



Appendix A

Quantitative Analysis of Internalization on Canadian Marketplaces

Appendix A looks quantitatively at trading activity and features associated with the internalization of orders and updates the data that was initially published as Part 1 of Appendix A to the Consultation Report.

This appendix provides data with respect to the occurrences of intentional and unintentional crosses on all Canadian marketplaces for the period of January 2016 to October 2019, and relies on data received by IIROC through the Market Regulation Feed submitted by each marketplace.



Fig. 1 – Percentage of Total Trades Executed as Intentional (IC) or Unintentional Crosses (UIC)

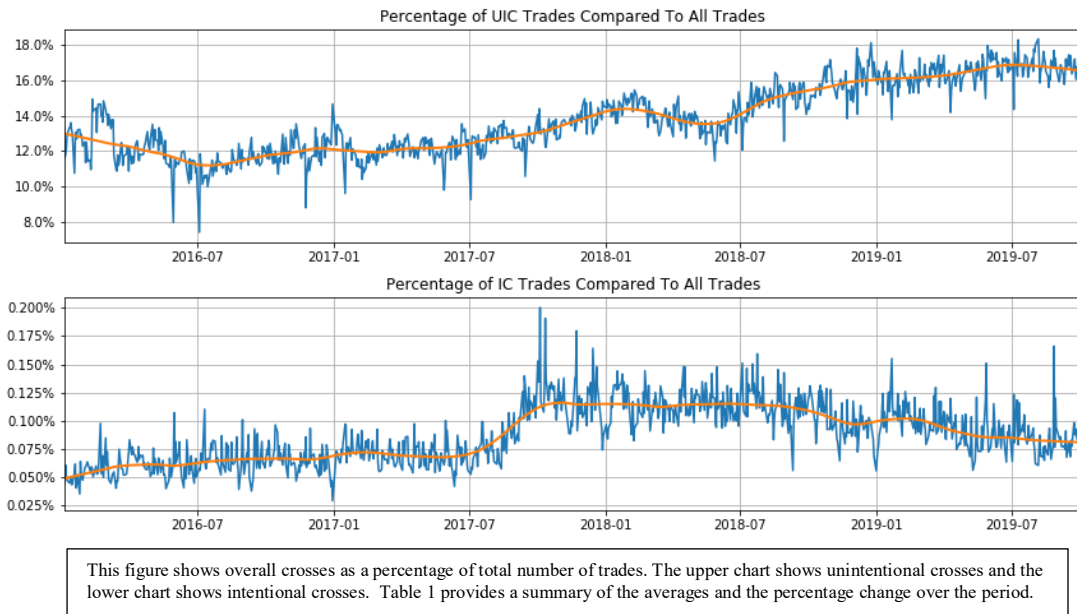


Fig 2 - Percentage of Total Volume Executed as Intentional or Unintentional Crosses

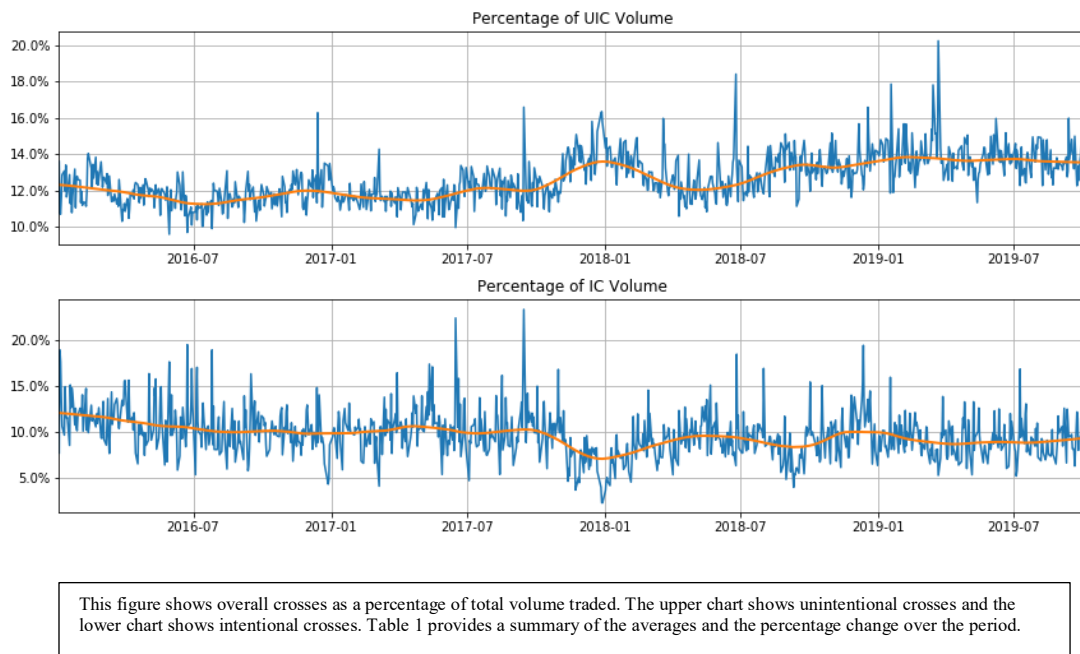
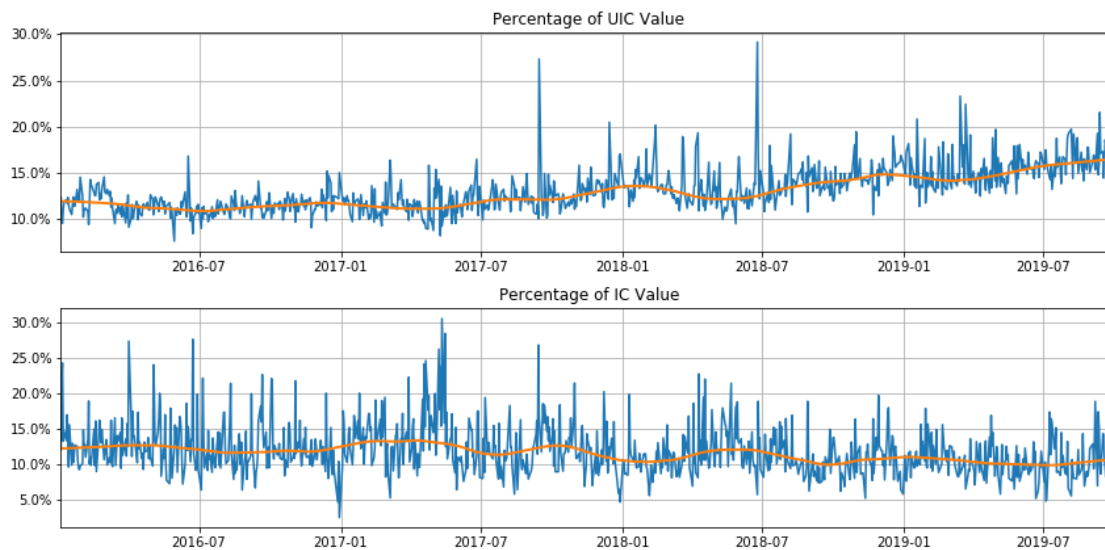




Fig 3 - Percentage of Total Value Executed as Intentional or Unintentional Crosses



This figure shows overall crosses as a percentage of total value traded. The upper chart shows unintentional crosses and the lower chart shows intentional crosses. Table 1 provides a summary of the averages and the percentage change over the period.



Table 1 – Six-month Averages of Intentional and Unintentional Crosses

	2016	2016	2017	2017	2018	2018	2019	Change between		Change between	
	Period	Period	Period	Period	Period	Period	Period	Period 1 and 7		Jan 2016- Jun 2018 & Jul 2018 – Oct 2019	
	Jan-	July-	Jan-	July-	Jan-	July-	Jan-	Net	%	Net	%
	June	Dec	June	Dec	June	Dec	June	Change	Change	Change	Change
Unintentional by Trade	12.27%	11.64%	12.07%	13.12%	13.91%	15.38%	16.32%	4.05%	33.04%	3.44%	27.26%
Unintentional by Volume	11.85%	11.70%	11.58%	12.62%	12.75%	13.23%	13.90%	2.05%	17.34%	1.49%	12.28%
Unintentional by Value	11.44%	11.39%	11.48%	12.65%	13.40%	14.21%	15.12%	3.68%	32.16%	2.99%	24.74%
Intentional by Trade	0.06%	0.07%	0.07%	0.10%	0.11%	0.11%	0.10%	0.04%	63.72%	0.02%	18.76%
Intentional by Volume	11.53%	10.03%	10.46%	9.41%	8.87%	9.46%	9.09%	-2.45%	-21.21%	-0.82%	-8.19%
Intentional by Value	13.18%	12.13%	13.82%	12.09%	11.67%	10.88%	10.43%	-2.75%	-20.84%	-1.94%	-15.40%

Table 1 shows the average percentages of total trade executions executed as intentional and unintentional crosses by number of trade, total volume and value averaged over six-month periods. Net change between period 1 and 7 is calculated by comparing period 7 (Jan-June 2019) to period 1 (Jan-June 2016). % Change between period 1 and 7 is the net change as a percentage of the period 1 percentage.



Fig 4 – Average Cross Trades by Account Type – Compared Against Average Non-cross (NC) Trades

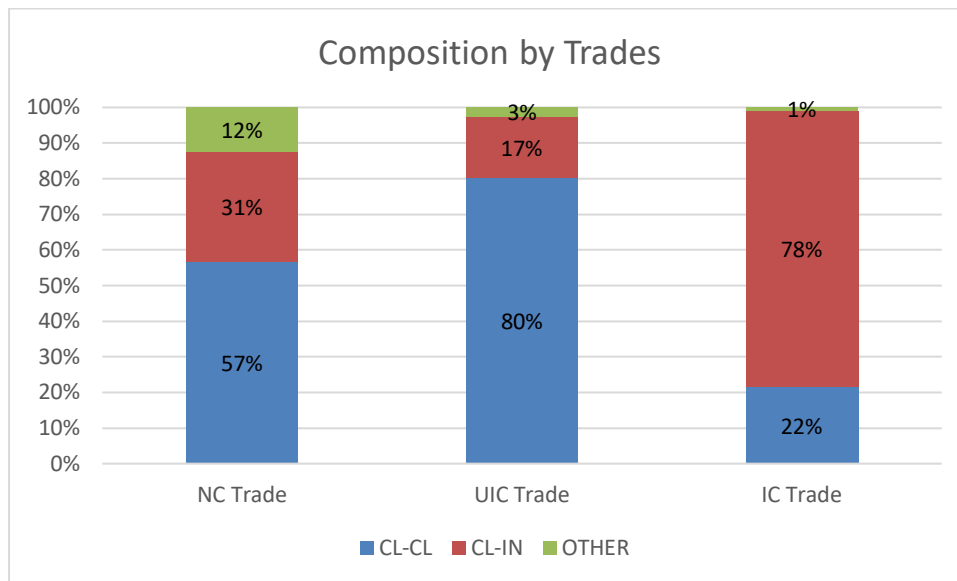


Fig 4 shows the percentage of intentional and unintentional crosses by number of trades and client types. Client types of non-cross trades are provided for comparison purposes. "OTHER" refers to any trade involving an account type market that is not CL-CL (Client to Client) or CL-IN (Client to Inventory).

Fig 5 – Average Cross Volume by Account Type – Compared Against Average Non-cross Volume

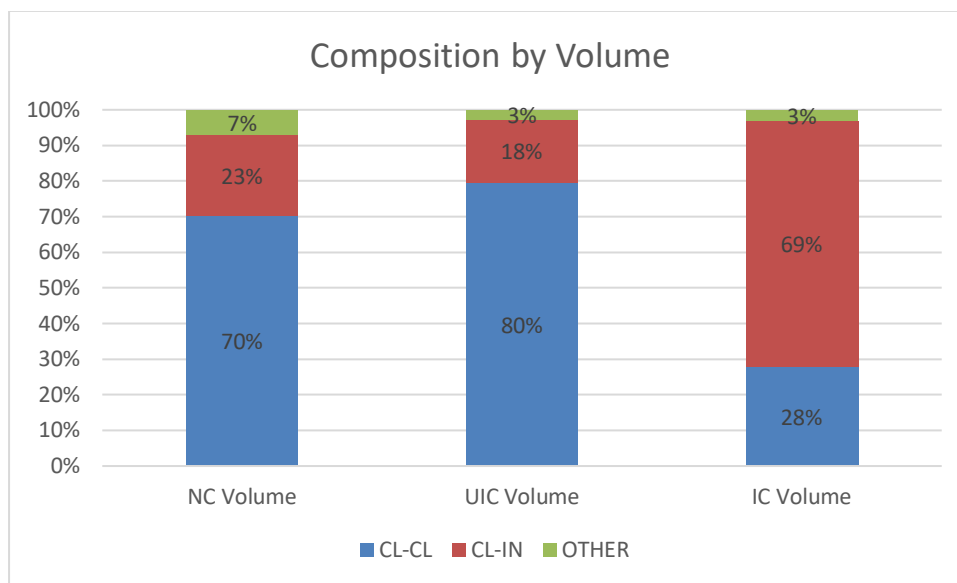


Fig 5 shows the percentage of intentional and unintentional crosses by volume and client types. Client types of non-cross trades are provided for comparison purposes.



Fig 6 – Average Cross Value by Account Type – Compared Against Average Non-cross Value

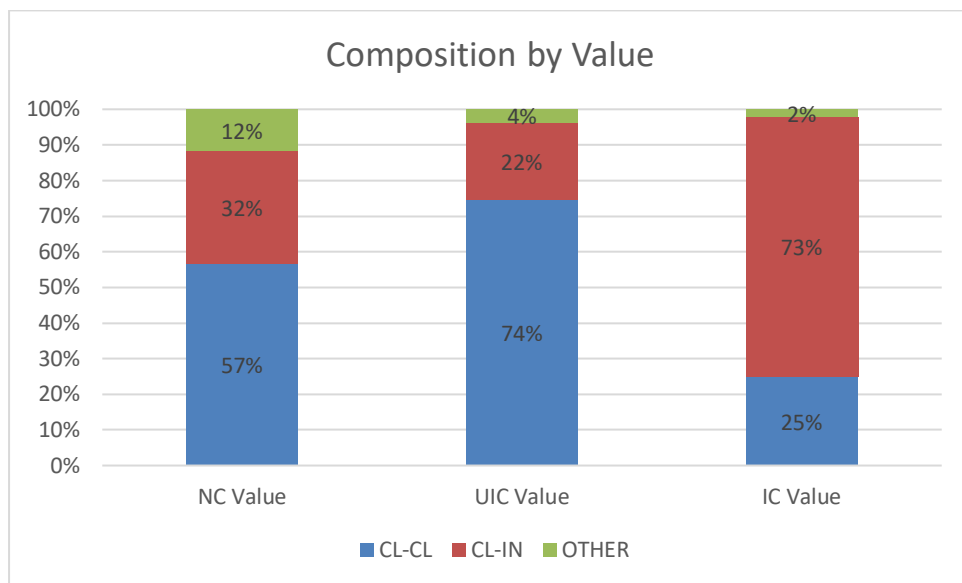


Fig 6 shows the percentage of intentional and unintentional crosses by value traded and client types. Client types of non-cross trades are provided for comparison purposes.



Fig 7 – Crosses by Account Type

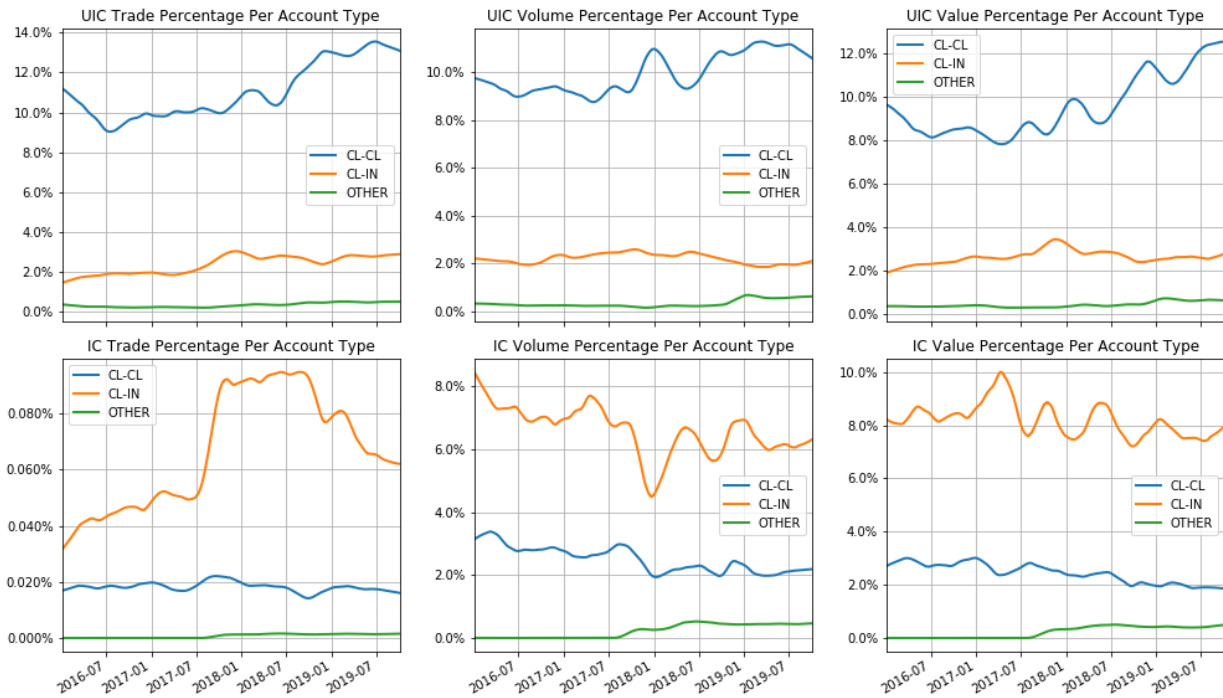


Fig 7 shows the change over the period by number of trades, total volume traded and total value traded by client type. The percentages are measured against the total trading that occurred on all marketplaces.



Table 2 – Cross by Account Types – 6-month Averages

Cross	Account Type	2016	2016	2017	2017	2018	2018	2019	Change between		Change between	
		Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 1 and 7	Period 1 and 7	Jan 2016 – Jun 2018 & Jul 2018 – Oct 2019	Jan 2016 – Jun 2018 & Jul 2018 – Oct 2019
		Jan-June	July-Dec	Jan-June	July-Dec	Jan-June	Jul-Dec	Jan-June	Net Change	% Change	Net Change	% Change
Unintentional by Trade	CL-CL	10.25%	9.47%	9.89%	10.13%	10.72%	12.35%	13.02%	2.77%	27.00%	2.73%	27.00%
	CL-IN	1.73%	1.95%	1.95%	2.74%	2.81%	2.58%	2.79%	1.07%	61.73%	0.50%	22.35%
	OTHER	0.29%	0.23%	0.24%	0.25%	0.39%	0.45%	0.51%	0.22%	75.44%	0.21%	76.05%
Unintentional by Value	CL-CL	8.80%	8.46%	8.22%	8.79%	9.95%	10.95%	11.46%	2.66%	30.19%	2.72%	30.73%
	CL-IN	2.25%	2.53%	2.91%	3.51%	3.00%	2.78%	2.93%	0.68%	30.20%	0.03%	1.20%
	OTHER	0.39%	0.40%	0.36%	0.35%	0.45%	0.48%	0.73%	0.34%	88.34%	0.23%	60.36%
Unintentional by Volume	CL-CL	9.37%	9.31%	8.97%	9.83%	10.12%	10.69%	11.32%	1.96%	20.92%	1.49%	15.61%
	CL-IN	2.18%	2.14%	2.38%	2.58%	2.40%	2.19%	1.97%	-0.21%	-9.44%	-0.26%	-11.20%
	OTHER	0.30%	0.25%	0.23%	0.21%	0.23%	0.35%	0.60%	0.30%	98.79%	0.26%	106.71%
Intentional by Trade	CL-CL	0.018%	0.020%	0.019%	0.023%	0.019%	0.017%	0.019%	0.0005%	2.52%	-0.002%	-9.04%
	CL-IN	0.04%	0.05%	0.05%	0.08%	0.09%	0.09%	0.08%	0.04%	87.98%	0.02%	26.13%
	OTHER	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NA *	0.001%	NA *
Intentional by Value	CL-CL	4.13%	3.75%	3.56%	3.23%	2.56%	2.26%	2.03%	-2.10%	-50.92%	-1.33%	-38.50%
	CL-IN	9.04%	8.38%	10.26%	8.65%	8.64%	8.11%	7.92%	-1.12%	-12.44%	-0.96%	-10.69%
	OTHER	0.00%	0.00%	0.00%	0.20%	0.47%	0.51%	0.49%	0.48%	NA *	0.35%	NA *
Intentional by Volume	CL-CL	3.54%	3.16%	2.96%	2.94%	2.24%	2.44%	2.09%	-1.45%	-40.87%	-0.69%	-23.37%
	CL-IN	7.99%	6.86%	7.50%	6.24%	6.16%	6.44%	6.46%	-1.53%	-19.19%	-0.53%	-7.69%
	OTHER	0.00%	0.00%	0.00%	0.23%	0.48%	0.58%	0.54%	0.54%	NA *	0.40%	NA *

Table 2 shows the average percentages of intentional and unintentional crosses by client type and number of trades, total volume and value averaged over six-month periods. Net change is calculated by comparing period 7 (Jan-June 2019) to period 1 (Jan-June 2016). % Change between period 1 and 7 is the net change as a percentage of the period 1 percentage.

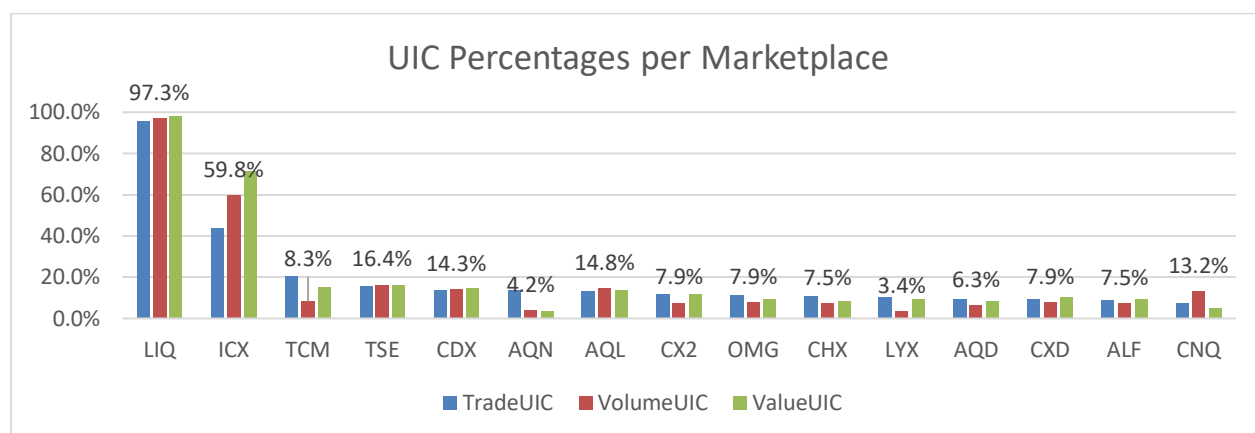
* Due to the negligible values in the denominator, the % changes are not informative. Thus, they are marked as NA.



Table 2.1 – Marketplace Reference Data

Market Name	Market Alias	Dark Market	Market Full Name
ALF	ALF	No	Alpha
AQD	AQD	Yes	NEO-D
AQL	AQL	No	NEO-L
AQN	AQN	No	NEO-N
CDX	TSXV	No	TSX Venture
CHX	CHX	No	Nasdaq CXC
CNQ	CSE	No	Canadian Securities Exchange
CX2	CX2	No	Nasdaq CX2
CXD	CXD	Yes	Nasdaq CXD
ICX	ICX	Yes	Instinet ICX
LIQ	LIQ	Yes	Liquidnet
LYX	LYX	No	Lynx
OMG	OMG	No	Omega
PTX	PTX	No	Pure
TCM	TCM	Yes	MATCHNow
TSE	TSX	No	TSX

Fig 8 – Average Cross Percentage by Marketplace – Relative to Own Trading



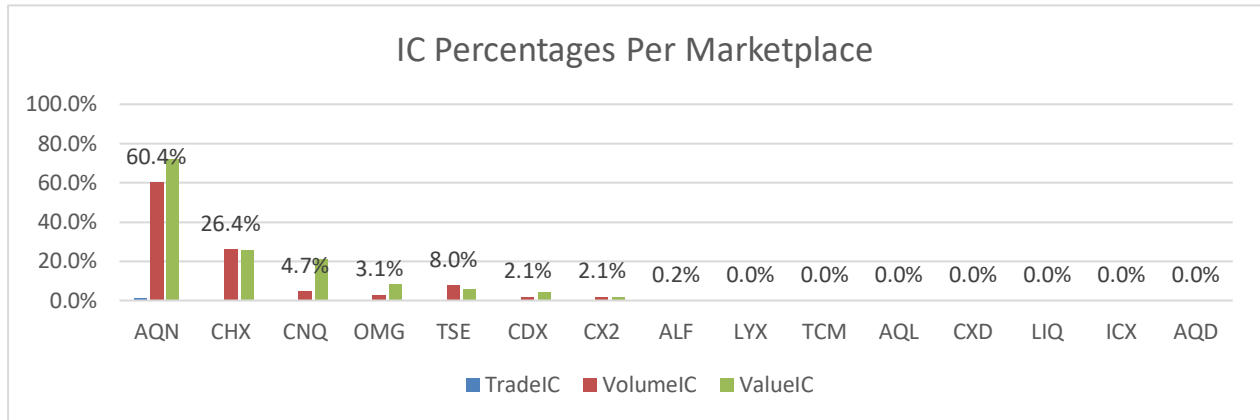


Fig 8 shows the percentage of intentional and unintentional crosses by total trades, total volume and total value measured against each marketplace's own trading. Percentages displayed above the bars correspond to volume.

Fig 9 – Average Contribution by Marketplace

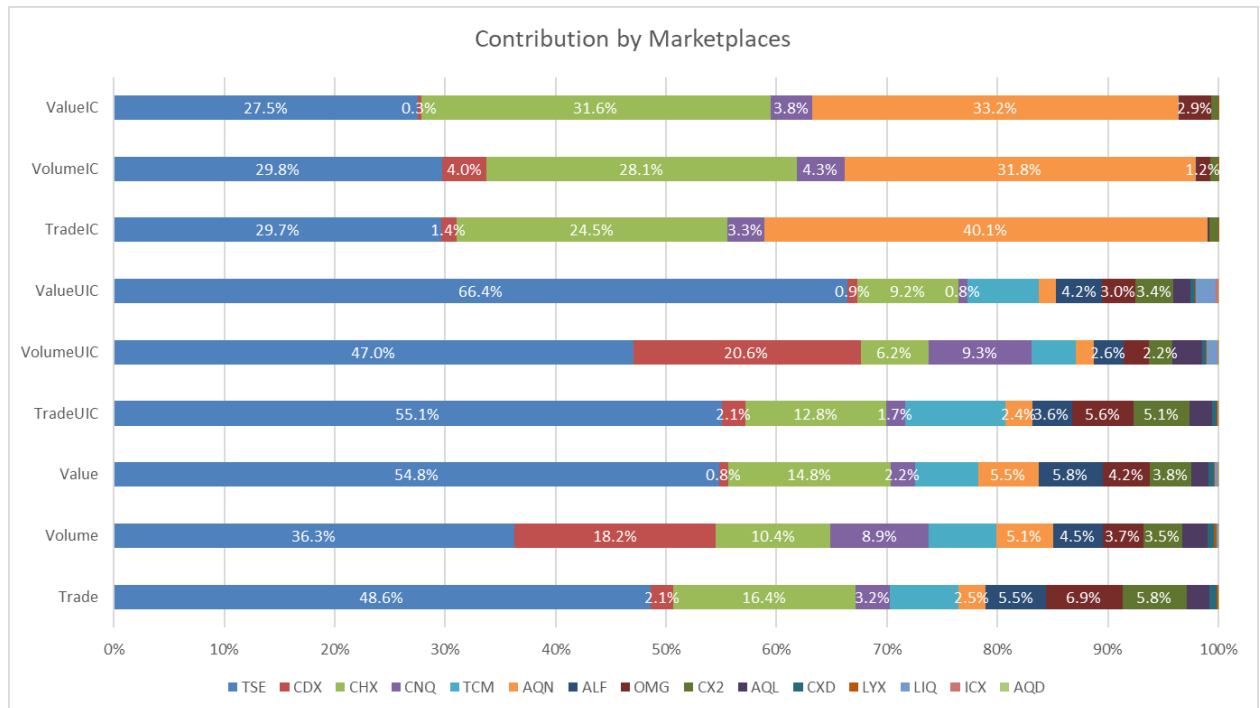


Fig 9 shows the percentage contribution by each marketplace against the total traded by all marketplaces. For comparison purposes, total (including cross and non-cross activity) number of trades, volume and value has been included. This chart is generated based on the exact data in Table 2.2.



Table 2.2 – Average contribution by each marketplace in terms of intentional / unintentional cross trades and overall trades

Market	Trade	Volume	Value	Trade UIC	Volume UIC	Value UIC	Trade IC	Volume IC	Value IC
TSE	48.6%	36.3%	54.8%	55.1%	47.0%	66.4%	29.7%	29.8%	27.5%
CDX	2.1%	18.2%	0.8%	2.1%	20.6%	0.9%	1.4%	4.0%	0.3%
CHX	16.4%	10.4%	14.8%	12.8%	6.2%	9.2%	24.5%	28.1%	31.6%
CNQ	3.2%	8.9%	2.2%	1.7%	9.3%	0.8%	3.3%	4.3%	3.8%
TCM	6.2%	6.1%	5.7%	9.1%	4.0%	6.5%	0	0	0
AQN	2.5%	5.1%	5.5%	2.4%	1.7%	1.5%	40.1%	31.8%	33.2%
ALF	5.5%	4.5%	5.8%	3.6%	2.6%	4.2%	0.1%	0.1%	0.1%
OMG	6.9%	3.7%	4.2%	5.6%	2.3%	3.0%	0.1%	1.2%	2.9%
CX2	5.8%	3.5%	3.8%	5.1%	2.2%	3.4%	0.8%	0.8%	0.7%
AQL	2.1%	2.3%	1.5%	2.0%	2.6%	1.5%	0	0	0
CXD	0.6%	0.6%	0.5%	0.4%	0.4%	0.4%	0	0	0
LYX	0.2%	0.3%	0.1%	0.1%	0.1%	0.1%	0.001%	0.000%	0.000%
LIQ	0.001%	0.1%	0.2%	0.0%	1.0%	1.8%	0	0	0
ICX	0.017%	0.020%	0.045%	0.1%	0.1%	0.2%	0	0	0
AQD	0.004%	0.004%	0.007%	0.003%	0.002%	0.004%	0	0	0
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%



Fig 10 – CL-CL Crosses by Security Price

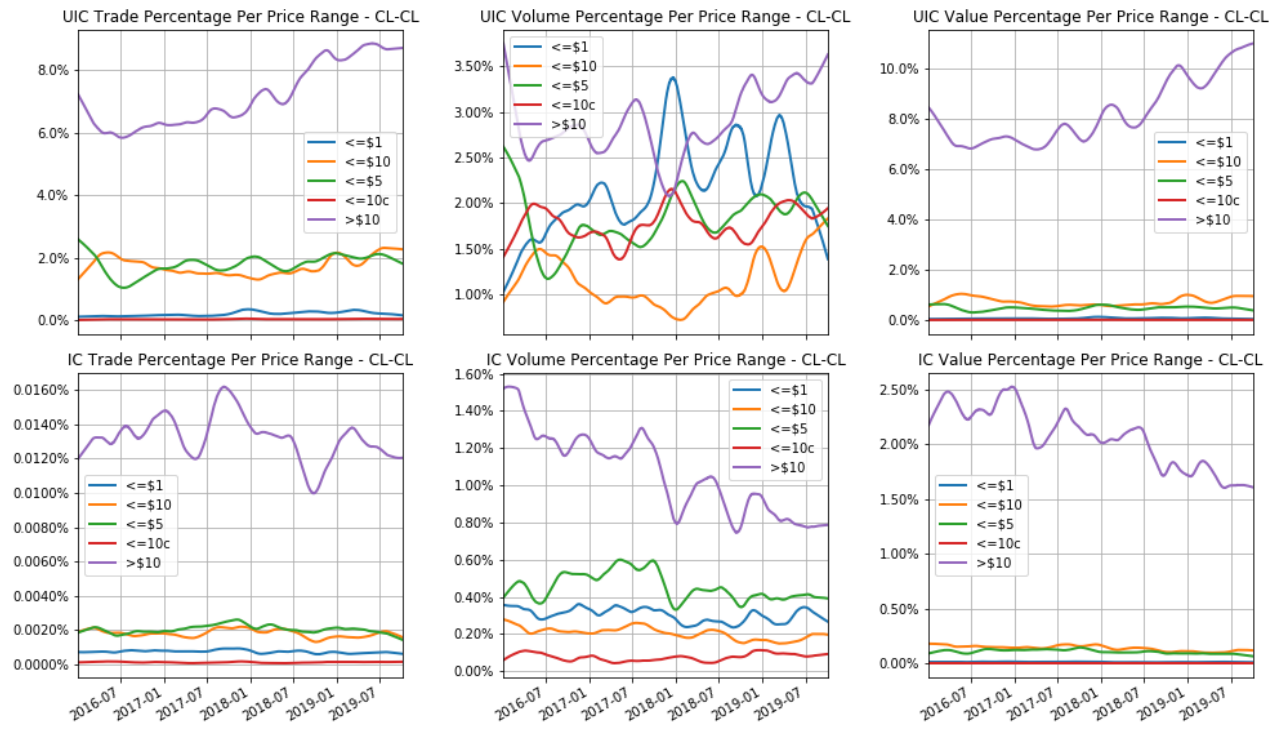


Fig 10 shows a breakdown of intentional and unintentional client-client crosses as a percentage of total trading activity over the period by security price. 5 buckets are used: =<.10, >.10 - \$1, >\$1 - \$\$, >\$5 - \$10, >\$10.



Fig 11 – CL-IN Crosses by Security Price

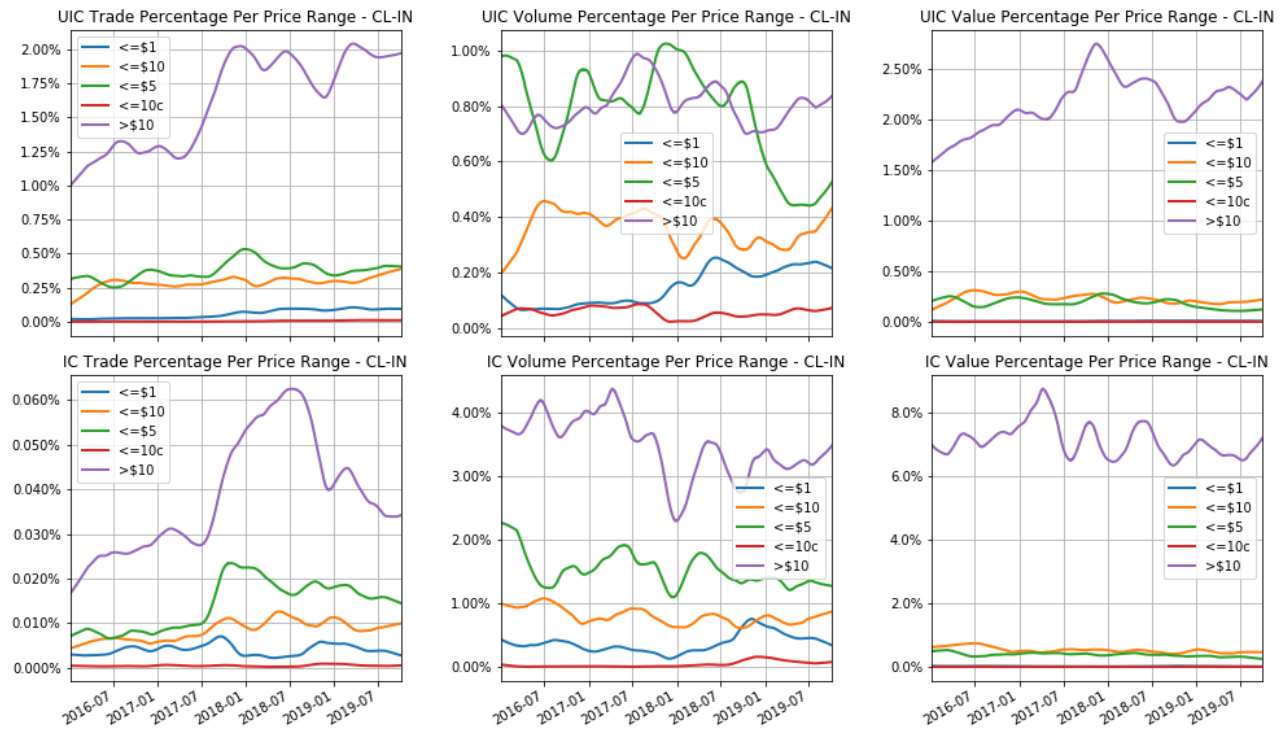


Fig 11 shows a breakdown of intentional and unintentional client-inventory crosses as a percentage of total trading activity over the period by security price. 5 buckets are used: =<.10, >.10 - \$1, >\$1 - \$5, >\$5 - \$10, >\$10.



Fig 12 –Crosses by Liquidity

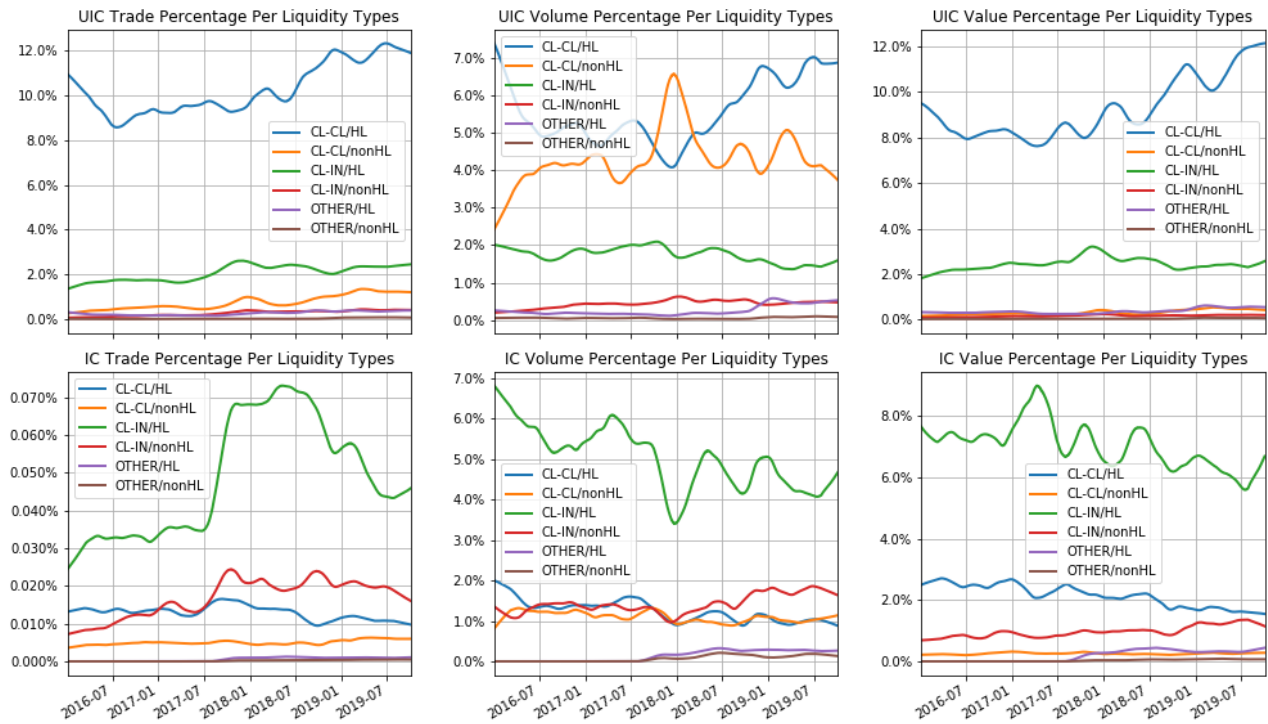


Fig 12 shows a breakdown of intentional and unintentional crosses as a percentage of total trading activity by client type over the period by liquidity. For the calculation of liquidity, the IIROC highly-liquid security list was used.

Table 3 – Average Contribution by Top 15 Dealers

Total Value	88.04%
Total Volume	81.87%
Total Trades	87.77%
Intentional Crosses - Value	85.97%
Intentional Crosses - Volume	77.11%
Intentional Crosses - Trades	81.16%
Unintentional Crosses - Value	94.75%
Unintentional Crosses - Volume	94.68%
Unintentional Crosses - Trades	98.59%

Table 3 aggregates the activity of the top 15 dealers as measured by trading activity. Percentages reflect the aggregate contribution over the period. For comparison purposes, total (including cross and non-cross trades) number of trades, volume and value have been included.



Fig 13 – Top 15 Dealers - Crosses - Percentage of Own Trading

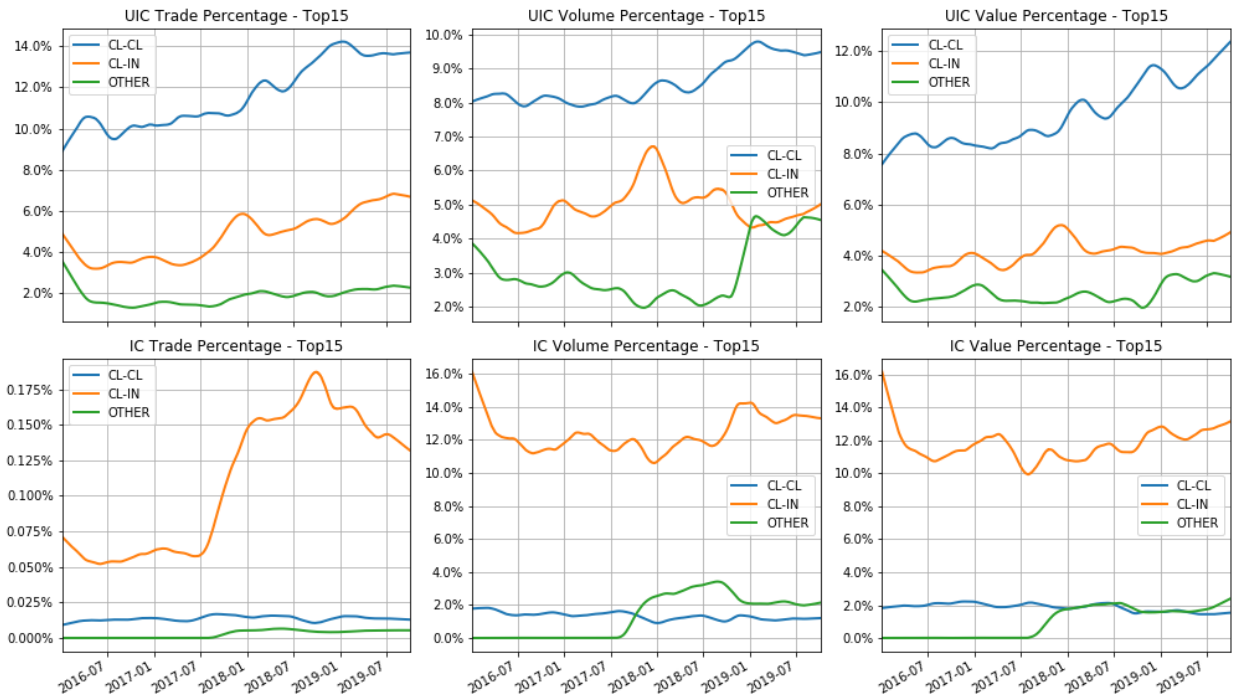


Fig 13 shows the percentage of intentional and unintentional crosses by client type of the top 15 dealers as compared against the total trading activity of the same top 15 dealers on all marketplaces.



Fig 14 – Top 15 Dealers - Crosses - Percentage of Total Trading

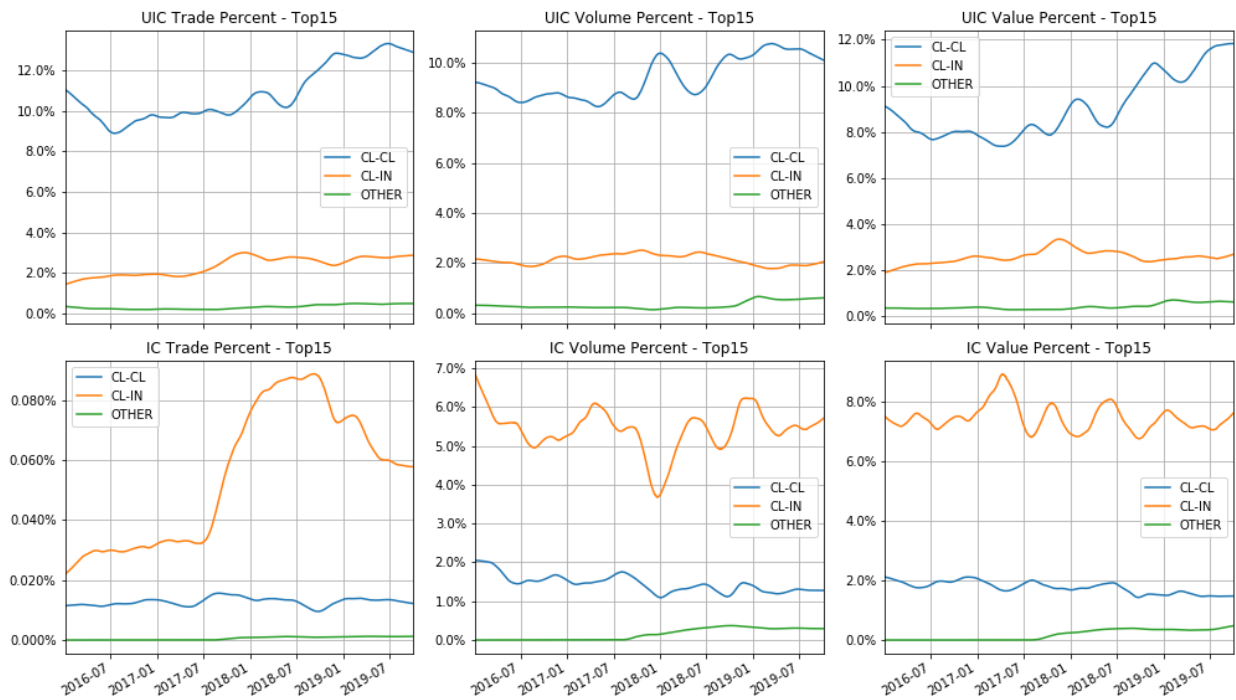


Fig 14 shows the percentage of intentional and unintentional crosses by client type of the top 15 dealers as compared against the total trading activity of all dealers on all marketplaces.