-rich firms.

The theory behind our findings relies on the expectation that, as reported by previous studies, an increase in capital requirements prompts banks to reduce the short-term amount of loanable funds in order to meet the mandatory Common Equity Tiers (CET) set by the Basel Committee. Small firms are particularly affected by this scenario given their financial constraints; large companies instead, possessing larger liquidity and having easier access to credit, take advantage of the situation to acquire more power on the market.

Overall, the analysis sheds light on the immediate consequences of a strengthening in capital requirements in corporate terms. The latter anyway not necessarily darken the general goodness of a capital norm whose long term positive implications have been repeatedly evidenced by the most part of the academic literature.

REFERENCES

Acharya V., Almeida H. & Campello M. (2007). Is cash negative debt? A hedging perspective on corporate financial policies. *Journal of Financial Intermediation*, vol. 16, issue 4, 515-554. https://doi.org/10.1016/j.jfi.2007.04.001

Almeida H., Campello M. & Weisbach M. S. (2004). The cash flow sensitivity of cash. *Journal of Finance*, 59, 1777–1804. https://doi.org/10.1111/j.1540-6261.2004.00679.x

Arshadi N., & Kane E.J. (1989). The S&L Insurance Mess: how did it happen? *Journal of Finance, 44*, 1444. https://doi.org/10.2307/2328656

Arslan O., Florackis C. & Ozkan A. (2006). The role of cash holdings in reducing investment-cash flow sensitivity: evidence from a financial crisis period in an emerging market. *Emerging Markets Review*, 7(4), 320–338. https://doi.org/10.1016/j.ememar.2006.09.003

Azmat Q. & Iqbal A. M. (2017). The role of financial constraints on precautionary cash holdings: evidence from Pakistan. *Economic Research*, 596-610. https://doi.org/ 10.1080/1331677X.2017.1305770

Benoit J. (1984). Financially constrained entry in a game with incomplete information. *Rand Journal of Economics*, 15, 490–499. https://doi.org/10.2307/2555520

Bigelli M. & Vidal J. S. (2012). Cash holdings in private firms. *Journal of Banking & Finance*, Volume 36, Issue 1,p. 26-35. https://doi.org/10.1016/j.jbankfin.2011.06.004

Bridges J. , Gregory D., Nielsen M., Pezzini S., Radia A. & Spaltro M. (2014). Bank of England Working Paper No. 486. Retrieved from: https://www.bankofengland.co.uk/working-paper/2014/the-impact-of-capital-requirements-on-bank-lending

Campello M. (2006). Debt financing: Does it boost or hurt firm performance in product markets? *Journal of Financial Economics*, 82, 135–172. https://doi.org/10.1016/j.jfineco.2005.04.001

Campello M., Graham J. & Harvey C. (2010). The real effects of financial constraints: evidence from a financial crisis. *Journal of Financial Economics*, 97, 470–487. https://doi.org/10.1016/j.jfineco.2010.02.009

Chiuri M., Ferri G. & Majnoni G. (2002). The macroeconomic impact of bank capital requirements in emerging economies: Past evidence to assess the future. *Journal of Banking & Finance,* Volume 26, Issue 5, 881-904. https://doi.org/10.1016/S0378-4266(01)00267-9

Chodorow-Reich G. (2014). The employment effects of credit market disruptions: firm level evidence from the 2008-9 financial crisis. *Quarterly Journal of Economics*, 129(1), 1-59. https://doi.org/10.1093/qje/qjt031

Cingano F., Manaresi F. & Sette E. (2016). Does credit crunch investment down? New evidence of the real effects of the bank lending channel. *Review of Financial Studies*, 29, 2737-2773. https://doi.org/10.1093/rfs/hhw040

Cosimano T. & Hakura D. (2011). Bank behavior in response to Basel III: a cross-country analysis. IMF Working Paper No. 11/119. Available at SSRN: https://ssrn.com/abstract=1860182 or http://dx.doi.org/10.2139/ssrn.1860182

Covas F. & Driscoll J. (2014). Bank liquidity and capital regulation in general equilibrium. FEDS Working Paper No. 2014-85. Available at SSRN: https://ssrn.com/abstract=2520193 or http://dx.doi.org/10.2139/ssrn.2520193

Darnell A. & Evans J. L. (1988). The holding cost of money. *Applied Economics*, 20:3, 395-406. https://doi.org: 10.1080/00036848800000052

Denis D. & Sibilkov V. (2010). Financial constraints, investment, and the value of cash holdings. *The Review of Financial Studies*, Volume 23, Issue 1, 247–269. https://doi.org/10.1093/rfs/hhp031

Diamond D. & Rajan R. (1999). A Theory of Bank Capital. *Journal of Finance,* 55 (6): 2431–65. https://doi.org/10.1111/0022-1082.00296

De Marco F. & Wieladek T. (2021). The real effects of capital requirements and monetary policy: Evidence from the United Kingdom. *Journal of Banking & Finance*, Elsevier, vol. 133(C). https://doi.org/10.1016/j.jbankfin.2021.106237

Dittmar, A., Mahrt-Smith, J., & Servaes, H. (2003). International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative Analysis*, 38(1), 111-133. https://doi.org/10.2307/4126766

Duchin R., Ozbas O. & Sensoy B. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics*, 97, 418-435. https://doi.org/10.1016/j.jfineco.2009.12.008

Fraisse et al. (2020). The real effects of bank capital requirements. *Management Science.* Vol. 66, 1. https://doi.org/10.1287/mnsc.2018.3222

Froot K., Scharfstein D. & Stein J. (1993). Risk management: coordinating corporate investment and financing policies. *Journal of Finance*, 48(5), 1629-1658. https://doi.org/10.1111/j.1540-6261.1993.tb05123.x

Furlong F. (1992). Capital Regulation and bank lending. *Economic Review*, 1992, 23-33. Retrieved from: https://ideas.repec.org/a/fip/fedfer/y1992p23-33n3.html

Gambacorta L. & Mistrulli P. (2004). Does bank capital affect lending behavior? *Journal of Financial Intermediation*, Volume 13, Issue 4, 436-457. https://doi.org/10.1016/j.jfi.2004.06.001

Gilchrist S., Schoenle R., Sim J. & Zakrajsek E. (2017). Inflation dynamics during the financial crisis. *American Economic Review*, 107(3), 785-823. https://doi.org/10.1257/aer.20150248

Greenwald B., Stiglitz J. E. & Weiss B. (1984). Informational imperfections in the capital market and macroeconomic fluctuations. *The American Economic Review* 74, 194-199. Available at: http://www.jstor.org/stable/1816354

Han S. & Qiu J. (2007). Corporate precautionary cash holdings. *Journal of Corporate Finance*, 13, 43–57. https://doi.org/10.1016/j.jcorpfin.2006.05.002

Harford J. (1999). Corporate cash reserves and acquisitions. *Journal of Finance*, 54(6), 1969–1997. https://doi.org/10.1111/0022-1082.00179

Haubrich J. & Wachtel P. (1993). Capital requirements and shifts in commercial bank portfolios. *Economic Review,* vol. 29, no. 3, 2-15. Retrieved from: https://ideas.repec.org/a/fip/fedcer/y1993iqiiip2-15nv.29no.3.html

Iyer R., Peydro J., da-Rocha-Lopes S. & Schoar A. (2014). Interbank liquidity crunch and the firm credit crunch: evidence from the 2007-2009 crisis. *Review of Financial Studies*, 27(1), 347-372. https://doi.org/10.1093/rfs/hht056

Jabbouri, I. & Almustafa, H. (2021). Corporate cash holdings, firm performance and national governance: evidence from emerging markets. *International Journal of Managerial Finance*, Vol. 17 No. 5, pp. 783-801. https://doi.org/10.1108/IJMF-07-2020-0342

Jensen M. (1986). Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review*, 76, 323–329. http://dx.doi.org/10.2139/ssrn.99580

Joseph A., Kneer C., Van Horen N. & Saleheen J. (2020). All you need is cash: corporate cash holdings and investment after the financial crisis. CEPR Discussion Paper No. DP14199. Available at SSRN: https://ssrn.com/abstract=3504629

Kalcheva I. & Lins K. (2007). International evidence on cash holdings and expected managerial agency problems. *The Review of Financial Studies*, Volume 20, Issue 4, 1087–1112. https://doi.org/10.1093/rfs/hhm023

Keynes J. M. (1936). The general theory of employment, interest and money. *Harcourt Brace, London*.

Kim C.-S., Mauer D. & Sherman A. (1998). The determinants of corporate liquidity: theory and evidence. *The Journal of Financial and Quantitative Analysis*, Vol. 33, No. 3, 335-359. https://doi.org/10.2307/2331099

Lian Y., Sepehri M. & Foley M. (2011). Corporate cash holdings and financial crisis: an empirical study of Chinese companies. *Eurasian Business Review*, 112-124. https://doi.org/10.14208/BF03353801

Martinez-Miera D. & Suarez J. (2014). A Macroeconomic model of endogenous systemic risk Taking. *Mimeo*. Available at: http://www.eief.it/files/2015/09/mmiera-suarez2014.pdf

Miller, M.H. & Orr, D. (1966). A model of the demand for money by firms. *Quarterly Journal of Economics*, 413–435. https://doi.org/10.2307/1880728

Minton B. & Schrand C. (1999). The impact of cash flow volatility on discretionary investment and the cost of debt and equity financing. *Journal of Financial Economics*, 54, 423–460. https://doi.org/10.1016/S0304-405X(99)00042-2

Modigliani F. & Miller M. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, vol. 48, no. 3, pp. 261–97, Available at: http://www.jstor.org/stable/1809766.

Myers S. & Majluf N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13, 187-221. https://doi.org/10.1016/0304-405X(84)90023-0

Ongena S., Peydro J. S. & Van Horen N. (2015). Shocks abroad, pain at home? Bank-firm-level evidence on the international transmission of financial shocks. *IMF Economic Review*, 63(4), 698-750. https://doi.org/10.1057/imfer.2015.34

Opler T., Pinkowitz L., Stulz R. & Williamson R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, 52, 3–46. https://doi.org/10.1016/S0304-405X(99)00003-3

Pinkowitz, L., Stulz, R., & Williamson, R. (2013). Is there a U.S. High Cash Holdings Puzzle after the Financial Crisis? *Corporate Finance: Capital Structure & Payout Policies Journal*. http://dx.doi.org/10.2139/ssrn.2253943

Shiau H., Chang Y. & Yang Y. (2018). The Cash Holdings and Corporate Investment Surrounding Financial Crisis: The Cases of China and Taiwan. *Chinese Economy*, 2018, vol. 51, issue 2, 175-207. https://doi.org/10.1080/10971475.2018.1447833

Shin H. & Kim Y. (2002). Agency costs and efficiency of business capital investment: evidence from quarterly capital expenditures. *Journal of Corporate Finance*, Volume 8, Issue 2, 139-158. https://doi.org/10.1016/S0929-1199(01)00033-5

Song K. & Lee Y. (2012). Long-term effects of a financial crisis: evidence from cash holdings of east Asian firms. *Journal of Financial and Quantitative Analysis*, 47(3), 617-641. https://doi.org/10.1017/S0022109012000142

Sun Z. & Yang Y. (2015). Corporate precautionary savings: Evidence from the recent financial crisis. *The Quarterly Review of Economics and Finance*, volume 56, 175-186. https://doi.org/10.1016/j.qref.2014.09.006

Suturova B. & Teply P. (2013). The impact of basel III on lending rates of EU banks. *Czech Journal of Economics and Finance,* vol. 63(3), pages 226-243. Retrieved from: https://journal.fsv.cuni.cz/mag/article/show/id/1274

Van den Heuvel S. (2002). Does bank capital matter for monetary transmission? *Economic Policy Review*, Vol. 8, No. 1. Available at SSRN: https://ssrn.com/abstract=831946

APPENDIX

TABLE 1 – Sample distribution per year

Year	#Obs	%
2014	1,502,196	15.76
2015	1,656,550	17.38
2016	1,409,115	14.78
2017	1,522,279	15.97
2018	1,732,661	18.18
2019	1,709,083	17.93
Total	9,531,884	100
Unique	1,733,623	

Number of observations for each year considered in the analysis. The frequency distribution appears to be homogenous across the sample.

TABLE 2 – Sample distribution per country

Country	#Obs	%
Austria	5,835	0.06
Belgium	127,942	1.34
Bulgaria	601,106	6.31
Croatia	288,915	3.03
Cyprus	216	0.002
Czech Republic	121,611	1.28
Denmark	490	0.01
Estonia	143,710	1.51
Finland	115,939	1.22
France	504,572	5.29
Germany	17,286	0.18
Greece	15,312	0.16
Hungary	597,850	6.27
Ireland	306	0.003
Italy	2,099,753	22.03
Latvia	321,566	3.37
Lithuania	17,904	0.19
Luxembourg	1,914	0.02
Malta	846	0.01
Netherlands	2,275	0.02
Poland	2,170	0.02
Portugal	961,032	10.08
Slovak Republic	456,309	4.79
Romania	1,612,218	16.91
Slovenia	180,630	1.90
Spain	947,100	9.94
Sweden	383,247	4.02
United Kingdom	3,830	0.04
Total	9,531,884	100

Number of observations for each EU country considered in the analysis.

FIGURE 1 – CRD IV CAPITAL REQUIREMENTS				
MANDATORY		**FLEXIBLE BUFFERS**		
CET 1	CET 2	CAPITAL CONSERVATION	COUNTERCYCLICAL	SIFI
1.5% (ADD. TIER 1) 4.5% (TIER 1)	2.0% (TIER 2)	0-2.5% (CET 1)	0-2.5% (CET 1)	1-2.5% (CET 1)
TOTAL: 8%		**TOTAL: 2.5-7.5%**		
OVERALL: 10.5-15.5%				

Source: European Banking Authority

TABLE 3 – OND

Country	Year of application
Austria	2016
Bulgaria	2014
Croazia	2014
Czech Republic	2014
Denmark	2015
Estonia	2014
Finland	2019
Hungary	2017
Netherlands	2016
Poland	2018
Romania	2016
Slovakia	2017
Sweden	2015
UK	2019

Year of application of the OND within each country.

This table provides the definition of variables used within the regression analysis and their source.

TAB A – Variables definition

Variables (data source)	Definition
Cash Holdings (Orbis Bureau Van Dijk)	Ratio of total amount of cash holdings over total assets
OND (European Banking Authority)	Dummy variable which equals 1 for firms within a country which chooses to adopt OND 133 and 0 otherwise
Size (Orbis Bureau Van Dijk)	Natural logarithm of total assets
Performance (Orbis Bureau Van Dijk)	Ratio of EBIT over total assets
Leverage (Orbis Bureau Van Dijk)	Ratio of non-current liabilities over total assets

This table provides the definition of variables used within the regression analysis and their source.

TABLE 4 – Descriptive statistics

	N	Mean	SD	p25	Median	p75
CashHoldings	9,531,884	0.2316	0.2735	0.0251	0.1140	0.3454
Size	9,531,884	12.277	2.3185	10.765	12.320	13.805
Performance	9,531,884	0.0493	0.3263	0	0.0423	0.1340
Leverage	9,531,884	0.2170	0.4675	0	0.0335	0.2494

The table provides descriptive statistics for the variables used in the main regression model. *CashHoldings*$_{i,t}$ is the total amount of cash holdings over assets retained by firm i in year t; *ONDs* is a dummy variable which equals to 1 for firms within a country which chooses to adopt OND 133 and 0 otherwise; Leverage, is measured as non-current Liabilities over Total Assets; *Performance* is computed as EBIT over Total Assets; *Size* is the logarithm of Total Assets. *Fixed effects* include firm and year fixed effects. We include firm and year fixed effect in the regressions, but we do not report the coefficient. t-statistics are reported in brackets.

TABLE 5 – Correlation matrix

		(1)	(2)	(3)	(4)
(1)	CashHoldings	1.0000			
(2)	Size	-0.3993	1.0000		
(3)	Performance	0.1366	0.1206	1.0000	
(4)	Leverage	-0.1331	-0.0751	-0.2032	1.0000

The table reports Pearson correlation coefficients among the main variables included in the analysis. *CashHoldings*$_{i,t}$ is the total amount of cash holdings over assets retained by firm i in year t; *ONDs* is a dummy variable which equals to 1 for firms within a country which chooses to adopt OND 133 and 0 otherwise; *Leverage*, is measured as non-current Liabilities over Total Assets; *Performance* is computed as EBIT over Total Assets; *Size* is the logarithm of Total Assets. *Fixed effects* include firm and year fixed effects. We include firm and year fixed effect in the regressions, but we do not report the coefficient. t-statistics are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

TABLE 6 – Regression results

Model	(1)
Dep. Var.	CashHoldings
OND	0.0064***
	[32.94]
Size	-0.0426***
	[-402.74]
Performance	0.0671***
	[358.40]
Leverage	-0.0260***
	[-130.74]
Constant	0.7691***
	[584.69]
Year fixed effects	Yes
Firm fixed effects	Yes
N	9,531,884

This table presents the results of the analysis for the main regression model considered. *CashHoldings*$_{i,t}$ is the total amount of cash holdings over assets retained by firm i in year t; *ONDs* is a dummy variable which equals to 1 for firms within a country which chooses to adopt OND 133 and 0 otherwise; *Leverage*, is measured as non-current Liabilities over Total Assets; *Performance* is computed as EBIT over Total Assets; *Size* is the logarithm of Total Assets. *Fixed effects* include firm and year fixed effects. We include firm and year fixed effect in the regressions, but we do not report the coefficient. t-statistics are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

TABLE 7 – Cross-firm financial constraints' impact on cash holdings 2014-2019

Financial Constraints	Constrained	Unconstrained	Difference (p-value)
Size	OND (SMALL)	OND (LARGE)	
	0.0161***	-0.0059***	0.000***
	(0.000)	(0.000)	
N	2,087,053	2,310,600	4,397,653

Notes: This table presents the estimates of OND 133 on cash holdings from 2014-2019 across different groups of firms based on financial constraints. Firms are classified on the basis of size proxy. Constrained firms in terms of size are firms in the bottom quartile of the total asset distribution and unconstrained firms are those in the top quartile. All variables are measured in 2013 unless otherwise specified. All regressions include the control variables as specified in model (1) and include firm and time fixed effects. The last column presents the p-value associated with the test that compares the difference in coefficients between the constrained and unconstrained subgroups. The number of firms in each group is specified in last rows. Standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

TABLE 8 – Cross-firm relative cash impact on cash holdings 2014-2019

Relative Cash	OND (LOW)	OND (HIGH)	Difference (p-value)
	0.0224***	0.0005	0.000***
	(0.000)	(0.338)	
N	2,226,323	2,164,524	4,390,847

Notes: This table presents the estimates of OND 133 on cash holdings from 2014-2019 across different groups of firms based on industry relative-cash position. Firms are classified in cash rich and cash poor on the basis of their place within the relative cash distribution. Cash rich and cash poor firms are respectively those in upper quartile and in the lower quartile of the distribution. All variables are measured in 2013 unless otherwise specified. All regressions include the control variables as specified in model (1) and include country and time fixed effects. The last column presents the p-value associated with the test that compares the difference in coefficients between the constrained and unconstrained subgroups. The number of firms in each group is specified in the last row. Standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

ONDs LIST – source: European Banking Authority

-	Directive 2013/36/EU	Regulation (EU) No 575/2013	LCR delegated regulation (EU) 2015/61	Addressee	Scope	Denomination	Description of the option or discretion
010	*Date of the last update of information in this template*						
020	Article 9(2)			Member States	Credit Institutions	Exception to the prohibition against persons or undertakings other than credit institutions from taking deposits or other repayable funds from the public	The prohibition against persons or undertakings other than credit institutions from carrying out the business of taking deposits or other repayable funds from the public shall not apply to a Member State, a Member State's regional or local authorities, a public international bodies of which one or more Member States are members, or to cases expressly covered by national or union law, provided that those activities are subject to regulations and controls intended to protect depositors and investors.

030	Article 12(3)			Member States	Credit Institutions	Initial capital	Member States may decide that credit institutions which do not fulfill the requirements to hold separate own funds and which were in existence on 15 December 1979 may continue to carry out their business.
040	Article 12(3)			Member States	Credit Institutions	Initial capital	Credit Institutions for which Member States have decided that they can continue to carry out their business according to Article 12(3) of Directive 2013/36/EU may be exempted by MS from complying with the requirements contained in the first subparagraph of Article 13(1) of Directive 2013/36/EU.
050	Article 12(4)			Member States	Credit Institutions	Initial capital	Member States may grant authorisation to particular categories of credit institutions the

							initial capital of which is less that EUR 5 million, provided that the initial capital is not less than EUR 1 million and the Member State concerned notifies the Commission and EBA of its reasons for exercising that option.
060	Article 21(1)			Competent Authorities	Credit Institutions	Exemptions for credit institutions permanently affiliated to a central body	Competent authorities may exempt with regard to credit institutions permanently affiliated to a central body from the requirements set out in Articles 10, 12 and 13(1) of Directive 2013/36/EU.

070	Article 29(3)			Member States	Investment Firms	Initial capital of particular types of investment firms	Member States may reduce the minimum amount of initial capital from EUR 125 000 to EUR 50 000 where a firm is not authorised to hold client money or securities, to deal for its own account, or to underwrite issues on a firm commitment basis.
080	Article 32(1)			Member States	Investment Firms	Investment firms' initial capital grandfathering clause	Member States may continue authorising investment firm and firms covered by Article 30 of Directive 2013/36/EU which were in existence on or before 31 December 1995, the own funds of which are less than the initial capital levels specified for

							them in Article 28(2), Article 29(1) or (3) or Article 30 of that Directive.
090	Article 40			Competent Authorities	Credit Institutions	Reporting requirements to host competent authorities	The competent authorities of host Member States may, for information, statistical or supervisory purposes, require that all credit institutions having branches within their territories shall report to them periodically on their activities in those host Member States, in particular to assess whether a branch is significant in accordance with Article 51(1) of Directive 2013/36/EU.
100	Article 129(2)			Member States	Investment Firms	Exemption from the requirement to maintain a capital conservation buffer for small and medium-sized investment firms	By way of derogation from paragraph 1 of Article 129, a Member State may exempt small and medium-sized investment firms from the requirements set out in that

							paragraph if such an exemption does not threaten the stability of the financial system of that Member State.
110	Article 130(2)			Member States	Investment Firms	Exemption from the requirement to maintain a countercyclical capital buffer for small and medium-sized investment firms	By way of derogation from paragraph 1 of Article 130, a Member State may exempt small and medium-sized investment firms from the requirements set out in that paragraph if such an exemption does not threaten the stability of the financial system of that Member State.
120	Article 133(18)			Member States	Credit Institutions and Investment firms	Requirement to maintain a systemic risk buffer	Member States may apply a systemic risk buffer to all exposures.
130	Article 134(1)			Member States	Credit Institutions and Investment firms	Recognition of a systemic risk buffer rate	Other Member States may recognise the systemic risk buffer rate set according to Article 133 and may apply that buffer rate to domestically authorised institutions for

							the exposures located in the Member State setting that buffer rate.
140	Article 152 first paragraph			Member States	Credit Institutions	Reporting requirements to host competent authorities	The competent authorities of host Member States may, for statistical purposes, require that all credit institutions having branches within their territories shall report to them periodically on their activities in those host Member States.
150	Article 152 second paragraph			Member States	Credit Institutions	Reporting requirements to host competent authorities	Host Member States may require that branches of credit institutions from other Member States provide the same information as they require from national credit institutions for that purpose.
160	Article 160(6)			Member States	Credit Institutions and Investment firms	Transitional provisions for capital buffers	Member States may impose a shorter transitional period for capital buffers than that specified in

							paragraphs 1 to 4 of Article 160. Such a shorter transitional period may be recognised by other Member States.
170		Article 4(2)		Member States or Competent Authorities	Credit Institutions and Investment firms	Treatment of indirect holdings in real estate	Member States or their competent authorities may allow shares constituting an equivalent indirect holding of immovable property to be treated as a direct holding of immovable property provided that such indirect holding is specifically regulated in the national law of the Member State and, when pledged as collateral, provides equivalent protection to creditors.
180		Article 6(4)		Competent Authorities	Investment Firms	Application of requirements on an individual basis	Pending the report from the Commission in accordance with Article 508(3), competent authorities may exempt investment firms

							from compliance with the obligations laid down in Part Six (liquidity) taking into account the nature, scale and complexity of the investment firms' activities.
190		Article 24(2)				Reporting and the compulsory use of IFRS	Competent authorities may require that institutions effect the valuation of assets and off-balance sheet items and the determination of own funds in accordance with International Accounting Standards as applicable under Regulation (EC) No 1606/2002.
200		Article 89(3)		Competent Authorities	Credit Institutions and Investment firms	Risk weighting and prohibition of qualifying holdings outside the financial sector	Competent authorities apply the following requirements to qualifying holdings of institutions referred to in paragraphs 1 and 2: for the purpose of calculating the capital requirement in accordance with Part Three of

						this Regulation, institutions shall apply a risk weight of 1250% to the greater of the following: (i) the amount of qualifying holdings referred to in paragraph 1 in excess of 15% of eligible capital; (ii) the total amount of qualifying holdings referred to in paragraph 2 that exceed 60% of the eligible capital of the institution;
201		Article 89(3)		Competent Authorities	Credit Institutions and Investment firms	Risk weighting and prohibition of qualifying holdings outside the financial sector	Competent authorities apply the following requirements to qualifying holdings of institutions referred to in paragraphs 1 and 2: the competent authorities shall prohibit institutions from having qualifying holdings referred to in paragraphs 1 and 2 the amount of which exceeds

							the percentages of eligible capital laid down in those paragraphs.
210		Article 95(2)		Competent Authorities	Investment Firms	Requirements for investment firms with limited authorisation to provide investment services	Competent authorities may set the own fund requirements for investment firms with limited authorisation to provide investment services as the own fund requirements that would be binding on those firms according to the national transposition measures in force on 31 December 2013 for Directive 2006/49/EC and Directive 2006/48/EC.
220		Article 99(3)		Competent Authorities	Credit Institutions	Reporting on own funds requirements and financial information	Competent authorities may require those credit institutions applying international accounting standards as applicable under Regulation (EC) No 1606/2002 for the reporting of own funds on

						a consolidated basis pursuant to Article 24(2) of this Regulation to also report financial information as laid down in paragraph 2 of this Article.
230		Article 124(2)		Competent Authorities	Credit Institutions and Investment firms	Risk weights and criteria applied to exposures secured by mortgages on immovable property	Competent authorities may set a higher risk weight or stricter criteria than those set out in Article 125(2) and Article 126(2), where appropriate, on the basis of financial stability considerations.
240		Article 129(1)				Exposures in the form of covered bonds	The competent authorities may, after consulting EBA, partly waive the application of point (c) of the first subparagraph and allow credit quality step 2 for up to 10 % of the total exposure of the nominal amount of outstanding covered bonds of the issuing institution, provided that significant

							potential concentration problems in the Member States concerned can be documented due to the application of the credit quality step 1 requirement referred to in that point.
250		Article 164(5)		Competent Authorities	Credit Institutions and Investment firms	Minimum values of exposure weighted average Loss Given Default (LGD) for exposures secured by property	Based on the data collected under Article 101 and taking into account forward-looking immovable property market developments and any other relevant indicators, the competent authorities shall periodically, and at least annually, assess whether the minimum LGD values in paragraph 4 of this Article are appropriate for exposures secured by residential property or commercial immovable property located in their territory. Competent authorities may,

							where appropriate on the basis of financial stability considerations, set higher minimum values of exposure weighted average LGD for exposures secured by immovable property in their territory.
260		Article 178(1)(b)		Competent Authorities	Credit Institutions and Investment firms	Default of an obligor	Competent authorities may replace the 90 days with 180 days for exposures secured by residential property or SME commercial immovable property in the retail exposure class, as well as exposures to public sector entities.
270		Article 284(4)		Competent Authorities	Credit Institutions and Investment firms	Exposure value	Competent authorities may require an α higher than 1.4 or permit institutions to use their own estimates in accordance with Article 284 (9)

280		Article 284(9)		Competent Authorities	Credit Institutions and Investment firms	Exposure value	Competent authorities may permit institutions to use their own estimates of alpha
290		Article 327(2)		Competent Authorities	Credit Institutions and Investment firms	Netting between a convertible and an offsetting position in the underlying instrument	Competent authorities may adopt an approach under which the likelihood of a particular convertible's being converted is taken into account or require an own funds requirement to cover any loss which conversion might entail.
300		Article 395(1)		Competent Authorities	Competent Authorities	Large exposure limits for exposures to institutions	Competent authorities may set a lower large exposure limit than EUR 150 000 000 for exposures to institutions.
310		Article 400(2)(a) 493(3)(a)		Competent Authorities	Competent Authorities	Exemptions or partial exemptions to large exposures limits	Competent authorities may fully or partially exempt covered bonds falling within the terms of Article 129(1), (3) and (6).

320		Article 400(2)(b) 493(3)(b)		Competent Authorities	Competent Authorities	Exemptions or partial exemptions to large exposures limits	Competent authorities may fully or partially exempt asset items constituting claims on regional governments or local authorities of Member States.
330		Article 400(2)(c) 493(3)(c)	-	Competent Authorities	Competent Authorities	Exemptions or partial exemptions to large exposures limits	Competent authorities may fully or partially exempt exposures incurred by an institution to its parent undertaking or subsidiaries.
340		Article 400(2)(d) 493(3)(d)	-	Competent Authorities	Competent Authorities	Exemptions or partial exemptions to large exposures limits	Competent authorities may fully or partially exempt exposures to regional or central credit institutions with which the credit institution is associated in a network and which are responsible for cash-clearing operations within the network.

| 350 | | Article 400(2)(e) 493(3)(e) | - | Competent Authorities | Competent Authorities | Exemptions or partial exemptions to large exposures limits | Competent authorities may fully or partially exempt exposures to credit institutions incurred by credit institutions, one of which operates on a non-competitive basis and provides or guarantees loans under legislative programmes or its statutes, to promote specified sectors of the economy under some form of government oversight and restrictions on the use of the loans, provided that the respective exposures arise from such loans that are passed on to the beneficiaries via credit institutions or from the guarantees of these loans. |
| 360 | | Article 400(2)(f) 493(3)(f) | - | Competent Authorities | Competent Authorities | Exemptions or partial exemptions to large exposures limits | Competent authorities may fully or partially exempt exposures to |

						institutions, provided that those exposures do not constitute such institutions' own funds, do not last longer than the following business day and are not denominated in a major trading currency.
370		Article 400(2)(g) 493(3)(g)	-	Competent Authorities	Competent Authorities	Exemptions or partial exemptions to large exposures limits	Competent authorities may fully or partially exempt exposures to central banks in the form of required minimum reserves held at those central banks which are denominated in their national currencies.
380		Article 400(2)(h) 493(3)(h)	-	Competent Authorities	Competent Authorities	Exemptions or partial exemptions to large exposures limits	Competent authorities may fully or partially exempt exposures to central governments in the form of statutory liquidity requirements held in government securities which are denominated and funded in

							their national currencies provided that, at the discretion of the competent authority, the credit assessment of those central governments assigned by a nominated External Credit Assessment Institution is investment grade.
390		Article 400(2)(i) 493(3)(i)	-	Competent Authorities	Competent Authorities	Exemptions or partial exemptions to large exposures limits	Competent authorities may fully or partially exempt 50% of medium/low risk off-balance sheet documentary credits and of medium/low risk off-balance sheet undrawn credit facilities referred to in Annex I and subject to the competent authorities' agreement, 80% of guarantees other than loan guarantees which have a legal or regulatory basis and are given for their members by mutual

							guarantee schemes possessing the status of credit institutions.
400		Article 400(2)(j) 493(3)(j)	-	Competent Authorities	Competent Authorities	Exemptions or partial exemptions to large exposures limits	Competent authorities may fully or partially exempt legally required guarantees used when a mortgage loan financed by issuing mortgage bonds is paid to the mortgage borrower before the final registration of the mortgage in the land register, provided that the guarantee is not used as reducing the risk in calculating the risk-weighted exposure amounts.
410		Article 400(2)(k) 493(3)(k)	-	Competent Authorities	Competent Authorities	Exemptions or partial exemptions to large exposures limits	Competent authorities may fully or partially exempt assets items constituting claims on and other exposures to recognised exchanges.

420		Article 412(5)		Member States	Credit Institutions	Liquidity coverage requirement	Member States may maintain or introduce national provisions in the area of liquidity requirements before binding minimum standards for liquidity coverage requirements are specified and fully introduced in the Union in accordance with Article 460.
430		Article 412(5)		Member States or Competent Authorities	Credit Institutions	Liquidity coverage requirement	Member states or competent authorities may require domestically authorised institutions, or a subset of those institutions to maintain a higher liquidity coverage requirement up to 100% until the binding minimum standard is fully introduced at a rate of 100% in accordance with Article 460.
440		Article 413(3)		Member States	Credit Institutions	Stable funding requirement	Member States may maintain or introduce national provisions in the area of stable

						funding requirements before binding minimum standards for net stable funding requirements are specified and introduced in the Union in accordance with Article 510.
450		Article 415(3)		Competent Authorities	Credit Institutions	Liquidity reporting requirements	Competent authorities may continue to collect information through monitoring tools for the purpose of monitoring compliance with existing national liquidity standards, until the full introduction of binding liquidity requirements.
460		Article 420(2)		Competent Authorities	Credit Institutions	Liquidity outflow rate	The competent authorities may apply an outflow rate up to 5% for trade finance off-balance sheet related products, as referred to in Article 429 and Annex 1.

470		Article 467(2)		Competent Authorities	Credit Institutions and Investment firms	Transitional treatment of unrealised losses measured at fair value	By way of derogation from paragraph 1 of Article 467, the competent authorities may, in cases where such treatment was applied before 1 January 2014, allow institutions not to include in any element of own funds unrealised gains or losses on exposures to central governments classified in the "Available for Sale" category of EU-endorsed IAS 39.
480		Article 467(3) second subparagraph		Competent Authorities	Credit Institutions and Investment firms	Transitional treatment of unrealised losses measured at fair value	Competent authorities shall determine and publish the applicable percentage in the ranges specified in points (a) to (d) of paragraph 2 of Article 467.
490		Article 468(2)		Competent Authorities	Credit Institutions and Investment firms	Transitional treatment of unrealised gains measured at fair value	Competent authorities may permit institutions to include in the calculation of their Common Equity Tier 1 capital 100% of their unrealised gains at fair

						value where under Article 467 institutions are required to include their unrealised losses measured at fair value in the calculation of Common Equity Tier 1 capital.
500		Article 468(3)		Competent Authorities	Credit Institutions and Investment firms	Transitional treatment of unrealised gains measured at fair value	Competent authorities shall determine and publish the applicable percentage of unrealised gains in the ranges specified in points (a) to (c) of paragraph 2 of Article 468 that is removed from Common Equity Tier 1 capital.
510		Article 471(1)		Competent Authorities	Credit Institutions and Investment firms	Exemption from deduction of equity holding in insurance companies from CET1 items	By way of derogation from Article 49(1), during the period from 1 January 2014 to 31 December 2022, competent authorities may permit institutions to not deduct equity holdings in insurance undertakings, reinsurance undertakings and insurance

						holding companies where the conditions set out in paragraph 1 of Article 471 are met.
520		Article 473(1)		Competent Authorities	Credit Institutions and Investment firms	Introduction of amendments to IAS 19	By way of derogation from Article 481 during the period from 1 January 2014 until 31 December 2018, competent authorities may permit institutions that prepare their accounts in conformity with the international accounting standards adopted in accordance with the procedure laid down in Article 6(2) of Regulation (EC) No 1606/2002 to add to their Common Equity Tier 1 capital the applicable amount in accordance with paragraph 2 or 3 of Article 473, as applicable, multiplied by the factor applied in accordance with paragraph 4 of

						Article 473.
530		Article 478(3)		Competent Authorities	Credit Institutions and Investment firms	Transitional deductions from Common Equity Tier 1, Additional Tier 1 and Tier 2 items	Competent authorities shall determine and publish an applicable percentage in the ranges specified in paragraphs 1 and 2 of Article 478 for each of the following deductions: (a) the individual deductions required pursuant to points (a) to (h) of Article 36(1), excluding deferred tax assets that rely on future profitability and arise from temporary differences; (b) the aggregate amount of deferred tax assets that rely on future profitability and arise from temporary differences and

							the items referred to in point (i) of Article 36(1) that is required to be deducted pursuant to Article 48; (c) each deduction required pursuant to points (b) to (d) of Article 56; (d) each deduction required pursuant to points (b) to (d) of Article 66.
540		Article 479(4)		Competent Authorities	Credit Institutions and Investment firms	Transitional recognition in consolidated Common Equity Tier 1 capital of instruments and items that do not qualify as minority interests	Competent authorities shall determine and publish the applicable percentage in the ranges specified in paragraph 3 of Article 479.
550		Article 480(3)		Competent Authorities	Credit Institutions and Investment firms	Transitional recognition of minority interests and qualifying Additional Tier 1 and Tier 2 capital	Competent authorities shall determine and publish the value of the applicable factor in the ranges specified in paragraph 2 of Article 480.

560		Article 481(5)		Competent Authorities	Credit Institutions and Investment firms	Additional transitional filters and deductions	For each filter or deduction referred to in paragraphs 1 and 2 of Article 481, competent authorities shall determine and publish the applicable percentages in the ranges specified in paragraphs 3 and 4 of that Article
570		Article 486(6)		Competent Authorities	Credit Institutions and Investment firms	Limits for grandfathering of items within Common Equity Tier 1, Additional Tier 1 and Tier 2 items	Competent authorities shall determine and publish the applicable percentages in the ranges specified in paragraph 5 of Article 486.
580		Article 495(1)		Competent Authorities	Credit Institutions and Investment firms	Transitional treatment of equity exposures under the IRB approach	By way of derogation from Chapter 3 of Part Three, until 31 December 2017, the competent authorities may exempt from the IRB treatment certain categories of equity exposures held by institutions and EU subsidiaries

						of institutions in that Member State as at 31 December 2007.
590		Article 496(1)		Competent Authorities	Credit Institutions and Investment firms	Transitional provision on the calculation of own fund requirements for exposures in the form of covered bonds	Until 31 December 2017, competent authorities may waive in full or in part the 10 % limit for senior units issued by French FondsCommuns de Créances or by securitisation entities which are equivalent to French FondsCommuns de Créances laid down in points (d) and (f) of Article 129(1), provided that conditions specified in points (a) and (b) of Article 496(1) are fulfilled.
600			Article 10(1)(b)(iii)	Competent Authorities	Credit Institutions	LCR - Liquid assets	The liquidity reserve held by the credit institution in a central bank is recognisable as Level 1 asset

						provided that it can be withdrawn in times of stress. The purposes under which central bank reserves may be withdrawn for the purposes of this Article must be specified in an agreement between the CA and the ECB or the central bank.
610			Article 10(2)	Competent Authorities	Credit Institutions	LCR - Liquid assets	The market value of extremely high quality covered bonds referred to in paragraph 1(f) shall be subject to a haircut of at least 7 %. Except as specified in relation to shares and units in CIUs in points (a) and (b) of Article 15(2), no haircut shall be required on the value of the remaining level 1 assets. Those cases where the higher haircuts were set to an entire asset class (all assets subject to a specific and differentiated

						haircut in the LCR Delegated Regulation) (e.g. to all level 1 covered bonds, etc.).
620			Article 12(1)(c)(i)	Competent Authorities	Credit Institutions	LCR - Level 2B assets	Shares may constitute level 2B assets provided that they form part of a major stock index in a MS or in a third country, as identified as such by the CA of a MS or the relevant public authority in a third country.
630			Article 12(3)	Competent Authorities	Credit Institutions	LCR - Level 2B assets	For credit institutions which in accordance with their statutes of incorporation are unable for reasons of religious observance to hold interest bearing assets, the competent authority may allow to derogate from points (ii) and (iii) of paragraph 1(b) of this Article, provided there is evidence

						of insufficient availability of non-interest bearing assets meeting these requirements and the non-interest bearing assets in question are adequately liquid in private markets.
640			Article 24(6)	Competent Authorities	Credit Institutions	LCR - Outflows from stable deposits in a third country qualifying for the 3% rate	Credit institutions may be authorised by their competent authority to multiply by 3% the amount of the retail deposits covered by a deposit guarantee scheme in a third country equivalent to the scheme referred to in paragraph 1 if the third country allows this treatment.

CSR DISCLOSURE AND LIQUIDITY MANAGEMENT: MEASURING THE IMPACT OF 2014/95/EU DIRECTIVE ON FIRMS' CASH HOLDINGS

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ABSTRACT

The last decade saw firms' Corporate Social Responsibility (CSR) practices gaining increasing attention from top executives and stakeholders. This growing interest in sustainable investments fomented in turn the demand for information about corporate social responsibility (CSR), pushing many jurisdictions to consider the possibility of implementing reporting mandates.

Exploiting a sample of corporate data drawn by Orbis and Eikon databases, this study assesses the impact of a new European binding CSR reporting directive (NFRD 95/14/EU) on cash holding policies of firms. Results evidence an increase of 0.8% on average in corporate cash and liquid assets after the Directive implementation. Cross-sectionally, the effect appears more marked for firms characterized by higher proprietary costs and higher investment expenditures. Robustness of findings is confirmed even after controlling for agency costs. Overall, the work contributes to the debate on the impact of CSR on firm issues, looking at the direct impact of a reporting mandate on firm liquidity holdings and revealing other possible determinants of cash accumulation.

INTRODUCTION

The last decade saw corporate social responsibility (CSR) practices gaining increasing attention from top executives and stakeholders. As soon as people started to address environmental issues (ranging from the financial risks of climate change to energy efficiency to water-related issues), they also started to identify themselves more and more with businesses that prove to be socially-responsible (Marin and Ruiz, 2007) and to enhance those companies that implement strong CSR practices (Servaes and Tamayo, 2013). According to a survey conducted by IBM[1] in March 2021 across 9 countries, 72% of consumers are willing to pay extra money to environmentally responsible brands and 55% of global consumers consider sustainability as extremely important when choosing a brand— with an increase of 22% over 2019. The pandemic in this sense, seems to have given a further acceleration to the process (McKinsey)[2].

Along with this growing interest in sustainable investments (Cohen et al., 2015; Amel-Zadeh and Serafeim, 2018) the demand for information about corporate social responsibility (CSR) has grown accordingly. Thus, at the time when several firms began to voluntarily incorporate information regarding their CSR practices into their reports, many jurisdictions started to consider the possibility of implementing reporting mandates, with the aim to improve or harmonize these practices. The incidence of these measures on corporate strategies, however, has rarely been considered in the CSR literature. Most of the latter in fact has focused on the direct effects of the activities concerning corporate social responsibility on firm characteristics such as firm value (Mackey et al., 2007; Kitzmueller and Shimshack, 2012) and financial performance (Herremans et al., 1993; Simpson and Kohers, 2002; Flammer, 2015; Cornett et al., 2016); or on the consequences of voluntary CSR disclosures at corporate level (Plumlee et al., 2015), finding mixed evidence.

Exploiting this gap and trying to address the endogeneity concerns related to actions largely based on voluntary firm choices, this paper aims at assessing the impact of a binding CSR reporting rule on cash holding policies of firms. Assuming sufficiently specific CSR standards and proper

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[1] https://www.ibm.com/downloads/cas/WLJ7LVP4
[2] https://www.mckinsey.com/industries/retail/our-insights/survey-consumer-sentiment-on-sustainability-in-fashion

enforcement, we expect that firms respond to a CSR reporting mandate by making real changes to their business operations. It is indeed clear that at corporate level these informational needs can have an influence on the definition of future management strategies, which at this point should take into account not only the primary duty to serve shareholders but also the mounting pressure that a company needs to be environmentally and socially fair while doing business (Christensen, Hail and Leuz, 2021). Worldwide we are always more often assisting to governmental initiatives aimed at achieving a common understanding and at defining long-term objectives with regards to the activities of companies with high social and environmental impact. Just within the triennium 2013-2016, the number of CSR or CSR-related mandates around the world increased from 130 to almost 250 (Carrots and Sticks, 2016[3]). In the U.S., the SEC's Investor Advisory Committee has started to require to SEC registrants the provision of information related to ESG issues that are relevant for investors' investment and voting decisions (IAC, 2020; Coates, 2021). The European Union (EU) is even further ahead. Its Non-Financial Reporting Directive (NFRD 2014/95/EU) compulsorily requires large companies and groups to provide a CSR report comprising a brief description of their business model and additional relevant non-financial data such as environmental or social and employee matters, starting from 2017. The NFRD embraces a double materiality perspective, enshrining that firms not only disclose how sustainability issues affect them, but also how their activities affect the society and the environment.

To frame the analysis, we consider the adoption of this latest regulation, affecting publicly listed corporations presenting an average number of employees exceeding 500 during a financial year and either a balance sheet total or a net turnover exceeding certain thresholds set by individual countries. The norm has been focus of debate given a light-touch enforcement, deemed as inadequate and unnecessarily expensive from a cost-benefit perspective (EU Commission survey, 2020).

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[3] https://assets.kpmg/content/dam/kpmg/pdf/2016/05/carrots-and-sticks-may-2016.pdf

Given the lack of any previous evidence, we formulate a bidirectional hypothesis, considering an increase in cash holdings as a shield against possible negative occurrences (e.g. deriving from proprietary costs, sanctions, reputational risks, external pressures) firms may face due to the CSR report publication, but not excluding any inverse effect related to an increase in transparency which reduces information asymmetries and may drive the management to reduce the amount of cash as a way to avoid dissipation. Although in fact some studies have shown how investors, when additional company information are issued through CSR reports, increasingly value cash holdings thanks to a better monitoring of managers which favors a more accurate liquidity management (Lu, Shailer and Yu, 2017); other authors envisage several costs associated with additional disclosures of information (Christensen, Leuz and Hail, 2021) which may foster the stockpile of cash reserves. Overall, therefore, publishing a report could prove to be a double-edged sword for a company.

Consistently with our first hypothesis, the results for a sample of European firms' drawn from Eikon Thomson Reuters database and Orbis Bureau Van Dijk between 2014 and 2019, evidence an increase of 0.8% on average in corporate cash and liquid assets after the Directive implementation. Cross-sectionally, the effect appears more marked for firms characterized by higher proprietary costs and higher investment expenditures. Findings remain robust even after controlling for agency costs.

The work contributes to the debate on the impact of CSR on firm factors, looking at the direct impact of a reporting mandate on firm liquidity holdings. The research in this sense is one of a kind, since as far as known few other studies have considered cash holdings implications of a CSR disclosure but no one of them has examined a mandatory regulation requiring social responsibility and sustainability reporting or has found significant results in terms of cash accumulation. Furtherly, it reveals other possible determinants of liquid assets accumulation related to the precautionary theory such as proprietary costs.

The paper is structured in the following way: Section 2 presents a literature review related to the study; Section 3 reports the hypotheses of the research; Section 4 contains a description of the data

and the empirical setting; Section 5 presents the results of the analysis; Section 6, provides further cross-sectional tests; Section 7 concludes the overall.

LITERATURE REVIEW

The last decade has been characterized by a significant increase in academic research devoted to the exploration of possible links between corporate social responsibility and cash holdings. Recent major studies include CSR and value of cash holdings (Arouri and Pijourlet, 2017), CSR commitment and cash holdings accumulation (Chang et al., 2019), CSR performance and cash holdings (Cheung A., 2017). However, apart from Benjamin, Regasa, Wellalage and Marathamuthu (2020), which provide evidence on the positive association between CSR waste disclosure and corporate cash holdings in Australia, the direct relationship between CSR reporting (a fortiori if mandatory) and corporate cash holdings remains unexplored. Our work integrates the two different lines of literature together.

CSR Reporting

Much of the evidence related to consequences of CSR reporting, presumes companies' in the execution of a certain disclosure policy. In this sense, CSR reporting is endogenous in two ways: it is linked to voluntary CSR activities and to companies' choices about reporting on these activities. This dual endogeneity complicates the disentangling of pure CSR reporting impacts from the underlying effect of CSR activities. It is also for this reason that past literature reports mixed evidence.

Experimental research by Martin and Moser (2016) finds that investors respond favorably to CSR disclosures, highlighting societal benefits even when the underlying activities are net costly.

Relatedly, Hanh Song Thi , Phama Hien, Thi Tranb (2020) find positive effects of CSR disclosure on firm reputation, which in turn significantly contribute to firms' financial performance.

Looking at other corporate aspects, Plumlee et al. (2015) find that the quality of voluntary CSR disclosures and firm value are positively associated, both through discount rate factors and cash flows. On the other hand, Yet, Cho, Michelon, Patten and Roberts (2015) find no such relation in their tests on Fortune 500 listings.

Other papers focusing on reporting provide evidence of a negative relation between voluntary CSR publishing and firms' cost of capital (e.g., El Ghoul et al., 2011; Matsumura et al., 2017). Further studies such as Clarkson et al (2013) instead, find no relation between these disclosures and cost of capital.

This divergence in outcomes can be justified by some relationship mediating factors, such as firms' actual CSR performance (Dhaliwal et al., 2011), the type of CSR disclosures (Ng and Rezaee, 2015) or whether a third-party provides assurance of the reports (Casey and Grenier, 2015).

Numerous other studies also relate CSR disclosures to market reactions. Flammer (2013) for example, shows that stock markets respond to the release of negative or positive CSR news, often in the same direction of the news. However, in some cases, market reactions and CSR news have been found to be not coincident, suggesting that shareholders and other stakeholders do not interpret events in the same way (e.g., events with positive impact on the environment are accompanied by negative market reactions; Groening and Kanuri, 2013). Lastly, several authors such as Hung, Shi and Wang (2013) or Michaels and Gruning (2017) find a negative and significant association between CSR disclosure and information asymmetry, which makes markets more liquid.

One way to mitigate endogeneity problems is to study CSR disclosure mandates. Specific empirical evidence on the real effects of CSR mandatory reporting is still relatively scarce but it is growing fast. Regulators in many countries (e.g., China, U.S., Denmark, U.K., and EU) have recently imposed CSR reporting mandates on selected firms in their jurisdictions. These mandates

represented a good study framework for many scholars as they allow to provide valuable insights into how firms respond to mandatory CSR disclosures.

Among them for example, Ioannou and Serafeim (2017), comparing firms from four countries adopting CSR disclosure mandates before 2011 (i.e., China, Denmark, Malaysia, and South Africa) find that treated firms significantly increment the volume and quality of CSR disclosures after the mandate implementation and are more likely to (voluntarily) seek assurance or to adopt reporting guidelines when preparing these disclosures. They also show that increases in CSR disclosure are associated with higher firm growth opportunities (Tobin Q). Chen et al. (2017) instead exploit the Chinese mandate requiring firms listed within the two principal Chinese exchanges to provide a CSR report on a broad set of topics, including consumer protection, environmental issues, and social welfare services. The analysis shows that firms subject to the CSR reporting mandate experience a reduction in future profitability but an improvement in environmental outputs. Such results are in line with Boodoo (2016) study on India. The drop in performance after the mandate is a demonstration of how the selection issues in settings of voluntary CSR disclosure (which typically show positive valuation or performance effects) could be quite severe.

From 2010, U.S. also require mandatory CSR disclosures. The Dodd-Frank Wall Street Reform and Consumer Protection Act in particular include a requirement for mine owners to disclose mine-safety information, and a requirement to publish information related to purchases of minerals from the Democratic Republic of Congo and neighboring countries in firms' SEC filings. Along the same line with Chen et al. (2017), Christensen et al. (2017) evaluating the real effects of the mine-safety disclosure provisions, evidence that after the mandate the safety of mines improves while the productivity declines.

In addition, in 2010 the U.S. also mandated the reporting of greenhouse gas (GHG) emissions for thousands of manufacturing facilities. Tomar (2021) exploiting this requirement finds that facilities reduce emissions by 7.9% following the disclosure. He also finds that peer benchmarking is one of the mechanisms inducing the reduction. Similarly, Jouvenot and Krueger (2020), Downar et al.

(2021), and Grewal (2021) examining the U.K. carbon reporting mandate of 2013 calling for listed companies to report GHG emissions in annual financial reports, find that the affected firms lower their emissions. Jouvenot and Krueger (2020) go further and pinpoint investor pressures as a potential driver of the effects, consistent with Bolton and Kacpercyk (2021).

The EU has also passed a directive that requires CSR disclosures. The EU Corporate Social Responsibility Directive (NFRD 2014/95/EU) requires large firms, banks and insurance companies to prepare and disclose nonfinancial information starting from fiscal year 2017. One of the few studies to analyze the announcement returns to a CSR reporting mandate is Grewal et al. (2019). The authors find, on average, a negative market reaction but less negative or even positive returns for firms already disclosing on CSR and enjoying a stronger CSR performance. These results suggest that investors view the reporting mandate as costly (in terms of proprietary costs and political costs), particularly for firms providing no voluntary CSR disclosures and forced to disclose by the norm. Fiechter et al. (2020) also examine the real effects around the disclosure mandate and find that firms, on average, increase their CSR activities in response to the regulation. The effects are stronger for firms with low levels of CSR expenditures prior to the regime change.

Before the NFRD, other European studies considered CSR reporting mandates in France (Belal and Cooper, 2018) and Denmark (Danwatch, 2011), highlighting an increase in the attention paid for the disclosure of issues related to CSR by firms and an increase in quality of reports.

Overall, consistent with the presence of selection effects, most voluntary CSR disclosure studies provide evidence of effects that tend to be beneficial to firms and to markets, whereas studies on mandatory CSR reporting find less firm and capital-market benefits, but an increase in socially responsible activity.

Cash Holdings

Management literature is full of studies considering the determinants of cash holdings. Keynes (1936) in particular indicates that firms hold cash for three main reasons. First, a firm can save

transaction costs by using cash to make payments without having to deploy assets (Transaction costs motive). In line with the transaction costs' motive, Miller and Orr (1966) show that brokerage costs could induce firms to hold more liquid assets. Myers and Majluf (1984) argue that raising external financing is more costly than using internally generated funds in presence of asymmetric information. Second, liquidity could be exploited for undertaking valuable investment projects, particularly in the presence of financial constraints (Speculative motive). It could be optimal for firms to hold a certain level of cash in order to meet investment expenditures (Almeida et al., 2004; Arslan, Florackis and Ozkan, 2006; Duchin-Ozbas and Sensoy, 2010). Third, cash holdings can serve as a shelter in response to increases in cash flow volatility and so to hedge against future liquidity shortages (Precautionary motive - Kim, Mauer and Sherman, 1998; Opler, Pinkowitz, Stulz and Williamson, 1999; Han and Qiu, 2007; Song and Lee, 2012), especially for constrained firms (Minton and Schrand, 1999).

The recent literature also establishes that other motives matter too such as the tax motive (Foley et al., 2007) and the diversification motive (Duchin, 2010; Tong, 2011). Other economic determinants include product market competition (Fresard, 2010), the firm life cycle (Dittmar and Duchin, 2011) and the customer relationship (Itzkowitz, 2013).

Holding cash nevertheless has also its downsides. Harford (1997), Shin and Kim (2002) and Kalcheva and Lins (2007) point up the role of agency costs in reducing firm value when too much cash is available for managers. Relatedly, Jensen (1986) suggests that free cash at hand makes it easier for managers to pursue negative NPV projects that grant the accomplishment of private benefits. Overall, storing too much cash represents anyway an opportunity cost (Von Wieser, 1914).

HYPOTHESES DEVELOPMENT

For constructing our hypotheses we consider previous theories related to the individual extremes (i.e. CSR reporting and Cash holdings) of the relation we are testing. As said and as far as known in

fact, studies that analyze the direct relationship between disclosure of information and the level of corporate cash holdings do not exist.

Main theories explaining why firms may or not decide to hold cash are antithetically linked to agency costs and precautionary motives. Agency costs theory predicts that firms reduce cash on hand in order to limit management incentives to misallocate reserves for private benefits. Agency costs gush out exactly from a misalignment of interests between shareholders and managers, assuming the existence of asymmetries of information. Precautionary theory (see Literature review section) on the other hand, suggests that firms raise cash reserves in order to hedge for the risk of future cash shortfalls and uncertainties related to the environment. Cash endowments are supposed to increase especially in a context of cash flow uncertainty which may threat the regular execution of corporate activities.

Despite the great use of the aforementioned theories, the absence of previous studies on the subject, as said, poses some doubts about their complete efficacy of application within our framework. The liquidity consequences of corporate disclosure of information in fact, especially when looking at non financial disclosures, are difficult to be evaluated and predicted ex ante. General tendency is to look at enhanced transparency as moderator of information asymmetries between the firm and its investors as well as among investors themselves. So, to the extent that CSR disclosures provide an additional and unbiased source of information, they should provide tangible market benefits in the form of lowered agency costs and therefore improved liquidity. If that is the case, we would expect a decrease in corporate cash holdings as compatible with the agency cost theory. However, the heterogeneous characters surrounding NFRD which relies on a non-standardized and partially flexible reporting format, suggest being cautious when formulating this hypothesis.

At the same time, it must be recognized that CSR reporting it is undeniably costly. Disclosure in fact brings not only direct but also indirect costs which also manifests in terms of risks. Direct costs may include the preparation, certification, and dissemination of accounting reports; indirect costs instead may occur in the proprietary or reputational form, because multiple audiences (e.g.,

competitors, suppliers, labor unions, etc.) can use the information provided to investors (Verrecchia, 1983; Feltham and Xie, 1992; Berger and Hann, 2007). In addition, the heightened transparency and scrutiny of firms' CSR, even by media, could also increase the threat of regulatory actions or litigation by shareholders and other parties. Firms in this regard might be spurred to signal their effective commitment in CSR, even because negative stakeholders' attitude may additionally push management to revise corporate strategies. Against this backdrop, the net effects on cash holdings for firms subjected to the NFRD directive are not a priori obvious. If these costs are perceived as being high by firms, we would expect an increase in cash holdings as the theory on precautionary motives suggests.

1A. THE PRECAUTIONARY THEORY (DEALING WITH CSR DISCLOSURE RELATED UNCERTAINTIES)

As previously reported, generic precautionary theory for cash holding proposes that when firms start to face more uncertainty related to their future cash flows, they protect themselves by increasing their cash holdings. In the real world however cash flows may not be the unique source of uncertainty for a business. Firms every day carry on a series of investments and operations characterized by a high degree of uncertainty which may concern, among other things, future costs and returns, but also possible accidents, sudden crises or the introduction of new regulations. In general, the human mind tends to be scared about novelty. Everything which is new creates concern and confusion at the same time. As with market vicissitudes and periods of financial emergency, dealing with the implementation of a new directive, especially if it is unclear or precise, can be complex and lead to the implementation of a whole series of cautions and attentions that can certainly influence also the management of corporate liquidity. Firms in fact may be encouraged to increase their liquidity holdings in order to cope with the possibility of not having enough funds to

cover future unexpected costs or negative facts related to such an event. For this reason, for our analysis, we hypothesize that even the uncertainty generated by a directive implementation, such as the NFRD, may bring to the same conclusions of precautionary theory.

Indeed, standards set by 2014/95/EU do not envisage homogeneous reporting rules but are limited to ensuring useful minimum information "to the extent necessary for an understanding of the development, performance, position and impact of [the company's] activities." Substantial flexibility in CSR standards is likely necessary for the reporting to be informative and applicable in various settings; nonetheless, such discretion may create troubles in terms of report readability, comparability and compliance issues. In this regard, a survey conducted by the European Commission between February and June of 2020 highlighted companies' difficulties and uncertainties in the application of the norm, emphasizing at the same time the stakeholders' discontent about the quantity and quality of information disclosed. In particular, from the latter emerged that companies face uncertainty and complexity when deciding what nonfinancial information to report, and how and where to report such information (in the case of some financial sector companies, this complexity may also arise from different disclosure requirements contained in different pieces of EU legislation); then, reported non-financial information seems not sufficiently comparable or reliable; companies do not report all non-financial information that users think is necessary, and many companies report information that users do not think is relevant; some companies from which investors and other users want non-financial information do not report such information; it is hard for investors and other users to find non-financial information even when it is reported.

Overall, these arguments can be summarized in a strong claim of respondents (i.e. stakeholders and firms) about the need of harmonization of all the reporting standards. Companies are nowadays under growing pressure to respond to additional demands for non-financial information coming from sustainability rating agencies, data providers and civil society, and it is logical to think that standardization could reduce the problems highlighted within the survey. Just think about the

reduction to analysts' incentives to gather private information about firms' CSR activities (e.g., Barron et al., 2002) which may make forecasts less expensive and more accurate.

Higher conformation however may turn out to be a solution that is only partially valid. Prior evidence in fact shows that differences in reporting outcomes persist even when firms use the same standards (Ball et al., 2003; Leuz, 2003; Lang et al., 2006; Daske et al., 2013). Said that, even more in the current context, it seems difficult to make any kind of forecast about the stakeholders' perception of a single disclosure, especially outside the company reality. In this sense, CSR disclosures likely affect the recipients of the information and thus again could induce firms to review their own behavior. Reporting may influence how firms allocate resources (Kanodia and Sapra, 2016) not only because they expect investors and other stakeholders to respond to the publication but also because of costs (i.e. regulatory and proprietary costs) and risks (i.e. reputational, legal and financial risks) associated with the new information releases.

Accordingly, firms often seem to respond to new disclosure requirements by extending their boilerplate disclosures (Dyer et al., 2017). To the extent that (meaningful) mandatory CSR disclosures would be inevitably costly to firms, boilerplate language is one way firms' use to mitigate these costs. However, adversely, boilerplate disclosures likely play a role in the increasing complexity and loss of readability of corporate disclosures (Li, 2008; Dyer et al., 2017), which may increase the risks of negative reactions. In the following paragraphs main risks and costs businesses may encounter are touched in a more detailed manner.

REPUTATIONAL RISKS

Reputation risk can be defined as "the risk of a change in the way an organization is perceived by its stakeholders" (Hogarth et al., 2018). Barnett et al. (2006) contend that corporate reputation captures the collective judgment of a corporation based on assessments of its financial, social, and environmental impacts. Likewise, Porter (1980) notes that customers and suppliers perceptions of firm reputation are an important source of a firm's competitive advantage.

In our scenario, firms are unlikely to be in full control of their CSR performance (and ranking), as outside factors may define part of it (e.g., natural catastrophes and accidents). At the same time, the measurement system for CSR performance is likely incomplete and noisy (e.g., injuries are an imperfect proxy of worker safety), increasing the likelihood of bad publicity even when firms are not at fault. Considering that, mandatory CSR reporting could expose firms to additional reputation risks, yet more when mandated metrics are fuzzy. The reputational costs to firms principally come from a misalignment with stakeholders' CSR preferences (Bradford, Earp, Showalter and Williams, 2016). Past studies show that reputation risk increases the potential for stakeholder sanctions, resulting in sales' declines, increases in cash flow-volatility and financial risk (Kolbel et al., 2017) as well as future risks and uncertainties (Kothari et al., 2009; Henisz and McGlinch, 2019) or in the withdrawal of trust and non-cooperation from (Baron and Diermeier, 2007). Misalignments nevertheless may even come from the different engagement of stakeholders with the firm. For example, investors having stake in the firm might repeal any attempt of CSR activities' implementation if it reduces firm value. In general, there is no optimal disclosure policy that is best for all shareholders (Kim, 1993).

Thus, eventual reputational damages could cause firms to deal with future unexpected expenses. This possibility may oblige a company to review some of its policies including that related to cash, also in consideration of the fact that usually high perceived risk firm have more difficulties in accessing external credit (Stiglitz and Weiss, 1981; Petersen and Rajan, 1994; Elsas and Krahnen, 1998). Of course, CSR related risks also exist in the absence of CSR reporting. The media or activists often scrutinize firms irrespective of their CSR reporting (Miller, 2006), and stakeholders will not automatically assume that firms without CSR reporting have no CSR issues. Typically, larger and highly visible firms are often well-suited targets for activist campaigns and also subject to more media scrutiny as a result of poor CSR performance in comparison to smaller, lesser known firms (Watts and Zimmerman, 1978). As a result, activities that are problematic or risky from a CSR perspective might shift from large to small firms, leading also to a possible change in industry

composition. Indeed, if costs rise or benefits decline following a CSR reporting mandate, firms likely adjust and could even abandon certain activities.

Even quality and quantity of disclosure may have an effect on reputation. CSR reporting offers a form of ex ante "insurance" in case something subsequently goes wrong. A company suffers less from a reputational point of view if by itself (and not trough others) discloses data on its activities and on the possible environmental risks associated with them (Reimsbach and Hahn, 2013). In this regard, the media again play a dissemination role for firms' CSR disclosures in positive or negative terms.

Lastly, benchmarking could expose firms to further reputational risks. Still, generally well-performing firms could occasionally report poor CSR performance with respect to competitors, even if, perhaps, not for reasons strictly due to company management decisions. Low ratings arising from benchmarking may also be a consequence of boilerplate disclosure. For NFRD in particular, some of the clauses such as comply or explain principle could boost boilerplate almost to the extreme, fomenting uncertainty and risks about reputational consequences of reporting.

LITIGATION RISKS

Litigation can be one mean of enforcing a regulation and, if costly, can affect how, what, and when firms disclose. Forward-looking disclosures, especially when too optimistic, could expose firms to higher litigation risk (Johnson et al., 2001; Rogers et al., 2011). Additionally, the heightened transparency and scrutiny of firms' CSR activities could also increase the threat of legal actions by shareholders and other parties. The reason lies in the fact that firms are invited to disclose special kinds of information to which a larger bunch of people is more interested in, compared to financial data, and that probably would have not been divulged without a mandate (Christensen, Hail and Leuz, 2021). Litigation risk it is hard to handle and is one of the factors that may motivate firms to

significantly raise the amount of held liquidity in anticipation of future settlement costs (Arena and Julio, 2011; Malm and Kanuri, 2016).

FINANCIAL RISKS

Ease of accessing credit is one of the main arguments that justify the precautionary motives to hold cash. As a matter of fact, when firms find difficulties in reaping liquidity on the market in order to meet the contingencies or to deal with unforeseen circumstances, they may utilize their cash reserves instead of liquidating assets.

Several studies find that better CSR performance is associated with lower loan spreads and, hence, a lower cost of debt (Goss and Roberts, 2011; Chava, 2014; Cheng et al., 2014; Kim et al., 2014; Kleimeier and Viehs, 2018; Cheng et al., 2017). Disclosure of CSR performance however may not necessarily encounter stakeholders' favor, and could even raise doubts about the management of certain activities, especially if of significant importance. In general, companies surrounded by a high degree of uncertainty or perceived risk present various criticalities also in terms of fundraising. (Beatty and Ritter, 1986). So, overall, in the impossibility to predict the grade of stakeholders' acceptance of a disclosure, cash holdings can be used to shield against any negative reactions that would affect the possibility of obtaining external credit.

REGULATORY, DISCLOSURE AND PROPRIETARY COSTS

Nowadays, regulatory costs represent one of the biggest hassles for firms. The cost of compliance, defined as to "all the expenses that a firm incurs to adhere to different regulations", over the last eight years has jettisoned almost all discretionary funding available to firms. It has been estimated that compared to pre-financial crisis spending levels, operating costs spent on compliance have increased by over 60 percent for businesses [4]. Corporations, especially small ones facing in

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[4] Source: Globalscape

proportion a higher burden with respect to big multinationals, usually see these costs as idle (as also evidenced by NFRD European survey).

Regulatory costs may have a significant impact on businesses. Within our framework in particular, the threat of future government regulations (i.e. regulatory risk) can motivate firms to initiate or extend CSR reporting with a possible repercussion on corporate policies (Reid and Toffel, 2009). In this regard for example, there exists evidence on market exit as a regulatory avoidance strategy in response to financial regulation (Leuz et al., 2008; Kamar et al., 2009; DeFond and Lennox, 2011). Off-shoring too is another practice firms use to avoid compliance and related costs (Moriconi, Peri and Cozzoli, 2019).

Bypassing a regulation is however risky. The cost of non-compliance is most notoriously understood via the heavy fines (laid down even for the legislation in question) issued by regulatory agencies every year. In total, firms spend on average almost $15 million on the consequences of non-compliance (Globalscape, 2018). This is 2.71 times higher than what firms typically pay to be in compliance by building strong law-abiding programs. The expense does not only refer to monetary loss. One of the main costs of non-compliance is indeed the related reputational damage that may be experienced by the organization in breach. This last aspect may be particularly accentuated for NFRD which currently does not require a preventive audit certification about what is published, and which presents characteristics of discretion and flexibility related to the content of disclosure. Hence, regulatory costs may have an impact on cash planning. From what has been said previously, it is in fact clear that greater liquidity available can lighten the burden of future government regulations and may help to cope with any penalties for reputational damage due to alleged non-compliance.

Corporate disclosures can also induce proprietary costs. Proprietary costs represent costs related to the disclosure of various information, that multiple audiences (e.g., competitors, suppliers, labor unions, etc.) can use (Verrecchia, 1983; Feltham and Xie, 1992; Berger and Hann, 2007) for their own interests. Proprietary costs in particular, could be more pronounced for CSR disclosures

because these reports go beyond the presentation of aggregate financial measures and are often directly related to a firm's core operations and processes.

It is therefore easy to imagine that companies are reluctant to publish too much information, as this could result not only in a reduction of competition but could also reduce firms' incentives to innovate (Breuer et al., 2020). Facing this risk firms may decide to increase cash holdings in order to deal with the possibility of lower expected cash flows in the future (Yue Cai, 2018).

2A. COMMITMENT THEORY

CSR activities incorporate a variety of commitments to stakeholders such as promises of job security for employees and continued service for customers. Under these commitments, stakeholders are willing to contribute resources and efforts to a firm, maybe accepting a less favorable wage or price, which in turn increases shareholder wealth. Whether a firm's CSR activities create value for shareholders largely depends on other stakeholder expectations about how likely it is that the firm will fulfill those commitments (Cornell and Shapiro, 1987; Maksimovic and Titman, 1991; Deng et al., 2013).

If voluntary reporting is seen as a way to gain stakeholders' support from the disclosure of additional and positive information on firms' engagements; a reporting mandate which forces firms to provide news on their corporate social responsibility practices may result deleterious in case a series of divergences between corporate policies and stakeholders' ideals emerge. To protect themselves from these eventualities, companies may decide to increase liquidity. Past studies in fact show that higher cash holdings may provide a credible commitment to honor implicit claims (Chang, Chen, Chen and Peng, 2019). So, higher cash holdings may represent a commitment to better future performance and a sign of willingness to always improve by the firm. Fiechter et al. (2020) examining the real effects around the disclosure mandate 2014/95/EU find that firms, on average, increase their CSR activities. This can be consistent with the theory that firms save cash in order to improve their CSR practices. Other studies in different contexts point out too that

disclosures effectively push firms to improve their performance in CSR and that generally serve as an incentive to maintain corporate promises (Jouvenot and Krueger, 2020; Downar et al., 2021; Grewal, 2021; Tomar, 2021).

So, in the impossibility to predict stakeholders' reaction to a disclosure, cash accumulation may represent also a signal of firms' intentions.

3A. PRESSURE GROUPS

The most likely real effect of a CSR reporting mandate is directly on firms' CSR activities. In essence, firms are expected to alter their CSR activities whenever (investor and other) stakeholders use the newly disclosed CSR information to exert meaningful pressure on firms (e.g., by reducing consumption or instigating activists' campaigns). Specifically, the main channels through which standardized CSR disclosures could boost firms' CSR are: (i) improved monitoring and governance of firms' CSR activities; (ii) strengthened market and societal pressure due to newly available CSR information; (iii) benchmarking against peer firms' CSR practices (Cao et al., 2019).

Stakeholders such as social activists, policymakers, or consumers can exert pressure through actions like public shaming (Dyck et al., 2008), boycotts, or by imposing sustainability restrictions along the supply chain (Dai et al., 2020). In response, firms have incentives to adjust their CSR activities. The stakeholder reactions to firm disclosures indeed may create a feedback loop in which firms respond to anticipated or actual stakeholder responses if the (anticipated or perceived) costs from goal misalignment with certain stakeholders are too high.

Having cash on hand at this stage can have a positive impact, giving the company the opportunity to find itself a way out in the event that such practices are implemented but, above all, giving the opportunity to immediately remedy any inconvenience (also at the investment level) that could characterize the company activity.

For all of the reasons previously mentioned, we expect the following:

H1a: AFTER THE NFRD IMPLEMENTATION, CORPORATE CASH HOLDINGS INCREASE

1B. AGENCY COSTS THEORY

A primary benefit of corporate disclosure is to mitigate information asymmetries between the firm and its investors as well as among investors. Disclosure can mitigate the adverse selection problem and level the playing field among investors (Verrecchia, 2001). More transparency in fact enables a better monitoring from outside shareholders, also allowing an easier access to credit. Disclosures of information may also help in reducing Agency costs. One mean the shareholders have to control such costs is by leaving less cash in the firm, avoiding managers to use excessive funds for private benefits or negative NPV projects.

The greatest part of the studies related to agency costs evaluates financial reporting. Financial reporting is specifically addressed to a much more defined group of people such as shareholders and financial analysts, for example. These two categories of people possess certain characteristics and generally also a technical knowledge that allows them to understand the data and decide how to act. Moreover, it should also be borne in mind that financial reporting is subject to well enforced audit procedures, aiming at preventing any fraud or omissions and following a rigid structure that leaves little room for "creativity". On the contrary, non-financial reporting is intended for a public that generally lacks technical and basic knowledge and does not envisage any certification procedure except on a voluntary basis. In addition, reports of this kind often are prepared on a voluntary basis.

So, having said that and given the characteristic of the directive under examination plus the shadow points highlighted by the already cited survey conducted by the EU commission, we can also conjecture that discretion in the content may not necessarily lead to a reduction in agency costs and thus to a reduction in cash allowances. Prior research in fact assumes that non-standardized disclosures can either (a) contribute to useful decision making by overcoming information asymmetries between managers and firm outsiders (informational perspective); or (b) constitute opportunistic behavior whereby managers exploit information asymmetries between them and firm outsiders through engaging in biased reporting, i.e. impression management (opportunistic perspective - Godfrey et al., 2003). Despite all, we cannot exclude a priori a negative effect of the disclosure of non financial information on cash, so we state the following:

H1b: AFTER THE NFRD IMPLEMENTATION, CORPORATE CASH HOLDINGS DECREASE

EMPIRICAL SETTING

Data

The sources of our data for this research are Eikon and Orbis databases. The databases are operated respectively by Thomson Reuters and Bureau Van Dijk, providing accounting and equity data for global companies and stock indices. Chosen data are characterized by yearly frequency and are collected for active firms operating during the period between 2014 and 2019. This interval allows tracing the difference in cash holdings before and after the implementation of NFRD Directive for each treated country.

Overall, the sample includes all firms incorporated in 19 EU countries, enjoying a comparable framework in terms of currency and measures set for the directive application. We exclude firms operating in the financial sector, banks and insurance companies because companies of this kind

present peculiar balance sheet structures and can more easily retrieve funds whenever needed compared to other businesses. Firm included are public listed entities and must possess available financial data for the entire six years interval considered. This process yielded 6,306 firm-year observations, for a total of 1,484 unique firms. Table 1 and Table 2 report the distribution of observations over the sample period.

<< INSERT TABLE 1 HERE >>

<< INSERT TABLE 2 HERE >>

Research Design

To empirically assess whether CSR reporting requirements affect corporate cash holdings plans, we consider the Non-Financial Reporting Directive (NFRD 2014/95/EU) set by the European Parliament and by the Council of EU. As previously mentioned, the Directive, transposed by the majority of countries in 2017, requires companies to include non-financial statements in their annual reports or in a separate filing from 2018 onwards, including information on environmental protection, social responsibility and treatment of employees, respect for human rights, anti-corruption and bribery, and diversity on company boards. Table 3 reports the year of implementation for the different countries.

The directive applies to public-interest companies with more than 500 employers in the EU, which constitutes approximately 6,000 companies and groups (listed companies, banks, insurance companies, and other public-interest entities – See Figure 1 in the appendix for further details). Given the nature of the legal instrument (i.e. Directive), each nation has had the possibility to set its own measures and threshold (see Figure 2 in the appendix for details). Compliance, as said, remains quite flexible in terms of content to be disclosed, with the EU Commission just recommending the use of international standards such as UN Global Compact, OECD Guidelines, ISO 2600, or Global Reporting Initiative (GRI).

In order to test the research hypothesis, we adopt a diff-in diff approach, running the following OLS model:

$$\text{CashHoldings}_{i,t} = \alpha_0 + \alpha_1 \text{NFRDs} + \delta \text{Controls} + \text{fixed effects} + e \tag{1}$$

where the dependent variable *CashHoldings*$_{i,t}$ is the total amount of cash holdings over assets retained by firm i in year t; NFRD is a dummy variable which equals to 1 when a firm is required to report its CSR activities under the Non Financial Reporting Directive and 0 when the report is not due; *δControls* captures five conventional variables which have been identified by the literature as being determinants of cash holdings such as *Leverage*, measured as non-current Liabilities over Total Assets reported; *Size*, which is natural logarithm of Total Revenue; *SGA*, which is the logarithm of Selling, General and Administrative Expenses; *CAPEX* which is defined as the ratio of Cumulative Capital Expenditures over Total Assets reported; *NWC*, measured as Working Capital

less Cash and Cash Equivalents over Total Assets and *RD* defined as the ratio of Research and Development Expenses over Sales. *Fixed effects* include firm and year fixed effects. All variables are winsorized at the 1st and 99th percentile. Table A in the appendix reports an exhaustive overview of variables' definitions.

Table 4 reports the descriptive statistics of main model variables. The summary statistics show that, on average, the sample firms hold 13.6% of their assets in cash and cash equivalents. All the other variables' statistics seem to be comparable to those in previous research.

<< INSERT TABLE 4 HERE >>

Table 5 discloses correlations among the main variables of the regression model. Not unpredictably and in line with comparable studies, Size, Leverage, NWC, CAPEX and SGA are negatively related with Cash Holdings suggesting that the bigger, the more indebted or the spender is the firm, the lower is the percentage of cash that it has the opportunity to accumulate during its run.

<< INSERT TABLE 5 HERE >>

RESULTS

Table 6 below shows our findings. As it is easily visible, the NFRD coefficient is positive and statistically significant. Consistently with our Hypothesis H1a, this implies that the mandatory adoption of the NFRD at European level, to whom public listed firms had to comply, leads to an increase in corporate cash holdings by 0.8% on average and all else equal. The intuition behind the results suggests that firms recognize some drawbacks related to an additional disclosure of information - especially if concerning a sensible sector such as the CSR - and decide to increment their liquidity holdings to safe from possible negative externalities. Coefficients for other parameters seem reasonable and their association with the dependent variable seems in line with other studies.

<< INSERT TABLE 6 HERE >>

ADDITIONAL ANALYSES

With the objective to discover which of the aforementioned causes leads us to the highlighted findings, we conduct some cross-sectional analyses based on Proprietary costs and Investment expenditures. Our conjecture is that firms characterized by higher proprietary costs and higher investment expenditures retain much cash after the directive implementation. Firms facing high proprietary costs and higher investments in fact need more cash to maintain their competitiveness on the market. For the purpose, we subdivide our sample of firms on the basis of their pertinence to the highest or to the lowest quartile of the measures' distribution chosen as proxies for Proprietary

costs and Investment expenditures; then we regress using model (1). Into the detail, for Proprietary costs we categorize firms in terms of RD Expenses, creating a dummy variable equal to 1 for firms experiencing high proprietary costs (highest quartile of RD expenses distribution) and equal to 0 for firms characterized by low proprietary costs (lowest quartile of RD expenses distribution). Similarly, for investments, we partition firms in terms of CAPEX and then create a dummy variable equal to 1 for firms pertaining to the highest quartile of the CAPEX distribution and equal to 0 for firms in the lowest quartile of the distribution. All the proxies used are measured in 2013 and have been often adopted by previous authors involved in analysis concerning proprietary costs (Wang, 2007; Ellis, Fee and Thomas, 2012) and investment expenditures (Blanchard et al., 1994).

Results are presented in table 7 and 8. For brevity, we only display the parameters of our main regressor (NFRD). As it can be seen, consistently with our hypothesis, the coefficient for Proprietary costs is positively and statistically significant ($\alpha 1 = 0.017$; $p < 0.085$) for firms characterized by high proprietary costs while is not significant for firms classified as low proprietary costs entities ($\alpha 1 = 0.006$; $p < 0.220$). Similarly, the coefficient for high investors is positive and statistically significant ($\alpha 1 = 0.018$; $p < 0.025$) while remain not significant for firms with low investments expenditures ($\alpha 1 = 0.008$; $p < 0.349$). The interpretation of these results is straightforward: firms facing lower proprietary costs and higher investments' expenditures accumulate more liquidity as a way to recover from a possible deterioration in corporate cash flows (due to a competitiveness' loss generated by the disclosure of CSR info) and in order to maintain unchanged their level of investments, respectively.

<< INSERT TABLE 7 HERE >>

<< INSERT TABLE 8 HERE >>

ROBUSTNESS TESTS

The presence of agency costs as mentioned, is another friction that may influence cash holdings. Dittmar, Mahrt-Smith, and Servaes (2002) for example, reveal that companies in countries characterized by big agency problems hold high level of cash holdings. In this sense, the findings of our main analysis could just reflect firms' agency problems, corroborating the possibility of biased reporting by managers and the disposal of a consistent degree of managerial discretion (Saddour, 2006). As argued by Jensen (1986), entrenched managers have incentive to hoard cash in order to increase the amount of assets under their control and to gain discretionary power over the firm's investment decisions. By retaining excess cash flow, managers reduce the ongoing need for raising finance from the capital markets, thereby also reducing exposure to capital providers' monitoring.

Thus, to confirm the goodness of our results, we test their sensitivity to alternative regression models, including a control for agency costs. In particular, we utilize an agency costs proxy previously adopted within the papers of Ang, Cole and Lin (2000); Singh and Davidson (2003) and Florackis and Ozkan (2009).

Results are presented in table 9. Model 1 in the table controls for Agency Costs proxied by the ratio of Total Revenue to Total Assets (inverse proxy). The coefficient on the agency costs variable is negative and significant, indicating that the greater are the asymmetries of information, the greater is also the stockpile of cash managers are able to build up. Overall, the sign and statistical

significance of the NFRD coefficient remains consistent with that reported in the main analysis, confirming our hypothesis.

<< INSERT TABLE 9 HERE >>

CONCLUSIONS

This paper investigates the consequences of the implementation of a CSR reporting mandate on corporate cash holdings. Exploiting a dataset on publicly listed firms drawn from Eikon and Orbis between 2014-2019, we show that in the aftermath of the launch of the Non Financial Reporting Directive set by the European authorities, firms raise their cash holdings by 0.8% on average.

The theory behind our findings relies on the expectation that a mandatory disclosure of information on environmental, social, employee and anticorruption matters may expose firms to several risks and costs whose negative externalities push management to boost corporate liquidity for precaution. Within possible determinants driving to this conclusion we look at the incidence of proprietary costs, investments expenditures. We perform the cross-sectional analysis by subdividing the sample based on the distribution of two proxies for each firm – RD expenses for proprietary costs and the ratio of Capital Expenditures over Total Assets for investments – and find that the increase in cash holdings is significant for firms characterized by high proprietary costs and high investment expenses. Results remain robust when controlling also for agency costs.

Overall, the analysis sheds light on another possible implication of CSR reporting at corporate level. In particular, we launch a message in a context that seems increasingly moving towards progressive regulation, arguing that disclosing about corporate social responsibility can be a double-edged sword, not only associated with possible advantages in terms of competitiveness and performance, but also with a series of risks and costs which may push firms to revise their financial strategies.

REFERENCES

Almeida H., Campello M. & Weisbach M. S. (2004). The cash flow sensitivity of cash. *Journal of Finance,* 59, 1777–1804. https://doi.org/10.1111/j.1540-6261.2004.00679.x

Amel-Zadeh A. & Serafeim G. (2018). Why and how investors use ESG information: Evidence from a global survey. *Financial Analysts Journal,* 74 (3): 87–103. https://dx.doi.org/10.2139/ssrn.2925310

Ang J. S., Cole R. A. & Lin J. W. (2000). Agency costs and ownership structure. *Journal of Finance*, 55, 81-106. https://doi.org/10.1111/0022-1082.00201

Arouri M. & Pijourlet G. (2017). CSR Performance and the Value of Cash Holdings: International Evidence. *Journal of Business Ethics*, 140, 263–284. https://doi.org/10.1007/s10551-015-2658-5

Arslan O., Florackis C. & Ozkan A. (2006). The role of cash holdings in reducing investment-cash flow sensitivity: evidence from a financial crisis period in an emerging market. *Emerging Markets Review*, 7(4), 320–338. https://doi.org/10.1016/j.ememar.2006.09.003

Ball R., Robin A., & Wu J.S. (2003). Incentives versus standards: Properties of accounting income in four East Asian countries. *Journal of Accounting and Economics*, 36 (1-3): 235–270. https://doi.org/10.1016/j.jacceco.2003.10.003

Barnett M. & Hoffman A. (2007). Beyond Corporate Reputation: Managing Reputational Interdependence. *Corporate Reputation Review*. https://doi.org/11. 10.1057/crr.2008.2.

Baron D.P. (2001). Private politics, corporate social responsibility, and integrated strategy. *Journal of Economics & Management Strategy,* 10 (1): 7–45. https://doi: 10.1111/j.1430-9134.2001.00007.x

Barron, O.E., Byard D. & Kim O. (2002). Changes in analysts' information around earnings announcements. *The Accounting Review,* 77 (4): 821–846. https://dx.doi.org/10.2139/ssrn.1013585

Belal A. & Cooper S. (2018). Sustainability Accounting: Education, Regulation, Reporting and Stakeholders. *Advances in environmental accounting and management, Volume 7.* Emerald Publishing. Available at:https://books.emeraldinsight.com/resources/pdfs/chapters/9781787548893-TYPE23-NR2.pdf

Benjamin S., Regasa D., Wellalage N. & Marathamuthu M. S. (2020). Waste disclosure and corporate cash holdings. *Applied Economics*, vol. 52(49), pages 5399-5412. https://doi.org/10.1080/00036846.2020.1764480

Berger P.G., & Hann. R.N. (2007). Segment profitability and the proprietary and agency costs of disclosure. *The Accounting Review*, 82 (4): 869–906. https://doi.org/10.2308/ACCR.2007.82.4.869

Blanchard O., Lopez-de-Silanes F. & Shleife A. (1994). What do firms do with cash windfalls? *Journal of Financial Economics*, 36, pp. 337-360. https://doi.org/10.1016/0304-405X(94)90009-4

Bolton, P., & Kacpercyk. M. (2020b). Signaling through carbon disclosure. Working paper, available at: https://ssrn.com/abstract=3755613

Boodoo M. (2016). Does mandatory CSR reporting regulation lead to improved corporate social performance? Evidence from India. *Academy of Management.* https://doi.org/10.5465/AMBPP.2020.17332abstract

Bradford M., Earp J.B, Showalter D.S. & Williams P.F. (2017). Corporate sustainability reporting and stakeholder concerns: Is there a disconnect? *Accounting Horizons*, 31 (1): 83–102. https://doi/10.2308/ACCH-51639.

Breuer M., Leuz C. & Vanhaverbeke S. (2020). Reporting regulation and corporate innovation. Working paper, available at: https://ssrn.com/abstract=3449813.

Cao J., Liang H. & Zhan X. (2019). Peer effects of corporate social responsibility. *Management Science*, 65 (12): 5487–5503. https://doi/10.1287/mnsc.2018.3100

Casey R.J. & Grenier J.H. (2015). Understanding and contributing to the enigma of corporate social responsibility (CSR) assurance in the United States. *Auditing: A Journal of Practice & Theory,* 34 (1): 97– 130. https://doi/10.2308/ajpt-5073

Chen Y.-C., Hung M. & Wang Y. (2017). The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China. *Journal of Accounting and Economics* 65 (1): 169–190. https://doi.org/10.1016/j.jacceco.2017.11.009

Cheung A. (2016). Corporate social responsibility and corporate cash holdings. *Journal of Corporate Finance*, Volume 37, Pages 412-430. https://doi.org/10.1016/j.jcorpfin.2016.01.008.

Chang C.-H., Chen S.-S., Chen Y.-S. & Peng S.-C. (2019). Commitment to build trust by socially responsible firms: Evidence from cash holdings. *Journal of Corporate Finance*, Volume 56, Pages 364-387. https://doi.org/10.1016/j.jcorpfin.2019.03.004.

Cho C.H., Michelon G., Patten D.M. & Roberts R.W. (2015b). CSR disclosure: The more things change…? Accounting. *Auditing and Accountability Journal*, 28 (1): 14–35. https://doi/10.1108/AAAJ-12-2013-1549

Christensen H.B., Floyd E., Liu L.Y., & Maffett M. (2017). The real effects of mandated information on social responsibility in financial reports: Evidence from mine-safety records. *Journal of Accounting and Economics*, 64 (2-3): 284–304. https://doi.org/10.1016/j.jacceco.2017.08.001

Clarkson P.M., Fang X., Li Y. & Richardson G. (2013). The relevance of environmental disclosures: Are such disclosures incrementally informative? *Journal of Accounting and Public Policy,* 32 (5): 410–431. https://doi.org/10.1016/j.jaccpubpol.2013.06.008

Coates J. (2021). ESG disclosure – keeping pace with developments affecting investors, public companies and the capital markets. U.S. Securities and Exchange Commission. Available at: https://www.sec.gov/ news/public-statement/coates-esg-disclosure-keeping-pace-031121

Cornell B. & Shapiro A. C. (1987). Corporate Stakeholders and Corporate Finance. *Financial Management*, 16(1), 5–14. https://doi.org/10.2307/3665543

Dai R., Liang H., & Ng L.K. (2020). Socially responsible corporate customers. *Journal of Financial Economics*, 1-29. https://doi.org/10.1016/j.jfineco.2020.01.003

Danwatch (2011). The impact of the Danish Law on CSR Reporting. Available at: https://germanwatch.org/sites/germanwatch.org/files/announcement/10649.pdf

Daske H., Hail L., Leuz C., & Verdi R. (2013). Adopting a label: Heterogeneity in the economic consequences around IAS/IFRS adoptions. *Journal of Accounting Research*, 51 (3): 495 547. https://doi.org/10.1111/1475-679X.12005

Defond M.L. & Lennox C.S. (2011). The effect of SOX on small auditor exits and audit quality. *Journal of Accounting and Economics,* 52 (1): 21–40. https://doi/10.1016/j.jacceco.2011.03.002

Deng X., Kang J.K., & Low B.S. (2013). Corporate social responsibility and stakeholder value maximization: Evidence from mergers. *Journal of Financial Economics*, 110 (1): 87–109. https://doi/10.1016/j.jfineco.2013.04.014

Dhaliwal D.S., Li O.Z., Tsang A. & Yang Y.G. (2011). Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *The Accounting Review*, 86 (1): 59–100. https://doi.org/10.2308/accr.00000005

Dittmar A. & Duchin R. (2010). The Dynamics of Cash. Ross School of Business Paper No. 1138. http://dx.doi.org/10.2139/ssrn.1569529

Dittmar A., Mahrt-Smith J. & Servaes H. (2002). Corporate Liquidity. *Journal of Finance and Quantitative Analysis*. https://doi.org/38. 10.2139/ssrn.319445.

Downar B., Ernstberger J., Reichelstein S., Schwenen S. & Zaklan A. (2021). The impact of carbon disclosure mandates on emissions and financial operating performance. Working paper, available at: https://ssrn.com/abstract=3693670.

Duchin R., Ozbas O. & Sensoy B. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics*, 97, 418-435. https://doi.org/10.1016/j.jfineco.2009.12.008

Duchin R. (2010). Cash Holdings and Corporate Diversification. *The Journal of Finance*, 65: 955-992. https://doi.org/10.1111/j.1540-6261.2010.01558.x

Dyck A., Volchkova N., & Zingales L. (2008). The corporate governance role of the media: Evidence from Russia. *The Journal of Finance,* 63 (3): 1093–1135. https://doi.org/10.1111/j.1540-6261.2008.01353.x

Dyer T., Lang M., & Stice-Lawrence L. (2017). The evolution of 10-K textual disclosure: Evidence from latent Dirichlet allocation. *Journal of Accounting and Economics*, 64 (2): 221–245. https://doi/10.1016/j.jacceco.2017.07.002

El Ghoul S., Guedhami O., Kwok C.C.Y. & Mishra D.R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of Banking and Finance,* 35 (9): 2388–2406. https://doi.org/10.1016/j.jbankfin.2011.02.007

Ellis J., Fee C. & Thomas S. (2012). Proprietary Costs and the Disclosure of Information About Customers. *Journal of Accounting Research*, 50: 685-727. https://doi.org/10.1111/j.1475-679X.2012.00441.x

Feltham G.A. & Xie J.Z (1992). Voluntary financial disclosure in an entry game with continua of types. *Contemporary Accounting Research*, 9 (1): 46–80. https://doi.org/10.1111/j.1911-3846.1992.tb00869.x

Fiechter P., Hitz J.-M. & Lehmann N. (2020). Real effects of a widespread CSR reporting mandate: Evidence from the European Union's CSR directive. Working paper, available at: https://ssrn.com/abstract=3725603.

Flammer C. (2013). Corporate social responsibility and shareholder reaction: The environmental awareness of investors. *Academy of Management Journal*, 56 (3): 758–781. https://doi.org/10.5465/amj.2011.0744

Flammer C. (2015). Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Science*, 61 (11): 2549–2568. https://doi.org/10.1287/mnsc.2014.2038

Florackis C. & Ozkan A. (2009). The Impact of Managerial Entrenchment on Agency Costs: An Empirical Investigation Using UK Panel Data. *European Financial Management*. https://doi.org/10.1111/j.1468-036X.2007.00418.x

Foley F. C., Hartzell J. C., Titman S. & Twite G. (2007). Why do firms hold so much cash? A tax-based explanation. *Journal of Financial Economics*, 86, 579–607. https://doi.org/10.1016/j.jfineco.2006.11

Fresard L. (2010). Financial Strength and Product Market Behavior: The Real Effects of Corporate Cash Holdings. *The Journal of Finance*, 65: 1097-1122. https://doi.org/10.1111/j.1540-6261.2010.01562.x

Grewal J. (2021). Real effects of disclosure regulation on voluntary disclosers. *Journal of Accounting and Economics*. https://doi.org/10.1016/j.jacceco.2021.101390

Grewal J., Riedl E.J. & Serafeim G. (2019). Market reaction to mandatory nonfinancial disclosure. *Management Science*, 65 (7): 3061–3084. https://doi.org/10.1287/mnsc.2018.3099

Groening C. & Kanuri V.K. (2013). Investor reaction to positive and negative corporate social events. *Journal of Business Research*, 66 (10): 1852–1860. https://doi.org//10.1016/j.jbusres.2013.02.006

Han S. & Qiu J. (2007). Corporate precautionary cash holdings. *Journal of Corporate Finance*, 13, 43–57. https://doi.org/10.1016/j.jcorpfin.2006.05.002

Henisz W.J., Dorobantu S. & Nartey L.J. (2014). Spinning gold: The financial returns to stakeholder engagement. *Strategic Management Journal,* 35 (12): 1727–1748. https://doi.org/10.1002/smj.2180

Herremans I.M., Akathaporn P. & Mcinnes M. (1993). An investigation of corporate social responsibility reputation and economic performance. *Accounting, Organizations and Society*, 18 (7-8): 587–604. https://doi.org/10.1016/0361-3682(93)90044-7

Hogarth K., Hutchinson M. & Scaife W. (2018). Corporate Philanthropy, Reputation Risk Management and Shareholder Value: A Study of Australian Corporate giving. *Journal of Business Ethics*, 151, 375–390. https://doi.org/10.1007/s10551-016-3205-8

Hung M., Shi J. & Wang Y. (2013). The Effect of Mandatory CSR Disclosure on Information Asymmetry: Evidence from a Quasi-Natural Experiment in China. *Asian Finance Association (asfa) Conference*. https://dx.doi.org/10.2139/ssrn.2206877

IAC. (2020). Recommendation from the investor-as-owner subcommittee of the SEC investor advisory committee relating to ESG disclosure. U.S. Securities and Exchange Commission investor advisory committee. Available at: https://www.sec.gov/spotlight/investor-advisory-committee-2012/ recommendation-of-the-investor-as-owner-subcommittee-on-esg-disclosure.pd

Ioannou I. & Serafeim G. (2017). The consequences of mandatory corporate sustainability reporting. Working paper, available at: https://ssrn.com/abstract=1799589

Itzkowitz J. (2013). Customers and cash: How relationships affect suppliers' cash holdings. *Journal of Corporate Finance,* Elsevier, vol. 19(C), pages 159-180. https://doi/10.1016/j.jcorpfin.2012.10.005

Johnson M.F., Kasznik R. & Nelson K.K. (2001). The impact of securities litigation reform on the disclosure of forward-looking information by high technology firms. *Journal of Accounting Research*, 39 (2): 297–327J. https://doi.org/10.1111/1475-679X.00014

Jouvenot V. & Krueger P. (2020). Mandatory corporate carbon disclosure: Evidence from a natural experiment. Working paper, available at: https://ssrn.com/abstract=3434490.

Kamar E., Karaca-Mandic P., & Talley E. (2009). Going-private decisions and the Sarbanes-Oxley Act of 2002: A cross-country analysis. *Journal of Law, Economics, and Organization*, 25 (1): 107–133. https://doi.org/10.1093/jleo/ewn019

Kanodia C. & Sapra H. (2016). A real effects perspective to accounting measurement and disclosure: Implications and insights for future research. *Journal of Accounting Research,* 54 (2): 623–676. https://doi.org/10.1111/1475-679X.12109

Keynes J. M. (1936). The general theory of employment, interest and money. Harcourt Brace, London.

Kim C.-S., Mauer D. & Sherman A. (1998) . The determinants of corporate liquidity: theory and evidence. *The Journal of Financial and Quantitative Analysis*, Vol. 33, No. 3, 335-359. https://doi.org/10.2307/2331099

Kitzmueller M. & Shimshack J. (2012). Economic perspectives on corporate social responsibility. *Journal of Economic Literature,* 50 (1): 51–84. https://doi/ 10.1257/jel.50.1.51

Kölbel J.F., Busch T. & Jancso L.M. (2017). How media coverage of corporate social irresponsibility increases financial risk. *Strategic Management Journal*, 38 (11): 2266–2284. https://doi.org/10.1002/smj.2647

Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics*, 115 (2): 304– 329. https://doi.org/10.1016/j.jfineco.2014.09.008

Lang M., Smith Raedy J. & Wilson W. (2006). Earnings management and cross listing: Are reconciled earnings comparable to US earnings? *Journal of Accounting and Economics*, 42 (1-2): 255–283. https://doi.org/10.1016/j.jacceco.2006.04.005

Leuz C. & Wysocki P. D. (2008). Economic consequences of financial reporting and disclosure regulation. A review and suggestions for future research. Working paper, available at: https://ssrn.com/abstract= 1105398

Li F. (2008). Annual report readability, current earnings, and earnings persistence. *Journal of Accounting and Economics*, 45 (2-3): 221–247. https://doi.org/10.1016/j.jacceco.2008.02.003

Lu L. Y., Shailer G. & Yu Y. (2017). Corporate social responsibility disclosure and the value of cash holdings. *European Accounting Review*, 26(4), 729-753. https://doi.org/10.1080/09638180.2016.1187074

Mackey A., Mackey T.B. & Barney J.B., (2007). Corporate social responsibility and firm performance: Investor preferences and corporate strategies. *Academy of Management Review,* 32 (3): 817–835. https://doi.org/10.5465/amr.2007.25275676

Maksimovic V. & Titman S. (1991). Financial Policy and Reputation for Product Quality. *The Review of Financial Studies*, 4(1), 175–200. Available at: https://www.jstor.org/stable/2962088

Malm J. & Kanuri S. (2016). Litigation risk and cash holdings. *Journal of Economics and Finance*, 41. https://doi.org/10.1007/s12197-016-9373-7.

Martin P.R. & Moser D. (2016). Managers' green investment disclosures and investors' reaction. *Journal of Accounting and Economics*, 61 (1): 239–254. https://doi.org/10.1016/j.jacceco.2015.08.004

Matsumura E. M., Prakash R. & Vera-Muñoz S. C. (2017). To disclose or not to disclose climate-change risk in form 10-K: Does materiality lie in the eyes of the beholder? Working paper, available at: https:// ssrn.com/abstract=2986290.

Michaels A. & Grüning M. (2017). Relationship of corporate social responsibility disclosure on information asymmetry and the cost of capital. *Journal of Management Control*, Springer, vol. 28(3), pages 251-274. https://doi: 10.1007/s00187-017-0251-z

Miller M.H. & Orr D. (1966). A model of the demand for money by firms. *Quarterly Journal of Economics*, 413–435. https://doi.org/10.2307/1880728

Minton B. & Schrand C. (1999). The impact of cash flow volatility on discretionary investment and the cost of debt and equity financing. *Journal of Financial Economics*, 54, 423–460. https://doi.org/10.1016/S0304-405X(99)00042-2

Myers S. & Majluf N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13, 187-221. https://doi.org/10.1016/0304-405X(84)90023-0

Ng A.C., & Rezaee Z. (2015). Business sustainability performance and cost of equity capital. *Journal of Corporate Finance,* 34: 128–149. https://doi.org/10.1016/j.jcorpfin.2015.08.003

Opler T., Pinkowitz L., Stulz R. & Williamson R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, 52, 3–46. https://doi.org/10.1016/S0304-405X(99)00003-3

Pham H. S. T. & Tran H. T. (2020). CSR disclosure and firm performance: The mediating role of corporate reputation and moderating role of CEO integrity. *Journal of Business Research*, Volume 120, Pages 127-136. https://doi.org/10.1016/j.jbusres.2020.08.002.

Plumlee M., Brown D., Hayes R.M. & Marshall R.S. (2015). Voluntary environmental disclosure quality and firm value: Further evidence. *Journal of Accounting and Public Policy,* 34 (4): 336–361. https://doi.org/10.1016/j.jaccpubpol.2015.04.004

Porter M. E. (1980). Competitive Strategy: Techniques for Analyzing Industries and Competitors. *New York: Free Press.* Available at: https://www.hbs.edu/faculty/Pages/item.aspx?num=195

Reid E.M. & Toffel M.W. (2009). Responding to public and private politics: Corporate disclosure of climate change strategies. *Strategic Management Journal*, 30 (11): 1157–1178. https://doi.org/10.1002/smj.796

Rives L. & Ruiz de Maya S. (2007). I Need You Too! Corporate Identity Attractiveness for Consumers and The Role of Social Responsibility. *Journal of Business Ethics*, 71. 245-260. https://doi.org/10.1007/s10551-006-9137-y.

Rogers J. L., Van Buskirk A. & Zechman S. L. C. (2011). Disclosure tone and shareholder litigation. *The Accounting Review,* 86 (6): 2155–2183. https://doi.org/10.2308/accr-10137

Saddour K. (2006). The Determinants and the Value of Cash Holdings: Evidence from French firms. HAL. Available at: https://halshs.archives-ouvertes.fr/halshs-00151916

Servaes H., & Tamayo A. (2013). The Impact of Corporate Social Responsibility on Firm Value: The Role of Customer Awareness. *Management Science*, 59(5), 1045–1061. https://doi.org/10.1287/mnsc.1120.1630

Simpson W.G. & Kohers T. (2002). The link between corporate social and financial performance: Evidence from the banking industry. *Journal of Business Ethics*, 35 (2): 97–109. https://doi.org/10.1023/A:1013082525900

Singh M. & Davidson W. N. (2003). Agency costs, ownership structure and corporate governance mechanisms. *Journal of Banking & Finance*, 27, 793-816. https://doi.org/10.1016/S0378-4266(01)00260-6

Song K. & Lee Y. (2012). Long-term effects of a financial crisis: evidence from cash holdings of east asian firms. *Journal of Financial and Quantitative Analysis*, 47(3), 617-641. https://doi.org/10.1017/S0022109012000142

Tomar S. (2021). Greenhouse gas disclosure and emissions benchmarking. Working paper available at: https://ssrn.com/abstract=3448904.

Verrecchia R.E. (1983). Discretionary disclosure. *Journal of Accounting and Economics*, 5: 179–194. https://doi.org/10.1016/0165-4101(83)90011-3

Wang, I. Y. (2007). Private Earnings Guidance and Its Implications for Disclosure Regulation. *The Accounting Review*, 82, 1299–1332. https://doi.org/10.2308/accr.2007.82.5.1299

APPENDIX

TABLE 1 – Sample distribution per year

Year	#Obs	%
2014	1,277	20,25
2015	1,223	19,39
2016	1,173	18,60
2017	130	2,06
2018	1,168	18,52
2019	1,335	21,17
Total	6,306	100
Unique	1,484	

Number of observations for each year considered in the analysis. The frequency distribution appears to be homogenous across the sample.

TABLE 2 – Sample distribution per country

Country	#Obs	%
Austria	175	2,78
Belgium	293	4,65
Cyprus	50	0,79
Estonia	54	0,86
Finland	384	6,09
France	1,469	23,30
Germany	1,557	24,69
Greece	199	3,16
Ireland	188	2,98
Italy	664	10,53
Latvia	44	0,70
Lithuania	76	1,21
Luxembourg	148	2,35
Malta	33	0,52
Netherlands	357	5,66
Portugal	106	1,68
Slovak Republic	20	0,32
Slovenia	39	0,62
Spain	450	7,14
TOTAL	6,306	100

Number of observations for each EU country considered in the analysis.

TABLE 3 – CSR

Country	Year of application
Austria	2017
Belgium	2017
Cyprus	2017
Estonia	2016
Finland	2017
France	2017
Germany	2017
Greece	2016
Ireland	2017
Italy	2017
Latvia	2017
Lithuania	2017
Luxembourg	2017
Malta	2017
Netherlands	2017
Portugal	2017
Slovak Republic	2017
Slovenia	2017
Spain	2018

NFRD Year of application within each country. Source: GRI (Global Reporting Initiative)

FIGURE 1 – NFRD requirements

NFRD requirements

Company Scope	Report features
1. **Organisations must produce a non-financial report if they present both*:** • **An average number of employees exceeding 500 during the financial year** • **Either: a balance sheet total exceeding EUR 20 million, or a net turnover exceeding EUR 40 million** 2. **A public-interest entity, meaning any entity which is either a:** • **Trader of transferable securities on the regulated market of any Member State** • **Credit institution** • **Insurance undertaking** • **Public interest entity** ***Thresholds may change on the basis of country**	Companies must disclose a brief description of their business model, and non-financial key performance indicators relevant to the business. Information must be provided at the minimum for the following matters: • **Environmental** • **Social and employee matters** • **Respect for human rights** • **Anti-corruption and bribery matters** Companies must disclose, for each of the four matters, the following information: • **A description of the group's business model** • **A description of the policies pursued by the group in relation to those matters** • **The outcomes of those polices** • **The principal risks related to those matters linked to the group's operations including, where relevant and proportionate, its business relationships, products or services which are likely to cause adverse impacts in those areas, and how the group manages those risks** • **Non-financial key performance indicators relevant to the business** This information shall be presented either in: • **The management report** • **A separate report published alongside the management report or within 6 months of the balance sheet date, made available on the undertaking's website and referenced in the management report.**

<div align="right">

Source: GRI 2017

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FIGURE 2 – Firms' threshold for NFRD application in each country

NFRD TRESHOLD IMPLEMENTATION			
Country	**Av. Employees (> =)**	**Total Assets (> =)**	**Turnover (> =)**
Austria	500	20.000.000 €	40.000.000 €
Belgium	500	17.000.000 €	34.000.000 €
Cyprus	500	20.000.000 €	40.000.000 €
Estonia	500	20.000.000 €	40.000.000 €
Finland	500	20.000.000 €	40.000.000 €
France	500	20.000.000 €	40.000.000 €
Germany	500	20.000.000 €	40.000.000 €
Greece	500	/	/
Ireland	500	20.000.000 €	40.000.000 €
Italy	500	20.000.000 €	40.000.000 €
Latvia	500	20.000.000 €	40.000.000 €
Lithuania	500	20.000.000 €	40.000.000 €
Luxembourg	250	20.000.000 €	40.000.000 €
Malta	500	20.000.000 €	40.000.000 €
Netherlands	500	20.000.000 €	40.000.000 €
Portugal	500	/	/
Slovak Republic	500	20.000.000 €	40.000.000 €
Slovenia	500	20.000.000 €	40.000.000 €
Spain	500	20.000.000 €	40.000.000 €
			Source: GRI 2017

This figure represents the parameters set by each country for the directive implementation by firms.

TAB A – Variables definition

Variables (data source)	Definition (detailed data source)
Cash Holdings (Orbis Bureau Van Dijk)	Ratio of total amount of cash holdings (Orbis) over total assets
NFRD (Accountancy EU)	Dummy variable which equals to 1 for firms required to disclose by the NFRD and 0 otherwise
Size (Orbis Bureau Van Dijk)	Natural logarithm of total revenue
Leverage (Thomson Reuters Eikon)	Ratio of non-current liabilities over total assets
NWC (Thomson Reuters Eikon and Orbis Bureau Van Dijk)	Ratio of working capital minus (Eikon) cash and equivalents (Orbis), over total Assets (Orbis)
SGA (Thomson Reuters Eikon and Orbis Bureau Van Dijk)	Logarithm of selling, general and administrative expenses
CAPEX (Thomson Reuters Eikon and Orbis Bureau Van Dijk)	Ratio of capital expenditures (Eikon) over total assets (Orbis)
RD (Thomson Reuters Eikon and Orbis Bureau Van Dijk)	Ratio of research and development expenses (Eikon) over sales (Orbis)

This table provides the definition of variables used within the regression analysis and their source.

TABLE 4 – Descriptive statistics

	N	Mean	SD	p25	Median	p75
CashHoldings	6,306	0.1357	0.1369	0.0406	0.0940	0.1737
Size	6,306	19.740	2.3048	18.235	19.691	21.360
Leverage	6,306	0.2533	0.1813	0.1114	0.2375	0.3669
NWC	6,306	0.0133	0.1695	-0.0790	0.0018	0.1111
SGA	6,306	18.323	2.0893	16.830	18.273	19.803
CAPEX	6,306	0.0464	0.0427	0.0165	0.0347	0.0618
RD	6,306	0.0692	0.3541	0	0	0.0153

The table provides descriptive statistics for the variables used in the main regression model. *CashHoldings*$_{i,t}$ is the total amount of cash holdings over assets retained by firm i in year t; *CSRs* is a dummy variable which equals to 1 for firms required to disclose by the NFRD and 0 otherwise; *Size* is the natural logarithm of Total Revenue; *Leverage*, is measured as non-current Liabilities over Total Assets; *NWC* is computed as Working Capital minus Cash and Equivalents over Total Assets; *SGA* is the logarithm of Selling, General and Administrative expenses; *CAPEX* is measured as Capital Expenditures over Total Assets; *RD* is the ratio of Research and Development Expenses over Sales.

TABLE 5 – Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) CashHoldings	1.0000						
(2) Size	-0.2854***	1.0000					
(3) Leverage	-0.3211***	0.0757***	1.0000				
(4) NWC	-0.0912***	-0.0509***	-0.2705***	1.0000			
(5) SGA	-0.1817***	0.9082***	0.0330***	-0.0984***	1.0000		
(6) CAPEX	-0.0822***	-0.0066	0.0613***	-0.0898***	-0.0044	1.0000	
(7) RD	0.4293***	-0.2960***	-0.0954***	-0.0519***	-0.1682***	-0.0702***	1.0000

The table reports Pearson correlation coefficients among the main variables included in the analysis. *CashHoldings*$_{i,t}$ is the total amount of cash holdings over assets retained by firm i in year t; *CSRs* is a dummy variable which equals to 1 for firms required to disclose by the NFRD and 0 otherwise; *Size* is the natural logarithm of Total Revenue; *Leverage*, is measured as non-current Liabilities over Total Assets; *NWC* is computed as Working Capital minus Cash and Equivalents over Total Assets; *SGA* is the logarithm of Selling, General and Administrative expenses; *CAPEX* is measured as Capital Expenditures over Total Assets; *RD* is the ratio of Research and Development Expenses over Sales.***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

TABLE 6 – Regression results

Model	(1)
Dep. Var.	CashHoldings
NFRD	0.0083**
	[2.24]
Size	-0.0092***
	[-2.79]
Leverage	-0.1361***
	[-12.33]
NWC	-0.1774***
	[-15.09]
SGA	-0.0124***
	[-3.64]
CAPEX	-0.1703***
	[-4.96]
RD	0.0223***
	[3.19]
Constant	0.4635***
	[9.05]
Year fixed effects	Yes
Firm fixed effects	Yes
N	6,306

This table presents the results of the analysis for the main regression model considered. $CashHoldings_{i,t}$ is the total amount of cash holdings over assets retained by firm i in year t; *NFRD* is a dummy variable which equals to 1 for firms required to disclose by the NFRD and 0 otherwise; *Size* is the natural logarithm of Total Revenue; *Leverage*, is measured as non-current Liabilities over Total Assets; *NWC* is computed as Working Capital minus Cash and Equivalents over Total Assets; *SGA* is the logarithm of Selling, General and Administrative expenses; *CAPEX* is measured as Capital Expenditures over Total Assets; *RD* is the ratio of Research and Development Expenses over Sales. *Fixed effects* include firm and year fixed effects. We include firm and year fixed effect in the regressions, but we do not report the coefficient. t-statistics are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

TABLE 7 – Cross-firm proprietary costs impact on cash holdings 2014-2019

Proprietary Costs	HIGH	LOW	Difference (p-value)
	0.0171*	0.0062	0.041**
	[1.72]	[1.23]	
N	1,408	3,099	4,507

Notes: This table presents the estimates of NFRD on cash holdings from 2014-2019 across different groups of firms based on proprietary costs. Firms are classified on the basis of their RD Expenses. Low Proprietary costs firms are firms in the bottom quartile of the RD proxy distribution and High Proprietary costs firms are those in the top quartile. All variables are measured in 2013 unless otherwise specified. All regressions include the control variables as specified in model (1) and include firm and time fixed effects. The last column presents the p-value associated with the tests that compare the coefficients between the constrained and unconstrained subgroups. The number of observations for each group is specified in last rows. Standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

TABLE 8 – Cross-firm investments expenditures impact on cash holdings 2014-2019

Investments	HIGH	LOW	Difference (p-value)
	0.0180**	0.0079	0.054*
	[2.24]	[0.94]	
N	1,487	1,274	2,761

Notes: This table presents the estimates of NFRD on cash holdings from 2014-2019 across different groups of firms based on investment expenditures. Firms are classified on the basis of their Capital Expenditures. Low Investments firms are those in the bottom quartile of the CAPEX proxy distribution and High Investments firms are those in the top quartile. All variables are measured in 2013 unless otherwise specified. All regressions include the control variables as specified in model (1) and include firm and time fixed effects. The last column presents the p-value associated with the tests that compare the coefficients between the constrained and unconstrained subgroups. The number of observations for each group is specified in last rows. Standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

TABLE 9 – Robustness tests

Model	Agency (1)
Dep. Var.	CashHoldings
CSR	0.0081**
	[2.19]
Size	-0.0042
	[-1.18]
Leverage	-0.1438***
	[-12.85]
NWC	-0.1784***
	[-15.20]
SGA	-0.0142***
	[-4.11]
CAPEX	-0.1678***
	[-4.89]
RD	0.0237***
	[3.40]
AgencyCosts	-0.0235***
	[-3.96]
Constant	0.5305***
	[8.42]
Year fixed effects	Yes
Firm fixed effects	Yes
N	6,306

This table presents the results for the robustness tests. $CashHoldings_{i,t}$ is the total amount of cash holdings over assets retained by firm i in year t; *NFRD* is a dummy variable which equals to 1 for firms required to disclose by the NFRD and 0 otherwise; *Size* is the natural logarithm of Total Revenue; *Leverage*, is measured as non-current Liabilities over Total Assets; *NWC* is computed as Working Capital minus Cash and Equivalents over Total Assets; *SGA* is the logarithm of Selling, General and Administrative expenses; *CAPEX* is measured as Capital Expenditures over Total Assets; *RD* is the ratio of Research and Development Expenses over Sales; *Agency Costs* is the ratio of Total Revenue over Total assets. *Fixed effects* include firm and year fixed effects. We include firm and year fixed effect in the regressions, but we do not report the coefficient. t-statistics are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).