

WHY DO CASH HOLDINGS OCCUR? RECENT EXPERIENCES IN JAPAN

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ABSTRACT

This paper examines the reason why cash holdings are promoted in Japan. In Japan, an unconventional monetary policy started in 2001, and capital movements from cash to risky assets should have occurred. However, such phenomena have not occurred strongly. Both short- and long-term interest rates have still impacts on currency holdings. All of the sample periods in this study are extraordinary low or almost zero interest rates ones. However, currency holdings are still related to interest rates. On the other hand, stock prices and exchange rates are not significantly associated with currency holdings. However, convertible bond (CB) is related to currency holdings significantly in some periods. Finally, the day when monetary policies are conducted does not impact currency holdings at least on the short-term (i.e., on the same day). Market participants would accept these policies in a calm manner.

Keywords: Cash holdings, monetary policy, quantitative easing, stock

INTRODUCTION

This paper examines changes in the cash holdings during the recent period of huge expansion of money in Japan. From the traditional macroeconomic theory, interest rates and cash holdings are associated strongly; however, interest rates during this period have and had been almost zero, so there are possibilities that other deterministic elements that impacts on cash holdings should be considered. Also, it would be necessary to examine the changes in cash holdings in response to monetary policy changes/announcements of the Bank of Japan (BOJ). Central banks conduct surprising monetary policies in some cases, and they move markets to do so. However, such policy conduct sometimes causes turmoil as large price fluctuations and huge volumes of transactions occur.

Against the importance of this field, there are not so many studies. From the *auditing*, there are some recent studies. Huang, Chen, & Lu (2016) showed that using efficiency of cash holdings isn't promoted after setting up an audit committee. Gleason, Greiner, & Kannan (2017) found that strength of shareholder rights reduces the positive relationship between excess cash and audit costs. Also from the view of board members, there are also some studies. Dittmar and

Mahrt-Smith (2007) indicated that a firm with less conflicts in firms or better corporate governance tends to promote cash holdings. Boubaker, Derouiche, and Nguyen (2014) showed that independent directors, splitting chief executive officer, and chair positions promote less cash holdings. Iskandar-Datta and Jia (2014) showed that excess cash depletion has negative impacts on firm performances. Yu, Sopranzetti, and Lee (2015) demonstrated that managerial ownership and board ownership are associated with cash holdings. Hsu, Huang, and Lai (2015) showed that independent board members allow managers to reserve cash holdings to avoid underinvestment and play a monitoring role in managers' cash spending in a regulated industry. Duran, Lozano, and Yaman (2016) showed that precautionary motives for holding cash as family-controlled firms' desire to perpetuate the family legacy for future generations motivates them to increase cash holdings than their non-family firms. Lee and Park (2016) found that board governance mitigates agency concern in cash holdings. Al-Najjar and Clark (2017) showed that there is a negative relationship between board size and cash holdings.

There are a lot of studies focusing on firms themselves. Attig, El, Guedhami, and Rizeanu (2013) showed that cash holdings are positively associated with an even distribution of blockholders' rights. Martinez-Sola, Garcia-Teruel, and Martinez-Solano (2013) found that there is a concave relation between cash holdings and firm value. Saeed, Belghitar, and Clark (2014) indicated that connected firms hold larger cash reserves than their non-connected firms. Tong (2014) showed that the marginal value of cash shareholders is high when a change in cash moves towards the optimal level. Also, Uvar and Kuzey (2014) found that firms have a targeted cash level. Sasaki (2015) showed that managers take consideration in anticipated liquidity shocks in determining current investment and cash-saving policies. Chi and Su (2016) found that cash holdings become more valuable by providing liquidity for investment. Dudley and Zhang (2016) showed that firms located in countries with less trusting circumstances promote cash holdings in order to compensate for diminished access to capital markets. He & Wintoki (2016) showed that increasing sensitivity of cash holdings for R&D investment is over 20%. Lyandres and Palazzo (2016) found that firm's cash holdings are negatively related with their rivals' cash-holding ones. Nguyen, Nguyen, and Le (2016) indicated that inverse U-shape relationship between firm value and cash holdings. Shah and Shah (2016) demonstrated that managers consider improvements in judicial efficiency as increasing the probability of bankruptcy and loss of their jobs and consider this fear by promoting cash holdings as a buffer against bankruptcy. Brick and Liao (2017) showed that there is a positive relation between cash holdings and debt maturity. Kato, Li, and Skinner (2017) confirmed that Japanese firms hold less cash and increase payouts to shareholders, because of the influence of the banks that traditionally sit at the center of horizontal *keiretsu*.

This paper focuses on macroeconomic phenomena in cash holdings. There does not exist much study in this field. Bernanke (1983) and Bloom, Bond, and van Reenen (2007) showed that uncertainty reduces corporate investment by increasing the value of option of waiting. Faulkender and Wang (2006), Han and Qju (2007), and Denis and Sibilkov (2010) found that financially constrained firms' level of uncertainty are positively linked with their cash holdings. Acharya, Davydenko, and Strebulaev (2012) showed that cash holdings are not determined by credit risk but by precautionary savings are central to understanding the effects of cash on credit risk. Abushammala and Sulaiman (2014) indicated that corporate cash holdings are related positively with GDP and credit spread. Chan, Kang, and Li (2014) found that local long-term institutional investors are linked with lower excess cash in firms with less growth. Horioka and Terada-Hagiwara (2014) showed that cash flow has a positive impact on the change in cash holdings. Neamtiu, Shroff, White, and Williams (2014) found that macroeconomic ambiguity is negatively associated with capital investment and positively associated with cash holdings. Booth, Ntantamis, and Zhou (2015) confirmed that the value of cash holdings is affected both by the status of financial constraints and by the nature of investment. Chen, Dou, Rhee, Truong, and Veeraraghavan (2015) indicated that individualism and uncertainty avoidance influence the precautionary motive for cash holdings. Qiu & Wan (2015) showed that firms facing technology spillovers promote cash holdings. Chen, Murgulov, Rhee, and Veeraraghavan (2016) found that religiosity is negatively linked with the level of local government debt and investment. Chiu, Wang, and Pena (2016) showed that cash holdings are associated with lower level of tail risk spillovers for financially constrained firms. Xu, Chen, Xu, and Chan (2016) indicated that market value of cash holdings is negative during periods of political uncertainty. Im, Park, and Zhao (2017) confirmed that a firm facing higher uncertainty places a higher value on cash.

For the issue of market liquidity, Glosten and Milgraom (1985) showed that highly informed investors tend to use that information before news is announced, which reduces liquidity. Agarwal, Mullally, Tang, and Yang (2015) found that stocks with higher fund ownership, especially those owned by well informed investors or under large information asymmetry, increase liquidity greatly. Chung, Kim, Park, and Sung (2012); Ali, Liu, and Su (2016); and Jain, Jiang, and Mekhaimer (2016) indicated that well-governed firms tend to have high stock liquidity. Komain (2012) found evidence of risk spillovers in the stock and foreign exchange markets in emerging economies. Wang and Zhang (2015) found that stocks that are more largely traded by investors have high liquidity. Glosten and Milgraom (1985) showed that announcements with included more information receive a larger response from investors and increase information asymmetry because of a gap among market participants; well-informed trading increases and liquidity declines after news announcements. Graham, Koski, and Lowenstein (2006) confirmed that liquidity declines before anticipated announcements. Riordan,

Storkernmaier, Wagener, and Zhang (2013) found that adverse selection costs increase around the arrival of newswire messages. He and Lepone (2016) showed that liquidity may worsen as passive and uninformed traders migrate to the futures market.

The relationship between macroeconomic variables and cash holdings has room for further study. The consensus of the results has not been reached yet. This article focuses on the relationship for recent Japanese case which low or almost zero interest rates had been prevailing. Following this section 1, section 2 provides theoretical aspect for this study. Based on the section 2, section 3 conducts empirical analyses to examine the relationship between macroeconomic variables and cash holdings. Finally, this study ends with a brief summary.

1. Theoretical aspect of the relationship between macroeconomic variables and cash holdings

1.1. The Japanese economic situation and monetary policy

Japan has been in severe economic condition and deflation since the so-called bubble economy burst at the beginning of the 1990s. In 1980, Japan experienced rising stock and land prices called 'bubble' economy; however, the bubble burst at the beginning of 1990s. In 2001, the Bank of Japan (BOJ) raised the outstanding balance of the current account at the BOJ. Usually, central banks make interest rates move (i.e., rise, reduce, or stay) using monetary policy; however, at that time, interest rates in Japan were already too low to boost the economy. There was no room to reduce interest rates (i.e., zero interest rate). This monetary policy objective can be perceived as a change from holding a level of reserves at the BOJ to one that transfers funds into lending to boost the economy and remove deflationary pressures. Under this quantitative easing policy from March 19, 2011, the BOJ purchased huge amounts of Japanese government bonds to arrive at its target level of current account balances held by financial institutions. This was called *unconventional* monetary policy, which was unprecedented in the world at that time that is now common in other developed countries. Still, at present, very few Japanese bonds are owned by foreign investors. This may be the reason that Japanese government prices are stable and low interest rates can continue. The policy had been continued to conduct till July 14, 2006 when a bright sign of the Japanese economy appeared. However, after the subprime problems in 2007 and the Lehman shock in 2008, a huge amount of capital flowed into the Japanese financial markets despite that the Japanese economy was not still in a good situation. The Japanese yen appreciated greatly against other currencies, which hit the Japanese economy seriously. On October 5, 2010, the BOJ introduced its comprehensive monetary easing policy to respond to the re-emergence of deflation and a slowing recovery. One key measure was an asset purchase program that involved Japanese government bonds as well as private assets. After that, the Japanese government changed and more aggressive fiscal policy was strongly demanded. The

zero interest rate policy by the BOJ was in effect beginning in October 2010 and continue in force now.

On April 4, 2013, the BOJ decided to conduct quantitative and qualitative monetary easing policy, which is a more aggressive monetary policy. The BOJ decided to achieve the consumer price target of two percent for the year-on-year rate of change in consumer prices. Deflation had been thought of as seriously spoiling the Japanese economy. The BOJ doubled the monetary base and the amounts outstanding of Japanese government bonds as well as exchange-traded funds (ETFs) in two years and more than doubled the maturity of Japanese government bond purchases (quality).

Furthermore, on January 29, 2016, the BOJ decided to introduce *Quantitative and Qualitative Monetary Easing (QQE) with a Negative Interest Rate* in order to achieve the price stability target of two percent at the earliest possible time. The BOJ applies a negative interest rate of minus 0.1% to current accounts that financial institutions hold at the BOJ.

There are four terms that have conducted aggressive monetary policy, namely, low or almost zero interest rates. This paper investigates these terms empirically to examine the relationship between cash holdings and some macroeconomic variables.

1.2. Candidate variables affecting cash holdings.

To examine the relationship between macroeconomic variables and cash holdings, interest rates and other financial variables have to be examined. The candidate variables are volatility of risky asset prices, short- and long-term interest rates, stock prices, exchange rates, convertible bond prices, and the conduction of monetary policy. One important thing should be considered. It is the causality among variables, which is taken into account in empirical analyses in the next section.

2. Empirical Methods

To examine the relationship between macroeconomic variables and cash holdings, two equations (1) and (2) are used for estimation. Daily data are used for estimation.

$$\Delta cash_{,t} = \alpha_0 + \alpha_1 volatility_{,t} + \alpha_2 controls_{,t} \quad (1)$$

$$volatility_{,t} = \alpha_0 + \alpha_1 \Delta cash_{,t} + \alpha_2 controls_{,t} \quad (2)$$

where $\Delta cash$ is the change rate from the previous day, volatility is i 's excess stock return calculated as the stock return minus the return on a call market. Controls are call rate (call), 10-year government bond's interest rate (interest rate), stock market price change (stock), exchange

rate (yen/dollar) change, convertible bond price change (CB), and policy change (0 or 1). T denotes time. Except for the dummy variables, all of the data is changed into the change. One reason is the existence of unit roots.

3. Empirical Results

All of the data, except for *policy* are from NIKKEI telecom. The sample period is from 2001.3 to 2017.7 and divided into four periods explained in section 2. The empirical results are in Table 1 for equation (1) and Table 2 for equation (2).

Table 1. Regression results of the equation (1) (dependent variable: currency)

	2001.3- 2006.7	2010.1 0- 2013.4	2013.4- 2016.1	2016.1- 2017.7	2001.3- 2006.7	2010.1 0- 2013.4	2013.4- 2016.1	2016.1 - 2017.7
C	6.69*** (10.66)	30.48* ** (15.12)	12.40** * (3.35)	189.80 *** (4.90)	31.57* ** (103.89)	21.77* ** (130.35)	23.70* ** (114.25)	19.60* ** (57.10)
volatility	0.0004 (1.32)	0.0004 (0.98)	0.0009* * (1.99)	-0.004 (-1.14)	0.001* * (2.16)	0.0007 * (1.74)	0.001* (1.95)	0.001 (0.94)
Call	- 31.87*** (-6.90)	- 210.32 *** (-10.37)	-11.36 (-0.78)	-8.07 (-0.11)				
Interest Rate	- 11.13*** (-24.23)	- 10.81* ** (-11.04)	- 11.37** * (-5.23)	- 78.90* ** (-4.22)				

Stock	0.005 (0.05)	-0.177 (-1.18)	0.17 (0.74)	-1.04 (-0.65)				
Exchange rate	0.36 (1.53)	0.58* (1.83)	-0.61 (-1.49)	-2.50 (-0.72)				
CB	-2.87 (-8.22)	- 1.12** *	-0.17 (-0.42)	2.74 (0.63)				
Policy	-6.81 (-1.38)	1.22 (0.27)	01.47 (-0.28)	5.02 (0.24)				
Adj.R2	0.36	0.30	0.08	0.13	0.01	0.02	0.04	0.01
Prob(F-statistic)	0.00	0.00	0.00	0.005	0.03	0.08	0.03	0.35
D.W.	0.18	0.18	0.13	0.19	0.16	0.16	0.17	0.20

Note. Parentheses are t-statistics. ***, **, * denote significant at 1, 5, and 10% level.

Table 2. Regression results of the equation (2) (dependent variable: volatility)

	2001.3- 2006.7	2010.10- 2013.4	2013.4- 2016.1	2016.1- 2017.7	2001.3- 2006.7	2010.10- 2013.4	2013.4- 2016.1	2016.1- 2017.7
C	-76.91 (-1.45)	-701.13 (-0.85)	-639.35 (-1.54)	846.39 (0.78)	- 183.93*** (-2.61)	63.03 (0.74)	- 87.52** (-2.16)	- 397.47** (-2.23)
currency	2.97 (1.32)	-1.91 (-1.14)	11.23* (1.93)	44.65 (1.32)	5.66* (1.95)	-2.08 (-1.33)	3.12* (1.74)	11.96** (2.16)

Call	141.94 (0.37)	1496.80 (1.12)	460.64 (0.26)	350.28 (0.54)				
Interest Rate	-6.15 (-0.13)	212.31 (0.54)	147.74 (0.59)	- (-1.26)	1299.43			
Stock	-4.38 (-0.53)	-15.38 (-0.48)	-28.04 (-1.09)	1.39 (0.08)				
Exchange rate	33.59* (1.73)	-25.31 (-0.36)	-4.99 (-1.09)	4.02 (0.08)				
CB	-7.13 (-0.24)	6.59 (0.07)	24.38 (0.54)	194.26 (0.48)				
Policy	-48.14 (-0.12)	453.13 (1.12)	55.90 (0.08)	-150.82 (-0.39)				
Adj.R2	0.004	0.04	-0.001	-0.10	0.004	0.005	0.001	0.009
Prob(F-statistic)	0.47	0.42	0.47	0.90	0.05	0.18	0.08	0.03
D.W.	2.03	2.09	2.06	2.10	2.00	2.06	2.04	2.04

Note. Parentheses are t-statistics. ***, **, * denote significant at 1, 5, and 10% level.

The results are not so robust, but there are some interesting and important results. In general, both short- and long-term interest rates have impacts on currency holdings as expected. All of the sample periods are during the periods of extraordinary low or almost zero interest rates ones. However, currency holdings are associated with interest rates. There is some possibility that markets seem a little bit unstable.

For the stock prices, exchange rates are not significantly associated with currency holdings. Low or almost interest rates do not cause capital movements into risky assets. On the other hand, CB is related with currency holdings significantly in some periods. CB can both take risk and avoid

risk. The day when monetary policies are conducted does not have impacts on currency holdings at least from the short-term periods, namely, on the same day. Market participants would accept these policies in a calm manner.

The Granger causality test is used for these estimations. It is the most used method for checking causality and a statistical hypothesis method to determine whether one time series is useful in forecasting another variable. For example, a time series, X, is said to Granger-cause Y if it can be produced by a series of (usually) F-statistics on lagged values of X (i.e., those X values yield significant results about future values of Y). The results are shown in Table 4.

Table 3. Pairwise Granger causality tests

	Null hypothesis	Prob(F-statistic)
2001.2-2006.7	Volatility does not Granger cause currency	0.00
	Currency does not Granger cause volatility	0.08
2008.12-2010.10	Volatility does not Granger cause currency	0.00
	Currency does not Granger cause volatility	0.18
2013.4-2016.1	Volatility does not Granger cause currency	0.00
	Currency does not Granger cause volatility	0.12
2016.1-2017.7	Volatility does not Granger cause currency	0.12
	Currency does not Granger cause volatility	0.27

The results show that equation (1) is more appropriate than equation (2). Finally, impulse responses are checked. The regression results and the impulse responses are in Table 4a-4d and Figure 1a-1d.

Table 4a. Regression analyses for impulse regression: 2001.2-2006.7

	CURRENCY	VOLATILITY	CALL
CURRENCY(-1)	-0.02 (0.05) [-0.42]	-0.0001 (0.0001) [-1.10]	1.11E-07 (1.4E-06) [0.07]
CURRENCY(-2)	-0.03 (0.05) [-0.62]	1.53E-06 (0.0001) [0.01]	1.39E-06 (1.4E-06) [0.99]
VOLATILITY(-1)	-15.20 (19.13) [-0.79]	0.84 (0.05) [15.93]	0.0004 (0.0005) [0.90]
VOLATILITY(-2)	26.17 (19.08) [1.37]	0.11 (0.05) [2.16]	-0.0004 (0.0005) [-0.81]
CALL(-1)	223.97 (1821.82) [0.12]	3.46 (5.04) [0.68]	0.35 (0.04) [7.35]
CALL(-2)	804.76 (1640.65) [0.49]	3.20 (4.54) [0.70]	0.18 (0.04) [4.26]

C	-394.79	1.11	0.01
	(190.10)	(0.52)	(0.005)
	[-2.07]	[2.12]	[2.27]
Adj. R-squared	-0.001	0.91	0.36
F-statistic	0.91	633.91	36.31

Note. () are standard errors and [] are t-statistics.

Figure 1a. Regression analyses for impulse regression.

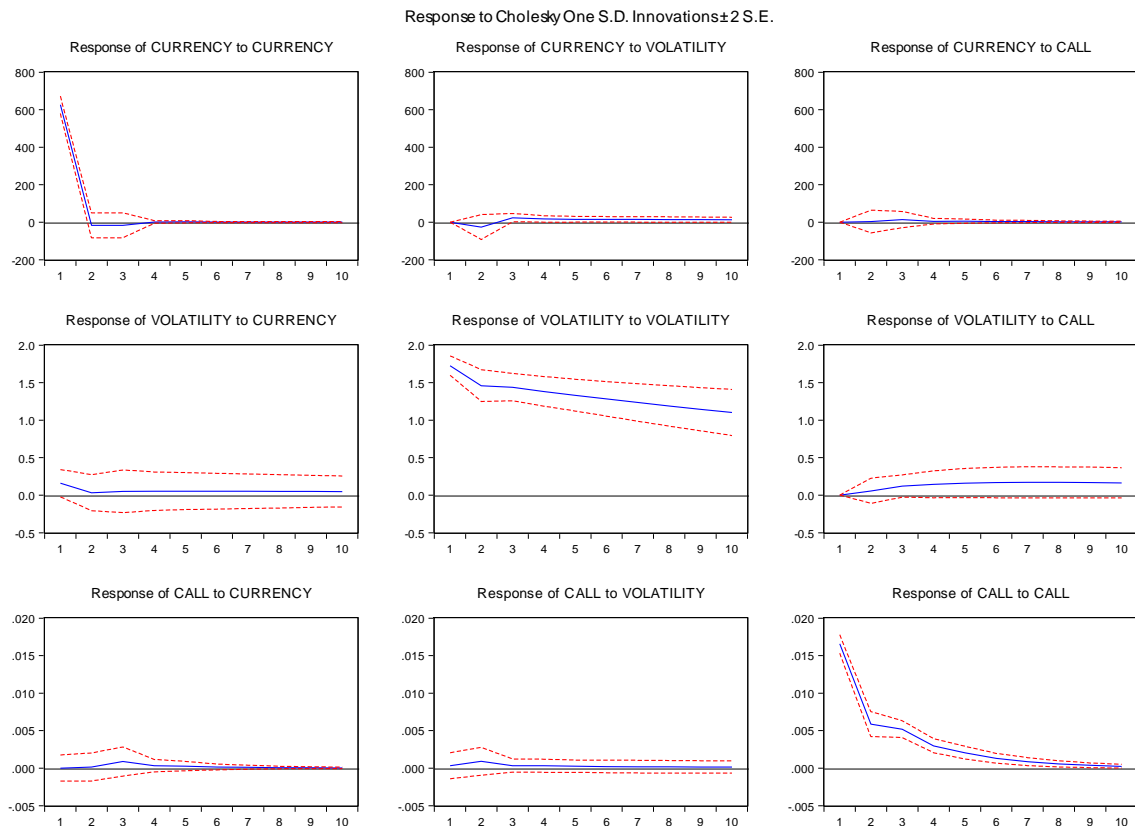


Table 4b. Regression analyses for impulse regression: 2008.12-2010.10

	CURRENCY	VOLATILITY	CALL
CURRENCY(-1)	-0.02 (0.02) [-0.80]	8.14E-05 (9.9E-05) [0.82]	1.14E-06 (5.9E-07) [1.94]
CURRENCY(-2)	-0.009 (0.02) [-0.35]	0.0001 (9.9E-05) [1.47]	1.59E-07 (5.9E-07) [0.26]
VOLATILITY(-1)	-2.52 (7.62) [-0.33]	0.87 (0.02) [31.85]	-0.0001 (0.0001) [-0.91]
VOLATILITY(-2)	5.71 (7.61) [0.75]	0.09 (0.02739) [3.64]	0.0001 (0.0001) [0.98]
CALL(-1)	-501.81 (1248.64) [-0.40]	1.41 (4.48) [0.31]	0.68 (0.02) [25.47]
CALL(-2)	674.34 (1219.93) [0.55]	-0.160 (4.38) [-0.03]	0.25 (0.02) [9.83]
C	-91.04 (41.06)	0.58 (0.14)	0.0001 (0.0008)

	[-2.21]	[3.96]	[0.11]
Adj. R-squared	-0.0008	0.94	0.91
F-statistic	0.80	3809.37	2404.23

Note. () are standard errors and [] are t-statistics.

Table 1b. Regression analyses for impulse regression.

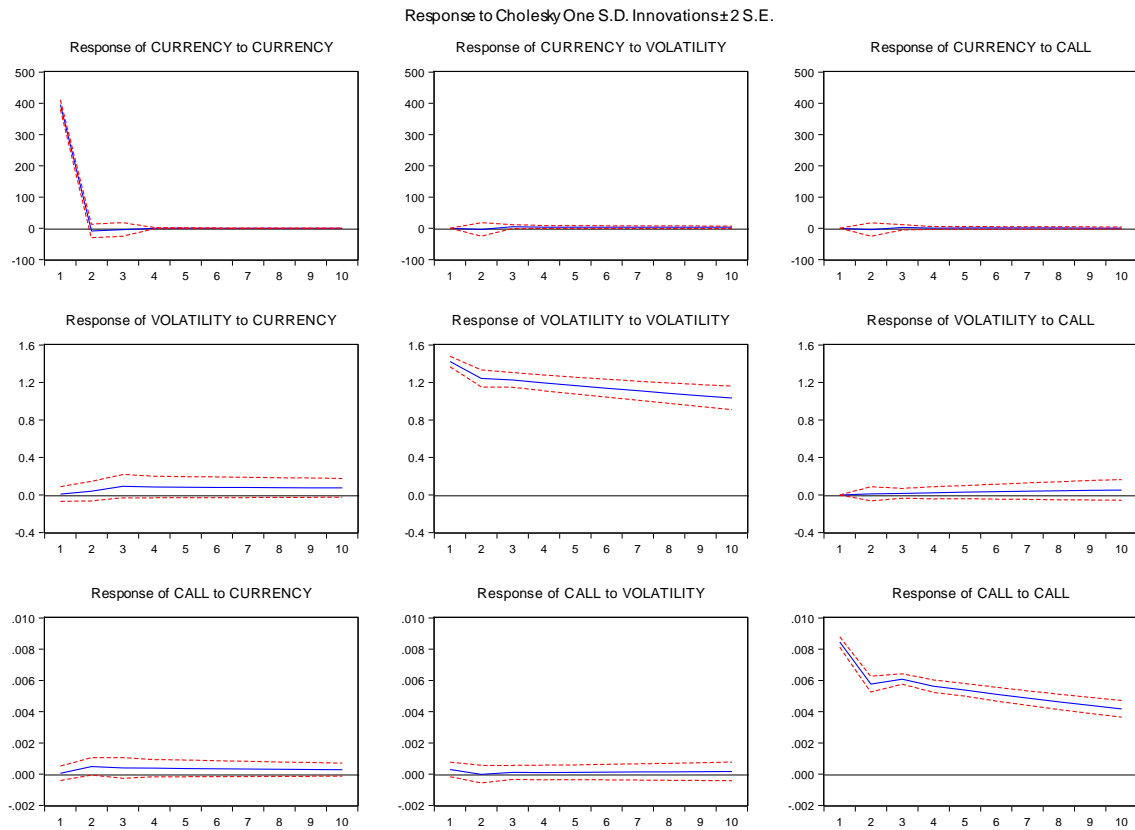


Table 4c. Regression analyses for impulse regression: 2013.4-2016.1

	CURRENCY	VOLATILITY	CALL
CURRENCY(-1)	-0.004 (0.03) [-0.11]	2.25E-05 (0.0001) [0.16]	-3.25E-07 (4.8E-07) [-0.67]
CURRENCY(-2)	-0.03 (0.03) [-0.80]	6.96E-05 (0.0001) [0.50]	-4.92E-07 (4.8E-07) [-1.02]
VOLATILITY(-1)	16.57 (11.37) [1.45]	0.89 (0.03) [22.72]	-0.0001 (0.0001) [-1.33]
VOLATILITY(-2)	-10.40 (11.39) [-0.91]	0.06 (0.03) [1.69]	0.0001 (0.0001) [0.72]
CALL(-1)	3143.18 (3086.33) [1.01]	-1.76 (10.70) [-0.16]	0.53 (0.03) [14.27]
CALL(-2)	-2256.33 (3091.87) [-0.72]	-5.16 (10.72) [-0.48]	0.32 (0.03) [8.56]
C	-269.70 (210.44)	1.43 (0.73)	0.01 (0.002)

	[-1.28]	[1.97]	[5.37]
Adj. R-squared	0.0008	0.93	0.70
F-statistic	1.08	1526.81	258.15

Note. () are standard errors and [] are t-statistics.

Table 1c. Regression analyses for impulse regression.

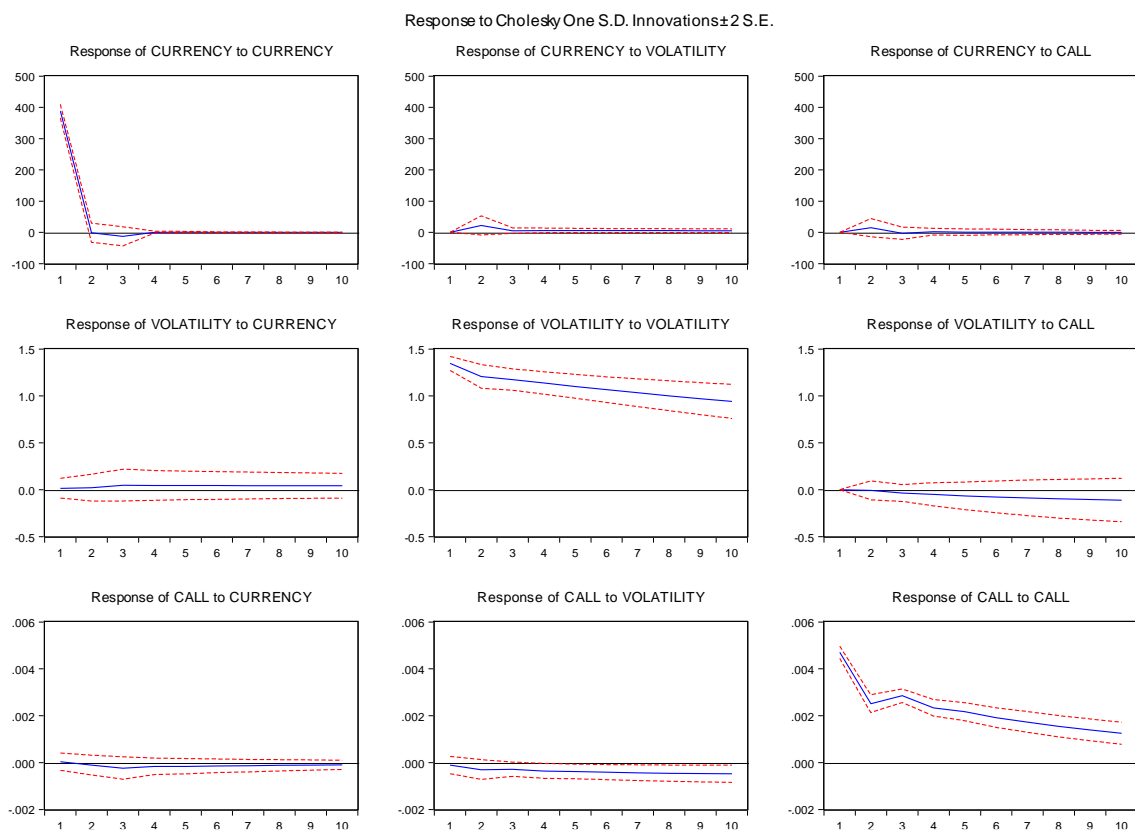


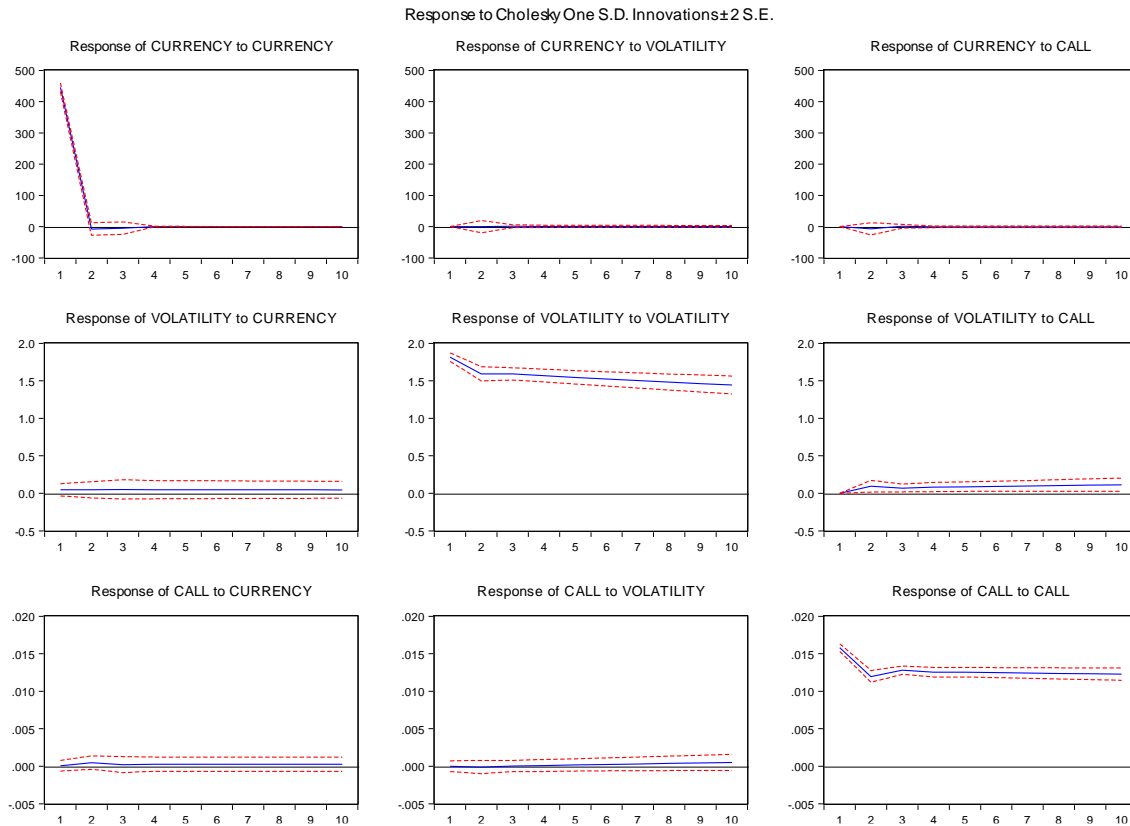
Table 4d. Regression analyses for impulse regression: 2016.1-2017.7

	CURRENCY	VOLATILITY	CALL
CURRENCY(-1)	-0.01 (0.02) [-0.80]	1.05E-05 (9.1E-05) [0.11]	9.51E-07 (7.9E-07) [1.19]
CURRENCY(-2)	-0.01 (0.02) [-0.52]	7.81E-06 (9.1E-05) [0.08]	-3.37E-07 (7.9E-07) [-0.42]
VOLATILITY(-1)	-0.18 (5.46) [-0.03]	0.87 (0.02) [39.45]	-6.20E-05 (0.0001) [-0.31]
VOLATILITY(-2)	0.72 (5.46) [0.13]	0.10 (0.02) [4.79]	0.0001 (0.0001) [0.60]
CALL(-1)	-464.71 (613.16) [-0.75]	5.93 (2.49) [2.37]	0.75 (0.02) [34.77]
CALL(-2)	421.09 (615.72) [0.68]	-5.31 (2.50) [-2.12]	0.23 (0.02) [10.92]
C	-34.21	0.37	-0.0008

	(27.35)	(0.11)	(0.0009)
	[-1.25]	[3.35]	[-0.88]
Adj. R-squared	-0.002	0.97	0.98
F-statistic	0.29	12539.14	18689.22

Note. () are standard errors and [] are t-statistics.

Table 1d. Regression analyses for impulse regression.



The results seem as expected from equations (1) and (2), but the effect of market volatility shock continues for some time. In conduction of monetary policies, policy makers might have to consider it.

4. Conclusions

This paper examines changes in cash holdings in Japanese recent cases, namely, under low or zero interest rates eras. The empirical results show some important things. In general, both short-

and long-term interest rates have still impacts on currency holdings. There is some possibility that markets seem a little bit unstable. On the other hand, stock prices and exchange rates are not significantly associated with currency holdings although CB is significantly related with currency holdings in some periods. Low or almost no interest rates do not cause capital movements into risky assets such as stocks immediately. Market participants would accept the BOJ's policy changes in a calm manner.

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References

- Abushammala, S. N. M., & Sulaiman, J. (2014). Impact of macroeconomic performance on corporate cash holdings: Some evidence from Jordan. *Asian Economic and Financial Review*, 4(10), 1363-1377.
- Acharya, V., Davydenko, S. A., & Strebulaev, I. A. (2012). Cash holdings and credit risk. *Review of Financial Studies*, 25(12), 3572-3609.
- Agarwal, V., Mullally, K. A., Tang, Y., & Yang, B. (2015). Mandatory portfolio disclosure, stock liquidity, and mutual fund performance. *Journal of Finance*, 70(6), 2733-2776.
- Ali, S., Liu, B., & Su, J. J. (2016). What determines stock liquidity in Australia? *Applied Economics*, 48(34-36), 3329-3344.
- Al-Najjar, B., & Clark, E. (2017). Corporate governance and cash holdings in MENA: Evidence from internal and external governance practices. *Research in International Business and Finance*, 39, 1-12.
- Attig, N., El, G. S., Guedhami, O., & Rizeanu, S. (2013). The governance role of multiple large shareholders: Evidence from the valuation of cash holdings. *Journal of Management and Governance*, 17(2), 419-451. doi:<http://dx.doi.org/10.1007/s10997-001-9184-3>
- Bernanke, B. S. (1983). Nonmonetary effects of the financial crisis in the propagation of the great depression. *American Economic Review*, 73(3), 257-276.
- Bloom, N., Bond, S., & van Reenen, J. (2007). Uncertainty and investment dynamics. *Review of Economic Studies*, 74(2), 391-418.

- Booth, L., Ntantamis, C., & Zhou, J. (2015). Financial constraints, R&D investment, and the value of cash holdings. *Quarterly Journal of Finance*, 5(4), 1-24.
- Boubaker, S., Derouiche, I., & Nguyen, D. C. (2014). Does the board of directors affect cash holdings? A study of French listed firms. *Journal of Management and Governance*, 19(2), 341-370. doi:<http://dx.doi.org/10.1007/s10997-013-9261-x>
- Brick, I. E., & Liao, R. C. (2016). The joint determinants of cash holdings and debt maturity: The case for financial constraints. *Review of Quantitative Finance and Accounting*, 48(3), 597-641.
- Chan, K., Kang, E., & Li, Y. (2014). Local long-term institutions, growth and cash holdings. *Applied Economics Letters*, 21(4-6), 387-390.
- Chen, Y., Dou, P. Y., Rhee, S. G., Truong, C., & Veeraraghavan, M. (2015). National culture and corporate cash holdings around the world. *Journal of Banking and Finance*, 50, 1-18. doi:<http://dx.doi.org/10.1016/j.jbankfin.2014.09.018>
- Chen, Y., Murgulov, Z., Rhee, S. G., & Veeraraghavan, M. (2016). Religious beliefs and local government financing, investment, and cash holding decisions. *Journal of Empirical Finance*, 38, 256-271. doi:<http://dx.doi.org/10.1016/j.jempfin.2016.07.009>
- Chi, J., & Su, X. (2016). Product market threats and the value of corporate cash holdings. *Financial Management*, 45(3), 705-735.
- Chiu, W.-C., Wang, C.-W., & Pena, J. I. (2016). Tail risk spillovers and corporate cash holdings. *Journal of Multinational Financial Management*, 36, 30-48.
- Chung, K. H., Kim, J.-S., Park, K., & Sung, T. (2012). Corporate governance, legal system, and stock market liquidity: Evidence around the world. *Asia-Pacific Journal of Financial Studies*, 41(6), 686-703.
- Denis, D. J., & Sibilkov, V. (2010). Financial constraints, investment, and the value of cash holdings. *Review of Financial Studies*, 23(1), 247-269.
- Dittmar, A., & Mahrt-Smith, J. (2007) Corporate governance and the value of cash holdings. *Journal of Financial Studies*, 83(3), 599-634.
- Dudley, E., & Zhang, N. (2016). Trust and corporate cash holdings. *Journal of Corporate Finance*, 41, 363-387.

Duran, R. F., Lozano, M. B., & Yaman, S. (2016). Is family control relevant for corporate cash holding policy? *Journal of Business and Accounting*, 43(9-10), 1325-1360.

Faulkender, M., & Wang, R. (2006). Corporate financial policy and the value of cash. *Journal of Finance*, 61(4), 1957-1990.

Gleason, K.C., Greiner, A. J., & Kanna, Y. H. (2017). Auditor pricing of excess cash holdings. *Journal of Accounting, Auditing, & Finance*, 32(3), 423-443. doi:10.1177/0148558X15617396.

Glosten, J., & Milgraom, P. R. (1985). Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. *Journal of Financial Economics*, 14(1), 71–100.

Graham, J. R., Koski, J. L., & Lowenstein, U. (2006). Information flow and liquidity around the anticipated and unanticipated dividend announcements. *Journal of Business*, 79(5), 2301–2336.

Han, S., & Qju, J. (2007). Corporate precautionary cash holdings. *Journal of Corporate Finance*, 13(1), 43-57.

He, P. W., & Lepone, A. (2016). The impact of CSI 300 index futures introduction on underlying stock liquidity. *Review of Futures Markets*, 22(2), 7–23.

He, Z., & Wintoki, M. B. (2016). The cost of innovation: R&D and high cash holdings in U.S. firms. *Journal of Corporate Finance*, 41, 280-303.

Horioka, C. Y., & Terada-Hagiwara, A. (2014). Corporate cash holding in Asia. *Asian Economic Journal*, 28(4), 323-345.

Hsu, W.-E., Huang, Y., & Lai, G. (2015). Corporate governance and cash holdings: Evidence from the U.S. property-liquidity insurance industry. *Journal of Risk, and Insurance*, 82(3), 715-748.

Huang, C.-L., Chen, W.-J., & Lu, K.-C. (2016). Can the audit committee provide better oversight of listed companies? – An efficiency of cash holdings perspective. *Asian Journal of Finance and Accounting*, 8(1), 100-126.

Im, H. J., Park, H., & Zhao, G. (2017). Uncertainty and the value of cash holdings. *Economics Letters*, 155, 43-48. doi:http://dx.doi.org.10.1016/j.econlet.2017.03.005

Iskandar-Datta, M. E., & Jia, Y. (2014). Investor protection and corporate cash holdings around the world: new evidence. *Review of Quantitative Finance and Accounting*, 43(2), 245-273.

Jain, P., Jiang, C., & Mekhaimer, M. (2016). Executives' horizon, internal governance and stock market liquidity. *Journal of Corporate Finance*, 40, 1–23.

Kato, K., Li, M., & Skinner, D. J. (2017). Is Japan really a 'buy'? The corporate governance, cash holdings and economic performance of Japanese companies. *Journal of Business Finance and Accounting*, 44(3-4), 480-523.

Komain, J. (2012). Linkages between Thai stock and foreign exchange markets under the floating regime. *Journal of Financial Economic Policy*, 4(4), 305–319.

Lee, C., & Park, H. (2016). Financial constraints, board governance standards, and corporate cash holdings. *Review of Financial Economics*, 28, 21-34. doi:<http://dx.doi.org/10.1016/j.rfe.2015.10.001>

Lyandres, E., & Palazzo, B. (2016). Cash holdings, competition, and innovation. *Journal of Financial and Quantitative Analysis*, 51(6), 1823-1861.

Martinez-Sola, C., Garcia-Teruel, P. J., & Martinez-Solano, P. (2013). Corporate cash holding and firm value. *Applied Economics*, 45(1-3), 161-170.

Neamtiu, M., Shroff, N., White, H. D., & Williams, C. D. (2014). The impact of ambiguity on managerial investment and cash holdings. *Journal of Business Finance and Accounting*, 41(7-8), 1071-1099.

Nguyen, T. L. H., Nguyen, L. N. T., & Le, T. P. V. (2016). Firm value, corporate cash holdings and financial constraint: A study from a developing market. *Australian Economic Papers*, 55(4), 368-385.

Qiu, J., & Wan, C. (2015). Technology spillovers and corporate cash holdings. *Journal of Financial Economics*, 115(3), 558-573. doi:<http://dx.doi.org/10.1016/j.jfineco.2014.10.005>

Riordan, R., Storkernmaier, A., Wagener, M., & Zhang, S. S. (2013). Public information arrival: Price discovery and liquidity in electronic limit order markets. *Journal of Banking and Finance*, 37(4), 1148–1159.

Saeed, A., Belghitar, Y., Clark, E. (2014). Theoretical motives of corporate cash holdings and political connections: Firms level evidence from a developing economy. *International Review of Applied Economics*, 28(6), 813-831.

Sasaki, T. (2015). The effects of liquidity shocks on corporate investments and cash holdings: Evidence from actuarial pension gains/losses. *Financial Management*, 44(3), 685-707.

Shah, H. A., & Shah, A. (2016). The relationship between judicial efficiency and corporate cash holdings: An international study. *Economic Modelling*, 59, 448-462.

Tong, Z. (2014). Deviations from optimal corporate cash holdings and the valuation from a shareholder's perspective. *Applied Economics*, 46(28-30), 3695-3707.

Uvar, A. & Kuzey, C. (2014). Determinants of corporate cash holdings: Evidence from the emerging market of Turkey. *Applied Economics*, 46(7-9), 1035-1048.

Wang, Q., & Zhang, J. (2015). Individual investor trading and stock liquidity. *Review of Quantitative Finance and Accounting*, 45(3), 485–508.

Xu, N., Chen, Q., Xu, Y., & Chan, K. C. (2016). Political uncertainty and cash holdings: Evidence from China. *Journal of Corporate Finance*, 40, 276-295. doi:<http://dx.doi.org/10.1016/j.jcorpfin.2016.08.007>

Yu, H. C., Sopranzetti, B. J., & Lee, C. F. (2015). The impact of banking relationships, managerial incentives, and board monitoring on corporate cash holdings: An emerging market perspective. *Review of Quantitative Finance and Accounting*, 44(2), 353-376. doi:<http://dx.doi.org/10.1007/s11156-013-0402-8>