Policy Uncertainty and Cash Dynamics

Tut, Daniel

20 April 2021

Policy Uncertainty and Cash Dynamics

Daniel Tut*

Ted Rogers School of Management

Ryerson University

This Version: 20^{th} April 2021

Abstract

Why and when do firms deviate from target cash? And why do we observe imperfect adjustment of cash? We postulate and provide evidence that policy uncertainty induces financing frictions and adjustment costs which decelerate the speed of adjustment (SOA) of cash toward target. We find that the effects of policy uncertainty on SOA are higher for firms that operate below target cash than for firms that operate above target cash. Our results suggest that under policy uncertainty shocks, firms deviate from target cash as the expected benefit of deviation is greater than the expected value of approaching the target.

JEL Classifications: G30, G31, G32,

Keywords: Cash, Adjustment Speed, Adjustment Costs, Financing frictions, Economic Policy uncertainty

***Email:** dtut@ryerson.ca. I would like to thank Ambrus Kecskés, Yelena Larkin, Peter Cziraki, Lu Zhang, George Georgopoulos, Melanie Cao, Moshe Milevsky, Yisong Tian, Mark Kamstra, Sergei Davydenko, Michael Schill, Ran Duchin, Shiu-Au Yik, Yanguang Liu, participants at the 2020 SWFA conference, University of Manitoba, York University and Ryerson University brownbags for helpful discussions, comments and suggestions. All errors remain my own. The author acknowledges research support from the Ted Rogers School of Management.

I Introduction

Why do we observe imperfect adjustment of cash? And what is the role of adjustment costs in cash holdings decisions? What are the sources of these adjustment costs? While extant literature (Jiang and Lie, 2016, Dittmar and Duchin, 2011) has documented the slow speed of adjustment of cash, there is very little empirical work on conditions under which firms may optimally deviate from target cash. In this paper, we exploit one potential condition and source of adjustment costs, namely policy-related uncertainty. The goal of this paper is to fill an important gap in the literature by establishing a consistent link between uncertainty, speed of adjustment and cash holdings. In the process we aim to evaluate the joint effects of policy uncertainty-induced adjustment costs and financing frictions on the speed of adjustment (SOA) toward target cash.

Policy-related uncertainty induces financing frictions. That is, uncertainty creates a wedge between the benefit of current period liquid assets and costly external finance in future states. These financing frictions lead to an increase in adjustment costs[1], which invariably affect the frequency with which firms rebalance cash holdings. Intuitively, we would expect that policy uncertainty-induced adjustment costs would slow down the speed of adjustment (SOA) of cash, and that such costs would also be higher for firms that operate below target cash than for firms that operate above target cash. Specifically, due to costly external finance in future states, firms that operate below target cash have a strong incentive to increase cash holdings. Firms that operate above target cash tend to reduce investment due to precautionary delays. Consistent with this hypothesis, our results suggest that there is an inverse relationship between policy uncertainty and speed of adjustment (SOA) of cash. Additionally, as policy uncertainty heightens, firms that operate above target cash tend to decelerate speed of adjustment (SOA) while firms that operate below target cash tend to accelerate speed of adjustment (SOA).

In this study, we focus mainly on the effects of policy uncertainty shocks on speed of

[1]See Baker, Bloom and Davis (2016), Pastor and Veronesi (2012,2013), Gungoraydinoglu et al. (2017) for a discussion on real effects of policy uncertainty.

adjustment (SOA) of cash toward target. We first document that the speed of adjustment (SOA) of cash is imperfect and then examine the effects of policy uncertainty-induced financing frictions and adjustment costs on SOA. To measure the speed of adjustment of cash, we follow the two-stage procedure outlined in Jiang and Lie (2016), Byoun (2008), Dittmar and Duchin (2011) and Flannery and Rangan (2006). In the first stage, we estimate optimal cash as the predicted value of cash from Bates et al (2009) and Opler et al. (1999) models of cash holdings. In the second stage, we estimate a fixed effect model and regress the change in cash holdings against deviation of current cash holdings from optimal cash holdings. The coefficient of deviation from target cash in the second stage regression is the estimated speed of adjustment of cash (SOA). A coefficient value of "1" indicates perfect adjustment toward target and a coefficient value of less than "1" indicates imperfect adjustment toward target. For the overall sample, we estimate that the speed of adjustment toward target cash is approximately 26%, which is statistically consistent with the estimated values in the extant literature. In terms of half-lives- that is, the time it takes for the average firm to adjust one-half the distance to its optimal (target) cash- the speed of adjustment translates to about 2.3 years.[2]

To measure uncertainty, we use Baker, Bloom and Davis (2016) index as our proxy for political and regulatory uncertainty. The index accounts for policy-related uncertainty separate from general macroeconomics uncertainty. The first component of the index takes into account the effects of news articles from the ten major newspapers in the U.S. In order for an article to be included in the index, it has to contain at least one word related to uncertainty, at least one word related to policy and at least one word related to the economy. The second component takes into account dispersion in analyst forecasts. And the third component takes into account the effects of tax provisions that are set to expire in the immediate future. The overall index is then computed as the normalized average weight of the three components. On average, the index is significantly correlated with periods during

[2]Consistent with prior literature, in the subsample analyses, we find that on average the estimated speed of adjustment of cash is between 21% and 50% The wide range in value of SOA reflects the susceptibility of subsample analyses to outlier effects, that SOA is heterogeneous in the cross-section.

which we would expect increase in economic and political debates such as 9/11, the great recession and the 2013 government shut down[3]. Higher values of the index are associated with an increase in cash holdings (Duong et al. 2017), a decline in investment (Gulen and Ion 2016) and an increase in adjustment costs and financing costs (Pastor and Veronesi 2012, 2013). We find that there is asymmetry in adjustment speeds; firms that tend to hold more cash tend to have a higher SOA than firms that hold less cash. We also find that during periods of significant policy related uncertainty, high cash holdings firms tend to decelerate speed of adjustment (SOA) at a faster rate than low cash holdings firms. The first result suggests that it is easier to disgorge cash than to raise it. The second result suggests that uncertainty induces adjustment costs that increase financing constraints and increase opportunity cost(s) in future states.

We also examine how firms respond to policy uncertainty shocks when the deviation of actual cash holdings from target cash is either positive or negative. Consistent with Dittmar and Duchin (2011), we find that firms with positive deviation from target cash tend to have higher speed of adjustment (SOA) than firms with negative deviation. Interestingly, we find that as policy uncertainty heightens, firms that operate below target cash holdings tend to accelerate SOA while firms that operate above target tend to decelerate SOA. This result establishes that the cost of non-adjustment is greater than the cost of adjustment for firms operating below target cash level. That is, as policy uncertainty heightens, it is less costly to operate with abundant cash than to operate with scarce cash. Overall, the results are consistent with the notion that firms build up cash reserves in anticipation of a rise in financing constraints and the costs of external financing. The results establish that policy-related uncertainty plays a significant role in firms' cash holdings decisions.

Furthermore, in a battery of robustness tests, we exploit firm-level heterogeneity and examine whether policy uncertainty affects SOA of cash in the cross-section. We find that during periods of significant policy related uncertainty, firms that have low leverage tend

[3] Baker, Bloom and Davis (2016): "The index spikes around consequential presidential elections and major political shocks like the Gulf wars and 9/11... has risen to historic highs after the Lehman bankruptcy and TARP legislation, debt-ceiling dispute".

to decelerate SOA at a faster rate than firms that have high leverage. This is because the marginal benefit of cash decreases with an increase in leverage; as a result highly leveraged firms prioritize debt reduction over cash accumulation. Additionally, during periods of policy uncertainty shocks, non-dividend payers reduce SOA faster than dividend payers. We also find that firms that are financially constrained tend to increase cash holdings significantly following policy uncertainty shocks, and as a result decelerate SOA faster than their non-financially constrained counterparts.

To the best of our knowledge, this paper is the first to interact policy uncertainty and adjustment speed measures, and in the process to quantify the joint effect of policy uncertainty-induced adjustment costs and cash holdings decision on speed of adjustment toward target. This paper also builds on several strands of previous research. First, we contribute to the emerging literature that examines the effects of policy and regulatory uncertainty on firms' real decisions. Gulen and Ion (2016) find that policy uncertainty induces precautionary delays which negatively affect investment. Duong et al. (2017) find that policy uncertainty is positively related to cash holdings. We contribute to this literature by arguing that policy uncertainty increases adjustment costs and financing frictions, which invariably affects speed of adjustment (SOA) of cash.

Second, we contribute to the literature on cash holdings (Bates et al. 2009, Opler et al. 1999) and cash dynamics (Dittmar and Duchin 2011, Jiang and Lie 2016). While extant literature has focused on the persistence of cash ratios and the costs of deviating from target cash, in this paper we focus mainly on the effects of policy-related uncertainty on speed of adjustment (SOA) of cash. We find that policy-related uncertainty induces financing frictions and adjustment costs which decelerate speed of adjustment (SOA) of cash. The results demonstrate that there is an inverse relationship between policy-related uncertainty and speed of adjustment of cash. We also establish that policy-related uncertainty is a signifcant determinant of the well-documented slow speed of adjustment of cash.

Third, we contribute to the general literature that estimates the speed of adjustment of capital structure (Byuon, 2009, Flannery and Rangan, 2006, Faulkender et al 2012, Lemmon, Roberts and Zender, 2008, Leary and Roberts, 2005, Huang and Ritter 2009, Strebulaev, 2007, Iliev and Welch 2010, Fama and French 2002, Elsa and Florysiak, 2011, Shyam-Sunder and Myers, 1999). In general these papers estimate the speed of adjustment as ranging from 9% to 40%[4]. In particular, Byuon (2009) examines the role of financial surpluses and deficits, and find that firms with above-target debt use financial surpluses to pay off debt while firms with below-target debt tend to retire debt and use surpluses to pay-off debt. Faulkender et al. (2012) find that adjustment costs explain heterogeneity in speed of adjustment toward target leverage, and that even when adjustment costs are equal across firms, the benefits of leverage adjustment might be different between under-levered firms and over-levered firms. We contribute to this line of thought by showing that as policy uncertainty heightens, over-levered firms tend to use internal funds (cash) to pay off debt while under-levered firms accumulate cash and decelerate SOA of cash.

The paper proceeds as follows. Section II presents the data and sample construction. Section III outlines the identification strategy and also presents empirical results. Section IV present a battery of robustness tests. Section V concludes.

II Data

II.I Firm-Level Controls

The sample consists of firm-quarter samples from Compustat for the period 1985-2016. We exclude financial firms (SIC 6000-6999) since it is difficult to assess their liquidity levels. We also exclude utilities (SIC 4900-4999) since their operations, cash holdings and financial activities are heavily regulated by the government. We also require that a firm has positive asset levels and that the firm be incorporated in the U.S.

Table [1], presents summary statistics for the sample. Cash is estimated as cash and short-term investment (CHEQ) adjusted by total assets. Cash has a mean (median) of 18.23% (8.60%) which is statistically consistent with prior literature (Jiang and Lie 2016,

[4]Iliev and Welch (2010)- result is an exception, as they estimate SOA of leverage to be less than zero.

Duchin, Ozbas and Sensoy 2010, Bates et al 2009). Observe also that there is a considerable variation in cash holdings across firms. The bottom 25^{th} per centile holds about 2.2% of their total assets in cash and the top 75^{th} per centile holds about 26.5% of their total assets in cash. The statistical distribution of cash is consistent with the extant literature (Dittmar, 2008, Dittmar and Mahrt-Smith, 2007).

Figure [I], presents the evolution of cash holdings over the sample period. The graph illustrates the drastic increase in cash holdings across firms over the sample period. The results confirm that the well-documented upward trend in cash holdings has continued even post-2008 financial crisis (Jiang and Lie 2016, Bates et al 2009).

[INSERT FIGURE I ABOUT HERE]

The remaining firm-level variables are constructed similar to Opler et al (2009) and Bates (2009). Firm size is estimated as the natural logarithm of total assets, and leverage is the sum of short-term debt and long-term debt adjusted by total assets. In the sample, the average debt-to-asset ratio is about 31.5%, which is consistent with prior literature (Strebulaev, 2007). Net working capital is estimated as net working capital less cash and marketable securities adjusted by total assets. Tobin Q is estimated as the book value of total assets plus market value of equity less book value of equity adjusted by total assets. To control for outliers and in order to be consistent with prior literature (Jiang and Lie 2016, Duchin et al 2010), Tobin Q is bounded above 10. Dividend dummy equals to "1" if a firm pays dividend and zero otherwise. Acquisition activity is a dummy equal to "1" if a firm was involved in any acquisition activity and zero otherwise. Policy uncertainty measure is based on the Baker, Bloom and Davis (2016) index. Index construction is detailed in the next section. Cash flow is estimated as earnings after interest and taxes adjusted by total assets.

[INSERT TABLE 1 ABOUT HERE]

II.II Measuring Policy Uncertainty

Policy uncertainty measure is based on the Baker, Bloom and Davis (2016) index. The index consists of three main components. The first component takes into account newspaper articles from the ten major newspapers in the U.S.[5] that have at least one term in each of the following sets: "economic set", "uncertainty set" and "policy set". The economic set consists of terms such as "economic" and "economy". The uncertainty set consists of words such as "uncertain" and "uncertainty". The policy set consists of words such as "white house", " regulation", "legislation", "federal reserve", "deficit", and "congress". In order to create consistent series, and due to the variation in the number of newspapers and news articles, the number of policy related articles is adjusted by the total number of articles in each newspaper; resulting in ten series. The series are then standardized monthly so that the overall index has a mean of 100 throughout the sample period.

Secondly, Baker et al (2016) take into account uncertainty related to changes in the tax code. Tax-related uncertainty is estimated on an annual basis by discounting the expected value of tax revenue from tax-provisions that are set to expire in the next decade. The third component of the index takes into account disagreement amongst forecasters on monetary and fiscal policy. The third component also takes into account forecasts on consumer price index (CPI) and purchases of goods and services by federal, state and local governments. The forecasters' disagreement index is then estimated as the average interquartile range between the forecasts on monetary and fiscal policies and the forecast on CPI and government spending.

The overall index is then computed as the weighted average of the three components. The news-based component of the index accounts for one-half, the tax-based component of the index accounts for one-sixth and the forecasters' disagreement component of the index accounts for one-third. In Table [1] above, the index has an average of 105.68 with a standard deviation of 31.6 and an interquartile range of 42.5. The index has a high correlation with events that are expected to generate policy-related uncertainty (Baker et al 2016, Gulen and Ion 2016, Duong et al. 2017). Some of these events include: wars, financial crises, major elections and policy-related debates such as changes in debt ceilings and the

[5]These papers are: The New York Times, USA Today, Miami Herald, Chicago Tribune, Washington Post, L.A Times, Boston Globe, San Francisco Chronicle and the Dallas Morning News.

size of government stimulus[6]. Policy uncertainty not only increases financing frictions and adjustment costs, but it increases market volatility as well.[7] All things considered, we would expect that as policy-related uncertainty heightens, firms would substantially substitute between external financing and internal financing, which would invariably affect the speed of adjustment of cash toward target. This conjecture is driven by the documented observation that policy-related uncertainty has negative shocks on the economy and that the effects of these shocks are larger when the economy is weaker (recessions) and when uncertainty is higher. Note that as the economy gets weaker, the probability of government intervention increases. Yet, even if government policy is welfare improving, the subsequent uncertainty regarding the new policy can only further magnify uncertainty-induced financing frictions and policy-induced adjustment costs. Hence, firms accumulate internal capital as a hedge against policy-related uncertainty shocks.

III Identification Strategy and Empirical Results

III.I Baseline Regression: Determinants of Cash Holdings

We first focus on the determinants of optimal cash holdings. We closely follow the works of Opler et al. (1999), Bates et al. (2009) and Jiang and Lie (2016) and estimate the following baseline panel regression model:

$$Cash_{it} = \mathbf{X}'\beta + \delta_i + \eta_j + \epsilon_{it} \tag{1}$$

where $\mathbf{X}$ is a vector of firm-specific variables which include size, Tobin Q, leverage, capex, net working capital, a dummy for level of acquisitions activity, a decade dummy and a dividend dummy. All variables are constructed as outlined in Section 2.1 above. δ_i and η_j are firm

[6] Akey and Lewellen 2016, Gulen and Ion 2016, Julio and Yook 2012, Jens 2017, Bhattacharya et al. 2017.

[7] Pastor and Veronesi (2013): "Political uncertainty pushes up not only the equity risk premium but also the volatilities and correlations of stock returns. As a result, stocks tend to be more volatile and more correlated when the economy is weak. The volatilities and correlations are higher when the potential new government policies are perceived as more heterogeneous a priori."

fixed effects and industry fixed effects. And ϵ_{it} is the error term. Following Petersen (2009), all standard errors are clustered at the firm-level. The estimates from Equation [1] above are reported in Table [2].

[INSERT TABLE 2 ABOUT HERE]

Models [1,2,3] present estimates in which cash scaled by total assets is the dependent variable and models [4,5,6] present estimates in which the dependent is the natural logarithm of cash scaled by total net assets. Net asset is estimated as total assets less cash and marketable securities.

The estimates are generally consistent with extant literature[8]. Tobin Q has a positive coefficient, suggesting that firms with higher growth opportunities tend to hold more cash. Size has a negative coefficient, suggesting that smaller firms with promising future opportunities tend to hold more cash relative to large firms that might have access to external finance. The result reflects profitability of investment opportunities for smaller firms and the fact that larger firms tend to have greater access to long-term debt financing. On average, large firms tend to have greater access to both bank debt and market debt financing (Boughes et al. 2006). The coefficient of leverage is negative, suggesting that firms use cash to mitigate financial distress. Cash flow has a positive coefficient as firms with higher cash flow are more likely to accumulate cash. Since capex might lead to an increase in collateral base, it is negatively related to cash holdings as a large collateral base minimizes demand for cash. The coefficient for dividend is negative since firms that pay dividend tend to be less risky and generally have access to external financing. Cash and net working capital are substitute; as a result the estimated coefficient of net working capital is negative. The dummy for acquisition activity has a negative coefficient since cash tends to be a source of financing during acquisitions.

In Table [3], we include the measure of policy-related uncertainty (Baker et al. 2016) as an explanatory variable. Baker et al. (2016) overall index is the proxy for policy-related uncertainty. The coefficient of the policy-related uncertainty term is positive, suggesting

[8] Bates et al 2009, Opler et al 1999

that there is a positive relationship between cash and policy uncertainty measure. This is in part because policy-related uncertainty increases financing frictions and adjustment costs, and limits access to external financing[9]. As a result, as policy uncertainty heightens, firms increase current period cash holdings since an increase in policy uncertainty-induced adjustment costs increases opportunity costs in future states. The result is consistent with precautionary motive of cash holdings.

[INSERT TABLE 3 ABOUT HERE]

III.II Cash Dynamics: Speed of adjustment of Cash (SOA)

To estimate the speed of adjustment (SOA) of cash, we closely follow the method of Jiang and Lie (2016), Dittmar and Duchin (2011), Venkiteshwaran (2011) and Byuon (2009)[10]. Firstly, we estimate target cash level ($cash^*_{it}$) as in Equation [1] above. In order to estimate the speed of adjustment of cash, we estimate the following partial adjustment model with firm fixed effects:

$$\{Cash_{it} - Cash_{it-1}\} = \lambda(Cash^*_{it} - Cash_{it-1}) + \delta_{it} + \epsilon_{it} \tag{2}$$

In the above partial adjustment model, $\{Cash_{it} - Cash_{it-1}\}$ estimates the beginning cash deviation and $\{Cash^*_{it} - Cash_{it-1}\}$ estimates the adjustment in cash during period t. Note that ($cash^*_{it}$) is the target cash level predicted by firm-level determinants of cash holdings from Equation [1] above. Hence, the dependent variable in Equation [2] is the deviation in the current period's cash holdings against the previous period's cash holdings- that is, the dependent variable is the change in cash holdings. The indepedent variable is the deviation of target cash level from the previous period's cash holdings. The coefficient (λ) accounts for the per period portion of deviation that is eliminated. If the coefficient (λ) equal to "1", it implies perfect adjustment of cash toward target. And if the coefficient (λ) is less than "1", it implies imperfect adjustment toward target.

[9] See Gilchrist and Jae, 2014

[10] A similar method is applied in the case of leverage by Flannery and Ragan,2006, Oztekin and Flannery, 2012.

[INSERT TABLE 4 ABOUT HERE]

Table [4] presents the results from the partial adjustment model outlined in Equation [2] above. Models [1,2,3] present estimates for which the target cash ($cash^*_{it}$) is estimated from model [1] of Table [2] above. Models [4,5,6] report estimates for which the target cash level is predicted from model [2] of Table [2].[11] The coefficient of (λ) is positive across all models in Table [4]. The estimated speed of adjustment (SOA) is about 26%, which is statistically consistent with the estimates of Dittmar and Duchin (2011). Economically, an SOA estimate of 26% implies a half-life of 2.3 years[12]; the result implies that it takes the average firm about 2.3 years to adjust one-half the distance to its target or optimal cash level. The key take away from Table [4] is that SOA is positive but less than "1". Positive (λ) suggests that, on the margin, the benefit of cash adjustment is on average greater than the cost of adjustment toward the target. Having established that SOA is imperfect and that it is less than "1", the outstanding question then becomes: why and when do firms optimally deviate from target cash? The fact that SOA is less than perfect can be partially explained away by adjustment costs. Since policy uncertainty induces financing frictions and adjustment costs, we would expect policy-related uncertainty to adversely affect the speed of adjustment (SOA) of cash toward target.

To account for the effect(s) of policy-related uncertainty on SOA, we estimate the following augmented panel regression model:

$$\{Cash_{it} - Cash_{it-1}\} = \lambda(Cash^*_{it} - Cash_{it-1}) + \psi\{(Cash^*_{it} - Cash_{it-1})^* Uncertainty\} + \delta_{it} + \epsilon_{it} \quad (3)$$

The coefficient of interest is the interaction of policy uncertainty and the deviation from target cash. "Uncertainty" measure is estimated as the natural logarithm of the Baker et al (2016) Overall index. In general, higher levels of the index reflect and coincide with periods of significant policy-related uncertainty. These periods of significant policy-related uncertainty are highly correlated with an increase in financing frictions and an increase in

[11] From untabulated table(s), the results are generally consistent when target cash is predicted using Equation [4,5,6] of Table [2].

[12] Assuming an AR(1) process, half-life is estimated as log(0.5)/log(1-SOA).

adjustment costs. Hence, a negative coefficient of the interaction term would imply that policy-related uncertainty increases adjustment costs which might induce firms to increase cash holdings. As a result, a negative coefficient of the interaction term would suggest that the costs of adjustment increase faster than the benefit of adjustment during period(s) of significant policy-related uncertainty.

[INSERT TABLE 5 ABOUT HERE]

The estimates in Table [5] confirm the above prediction. The coefficient of the interaction term is negative, suggesting that on average policy-related uncertainty leads to an increase in cash holdings and partially slows down SOA of cash. The estimates demonstrate that uncertainty induces financing frictions and creates a wedge between current period liquid assets and costly external finance in future states. As a result, firms tend to increase internal capital as a hedge against policy-related uncertainty shocks.

Jiang and Lie (2016) find that there is asymmetry in adjustment speed. That is, firms that tend to hold more cash tend to have higher SOA on average than firms that tend to hold less cash. In Table [6], we first test this hypothesis and subsequently examine whether the effects of policy-related uncertainty on SOA are heterogeneous across firms.

$$\begin{aligned}\{Cash_{it} - Cash_{it-1}\} = \{\lambda(Cash^*_{it} - Cash_{it-1}) \\ + \psi[(Cash^*_{it} - Cash_{it-1})^* Uncertainty] \\ + \rho[(Cash^*_{it} - Cash_{it-1})^* High] \\ + \gamma[(Cash^*_{it} - Cash_{it-1})^* Uncertainty^* High] \\ + \delta_{it} + \epsilon_{it}\}\end{aligned} \tag{4}$$

"High" is a dummy equal to "1" if a firm's cash holding is above the sample mean and zero otherwise. The results in Table [6] indicate that the interaction term between high cash holdings and deviation from the target cash is positive, suggesting that firms with high cash holdings tend to have higher SOA than firms with lower cash holdings. This result is consistent with the hypothesis that it is generally cheaper to disgorge cash than to raise cash (Hartford et al. 2008, Dittmar and Marhrt-Smith 2007, Jiang and Lie 2016). Note also that the results in models [3,6] suggest that such firms also tend to reduce SOA during periods of significant policy-related uncertainty. This result reflects an increase in both financing frictions and adjustment costs which lead to a decline in investment (Gulen and Ion, 2016) and increase in opportunity cost(s) in future states. As a result, high-cash holdings firms tend to accumulate cash during periods of heightened policy-related uncertainty.

[INSERT TABLE 6 ABOUT HERE]

Figure [II] illustrates the evolution of actual cash holdings and target cash. Target cash is estimated as the predicted value of cash holdings from Equation [1] above. The graph indicates that, over the sample period, the actual cash holdings of firms have been increasing significantly above the target cash holdings on average. Figure [III] plots the uncertainty index based on Baker et al. (2016) against average cash and against average target cash over the sample period. For aesthetic purposes, the policy uncertainty index is scaled so that it has a statistically similar mean and variance to actual cash. The vertical lines represent periods of heightened policy-related uncertainty. These periods include: the gulf war, the tech bubble, the 2008 financial crisis, the 2010 midterm elections, and the 2012 general election. Overall, the graph indicates that there is a positive co-movement between policy-related uncertainty and cash holdings.

Jiang and Lie (2016) conjectured that the distance of actual cash from the target cash would affect the speed of adjustment (SOA). It might be the case that adjustment costs are higher for firms that operate below target cash than above target cash. This would imply that during periods of significant policy-related uncertainty, firms that are below target would increase SOA while firms that are above target would reduce SOA[13].

[INSERT FIGURE II & FIGURE III ABOUT HERE]

In Table [7] below, we carry out subsample analyses. We first estimate the deviation between actual cash and target cash. Firms whose deviation is below zero are classified as operating below target cash level while firms whose deviation is positive are classified as operating above target level. Models [1,2] present results for firms whose deviation is

[13]This hypothesis is consistent with the argument of Fisher, Heinkel and Zechner (1989) that firms will only converge toward target leverage if the benefit of doing so is greater than the cost.

positive and models [3,4] present results for firms whose deviation is negative. Observe that the speed of adjustment is faster if the deviation is positive than if the deviation is negative. Consistent with our hypothesis, we find that as policy-related uncertainty heightens, firms that operate below target cash level tend to accelerate SOA while firms that operate above target cash level tend to decelerate SOA. This result is consistent with Venkiteshwaran (2011), who finds that adjustment speed for firms with significant excess cash tend to be slower than for those firms that operate with scarce or below target cash. Policy-related uncertainty exacerbates this effect and firms operating below target cash tend to increase SOA during periods of heightened uncertainty. The results demonstrate that during periods of heightened policy uncertainty, it is less costly to operate with abundant cash than to operate with scarce cash. The results demonstrate that cash serves as a hedge against policy uncertainty-induced financing frictions and adjustment costs.[14]

[INSERT TABLE 7 ABOUT HERE]

IV Robustness Tests

IV.I Uncertainty, Leverage and Cash Dynamics

Firms with high leverage may react differently to policy uncertainty shocks than firms with low leverage. For instance, as a firm's debt-to-asset ratio becomes abnormally high, the firm tends to use internal capital to reduce debt (Auerbach, 1985). This is because the marginal value of cash holdings decreases with an increase in leverage (Faulkender and Wang, 2006). Since policy uncertainty increases adjustment costs, we would expect that policy uncertainty will invariably accelerate this debt reduction process. Specifically, during periods of heightened policy-related uncertainty, firms with a high level of leverage are more likely to use cash to mitigate the adverse effects of leverage on firm value. Contrastingly, firms that have a low level of leverage are more likely to increase cash holdings and reduce

[14] See Acharya, Davydenko and Strebulaev, 2012, Acharya et al 2007 for a discussion on the hedging role of cash

speed of adjustment (SOA).

In Table [8], firms are sorted based on level of leverage. Firms whose leverage is below the sample mean are classified as "Low Leverage" firms, and firms whose leverage is above the sample mean are classified as "High Leverage" firms. In models [1,3] of Table [8], the coefficient of the interaction term between uncertainty and deviation from the target is negative, suggesting that these firms (low leverage) lower SOA and increase cash holdings levels during periods of significant politicy related uncertainty. Observe that policy uncertainty has no significant effect in the case of highly levered firms. This result suggests that highy levered firms prioritize debt repayment over cash accumulation since the marginal benefit of cash holdings decreases with a marginal increase in total debt. The result is consistent with Gonzalez et a.l (2007) who fnd that highly levered firms have less desire for additional external financing. As a result, these firms utilize internal funds to reduce debt. Overall, the estimates in Table [8] are consistent with the findings of Jiang and Lie (2016) and suggest that the effect of leverage on SOA is asymmetric. However, mean leverage sorting is susceptible to the outliers effect due to the right-skewed nature of leverage distribution.

In Table [8] panel [B], we present estimates in which firms are sorted and classified based on whether firm leverage is above or below the sample median. The results in Table [8] panel [B] are consistent with those reported in Panel [A]. The results are generally consistent with the notion that firms have a strong preference for debt capacity preservation (Byuon, 2009, Lemmon and Zender, 2004). These results are also consistent with Faulkender et al. (2012) finding that even if leverage adjustment costs were equal for under-levered and over-levered firms, the benefits may be asymmetrical as potential financial distress costs loom quite large for over-levered firms.

[INSERT TABLE 8 ABOUT HERE]

To the extent that policy-related uncertainty increases financing frictions, we would expect that the effect of policy-related uncertainty on SOA would be stronger for firms that rely more on external financing. To measure the degree of external finance dependence, we follow Rajan and Zingales (1998) and estimate external finance dependence as capital expenditure net of funds from operations scaled by capital expenditure. We also measure equity dependence as the ratio of net amount of equity issued to capital expenditure. Table [8] Panel [C] presents estimates in which firms are sorted by whether they are below or above median level of external finance dependence measure(s). Consistent with our hypothesis, the results demonstrate that the effects of policy-related uncertainty on SOA are stronger for firms that are highly dependent on equity and external financing.

IV.II Uncertainty, Payout Policy and Cash Dynamics

During periods of heightened policy-related uncertainty, firms that pay dividend might behave differently than those firms that do not pay dividend. Prior literature suggests that firms that pay dividend tend to have about 6.2% lower leverage than their non-dividend paying counterparts (Leary and Michealy, 2005). In addition, dividend payers tend to have lower cash holdings than non-dividend payers (Brown and Kapadia, 2007). In the sample, dividend-payers hold about 13.3% of total assets in cash while non-dividend payers hold about 18.8% of total asset in cash.

In particular, since non-dividend payers tend to be financially constrained and to have limited access to external financing relative to their dividend-paying counterparts[15], we would expect that during periods of significant policy-related uncertainty, non-dividend payers would adjust SOA faster than dividend-payers. In this case, the expected sign of the coefficient of the interaction term would be negative, reflecting deceleration in SOA and increase in cash holdings amongst non-dividend payers.

Table [9] presents estimates in which firms are sorted by whether they are dividend-payers or non-dividend payers. Models [1,3] present estimates for dividend-payers while models [2,4] present estimates for non-dividend payers. The results suggest that during periods of heightened policy-related uncertainty, non-dividend payers decelerate SOA. However, there is no evidence that policy-related uncertainty has any effects on

[15] See Almeida, Campello and Weisbach (2004), Fazzari and Petersen (1993) for this argument.

dividend-payers. The coefficient for dividend-payers is positive but statistically insignificant. This is partly because the choice to distribute permanent and temporary earnings implies that firms have the capability and access to finance dividend pay-out, and that there is a penalty associated with the failure to pay expected dividend.[16] Hence, the second reason for the non-adjustment of SOA for dividend-payers might reflect the lack of flexibility and the market penalty associated with failure to issue dividend. Thus, in the face of significant policy-related uncertainty shocks, firms might continue to prioritize paying dividend over cash accumulation. The results are also consistent with Jensen's (1986) free cash flow hypothesis. In particular, Jensen (1986) argues that non-dividend payers with poor growth options will accumulate cash; to this end policy-related uncertainty exacerbates cash accumulation and results in a slower speed of adjustment of cash (SOA).

[INSERT TABLE 9 ABOUT HERE]

IV.III Uncertainty, Stock Repurchases and Cash Dynamics

Since stock repurchases give firms the flexibility (Grullon and Michaely, 2002, 2004, Dittmar 2008) without facing a significant penalty from the market, we should expect some variation in how firms with different levels of stock repurchases adjust SOA of cash. In Table [10], firms are sorted into terciles based on the level of stock repurchases. The estimates in models [1,2,4,5] suggest that, as policy-related uncertainty heightens, firms in the low and medium tercile of stock repurchases partially lower SOA of cash.

The estimates reported in model [3] suggest that firms in the upper tercile of stock repurchases tend to increase SOA, but once we account for year fixed effects in model [6] this result largely disappears. This is in part because firms in the upper tercile tend to use internal funds (cash) for stock repurchases. Meanwhile firms in the lower tercile of stock repurchases have the flexibility to increase cash holdings during periods of significant

[16] Jagannathan, Stephens and Weisbach (2000) find that about 90% of CFOs agree that there are negative consequences to not paying dividend.

policy-related uncertainty. The flexibility comes from the observaton that, unlike dividend issuance, the market does not treat the announcement of stock repurchases as a credible and permanent commitment (Jagannathan et al, 2000); indeed about 20% of firms that announce stock repurchases do not follow through and only 54% of firms that announce stock repurchases tend to follow through in the immediate quarter following the announcement.

[INSERT TABLE 10 ABOUT HERE]

IV.IV Uncertainty, Cash Volatility and Cash Dynamics

Since younger firms tend to have limited access to external financing and also to experience greater volatility in cash, we would expect that the marginal benefit of cash should be higher on average for younger and smaller firms than for older and larger firms. Shipe (2015) finds that cash volatility affects firm value and that cash adjustment is higher for firms that face higher cash volatility[17] .

In this section, we examine whether the effects of cash volatility are heterogeneous in the cross-section. Cash volatility is estimated as a firm's quarterly standard deviation of cash over the whole sample period. To smooth out outlier effects, we also require that a firm has positive cash holdings and that a firm has observations for at least eight quarters or two-years. Firms are then sorted into terciles based on the level of cash volatility. Since firms that experience higher cash volatility are more susceptible to uncertainty shocks, we would expect that such firms reduce speed of cash adjustment (SOA) at a faster rate than firms in the lower tercile of cash volatility.

The results in Panel [A] of Table [11] confirm this hypothesis. Models [3,6] report the estimates for firms in the top tercile of cash volatility. The results suggest that such firms decelerate SOA at a faster rate than firms in the bottom tercile of cash volatility. Models [1,4] present the estimates for firms in the bottom tercile. We can observe that while the coefficient

[17]Note that cash volatility is separate from cash flow volatility. Generally, cash flow volatility is associated with lower investment and higher risk (Minton and Schrand, 1999), while cash volatility is positively related to firm value (Shipe 2015).

is positive and statistically significant at the 1% significance level in model [1], this result disappears once we take into account year fixed effects. Overall, the results in Table [11] suggest that firms that experience higher cash volatility are more susceptible to the adverse effects of policy-related uncertainty shocks and as a result are more responsive to adjusting cash holdings. The results also suggest that younger firms- which on average have higher cash volatility- tend to have higher investment opportunities and face significant opportunity cost(s) in future states. Hence, such firms tend to decelerate speed of adjustment (SOA) of cash during periods of heightened policy-related uncertainty. The results are consistent with the notion that firms with higher cash flow volatility require significantly more in external financing than firms with stable cash flow. In order to hedge against an increase in cost of external financing, such firms increase cash holdings during periods of significant policy-related uncertainty.

Dittmar and Duchin (2011) find that firms that experience large cash flow shocks tend to hoard cash. Thus, we would expect that as policy-related uncertainty heightens, firms with high cash flow volatility would significantly increase cash holdings and decelerates SOA. The significant increase in policy-related uncertainty-induced adjustment costs imply that firms with significant cash flow volatility would take longer to rebalance back to target cash. In panel [B] of Table [11], firms are sorted into terciles based on cash flow volatility. Similar to Leary and Roberts (2005) estimation strategy, cash flow volatility is estimated as the standard deviation of profitability over the entire sample period. We also require that a firm has at least 3 years of data available. Note that profitability is estimated as the ratio of operating income before depreciation (OIBDQ) scaled by total assets. The results in panel [B] suggest that firms that face high cash flow volatility tend to decelerate SOA at a faster rate during periods of significant policy-related uncertainty than firms in the low tercile of cash flow volatility. This result is attributable to cash flow volatility being positively correlated with risk. Firms that tend to be riskier face higher adjustment costs and also face higher opportunity cost(s) in future states. Such firms are therefore more likely to accumulate cash during periods of significant policy-related uncertainty, which results in a reduction in the speed of adjustment of cash (SOA).

[INSERT TABLE 11 ABOUT HERE]

IV.V Uncertainty, Financial Constraints and Cash Dynamics

Since financially constrained firms tend to face higher costs in accessing external financing than their unconstrained counterparts (Fazzari et al. 1988), we should expect that such costs will only increase further with increase in policy-related uncertainty. This is because firms differ in both the cost and the benefit of adjusting towards target cash.[18] All things considered, we would expect that financially constrained firms would decelerate SOA at a faster rate than financially unconstrained firms.

Leary and Michaely (2005) find that firms with net negative income are more likely to be financially constrained than firms with positive net income. Hence, on average, we should expect that in the face of significant policy-related uncertainty shocks, firms in the lower tercile of net income distribution will be more likely to decelerate SOA. In Table [12], firms are sorted into terciles based on their level of net income. Consistent with Bates et al. (2009) ,in the sample we find that firms that are in the "low" tercile of net income distribution hold about 24.7% of assets in cash while firms that are in the "high" tercile of net income distribution hold about 18.2% of assets in cash. The results reported in Table [12] largely support the notion that financially constrained firms are more responsive to policy-related uncertainty shocks. Firms in the "low tercile" of net income distribution (models 1,4) decelerate SOA at a faster rate than firms in the "high tercile" of net income distribution (models 4,6). The estimates support the precautionary motive of cash holdings and suggest that during periods of significant policy-related uncertainty, financially constrained firms are more likely to increase cash holdings and to decrease speed of adjustment (SOA) of cash.

[INSERT TABLE 12 ABOUT HERE]

In Table [12] Panel [B], we use alternative measures of financial constraints and consider

[18] Korajczk and Levy (2003) find that the cost of leverage and SOA of leverage differ between "constrained" and "unconstrained" firms.

the effects of policy-related uncertainty on SOA. These measures of financial constraints are: the Whited- Wu (2006) index (WW Index henceforth), firm size and payout ratio. Firms are classified as financially constrained or unconstrained by dividing the sample at the median. Firms whose WW Index is above median are classified as financially constrained. Firms whose size is below median are classified as financially constrained. Firms whose pay-out ratio is below median are classified as financially constrained. The results in Panel [B] are generally consistent with those reported in Panel [A]. Financially constrained firms decelerate SOA at a faster rate than their unconstrained counterparts. Financially constrained firms increase cash holdings in anticipation of increase in the cost of external finance and potentially limited access to external financing in future states.

IV.VI Accounting for the Effects of Liquidity Risk

Firms with low liquidity levels tend to face higher distress costs and limited access to external financing (Fazzari et al 1988, Acharya, Davydenko and Strebulaev, 2012). Hence, as policy-related uncertainty heightens, firms with low liquidity might find it more costly to adjust SOA than firms with high liquidity. This is because policy uncertainty accelerates this acute cash flow shortage and increases financing frictions. As such, we should expect that as policy uncertainty heightens, firms that face low liquidity risk will on average decelerate SOA at a faster rate than firms that face high liquidity risk.

Similar to Acharya et al (2012), we use interest coverage ratio as the proxy for liquidity risk. Interest coverage ratio is estimated as income before depreciation scaled by interest expense. Interest coverage ratio proxies for the ability of a firm to pay-off its interest expense. Table [13] presents subsample analyses in which firms are sorted on whether their interest coverage ratios are above or below the sample median. Firms whose interest coverage ratios are below the sample median are classified as "Low" liquidity firms and firms whose interest coverage ratios are above the sample median are classified as "High" liquidity firms. Note that low liquidity firms tend to be riskier than high liquidity firms. Observe that in Table [13] the coefficient of the interaction term in column [2] is greater than in column [1]. The results in columns [1&2] confirm the prediction that firms in the low liquidity category adjust SOA at a slower rate than firms in the high liquidity category. That is, low liquidity firms do not effectively respond to policy-related uncertainty shocks.

To further test the above hypothesis, we also use commonly employed balance sheet measures of liquidity. These measures are: quick ratio, current ratio and working capital-to-total assets ratio. Following Davydenko (2010), quick ratio is estimated as current assets net of inventories scaled by current liabilities. Quick ratio is a robust proxy for liquidity risk since financially distressed firms find it more costly to convert inventories into cash. Consistent with prior literature, current ratio is estimated as current assets scaled by current liabilities. The results in columns [3-8] of Table [13] lend support to the notion that due to cash flow shortage and an increase in financing frictions during periods of significant policy-related uncertainty, firms that face higher liquidity risk find it more costly to adjust SOA.

[INSERT TABLE 13 ABOUT HERE]

V Conclusion

Previous research has established that firms slowly and imperfectly adjust cash toward target. However, there is little consensus and evidence on what drives and explains the slow speed of adjustment toward target. In this paper, we provide evidence that policy-related uncertainty partially explains the slow speed of adjustment (SOA) of cash. Policy-related uncertainty induces adjustment costs and financing frictions and as a result creates a wedge between the benefit of current period's liquid assets and costly external finance in future states. These policy uncertainty-induced costs lead to an increase in cash holdings and a deceleration in speed of adjustment (SOA) toward target. The results establish that during periods of significant policy-related uncertainty shocks, firms optimally deviate from target cash holdings.

Secondly, we find that the costs of adjustment are higher for firms that operate below target cash than for firms that operate above target cash. In addition, during periods of significant policy-related uncertainty shocks, firms that operate below target cash accelerate SOA, while firms that operate above target cash decelerate SOA. The results demonstrate that the marginal benefit of cash holdings increases with an increase in policy-related uncertainty. As policy-related uncertainty heightens, firms that operate above target cash decelerate SOA as the benefit of doing so is greater than the cost. In contrast, firms that operate below target cash accelerate SOA since the cost of reducing deviation from target cash is lower than the benefit of doing so.

Thirdly, we study the effects of policy-related uncertainty on the speed of adjustment of cash across different sorts of firms. To this end, we find that as policy-related uncertainty heightens, non-dividend payers tend to decelerate SOA,and that financially constrained firms tend to decelerate SOA at a faster rate than their financially unconstrained counterparts. Firms that face high cash flow volatility also tend to decelerate SOA at a faster rate than firms with stable cash flow. We also find that firms that are under-levered tend to decelerate SOA at a faster rate than firms that are highly-levered. In addition, firms that are highly dependent on external financing decelerate SOA at a faster rate than firms that are less dependent on external financing. Overall, the results suggest that the effects of policy-related uncertainty on SOA of cash are heterogeneous in the cross-section.

Taken together, these results suggest that policy-related uncertainty induces adjustment costs and financing frictions, which play an important role in how often firms rebalance cash toward target. Overall, the results demonstrate that as policy-related uncertainty increases, the speed of adjustment (SOA) of cash toward target decreases.

VI References

[1] Acharya, V., Davydenko, S., and Strebulaev, I.,(2012) Cash Holdings and Credit Risk. Review of Financial Studies, 25(12), 3572-3609.

[2] Acharya, V., Almeida, H., and Campello, M (2007) Is Cash negative debt? Hedging Perspective on Corporate Financial Policies. Journal of Financial Intermediation, 26,515-554.

[3] Akey, P. and S. Lewellen (2016). Policy Uncertainty, Political Capital and Firm Risk-Taking- Working paper

[4] Allen F., and Michaely, F., (2003). Payout Policy. Handbook of the Economics,1,337-429.

[5] Almeida, H., and Campello, M. (2010) Financing Frictions and the Substitution between internal and External Funds. Journal of Financial and Quantitative Analysis, 45(3), 589-622.

[6] Almeida, H., M. Campello and M.S., weisbach (2004) The cash flow sensitivity of cash. Journal of Finance, 59, 1777-1804.

[7] Auerbach, A. (1985). Real Determinants of Corporate Leverage. B.M Friedman (ed.) Corporate Capital Structure in the United States, National Bureau of Economic Research, 301-322.

[8] Bates, T. W., Kahle, K. M., and Stulz, R. M. (2009). Why do US firms hold so much more cash than they used to?. The journal of finance, 64(5), 1985-2021.

[9] Baker, S.R., N. Bloom a S.J. Davis (2016) Measuring economic policy uncertainty. Quarterly journal of Economics, 131, 1593-1638

[10] Bhattacharya, U., Hsu, P,H, Tian, X and Xu, Y. (2017) What Affects Innovation More: Policy or Policy Uncertainty?Journal of Financial and Quantitative Analysis, Forthcoming.

[11] Blundell, R., and Bond, S. (1998) Initial Conditions and moment restrictions in dynamic panel models. Journal of Econometrics, 87,115-143.

[12] Bougheas, A., Mizen, P., and Yalcin C., (2006) Access to External Finance: Theory and Evidence on the impact of Monetary Policy and Firm-Specific Characteristics. Journal of banking and Finance, 30, 199-227.

[13] Brown, G., and N. Kapadaia (2007) Firm-specific risk and equity market development. Journal of Financial Economics, 84, 358-388.

[14] Byuon, S.. (2009) How and when do firms adjust their capital structures toward targets? Journal of Finance, 63,3069-3096.

[15] Chang, X. and Dasqupta, S., (2009) Target Behaviour and Financing: How conclusive is the evidence? Journal of Finance, 64,1767-1796.

[16] Davydenko, Sergei A.,(2010) What triggers default? A Study of the default boundary, Working paper, University of Toronto.

[17] DeAngelo, H., L. DeAngelo, and T. Whited (2010) Capital Structure Dynamics and Transitory Debt. Working Paper.

[18] Dittmar, A. and J. Mahrt-Smith (2007) Corporate Governance and the Value of Cash holdings. Journal of Financial Economics, 83, 599-634.

[19] Dittmar A. and R. Duchin. (2011). Dynamics of Cash. Working paper, University of Michigan

[20] Duchin, R., Ozbas, O., and Sensoy, B. A. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. Journal of Financial Economics, 97(3), 418-435.

[21] Duchin, R.A., Gilbert T., Harford J. and Hrdlicka, C. (2017) Precautionary Savings with Risky Assets: When Cash is not cash. Journal of Finance, 72(2), 793-852.

[22] Duong, H.N., J.H Nguyen, M. Nguyen and S.G Rhee (2017) Economic Policy Uncertainty and Corporate Cash Holdings. Working Paper

[23] Elsas, R., and D. Florysiak (2015) Heterogeneity in speed of adjustment toward target leverage, International Review of Finance 11: 181-211.

[24] Fama, E. and L. French (2002) Testing trade-off and pecking order predictions about dividends and debt, Review of Financial Studies 15: 1-33.

[25] Faulkender, M., M.J Flannery, K. Watson and J.M Smith (2012) Cash flows and Leverage adjustments. Journal of Financial Economics, 103,632-646.

[26] Faulkender, M. and R. Wang (2006) Corporate Financial Policy and the Value of Cash. Journal of Finance, ,

[27] Fazzari, S., Hubbard, G., Petersen, B. (1988) Financing Constraints and Corporate Investment. Brookings Papers on Economic Activity, 1, 141-195.

[28] Fazzari, S.M and B.Petersen (1993) Working capital and fixed investment: New Evidence on financing constraints. RAND Journal of Economics, 24, 328-342.

[29] Fisher, E.O, Heinkel, R., and Zechner, J. (1998) Dynamic Capital Structure choice: theory and tests. Journal of Finance, 44, 19-40.

[30] Flannery, M., and Rangan, K.P. (2006) Partial Adjustment toward Capital structure. Journal of Financial Economics, 79, 469-506.

[31] Gilchrist S, J.W Sim and E. Zakrajsek (2014) Uncertainty, Financial Frictions and Irreversible Investment. Working Paper

[32] Gonzalez, R.L., Lopez, J. A. and Saurina, J. (2007) Determinants of Access to External Finance. Evidence from Spanish Firms. Federal Reserve Bank of San Franscisco. Worokign paper Series NO- 2007-022.

[33] Grullon, G. and R. Michaely (2002). Dividends, Share Repurchases and Substitution Hypothesis. Journal of Finance, 57,1649-1684.

[34] Grullon, G. and R. Michaely (2004). The Information Content of Share Repurchase Program . Journal of Finance, 59,651-680.

[35] Gulen and M. Ion (2016) Policy Uncertainty and Corporate Investment. Review of Financial Studies, 29, 524-564.

[36] Gungoradinoglu, A., Colak G., and Oztekin, O. (2017). Political Environment, Financial Intermediation costs and Financing Patterns. Journal of Corporate Finance, 44, 167-192.

[37] Harford, J., Mansi, S.A., and Maxwell, W.F. (2008) Corporate Governance and Firm Cash holdings in the U.S. Journal of Financial Economics, 87(3), 535-555.

[38] Huang,and J.R Ritter (2009) Testing Theories of Capital structure and Estimating the Speed of Adjustment. Journal of Financial and Quantitative Analysis, 44(2), 237-271.

[39] Iliev, P., and I. Welch, (2010) Reconciling Estimates of the Speeds of Adjustment of Leverage Ratios. Working paper.

[40] Jagannathan, M., Stephen, C. and M. Weisbach (2000).Financial Flexibility and The Choice Between Dividends and Stock Repurchases. Journal of Financial Economics,57, 355-384. Reprinted in Recent Developments in Corporate Finance, edited by Jay Ritter, Edward Elgar publishing, 2005.

[41] Jens, C. E (2017) Political Uncertainty and Investment: Causal Evidence from the U.S. gubernorial Elections. Journal of Financial Economics, 124, 563-579.

[42] Julio, B., and Y. Yook (2012). Political Uncertainty and Corporate Investment cycles, Journal of Finance 67, 45-82.

[43] Jiang Z. and E. Lie (2016) Cash Holdings adjustments and managerial entrnchment. Journal of Corporate Finance, 36,190-205

[44] Korajczyk, R.A. and Levy, A. (2003) Capital Structure choice: macroeconomic conditions and financial constraints. Journal of Financial Economics, 68,75-109.

[45] Leary, M., and M. Roberts (2005) Do Firms Rebalance their capital structures. Journal of Finance, 60, 2575-2619.

[46] Lemmon, M. and F. Zender (2004) Debt capacity an tests of capital structure theories. Working Paper. University of Utah and University of Colorado.

[47] Minton, B. and C. Strand (1999). The impact of cash flow volatility on discretionary investment and the costs of debt and equity financing. Journal of Financial Economics, 73, 201-228.

[48] Opler, Tim, Lee Pinkowitz, Rene Stulz, and Rohan Williamson (1999). The determinants and implications of corporate cash holdings. Journal of Financial Economics 52, 3-46.

[49] Oztekin, O. and M.J Flannery (2012) Institutional Determinants of Capital Structure adjustment speeds. Journal of Financial Economics, 103, 88-112.

[50] Pastor, L and Pietro Veronesi (2012). Uncertainty about government policy and stock prices. Journal of Finance, 67, 1219-1264

[51] Pastor, L and Pietro Veronesi (2013) Political uncertainty and risk premia. Journal of Financial Economics. 110(3), 520-545.

[52] Petersen, M. (2009) Estimating standard errors in finance panel data sets: comparing approaches. Review of Financial Studies 22, 435–480.

[53] Rajan, R., and Zingales, L., (1998). Financial dependence and growth. American Economic Review 88, 559–586.

[54] Shipe, S., (2015). Volatility of Cash holdings and Firm Value. Working paper.

[55] Strebulaev, I. (2007) Do tests of capital structure theory mean what they say? Journal of Finance, 62, 1747-1787.

[56] Venkiteshwaran, V., (2011) Partial adjustment towards optimal cash holding level. Review of Financial Economics 20, 113-121

[57] Whited, T. and Wu, G., (2006). Financial constraints risk. Review of Financial Studies 19, 531–559.

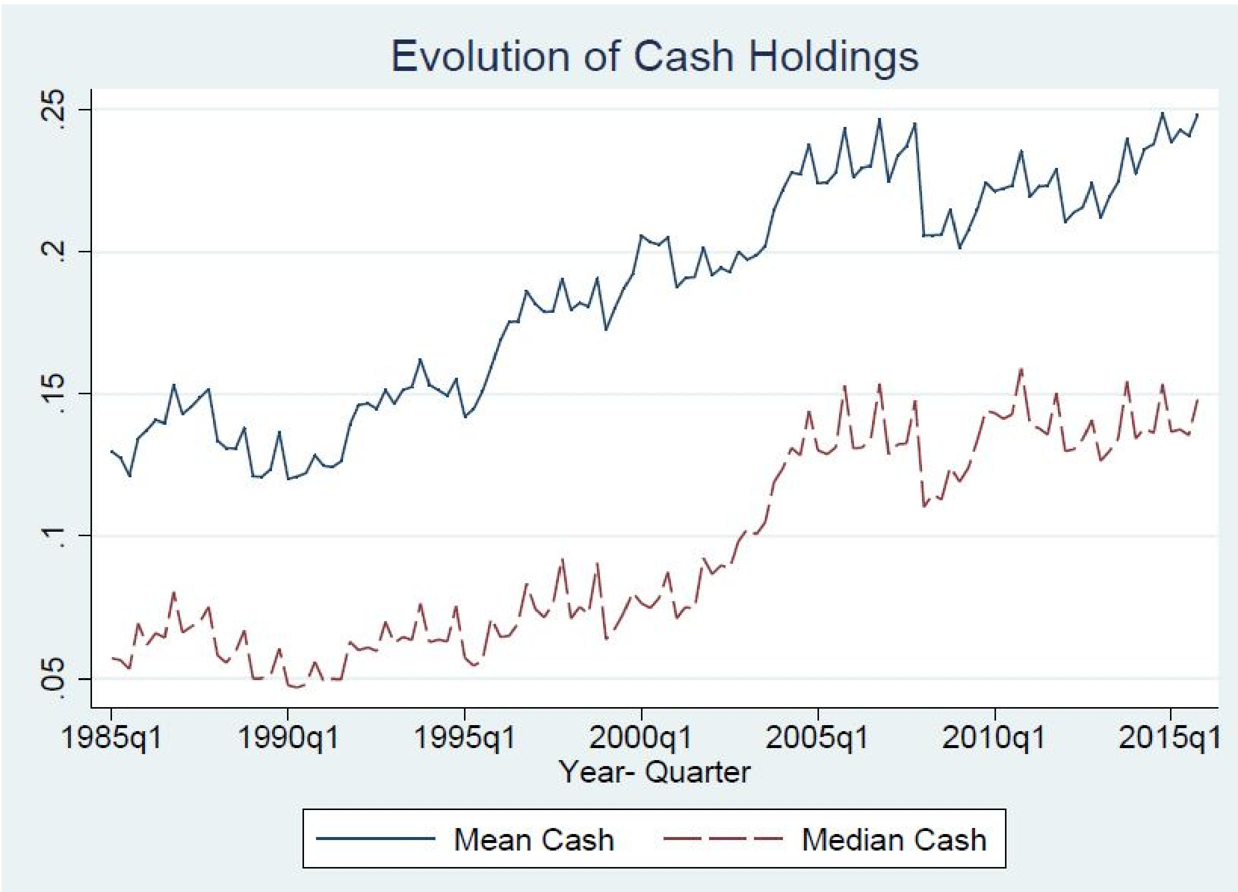

Figure I: *Evolution of Cash holdings*

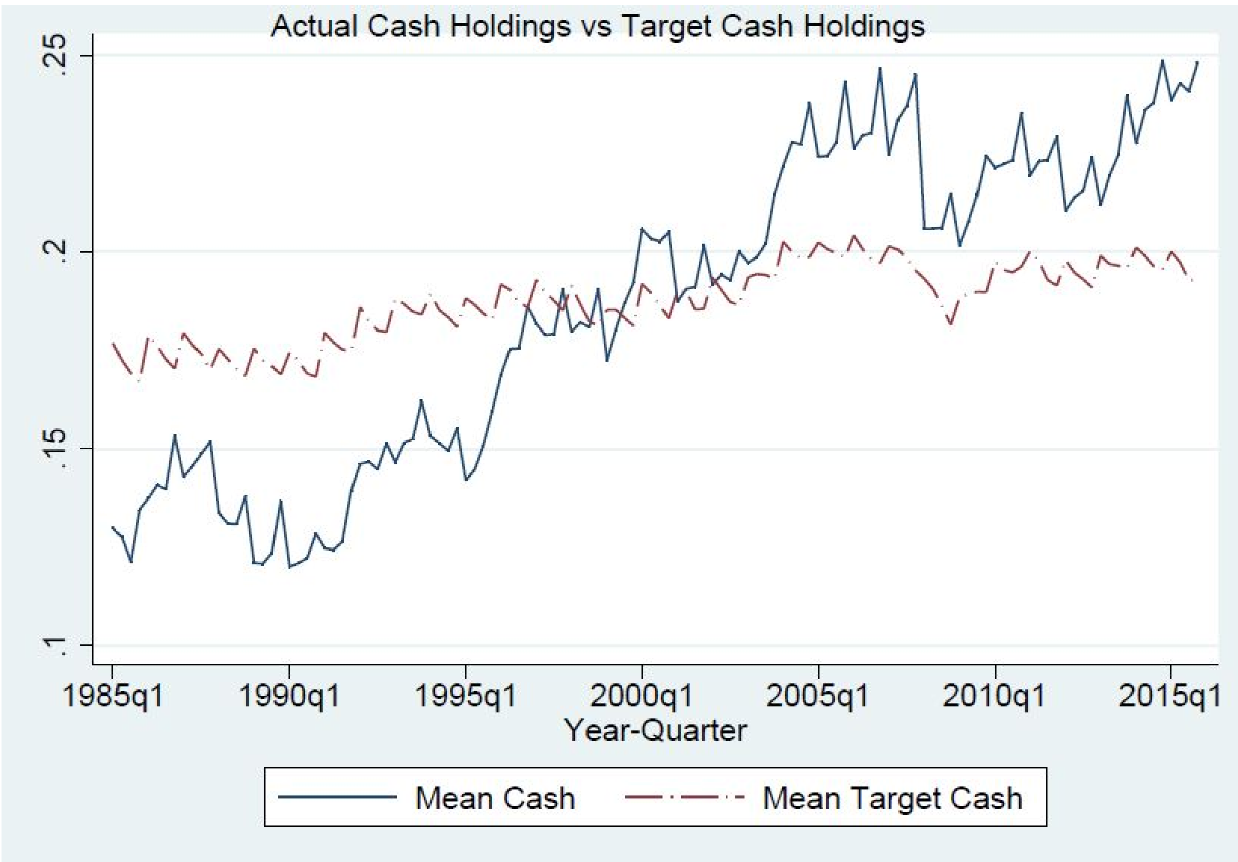

Figure II: *Evolution of Actual Cash and Target Cash*

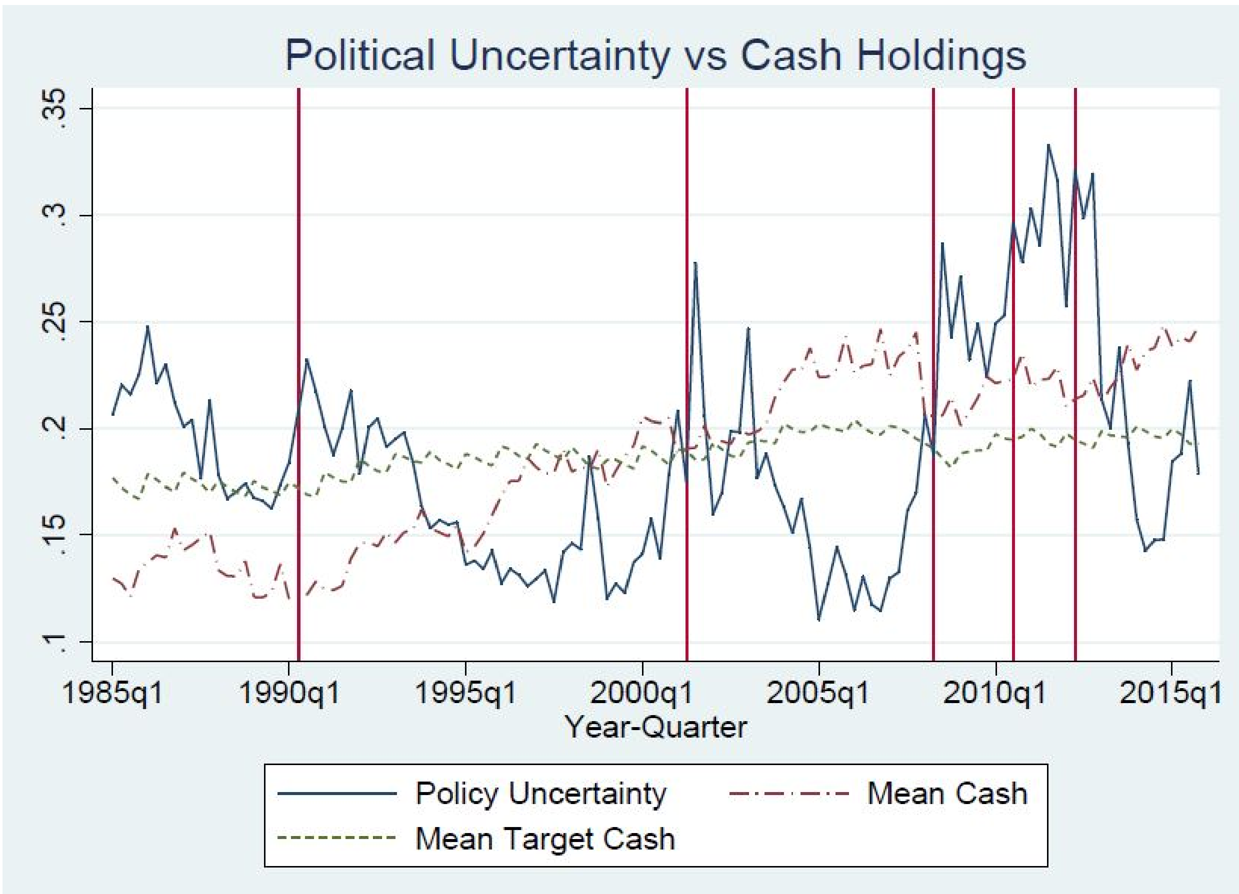

Figure III: *Policy Uncertainty vs Cash Holdings*

The vertical lines represent periods of heightened uncertainty: the gulf war, the tech bubble, the 2008 financial crisis, the 2010 midterms election and the 2012 general election. Note that for aesthetic purposes the policy uncertainty index (solid line) has been scaled so as to have a statistically similar mean and variance to actual cash (dash-dot line).

TABLE 1: Summary Statistics:

This table presents summary statisics for the sample, which consists of non-financial and non-utility U.S. incorporated firms in Compustat's quarterly files for the period 1985Q1-2016Q4. Cash is estimated as cash and cash equivalents (CHEQ) scaled by total assets. Size is the natural logarithm of total assets. We require that firm has positive total assets to be included in the sample. Tobin Q is estimated as the book value of total assets plus the market value of equity less book value of equity scaled by total assets. Dividend is a dummy equal to "1" if a firm paid or issued dividend during period t. Net working capital is net working capital minus cash and marketable securities scaled by total assets. Acquisition activity is a dummy equal to "1" if the firm has undertaken or engaged in acquisition activity in period t. Leverage is estimated as short-term debt plus long-term debt scaled by total assets. Capex is estimated as capital expenditure scaled by total assets. Policy uncertainty is the Baker, Bloom and Davis (2016) Overall index

	Mean	Median	Std. Dev	25^{th}	75^{th}
Summary Statistics:					
Cash	0.1823	0.0866	0.223	0.0221	0.2652
Size	4.569	4.558	2.153	3.0313	6.122
Tobin Q	1.996	1.468	1.498	1.082	2.303
Capex	0.0401	0.0204	0.0668	0.0082	0.0465
Leverage	0.315	0.1981	6.932	0.0297	0.3897
Policy Uncertainty	105.675	96.789	31.614	79.813	122.349
Dividend Dummy	0.1086	0.000	0.3111	0.000	0.000
Net working Capital	0.0763	0.0802	39.936	0.0417	0.2269
Acquisition Activity	0.1497	0.000	0.3568	0.000	0.000

TABLE 2: Panel Regressions Estimating the Determinants of Cash Holdings:
This table reports determinants of target/optimal cash. In models [1,2,3] the dependent variable is cash estimated as cash and cash equivalent scaled by total assets. Models [4,5,6] present estimates for which the dependent variable isthe natural logarithm of cash adjusted by net assets. Net assets are estimated as total assets less cash and cash equivalents. All regressions include firm fixed effects. Standard errors are clustered at firm-level. Within R^2 is reported.

	(1)	(2)	(3)	(4)	(5)	(6)
	Cash	Cash	Cash	Ln(Cash/Net assets)	Ln(Cash/Net assets)	Ln(Cash/Net assets)
Tobin Q	0.0139***	0.0140***	0.0140***	0.122***	0.124***	0.124***
	(76.93)	(21.68)	(21.68)	(67.49)	(24.88)	(24.88)
Leverage	-0.171***	-0.172***	-0.172***	-1.680***	-1.676***	-1.676***
	(-157.86)	(-24.86)	(-24.86)	(-153.80)	(-24.19)	(-24.19)
Size	-0.000843***	0.00185	0.00185	-0.0146***	-0.0356***	-0.0356***
	(-3.09)	(1.30)	(1.30)	(-5.31)	(-2.82)	(-2.82)
Cash flow	0.0248***	0.0232***	0.0232***	0.268***	0.287***	0.287***
	(10.74)	(3.33)	(3.33)	(11.38)	(3.70)	(3.70)
Capex	-0.132***	-0.139***	-0.139***	-0.744***	-0.700***	-0.700***
	(-34.74)	(-10.75)	(-10.75)	(-19.46)	(-7.13)	(-7.13)
Networking Capital	-0.0875***	-0.0907***	-0.0907***	-0.801***	-0.781***	-0.781***
	(-89.20)	(-15.39)	(-15.39)	(-80.80)	(-15.45)	(-15.45)
Dividend dummy	-0.0132***	-0.0134***	-0.0134***	-0.137***	-0.123***	-0.123***
	(-15.07)	(-5.47)	(-5.47)	(-15.52)	(-4.72)	(-4.72)
Acquisition Activity	-0.0158***	-0.0158***	-0.0158***	-0.0904***	-0.0831***	-0.0831***
	(-25.50)	(-14.23)	(-14.23)	(-14.57)	(-7.43)	(-7.43)
1990s Dummy		-0.0216***	-0.0216***		-0.245***	-0.245***
		(-10.50)	(-10.50)		(-11.48)	(-11.48)
2000s Dummy		-0.0237***	-0.0237***		-0.134***	-0.134***
		(-7.35)	(-7.35)		(-4.23)	(-4.23)
2010s Dummy		-0.0225***	-0.0225***		0.0564	0.0564
		(-5.37)	(-5.37)		(1.41)	(1.41)
Constant	0.220***	0.227***	0.227***	-1.987***	-1.772***	-1.772***
	(154.85)	(35.46)	(35.46)	(-138.99)	(-30.69)	(-30.69)
Firm F.E	YES	YES	YES	YES	YES	YES
Industry F.E	NO	NO	YES	NO	NO	YES
Clustered Std. Errors	NO	YES	YES	NO	YES	YES
N	383,333	383,333	383,333	379,332	379,332	379,332
R^2	0.278	0.260	0.260	0.264	0.270	0.270

NOTE: t-stats in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 3: The effect(s) of Policy Uncertainty on Cash Holdings:

This table reports determinants of target/optimal cash. Policy uncertainty is estimated as the natural logarithms of the Baker et al. (2016) index. Net assets are estimated as total assets less cash and cash equivalents. All regressions include firm fixed effects. Standard errors are clustered at firm-level. Within R^2 is reported.

	(1)	(2)	(3)	(4)
	Cash	Cash	Ln(Cash/Net asset)	Ln(Cash/Net asset)
Policy Uncertainty	0.00743***	0.00602***	0.190***	0.0780***
	(10.69)	(4.14)	(27.30)	(5.69)
Tobin Q	0.0141***	0.0142***	0.129***	0.127***
	(77.68)	(21.68)	(70.61)	(25.06)
Leverage	-0.171***	-0.172***	-1.679***	-1.678***
	(-157.85)	(-24.85)	(-153.88)	(-24.19)
Size	-0.000871***	0.00216	-0.0153***	-0.0315**
	(-3.19)	(1.51)	(-5.57)	(-2.47)
Cashflow	0.0250***	0.0231***	0.274***	0.286***
	(10.83)	(3.33)	(11.64)	(3.71)
Capex	-0.132***	-0.140***	-0.751***	-0.713***
	(-34.82)	(-10.75)	(-19.65)	(-7.19)
Networking Capital	-0.0871***	-0.0907***	-0.791***	-0.782***
	(-88.77)	(-15.39)	(-79.86)	(-15.45)
Dividend Dummy	-0.0131***	-0.0134***	-0.133***	-0.123***
	(-14.86)	(-5.47)	(-15.03)	(-4.71)
Acquisition Activity	-0.0157***	-0.0158***	-0.0885***	-0.0833***
	(-25.39)	(-14.24)	(-14.28)	(-7.45)
1990s Dummy		-0.0208***		-0.235***
		(-10.35)		(-11.26)
2000s Dummy		-0.0238***		-0.135***
		(-7.35)		(-4.26)
2010s Dummy		-0.0246***		0.0297
		(-5.72)		(0.72)
Constant	0.185***	0.198***	-2.879***	-2.155***
	(52.22)	(19.87)	(-80.78)	(-23.65)
Firm F.E	YES	YES	YES	YES
Industry F.E	NO	YES	NO	YES
Clustered Std. Errors	NO	YES	NO	YES
N	383,333	383,333	379,332	379,332
R^2	0.279	0.258	0.267	0.269

NOTE: t-statistics in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 4: The Dynamics of Cash Holdings: Speed of Adjustment (SOA):

This Table presents estimates for measuring speed of adjustment of cash. The method is similar to Jiang and Lie (2016), Dittmar and Duchin (2011) and Byuon (2009). Deviation from Target is the difference between target cash and previous period cash holdings. Estimates of target cash in models [1,2,3] are based on determinants of optimal cash from model [1] of Table 2, while in models [4,5,6] target cash holdings is estimated from model [2] of Table 2. Standard errors are clustered at firm-level. Within R^2 is reported.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
Deviation from Target	0.261***	0.263***	0.263***			
	(233.85)	(72.56)	(72.29)			
Deviation from Target(2)				0.262***	0.262***	0.263***
				(234.48)	(72.35)	(72.29)
Constant	0.000769***	0.000769***	0.0109***	0.000840***	0.000840***	0.00661***
	(6.28)	(426.23)	(7.87)	(6.86)	(1021.01)	(4.78)
Firm F.E	YES	YES	YES	YES	YES	YES
Year F.E	NO	NO	YES	NO	NO	YES
Clustered Std. Errors	NO	YES	YES	NO	YES	YES
N	341,141	341,141	341,141	341,141	341,141	341,141
R^2	0.143	0.143	0.144	0.144	0.144	0.145

NOTE: t-statistics in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 5: Uncertainty and Dynamics of Cash Holdings:

This Table presents estimates for measuring speed of adjustment of cash. The method is similar to Jiang and Lie (2016), Dittmar and Duchin (2011) and Byuon (2009). Deviation from Target is the difference between target cash and previous period cash holdings. Estimates of target cash in models [1,2] are based on determinants of optimal cash from model [1] of Table 2, while in models[3,4] target cash holdings is estimated from model [2] of Table 2. Uncertainty is the natural logarithm of the Baker et al. (2016) Overall index. Standard errors are clustered at firm-level. Within R^2 is reported.

	(1)	(2)	(3)	(4)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
Deviation from Target	0.326***	0.326***		
	(30.34)	(18.33)		
Deviation from Target(2)			0.335***	0.335***
			(34.56)	(20.55)
UncertaintyxDeviation	-0.0140***	-0.0140***	-0.0158***	-0.0158***
	(-6.03)	(-3.68)	(-7.55)	(-4.59)
Constant	0.000757***	0.000757***	0.000847***	0.000847***
	(6.18)	(209.89)	(6.92)	(507.21)
Firm F.E	YES	YES	YES	YES
Year F.E	YES	YES	YES	YES
Clustered Std. Errors	NO	YES	NO	YES
N	341,141	341,141	341,141	341,141
R^2	0.143	0.143	0.144	0.144

NOTE:t-statistics in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 6: Accounting for Heterogeneity in Cash Holdings:

This Table presents estimates for measuring speed of adjustment of cash. The method is similar to Jiang and Lie (2016), Dittmar and Duchin (2011) and Byuon (2009). Deviation from Target is the difference between target cash and previous period cash holdings. Target cash is estimated from determinants of cash in Table 2. "High" is a dummy variable equal to "1" if cash holdings is above sample mean and zero otherwise. Uncertainty measure is based on Baker et al (2016) Overall index. It is estimated as the natural logarithm of the overall index. Standard errors are clustered at firm- level. Within R^2 is reported.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
Deviation from Target	0.293***	0.293***	0.186***	0.309***	0.309***	0.212***
	(26.93)	(15.78)	(6.91)	(28.19)	(16.53)	(5.40)
UncertaintyxDeviation	-0.0143***	-0.0143***	0.00901	-0.0172***	-0.0172***	0.00394
	(-6.18)	(-3.70)	(1.59)	(-7.37)	(-4.44)	(0.47)
DeviationxHighCash	0.0478***	0.0478***	0.190***	0.0463***	0.0463***	0.177***
	(17.24)	(6.36)	(5.33)	(16.67)	(6.16)	(3.55)
UncertaintyxHighCashxDeviation			-0.0310***			-0.0284***
			(-4.15)			(-2.69)
Constant	0.00401***	0.00401***	0.00397***	0.0142***	0.0142***	0.0137***
	(17.83)	(7.85)	(7.79)	(10.80)	(9.62)	(9.20)
Firm F.E	YES	YES	YES	YES	YES	YES
Year F.E	NO	NO	NO	YES	YES	YES
Clustered Std. Errors	NO	YES	YES	NO	YES	YES
N	341,141	341,141	341,141	341,141	341,141	341,141
R^2	0.144	0.144	0.144	0.145	0.145	0.145

NOTE: t-statistics in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 7: Uncertainty and Deviation from Optimal Cash Holdings*:*

This Table presents estimates for measuring speed of adjustment of cash. The method is similar to Jiang and Lie (2016), Dittmar and Duchin (2011) and Byuon (2009). Deviation from Target is the difference between target cash and previous period cash holdings. Target cash is estimated from determinants of cash in Table 2. Firms are sorted on whether their actual cash is above (Deviation>0) or below (Deviation<0) target cash. Uncertainty measure is based on Baker et al (2016) overall index. It is estimated as the natural logarithm of the overall index. Standard errors are clustered at firm-level. Within R^2 is reported.

	(1)	(2)	(3)	(4)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
	Deviation>0	**Deviation**>0	**Deviation**<0	**Deviation**<0
Deviation from Target	0.527***	0.527***	0.456***	0.456***
	(33.88)	(19.90)	(43.17)	(23.34)
UncertaintyxDeviation	-0.0160***	-0.0160***	0.0309***	0.0309***
	(-4.78)	(-2.90)	(13.51)	(7.54)
Constant	0.110***	0.110***	-0.0706***	-0.0706***
	(224.29)	(85.90)	(-453.88)	(-137.49)
Firm F.E	YES	YES	YES	YES
Year F.E	YES	YES	YES	YES
Clustered Std. Errors	NO	YES	NO	YES
N	115,522	115,522	225,619	225,619
R^2	0.318	0.318	0.497	0.497

NOTE: t-statistics in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 8: Leverage, Uncertainty and Speed of Adjustment(SOA):

This Table presents estimates for measuring speed of adjustment of cash and takes into account the effects of leverage. Deviation from Target is the difference between target cash and previous period cash holdings. Target cash is estimated from determinants of cash in Table 2. Firms are sorted on whether their leverage level is below or above sample mean (median). Uncertainty measure is based on the Baker et al. (2016) overall index, and it is estimated as the natural logarithm of the Overall index. Standard errors are clustered at firm-level. Within R^2 is reported.

	(1) $\Delta Cash_{t,t-1}$	(2) $\Delta Cash_{t,t-1}$	(3) $\Delta Cash_{t,t-1}$	(4) $\Delta Cash_{t,t-1}$
		Panel A		
Leverage(Mean):	LOW	HIGH	LOW	HIGH
Deviation from Target	0.344***	0.334***	0.360***	0.349***
	(28.69)	(13.08)	(18.63)	(6.10)
UncertaintyxDeviation from Target	-0.0154***	0.00112	-0.0184***	-0.00163
	(-5.94)	(0.20)	(-4.45)	(-0.14)
Constant	0.00394***	-0.0149***	0.0158***	-0.00893***
	(28.11)	(-56.90)	(9.80)	(-2.88)
Firm F.E	YES	YES	YES	YES
Year F.E	NO	NO	YES	YES
Clustered Std. Errors	NO	NO	YES	YES
N	273,442	67,699	273,442	67,699
R^2	0.151	0.184	0.153	0.186
		Panel B		
Leverage(Median):	LOW	HIGH	LOW	HIGH
Deviation from Target	0.403***	0.288***	0.417***	0.331***
	(27.47)	(17.84)	(19.13)	(8.65)
UncertaintyxDeviation from Target	-0.0248***	0.00685**	-0.0275***	-0.00184
	(-7.83)	(1.97)	(-5.93)	(-0.23)
Constant	0.0163***	-0.0192***	0.0342***	-0.0134***
	(80.88)	(-109.53)	(13.49)	(-8.77)
Firm F.E	YES	YES	YES	YES
Year F.E	NO	NO	YES	YES
Clustered Std. Errors	NO	NO	YES	YES
N	183,413	157,728	183,413	157,728
R^2	0.163	0.176	0.166	0.178

NOTE: t-statistics in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 8- Panel [C]: External Finance Dependence and Equity Dependency

Measures are constructed at the firm level . External finance dependence is defined as the ratio of capxy less funds from operations scaled by capxy. External equity dependence is defined as the ratio of net amount of equity issued to capital expenditure. All measures are construced based on Rajan and Zingales (1998) and Duchin et al. (2010). The low and high subsamples comprise firms with external-finance dependence and equity dependence measures below and above the sample median respectively. t-stats are reported in the parenthesis. Within R^2 *is reported.*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
	External	**Finance**	**Dependence**		**External**	**Equity**	**Dependence**	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Deviation from Target	0.286***	0.352***	0.310***	0.372***	0.262***	0.363***	0.292***	0.385***
	(18.70)	(22.73)	(12.82)	(15.51)	(16.09)	(24.56)	(9.15)	(17.47)
UncertaintyxDeviation from Target	-0.0105***	-0.0125***	-0.0152***	-0.0165***	-0.00424	-0.0145***	-0.0103	-0.0189***
	(-3.19)	(-3.74)	(-2.94)	(-3.25)	(-1.21)	(-4.51)	(-1.53)	(-4.00)
Constant	0.000646***	0.00172***	0.00726***	0.0180***	-0.0108***	0.0120***	-0.00410**	0.0257***
	(4.23)	(9.00)	(4.83)	(6.63)	(-69.10)	(63.10)	(-2.45)	(11.04)
Firm F.E	YES	YES	YES	YES	YES	YES	YES	YES
Year F.E	NO	NO	YES	YES	NO	NO	YES	YES
Clustered Std. Errors	NO	NO	YES	YES	NO	NO	YES	YES
N	170,641	170,500	170,641	170,500	156,022	185,119	156,022	185,119
R^2	0.127	0.163	0.130	0.165	0.139	0.162	0.141	0.164

Note: t- statistics in parentheses* p:0.10, ** p:0.05, *** p:0.01

TABLE 9: Accounting for the effects of Payout Policy on Speed of Adjustment(SOA): *This Table presents estimates for measuring speed of adjustment of cash and take into account the effects of dividend. Deviation from Target is the difference between target cash and previous period cash holdings. Target cash is optimal cash estimated from determinants of cash in Table 2. Firms are sorted on whether they pay dividend in each period t. Uncertainty measure is based on Baker et al. (2016) overall index, and it is estimated as the natural logarithm of the overall index. Standard errors are clustered at firm- level .Within* R^2 *is reported.*

	(1)	(2)	(3)	(4)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
Dividend-Payer	YES	NO	YES	NO
Deviation from Target	0.343***	0.318***	0.343***	0.332***
	(7.65)	(28.76)	(4.02)	(18.11)
UncertaintyxDeviation	0.00490	-0.0127***	0.00526	-0.0155***
	(0.50)	(-5.31)	(0.28)	(-3.97)
Constant	-0.00644***	0.00121***	-0.00222	0.0126***
	(-15.61)	(9.53)	(-0.64)	(8.17)
Firm F.E	YES	YES	YES	YES
Year F.E	NO	NO	YES	YES
Clustered Std. Errors	NO	NO	YES	YES
N	33541	307600	33541	307600
R^2	0.192	0.143	0.194	0.145

NOTE: t-statistics in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 10: Accounting for the effects of Payout Policy on Speed of Adjustment(SOA): *This Table presents estimates for measuring speed of adjustment of cash and takes into account the effects of stock repurchases. Deviation from Target is the difference between target cash and previous period cash holdings. Target cash is optimal cash estimated from determinants of cash in Table 2. Firms are sorted into terciles based on their level of stock repurchases. Uncertainty measure is based on Baker et al (2016) overall index, and it is estimated as the natural logarithm of the overall index. Standard errors are clustered at firm-level. Within* R^2 *is reported.*

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
Share Repurchases:	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Deviation from Target	0.561***	0.398***	0.241***	0.607***	0.411***	0.257***
	(21.43)	(20.36)	(16.42)	(11.91)	(13.01)	(10.35)
UncertaintyxDeviation	-0.0511***	-0.0144***	0.00536*	-0.0602***	-0.0168**	0.00239
	(-9.00)	(-3.39)	(1.71)	(-5.56)	(-2.51)	(0.45)
Constant	-0.00920***	0.00442***	0.00521***	0.00765***	0.0178***	0.00577*
	(-40.21)	(20.61)	(27.59)	(3.84)	(5.14)	(1.90)
Firm F.E	YES	YES	YES	YES	YES	YES
Year F.E	NO	NO	NO	YES	YES	YES
Clustered Std. Errors	NO	NO	NO	YES	YES	YES
N	105,425	118,227	117,489	105,425	118,227	117,489
R^2	0.183	0.187	0.144	0.186	0.189	0.147

NOTE: t-statistics in parentheses: *p:0.10, ** p:0.05, *** p:0.01

TABLE 11: Effects of Cash Volatility and Cash flow Volatility on Speed of Adjustment(SOA):

This Table presents estimates for measuring speed of adjustment of cash. Deviation from Target is the difference between target cash and previous period cash holdings. Target cash is optimal cash estimated from determinants of cash in Table 2. Firms are sorted into terciles based on their level of cash and cash flow volatility. Uncertainty measure is based on the Baker et al. (2016) overall index. And it is estimated as the natural logarithm of the Overall index. Standard errors are clustered at firm-level. Within R^2 is reported.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
			PANEL A			
Cash Volatility	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Deviation from Target	0.216***	0.331***	0.374***	0.297***	0.366***	0.432***
	(19.76)	(19.47)	(18.42)	(15.29)	(15.11)	(15.05)
UncertaintyxDeviation	0.0209***	0.000837	-0.0289***	0.00415	-0.00540	-0.0412***
	(8.94)	(0.23)	(-6.58)	(1.15)	(-1.05)	(-6.72)
Constant	-0.0324***	-0.00398***	0.0280***	-0.0271***	0.00546**	0.0469***
	(-130.17)	(-23.23)	(75.28)	(-24.82)	(2.53)	(9.21)
Firm F.E	YES	YES	YES	YES	YES	YES
Year F.E	NO	NO	NO	YES	YES	YES
Clustered Std Errors	NO	NO	NO	YES	YES	YES
N	106,580	119,610	114,951	106,580	119,610	114,951
R^2	0.162	0.182	0.133	0.165	0.187	0.135
			PANEL B			
Cash Flow Volatility	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Deviation from Target	0.203***	0.359***	0.341***	0.263***	0.377***	0.376***
	(11.73)	(20.52)	(17.40)	(6.80)	(13.65)	(13.72)
UncertaintyxDeviation	0.00568	-0.0284***	-0.0117***	-0.00681	-0.0321***	-0.0191***
	(1.52)	(-7.53)	(-2.76)	(-0.81)	(-5.54)	(-3.27)
Constant	-0.0119***	-0.00241***	0.0212***	-0.00432***	0.00460**	0.0410***
	(-67.63)	(-13.49)	(64.16)	(-2.86)	(2.23)	(9.87)
Firm F.E	YES	YES	YES	YES	YES	YES
Year F.E	NO	NO	NO	YES	YES	YES
Clustered Std Errors	NO	NO	NO	YES	YES	YES
N	110,875	119,408	110,858	110,875	119,408	110,858
R^2	0.123	0.124	0.158	0.126	0.126	0.160

NOTE: t-statistics in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 12: Financial Constraints and Speed of Adjustment*:*

This Table presents estimates for measuring speed of adjustment of cash. Deviation from Target is the difference between target cash and previous period cash holdings. Target cash is optimal cash estimated from determinants of cash in Table 2. Firms are sorted into terciles based on their level of net income. Uncertainty measure is based on the Baker et al (2016) overall index, and it is estimated as the natural logarithm of the Overall index. Standard errors are clustered at firm-level. Within R^2 is reported.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
Net income:	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
PANEL A:						
Deviation from Target	0.365***	0.343***	0.295***	0.406***	0.392***	0.323***
	(19.33)	(19.07)	(14.28)	(15.45)	(11.91)	(9.96)
UncertaintyxDeviation	-0.0147***	-0.0237***	-0.00492	-0.0234***	-0.0338***	-0.0103
	(-3.62)	(-6.12)	(-1.10)	(-4.25)	(-4.85)	(-1.47)
Constant	0.0162***	-0.0113***	0.00136***	0.0386***	-0.00401**	0.00636***
	(52.73)	(-66.40)	(6.99)	(9.81)	(-2.17)	(3.20)
Firm F.E	YES	YES	YES	YES	YES	YES
Year F.E	NO	NO	NO	YES	YES	YES
Clustered Std Errors	NO	NO	NO	YES	YES	YES
N	108,647	113,625	118,805	108,647	113,625	118,805
R^2	0.167	0.130	0.144	0.169	0.133	0.147

NOTE: t-statistics in parentheses: * p:0.10, ** p:0.05, *** p:0.01

TABLE 12: Alternative Measures of Financial Constraints:

This Table presents estimates for measuring speed of adjustment of cash. Deviation from Target is the difference between target cash and previous period cash holdings. Target cash is optimal cash estimated from determinants of cash in Table 2.Firms are sorted into low/high based on the Whited-Wu index, Firm Size and Payout Ratio. Uncertainty measure is based on Baker et al (2016) overall index, and it is estimated as the natural logarithm of the Overall index. Payout ratio is estimated as dividend scaled by income before extraordinary expense.Standard errors are clustered at firm-level. Within R^2 is reported.

	(1)	(2)	(3)	(4)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
PANEL B:				
WHITED-WU INDEX:	LOW	HIGH	LOW	HIGH
Deviation from Cash	0.238***	0.373***	0.286***	0.398***
	(16.54)	(25.05)	(9.60)	(17.86)
UncertaintyxDeviation	0.00329	-0.0195***	-0.00660	-0.0246***
	(1.06)	(-6.06)	(-1.04)	(-5.19)
Constant	-0.0112***	0.0103***	-0.00771***	0.0242***
	(-72.79)	(53.27)	(-4.77)	(11.84)
N	142,112	199,029	142,112	199,029
R^2	0.137	0.156	0.140	0.158
FIRM SIZE:	SMALL	LARGE	SMALL	LARGE
Deviation from Target	0.407***	0.230***	0.427***	0.247***
	(23.34)	(18.57)	(16.00)	(10.76)
UncertaintyxDeviation	-0.0228***	0.00246	-0.0267***	-0.000813
	(-6.06)	(0.92)	(-4.69)	(-0.17)
Constant	0.00710***	-0.00396***	0.0251***	-0.000195
	(33.35)	(-30.14)	(11.27)	(-0.13)
N	167,798	173,343	167,798	173,343
R^2	0.168	0.131	0.171	0.133
PAYOUT RATIO:	LOW	HIGH	LOW	HIGH
Deviation from Target	0.335***	0.325***	0.351***	0.340***
	(25.11)	(17.52)	(16.36)	(10.76)
UncertaintyxDeviation	-0.0136***	-0.0103***	-0.0167***	-0.0132*
	(-4.72)	(-2.58)	(-3.68)	(-1.96)
Constant	0.000481***	0.00137***	0.0131***	0.00699***
	(3.17)	(7.03)	(7.67)	(3.23)
N	239,178	101,963	239,178	101,963
R^2	0.150	0.153	0.152	0.156
Firm F.E	YES	YES	YES	YES
Year F.E	NO	NO	YES	YES
Clustered Std. Errors	NO	NO	YES	YES

TABLE 13: Uncertainty and Liquidity Risk:

This Table presents estimates for measuring speed of adjustment of cash. Deviation from Target is the difference between target cash and previous period cash holdings. Target cash is optimal cash estimated from determinants of cash in Table 2. The subsamples comprise firms interest coverage ratio measures below and above the sample median. Similar to Acharya, Davydenko and Strebulaev (2007), Interest coverage ratio is estimated as income before depreciation scaled by interest expense. Quick ratio is estimated as current assets net of inventories scaled by current liability. And current ratio is current assets scaled by current liability. WC/TA is working capital to total assets.Uncertainty measure is based on Baker et al (2016) overall index. It is estimated as the natural logarithm of the overall index. Standard errors are clustered at firm-level. Within R^2 *is reported.*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$	$\Delta Cash_{t,t-1}$
Liquidity Ratio:	**Interest**	Coverage	**Quick**	Ratio	**Current**	Ratio	**WC/TA**	Ratio
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Deviation from Target	0.383***	0.357***	0.474***	0.451***	0.437***	0.454***	0.485***	0.467***
	(11.47)	(16.93)	(9.01)	(20.94)	(9.49)	(21.15)	(9.88)	(21.86)
UncertaintyxDeviation	-0.0140**	-0.0197***	-0.00660	-0.0281***	-0.0112	-0.0287***	-0.0153	-0.0271***
	(-2.01)	(-4.37)	(-0.62)	(-6.21)	(-1.17)	(-6.41)	(-1.52)	(-6.03)
Constant	0.00522**	0.0145***	-0.0454***	0.0480***	-0.0344***	0.0409***	-0.0398***	0.0433***
	(2.33)	(8.01)	(-31.80)	(18.23)	(-20.98)	(17.48)	(-25.08)	(18.54)
Firm F.E	YES	YES	YES	YES	YES	YES	YES	YES
Year F.E	YES	YES	YES	YES	YES	YES	YES	YES
Clustered Std. Errors	YES	YES	YES	YES	YES	YES	YES	YES
N	118,675	222,466	161,010	180,131	160,868	180,273	162,346	178,795
R^2	0.178	0.147	0.291	0.192	0.239	0.192	0.276	0.207

NOTE: t-statistics in parentheses * p:0.10, ** p:0.05, *** p:0.01