

Research on Taiwan Financial Markets

prepared for the Santa Fe Institute
July 2008

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Taiwan Stock Exchange

- World's 12th largest financial market.
- 6.8 million (31 percent) of Taiwan's population of 22.2 had opened a brokerage account as of end of 2000.
- Electronic limit order market.
- Daily price change limits of 7 percent.
- Cap of 0.1425 percent on commissions.
- Transaction Tax – 0.3 percent on Sales
- No capital gains tax.

Data

- All trades on TSE: 1995 to 1999
- Identification of Investors
 - Institutions
 - Corporations
 - Dealers
 - Foreigners
 - Mutual Funds
 - Individuals

The Data

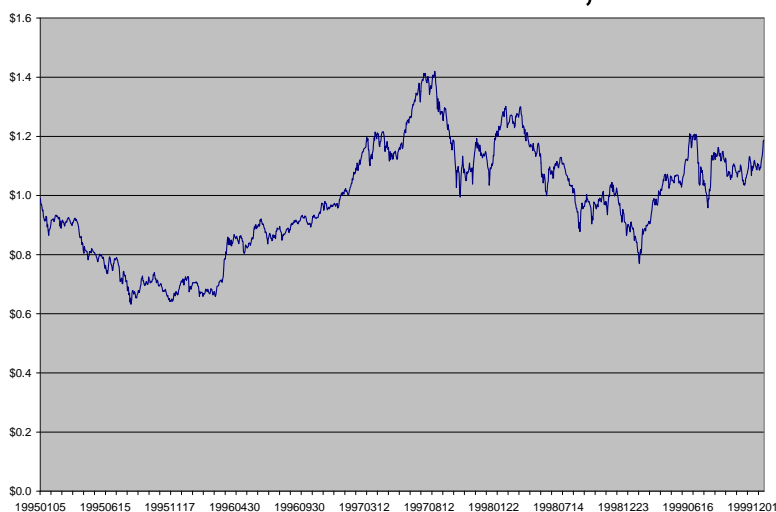
Taiwan Stock Exchange

Year	Return %	Listed firms	Mean Market Cap (bil TW \$)	Turnover %	No. of Traders (000)	No. of Trades (000)	Day Trade as % of All trades
1995	-27.4	347	5,250	195	1,169	120,115	20.6
1996	33.9	382	6,125	214	1,320	149,197	17.3
1997	18.2	404	9,571	393	2,173	310,926	24.8
1998	-21.6	437	9,620	310	2,816	291,876	25.6
1999	31.6	462	10,095	292	2,934	321,926	21.8
1995-99	18.5		8,132	294	3,971	1,194,040	23.1

Trader Types

	Individual Investors	Corporate Investors	Foreign Investors	Dealers	Mutual Funds
No. of Traders	3,944,932	24,358	1,570	83	289
% of All Trades (by value)	89.2	4.5	2.0	1.4	2.8
Ave. Size of Buy (TW \$)	190,256	384,771	353,560	426,463	433,411
Ave Size of Sell (TW \$)	190,995	384,454	314,805	416,701	365,017

Growth of \$1 invested in Taiwan Index on December 31, 1994



Trading in Financial Markets

- No-Trade Theorem

Milgrom and Stokey (1982)

- Speculative Trade requires

- Risk loving or irrational traders

- e.g., Entertainment

- Insurance and diversification motives

- Agents may have different prior beliefs

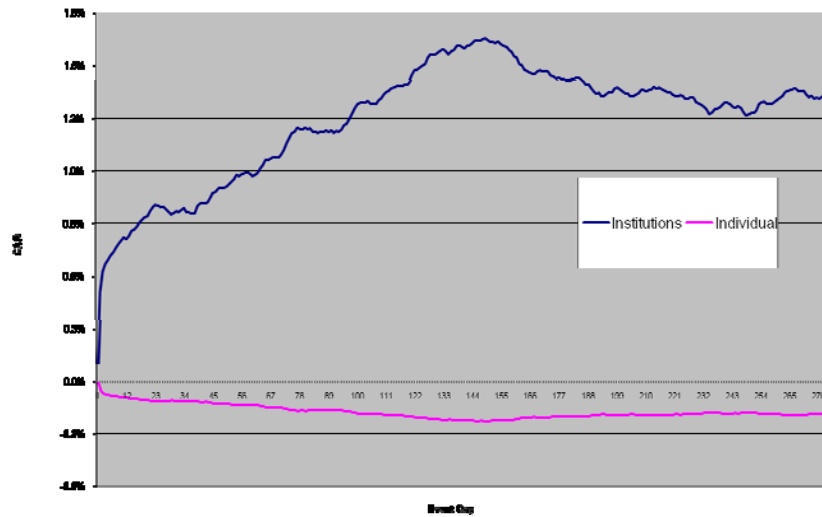
Tirole (1982)

Mean Daily Profits Net of Transaction Costs

	Institutions	Individuals
Gross Profits	178.0	(178.0)
Commissions	(25.6)	(216.9)
Transaction Tax	(27.0)	(228.4)
Net Profits	125.4	(623.3)

Event-Time Results

Cumulative Market-Adjusted Returns



Economic Significance

- Individual Losses
 - 3.5% annually
- Institutional Gains
 - 1.0% annually
 - Before management fees (information costs)

Economic Significance

- Average Individual Trader
 - \$7,545 loss over five years
- 1.5% of Total Personal Income in Taiwan
- Institutions earn \$NT 35 bil.
 - Assume inv't prof. are paid \$NT 6 mil. / year
 - Supports an industry of 6,000 professionals

Day Trading

- Definition: The purchase and sale of the same stock by the same investor on the same day.
- Who are day traders?
 - Risk loving or irrational traders
 - Entertainment
 - Insurance and diversification motives
 - Agents may have different prior beliefs
 - Tirole (1982)

Preview of Results

Day Trading is Material in Taiwan. In average month,

- 140,000 individuals day trade
- 17% of all volume is day trading
- 2/3rds of day trading can be traced to top 1,000 day traders

Day Traders Lose Money

- In aggregate, gross profits are positive (or zero)
- Net profits are unambiguously negative
 - Commissions (5-10 bps one-way)
 - Sales Tax (30 bps)
- 80% of Day Traders lose money over 6-month horizon
- A very small minority (< 0.5% of day traders) consistently profit

Learning (ongoing work)

Do day traders rationally learn?

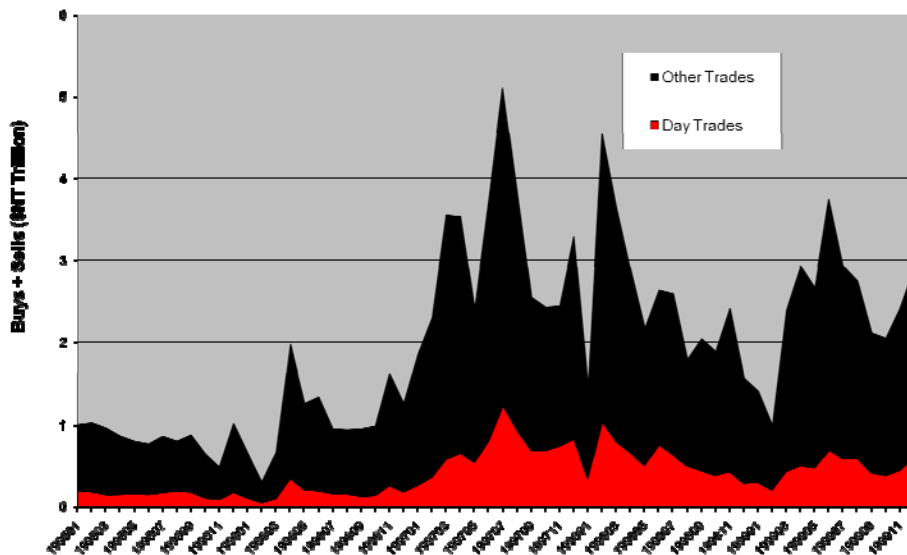
- About their own ability?
- By doing (i.e., through experience)?

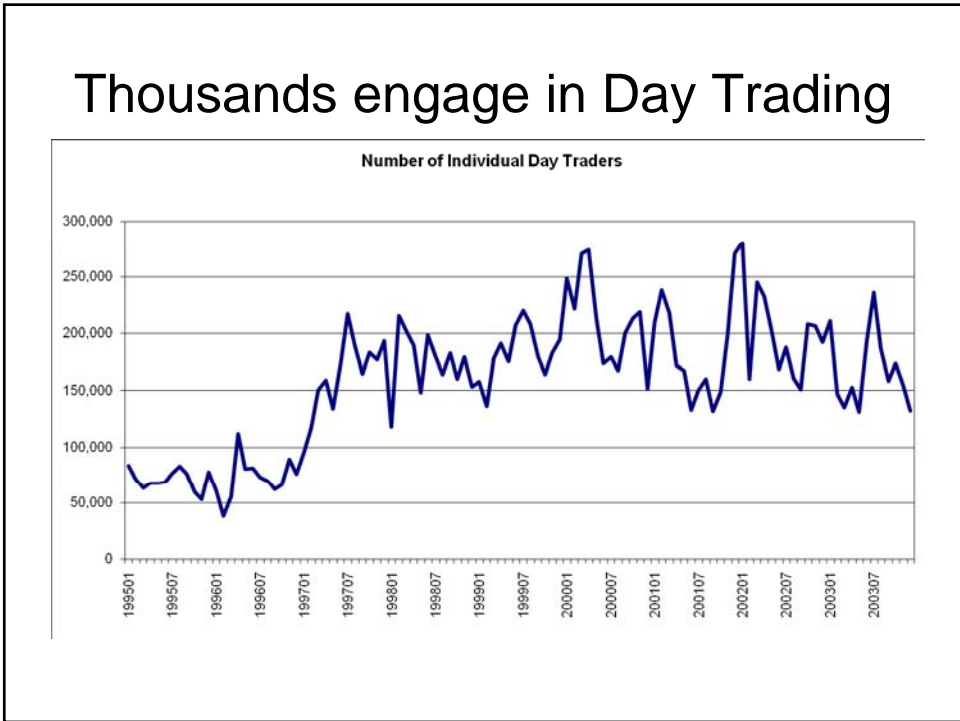
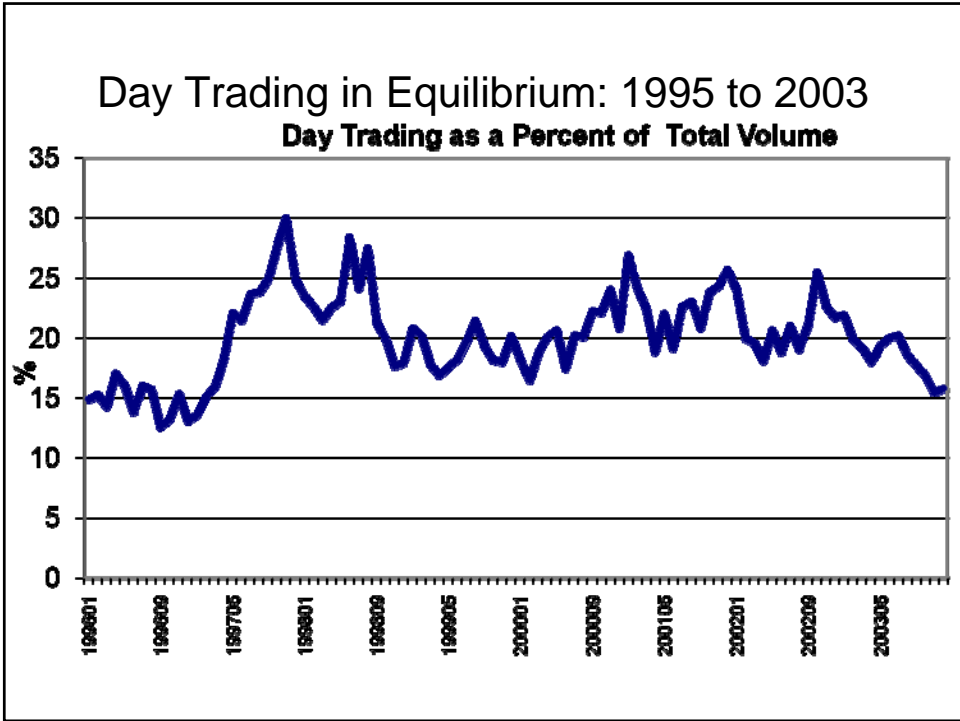
Do day traders respond to feedback about their ability rationally?

Table 1: Mean Daily Value of Trade

Investor Type	ALL TRADE		DAY TRADE		Day Tr % of All Tr
	Value (\$NT Mil)	% of All Trd	Value (\$NT Mil)	% of Day Trd	
All Traders	170,148	100.0	34,912	100.0	20.5
All Individ.	152,232	89.5	34,030	97.5	22.4
All Inst.	17,916	10.5	883	2.5	4.9
Corporations	7,453	4.4	682	2.0	9.1
Dealers	2,503	1.5	141	0.4	5.6
Foreigners	3,272	1.9	59	0.2	1.8
Mutual Funds	4,688	2.8	0.7	0.0	0.0

Figure 1: Trading Volume in Taiwan: 1995 to 1999





Identifying Day Traders

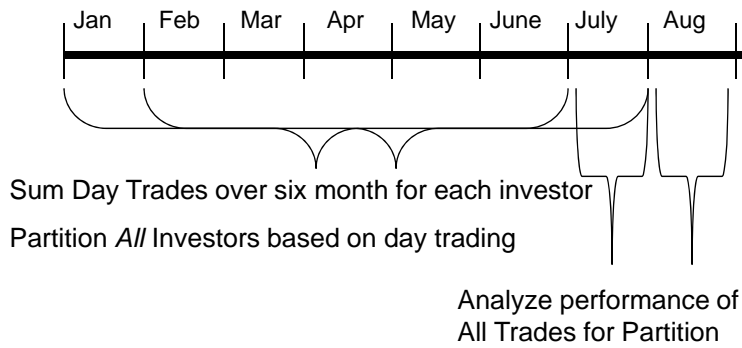


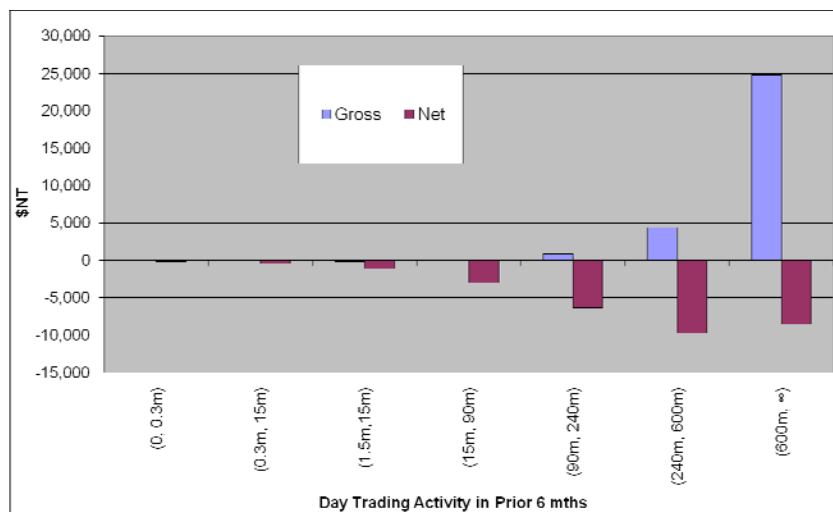
Table 2: Descriptive Statistics for Day Trader Partitions

Partition Range	ALL TRADE		DAY TRADE		Day Trade % of All Trade	Mean No. of Acc.	Mean Dly Volume (per Acc.) (000)
	Value (\$NT Mil)	% of All Trade	Value (\$NT Mil)	% of Day Trade			
(600m, ∞)	11,450	7.1	6,276	17.3	54.8	862	13,280
(240m, 600m)	12,448	7.7	5,422	14.9	43.6	2,224	5,598
(90m, 240m)	18,078	11.2	6,542	18.0	36.2	6,303	2,868
(15m, 90m)	36,003	22.3	9,537	26.3	26.5	30,944	1,163
(1.5m, 15m)	32,923	20.4	5,292	14.6	16.1	87,833	375
(0.3m, 15m)	10,433	6.5	1,322	3.6	12.7	78,668	133
(0, 0.3m)	39,828	24.7	1,920	5.3	4.8	719,007	55

Performance Measurement Assumptions

- 10 bp commission
- 30 bp transaction tax on sales
- Perfect accounting for day trades
- Non-day trades are evaluated using closing prices
 - Implicit Assumption: no gains (or losses) beyond day of trade
 - Robustness: Evaluation periods up to 10 days yield qualitatively similar results

Accounts sorted by Past Day Trading Activity Mean Daily Profits per Account



Accounts sorted by Past Day Trading Activity Intraday Buy Return less Intraday Sell Return

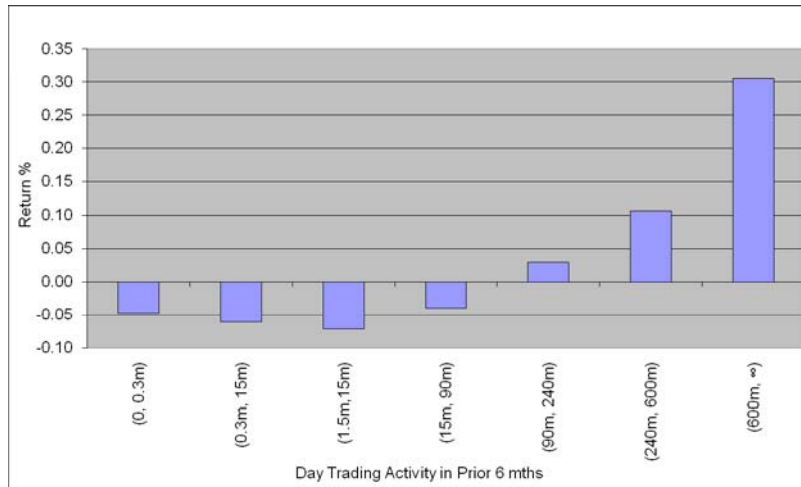


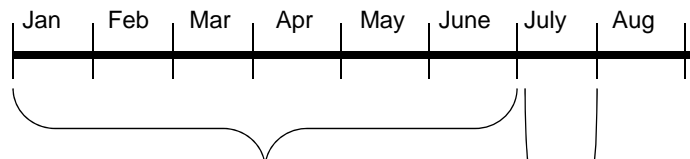
Table 3: Gross Performance of Day Traders

Partition Range	Buy less Sell Return (%)	t-stat	Mean Daily Gross Profit (\$NT Mil)	t-stat	% Days with Profit
(600m, ∞)	0.305	37.99*	21.426	26.64*	90.7*
(240m, 600m)	0.107	20.42*	9.629	20.96*	80.4*
(90m, 240m)	0.030	7.37*	5.332	12.40*	67.2*
(15m, 90m)	-0.039	-14.43*	-3.460	-5.65*	42.8*
(1.5m, 15m)	-0.071	-30.93*	-11.681	-19.19*	21.2*
(0.3m, 15m)	-0.061	-21.18*	-4.959	-20.53*	20.8*
(0, 0.3m)	-0.047	-12.27*	-24.325	-18.34*	21.2*

Table 4: Net Performance of Day Traders

Partition Range	Mn Dly Net Pft (\$NT Mil)	t-stat	Percentage of Days with Profit	Number of Accounts	Mn Dly Net Pft (Loss) per Account
(600m, ∞)	-7.278	-12.47*	28.3*	862	-8,443
(240m, 600m)	-21.588	-36.31*	4.0*	2,224	-9,707
(90m, 240m)	-40.033	-46.64*	0.7*	6,303	-6,351
(15m, 90m)	-93.851	-55.80*	0.2*	30,944	-3,033
(1.5m, 15m)	-94.230	-58.91*	0.0*	87,833	-1,073
(0.3m, 15m)	-31.033	-55.38*	0.0*	78,668	-394
(0, 0.3m)	-122.950	-46.55*	0.0*	719,007	-171

Profit Partitions



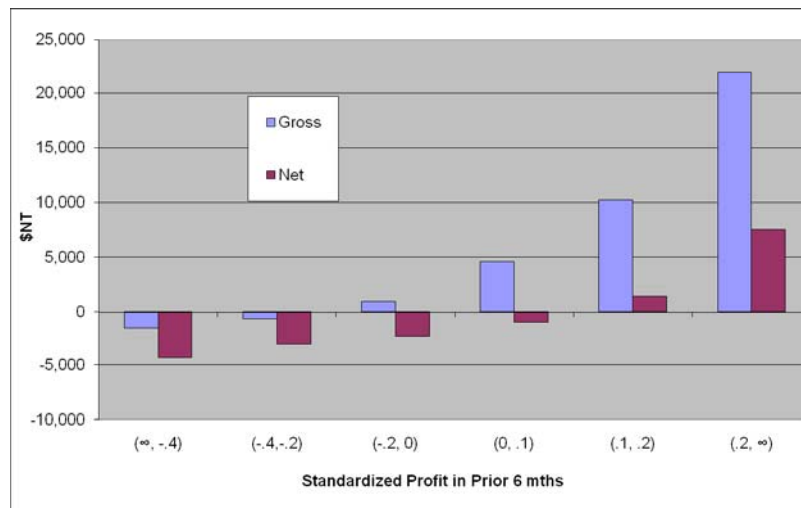
- Calculate Daily Profits for each Investor over six month period
- Calculate mean daily profits scaled by standard deviation of profits (deals with scale issues)
- Partition investors with a minimum of 35 days of trading activity

Analyze performance of All Trades for Partition

Table 2: Descriptive Statistics for Day Trader Profit Partitions

Partition Range	ALL TRADE		DAY TRADE		Day Trade % of All Trade	Mean No. of Acc.	Mean Dly Volume (per Acc.) (000)
	Value (\$NT Mil)	% of All Trade	Value (\$NT Mil)	% of Day Trade			
(.2, ∞)	2,276	1.4	1,198	3.3	52.6	393	5,786
(.1, .2)	3,706	2.3	1,484	4.1	40.0	1,062	3,490
(0, .1)	6,936	4.3	2,379	6.6	34.3	3,027	2,292
(-.2, 0)	22,816	14.2	7,365	20.3	32.3	17,069	1,337
(-.4, -.2)	21,633	13.4	8,460	23.3	39.1	22,158	976
(∞, -.4)	8,287	5.1	4,278	11.8	51.6	7,638	1,085
No Rank	95,511	59.3	11,145	30.7	11.7	874,495	109

Accounts sorted by Past Trading Profits
Mean Daily Profits per Account



Accounts sorted by Past Trading Profits Intraday Buy Return less Intraday Sell Return

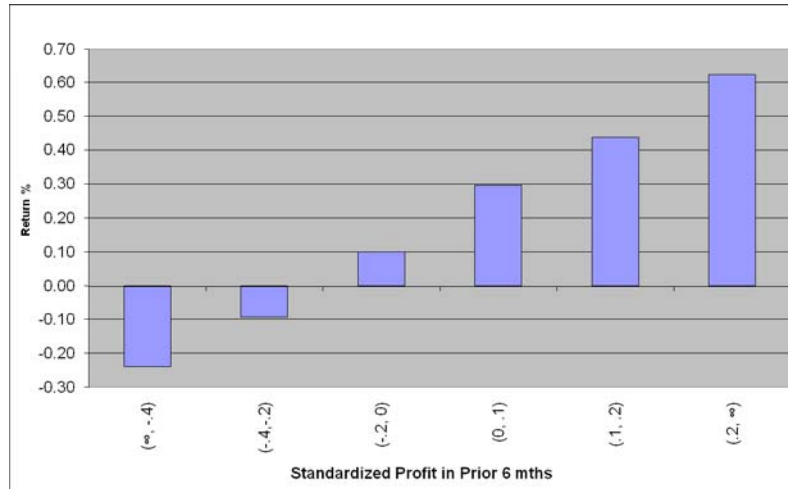


Table 3: Gross Performance of Day Traders (Profit Partition)

Partition Range	Buy less Sell Return (%)	t-stat	Mean Daily Gross Profit (\$NT Mil)	t-stat	% Days with Profit
(.2, ∞)	0.622	61.73*	8.671	28.92*	97.0*
(.1, .2)	0.438	48.03*	10.842	30.36*	94.9*
(0, .1)	0.296	40.33*	14.030	28.24*	92.1*
(-.2, 0)	0.101	28.67*	16.342	25.13*	89.3*
(-.4, -.2)	-0.094	-21.24*	-14.477	-18.35*	21.1*
($\infty, -.4$)	-0.240	-25.56*	-12.419	-21.49*	18.0*

**Table 4: Net Performance
of Day Traders (Profit Partition)**

Partition Range	Mean Daily Net Profit (\$NT Mil)	t-stat	Percentage of Days with Profit	Number of Accounts	Mn Dly Net Profit (Loss) per Account
(.2, ∞)	2.960	13.85*	71.1*	393	7,532
(.1, .2)	1.535	5.70*	49.5	1,062	1,445
(0, .1)	-3.367	-8.45*	30.3*	3,027	-1,112
(-.2, 0)	-40.901	-42.57*	2.6*	17,069	-2,396
(-.4, -.2)	-68.694	-48.11*	0.0*	22,158	-3,100
(∞, -.4)	-33.167	-44.73*	0.2*	7,638	-4,342

Identifying Aggressive and Passive Trades

	Price	Buy Orders	Sell Orders	Shares Cleared
	10.40	100		
Buy Orders > 10.10	10.30	200	100	300
	10.20	250	200	550
	10.10	100	200	650
	10.00	200	350	850
Sell Orders < 9.90	9.90	200	100	500
	9.80	100	100	400
	9.70	200	200	300
	9.60		100	

Table 5: Liquidity Providers?

Partition Range	Percentage of Trades Emanating from Orders Classified as:		
	Passive	Aggressive	Indeterminate
All Individual Investors	25.2	64.9	9.9
(600m, ∞)	16.3	73.7	10.0
(240m, 600m)	17.7	72.3	10.1
(90m, 240m)	19.5	70.4	10.1
(15m, 90m)	21.9	68.0	10.1
(1.5m, 15m)	25.6	64.4	10.0
(0.3m, 15m)	28.5	61.5	10.0
(0, 0.3m)	34.6	55.9	9.5

Summary of Results

Day Trading is Material in Taiwan. In average month,

- 140,000 individuals day trade
- 17% of all volume is day trading
- 2/3rds of day trading can be traced to top 1,000 day traders

Day Traders Lose Money

- In aggregate, gross profits are positive (or zero)
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- 80% of Day Traders lose money over 6-month horizon
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Why do Day Traders Lose?

- Diversification or Insurance?
 - Intraday insurance or diversification seems unlikely
- Liquidity Needs?
 - Day trading exceeds 20% of volume
 - Annual turnover is greater than 300%
- More Plausible Explanations
 - Entertainment
 - Overconfidence
 - Learning about Ability