Evaporating Liquidity - Replication Report

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1 Introduction

This project replicates Table 1 and 2 in Evaporating Liquidity[Nagel(2012)]. The author shows that the returns of short-term reversal strategies are generated by liquidity provision, and therefore are highly predictable by the VIX index. The author also found that reversal strategies on not only individual stocks but also industry portfolios produce high returns, especially during periods of high VIX.

The author constructs the reversal strategy by averaging the returns of five substrategies that weight stocks (or industries) proportional to the negative of market-adjusted returns on days $t-1$ to $t-5$.

$$w_{it}^R = -\left(\frac{1}{2}\sum_{i=1}^{N}|R_{it-1} - R_{mt-1}|\right)^{-1}(R_{it-1} - R_{mt-1}), \tag{1}$$

where $R_{mt-1} = \frac{1}{N}\sum_{i=1}^{N} R_{it-1}$ is the equal-weighted market return. Table 1 reports the summary statistics of the reversal strategies on individual stocks and industry portfolios. For individual stocks, the returns are calculated based on end-of-day transaction prices and quote midpoints.

Table 2 reports the results of the following predictive regression

$$L_t^R = a + bVIX_{t-5} + c'g_{t-5} + e_t, \tag{2}$$

where L_t^R is the return of the reversal strategy. VIX_{t-5} is the VIX index lagged by 5 days, divided by $\sqrt{250}$. g_{t-5} is a vector of control variables, including pre-decimalization dummy (takes a value of one prior to April 9, 2001 and a value of zero thereafter) and market return.

This project replicates these two tables using the same sample range as the original paper (from January 1998 to December 2010). We also provide the updated tables using data from January 1998 to December 2023.

2 Data Description

3 Replicated and updated results

Table 1: Summary Statistics of Reversal Strategy Returns

Table 1: Summary Statistics of Reversal Strategy Returns (Replicated)

Table 1: Summary Statistics of Reversal Strategy Returns (Updated)

Table 2: Predicting Reversal Strategy Returns with VIX

Original Table 2 from the paper.

	Individual stocks Transaction-price returns				Individual stocks Quote-midpoint returns				Industry portfolios			
	Daily		Monthly		Daily		Monthly		Daily		Monthly	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	-0.03	-0.05	-0.02	0.02	-0.06	-0.07	-0.04	-0.01	-0.08	-0.09	-0.06	-0.05
	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
VIX	0.22	0.20	0.18	0.15	0.16	0.16	0.13	0.10	0.07	0.07	0.05	0.04
	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Pre-decim.		0.22	0.22	0.23		0.08	0.09	0.09		0.00	0.01	0.01
		(0.03)	(0.03)	(0.03)		(0.03)	(0.03)	(0.03)		(0.02)	(0.02)	(0.02)
R_M			-0.60	-0.03			-0.59	-0.16			-0.42	-0.05
			(0.19)	(0.26)			(0.21)	(0.28)			(0.17)	(0.16)
Adj. R^2	0.07	0.11	0.11	0.56	0.03	0.03	0.04	0.25	0.01	0.01	0.01	0.07

Table 2: Predicting Reversal Strategy Returns with VIX (Replicated)

Replicated Table 2, which uses the same sample range as the original (from January 1998 to December 2010). It has been verified that coefficients of predictor variables in the replicated result have the same sign with the original result. The coefficients of replicated result are within the 99.7% confidence interval of the original result.

	Individual stocks Transaction-price returns				Individual stocks Quote-midpoint returns				Industry portfolios			
	Daily		Monthly		Daily		Monthly		Daily		Monthly	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	-0.06	-0.09	-0.06	-0.01	-0.06	-0.07	-0.03	0.00	-0.10	-0.10	-0.07	-0.04
	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
VIX	0.25	0.23	0.21	0.18	0.18	0.17	0.14	0.11	0.08	0.08	0.06	0.04
	(0.02)	(0.02)	(0.02)	(0.01)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Pre-decim.		0.23	0.24	0.25		0.11	0.11	0.12		0.01	0.01	0.02
		(0.03)	(0.03)	(0.03)		(0.03)	(0.03)	(0.03)		(0.02)	(0.02)	(0.02)
R_M			-0.45	0.10			-0.78	-0.28			-0.57	-0.21
			(0.19)	(0.23)			(0.23)	(0.26)			(0.21)	(0.16)
Adj. R^2	0.07	0.10	0.10	0.65	0.02	0.03	0.03	0.27	0.01	0.01	0.01	0.07

Table 2: Predicting Reversal Strategy Returns with VIX (Updated)

Updated Table 2, using data from January 1998 to December 2023. The results are consistent.

	Individual stocks Transaction-price returns				Individual stocks Quote-midpoint returns				Industry portfolios			
	Daily		Monthly		Daily		Monthly		Daily		Monthly	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	-0.08	-0.08	-0.05	-0.01	-0.09	-0.09	-0.06	-0.02	-0.09	-0.09	-0.07	-0.06
	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
VIX	0.24	0.21	0.19	0.15	0.19	0.18	0.17	0.12	0.08	0.08	0.07	0.05
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.01)
Pre-decim.		0.26	0.27	0.28		0.09	0.10	0.12		0.00	0.00	0.01
		(0.03)	(0.03)	(0.03)		(0.03)	(0.03)	(0.03)		(0.02)	(0.02)	(0.02)
R_M			-0.39	0.03			-0.47	-0.04			-0.24	-0.03
			(0.17)	(0.18)			(0.23)	(0.26)			(0.16)	(0.13)
Adj. R^2	0.04	0.05	0.05	0.53	0.02	0.02	0.02	0.19	0.01	0.01	0.01	0.08

References

[Nagel(2012)] Nagel, Stefan. 2012. "Evaporating Liquidity." *The Review of Financial Studies* 25 (7):2005–2039.