Economics Bulletin

Volume 36, Issue 1

Momentum trading behavior in the FX market: Evidence from Japanese retail investors

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Abstract

This article explores behaviors of emerging players in the foreign exchange markets, retail investors in Japan. We find that they are momentum traders, implying that their actions could have a destabilizing effect in the markets. We also present the fact that the portfolio formation is mainly driven by past returns from spot rate changes, not interest rate differentials. Examining asymmetries in their behaviors shows that momentum tradings are relatively stronger particularly for sells after the global financial crisis occurred.

We would like to thank seminar participants at Osaka University and Japanese Economic Association for their helpful comments on an earlier version of this paper. We also thank an anonymous referee for valuable comments and suggestions. The views expressed herein are those of the author and do not reflect those of the Bank of Japan, which does not accept any responsibility for the contents and opinions expressed in this paper.

Citation: Maiko Koga, (2016) "Momentum trading behavior in the FX market: Evidence from Japanese retail investors", *Economics Bulletin*, Volume 36, Issue 1, pages 92-96

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Submitted: July 05, 2015. **Published:** February 04, 2016.

1. Introduction

While the foreign exchange (FX) transactions were dominated by traders of financial institutions and asset managers over the years, the rise of retail investors has become remarkable recently (Rime and Schrimpf (2013)). In this paper, we attempt to explore behaviors of these new players in the FX markets using the daily position data in Japan, where we observe the largest retail spot trading in the world. Our paper adds a new finding to the FX literature in which there are few analyses for retail investors (A notable exception is Nolte and Nolte (2016)), while plentiful studies exist for the stock markets..

Another aim of this paper is to study momentum strategies that are not simulated, but are employed in reality in the FX markets. The studies on momentum trading in the FX markets have advanced mostly through testing its profitability based on simulation (Okunev and White (2003), Menkhoff *et al.* (2012), and Raza *et al.* (2014) among others). Aggregate position data of retail investors allows us to study the strategies actually taken in the FX markets. This analysis is to the best of our knowledge the first attempt in the literature.

We apply the method of Grinblatt *et al.* (1995) to the FX markets. Their framework has been utilized in empirical works on various investors including US institutional investors in stocks (Badrinath and Wahal (2002)), US investors in foreign equity portfolios (Curcuru *et al.* (2011)), and Dutch institutional investors (de Haan and Kakes (2011)).

In this paper, we find that retail investors in Japan are momentum traders in a short-term horizon and their portfolio formation is mainly driven by past returns from spot rate changes, not interest rate differentials. This evidence is generally consistent with the past studies that present different properties between momentum and carry trade strategies (Menkhoff *et al.* (2012) and Raza *et al.* (2014)). We also check asymmetries in their behaviors, and we find that relatively stronger momentum tradings are observed particularly for sells, which counters the results in the earlier studies (Grinblatt *et al.* (1995), Badrinath and Wahal (2002), and Curcuru *et al.* (2011)), after the global financial crisis.

2. Empirical Methodology and Data

We examine what strategies are adopted on average by testing the sign of the momentum measure following Grinblatt *et al.* (1995) and others. We assume that the investors construct their portfolios based on the lagged returns over the previous l days and these portfolios are held for h days. We consider look-back (l) and holding (h) periods of 1, 2, 3, 5, and 10 days, because the retail investors in Japan are noted for trading in a very short horizon. Momentum measure is written as follows:

$$MOM_{l,h} = \frac{1}{T}\Sigma_{t=1}^{T}\Sigma_{k=1}^{K} R_{k,t,l}(X_{k,t+h} - X_{k,t}\frac{P_{k,t+h}}{P_{k,t}}). \tag{1}$$

$R_{k,t,l}$ is the daily average return on investing foreign currency k from period $t-l$ to t. The returns are the sum of base currency returns (appreciation or depreciation of foreign currency against Japanese Yen (JPY)) and interest differentials between foreign country and Japan[1], and is divided by l. $X_{k,t}$ is the value of portfolio k at time t[2]. It is

[1] We do not deal with the transaction costs involved with swapping currency pairs, since bid-ask spreads available for the Japanese retail investors are so narrow that the investors do not generally consider them as a cost.

[2] We use the value of each currency portfolio instead of calculating its weight. While the weight only captures the deviation from average portfolio changes, the change in values reflects all transactions.

corrected for valuational changes by multiplying the change in exchange rate $P_{k,t}$, which denotes unit of foreign currency k per JPY at time t, and divided by h. The momentum measure is the weighted average across K currency portfolios and throughout time T. A significantly positive $MOM_{l,h}$ measure describes the investors taking a momentum trading strategy, while a significantly negative value is the opposite, evidence of a contrarian trading strategy.

Our dataset consists of daily returns and portfolios of retail investors' foreign exchange transactions and is obtained from the Tokyo Financial Exchange. The investment currencies are nine tradable currencies in the Exchange; US Dollar, Euro, British Pound, Swiss Franc, Australian Dollar, New Zealand Dollar, Canadian Dollar, Swedish Krona and Norwegian Krone[3]. The funding currency is JPY. In calculating the returns from the interest differentials, we use the data on returns that are actually paid to investors in proportion to the interest differentials when they hold their positions overnight. The changes in portfolios are calculated by subtracting long positions (buy and hold positions) from short positions (sell positions)[4]. Due to the availability of the data, our dataset covers the period from July 2006 to September 2011.

3. Results

Table I summarizes the results for momentum measures for various look-back and holding periods[5]. We find statistically significant positive momentum index for many cases, implying that Japanese retail investors are likely to behave as momentum traders. It is evident especially within shorter horizons. When we compare the momentum measures for total returns and base currency returns, the main results almost coincide between the two, suggesting that base currency returns mostly affect the investing behavior. Although the trading using JPY as the funding currency is noted for taking advantage of what we call carry trade return, and 84% of the daily returns in our dataset involve positive gain from interest differentials, our evidence shows that the trading is not driven by the carry returns in the framework we consider. Considering the property of each return, Japanese retail investors presumably pursue profit opportunity of volatile currency returns and do not just buy and hold high interest currency to search for stable carry returns. This is in line with the earlier studies that show different properties of returns and portfolios between the momentum trade and carry trade (Menkhoff *et al.* (2012) and Raza *et al.* (2014)).

We carry out a subsample analysis by dividing the sample periods into the subperiods before (period 1) and after (period 2) the global financial crisis across which the level of returns lowered[6]. The results corroborate the robustness of our main results (Table II).

We next check the symmetry of the measures by presenting separate momentum measures in buy momentum ($X_{k,t+h} - X_{k,t} > 0$) and in sell momentum ($X_{k,t+h} - X_{k,t} < 0$) for the two subperiods, respectively. In the result for period 1, there are several cases in which momentum measures are significant only for buys, implying that their momentum behaviors are pronounced in purchasing a well-performed portfolio (Table III, Panel A). We also find that the momentum measures in period 2 are larger for sells than for buys (Table

[3]The data for transactions with Swedish Krona and Norwegian Krone started in October 2008.

[4]Our paper deals with potential gain or loss by the investors. In actual transactions, the investors do not realize capital gain or loss unless they settle their transactions.

[5]As we use overlapping data that helps to increase the power of test, we calculate Newey-West standard errors to detect their significance.

[6]The results in this section remain to hold when we omit from period 2 the sample severely affected by the financial crisis in the late 2008.

III, Panel B)[7]. This suggests that they were willing to realize capital loss by selling the devaluating assets to prevent additional loss, once they faced the crisis. Our finding that momentum reactions are evident in sells counters the results in earlier studies that present the investors are inclined to take contrarian behaviors especially for sells (Grinblatt *et al.* (1995), Badrinath and Wahal (2002), and Curcuru *et al.* (2011)). Such difference may reflect a more risk averse attitude of retail investors compared to institutional investors.

Table I: Momentum Measure for Two Types of Return

	Total Return					Base Currency Return				
horizon l	1 day	2 days	3 days	5 days	10 days	1 day	2 days	3 days	5 days	10 days
horizon h										
1 day	4.22‡	3.78‡	3.34‡	2.98‡	1.90‡	4.23‡	3.78‡	3.33‡	2.97‡	1.89‡
	(5.16)	(6.07)	(6.56)	(6.87)	(6.98)	(5.15)	(6.04)	(6.52)	(6.81)	(6.93)
2 days	3.78‡	3.34‡	3.07‡	2.65‡	1.82‡	3.77‡	3.33‡	3.06‡	2.64‡	1.81‡
	(6.13)	(6.51)	(6.85)	(7.08)	(7.23)	(6.11)	(6.47)	(6.79)	(7.01)	(7.19)
3 days	3.34‡	3.08‡	2.86‡	2.36‡	1.68‡	3.33‡	3.06‡	2.85‡	2.35‡	1.67‡
	(6.46)	(6.85)	(7.30)	(7.21)	(7.33)	(6.42)	(6.79)	(7.24)	(7.15)	(7.29)
5 days	2.98‡	2.66‡	2.36‡	1.97‡	1.42‡	2.97‡	2.65‡	2.35‡	1.96‡	1.41‡
	(7.09)	(7.31)	(7.37)	(7.52)	(7.26)	(7.03)	(7.25)	(7.31)	(7.45)	(7.22)
10 days	1.89‡	1.81‡	1.68‡	1.42‡	1.11‡	1.88‡	1.80‡	1.67‡	1.41‡	1.10‡
	(6.74)	(6.93)	(7.02)	(7.02)	(7.14)	(6.69)	(6.88)	(6.98)	(6.98)	(7.10)

Notes: ‡ denotes significance at the 5% levels.

Numbers in brackets are t-statistics based on Newey-West standard errors.

Table II: Momentum Measure for Total Return: Subsample Results

	Period 1					Period 2				
horizon l	1 day	2 days	3 days	5 days	10 days	1 day	2 days	3 days	5 days	10 days
horizon h										
1 day	4.99‡	2.94‡	2.80‡	2.95‡	1.43‡	3.69‡	4.37‡	3.72‡	3.01‡	2.22‡
	(4.05)	(3.12)	(3.68)	(4.36)	(4.48)	(3.39)	(5.29)	(5.45)	(5.33)	(5.53)
2 days	2.97‡	2.33‡	2.44‡	2.43‡	1.21‡	4.35‡	4.05‡	3.51‡	2.81‡	2.24‡
	(3.26)	(3.28)	(3.99)	(4.64)	(4.61)	(5.23)	(5.65)	(5.57)	(5.41)	(5.84)
3 days	2.81‡	2.43‡	2.60‡	2.25‡	1.12‡	3.71‡	3.53‡	3.05‡	2.43‡	2.07‡
	(3.91)	(4.20)	(4.79)	(5.14)	(4.75)	(5.16)	(5.45)	(5.57)	(5.27)	(5.89)
5 days	2.97‡	2.43‡	2.25‡	1.78‡	1.00‡	2.99‡	2.82‡	2.43‡	2.10‡	1.71‡
	(4.73)	(4.82)	(5.19)	(5.52)	(4.85)	(5.34)	(5.58)	(5.41)	(5.50)	(5.75)
10 days	1.48‡	1.24‡	1.16‡	1.03‡	0.85‡	2.18‡	2.21‡	2.05‡	1.69‡	1.28‡
	(4.50)	(4.48)	(4.59)	(4.76)	(4.59)	(5.28)	(5.57)	(5.62)	(5.53)	(5.65)

Notes: ‡ denotes significance at the 5% levels.

Numbers in brackets are t-statistics based on Newey-West standard errors.

[7]We detect a significant mean difference between buys and sells at the 5% level.

Table III: Momentum Measure for Total Return: Buys and Sells

horizon l	1 day		2 days		3 days		5 days		10 days	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
Panel A: Period 1										
horizon h										
1 day	2.39‡	2.59‡	1.58‡	1.35	1.61‡	1.18	1.73‡	1.22†	1.29‡	0.14
	(3.74)	(2.41)	(3.20)	(1.46)	(3.50)	(1.55)	(3.93)	(1.74)	(3.00)	(0.33)
2 days	1.53‡	1.44†	1.24‡	1.09	1.31‡	1.12†	1.36‡	1.07‡	1.02‡	0.19
	(3.25)	(1.70)	(3.15)	(1.63)	(3.61)	(1.91)	(4.09)	(2.16)	(3.24)	(0.72)
3 days	1.50‡	1.31‡	1.29‡	1.14‡	1.40‡	1.20‡	1.29‡	0.96‡	0.92‡	0.21
	(4.01)	(2.05)	(3.98)	(2.17)	(4.57)	(2.44)	(4.60)	(2.58)	(3.50)	(0.97)
5 days	1.37‡	1.60‡	1.21‡	1.22‡	1.17‡	1.08‡	1.01‡	0.77‡	0.74‡	0.26
	(4.85)	(2.83)	(4.55)	(2.80)	(4.65)	(2.97)	(4.44)	(2.96)	(3.61)	(1.58)
10 days	0.81‡	0.67‡	0.73‡	0.51‡	0.69‡	0.46‡	0.66‡	0.37‡	0.55‡	0.30‡
	(4.00)	(2.64)	(3.83)	(2.53)	(3.79)	(2.63)	(3.76)	(2.58)	(3.88)	(1.99)
Panel B: Period 2										
horizon h										
1 day	0.92	2.78‡	1.34‡	3.03‡	1.13‡	2.60‡	0.90‡	2.11‡	0.68†	1.55‡
	(1.22)	(3.11)	(2.50)	(3.79)	(2.33)	(3.68)	(2.10)	(3.42)	(1.68)	(3.22)
2 days	1.65‡	2.70‡	1.50‡	2.54‡	1.28‡	2.24‡	1.02‡	1.79‡	0.82‡	1.42‡
	(3.49)	(3.69)	(3.73)	(3.89)	(3.40)	(3.90)	(3.12)	(3.64)	(2.75)	(3.91)
3 days	1.41‡	2.30‡	1.30‡	2.23‡	1.12‡	1.93‡	0.89‡	1.54‡	0.81‡	1.26‡
	(3.67)	(3.71)	(3.75)	(3.97)	(3.59)	(3.98)	(3.24)	(3.70)	(3.12)	(4.17)
5 days	1.11‡	1.88‡	1.08‡	1.73‡	0.94‡	1.50‡	0.84‡	1.26‡	0.73‡	0.98‡
	(3.80)	(3.96)	(4.06)	(4.03)	(3.69)	(3.87)	(3.52)	(3.94)	(3.28)	(4.23)
10 days	0.85‡	1.33‡	0.88‡	1.33‡	0.84‡	1.21‡	0.72‡	0.97‡	0.59‡	0.69‡
	(3.63)	(4.12)	(3.84)	(4.39)	(3.75)	(4.41)	(3.57)	(4.20)	(3.49)	(4.19)

Notes: † and ‡ denote significance at the 10% and 5% levels, respectively.
Numbers in brackets are t-statistics based on Newey-West standard errors.

4. Conclusion

In this paper, we analyze the behavior of retail traders using the daily position data in Japan. We provide evidence that they take momentum trading strategies, suggesting that their emergence could have a destabilizing effect on the FX markets. Comparing the momentum measures using the total returns and the base currency returns shows us that the investors do not just buy and hold high interest currencies and pursue profit from the currency return changes. We also find that their momentum behaviors exhibit some asymmetries. Unlike the earlier studies, we find the investors are inclined to take momentum behavior especially for sells after the global financial occurred, which may suggest that retail investors are more risk averse than other types of investors. The interpretation of our findings may be discussed in the context of a behavioral bias. For example, Nolte (2012) explored the retail investors' disposition effect, the tendency that investors hold losing asset positions longer than corresponding winning asset positions, which seems to be a counter fact to our findings. We shed light on the fact, and analyzing the mechanism remains for future studies.

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