



# Transaction Cost Analysis

San Jose Police and Fire Department Retirement Plan  
Investment Committee  
October 22, 2019

Presented by:

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# Transaction Cost Management Presentation Overview

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## About US

Introduction to Zeno AN  
Solutions

## Trading Summary Report – US Market

Historical Analysis  
Artisan  
Cove Street





# Who is Zeno AN Solutions?

Our merger assembled the most comprehensive suite of TCM products available exclusively to asset owners and consultants and takes trade cost management to the next level

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- Servicing over 300 institutional asset owner clients
- Multi-asset class analysis across equity, fixed income, foreign exchange, futures and derivative asset classes
- Stock-specific peer group trade universe comprised of over \$7.5 trillion in principal traded annually
- Investment mandate peer group rankings of over 2,000 global institutional investment mandates
- Industry-leading web-based drill-down and technology platform, Trade Zoom
- Independent, conflict-free consulting as a Registered Investment Advisor under the Investment Company Act of 1940

# San Jose Police and Fire Department Retirement Plan

## Trading Summary Report – US Market

July 2018 – June 2019

# Trading Profile and Historical Summary

## Current Period

	Shares	Principal (000)	Commission Cost				Execution Cost / Gain								Total Cost / Gain oVWAP + Commission			
			Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank
<b>Total</b>	<b>1,685,701</b>	<b>\$69,513</b>	<b>-\$29</b>	<b>-4.1</b>	<b>-1.71</b>	<b>43%</b>	<b>\$19</b>	<b>2.8</b>	<b>1.14</b>	<b>17%</b>	<b>\$2</b>	<b>0.3</b>	<b>0.14</b>	<b>24%</b>	<b>-\$27</b>	<b>-3.8</b>	<b>-1.57</b>	<b>30%</b>
Buy	691,676	\$39,435	-\$11	-2.9	-1.66	41%	\$129	32.8	18.68	9%	\$6	1.6	0.89	24%	-\$5	-1.4	-0.77	23%
Sell	994,025	\$30,078	-\$17	-5.8	-1.75	44%	-\$110	-36.6	-11.07	42%	-\$4	-1.3	-0.39	39%	-\$21	-7.1	-2.13	36%

## Historical Summary

	Shares	Principal (000)	Commission Cost				Execution Cost / Gain								Total Cost / Gain oVWAP + Commission			
			Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank
2019 Q2	756,156	\$23,217	-\$12	-5.2	-1.58	39%	-\$6	-2.5	-0.78	19%	-\$2	-0.7	-0.20	32%	-\$14	-5.8	-1.79	32%
2019 Q1	453,710	\$15,868	-\$9	-5.6	-1.95	49%	-\$59	-37.4	-13.10	50%	-\$10	-6.1	-2.13	60%	-\$19	-11.7	-4.09	60%
2018	2,041,641	\$88,577	-\$34	-3.8	-1.64	41%	\$508	57.3	24.88	5%	\$123	13.9	6.03	5%	\$90	10.1	4.39	5%
2017	2,709,742	\$83,580	-\$52	-6.2	-1.92	48%	-\$313	-37.4	-11.54	46%	\$23	2.8	0.86	21%	-\$29	-3.4	-1.06	23%
2016	1,209,358	\$28,536	-\$27	-9.5	-2.25	64%	-\$89	-31.1	-7.35	36%	\$17	6.0	1.42	19%	-\$10	-3.5	-0.83	21%
2015	1,603,855	\$53,075	-\$31	-5.9	-1.96	49%	-\$289	-54.4	-18.01	62%	-\$76	-14.4	-4.77	79%	-\$108	-20.3	-6.72	78%
2014	18,935,297	\$751,825	-\$135	-1.8	-0.71	16%	\$950	12.6	5.02	12%	\$321	4.3	1.70	18%	\$186	2.5	0.98	13%
2013	3,011,038	\$102,233	-\$55	-5.4	-1.84	46%	-\$77	-7.5	-2.55	22%	\$112	11.0	3.72	10%	\$57	5.5	1.88	8%

Abel/Noser Universe Breakdown				
	Confirms	Shares	Dollars (000)	Avg. Price Per Share
<b>Total</b>	23,913,612	121,280,241,664	<b>\$5,902,162,723</b>	\$48.67
<b>Sell</b>	11,738,355	59,395,698,688	\$2,835,596,182	\$47.74
<b>Buy</b>	12,175,256	61,884,538,880	\$3,066,566,541	\$49.55

Abel/Noser Universe Benchmarks								
	Commission		oOpnStrike Cost /Gain		oVWAP Cost /Gain		Total Cost /Gain	
	BP	¢/Share	BP	¢/Share	BP	¢/Share	BP	¢/Share
Total	-4.0	-1.98	-28.2	-13.30	-3.9	-1.73	-7.6	-3.54
Buy	-4.3	-2.01	-24.8	-10.83	-3.2	-1.56	-7.7	-3.48
Sell	-3.8	-1.97	-33.8	-14.62	-3.6	-1.54	-7.8	-3.68

# All Manager Summary by Buys / Sells

TOTAL - Current Period			Commission Cost				Execution Cost / Gain								Total Cost / Gain			
Shares		Principal					oOpnStrike Cost /Gain				oVWAP Cost / Gain				oVWAP + Commission			
		(000)	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank
Total	1,685,701	\$69,513	-\$29	-4.1	-1.71	43%	\$19	2.8	1.14	17%	\$2	0.3	0.14	24%	-\$27	-3.8	-1.57	30%
Buy	691,676	\$39,435	-\$11	-2.9	-1.66	41%	\$129	32.8	18.68	9%	\$6	1.6	0.89	24%	-\$5	-1.4	-0.77	23%
Sell	994,025	\$30,078	-\$17	-5.8	-1.75	44%	-\$110	-36.6	-11.07	42%	-\$4	-1.3	-0.39	39%	-\$21	-7.1	-2.13	36%

Manager 1: Artisan Global Value			Commission Cost				Execution Cost / Gain								Total Cost / Gain			
		(000)	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank
Total	677,070	\$55,995	-\$14	-2.5	-2.10	59%	-\$198	-35.3	-29.23	77%	-\$3	-0.5	-0.41	34%	-\$17	-3.0	-2.51	40%
Buy	342,143	\$33,393	-\$7	-2.0	-1.99	50%	\$1	0.2	0.24	32%	\$2	0.5	0.47	31%	-\$5	-1.6	-1.52	30%
Sell	334,927	\$22,601	-\$7	-3.3	-2.22	63%	-\$199	-87.9	-59.33	91%	-\$4	-1.9	-1.31	48%	-\$12	-5.2	-3.53	49%

Manager 2: Cove Street Small Cap Value			Commission Cost				Execution Cost / Gain								Total Cost / Gain			
		(000)	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank
Total	1,008,631	\$13,518	-\$15	-10.8	-1.45	35%	\$217	160.6	21.52	5%	\$5	3.7	0.50	23%	-\$10	-7.0	-0.94	22%
Buy	349,533	\$6,041	-\$5	-7.7	-1.33	32%	\$128	212.5	36.73	5%	\$5	7.5	1.29	23%	\$0	-0.2	-0.04	20%
Sell	659,098	\$7,477	-\$10	-13.3	-1.51	37%	\$89	118.6	13.46	7%	\$1	0.7	0.08	34%	-\$9	-12.6	-1.43	25%

Trading Profile by Style						
Style	Buys		Sells		Total	
	Dollars (K)	% Buy	Dollars (K)	% Sell	Dollars (K)	% Total
Large Cap Value	\$7,852	19.9%	\$6,483	21.6%	\$14,335	20.6%
Large Cap Growth	\$21,395	54.3%	\$11,273	37.5%	\$32,668	47.0%
Mid Cap Value	\$1,228	3.1%	\$2,572	8.6%	\$3,800	5.5%
Mid Cap Growth	\$2,590	6.6%	\$2,274	7.6%	\$4,864	7.0%
Small Cap Value	\$4,038	10.2%	\$6,490	21.6%	\$10,528	15.1%
Small Cap Growth	\$2,092	5.3%	\$439	1.5%	\$2,531	3.6%
Other	\$0	0.0%	\$0	0.0%	\$0	0.0%

Abel/Noser Universe Benchmarks							
	Commission		oOpnStrike Cost /Gain		oVWAP Cost /Gain		Total Cost /Gain
	BP	¢/Share	BP	¢/Share	BP	¢/Share	BP ¢/Share
Total	-4.0	-1.98	-28.2	-13.30	-3.9	-1.73	-7.6 -3.54
Buy	-4.3	-2.01	-24.8	-10.83	-3.2	-1.56	-7.7 -3.48
Sell	-3.8	-1.97	-33.8	-14.62	-3.6	-1.54	-7.8 -3.68

# **San Jose Police and Fire Department Retirement Plan**

## **Trading Summary Report – International**

July 2018 – June 2019



# All Manager Summary by Buys / Sells

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TOTAL - Current Period			Commission Cost			Execution Cost / Gain						Total Cost / Gain		
Shares	Principal					oOpnStrike Cost / Gain			oVWAP Cost / Gain			oVWAP + Commission		
	(000)	Dollars (000)	BP	Rank		Dollars (000)	BP	Rank	Dollars (000)	BP	Rank	Dollars (000)	BP	Rank
Total	997,095	\$6,839	-\$7	-10.9	77%	\$0	-0.1	25%	-\$8	-11.0	74%	-\$15	-21.9	77%
Buy	193,256	\$3,311	-\$4	-12.2	80%	-\$39	-117.0	86%	-\$2	-6.2	60%	-\$6	-18.3	75%
Sell	803,839	\$3,527	-\$3	-9.7	71%	\$39	109.6	6%	-\$5	-15.5	76%	-\$9	-25.2	77%

Manager 1: Artisan Global Value			Commission Cost			Execution Cost / Gain						Total Cost / Gain		
	(000)	Dollars (000)	BP	Rank		Dollars (000)	BP	Rank	Dollars (000)	BP	Rank	Dollars (000)	BP	Rank
Total	997,095	\$6,839	-\$7	-10.9	77%	\$0	-0.1	25%	-\$8	-11.0	74%	-\$15	-21.9	77%
Buy	193,256	\$3,311	-\$4	-12.2	80%	-\$39	-117.0	86%	-\$2	-6.2	60%	-\$6	-18.3	75%
Sell	803,839	\$3,527	-\$3	-9.7	71%	\$39	109.6	6%	-\$5	-15.5	76%	-\$9	-25.2	77%

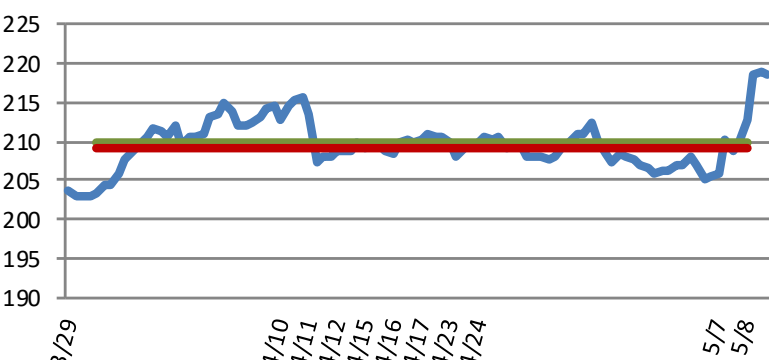
Trading Profile by Style						
Style	Buys		Sells		Total	
	Dollars (K)	% Buy	Dollars (K)	% Sell	Dollars (K)	% Total
Large Cap Value	\$1,861	56.2%	\$669	19.0%	\$2,530	37.0%
Large Cap Growth	\$1,451	43.8%	\$1,644	46.6%	\$3,095	45.3%
Mid Cap Value	\$0	0.0%	\$1,213	34.4%	\$1,213	17.7%
Mid Cap Growth	\$0	0.0%	\$0	0.0%	\$0	0.0%
Small Cap Value	\$0	0.0%	\$0	0.0%	\$0	0.0%
Small Cap Growth	\$0	0.0%	\$0	0.0%	\$0	0.0%
Other	\$0	0.0%	\$0	0.0%	\$0	0.0%

Abel/Noser Universe Benchmarks				
	Commission	oOpnStrike Cost /Gain	oVWAP Cost /Gain	Total Cost /Gain
	BP	BP	BP	BP
Total	-6.4	-25.2	-4.0	-7.8
Buy	-6.0	-17.6	-3.9	-9.3
Sell	-6.5	-23.6	-3.4	-8.0

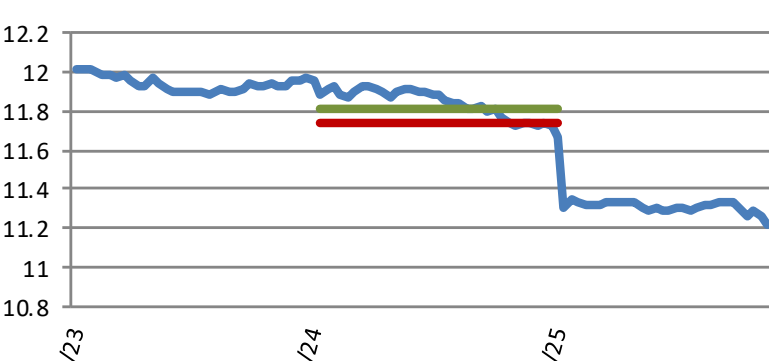
# Highest Cost Trades by oVWAP(K)

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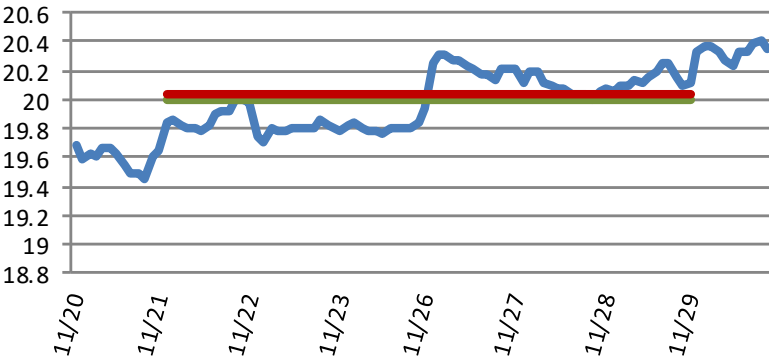
1

Trade Information				Commission and Execution Costs			Stock Data	
Trade Date	04/01/19	Manager	Artisan Global Value		Dollars (K)	BP		Open: 209.13
Shares	38,607	Broker	CARNEGIE INVESTMENT BANK AB	Commission Cost	-\$0.88	-7.29		High: 216.70
Side	SELL	Currency	DKK - DANISH KRONE	oOpenStrike Cost / Gain	\$33.32	274.60		Low: 202.60
Price	209.14	Market	DC - DENMARK	oVWAP Cost / Gain	-\$3.82	-31.48		Close: 209.58
Principal (K)	\$1,213	Trade Days	24	Total Cost / Gain	-\$4.70	-38.77		VWAP: 209.80
Symbol	ISS	Stock Name	ISS A/S					

2

Trade Information				Commission and Execution Costs			Stock Data	
Trade Date	04/24/19	Manager	Artisan Global Value		Dollars (K)	BP		Open: 11.93
Shares	14,556	Broker	REDBURN (EUROPE) LIMITED	Commission Cost	-\$0.29	-14.99		High: 11.95
Side	SELL	Currency	EUR - EURO (B)	oOpenStrike Cost / Gain	-\$3.09	-161.84		Low: 11.70
Price	11.74	Market	NA - NETHERLANDS	oVWAP Cost / Gain	-\$1.17	-61.36		Close: 11.73
Principal (K)	\$191	Trade Days	1	Total Cost / Gain	-\$1.46	-76.36		VWAP: 11.81
Symbol	INGA	Stock Name	ING GROEP NV					

3

Trade Information				Commission and Execution Costs			Stock Data	
Trade Date	11/21/18	Manager	Artisan Global Value		Dollars (K)	BP		Open: 19.94
Shares	29,303	Broker	JP MORGAN SECURITIES PLC	Commission Cost	-\$0.38	-6.47		High: 20.37
Side	BUY	Currency	CHF - SWISS FRANC	oOpenStrike Cost / Gain	-\$8.42	-143.08		Low: 19.67
Price	20.04	Market	SW - SWITZERLAND	oVWAP Cost / Gain	-\$1.08	-18.41		Close: 20.01
Principal (K)	\$589	Trade Days	6	Total Cost / Gain	-\$1.46	-24.87		VWAP: 20.00
Symbol	ABBN	Stock Name	ABB LTD-REG					

# San Jose Police and Fire Department Retirement Plan

## Trading Summary Report – US Market (Oberweis)

July 2018 – June 2019

# Trading Profile and Historical Summary

Total - Current Period			Commission Cost				Execution Cost / Gain								Total Cost / Gain			
Shares	Principal						oOpnStrike Cost / Gain				oVWAP Cost / Gain				oVWAP + Commission			
		(000)	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank
Total	229,376	\$10,620	-\$5	-4.3	-2.00	38%	-\$269	-253.6	-117.42	95%	-\$22	-20.4	-9.44	79%	-\$26	-24.7	-11.44	78%
Buy	152,550	\$7,081	-\$3	-4.3	-2.00	41%	-\$135	-190.2	-88.28	74%	-\$7	-9.4	-4.38	60%	-\$10	-13.7	-6.38	57%
Sell	76,826	\$3,539	-\$2	-4.3	-2.00	40%	-\$135	-380.5	-175.29	95%	-\$15	-42.3	-19.49	90%	-\$17	-46.7	-21.49	89%

Manager 1: Oberweis Intl Opportunities			Commission Cost				Execution Cost / Gain								Total Cost / Gain			
		(000)	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank	Dollars (000)	BP	¢/Share	Rank
Total	229,376	\$10,620	-\$5	-4.3	-2.00	38%	-\$269	-253.6	-117.42	95%	-\$22	-20.4	-9.44	79%	-\$26	-24.7	-11.44	78%
Buy	152,550	\$7,081	-\$3	-4.3	-2.00	41%	-\$135	-190.2	-88.28	74%	-\$7	-9.4	-4.38	60%	-\$10	-13.7	-6.38	57%
Sell	76,826	\$3,539	-\$2	-4.3	-2.00	40%	-\$135	-380.5	-175.29	95%	-\$15	-42.3	-19.49	90%	-\$17	-46.7	-21.49	89%

Trading Profile by Style						
Style	Buys		Sells		Total	
	Dollars (K)	% Buy	Dollars (K)	% Sell	Dollars (K)	% Total
Large Cap Value	\$1,317	18.6%	\$1,695	47.9%	\$3,012	28.4%
Large Cap Growth						
Mid Cap Value						
Mid Cap Growth	\$611	8.6%	\$0	0.0%	\$611	5.8%
Small Cap Value	\$1,482	20.9%	\$0	0.0%	\$1,482	14.0%
Small Cap Growth	\$3,629	51.3%	\$1,844	52.1%	\$5,473	51.5%
Other	\$43	0.6%	\$0	0.0%	\$43	0.4%

Abel/Noser Universe Benchmarks							
	Commission		oOpnStrike Cost/Gain		oVWAP Cost/Gain		Total Cost/Gain
	BP	¢/Share	BP	¢/Share	BP	¢/Share	BP ¢/Share
Total	-4.0	-2.41	-28.2	-55.20	-3.9	-2.44	-7.6 -4.51
Buy	-4.3	-2.31	-24.8	-54.95	-3.2	-2.78	-7.7 -4.96
Sell	-3.9	-2.44	-33.8	-56.23	-3.9	-2.48	-7.8 -4.86

# **San Jose Police and Fire Department Retirement Plan**

## **Trading Summary Report – International (Oberweis)**

July 2018 – June 2019



# All Manager Summary by Buys / Sells

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Total - Current Period			Commission Cost			Execution Cost / Gain						Total Cost / Gain		
Shares		Principal				oOpnStrike Cost /Gain			oVWAP Cost / Gain			oVWAP + Commission		
		(000)	Dollars (000)	BP	Rank	Dollars (000)	BP	Rank	Dollars (000)	BP	Rank	Dollars (000)	BP	Rank
Total	10,949,380	\$95,321	-\$123	-12.9	83%	-\$3,787	-397.3	88%	-\$80	-8.4	48%	-\$203	-21.3	52%
Buy	4,875,636	\$46,645	-\$61	-13.1	73%	-\$1,947	-417.4	95%	-\$71	-15.2	57%	-\$132	-28.3	62%
Sell	6,073,744	\$48,675	-\$62	-12.7	91%	-\$1,840	-378.1	77%	-\$9	-1.9	38%	-\$71	-14.6	43%

Manager 1: Oberweis Intl Opportunities			Commission Cost			Execution Cost / Gain						Total Cost / Gain		
		(000)	Dollars (000)	BP	Rank	Dollars (000)	BP	Rank	Dollars (000)	BP	Rank	Dollars (000)	BP	Rank
Total	10,949,380	\$95,321	-\$123	-12.9	83%	-\$3,787	-397.3	88%	-\$80	-8.4	48%	-\$203	-21.3	52%
Buy	4,875,636	\$46,645	-\$61	-13.1	73%	-\$1,947	-417.4	95%	-\$71	-15.2	57%	-\$132	-28.3	62%
Sell	6,073,744	\$48,675	-\$62	-12.7	91%	-\$1,840	-378.1	77%	-\$9	-1.9	38%	-\$71	-14.6	43%

Trading Profile by Style						
Style	Buys		Sells		Total	
	Dollars (K)	% Buy	Dollars (K)	% Sell	Dollars (K)	% Total
Large Cap Value						
Large Cap Growth	\$1,387	3.0%	\$1,707	3.5%	\$3,093	3.2%
Mid Cap Value	\$1,210	2.6%	\$298	0.6%	\$1,508	1.6%
Mid Cap Growth	\$4,126	8.8%	\$9,587	19.7%	\$13,712	14.4%
Small Cap Value	\$12,298	26.4%	\$8,358	17.2%	\$20,655	21.7%
Small Cap Growth	\$24,829	53.2%	\$26,765	55.0%	\$51,594	54.1%
Other	\$2,796	6.0%	\$1,962	4.0%	\$4,758	5.0%

Abel/Noser Universe Benchmarks				
	Commission	oOpnStrike Cost/Gain	oVWAP Cost/Gain	Total Cost/Gain
	BP	BP	BP	BP
Total	-3.4	-236.7	-11.9	-18.4
Buy	-3.7	-229.5	-5.5	-11.6
Sell	-3.7	-251.2	-22.9	-26.8

# The Value of Transaction Cost Management (TCM)

## Meaningful Trade Cost Analysis & Audits

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- Satisfies legal obligation, as fiduciaries, to monitor your managers' (and their brokers') global equity, FX and fixed income trading processes for best execution
- Provides critical transparency, substantive due diligence, and insight into how your managers are handling fund assets (*"What you don't know, can hurt you!"*)
- Helps control excessive trade costs (often the single largest expense of the fund) by identifying trends and cost savings opportunities
- Mitigates investment and fiduciary risk
- Monitor Directed Brokerage/MWBE programs including participation and execution quality





# Turning Trading Insight into Action

[www.abelnoser.com](http://www.abelnoser.com)

*Thank you!*