



Cash holdings speed of adjustment

Svetlana V. Orlova^{a,*}, Ramesh P. Rao^b

^a Department of Finance, International Business and Operations Management, Collins College of Business, University of Tulsa, United States

^b Department of Finance, Spears School of Business, Oklahoma State University, United States



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ABSTRACT

This study examines the speed of adjustment of cash holdings and extends the recent work that highlights the importance of accounting for heterogeneity of the speed of adjustment of cash holdings. The results indicate that firms with cash deficits, rated firms and firms with financial surpluses have a slower speed of adjustment, while firms with excess cash, non-rated firms and firms that have financial deficit adjust towards the target faster. Overall, the results support the idea that firms have a target level of cash holdings, however, costs of adjustment as well as costs of non-adjustment affect the speed with which firms adjust towards the target.

1. Introduction

Increases in the level of corporate cash holdings over the past decade have attracted considerable attention from media, investors and academic researchers. Bates, Kahle, and Stulz (2009, p.1985), note that “cash-to-assets ratio for U.S. industrial firms more than doubles from 1980 to 2006,” and that starting from 2003, “the average firm can retire all debt obligations with its cash holdings.” In light of these findings, the topic of cash holdings management has become increasingly important, potentially deserving the same attention as capital structure management. The recent financial downturn and liquidity crisis further emphasized the importance of liquidity management, and added another angle to the debate on the optimal level of corporate cash holdings. The level of corporate cash holdings and the factors that explain it have been the subject of considerable recent research (e.g. Opler, Pinkowitz, Stulz, & Williamson, 1999; Dittmar, Mahrt-Smith, Servaes, 2003; Foley, Hartzell, Titman, & Twite, 2007; Bates et al., 2009). But cross-sectional examination of cash holdings addresses only one aspect of cash management. Understanding the dynamic aspects of cash holdings is also important as it provides a more complete understanding of cash management policy. Specifically, answers to questions such as whether firms have and operate with target cash holdings in mind, whether managers adjust cash holdings towards such targets, and what factors influence the speed of such adjustments are all important aspects of cash holdings that are not well-understood. Only a few papers focus on the dynamic aspects of cash holdings (Bates, Chang, & Chi, 2017; Dittmar & Duchin, 2011; Gao, Harford, & Li, 2013; Venkiteshwaran, 2011). Our study contributes to this emerging literature.

Following the seminal paper by Opler et al. (1999), several studies examine cash holdings from the perspective of the theories developed to explain corporate capital structure including: trade-off, agency, financial hierarchy, and market timing theories (e.g. Dittmar, Mahrt-Smith, & Servaes, 2003; Venkiteshwaran, 2011; Dittmar & Duchin, 2011; Gao et al., 2013; Bates et al., 2017). As in the case of research into capital structure, the trade-off model has garnered the most attention when it comes to investigating cash holdings. In the *trade-off* theory framework, managers of a firm balance the cost and benefits of holding cash to determine an optimal (target) level of cash that should be maintained in order to maximize shareholders' wealth. As in the case of studies on capital structure, one way to

* Corresponding author. Helmerich 122-D, Collins College of Business, University of Tulsa, United States.

E-mail addresses: svetlana-orlova@utulsa.edu (S.V. Orlova), ramesh.rao@okstate.edu (R.P. Rao).

test for the existence of an optimal (target) level of cash holdings is to see if, and how quickly, firms move back to their target cash holdings level over time (i.e., speed of adjustment (SOA)). A high SOA estimate (close to 1.0) would support the *static* version of the trade-off theory of cash holdings, which assumes immediate adjustment towards target of cash holdings, while CH-SOA estimates lower than 1.0, albeit significant, would support the *dynamic* version of the trade-off theory. The latter recognizes that due to various market frictions and adjustment costs, the immediate full adjustment is not always possible and adjusting towards target takes time.

Several studies dealing with capital structure argue that firms adjust towards the target leverage only when the cost of non-adjustment exceeds the adjustment costs (e.g., Fischer, Heinkel, and Zechner, 1989; Faulkender, Flannery, Hankins, & Smith, 2012; Oztekin & Flannery, 2012). A similar argument could hold for target cash holdings. In the case of cash holdings, a significant source of adjustment cost can be transaction costs associated with having to raise capital or distribute cash to shareholders in order to bring the cash holdings to the target level. Non-adjustment costs include the increased probability of financial distress if the firm is cash deficient, or foregone returns and potential agency costs (management's misuse of cash or suboptimal investment) if a firm holds excess cash. Another cost of holding too much or too little cash is a decrease in the investors' valuation of cash. Faulkender and Wang (2006) show that investors' valuation is higher for the firms that retain liquidity; however, "the value of additional cash diminishes in the level of cash (p.1988)." Faulkender and Wang's (2006) findings suggest that from investors' perspective there is an optimal value maximizing level of cash the firm should hold, and deviation from this optimal level decreases the value of the firm.

Investigations into cash holdings speed of adjustment (CH-SOA) is still a developing area of research, especially as it applies to factors that affect the heterogeneity of SOA across firms. Recent studies on corporate cash holdings showed that CH-SOA varies among different firms and changes through time (Bates et al., 2017; Dittmar & Duchin, 2011; Gao et al., 2013). Gao et al. (2013) find that cash holdings speed of adjustment is higher for private firms compared to public firms due to agency costs. Dittmar and Duchin (2011) show that mature firms have slower CH-SOA. Bates et al. (2017) show that CH-SOA has been declining over time.

Based on prior evidence we hypothesize that the majority of companies adjust their cash levels towards targets on a regular basis. However, we propose that the speed of adjustment varies with firm characteristics. We specifically focus on availability of funds, as one of the main factors that contributes to differences in CH-SOA across firms. We test the hypothesis that differences in adjustment cost as well in cost of non-adjustment among firms will lead to the different CH-SOA. While adjustment costs are difficult to measure or observe, it can reasonably be expected to vary with several firm and financial characteristics. The specific factors we examine are as follows. First, we examine how the sign and size of deviation from the target affects CH-SOA. Second, building on the prior findings on the effect of free cash flow on cash holdings (e.g., Almeida, Campello, & Weisbach, 2004; Bao, Chan, & Zhang, 2012) we examine how the sign and size of free cash flow affects the CH-SOA. Finally, we demonstrate that various combinations of cash deviation from target and free cash flow have different effects on the CH-SOA.

We make two contributions to the literature. First, we provide evidence of a moderately high CH-SOA, but not close to 1.0, which is consistent with firms adjusting their cash towards a target, thus supporting a version of the trade-off theory of cash holdings. Second, and more importantly, we provide evidence of variability of CH-SOA based on firms' financial characteristics. Thus, we contribute to growing literature on CH-SOA heterogeneity (e.g. Dittmar & Duchin, 2011; Venkiteshwaran, 2011; Gao et al., 2013; Bates et al., 2017).¹ We show that systematic differences in CH-SOA among the firms with different characteristics is consistent with the idea that firms adjust towards their CH target, but, as predicted by the dynamic version of the trade-off theory, the adjustment is not instantaneous since the adjustment costs affect the speed of this adjustment.

Our findings are as follows. The overall CH-SOA is relatively high at 0.54, implying that on average firms close over half of their deviation from target in one year. The results indicate that firms with cash deficits have slower CH-SOA compared to the firms with excess cash, and firms that have greater excess cash adjust towards the target faster. Larger free cash flow (in absolute terms) leads to faster adjustment towards target. We find that firms with financial surpluses adjust slower than firms with financial deficits. Also, larger and, particularly, rated firms have slower CH-SOA. These results support the idea that costs of adjustment as well as costs of non-adjustment affect the speed with which firms adjust towards their cash holdings target. Since the CH-SOA that we document is significant, yet lower than 1.0, and varies with firm characteristics that proxy for various market frictions, we conclude that our findings are consistent with the dynamic version of the trade-off theory of corporate cash holdings.

The rest of the paper proceeds as follows: Section 2 reviews the literature and offers several testable hypotheses. Section 3 discusses the methodology and describes variables and data used. Section 4 presents the empirical results and section 5 concludes.

2. Relevant literature and hypotheses development

This section highlights the relevant literature and details the key hypotheses to be tested. In section 2.1 we discuss the determinants of cash holdings while in section 2.2 we discuss the more closely related literature on CH-SOA and how our study contributes to the literature in this area. Sections 2.3–2.5 detail the hypotheses to be tested.

2.1. Determinants of cash holdings

Research on corporate cash holdings have used the theories originally developed for capital structure including the trade-off model to explain corporate liquidity (e.g., Dittmar & Duchin, 2011; Opler et al., 1999; Venkiteshwaran, 2011). Central to the trade-off model is

¹ An earlier version of the Dittmar and Duchin (2011) paper contains tests of some of the factors that we examine in our study. However, most of these results did not carry over to the 2011 version. It is not clear why these tests/results were dropped, but several of them conflict with results documented in Venkiteshwaran (2011).

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