Retail Investor Experience, Asset Learning, and Portfolio Risk-adjusted returns

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Forthcoming in the Finance Research Letters

Abstract

It is well documented in the finance literature that retail investors (households) underperform on a risk-adjusted basis when trading in securities markets. More recently, however, there is growing evidence that some retail investors increase risk-adjusted returns from security selection (portfolio concentration). I show that these mixed findings are driven by investor trading experience. Using unique portfolio holdings data of all the 620,970 domestic retail investors on the Oslo Stock Exchange (OSE) from 1993 to 2006, I document that inexperienced investors reduce returns from portfolio concentration. However, as investors gain trading experience their ability to turn portfolio concentration into excess returns improves.

JEL classification: G11, G14, G15

Keywords: Retail investors, Portfolio choice, Portfolio performance

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1. Introduction

It is well documented in the finance literature that retail investors exhibit trading biases that are devastating for portfolio returns; see Odean (1998a), Odean (1998b), and Barber and Odean (2000). More recently, however, it is documented that some retail investors show evidence of security selection ability (skill) as they improve portfolio returns from portfolio concentration; see Ivković, Sialm, and Weisbenner (2008). These newer findings suggest that retail investors might be better off when investing in highly concentrated portfolios.

In this paper, I reconcile these apparent differences by positing that retail investors improve their ability to pick securities as they gain more trading experience.

Investigating this research question has in the past been hampered by the lack of readily available data on retail investor portfolio holdings over time. In this paper, I investigate all the portfolio holdings by domestic retail investors on the OSE from January 1993 to July 2006. In this period, there are 620,970 unique retail investors with a combined 42 million investor-month portfolio holdings.

My main empirical finding is that experienced retail investors improve risk-adjusted returns from portfolio concentration on the OSE. Experienced investors who increase portfolio concentration by one-standard deviation increase annual risk-adjusted returns by +2.4%. This is in stark contrast to inexperienced investors who equivalently reduce annual risk-adjusted returns by -0.53%.

I investigate the relation between portfolio concentration, investor experience, and future risk-adjusted returns following Choi, Fedenia, Skiba, and Sokolyk (2017). I measure portfolio concentration as the investor portfolio weights in deviation from the market value weights. I regress investor monthly portfolio returns on investor portfolio concentration, trading experience, portfolio value, the actual number of investments, traditional risk factors (RM-RF, SMB, HML, MOM), as well as various fixed effects. Any relation between return, portfolio

concentration, and investor experience is in excess of what is expected based on investor size (portfolio value), the actual number of investments, portfolio risk characteristics, and time effects.

I only observe shares held on the OSE. It could be argued that investors hold OSE portfolios as part of well-diversified international portfolios. Treynor and Black (1973) explain that the information ratio can be used to evaluate the performance of one section of a portfolio to an overall diversified portfolio. Following Treynor and Black (1973), I document that a small number of very experienced retail investors are able to generate OSE portfolios that are positive to hold in addition to an overall well diversified portfolio. However, most retail investors are inexperienced and reduce information ratios from portfolio concentration.

I conclude that retail investors gain experience as they trade over time. This experience results in increased information learning that again leads to increased portfolio returns. Gaining experience is, however, very costly.

I contribute to a large area of the literature that investigates investor learning and portfolio formations. Odean (1998a), Odean (1998b), and Barber and Odean (2000) show that retail investors exhibit trading biases that reduce portfolio returns. Ivković et al. (2008) show that retail investors exhibit security picking skill as they improve returns from reducing portfolio diversification (concentrating their portfolios). I contribute by documenting that retail investors improve their portfolio concentrating skills as they gain more trading experience.

2. Related literature and hypothesis development

Traditional portfolio theory suggests that investors optimize risk-adjusted returns by holding the market portfolio; see Markowitz (1952 and 1959) and Tobin (1958). More recent portfolio theory argues that investors can learn about assets and then concentrate investments where they have more information; see Van Nieuwerburgh and Veldkamp (2009 and 2010).

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Empirically Coval and Moskowitz (2001), Kacperczyk, Sialm, Zheng (2005), Choi et al. (2017), and Fjesme (2018) document how institutional investors improve portfolio returns from portfolio concentration. Michaely and Shaw (1994), Hanley and Wilhelm (1995), and Aggarwal, Prabhala, and Puri (2002) document how institutional investors perform better than retail investors when investing in Initial Public Offerings (IPOs). Kramer (2012) also shows that retail investors who obtain help from financial advisors reduce their portfolio concentration. Ivković, Sialm, and Weisbenner (2008), however, document how retail investors can improve portfolio returns from portfolio concentration.

Based on Choi et al. (2017) and Ivković et al. (2008) I expect that retail investors who keep concentrated portfolios on the OSE are better informed (skilled) and therefore earn higher risk-adjusted returns on their portfolios. I formalize this as hypothesis 1.

Hypothesis 1: Portfolio concentration increases risk-adjusted returns for domestic retail investors on the OSE.

Odean (1998a), Odean (1998b), and Barber and Odean (2000) document that retail investors exhibit trading biases such as loss aversion, excessive rebalancing, and overconfidence that are harmful to portfolio returns. Ivković et al. (2008), however, document that some retail investors show trading ability as they increase returns from portfolio concentration. Greenwood and Nagel (2008) show that portfolio managers with more trading experience obtain better portfolio returns by avoiding overpriced securities. If retail investors increase concentration because they improve their security picking skill, I should see that experienced investors have more concentrated portfolios than inexperienced investors. I formalize this as hypothesis 2.

Hypothesis 2: Experienced retail investors have more concentrated stock portfolios than inexperienced retail investors.

If investors increase their security picking skill over time, we should also see that the effect of portfolio concentration on future returns increase with investor experience. I formalize this as hypothesis 3.

Hypothesis 3: Portfolio concentration increases risk-adjusted returns for retail investors with greater trading experience.

3. Institutional setup

The OSE is similar to other US and European exchanges as it is regulated under the European Union directive of financial instruments.[2] The OSE, however, differs from some other exchanges in that companies listing on the OSE must register all shareholdings into the OSE VPS database (the share depository) as part of the listing process. The OSE VPS shareholding registrar is then continually updated with secondary trading. From the OSE VPS I calculate investor portfolio holdings at the beginning of each calendar month and the subsequent monthly portfolio returns. See Fjesme (2016) for a more detailed description of the OSE.

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[2] See the OSE homepage at https://www.oslobors.no/ob_eng/

4. Descriptive statistics

Table 1 list the companies trading on the OSE over the sample period from January 1993 to July 2006.[3]

[Insert Table 1 about here]

All investor-month variables are defined in Table 2. Table 2 Panel A show summary statistics for the main variables. The average *Return, Concentration, Portfolio, N. Companies, and Experience* are 1.127%, 0.935, $23,000 USD, 1.792 companies, and 0.654, respectively. An average *Concentration* of 0.935 means that most investors are highly concentrated. The interpretation is that an investor who places her entire portfolio in one company with a market value weight of 6.5% will have a *Concentration* of 0.935 (1 - 0.935 = 0.065).

[Insert Table 2 about here]

Table 2 Panel B list the correlation matrix of the main variables. The portfolio variables are not very correlated. There is a low negative correlation between *N. Companies* and *Concentration* of -0.278. Panel C show percentile distributions. In total, 90% of monthly *Returns* fall between -14.6% and +18.1%. Only 5% of the investor-month observations have a *Concentration* below 0.736. Most investors have low *Portfolio* and *N. Companies*. *Experience* vary greatly with some investors with no past trading history (*Experience* = 0) and some with complete past trading history (*Experience* = 1).

Tables 3 and 4 shows descriptive statistics at the investor ID level and for the risk factors, respectively.

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[3] The OSE VPS stopped supplying the data at this point.

[Insert Table 3 about here]

[Insert Table 4 about here]

5. Empirical results

5.1 Portfolio concentration and return

Hypothesis 1 predicts that portfolio concentration increases risk-adjusted returns for domestic retail investors on the OSE. In Table 5 I follow Choi et al. (2017) using international data and Fjesme (2019) using Norwegian data and regress *Return* on *Concentration* and controls for every retail investor (i) in every calendar month (t) on the OSE in the period 1993 to 2006 in standard OLS regressions as equation [1].

[1] $Return_{it} = \alpha + \beta_1[Concentration]_{it} + \beta_2[Portfolio]_{it} + \beta_3[N.\ Companies]_{it} + \beta_4[RM\text{-}RF]_t + \beta_5[SMB]_t + \beta_6[HML]_t + \beta_7[MOM]_t + Year\ Fixed\ Effects + e_{it}$

Return is the value weighted investor monthly portfolio return in excess of the risk-free rate during the calendar month. *Concentration* is the investor cumulated absolute monthly company portfolio weights as deviation from the market value weights at the beginning of the calendar month; see Appendix Table A1 for a detailed description of *Concentration*. From Column 1 in Table 5 we see that there is a positive relation between *Return* and *Concentration*. The sample size is naturally very large, so I increase the critical t-values necessary for statistical significance upwards following Leamer (1978) and Kim and Ji (2015).[4]

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[4] Statistical significance at the 1% level is traditionally indicated for t-values greater than ±2.576. With a sample size of 41,798,233 observations, statistical significance at the 1% level is indicated for t-values greater than ±17.548; see Leamer (1978) and Kim and Ji (2015).

[Insert Table 5 about here]

The interpretation is that investors increasing *Concentration* by one-standard deviation will increase *Return* by 0.112% (0.096 * 1.171). This is equivalent to an annual increase in *Return* of 1.35%.

To make sure that the results are not driven by investor size I include the investor portfolio value (*Portfolio*) in all regressions. As I investigate many retail investors who keep single company portfolios, I also include the actual number of investments as a control (*N. Companies*). There is a positive relation between *Return* and *N. Companies* when controlling for *Concentration*. The findings are consistent with hypothesis 1, which predicts that portfolio concentration increases risk-adjusted returns for domestic retail investors on the OSE.

Concentration and *N. Companies* are both calculated from the investor portfolio. To make sure that multicollinearity is not driving the results I drop *N. Companies* from the regression in Column 2. The results remain unchanged. The sample size is also naturally very large. In Column 3 I drop 90% of the observations randomly to reduce the sample size. The results remain unchanged. I conclude that the results are not driven by the large sample size or how the control variables are specified.

5.2 Investor experience and portfolio concentration

Hypothesis 2 predicts that experienced retail investors have more concentrated stock portfolios than inexperienced retail investors. In Table 6 I report the differences in average *Concentration* between *Experienced* and *Inexperienced investors*. In Table 6 Panel A *Experienced investors* are defined as those with above the average level of *Experience* (and all else as *Inexperienced investors*). In Panel B *Experienced investors* are defined as those with above the median level of *Experience* (and all else as *Inexperienced investors*). *Experience* is the investor past number

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of monthly trading observations as a fraction of possible in the data. From Table 6 we see that *Experienced investors* have more concentrated portfolios on average than *Inexperienced investors*. This finding is consistent with hypothesis 2, which predicts that experienced retail investors have more concentrated stock portfolios than inexperienced retail investors.

[Insert Table 6 about here]

5.3 Experienced concentration

Hypothesis 3 predicts that portfolio concentration increases risk-adjusted returns for retail investors with greater trading experience. In Table 7 I regress *Return* on *Concentration*, *Experience*, the interaction term (*Concentration * Experience*), and controls using standard OLS regressions as equation [2].

[2] $Return_{it} = \alpha + \beta_1[Concentration]_{it} + \beta_2[Concentration * Experience]_{it} + \beta_3[Experience]_{it} + \beta_4[Portfolio]_{it} + \beta_5[N.\ Companies]_{it} + \beta_6[RM\text{-}RF]_t + \beta_7[SMB]_t + \beta_8[HML]_t + \beta_9[MOM]_t + Year\ Fixed\ Effects + e_{it}$

There is now a negative relation between *Return* and both *Concentration* and *Experience*. There is, however, a positive relation between *Return* and the interaction term (*Concentration * Experience*). The interpretation is that investors with *Experience* = 0 who increase *Concentration* with one-standard deviation will reduce risk-adjusted returns by -0.044% [0.096 * (-0.455)]. A monthly decrease of -0.044% is equivalent to an annual decrease in *Return* of -0.53%. This is significantly lower than investors with *Experience* = 1 who increase *Concentration* by one-standard deviation and increase risk-adjusted returns by + 0.2% [0.096 * (-0.455 + 2.483)]. A monthly increase in *Return* of + 0.2% is equivalent to an annual increase

of 2.4%. These findings are consistent with hypothesis 3, which predicts that portfolio concentration increase returns for investors with greater trading experience.

[Insert Table 7 about here]

5.4 Information ratios

It is possible that investors keep their OSE portfolio as part of an international well-diversified portfolio that is unobserved in the data. Treynor and Black (1973) explain that the information ratio evaluates how a subsection of a portfolio adds or destroys value to an overall well diversified portfolio. In Table 8 I regress the *Information ratio* for each investor on the investor *Mean Concentration*, *Mean Experience*, the interaction term (*Mean Concentration * Mean Experience*), and controls in a standard OLS model for all retail investors with more than six months of trading on the OSE during the sample period.[5] The results remain unchanged. The interpretation is that an investor with *Mean Experience = 1* who increase *Mean Concentration* by one-standard deviation will increase the *Information ratio* by 0.063 [(-0.05 + 0.82) * 0.082]. This is economically significant given that the average *Information ratio* is -0.11. Investors with *Mean Experience = 0* reduce the *Information ratio* by increasing *Mean Concentration*. The findings are consistent with hypothesis 3, which predicts that portfolio concentration increase returns for investors with greater trading experience.

I conclude that some very experienced retail investors with highly concentrated investment portfolios are able to select OSE securities with an overall positive contribution to

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[5] I only observe one *Information ratio* per investor, so I average all control variables by each unique investor ID. I also drop all investors with less than six months of trading history to get more meaningful information ratios.

an overall diversified investment portfolio. However, inexperienced retail investors destroy value from keeping highly concentrated portfolios on the OSE.

[Insert Table 8 about here]

6. Conclusion

It is well documented in the finance literature how retail investors exhibit trading biases that are devastating for portfolio returns; see see Odean (1998a), Odean (1998b), and Barber and Odean (2000). Van Nieuwerburgh and Veldkamp (2009 and 2010) show that investors can learn about assets and thereby improve their portfolio formations while Greenwod and Nagel (2008) show how experience can help with security selection.

In this paper, I investigate if retail investors improve asset learning ability from experience. My main empirical finding is that experienced retail investors increase returns from portfolio concentration on the OSE. Inexperienced investors, however, reduce returns from concentration. I investigate the relation between portfolio return and investor concentration and experience while controlling for portfolio size, the number of actually held securities, traditional risk factors, as well as time fixed effects. The relation between return and concentration and experience is therefore in excess of what is expected based on investor size, the number of actual investments, portfolio risk characteristics, as well as time effects.

I conclude that retail investors gain experience as they trade over time. This experience results in increased information learning that again leads to increased portfolio returns. Gaining experience is, however, very costly.

The empirical implications of these findings are that inexperienced retail investors should be very careful when decreasing the diversification of their portfolios. Most retail investors are better served by increasing diversification or placing funds with professional

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managers. Only very experienced investors benefit from keeping concentrated portfolios. Theoretical implications of these findings are that future models on portfolio optimization should include investor experience and asset learning as explanatory variables in investor returns.

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Table 1

Companies per Year

Column 1 lists the companies trading on the OSE over the sample period from January 1993 to July 2006. Column 2 lists the number of companies traded on the OSE after dropping companies with low trading volume (less than 20 trading days), penny stocks (share price less than 10 NOK or $1.792 USD), and companies with total value below 1 million NOK ($179,200 USD).

1	2
	Companies
Year	N
1993	106
1994	126
1995	131
1996	147
1997	177
1998	189
1999	169
2000	174
2001	152
2002	130
2003	116
2004	131
2005	163
2006	173

Table 2

Investor-Month Descriptive Statistics

Table 2 show descriptive statistics for the investors trading on the OSE. *Return* is the value weighted investor monthly portfolio return during the calendar month in excess of the risk-free rate. *Concentration* is the investor cumulated absolute monthly company portfolio weights as deviation from the market value weights at the beginning of the calendar month; see Appendix Table A1 for a detailed description of *Concentration*. *Portfolio* is the total investor monthly portfolio value in million USD at the beginning of the calendar month. *N. Companies* are the total number of unique companies in the investor monthly portfolio at the beginning of the calendar month. *Experience* is the investor past number of monthly trading observations as a fraction of possible in the data. Panel A, B, and C show summary statistics, correlations, and percentiles, respectively.

Panel A: Summary				
	N	Mean	St.Dev	Median
Return	41,798,233	1.127	11.057	0.545
Concentration	41,798,233	0.935	0.096	0.983
Portfolio	41,798,233	0.023	0.862	0.002
N. Companies	41,798,233	1.792	1.960	1.000
Experience	41,798,233	0.654	0.329	0.727

Panel B: Correlation matrix				
	Return	Concent.	Portfolio	N. Comp.
Return	1			
Concentration	0.003	1		
Portfolio	0.000	-0.006	1	
N. Companies	0.007	-0.278	0.047	1
Experience	0.023	0.034	0.010	0.160

Panel C: Percentiles				
	5th	25th	75th	95th
Return	-14.603	-4.433	6.153	18.142
Concentration	0.736	0.910	0.998	1.000
Portfolio	0.000	0.001	0.009	0.063
N. Companies	1.000	1.000	2.000	5.000
Experience	0.092	0.353	1.000	1.000

Table 3

Investor ID Descriptive Statistics

Table 3 show descriptive statistics by each unique investor ID. *Mean Return, Mean Concentration, Mean Portfolio, Mean N. Companies,* and *Mean Experience* are the average *Return, Concentration, Portfolio, N. Companies*, and *Experience* by each unique investor over the sample period January 1993 to July 2006. The *Information ratio* is calculated as: Average (*RP – RM*) / Standard deviation (*RP – RM*). *RP* and *RM* are the unadjusted investor portfolio and market returns, respectively. For the *Information ratio* investors with less than six months of trading history are dropped. *Information ratio* is winsorized at the 1% level.

	N	Mean	St.Dev	25th	50th	75th
Mean Return	620,970	1.072	3.307	0.456	1.065	1.717
Mean Concentration	620,970	0.941	0.082	0.911	0.983	0.997
Mean Portfolio	620,970	0.017	0.518	0.001	0.003	0.008
Mean N. Companies	620,970	1.578	1.401	1.000	1.000	1.632
Mean Experience	620,970	0.498	0.350	0.195	0.407	0.922
Information ratio	582,860	-0.110	0.159	-0.188	-0.107	-0.025

Table 4

Risk Factors

Table 4 show descriptive statistics for the traditional risk factors on the OSE. *RM-RF* is the value weighted market return minus the risk-free rate of return. *SMB* is the average return on small stock portfolios minus the average return on big stock portfolios; see Fama and French (1993). *HML* is the average return on value portfolios minus the average return on growth portfolios; see Fama and French (1993). *MOM* is the difference in return on winners and losers; see Carhart (1997). *RM-RF, SMB, HML,* and *MOM* are obtained from Ødegård's data library; see Ødegård (2016 and 2017).

Variable	Obs	Mean	Std. Dev.	Min	Max
RM-RF	163	1.929	5.656	-21.251	16.228
SMB	163	1.284	4.089	-17.081	22.140
HML	163	0.306	5.386	-16.649	14.369
MOM	163	0.460	4.962	-14.219	15.427

Table 5

Portfolio Concentration and Portfolio Returns

Table 5 reports intercept coefficients and robust t-statistics in parentheses for standard OLS regressions of *Return* on *Concentration* and controls for the 41,798,233 domestic retail investor-month portfolio observations on the OSE in the period 1993 to 2006. All variables are defined in Table 2 and Table 4. All regressions are run with investor-clustered standard errors. Column 2 drop *N. Companies* as a control. Column 3 drops 90% of the sample size at random. Statistical significance adjusted for the large sample size following Leamer (1978) and Kim and Ji (2015) at the 10%, 5%, and 1% level are indicated by *, **, and ***, respectively.

	1	2	3
Concentration	1.171***	0.920***	1.187***
	(85.3)	(72.9)	(30.2)
Ln (Portfolio)	-0.013	0.007	-0.012
	-(14.9)	(10.0)	-(4.1)
N. Companies	0.061***		0.062***
	(34.8)		(23.2)
RM-RF	0.931***	0.931***	0.931***
	(1805.9)	(1805.7)	(879.5)
SMB	0.049***	0.049***	0.047***
	(82.4)	(82.4)	(27.4)
HML	0.031***	0.031***	0.034***
	(70.0)	(70.2)	(31.8)
MOM	-0.092***	-0.092***	-0.093***
	-(223.1)	-(223.1)	-(80.9)
Constant	-0.197	0.303***	-0.209
	-(10.8)	(23.7)	-(4.7)
N	41,798,233	41,798,233	4,179,823
Year FE	Yes	Yes	Yes
Adj R2	24.7%	24.7%	24.8%

Table 6

Investor Experience and Future Portfolio Concentration

Table 6 reports differences in *Concentration* between *Experienced* and *Inexperienced investors*. In Panel A *Experienced investors* are defined as those with above the average level of *Experience* (and all else as *Inexperienced investors*). In Panel B *Experienced investors* are defined as those with above the median level of *Experience* (and all else as *Inexperienced investors*). *Experience* is the investor past number of monthly trading observations as a fraction of possible in the data. *Concentration* is the investor cumulated absolute monthly company portfolio weights as deviation from the market value weights at the beginning of the calendar month; see Appendix Table A1 for a detailed description of *Concentration*. All the 41,798,233 domestic retail investor-month portfolio observations on the OSE in the period 1993 to 2006 are included. Statistical significance adjusted for the large sample size following Leamer (1978) and Kim and Ji (2015) at the 10%, 5%, and 1% level are indicated by *, **, and ***, respectively.

		Experience			Inexperience			Difference	
	Variable	N	Mean	Std.D	N	Mean	Std.D	Diff.	t-stat
Panel A	Concentration	22,792,844	0.936	0.097	19,005,389	0.933	0.094	0.00370***	(124.8)
Panel B	Concentration	20,925,163	0.936	0.097	20,873,070	0.933	0.094	0.00271***	(91.7)

Table 7

Portfolio Concentration, Experience, and Portfolio Returns

Table 7 reports intercept coefficients and robust t-statistics in parentheses for standard OLS regressions of *Return* on *Concentration* and controls for the 41,798,233 domestic retail investor-month portfolio observations on the OSE in the period 1993 to 2006. All variables are defined in Table 2 and Table 4. All regressions are run with investor-clustered standard errors. Column 2 drop *N. Companies* as a control. Column 3 drops 90% of the sample size at random. Statistical significance adjusted for the large sample size following Leamer (1978) and Kim and Ji (2015) at the 10%, 5%, and 1% level are indicated by *, **, and ***, respectively.

	1	2	3
Concentration	-0.455***	-0.550***	-0.343
	-(18.2)	-(22.2)	-(4.1)
Concentration * Experience	2.483***	2.222***	2.337***
	(76.5)	(67.8)	(21.1)
Experience	-2.364***	-2.063***	-2.246***
	-(84.3)	-(73.2)	-(23.3)
Ln (Portfolio)	-0.009	0.011	-0.008
	-(10.1)	(16.4)	-(2.8)
N. Companies	0.066***		0.067***
	(34.8)		(23.7)
RM-RF	0.931***	0.931***	0.931***
	(1805.6)	(1805.3)	(879.2)
SMB	0.050***	0.049***	0.048***
	(82.8)	(82.6)	(27.5)
HML	0.031***	0.031***	0.034***
	(70.1)	(70.2)	(31.8)
MOM	-0.092***	-0.092***	-0.093***
	-(222.8)	-(222.8)	-(80.8)
Constant	1.392***	1.704***	1.305
	(54.9)	(73.0)	(15.5)
N	41,798,233	41,798,233	4,179,823
Year FE	Yes	Yes	Yes
Adj R2	24.8%	24.7%	24.8%

Table 8

Portfolio Concentration, Experience, and Information Ratios

Table 8 reports intercept coefficients and robust t-statistics in parentheses for standard OLS regressions of *Information ratio* on *Mean Concentration* and controls for all unique retail investors on the OSE in the period 1993 to 2006. All variables are defined in Table 3. Statistical significance adjusted for the large sample size following Leamer (1978) and Kim and Ji (2015) at the 10%, 5%, and 1% level are indicated by *, **, and ***, respectively. The *Information ratio* is calculated as: Average (*RP* – *RM*) / Standard deviation (*RP* – *RM*). Investors with less than six months of trading history are dropped from the analysis. *Information ratio* is winsorized at the 1% level.

	1
Mean Concentration	-0.050
	-(11.0)
Mean Concentration * Mean Experience	0.823***
	(103.2)
Mean Experience	-0.659***
	-(89.7)
Mean Portfolio	0.002***
	(18.6)
Mean N. Companies	0.004***
	(26.2)
Constant	-0.122***
	-(29.7)
N	582,860
Adj R2	11.2%

Table Appendix A1

Portfolio Concentration

Table Appendix A1 gives an example of how portfolio concentration is measured for one investor in one calendar month. *Concentration* is measured for each investor on the OSE for all calendar months in the sample. Column 1 lists the companies trading on the exchange. Column 2 lists the company weights in the example market value weighted portfolio. Column 3 lists the company weights in the example investor portfolio. Column 4 lists the absolute difference between the investor weights and the market weights in each company. *Concentration* is calculated as half of the cumulated absolute difference between investor weights and market value weights; see Choi et al. (2017).

1	2	3	4 (2 -3)
Company	Company weight in market portfolio	Company weight in investor portfolio	Absolute difference
1	0.200	0.000	0.200
2	0.200	0.000	0.200
3	0.200	0.000	0.200
4	0.335	0.000	0.335
5	0.065	1.000	0.935
Total	1.000	1.000	1.870
Concentration			0.935