

**Nasdaq PHLX  
Filing to Make PIXL Permanent  
January 15, 2016**

## Introduction

This report covers PIXL activity from January 2, 2015 through June 30, 2015. It covers volume, characteristics of price improvement, and the outcome of auctions that terminated early.

## Use of PIXL

PIXL auctions executed 34.8 million contracts over the 6 month period covered by this study (Table 1). That was 11.4% of total PHLX contract volume and 1.8% of total consolidated volume over the period. The average daily number of contracts traded on PIXL declined from 399,361 contracts per day in January 2015 to 187,062 contracts per day in June 2015. The percent of PHLX volume traded in PIXL auctions fell from 14.4% in January 2015 to 8.5% in June 2015. The percent of consolidated volume traded in PIXL auctions fell from 2.3% in January 2015 to 1.2% in June 2015.

The period analyzed for this report coincided with a decline in volatility, an important driver of options trading volume. The VIX declined from an average of 19.1 during January 2015 to 14.3 during June 2015. During the period consolidated options volume fell by 5.3%. PHLX volume fell by 12.3% and PIXL volume fell by 48.5%.

Volume (in millions)	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total	Period % change
PIXL volume	8.0	8.1	5.7	4.6	4.2	4.1	34.8	-48.5%
PHLX volume	55.3	52.9	51.5	49.5	46.1	48.5	303.8	-12.3%
Consolidated volume	353.3	302.5	337.0	327.6	304.1	334.5	1,959.0	-5.3%
% PIXL-to-PHLX volume	14.4%	15.3%	11.2%	9.4%	9.1%	8.5%	11.4%	
% PIXL-to-Consolidated volume	2.3%	2.7%	1.7%	1.4%	1.4%	1.2%	1.8%	
VIX	19.1	15.9	14.8	13.5	13.3	14.3		-25.0%
Average daily volume (in thousands)	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jun-Jan	Period % change
PIXL average daily volume	399.4	425.5	261.1	220.5	210.6	187.1	280.4	-53.2%
PHLX average daily volume	2,764.3	2,786.5	2,340.6	2,356.8	2,305.4	2,203.1	2,449.9	-20.3%
Consolidated average daily volume	17,663.2	15,922.5	15,319.8	15,599.9	15,206.7	15,203.2	15,798.6	-13.9%
Number of days	20	19	22	21	20	22	124	

## Price Improvement<sup>1</sup>

Between January and June 2015, 68.6% of PIXL auctions executed at a price that was better than the national best bid or offer (NBBO) at the time the auction began (Table 2). The equal-weighted average amount of price improvement per contract for PIXL auctions was 5.5%. The average amount of price improvement was stable between January and June 2015.

The total amount of price improvement provided to customers was \$1.2 million. The monthly total amount of price improvement declined as volume in PIXL auctions declined.

**Table 2 : Price improvement provided by PIXL auctions**

Auctions	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
Price improvement	70.6%	67.3%	63.8%	66.6%	68.3%	75.5%	68.6%
No price improvement	29.4%	32.7%	36.2%	33.4%	31.7%	24.5%	31.4%
Total	491,564	471,691	357,342	347,333	326,633	302,438	2,297,001
Percent of contracts receiving price improvement	62.9%	59.4%	57.4%	59.5%	60.5%	64.5%	60.6%
Percent of contracts not receiving price improvement	37.1%	40.6%	42.6%	40.5%	39.5%	35.5%	39.4%
Total number of contracts	7,930,277	8,022,355	5,705,024	4,581,541	4,169,886	4,064,535	34,473,618
Average price improvement	5.7%	5.0%	4.9%	5.0%	6.2%	6.5%	5.5%
Total price improvement	\$296,242	\$238,038	\$159,915	\$148,791	\$150,895	\$174,371	\$1,168,251

## Appendix tables

Appendix 1 presents detailed price improvement statistics for the volume transacted through PIXL for January to June 2015. Tables below summarize some of the information evident in the appendix tables.

## Customer orders

Public customer agency orders initiated 99.2% of PIXL auctions and 99.1% of contracts executed by those auctions between January and June 2015 (Table 3). The share of customer orders in

<sup>1</sup> Price improvement for a buy order is the national best offer at the time the auction began minus the execution price. Price improvement for a sell order is the execution price minus the national best bid at the time the auction began. An auction may result in multiple executions at different prices with some contracts receiving more price improvement than others. The total price improvement for an auction is divided by the number of contracts in the auction to get the per-contract price improvement for the auction. Percent price improvement for an auction is calculated as the per-contract price improvement for the auction divided by the NBBO midpoint at the time the auction began. Percent price improvement per auction is then averaged across time without weights. In 0.7% of auctions no NBBO was available at the time the auction began. These cases were not included in the calculations (Tables 2-16) because the amount of price improvement is unknown.

PIXL auctions was stable over the period. The share of orders receiving price improvement was 68.8% for customer orders and 36.5% for non-customer orders. The equal-weighted average price improvement was 5.5% for customer orders and 1.4% for non-customer orders.

Table 3 : Customers versus non-customers PIXL auctions

Auctions	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
Customers auctions	99.1%	99.3%	99.0%	99.0%	99.0%	99.7%	99.2%
Non customer auctions	0.9%	0.7%	1.0%	1.0%	1.0%	0.3%	0.8%
Total auctions	491,564	471,691	357,342	347,333	326,633	302,438	2,297,001
Customer traded contracts	99.2%	99.5%	98.7%	98.2%	99.0%	99.6%	99.1%
Non-customer traded contracts	0.8%	0.5%	1.3%	1.8%	1.0%	0.4%	0.9%
Total number of contracts	7,930,277	8,022,355	5,705,024	4,581,541	4,169,886	4,064,535	34,473,618
Percent of customer auctions receiving price improvement	70.8%	67.6%	64.1%	66.9%	68.7%	75.6%	68.8%
Percent of non-customer auctions receiving price improvement	49.8%	32.2%	32.4%	35.0%	27.0%	41.0%	36.5%
Percent of customer traded contracts receiving price improvement	62.9%	59.6%	57.8%	60.1%	60.8%	64.6%	60.8%
Percent of non-customer traded contracts receiving price improvement	58.1%	25.0%	26.7%	29.3%	30.9%	37.5%	34.5%
Percent price improvement received by customer auctions	5.7%	5.1%	4.9%	5.1%	6.2%	6.5%	5.5%
Percent price improvement received by non-customer auctions	3.5%	0.7%	0.5%	0.7%	0.7%	2.1%	1.4%

### Order size

93.0% of PIXL auctions between January and June 2015 were for orders for less than 50 contracts (Table 4). The percent of auctions less than 50 contracts increased slightly over the period. Auctions for orders of less than 50 contracts traded 45.5% of contract volume traded in PIXL. Auctions of 50 contracts or more made up 7.0% of all PIXL auctions and traded 54.5% of contracts traded in PIXL.

69.2% of auctions for less than 50 contracts received price improvement. 56.3% of auctions for 50 contracts or more received price improvement. 66.5% of contracts in auctions for less than 50 contracts received price improvement. 55.7% of auctions for 50 contracts or more received price improvement. The equal-weighted average price improvement was 5.5% for auctions of less than 50 contracts and 4.9% for auctions of 50 contracts or more.

Table 4 : PIXL auctions by size

Auctions	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
Auctions order size < 50	92.2%	92.3%	93.1%	93.8%	93.8%	93.6%	93.0%
Auctions order size >= 50	7.8%	7.7%	6.9%	6.2%	6.2%	6.4%	7.0%
Total auctions	491,564	471,691	357,342	347,333	326,633	302,438	2,297,001
Traded contracts in auctions with order size < 50	44.1%	41.1%	40.6%	49.6%	52.1%	52.5%	45.5%
Traded contracts in auctions with order size >= 50	55.9%	58.9%	59.4%	50.4%	47.9%	47.5%	54.5%
Total number of contracts	7,930,277	8,022,355	5,705,024	4,581,541	4,169,886	4,064,535	34,473,618
Percent of auctions with order size < 50 receiving price improvement	71.3%	68.2%	64.3%	67.0%	68.8%	76.2%	69.2%
Percent of auctions with order size >= 50 receiving price improvement	59.2%	55.2%	52.1%	54.9%	56.4%	59.5%	56.3%
Percent of traded contracts in auctions with order size < 50 receiving price improvement	67.8%	65.7%	62.5%	64.5%	66.3%	72.5%	66.5%
Percent of traded contracts in auctions with order size >= 50 receiving price improvement	59.0%	55.0%	53.9%	54.6%	54.1%	55.6%	55.7%
Percent price improvement received by auctions with order size < 50	5.7%	5.1%	4.9%	5.0%	6.2%	6.6%	5.5%
Percent price improvement received by auctions with order size >= 50	5.3%	4.7%	4.4%	4.3%	5.3%	5.2%	4.9%

*PHLX quote*

93.4% of PIXL auction began when PHLX best bid or offer (PBBO) was at the NBBO<sup>2</sup> (Table 5). 68.8% of auctions that began when the PBBO was at the NBBO received price improvement. 64.8% of auctions that began when the PBBO was not at the NBBO received price improvement. Average price improvement was 5.6% when PBBO was at the NBBO and 3.4% when PBBO was not at the NBBO.

Table 5 : PIXL auctions by PHLX quote situation

Auctions	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
PBBO = NBBO	92.3%	93.6%	93.6%	93.9%	93.5%	94.3%	93.4%
PBBO ≠ NBBO	7.7%	6.4%	6.4%	6.1%	6.5%	5.7%	6.6%
Total auctions	491,564	471,691	357,342	347,333	326,633	302,438	2,297,001
Traded contracts when PBBO = NBBO	92.7%	93.8%	92.8%	92.4%	92.1%	92.6%	92.9%
Traded contracts when PBBO ≠ NBBO	7.3%	6.2%	7.2%	7.6%	7.9%	7.4%	7.1%
Total number of contracts	7,930,277	8,022,355	5,705,024	4,581,541	4,169,886	4,064,535	34,473,618
Percent of auctions with PBBO = NBBO receiving price improvement	71.0%	67.7%	64.0%	66.7%	68.3%	75.8%	68.8%
Percent of auctions with PBBO ≠ NBBO receiving price improvement	65.8%	62.0%	60.0%	64.7%	67.8%	70.1%	64.8%
Percent of traded contracts when PBBO = NBBO receiving price improvement	62.7%	59.4%	57.7%	59.6%	60.5%	64.9%	60.7%
Percent of traded contracts when PBBO ≠ NBBO receiving price improvement	65.1%	59.7%	54.0%	57.8%	59.7%	58.8%	59.6%
Percent price improvement received auctions when PBBO = NBBO	5.9%	5.2%	5.0%	5.1%	6.2%	6.6%	5.6%
Percent price improvement received auctions when PBBO ≠ NBBO	2.4%	2.7%	3.0%	3.6%	5.4%	4.9%	3.4%

*NBBO spread width*

The median quoted spread when a PIXL auction began was \$0.05 or 6.5%. The distribution of auctions and contracts traded by spread were similar (Tables 6 and 7). Auctions that began when spreads were wider were more likely to receive price improvement (Tables 8 and 9). Auctions that began when spreads were wider had higher average price improvement per contract (Table 10).

Table 6 : Distribution of PIXL auctions, by spread width when auction began

Quoted spread	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
0.01	4.5%	4.5%	4.4%	4.2%	3.9%	3.1%	4.2%
0.02	13.5%	15.1%	15.7%	14.3%	13.8%	10.2%	13.9%
0.03	13.3%	13.9%	15.2%	15.0%	13.9%	11.2%	13.8%
0.04	6.2%	5.6%	5.8%	6.2%	5.8%	4.9%	5.8%
0.05	8.7%	9.7%	10.1%	10.5%	10.8%	10.2%	9.9%
>.05,<=.10	16.9%	17.3%	16.8%	17.0%	17.2%	18.0%	17.2%
>.10,<=.20	16.8%	16.2%	15.2%	15.4%	15.7%	18.7%	16.3%
>.20,<=.30	7.5%	7.1%	6.4%	6.3%	6.6%	8.0%	7.0%
>.30,<=.40	3.9%	3.4%	3.2%	3.4%	3.8%	4.5%	3.7%
>.40,<=.50	2.7%	2.3%	2.3%	2.5%	2.7%	3.4%	2.6%
>.50	6.0%	4.7%	4.8%	5.4%	5.9%	7.8%	5.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

<sup>2</sup> Defined as when PHLX best offer was equal to national best offer for a buy initiating order, and PHLX best bid was equal to national best bid for a sell initiating order.

**Table 7 : Distribution of contracts traded in PIXL auctions, by spread width when auction began**

Quoted spread	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
0.01	6.6%	7.5%	5.4%	7.1%	6.2%	4.8%	6.4%
0.02	17.5%	20.1%	19.0%	17.1%	17.3%	14.7%	18.0%
0.03	16.8%	16.1%	19.2%	17.1%	16.6%	15.0%	16.8%
0.04	7.4%	6.4%	7.6%	7.3%	6.3%	6.2%	6.9%
0.05	9.1%	10.2%	11.5%	11.7%	12.0%	11.5%	10.7%
>.05,<=.10	16.5%	16.3%	16.3%	16.7%	17.3%	18.4%	16.8%
>.10,<=.20	13.7%	13.1%	12.0%	12.5%	12.9%	15.6%	13.2%
>.20,<=.30	5.3%	4.7%	3.8%	4.2%	4.3%	5.7%	4.7%
>.30,<=.40	2.6%	2.2%	2.0%	2.2%	2.4%	2.8%	2.4%
>.40,<=.50	1.5%	1.3%	1.2%	1.4%	1.7%	1.9%	1.5%
>.50	2.9%	2.1%	2.1%	2.6%	3.0%	3.4%	2.6%
Total	100%	100%	100%	100%	100%	100%	100%

**Table 8 : Percent of auctions receiving price improvement, by spread width when auction began**

Quoted spread	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
0.01	5.2%	3.3%	3.4%	3.6%	3.9%	5.2%	4.0%
0.02	15.2%	10.9%	7.7%	8.6%	7.8%	8.6%	10.2%
0.03	40.7%	36.0%	26.8%	29.1%	26.7%	32.6%	32.6%
0.04	64.4%	64.3%	60.1%	61.9%	62.1%	69.1%	63.5%
0.05	80.4%	82.2%	82.1%	85.3%	87.2%	85.6%	83.6%
>.05,<=.10	91.7%	91.2%	90.9%	92.4%	94.1%	93.5%	92.2%
>.10,<=.20	97.6%	96.8%	96.5%	97.3%	97.8%	97.7%	97.3%
>.20,<=.30	99.2%	98.8%	98.4%	98.7%	98.9%	98.8%	98.8%
>.30,<=.40	99.5%	99.4%	99.3%	99.4%	99.5%	99.4%	99.4%
>.40,<=.50	99.7%	99.6%	99.3%	99.6%	99.6%	99.7%	99.6%
>.50	99.8%	99.8%	99.7%	99.8%	99.7%	99.8%	99.8%

**Table 9 : Percent of contracts receiving price improvement, by spread width when auction began**

Quoted spread	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
0.01	4.4%	4.1%	2.3%	17.1%	6.4%	4.0%	6.1%
0.02	17.2%	15.1%	10.3%	9.2%	10.4%	8.1%	12.8%
0.03	41.2%	38.9%	33.9%	30.7%	29.6%	30.7%	35.4%
0.04	65.5%	64.6%	60.2%	62.8%	60.6%	61.5%	63.0%
0.05	79.1%	81.3%	80.3%	81.4%	83.0%	79.9%	80.8%
>.05,<=.10	91.5%	89.6%	89.6%	89.5%	91.5%	91.1%	90.4%
>.10,<=.20	97.0%	96.5%	95.0%	96.5%	96.5%	96.8%	96.5%
>.20,<=.30	99.2%	96.8%	98.6%	98.3%	98.0%	97.5%	98.1%
>.30,<=.40	99.5%	99.5%	99.3%	99.2%	98.8%	98.8%	99.2%
>.40,<=.50	97.7%	97.8%	99.1%	99.1%	98.7%	99.1%	98.5%
>.50	98.8%	99.6%	99.8%	99.6%	99.4%	99.7%	99.4%

**Table 10 : Average price improvement for PIXL auctions, by spread width when auction began**

Quoted spread	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
0.01	0.9%	0.6%	0.4%	0.5%	0.5%	0.5%	0.6%
0.02	2.1%	1.3%	0.7%	0.7%	0.6%	0.6%	1.0%
0.03	1.8%	1.5%	1.0%	1.0%	1.0%	1.1%	1.2%
0.04	2.8%	2.8%	1.8%	1.9%	1.9%	2.0%	2.2%
0.05	7.2%	7.8%	8.4%	8.5%	11.9%	11.6%	9.2%
>.05,<=.10	6.1%	5.5%	5.9%	5.4%	6.9%	6.6%	6.1%
>.10,<=.20	6.8%	6.4%	6.4%	6.4%	7.8%	7.3%	6.8%
>.20,<=.30	7.6%	7.1%	7.1%	7.3%	8.3%	8.2%	7.6%
>.30,<=.40	10.5%	9.7%	10.6%	10.8%	11.5%	11.0%	10.7%
>.40,<=.50	10.5%	9.4%	10.1%	10.6%	11.3%	10.2%	10.4%
>.50	14.3%	13.5%	13.7%	13.6%	14.5%	12.7%	13.7%

*Number of unique participants*

The mean number of unique participants in PIXL auctions was 4.0 and median was 3.0. The distribution of auctions and contracts traded by number of unique participants were similar, with a single participant in about ¼ of auctions and volume (Tables 11 and 12). The probability that an auction provided price improvement does not vary systematically with the number of

participants (Tables 13 and 14). Auctions that had fewer participants had higher average price improvement per contract (Table 15).

**Table 11 : Distribution of PIXL auctions, by number of participants**

PIXL auctions number of participants	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
1	24.1%	24.9%	24.3%	23.7%	26.2%	35.3%	26.0%
2	13.5%	15.3%	14.7%	14.3%	14.9%	16.2%	14.7%
3	10.3%	12.0%	11.2%	10.3%	10.6%	10.2%	10.8%
4	9.8%	10.9%	10.1%	9.3%	9.3%	8.2%	9.7%
5	9.9%	10.2%	9.7%	9.0%	8.6%	7.2%	9.3%
6	9.6%	8.9%	8.9%	8.6%	7.8%	6.3%	8.5%
7	8.2%	7.0%	7.5%	7.6%	6.8%	5.3%	7.2%
8	6.3%	4.9%	5.8%	6.3%	5.6%	4.2%	5.6%
9	4.2%	3.0%	3.7%	4.6%	4.2%	2.9%	3.8%
10	2.3%	1.6%	2.2%	3.1%	2.8%	1.9%	2.3%
>10	1.6%	1.1%	1.8%	3.3%	3.2%	2.1%	2.1%

**Table 12 : Distribution of contracts traded in PIXL auctions, by number of participants**

PIXL auctions number of participants	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
1	25.3%	28.2%	29.0%	26.1%	28.9%	34.3%	28.2%
2	14.4%	15.2%	14.2%	14.6%	15.0%	15.5%	14.8%
3	10.8%	11.4%	10.7%	11.2%	11.1%	10.6%	11.0%
4	9.9%	10.6%	9.9%	10.0%	9.9%	9.0%	10.0%
5	10.1%	10.3%	8.9%	9.3%	8.8%	7.7%	9.4%
6	9.4%	8.2%	8.9%	8.2%	7.5%	7.3%	8.4%
7	7.6%	6.3%	6.0%	6.8%	6.2%	5.4%	6.5%
8	5.5%	4.3%	5.0%	5.2%	4.7%	3.9%	4.8%
9	3.6%	2.8%	3.1%	3.7%	3.3%	2.6%	3.2%
10	1.9%	1.6%	2.0%	2.3%	2.1%	1.7%	1.9%
>10	1.5%	1.0%	2.2%	2.7%	2.5%	1.9%	1.8%

**Table 13 : Percent of PIXL auctions receiving price improvement, by number of participants**

PIXL auctions number of participants	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
1	81.2%	78.6%	73.9%	76.8%	79.9%	87.5%	80.0%
2	63.9%	63.8%	62.7%	66.9%	71.1%	79.5%	67.4%
3	57.6%	57.9%	57.7%	61.1%	64.3%	72.3%	61.0%
4	58.4%	58.6%	55.3%	59.3%	59.8%	65.9%	59.1%
5	63.7%	61.0%	56.3%	59.4%	58.1%	63.0%	60.4%
6	70.5%	65.3%	58.9%	61.1%	58.7%	62.4%	63.7%
7	75.4%	69.4%	63.4%	63.3%	61.9%	62.1%	67.2%
8	78.6%	71.9%	66.2%	66.4%	64.4%	64.2%	69.8%
9	80.4%	73.9%	68.8%	68.8%	68.0%	63.8%	71.8%
10	80.5%	74.1%	69.4%	69.0%	70.2%	63.7%	72.0%
>10	75.0%	65.1%	60.7%	65.1%	68.1%	59.6%	66.1%

**Table 14 : Percent of contracts traded receiving price improvement, by number of participants**

PIXL auctions number of participants	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
1	82.2%	79.5%	79.0%	77.2%	77.1%	80.9%	79.6%
2	63.3%	58.4%	56.4%	59.9%	62.5%	68.4%	61.1%
3	52.4%	49.6%	52.3%	53.2%	56.8%	58.7%	53.1%
4	48.5%	46.6%	47.4%	50.7%	50.8%	50.3%	48.6%
5	48.4%	43.0%	46.8%	51.3%	47.6%	50.2%	47.2%
6	52.6%	48.1%	42.3%	50.7%	47.6%	47.4%	48.5%
7	58.1%	52.4%	46.7%	51.7%	49.4%	50.5%	52.4%
8	63.1%	54.8%	42.1%	53.6%	52.1%	55.1%	54.3%
9	67.3%	63.2%	44.5%	51.5%	55.1%	53.8%	57.6%
10	70.5%	69.7%	38.9%	54.4%	54.9%	52.3%	58.3%
>10	66.6%	51.5%	53.2%	45.8%	49.2%	44.6%	52.3%

**Table 15:** Average percent price improvement, by number of participants

PIXL auctions number of participants	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
1	9.0%	8.0%	7.9%	8.3%	10.2%	9.2%	8.8%
2	6.8%	5.5%	5.4%	5.6%	7.3%	7.4%	6.3%
3	5.1%	4.0%	4.0%	4.1%	5.2%	5.8%	4.6%
4	4.3%	3.5%	3.4%	3.6%	4.3%	4.8%	3.9%
5	4.2%	3.4%	3.3%	3.7%	3.9%	4.2%	3.7%
6	3.9%	3.6%	3.3%	3.7%	4.0%	4.0%	3.7%
7	3.9%	3.8%	3.8%	3.5%	3.8%	3.7%	3.8%
8	3.7%	3.8%	3.8%	3.6%	3.9%	3.5%	3.7%
9	3.6%	3.8%	3.7%	3.5%	3.7%	3.0%	3.6%
10	3.2%	3.5%	3.5%	3.1%	3.2%	2.7%	3.2%
>10	2.4%	2.5%	2.6%	2.2%	2.5%	2.0%	2.4%

### Auctions terminated early

Between January and June 2015 320 auctions terminated early because the PBBO crossed the PIXL order stop price (Table 16). No auctions terminated early because of halts. The number of auctions that terminated early was 1/100<sup>th</sup> of 1% of all PIXL auctions over the period. The auctions that terminated early included 1/100<sup>th</sup> of 1% of contracts traded in PIXL auctions. The share of auctions that terminated early was stable between January and June 2015.

Between January and June 2015, 76.3% of PIXL auctions that terminated early executed at a price that was better than the NBBO at the time the auction began. 71.9% of contracts in auctions that terminated early received price improvement. The average amount of price improvement per contract for PIXL auctions that terminated early was 4.1%.

**Table 16:** Early terminated PIXL auctions

	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Total
Early terminated auctions	57	86	56	41	35	45	320
Percent early terminated auctions	0.01%	0.02%	0.02%	0.01%	0.01%	0.01%	0.01%
Traded contracts in early terminated auctions	384	1016	628	684	673	508	3893
Percent of traded contracts in early terminated auctions	0.00%	0.01%	0.01%	0.01%	0.02%	0.01%	0.01%
Percent of early terminated auctions receiving price improvement	71.9%	74.4%	67.9%	85.4%	82.9%	82.2%	76.3%
Percent of traded contracts in early terminated auctions receiving price improvement	71.9%	69.7%	72.1%	89.5%	64.2%	63.0%	71.9%
Percent price improvement received by early terminated auctions	4.4%	2.8%	2.2%	4.9%	4.5%	7.6%	4.1%

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for January 2015.

Customer

Month Jan 2015

Order size greater than or equal to 50

Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts	
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	844,181	29,434	250	0	50	0	0	0	0	0	0	0	0	873,915	4	52	49
0.02	536,092	300,066	9,462	50	0	150	0	0	0	0	0	0	0	845,820	4	59	58
0.03	194,718	165,962	10,807	1,876	116	0	63	0	0	0	0	0	0	373,542	5	54	53
0.04	67,805	123,859	77,574	1,661	496	0	0	0	0	0	0	0	0	271,395	4	64	63
0.05	88,173	118,894	87,802	26,271	10,253	7,541	391	42	0	0	0	0	0	339,367	4	59	54
>.05,<=.10	55,971	162,012	130,658	107,215	58,305	92,355	32,886	84	0	0	0	0	0	639,486	4	62	57
>.10,<=.20	23,484	52,573	35,808	46,719	36,610	78,776	158,603	18,686	50	0	0	0	0	451,309	4	62	55
>.20,<=.30	5,777	3,597	7,888	9,133	6,859	15,243	56,779	45,244	5,982	0	0	0	0	156,502	4	62	58
>.30,<=.40	732	1,593	734	1,621	1,814	4,574	18,182	30,723	9,606	566	0	0	0	70,145	4	62	58
>.40,<=.50	2,694	40	426	77	496	1,547	8,727	14,862	8,616	2,020	293	0	0	39,798	4	65	54
>.50	2,662	375	71	143	477	706	4,881	20,384	12,497	11,398	7,846	12,264	0	73,704	4	63	59
Total Contracts Traded													4,134,983				

Customer

Month Jan 2015

Order size greater than or equal to 50

Not Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts	
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	39,280	7,554	1,183	70	0	0	75	0	0	0	0	0	0	48,162	3	65	58
0.02	46,005	32,762	1,934	210	19	81	0	0	0	0	0	0	0	81,011	4	56	50
0.03	16,026	24,066	3,572	1,026	134	0	0	0	0	0	0	0	0	44,824	5	50	48
0.04	7,387	10,085	7,645	681	227	0	0	0	0	0	0	0	0	26,025	5	55	49
0.05	6,809	7,531	4,145	1,463	764	528	133	0	0	0	0	0	0	21,373	4	55	50
>.05,<=.10	5,157	14,125	6,597	11,223	3,601	3,945	2,792	0	0	0	0	0	0	47,440	5	57	53
>.10,<=.20	2,781	1,261	1,726	1,975	1,970	2,203	5,955	1,182	0	0	0	0	0	19,053	4	53	44
>.20,<=.30	350	459	180	285	162	954	2,642	1,982	329	0	0	0	0	7,343	4	65	55
>.30,<=.40	111	0	149	310	4	86	774	2,012	531	100	0	0	0	4,077	4	47	35
>.40,<=.50	100	239	40	20	40	776	460	360	292	28	0	0	0	2,355	3	82	61
>.50	1,000	0	0	0	0	0	671	200	457	120	340	1,445	0	4,233	3	71	62
Total Contracts Traded													305,896				



Appendix: Detailed price improvement statistics for the volume transacted through PIXL for January 2015.

Customer  
 Month Jan 2015  
 Order size less than 50  
 Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	490,929	16,852	203	87	35	6	9	44	0	0	0	0	0	508,165	4	61	53
0.02	293,795	163,984	2,403	29	3	0	0	0	0	0	0	0	0	460,214	4	64	57
0.03	103,641	131,703	6,599	665	21	49	0	0	0	0	0	0	0	242,678	5	63	56
0.04	33,266	74,027	55,956	2,459	332	1	2	0	0	0	0	0	0	166,043	4	69	63
0.05	62,997	104,242	94,845	32,943	18,705	3,170	430	2	0	1	0	0	0	317,335	4	69	64
>.05,<=.10	29,748	80,704	115,121	120,019	79,206	100,531	45,564	178	1	0	46	5	571,123	4	72	66	
>.10,<=.20	8,330	13,890	24,870	38,817	48,325	78,267	221,170	36,544	32	2	1	0	470,248	4	72	65	
>.20,<=.30	1,164	1,878	2,795	5,098	8,050	11,687	75,153	77,048	6,175	22	0	0	189,070	4	74	64	
>.30,<=.40	396	568	709	1,073	1,659	3,017	21,256	47,184	16,547	1,845	0	10	94,264	4	75	66	
>.40,<=.50	132	155	181	475	633	1,158	8,086	21,359	17,039	5,629	972	20	55,839	4	76	64	
>.50	244	258	262	392	636	786	7,545	23,965	28,837	22,685	16,480	42,805	144,895	4	77	65	
Total Contracts Traded													3,219,874				

Customer  
 Month Jan 2015  
 Order size less than 50  
 Not Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	36,833	4,908	783	148	64	5	15	35	1	0	0	0	0	42,792	3	73	66
0.02	35,998	21,833	2,088	372	22	40	29	5	0	0	0	0	0	60,387	4	65	56
0.03	14,766	18,753	4,729	907	255	90	25	0	0	0	0	0	0	39,525	5	61	52
0.04	5,660	10,233	6,040	1,466	399	97	14	0	0	0	0	0	0	23,909	5	64	56
0.05	4,724	6,277	4,604	2,187	623	259	192	8	1	1	0	0	0	18,876	4	67	60
>.05,<=.10	4,757	7,562	7,363	6,157	3,868	3,236	2,729	115	2	0	0	0	35,789	5	68	56	
>.10,<=.20	1,672	1,637	1,984	2,242	1,966	2,610	7,965	1,677	72	9	0	1	21,835	5	69	56	
>.20,<=.30	473	337	343	413	458	598	2,360	2,998	317	11	2	0	8,310	5	73	60	
>.30,<=.40	109	81	52	180	79	109	788	1,327	468	37	3	3	3,236	5	77	64	
>.40,<=.50	80	33	26	37	60	77	350	800	417	156	21	1	2,058	4	78	68	
>.50	211	9	12	70	77	50	361	1,000	1,092	834	548	1,801	6,065	4	78	62	
Total Contracts Traded													262,782				

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for January 2015.

Non-Customer

Month Jan 2015

Order size greater than or equal to 50

Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
Spread		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
0.01		1,095	1,763	0	0	0	0	0	0	0	0	0	0	2,858	2	71	71
0.02		1,671	1,713	1,188	0	0	0	0	0	0	0	0	0	4,572	2	80	75
0.03		100	448	0	292	0	0	0	0	0	0	0	0	840	3	72	73
0.04		0	768	100	0	0	0	0	0	0	0	0	0	868	2	83	83
0.05		0	584	252	0	0	1,607	0	0	0	0	0	0	2,443	3	77	70
>.05,<=.10		305	1,059	1,439	721	1,106	100	100	0	0	0	0	0	4,830	2	74	71
>.10,<=.20		0	100	0	291	178	1,321	1,016	144	0	0	0	0	3,050	3	74	69
>.20,<=.30		0	0	0	0	0	70	176	533	167	0	0	0	946	2	89	87
>.30,<=.40		0	0	0	0	50	30	70	150	0	0	0	0	300	4	72	56
>.40,<=.50		0	0	0	0	0	0	54	43	6	6	16	0	125	3	16	17
>.50		0	0	0	0	0	0	138	79	74	50	0	100	441	2	80	80
Total Contracts Traded														21,273			

Non-Customer

Month Jan 2015

Order size greater than or equal to 50

Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
Spread		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
0.01		841	145	0	0	0	0	0	0	0	0	0	0	986	2	76	76
0.02		776	110	0	0	0	0	0	0	0	0	0	0	886	3	53	42
0.03		150	149	0	0	0	0	0	0	0	0	0	0	299	2	65	55
0.04		320	90	0	0	0	0	0	0	0	0	0	0	410	3	72	55
0.05		522	0	0	0	0	0	0	0	0	0	0	0	522	3	45	45
>.05,<=.10		76	206	110	149	0	0	100	0	0	0	0	0	641	4	52	47
>.10,<=.20		0	0	100	50	0	0	0	76	0	0	0	0	226	4	50	50
>.20,<=.30		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>.30,<=.40		0	0	0	0	0	0	0	50	0	0	0	0	50	2	50	50
>.40,<=.50		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>.50		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Contracts Traded														4,020			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for January 2015.

Non-Customer  
 Month Jan 2015  
 Order size less than 50  
 Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	11,426	417	1	0	0	0	0	0	0	0	0	0	0	11,844	3	64	59
0.02	4,206	5,672	100	15	0	0	0	0	0	0	0	0	0	9,993	3	53	48
0.03	1,172	1,102	123	20	0	0	0	0	0	0	0	0	0	2,417	4	54	48
0.04	299	803	583	60	0	0	0	0	0	0	0	0	0	1,745	4	60	59
0.05	72	553	412	181	39	74	1	0	0	0	0	0	0	1,332	4	63	61
>.05,<=.10	48	434	774	370	433	289	179	0	0	0	0	0	0	2,527	4	64	62
>.10,<=.20	6	72	35	140	130	118	495	192	0	0	0	0	0	1,188	4	61	55
>.20,<=.30	1	1	1	10	24	26	217	105	43	0	0	0	0	428	4	85	76
>.30,<=.40	0	0	0	1	0	38	73	148	27	7	0	0	0	294	4	87	86
>.40,<=.50	3	1	0	1	0	3	14	94	27	18	0	0	0	161	4	88	88
>.50	0	0	0	0	1	3	6	101	99	74	35	72	0	391	3	81	72
Total Contracts Traded														32,320			

Non-Customer  
 Month Jan 2015  
 Order size less than 50  
 Not Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	1,746	149	0	10	0	0	0	0	0	0	0	0	0	1,905	2	71	64
0.02	1,200	531	81	30	32	0	0	0	0	0	0	0	0	1,874	4	55	50
0.03	367	300	57	45	0	0	0	0	0	0	0	0	0	769	4	59	59
0.04	298	161	98	30	15	0	0	0	0	0	0	0	0	602	3	53	51
0.05	30	80	49	17	0	0	1	0	0	0	0	0	0	177	4	69	66
>.05,<=.10	21	174	99	25	2	20	13	0	0	0	0	0	0	354	4	59	58
>.10,<=.20	44	47	31	34	50	0	53	0	0	0	0	0	0	259	4	55	49
>.20,<=.30	0	0	32	13	0	1	58	5	0	0	0	0	0	109	4	47	47
>.30,<=.40	0	0	0	0	0	0	0	5	0	0	0	0	0	5	2	0	0
>.40,<=.50	0	0	0	0	0	0	0	1	0	0	0	0	0	1	6	0	0
>.50	0	0	0	0	0	0	2	5	3	1	0	1	0	12	2	100	100
Total Contracts Traded														6,067			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for February 2015.

Customer

Month Feb 2015

Order size greater than or equal to 50

Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	1,090,537	45,491	370	143	0	0	0	0	0	0	0	0	0	1,136,541	4	54	52
0.02	578,633	271,441	3,409	0	0	0	0	0	0	0	0	0	0	853,483	4	57	55
0.03	186,473	182,503	5,245	12,566	0	0	0	0	0	0	0	0	0	386,787	4	58	58
0.04	62,759	100,507	53,562	17,348	100	0	0	0	0	0	0	0	0	234,276	4	65	61
0.05	120,341	151,354	123,230	24,204	13,688	24,671	201	88	57	82	0	0	0	457,916	3	62	57
>.05,<=.10	102,418	149,880	141,638	105,447	63,682	67,405	30,637	0	0	0	0	0	0	661,107	4	64	60
>.10,<=.20	28,231	22,749	43,237	93,757	31,571	86,682	108,745	17,977	15	0	0	0	0	432,964	4	64	62
>.20,<=.30	18,859	4,276	3,943	5,461	7,885	21,701	50,396	43,279	2,139	26	0	0	0	157,965	4	64	62
>.30,<=.40	2,387	1,233	1,828	2,820	1,432	5,936	20,996	16,405	7,013	1,053	0	0	0	61,103	3	65	61
>.40,<=.50	3,080	0	268	682	354	2,437	5,464	10,612	6,533	3,542	950	0	0	33,922	4	64	58
>.50	1,900	181	204	70	435	3,209	3,846	10,320	10,560	10,232	4,193	8,712	0	53,862	4	62	60
Total Contracts Traded														4,469,926			

Customer

Month Feb 2015

Order size greater than or equal to 50

Not Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	47,531	5,944	503	100	0	0	0	0	0	0	0	0	0	54,078	3	64	56
0.02	42,068	28,786	4,431	250	0	0	0	0	0	0	0	0	0	75,535	4	55	51
0.03	17,602	16,850	2,632	150	100	0	0	0	0	0	0	0	0	37,334	4	56	53
0.04	5,603	9,993	4,563	332	78	200	0	0	0	0	0	0	0	20,769	4	58	54
0.05	5,827	9,008	3,310	12,851	378	395	50	0	0	0	0	0	0	31,819	4	60	57
>.05,<=.10	8,298	7,713	5,469	3,321	2,406	1,443	1,924	253	0	0	0	0	0	30,827	4	56	48
>.10,<=.20	6,194	2,574	1,967	1,284	1,380	1,067	2,672	2,749	0	0	0	0	0	19,887	4	60	52
>.20,<=.30	166	298	311	66	160	1,269	1,603	525	50	0	0	0	0	4,448	3	67	56
>.30,<=.40	169	127	100	104	262	0	200	596	298	10	0	0	0	1,866	3	73	63
>.40,<=.50	100	0	0	0	0	63	363	293	254	0	0	0	0	1,073	3	68	68
>.50	50	0	0	50	0	50	605	357	229	183	44	417	0	1,985	4	68	60
Total Contracts Traded														279,621			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for February 2015.

Customer  
 Month Feb 2015  
 Order size less than 50  
 Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts	
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	499,039	10,287	168	66	42	20	67	1	0	0	0	0	0	509,690	4	63	53
0.02	310,597	149,544	1,328	46	17	0	0	0	0	0	0	0	0	461,532	4	65	57
0.03	89,343	126,076	5,067	373	15	10	0	5	0	0	0	0	0	220,889	4	66	59
0.04	25,947	71,973	39,426	1,749	136	0	16	0	0	0	0	0	0	139,247	4	71	64
0.05	71,779	133,325	113,413	41,649	24,456	3,172	281	12	0	0	0	0	0	388,087	3	72	67
>.05,<=.10	30,973	88,830	113,440	112,136	84,447	70,736	41,479	57	6	0	0	0	0	542,104	4	71	65
>.10,<=.20	8,766	15,430	28,104	40,229	48,740	68,525	184,137	27,355	41	0	0	0	0	421,327	4	72	66
>.20,<=.30	1,510	2,232	2,987	5,273	7,373	13,463	70,995	59,574	4,291	0	0	0	0	167,698	4	74	66
>.30,<=.40	400	707	887	1,010	1,574	2,740	21,354	36,426	10,859	1,110	0	1	1	77,068	4	74	66
>.40,<=.50	111	272	246	624	658	803	7,609	18,412	11,717	3,567	650	3	3	44,672	4	75	66
>.50	330	243	317	421	445	1,099	6,763	21,427	21,672	16,313	11,436	28,292	28,292	108,758	4	75	63
Total Contracts Traded													3,081,072				

Customer  
 Month Feb 2015  
 Order size less than 50  
 Not Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts	
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	34,905	3,193	397	101	85	1	16	10	0	0	0	0	0	38,708	3	71	63
0.02	33,442	19,780	1,296	160	12	19	16	0	0	0	0	0	0	54,725	4	64	56
0.03	9,765	14,270	2,624	370	125	32	40	29	0	1	0	0	0	27,256	5	64	53
0.04	2,969	7,515	3,745	591	224	43	33	11	0	0	0	0	0	15,131	4	68	60
0.05	4,222	6,286	3,841	1,186	595	214	156	4	0	0	0	0	0	16,504	3	73	66
>.05,<=.10	3,579	6,041	5,261	3,839	2,945	2,318	2,662	35	0	0	0	0	0	26,680	4	72	61
>.10,<=.20	1,256	1,759	1,604	1,860	1,780	2,244	5,393	1,309	83	0	0	0	0	17,288	4	74	62
>.20,<=.30	389	264	297	361	369	602	1,841	2,125	287	3	0	10	10	6,548	4	76	64
>.30,<=.40	67	121	74	106	75	207	885	994	314	106	86	2	3	2,934	4	77	67
>.40,<=.50	65	15	9	70	30	76	306	522	342	98	10	0	0	1,543	3	79	67
>.50	177	46	34	42	15	49	378	807	729	548	423	1,283	1,283	4,531	3	81	70
Total Contracts Traded													211,848				

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for February 2015.

Non-Customer

Month Feb 2015

Order size greater than or equal to 50

Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	2,352	100	0	0	0	0	0	0	0	0	0	0	2,452	2	72	68
	0.02	3,589	0	0	0	0	0	0	0	0	0	0	0	3,589	5	45	46
	0.03	936	14	0	0	0	0	0	0	0	0	0	0	950	4	40	36
	0.04	83	150	91	0	0	0	0	0	0	0	0	0	324	5	40	40
	0.05	100	437	201	49	0	0	0	0	0	0	0	0	787	5	46	48
	>.05,<=.10	50	1,256	363	50	100	0	0	0	0	0	0	0	1,819	4	51	48
	>.10,<=.20	90	200	160	215	128	0	60	0	0	0	0	0	853	5	51	44
	>.20,<=.30	0	0	0	0	75	0	50	0	0	0	0	0	125	3	100	100
	>.30,<=.40	0	0	0	0	0	0	67	0	0	0	0	0	67	10	38	39
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Contracts Traded														10,966			

Non-Customer

Month Feb 2015

Order size greater than or equal to 50

Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	1,043	0	0	0	0	0	0	0	0	0	0	0	1,043	2	76	71
	0.02	1,318	50	0	0	0	0	0	0	0	0	0	0	1,368	2	71	65
	0.03	272	150	0	0	0	0	0	0	0	0	0	0	422	4	46	41
	0.04	178	100	0	0	0	0	0	0	0	0	0	0	278	3	40	40
	0.05	586	86	70	0	0	0	0	0	0	0	0	0	742	3	54	46
	>.05,<=.10	252	642	0	58	0	0	0	0	0	0	0	0	952	4	59	55
	>.10,<=.20	230	0	0	249	40	20	0	0	0	0	0	0	539	4	73	55
	>.20,<=.30	11	0	0	0	0	100	0	0	0	0	0	0	111	2	54	27
	>.30,<=.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Contracts Traded														5,455			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for February 2015.

Non-Customer  
 Month Feb 2015  
 Order size less than 50  
 Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	13,538	142	0	0	0	0	0	0	0	0	0	0	13,680	4	60	56
	0.02	2,966	318	17	0	0	0	0	0	0	0	0	0	3,301	5	58	47
	0.03	710	277	23	0	0	0	0	0	0	0	0	0	1,010	5	64	48
	0.04	258	458	29	0	0	0	0	0	0	0	0	0	745	5	58	56
	0.05	239	624	131	53	26	26	0	0	0	0	0	0	1,099	5	88	77
	>.05,<=.10	69	232	155	100	39	37	16	0	0	0	0	0	648	5	65	54
	>.10,<=.20	24	7	6	22	22	6	164	6	16	0	0	0	273	5	60	53
	>.20,<=.30	0	0	1	0	10	3	50	25	1	0	0	0	90	4	100	100
	>.30,<=.40	0	0	0	0	0	10	47	42	4	0	0	0	103	4	37	23
	>.40,<=.50	2	0	0	15	0	0	28	35	0	0	0	0	80	3	39	38
	>.50	0	0	0	0	0	0	2	37	43	7	1	11	101	4	70	70
Total Contracts Traded														21,130			

Non-Customer  
 Month Feb 2015  
 Order size less than 50  
 Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	1,847	218	45	0	4	0	0	0	0	0	0	0	2,114	3	67	65
	0.02	752	337	10	0	0	0	0	0	0	0	0	0	1,099	4	58	49
	0.03	336	135	46	15	0	0	0	0	0	0	0	0	532	4	66	64
	0.04	21	181	5	0	0	10	5	0	0	0	0	0	222	4	56	57
	0.05	140	95	20	0	1	3	0	0	0	0	0	0	259	4	81	80
	>.05,<=.10	56	32	61	67	23	0	5	0	0	0	0	0	244	4	63	57
	>.10,<=.20	77	0	0	11	0	0	0	0	0	0	0	0	88	2	63	63
	>.20,<=.30	47	1	0	0	2	0	19	0	0	0	0	0	69	3	63	63
	>.30,<=.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	0	0	0	0	0	0	0	0	0	10	0	0	10	3	0	0
Total Contracts Traded														4,637			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for March 2015.

Customer

Month Mar 2015

Order size greater than or equal to 50

Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	604,295	31,443	349	550	0	0	190	0	0	0	0	0	636,827	4	55	51
	0.02	514,789	125,700	20,212	0	0	0	0	0	0	0	0	0	660,701	5	50	50
	0.03	159,620	204,886	4,442	3,527	0	0	0	0	0	0	0	0	372,475	5	54	58
	0.04	93,342	127,250	37,476	1,349	1,204	0	0	0	0	0	0	0	260,621	4	60	66
	0.05	77,338	131,676	64,403	27,624	10,017	2,923	344	0	0	0	0	0	314,325	3	67	60
	>.05,<=.10	47,163	132,054	100,081	80,039	32,288	35,398	16,776	80	0	0	0	0	443,879	4	60	57
	>.10,<=.20	14,993	23,689	35,859	41,662	25,683	43,475	67,440	11,079	0	0	0	0	263,880	4	63	54
	>.20,<=.30	2,103	993	4,436	5,427	3,857	10,119	29,663	18,737	1,813	0	0	0	77,148	3	65	57
	>.30,<=.40	456	1,311	571	374	515	374	2,144	6,839	17,687	246	0	0	38,006	3	65	57
	>.40,<=.50	1,210	180	339	385	120	1,002	1,830	6,236	3,718	828	159	0	16,007	4	67	62
	>.50	119	333	134	467	472	2,896	2,211	7,213	7,119	3,094	2,562	9,312	35,932	3	69	63
Total Contracts Traded														3,119,801			

Customer

Month Mar 2015

Order size greater than or equal to 50

Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	37,659	5,045	175	100	0	0	0	0	0	0	0	0	42,979	3	74	65
	0.02	53,229	15,604	983	350	0	0	0	0	0	0	0	0	70,166	4	58	53
	0.03	21,577	12,010	1,627	0	0	0	0	0	0	0	0	0	35,214	4	54	50
	0.04	6,934	6,139	2,369	771	50	0	0	0	0	0	0	0	16,263	4	60	56
	0.05	4,003	17,049	2,793	409	100	202	286	0	0	0	0	0	24,842	3	63	56
	>.05,<=.10	5,141	11,111	4,674	2,550	1,139	836	909	150	0	0	0	0	26,510	4	57	48
	>.10,<=.20	3,022	1,752	1,812	697	827	1,851	2,327	106	100	0	0	0	12,494	4	61	52
	>.20,<=.30	125	466	50	100	173	781	984	1,205	200	0	0	0	4,084	3	71	58
	>.30,<=.40	230	0	70	70	0	200	306	565	45	0	0	0	1,486	3	52	42
	>.40,<=.50	100	100	99	0	0	85	292	673	600	0	0	0	1,949	2	65	51
	>.50	50	0	0	0	106	0	1,874	390	1,086	132	134	720	4,492	3	69	62
Total Contracts Traded														240,479			



Appendix: Detailed price improvement statistics for the volume transacted through PIXL for March 2015.

Customer

Month Mar 2015

Order size less than 50

Quoting at NBBO

		Improvement											Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts	
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50					>.50
Spread	0.01	345,249	5,705	213	118	48	20	54	39	1	10	1	0	351,458	4	66	56
	0.02	268,048	69,043	609	58	6	1	0	0	0	0	0	0	337,765	5	64	52
	0.03	76,064	81,892	2,688	177	40	0	0	0	0	0	0	0	160,861	5	68	57
	0.04	18,132	65,887	11,938	923	66	0	18	0	0	0	0	0	96,964	4	71	61
	0.05	63,354	119,861	72,206	32,549	22,666	2,258	135	50	1	0	0	0	313,080	3	75	70
	>.05,<=.10	20,310	72,788	83,334	72,315	48,404	33,829	28,962	26	10	0	0	0	359,978	4	72	65
	>.10,<=.20	6,822	12,496	21,705	31,168	37,199	40,670	111,348	17,273	41	1	0	0	278,723	4	75	68
	>.20,<=.30	1,019	1,980	2,148	3,956	6,015	7,844	45,577	36,251	3,009	4	0	0	107,803	4	77	69
	>.30,<=.40	372	487	614	927	1,105	1,823	14,357	23,300	7,427	1,017	0	3	51,432	4	79	70
	>.40,<=.50	188	218	259	273	331	825	5,522	13,668	7,867	2,809	668	10	32,638	4	80	72
	>.50	296	319	140	181	429	380	4,880	15,024	14,803	12,124	8,407	20,827	77,810	4	81	71
Total Contracts Traded													2,168,512				

Customer

Month Mar 2015

Order size less than 50

Not Quoting at NBBO

		Improvement											Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts	
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50					>.50
Spread	0.01	26,610	2,555	441	105	56	54	19	1	0	0	0	0	29,841	3	76	69
	0.02	24,108	12,877	769	134	2	0	1	0	0	0	0	0	37,891	5	68	56
	0.03	6,107	8,652	1,501	220	37	4	18	0	0	0	0	0	16,539	5	67	55
	0.04	2,084	5,075	1,806	401	108	10	35	5	0	0	0	0	9,524	4	69	59
	0.05	2,977	4,752	1,499	683	280	129	36	13	0	0	0	1	10,370	3	78	69
	>.05,<=.10	1,976	3,983	3,761	2,330	1,259	1,183	1,245	76	5	0	1	4	15,823	4	74	63
	>.10,<=.20	1,034	1,211	835	963	867	1,146	3,160	1,001	27	2	0	0	10,246	4	78	67
	>.20,<=.30	333	301	164	149	162	305	1,337	1,462	131	16	0	0	4,360	4	79	66
	>.30,<=.40	119	65	78	40	88	158	433	857	253	102	0	0	2,193	4	82	75
	>.40,<=.50	57	51	11	21	41	43	363	480	431	87	37	0	1,622	3	84	76
	>.50	201	12	31	30	96	51	327	610	941	576	514	1,121	4,510	3	84	73
Total Contracts Traded													142,919				

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for March 2015.

Non-Customer

Month Mar 2015

Order size greater than or equal to 50

Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	7,211	361	0	0	0	0	0	0	0	0	0	0	7,572	4	66	61
	0.02	6,617	111	296	0	0	0	0	0	0	0	0	0	7,024	5	47	46
	0.03	1,298	461	28	0	0	0	0	0	0	0	0	0	1,787	5	49	49
	0.04	744	861	220	0	0	0	0	0	0	0	0	0	1,825	5	48	40
	0.05	910	1,504	611	0	0	100	0	0	0	0	0	0	3,125	4	44	39
	>.05,<=.10	450	663	856	395	0	0	0	0	0	0	0	0	2,364	4	63	64
	>.10,<=.20	280	265	50	100	0	50	350	0	0	0	0	0	1,095	3	69	58
	>.20,<=.30	0	0	0	0	0	0	50	0	0	0	0	0	50	8	50	50
	>.30,<=.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	0	0	0	0	0	0	0	0	64	0	0	0	64	8	50	50
Total Contracts Traded														24,906			

Non-Customer

Month Mar 2015

Order size greater than or equal to 50

Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	5,316	0	82	0	0	0	0	0	0	0	0	0	5,398	1	86	81
	0.02	2,356	350	0	0	0	0	0	0	0	0	0	0	2,706	2	70	70
	0.03	2,206	839	75	0	0	0	0	0	0	0	0	0	3,120	4	60	57
	0.04	1,472	328	60	0	0	0	0	0	0	0	0	0	1,860	4	51	47
	0.05	2,542	416	190	0	74	0	0	0	0	0	0	0	3,222	3	66	60
	>.05,<=.10	1,604	476	240	250	0	50	0	0	0	0	0	0	2,620	4	46	33
	>.10,<=.20	230	314	51	25	160	98	0	0	0	0	0	0	878	6	60	46
	>.20,<=.30	1	0	99	0	50	0	0	0	0	0	0	0	150	4	42	22
	>.30,<=.40	154	0	0	2	0	2	2	24	0	0	0	0	184	3	86	15
	>.40,<=.50	0	0	0	0	0	0	0	100	0	0	0	0	100	4	50	50
	>.50	0	0	0	0	0	0	0	0	0	50	0	0	50	4	50	50
Total Contracts Traded														20,288			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for March 2015.

Non-Customer  
 Month Mar 2015  
 Order size less than 50  
 Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	12,840	274	1	0	0	0	0	0	0	0	0	0	13,115	3	68	62
	0.02	4,016	395	0	0	1	0	0	0	0	0	0	0	4,412	5	63	48
	0.03	799	360	17	0	0	0	0	0	0	0	0	0	1,176	5	68	57
	0.04	236	389	100	0	0	0	0	0	0	0	0	0	725	5	52	50
	0.05	84	594	587	27	19	0	0	0	0	0	0	0	1,311	4	91	83
	>.05,<=.10	7	140	252	188	149	9	14	0	0	0	0	0	759	5	87	81
	>.10,<=.20	0	10	56	27	53	50	66	32	4	0	0	0	298	5	66	67
	>.20,<=.30	0	0	12	39	0	8	32	52	9	0	0	0	152	4	75	75
	>.30,<=.40	0	0	0	0	0	0	0	4	1	0	0	0	5	8	100	100
	>.40,<=.50	0	0	0	0	0	0	0	1	3	0	0	0	4	3	100	100
	>.50	0	0	0	0	0	0	0	12	1	0	0	39	52	5	100	100
Total Contracts Traded														22,009			

Non-Customer  
 Month Mar 2015  
 Order size less than 50  
 Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	1,982	308	52	0	0	0	0	0	0	0	0	0	2,342	3	76	72
	0.02	946	437	73	35	0	0	0	0	0	0	0	0	1,491	4	66	58
	0.03	298	305	31	0	5	0	0	0	0	0	0	0	639	5	66	57
	0.04	140	236	30	1	0	0	0	0	0	0	0	0	407	5	56	55
	0.05	122	78	30	2	1	0	0	0	0	0	0	0	233	3	82	77
	>.05,<=.10	83	4	156	7	25	0	9	0	0	0	0	0	284	4	68	63
	>.10,<=.20	0	0	0	12	50	0	15	0	0	0	0	0	77	6	45	45
	>.20,<=.30	0	41	0	0	0	5	11	0	0	0	0	0	57	2	100	100
	>.30,<=.40	0	8	6	0	0	0	0	0	0	0	0	0	14	3	49	25
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	0	0	0	0	0	0	0	0	0	0	0	3	3	5	0	0
Total Contracts Traded														5,547			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for April 2015.

Customer

Month Apr 2015

Order size greater than or equal to 50

Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	404,758	59,058	159	105	0	0	0	0	50	0	0	0	0	464,130	4	56	53
0.02	344,320	65,655	3,523	71	0	0	0	0	0	0	0	0	0	413,569	5	49	48
0.03	109,653	91,948	1,851	738	142	0	0	0	0	0	0	0	0	204,332	5	53	54
0.04	31,561	100,217	10,959	3,501	25,250	0	0	0	0	0	0	0	0	171,488	4	58	58
0.05	69,649	106,720	54,852	20,306	10,136	6,166	163	100	0	0	0	0	0	268,092	3	68	58
>.05,<=.10	26,651	75,782	69,741	51,970	32,870	24,664	9,515	70	0	0	0	0	0	291,263	4	61	52
>.10,<=.20	8,227	12,348	19,112	22,989	20,047	31,415	46,519	8,092	0	0	0	0	0	168,749	4	64	53
>.20,<=.30	3,531	1,476	1,503	2,560	3,515	6,726	18,407	15,134	624	0	0	0	0	53,476	4	69	57
>.30,<=.40	542	325	338	407	1,131	1,950	8,938	7,417	1,600	140	0	0	0	22,788	3	70	60
>.40,<=.50	594	102	260	240	132	1,731	2,192	6,474	3,159	512	129	0	0	15,525	3	71	62
>.50	438	170	244	273	520	705	2,343	5,974	5,294	3,390	1,979	4,220	0	25,550	3	73	55
Total Contracts Traded														2,098,962			

Customer

Month Apr 2015

Order size greater than or equal to 50

Not Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	28,113	2,402	52	200	0	0	0	0	0	0	0	0	0	30,767	2	78	75
0.02	28,342	9,395	255	50	0	0	0	0	0	0	0	0	0	38,042	4	59	53
0.03	11,615	11,819	879	70	0	0	200	0	0	0	0	0	0	24,583	5	55	52
0.04	5,046	11,112	2,097	269	100	0	0	0	0	0	0	0	0	18,624	4	62	54
0.05	4,838	8,799	2,921	796	42	60	53	0	0	0	0	0	0	17,509	3	68	60
>.05,<=.10	5,584	9,089	5,731	2,100	1,180	750	999	0	0	0	0	0	0	25,433	4	57	45
>.10,<=.20	1,407	1,966	1,351	1,579	726	1,816	4,525	476	0	0	0	0	0	13,846	4	59	52
>.20,<=.30	648	152	391	202	3	238	1,279	573	0	0	0	0	0	3,486	4	61	51
>.30,<=.40	231	324	73	50	10	4	5,071	643	28	0	0	0	0	6,434	3	77	69
>.40,<=.50	0	0	101	0	0	15	350	131	0	100	0	0	0	697	4	38	34
>.50	268	148	0	0	53	291	22	570	440	427	80	573	0	2,872	3	71	61
Total Contracts Traded														182,293			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for April 2015.

Customer  
 Month Apr 2015  
 Order size less than 50  
 Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
0.01	317,636	5,137	135	32	2	0	15	30	2	0	0	1	322,990	4	65	55
0.02	261,681	70,315	542	5	11	25	0	0	0	0	0	0	332,579	5	62	50
0.03	74,937	81,521	2,731	82	6	0	1	0	0	0	0	0	159,278	5	67	55
0.04	15,314	71,479	11,101	1,120	119	15	0	8	0	0	0	0	99,156	4	69	59
0.05	54,476	121,577	71,736	35,003	23,074	1,207	45	11	0	0	0	0	307,129	3	75	70
>.05,<=.10	17,534	70,087	79,581	75,117	51,719	34,869	24,212	55	2	0	0	0	353,176	4	71	62
>.10,<=.20	5,411	12,694	20,164	30,333	34,951	41,513	112,883	14,655	33	2	0	0	272,639	5	74	65
>.20,<=.30	1,081	1,770	1,933	3,310	4,726	7,397	43,886	37,313	2,580	13	14	0	104,023	4	78	69
>.30,<=.40	197	576	454	664	698	1,718	13,405	28,038	8,176	826	4	0	54,756	4	80	72
>.40,<=.50	87	333	203	187	547	665	4,785	14,882	9,742	2,619	190	6	34,246	4	82	72
>.50	303	337	129	210	451	575	4,182	14,894	17,538	14,631	9,928	24,827	88,005	4	83	73
Total Contracts Traded												2,127,977				

Customer  
 Month Apr 2015  
 Order size less than 50  
 Not Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
0.01	20,892	3,101	361	138	63	86	20	1	1	3	0	21	24,687	3	77	71
0.02	21,419	11,771	880	121	39	14	0	1	0	0	0	0	34,245	5	66	55
0.03	6,527	8,634	1,803	366	59	10	33	0	0	0	0	0	17,432	5	67	56
0.04	1,552	5,536	1,943	324	165	12	29	0	0	0	0	0	9,561	5	68	58
0.05	2,828	4,762	2,071	798	393	103	104	13	0	0	0	0	11,072	3	76	69
>.05,<=.10	2,339	4,630	3,188	2,111	1,557	931	1,515	82	25	0	0	0	16,378	5	71	60
>.10,<=.20	1,319	1,035	872	922	766	1,062	2,988	993	23	5	5	0	9,990	5	75	63
>.20,<=.30	340	193	139	264	170	267	1,367	1,450	243	18	1	0	4,452	4	80	68
>.30,<=.40	133	92	127	27	90	93	441	986	344	99	5	2	2,439	4	83	74
>.40,<=.50	54	19	3	30	14	16	317	643	503	109	55	6	1,769	3	83	76
>.50	95	38	36	28	6	54	194	750	779	697	557	1,745	4,979	3	86	75
Total Contracts Traded												137,004				

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for April 2015.

Non-Customer

Month Apr 2015

Order size greater than or equal to 50

Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	9,719	527	250	0	0	0	0	0	0	0	0	0	10,496	5	56	53
	0.02	6,050	428	0	0	0	0	0	0	0	0	0	0	6,478	5	51	49
	0.03	3,163	1,020	0	0	0	0	0	0	0	0	0	0	4,183	5	43	42
	0.04	322	1,497	18	0	0	0	0	0	0	0	0	0	1,837	6	44	43
	0.05	1,288	834	1,050	0	0	200	0	0	0	0	0	0	3,372	4	54	53
	>.05,<=.10	1,040	1,349	1,103	598	25	232	0	0	0	0	0	0	4,347	6	47	37
	>.10,<=.20	0	0	432	140	200	360	524	33	0	0	0	0	1,689	6	48	45
	>.20,<=.30	0	0	0	0	100	0	0	0	0	0	0	0	100	4	40	40
	>.30,<=.40	0	0	0	0	0	0	100	50	0	0	0	0	150	2	100	100
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	34	14	0	0	0	150	50	50	147	10	8	10	473	4	58	34
	Total Contracts Traded														33,125		

Non-Customer

Month Apr 2015

Order size greater than or equal to 50

Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	5,055	0	0	0	0	0	0	0	0	0	0	0	5,055	2	79	69
	0.02	3,314	187	0	0	0	0	0	0	0	0	0	0	3,501	4	56	53
	0.03	2,456	832	0	0	0	0	0	0	0	0	0	0	3,288	3	56	52
	0.04	3,064	520	0	0	0	0	0	0	0	0	0	0	3,584	4	60	56
	0.05	2,052	422	214	0	0	0	0	0	0	0	0	0	2,688	4	59	54
	>.05,<=.10	2,323	671	701	193	20	0	0	0	0	0	0	0	3,908	4	53	43
	>.10,<=.20	592	117	629	100	273	100	200	0	0	0	0	0	2,011	5	53	49
	>.20,<=.30	50	0	0	0	50	0	0	0	0	0	0	0	100	4	45	45
	>.30,<=.40	0	0	0	0	0	0	0	250	0	0	0	0	250	11	48	24
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Contracts Traded														24,385		

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for April 2015.

Non-Customer  
 Month Apr 2015  
 Order size less than 50  
 Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	10,892	501	40	0	0	0	0	0	0	0	0	0	11,433	3	68	63
	0.02	4,272	597	0	0	0	0	0	0	0	0	0	0	4,869	5	70	55
	0.03	1,213	370	51	40	0	0	0	0	0	0	0	0	1,674	6	66	52
	0.04	147	546	95	0	0	0	0	0	0	0	0	0	788	5	67	61
	0.05	99	325	196	123	42	1	0	0	0	0	0	0	786	5	83	73
	>.05,<=.10	67	149	270	350	168	32	27	0	0	0	0	0	1,063	7	91	78
	>.10,<=.20	0	4	14	26	15	27	140	7	0	0	0	0	233	6	61	58
	>.20,<=.30	1	0	0	0	31	10	31	2	0	0	0	0	75	6	69	68
	>.30,<=.40	0	0	0	0	0	2	24	14	4	0	0	0	44	4	54	54
	>.40,<=.50	0	0	0	0	0	0	10	16	6	0	1	0	33	6	43	43
	>.50	0	0	0	0	0	0	54	2	10	10	10	39	115	5	75	72
Total Contracts Traded														21,113			

Non-Customer  
 Month Apr 2015  
 Order size less than 50  
 Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	2,216	144	71	0	0	0	0	0	0	0	0	0	2,431	2	83	79
	0.02	871	382	65	0	0	0	0	0	0	0	0	0	1,318	5	72	62
	0.03	271	286	151	5	0	0	0	0	0	0	0	0	713	6	63	60
	0.04	184	66	11	0	20	0	0	0	0	0	0	0	281	4	69	65
	0.05	178	56	57	0	0	0	0	1	0	0	0	0	292	4	71	66
	>.05,<=.10	113	42	26	0	2	8	1	0	0	0	0	0	192	4	74	71
	>.10,<=.20	2	5	25	0	23	0	0	0	0	0	0	0	55	3	50	50
	>.20,<=.30	0	0	2	2	0	0	0	1	0	0	0	0	5	5	50	25
	>.30,<=.40	0	0	0	0	0	11	10	5	0	0	0	0	26	4	0	0
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	33	0	0	0	0	33	11	28	0	0	0	0	105	4	34	34
Total Contracts Traded														5,418			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for May 2015.

Customer

Month May 2015

Order size greater than or equal to 50

Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts	
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	362,430	25,446	306	122	0	110	0	100	0	0	0	0	0	388,514	4	57	55
0.02	298,250	84,709	10,847	0	0	0	0	0	0	0	0	0	0	393,806	5	49	51
0.03	89,747	73,782	6,116	2,331	0	0	0	0	0	0	0	0	0	171,976	5	54	55
0.04	25,949	58,063	5,639	1,555	1,700	0	0	0	0	0	0	0	0	92,906	4	59	54
0.05	55,984	122,075	55,009	23,232	12,554	2,078	0	0	0	0	0	0	0	270,932	3	71	65
>.05,<=.10	19,985	68,975	61,654	47,735	26,492	23,892	12,032	111	0	0	0	0	0	260,876	4	65	60
>.10,<=.20	6,690	10,058	16,814	19,824	19,158	26,796	46,750	5,711	0	0	0	0	0	151,801	3	68	60
>.20,<=.30	2,220	1,687	2,055	3,520	1,778	4,340	17,870	12,469	1,037	0	0	0	0	46,976	3	75	67
>.30,<=.40	856	528	630	569	1,117	1,235	7,941	14,233	1,754	200	0	0	0	29,063	3	77	72
>.40,<=.50	633	189	247	61	499	436	1,718	5,686	2,726	431	50	0	0	12,676	3	79	74
>.50	378	50	307	245	120	223	2,335	5,268	4,600	7,282	1,576	3,386	0	25,770	3	78	68
Total Contracts Traded													1,845,296				

Customer

Month May 2015

Order size greater than or equal to 50

Not Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts	
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	30,703	4,908	486	355	0	0	0	0	0	0	0	0	0	36,452	2	79	72
0.02	30,789	13,147	843	100	0	0	0	0	0	0	0	0	0	44,879	4	62	55
0.03	10,409	10,787	1,554	370	114	100	0	0	0	0	0	0	0	23,334	4	60	56
0.04	4,597	8,361	1,778	140	55	0	50	0	0	0	0	0	0	14,981	4	59	54
0.05	4,403	9,096	1,983	511	100	59	100	0	0	0	0	0	0	16,252	3	67	65
>.05,<=.10	4,120	8,117	3,905	3,247	772	2,400	963	0	0	0	0	0	0	23,524	4	57	52
>.10,<=.20	1,678	1,384	1,457	1,221	1,673	1,191	2,350	473	0	100	0	0	0	11,527	4	56	50
>.20,<=.30	508	683	70	54	120	177	1,362	971	100	0	0	0	0	4,045	3	80	72
>.30,<=.40	1,569	110	0	93	25	50	0	759	188	100	0	0	0	2,894	4	62	44
>.40,<=.50	200	403	100	0	0	0	484	518	200	0	0	0	0	1,905	3	69	70
>.50	159	0	0	69	0	50	150	228	499	76	257	629	0	2,117	3	83	75
Total Contracts Traded													181,910				



Appendix: Detailed price improvement statistics for the volume transacted through PIXL for May 2015.

Customer  
 Month May 2015  
 Order size less than 50  
 Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	297,882	5,258	91	98	43	18	0	0	42	0	0	0	0	303,432	4	64	56
0.02	235,288	46,664	629	25	7	0	5	0	0	0	0	0	0	282,618	6	62	49
0.03	61,843	71,935	2,516	172	30	0	0	0	0	0	0	0	0	136,496	5	68	58
0.04	14,679	61,700	9,071	771	76	3	0	0	0	0	0	0	0	86,300	4	69	60
0.05	42,396	125,140	74,551	43,189	23,053	1,856	240	77	0	2	0	1	1	310,505	3	77	73
>.05,<=.10	14,436	65,329	79,624	71,880	53,880	38,066	27,385	42	7	1	1	3	3	350,654	4	72	66
>.10,<=.20	4,401	11,930	18,615	26,440	34,578	41,071	117,517	15,890	12	1	0	0	0	270,455	4	76	69
>.20,<=.30	1,304	1,906	2,275	3,127	4,683	6,552	45,164	39,628	2,643	44	0	0	0	107,326	4	79	72
>.30,<=.40	324	549	331	763	931	1,608	13,169	28,823	9,154	724	0	1	1	56,377	4	80	71
>.40,<=.50	202	364	357	186	245	770	4,960	15,310	10,786	3,259	397	1	1	36,837	3	81	74
>.50	231	151	125	318	333	474	3,838	15,138	19,937	15,289	10,166	25,271	25,271	91,271	4	83	75
Total Contracts Traded														2,032,271			

Customer  
 Month May 2015  
 Order size less than 50  
 Not Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	20,854	2,750	233	87	12	10	14	1	0	0	0	1	1	23,962	3	80	75
0.02	19,908	11,785	784	216	11	60	5	0	0	0	0	0	0	32,769	5	68	58
0.03	5,833	10,379	1,604	232	34	62	33	1	0	0	0	0	0	18,178	5	67	57
0.04	1,714	4,905	2,251	325	69	19	24	30	0	0	0	0	0	9,337	4	69	57
0.05	2,688	4,908	1,955	861	355	79	109	5	0	0	0	0	0	10,960	3	77	69
>.05,<=.10	2,022	3,994	3,366	2,470	1,424	1,307	2,799	37	4	0	0	0	0	17,423	4	75	66
>.10,<=.20	899	978	751	1,050	836	1,121	3,743	937	16	9	0	3	3	10,343	4	78	65
>.20,<=.30	323	255	204	192	179	272	1,408	1,314	225	14	7	0	0	4,393	4	79	71
>.30,<=.40	137	60	37	93	134	22	463	1,093	394	45	1	3	3	2,482	4	83	69
>.40,<=.50	28	8	20	12	1	64	268	762	495	117	89	0	0	1,864	3	86	78
>.50	209	37	19	13	112	14	266	705	776	896	626	2,316	2,316	5,989	3	85	80
Total Contracts Traded														137,700			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for May 2015.

Non-Customer

Month May 2015

Order size greater than or equal to 50

Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	2,750	811	0	0	0	0	0	0	0	0	0	0	3,561	3	54	49
	0.02	1,486	73	0	0	0	0	0	0	0	0	0	0	1,559	5	55	51
	0.03	609	620	250	0	0	0	0	0	0	0	0	0	1,479	5	57	57
	0.04	189	445	10	0	0	0	0	0	0	0	0	0	644	2	68	62
	0.05	131	400	168	5	0	0	0	0	0	0	0	0	704	3	78	78
	>.05,<=.10	100	275	164	159	77	51	100	0	0	0	0	0	926	4	60	60
	>.10,<=.20	30	25	279	120	25	0	350	0	0	0	0	0	829	4	42	31
	>.20,<=.30	0	0	0	0	0	0	96	100	0	0	0	0	196	5	40	40
	>.30,<=.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.40,<=.50	0	0	0	50	0	0	0	50	0	0	0	0	100	3	50	50
	>.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Contracts Traded														9,998			

Non-Customer

Month May 2015

Order size greater than or equal to 50

Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	812	101	0	0	0	0	0	0	0	0	0	0	913	2	81	80
	0.02	799	20	0	0	0	0	0	0	0	0	0	0	819	3	68	45
	0.03	352	32	0	0	68	0	0	0	0	0	0	0	452	4	35	35
	0.04	433	513	0	0	0	0	0	0	0	0	0	0	946	5	54	51
	0.05	350	100	100	0	0	0	0	0	0	0	0	0	550	5	58	56
	>.05,<=.10	859	1,142	86	0	85	0	0	0	0	0	0	0	2,172	4	49	45
	>.10,<=.20	250	100	150	450	100	0	0	0	0	0	0	0	1,050	6	47	43
	>.20,<=.30	59	0	0	0	0	0	0	0	0	0	0	0	59	2	100	100
	>.30,<=.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Contracts Traded														6,961			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for May 2015.

Non-Customer  
 Month May 2015  
 Order size less than 50  
 Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	13,053	266	45	0	0	0	0	0	0	0	0	0	13,364	3	66	64
	0.02	4,131	754	20	0	0	0	0	0	0	0	0	0	4,905	5	71	53
	0.03	1,178	542	31	0	0	0	0	0	0	0	0	0	1,751	7	80	56
	0.04	178	383	46	0	0	0	0	0	0	0	0	0	607	5	80	74
	0.05	73	272	196	57	17	0	0	0	0	0	0	0	615	4	84	75
	>.05,<=.10	50	92	193	192	125	53	11	0	0	0	0	0	716	6	86	74
	>.10,<=.20	7	72	41	24	31	2	30	5	0	0	0	0	212	5	76	72
	>.20,<=.30	0	0	0	0	0	0	119	31	0	0	0	0	150	5	66	66
	>.30,<=.40	0	0	0	0	0	0	2	0	0	0	0	0	2	1	100	100
	>.40,<=.50	0	0	0	0	0	0	1	14	2	0	1	0	18	4	100	100
	>.50	0	0	0	0	0	0	0	35	24	0	6	9	74	5	55	38
Total Contracts Traded														22,414			

Non-Customer  
 Month May 2015  
 Order size less than 50  
 Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	1,676	235	79	0	0	0	0	0	0	0	0	0	1,990	2	86	85
	0.02	455	257	143	20	0	0	0	0	0	0	0	0	875	5	77	65
	0.03	174	133	23	30	15	0	0	0	0	0	0	0	375	5	83	68
	0.04	8	115	32	0	1	0	0	0	0	0	0	0	156	5	59	54
	0.05	27	45	38	7	6	0	0	0	0	0	0	0	123	3	73	68
	>.05,<=.10	55	42	38	58	0	0	0	0	0	0	0	0	193	4	74	74
	>.10,<=.20	6	5	20	5	1	0	0	0	0	0	0	0	37	3	67	67
	>.20,<=.30	3	43	0	0	0	0	0	0	0	0	0	0	46	4	41	41
	>.30,<=.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.40,<=.50	0	0	0	0	0	0	0	1	1	0	0	0	2	2	50	50
	>.50	0	0	0	0	0	0	0	2	3	0	0	2	7	2	50	50
Total Contracts Traded														3,804			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for June 2015.

Customer

Month Jun 2015

Order size greater than or equal to 50

Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	336,600	19,482	150	50	0	0	0	0	0	0	0	0	0	356,282	4	58	55
0.02	249,339	70,792	3,895	0	0	100	0	0	0	0	0	0	0	324,126	5	50	52
0.03	101,662	71,526	57,399	1,060	0	0	50	0	0	0	0	0	0	231,697	5	61	59
0.04	26,099	92,420	19,977	10,375	292	0	0	71	0	0	0	0	0	149,234	4	65	61
0.05	62,490	90,450	55,105	22,758	11,882	1,316	184	0	0	0	0	0	0	244,185	3	73	67
>.05,<=.10	30,803	67,871	64,901	51,274	37,126	34,612	13,706	0	0	0	0	0	0	300,293	3	71	65
>.10,<=.20	7,738	17,515	17,245	20,837	21,642	35,047	65,956	9,814	0	0	0	0	0	195,794	3	77	71
>.20,<=.30	4,348	1,712	2,030	2,899	3,012	5,539	29,925	19,546	804	0	0	0	0	69,815	2	77	71
>.30,<=.40	1,118	535	233	409	710	1,059	6,303	12,126	2,863	226	710	0	0	25,582	2	79	73
>.40,<=.50	506	70	50	0	200	1,995	2,676	7,037	12,114	754	100	0	0	25,502	2	84	82
>.50	204	106	175	55	140	305	2,817	4,502	7,219	3,376	1,837	3,873	0	24,609	2	79	73
Total Contracts Traded														1,947,119			

Customer

Month Jun 2015

Order size greater than or equal to 50

Not Quoting at NBBO

Spread	Improvement													Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50					
0.01	27,800	1,884	499	50	200	0	0	0	0	0	0	0	0	30,433	2	81	75
0.02	35,590	11,471	622	50	100	0	0	0	0	0	0	0	0	47,833	5	60	58
0.03	12,347	8,053	2,556	200	0	0	0	0	0	0	0	0	0	23,156	4	60	54
0.04	4,359	5,968	1,577	333	200	0	50	0	0	0	0	0	0	12,487	5	55	50
0.05	6,857	3,180	2,241	350	192	58	0	66	0	0	0	0	0	12,944	3	67	57
>.05,<=.10	3,092	8,865	3,727	1,978	1,868	1,707	1,276	0	0	0	0	0	0	22,513	4	65	56
>.10,<=.20	1,396	1,166	1,566	936	3,017	1,834	3,570	867	0	0	0	0	0	14,352	4	63	54
>.20,<=.30	756	222	308	439	286	211	1,314	968	367	0	0	0	0	4,871	3	63	55
>.30,<=.40	265	20	40	100	50	100	417	227	181	0	0	0	0	1,400	2	80	77
>.40,<=.50	0	0	0	0	0	25	422	412	281	80	0	0	0	1,220	3	59	58
>.50	161	0	20	0	0	54	334	545	200	356	90	590	0	2,350	3	84	79
Total Contracts Traded														173,559			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for June 2015.

Customer  
 Month Jun 2015  
 Order size less than 50  
 Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
0.01	237,725	4,834	299	29	74	0	54	38	28	1	2	1	243,085	4	60	55
0.02	180,878	47,148	739	38	10	0	14	0	0	0	0	0	228,827	6	59	51
0.03	47,015	72,147	7,275	194	25	20	0	0	0	0	0	0	126,676	4	70	64
0.04	12,374	52,537	14,780	2,308	166	3	22	0	0	0	0	0	82,190	4	69	63
0.05	46,339	106,505	75,489	45,435	25,890	1,319	145	33	0	1	0	0	301,156	3	79	77
>.05,<=.10	15,551	54,794	80,860	80,445	59,733	48,659	36,077	109	2	9	6	0	376,245	3	77	73
>.10,<=.20	5,211	10,077	16,954	26,705	35,861	51,717	151,770	18,039	19	16	0	0	316,369	3	82	77
>.20,<=.30	1,380	1,428	1,719	2,874	4,519	7,224	56,166	50,276	3,132	52	0	0	128,770	3	84	78
>.30,<=.40	302	429	512	643	734	1,708	16,064	36,617	10,012	934	4	0	67,959	3	84	78
>.40,<=.50	133	265	149	227	465	660	5,411	18,890	12,446	3,218	377	0	42,241	3	85	78
>.50	226	265	194	257	417	464	4,222	16,273	23,451	18,738	11,173	31,008	106,688	3	87	79
Total Contracts Traded													2,020,206			

Customer  
 Month Jun 2015  
 Order size less than 50  
 Not Quoting at NBBO

Spread	Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
	0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
0.01	18,393	2,541	584	139	39	29	10	11	0	0	1	13	21,760	3	80	77
0.02	16,841	10,130	818	113	56	27	42	0	0	0	0	0	28,027	5	66	59
0.03	5,340	7,943	2,031	266	100	24	18	6	1	0	0	0	15,729	5	68	62
0.04	2,234	3,847	1,855	448	138	8	4	0	0	0	0	0	8,534	5	68	60
0.05	2,374	3,536	2,002	872	318	79	138	22	13	0	0	0	9,354	3	78	71
>.05,<=.10	2,030	2,621	2,798	2,145	1,673	1,164	1,726	103	9	2	0	0	14,271	4	77	69
>.10,<=.20	932	765	790	1,097	984	1,546	4,340	1,085	55	4	0	0	11,598	3	83	77
>.20,<=.30	428	136	245	173	186	352	2,184	1,354	110	9	8	23	5,208	3	86	80
>.30,<=.40	105	39	5	34	33	97	534	1,275	384	49	28	0	2,583	3	85	78
>.40,<=.50	144	5	12	43	14	17	205	883	556	176	75	28	2,158	3	86	77
>.50	149	42	7	42	26	30	156	868	1,226	1,000	565	2,223	6,334	2	87	76
Total Contracts Traded													125,556			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for June 2015.

Non-Customer

Month Jun 2015

Order size greater than or equal to 50

Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	1,058	0	0	0	0	0	0	0	0	0	0	0	1,058	5	58	58
	0.02	1,000	0	0	0	0	0	0	0	0	0	0	0	1,000	5	47	47
	0.03	244	193	0	0	0	0	0	0	0	0	0	0	437	7	39	39
	0.04	150	150	225	0	0	0	0	0	0	0	0	0	525	5	81	81
	0.05	50	150	0	100	0	0	0	0	0	0	0	0	300	6	40	40
	>.05,<=.10	0	273	187	147	100	61	0	0	0	0	0	0	768	6	51	50
	>.10,<=.20	0	0	0	0	0	100	59	0	0	0	0	0	159	6	0	0
	>.20,<=.30	0	0	0	0	0	0	105	0	0	0	0	0	105	4	50	50
	>.30,<=.40	0	50	0	30	0	0	20	0	0	0	0	0	100	6	50	17
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Contracts Traded														4,452			

Non-Customer

Month Jun 2015

Order size greater than or equal to 50

Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	0	100	0	0	0	0	0	0	0	0	0	0	100	6	0	0
	0.02	100	0	50	0	0	0	0	0	0	0	0	0	150	4	50	50
	0.03	299	50	0	0	0	0	0	0	0	0	0	0	349	3	78	63
	0.04	0	202	86	50	0	0	0	0	0	0	0	0	338	5	5	6
	0.05	56	200	0	0	0	0	0	0	0	0	0	0	256	6	40	40
	>.05,<=.10	0	0	0	171	0	0	0	0	0	0	0	0	171	3	50	50
	>.10,<=.20	0	0	0	44	88	25	52	0	0	0	0	0	209	7	50	50
	>.20,<=.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.30,<=.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.40,<=.50	0	0	0	0	0	0	0	66	0	0	0	0	66	2	50	50
	>.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Contracts Traded														1,639			

Appendix: Detailed price improvement statistics for the volume transacted through PIXL for June 2015.

Non-Customer  
 Month Jun 2015  
 Order size less than 50  
 Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	4,585	93	0	0	0	5	0	0	0	0	0	0	4,683	4	60	60
	0.02	1,289	231	0	0	0	0	0	0	0	0	0	0	1,520	5	56	48
	0.03	203	212	0	0	0	0	0	0	0	0	0	0	415	6	68	60
	0.04	73	240	18	0	0	0	0	0	0	0	0	0	331	6	75	74
	0.05	47	205	101	28	0	35	0	0	0	0	0	0	416	4	76	72
	>.05,<=.10	44	110	51	63	47	5	5	0	0	0	0	0	325	5	71	61
	>.10,<=.20	2	25	41	10	109	23	165	29	0	0	0	0	404	5	71	69
	>.20,<=.30	0	0	0	0	0	10	6	22	0	0	0	0	38	4	69	58
	>.30,<=.40	4	0	0	0	0	3	12	29	0	0	0	0	48	3	68	66
	>.40,<=.50	0	0	0	0	0	0	0	18	3	7	0	0	28	5	75	75
	>.50	0	0	0	0	0	0	5	25	19	0	0	11	60	6	59	59
Total Contracts Traded														8,268			

Non-Customer  
 Month Jun 2015  
 Order size less than 50  
 Not Quoting at NBBO

		Improvement												Total Contracts Traded	Average Number of Participants	Average Percent of Orders Initiator Receives	Average Percent of Contracts
		0	0.01	0.02	0.03	0.04	0.05	>.05,<=.10	>.10,<=.20	>.20,<=.30	>.30,<=.40	>.40,<=.50	>.50				
Spread	0.01	290	23	0	0	0	0	0	0	0	0	0	0	313	2	64	57
	0.02	151	198	0	2	3	0	0	0	0	0	0	0	354	5	61	57
	0.03	27	17	40	0	0	0	0	0	0	0	0	0	84	5	64	60
	0.04	43	18	25	0	0	0	0	0	0	0	0	0	86	5	64	64
	0.05	0	55	11	0	0	10	20	0	0	0	0	0	96	4	62	51
	>.05,<=.10	40	37	50	39	11	0	1	0	0	0	0	0	178	4	73	73
	>.10,<=.20	0	0	0	0	28	1	25	0	0	0	0	0	54	7	0	0
	>.20,<=.30	0	0	0	0	0	0	44	3	0	0	0	0	47	3	80	65
	>.30,<=.40	0	0	0	0	0	0	25	0	0	0	0	0	25	4	48	48
	>.40,<=.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	>.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Contracts Traded														1,237			