

## Commonwealth of PA State Empl. Ret. System

### Fixed Income TCA Summary

Reporting Period: 01/01/2018 - 03/31/2018

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We make no warranties as to completeness or correctness of this report. We strive for accuracy over completeness in the trades we measure. We rely on sources that we believe can provide reliable price information for our measurement. We may exclude trades that we suspect contain erroneous information, that are priced outside the published hi-lo range for the day, or that display commission rates far in excess of typical institutional commission rates (as reflected in our database). This report does not represent a comprehensive audit of our client's trading. Each presentation of this report's results should include this disclaimer.

## Economy by Security Type

## Developed - Corporate

Buy / Sell	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Total	\$75,635.61	\$141.08	18.65	\$141.08	18.65	(\$15.14)	(2.00)
Buy	\$34,060.54	(\$61.50)	(18.06)	(\$61.50)	(18.06)	(\$63.59)	(18.67)
Sell	\$41,575.06	\$202.58	48.73	\$202.58	48.73	\$48.44	11.65

## Developed - Govt/Treasury/Central Bank

Buy / Sell	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Total	\$1,231,710.73	(\$89.65)	(0.73)	(\$103.50)	(0.84)	(\$44.07)	(0.36)
Buy	\$630,065.86	(\$140.29)	(2.23)	(\$154.05)	(2.44)	(\$161.20)	(2.56)
Sell	\$601,644.87	\$50.65	0.84	\$50.55	0.84	\$117.13	1.95

## Emerging - Govt/Treasury/Central Bank

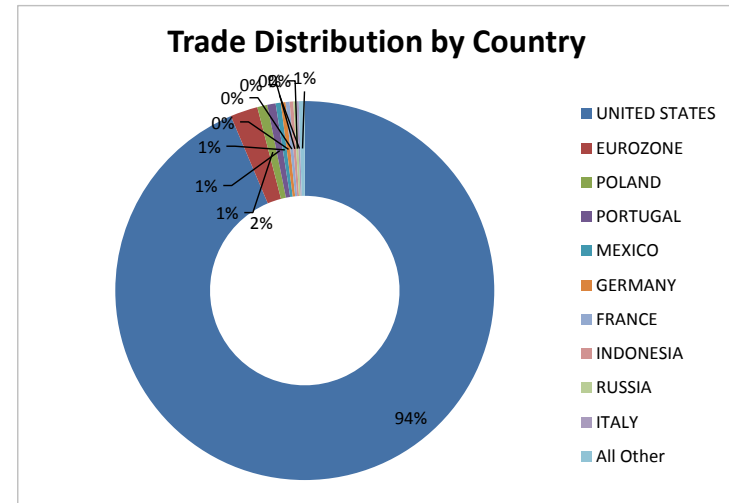
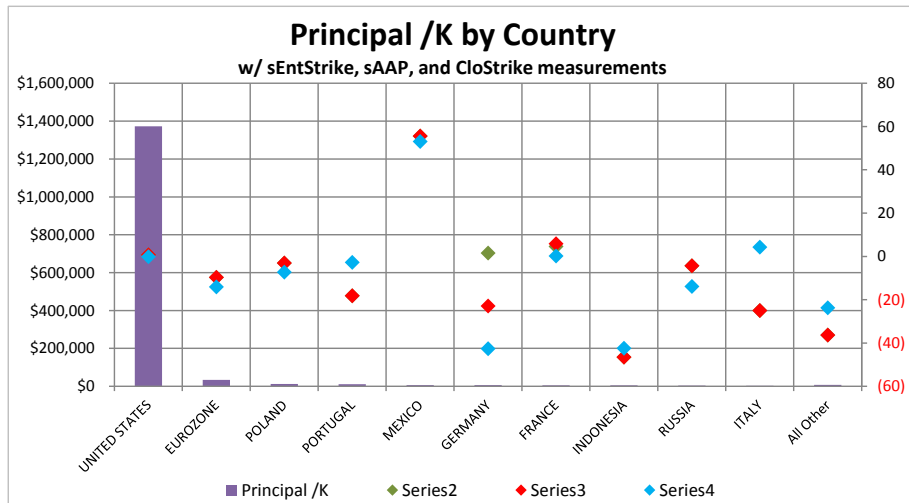
Buy / Sell	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Total	\$19,717.60	(\$6.57)	(3.33)	(\$6.57)	(3.33)	(\$3.02)	(1.53)
Buy	\$8,694.18	\$60.11	69.13	\$60.11	69.13	\$22.10	25.42
Sell	\$11,023.42	(\$66.67)	(60.48)	(\$66.67)	(60.48)	(\$25.12)	(22.79)

## Other

Buy / Sell	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Total	\$2,321.43	(\$4.46)	(19.19)	(\$4.46)	(19.19)	(\$13.30)	(57.30)
Buy	\$1,620.16	(\$4.46)	(27.50)	(\$4.46)	(27.50)	(\$5.60)	(34.59)
Sell	\$701.27					(\$7.70)	(109.79)

TCA Summary by Country

Country	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
UNITED STATES	\$1,372,038.38	\$89.60	0.65	\$89.60	0.65	(\$18.50)	(0.13)
EUROZONE	\$34,379.18	(\$33.33)	(9.69)	(\$33.33)	(9.69)	(\$48.48)	(14.10)
POLAND	\$12,536.98	(\$3.87)	(3.08)	(\$3.87)	(3.08)	(\$9.09)	(7.25)
PORTUGAL	\$10,483.20	(\$19.10)	(18.22)	(\$19.10)	(18.22)	(\$2.87)	(2.74)
MEXICO	\$6,446.87	\$35.85	55.61	\$35.85	55.61	\$34.18	53.02
GERMANY	\$5,932.52	\$0.88	1.48	(\$13.59)	(22.91)	(\$25.28)	(42.62)
FRANCE	\$5,018.45	\$2.30	4.59	\$2.92	5.82	\$0.05	0.11
INDONESIA	\$4,507.05	(\$20.99)	(46.58)	(\$20.99)	(46.58)	(\$19.12)	(42.41)
RUSSIA	\$3,886.18	(\$1.70)	(4.39)	(\$1.70)	(4.39)	(\$5.39)	(13.86)
ITALY	\$2,904.97	(\$7.26)	(24.98)	(\$7.26)	(24.98)	\$1.24	4.27
All Other	\$7,403.32	(\$9.61)	(36.33)	(\$9.61)	(36.33)	(\$6.25)	(23.73)
<b>Grand Total</b>	<b>\$1,465,537.13</b>	<b>\$15.48</b>	<b>0.11</b>	<b>\$1.63</b>	<b>0.01</b>	<b>(\$110.83)</b>	<b>(0.76)</b>



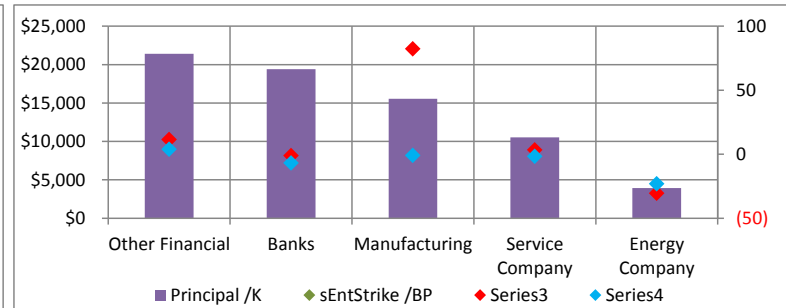
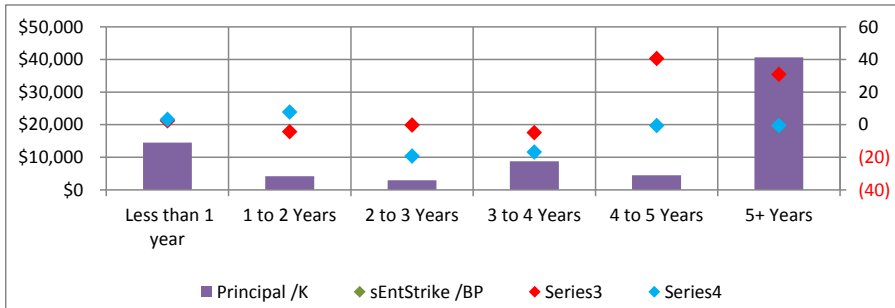
**Fixed Income TCA Summary**

**Developed - Corporate**

Buy / Sell	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Total	\$75,635.61	\$141.08	18.65	\$141.08	18.65	(\$15.14)	(2.00)
Buy	\$34,060.54	(\$61.50)	(18.06)	(\$61.50)	(18.06)	(\$63.59)	(18.67)
Sell	\$41,575.06	\$202.58	48.73	\$202.58	48.73	\$48.44	11.65

Time To Maturity	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Less than 1 year	\$14,502.82	\$3.36	2.32	\$3.36	2.32	\$4.63	3.19
1 to 2 Years	\$4,171.74	(\$1.80)	(4.32)	(\$1.80)	(4.32)	\$3.26	7.82
2 to 3 Years	\$2,987.28	(\$0.09)	(0.30)	(\$0.09)	(0.30)	(\$5.77)	(19.32)
3 to 4 Years	\$8,803.40	(\$4.24)	(4.82)	(\$4.24)	(4.82)	(\$14.75)	(16.76)
4 to 5 Years	\$4,480.77	\$18.20	40.62	\$18.20	40.62	(\$0.21)	(0.47)
5+ Years	\$40,689.60	\$125.65	30.88	\$125.65	30.88	(\$2.30)	(0.56)

Sector	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Other Financial	\$21,394.28	\$24.77	11.58	\$24.77	11.58	\$8.49	3.97
Banks	\$19,402.36	(\$2.21)	(1.14)	(\$2.21)	(1.14)	(\$13.34)	(6.88)
Manufacturing	\$15,558.46	\$128.03	82.29	\$128.03	82.29	(\$1.42)	(0.91)
Service Company	\$10,524.13	\$3.49	3.32	\$3.49	3.32	(\$1.76)	(1.67)
Energy Company	\$3,921.52	(\$11.92)	(30.39)	(\$11.92)	(30.39)	(\$9.04)	(23.04)



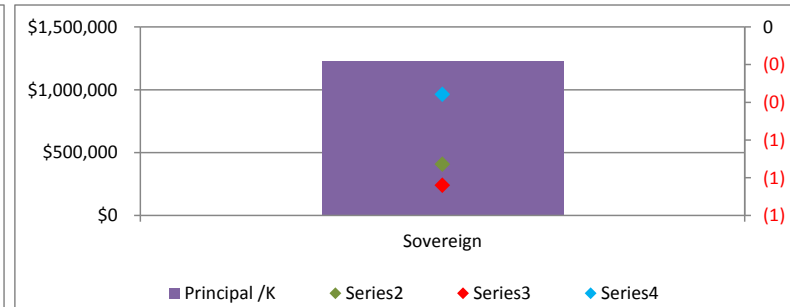
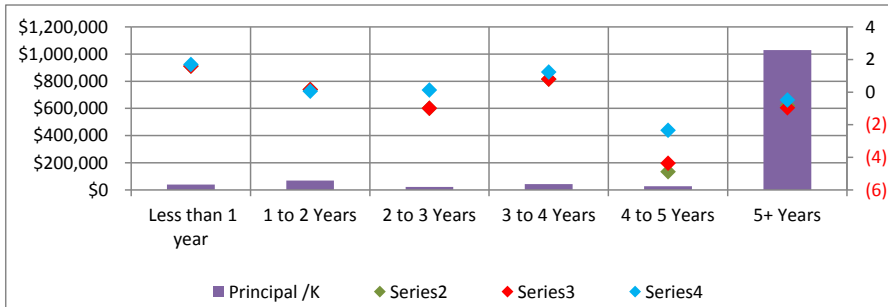
**Fixed Income TCA Summary**

**Developed - Govt**

Buy / Sell	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Total	\$1,231,710.73	(\$89.65)	(0.73)	(\$103.50)	(0.84)	(\$44.07)	(0.36)
Buy	\$630,065.86	(\$140.29)	(2.23)	(\$154.05)	(2.44)	(\$161.20)	(2.56)
Sell	\$601,644.87	\$50.65	0.84	\$50.55	0.84	\$117.13	1.95

Time To Maturity	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Less than 1 year	\$38,903.88	\$6.21	1.60	\$6.21	1.60	\$6.60	1.70
1 to 2 Years	\$69,959.99	\$1.12	0.16	\$1.12	0.16	\$0.35	0.05
2 to 3 Years	\$22,691.72	(\$2.27)	(1.00)	(\$2.27)	(1.00)	\$0.27	0.12
3 to 4 Years	\$43,224.49	\$3.41	0.79	\$3.41	0.79	\$5.31	1.23
4 to 5 Years	\$27,670.05	(\$13.54)	(4.89)	(\$12.09)	(4.37)	(\$6.49)	(2.34)
5+ Years	\$1,029,260.59	(\$84.58)	(0.82)	(\$99.87)	(0.97)	(\$50.12)	(0.49)

Sector	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Sovereign	\$1,231,710.73	(\$89.65)	(0.73)	(\$103.50)	(0.84)	(\$44.07)	(0.36)



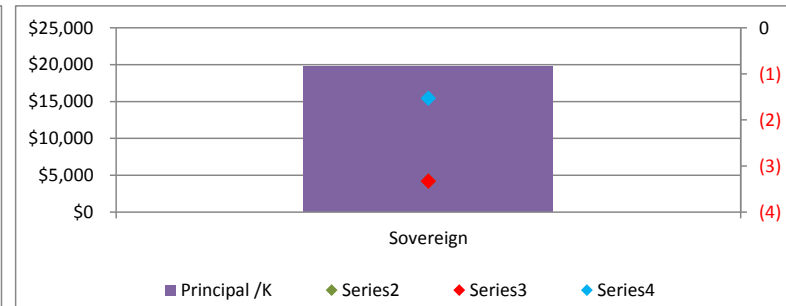
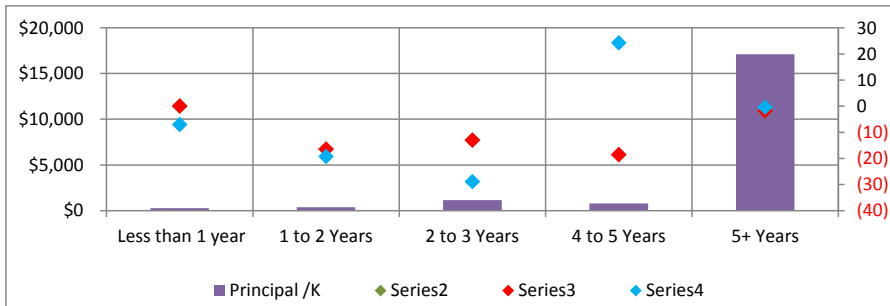
**Fixed Income TCA Summary**

**Emerging - Govt**

Buy / Sell	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Total	\$19,717.60	(\$6.57)	(3.33)	(\$6.57)	(3.33)	(\$3.02)	(1.53)
Buy	\$8,694.18	\$60.11	69.13	\$60.11	69.13	\$22.10	25.42
Sell	\$11,023.42	(\$66.67)	(60.48)	(\$66.67)	(60.48)	(\$25.12)	(22.79)

Time To Maturity	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Less than 1 year	\$285.69	\$0.00	0.00	\$0.00	0.00	(\$0.20)	(7.00)
1 to 2 Years	\$368.69	(\$0.61)	(16.47)	(\$0.61)	(16.47)	(\$0.71)	(19.29)
2 to 3 Years	\$1,162.22	(\$1.51)	(12.98)	(\$1.51)	(12.98)	(\$3.36)	(28.90)
4 to 5 Years	\$787.99	(\$1.46)	(18.51)	(\$1.46)	(18.51)	\$1.91	24.25
5+ Years	\$17,113.01	(\$2.99)	(1.75)	(\$2.99)	(1.75)	(\$0.66)	(0.38)

Sector	Principal /K	sEntStrike		sAAP		CloStrike	
		/K	BP	/K	BP	/K	BP
Sovereign	\$19,717.60	(\$6.57)	(3.33)	(\$6.57)	(3.33)	(\$3.02)	(1.53)



Lowest Cost Trades by sAAP /K

**1**

Trade Details		
Trade Date	02/05/18	
Face Value /K	\$909.00	
Principal /K	\$956.72	
Price	105.2500	
Side	<b>SELL</b>	
Broker	BAIRD, ROBERT W., & CO. INCORPORATED	
Manager	STONE HARBOR	
Trader		

Security Details		Market Details		
Security Name	6.5% 144A Sr Sec 2nd Lien Nts Due 2024	Previous Close:	First Tick: \$105.25	
Security Type	Corporate	Close:	\$104.50	
Sector	Manufacturing	Measurement Details		
Currency	USD	/K	BP	Universe (BP)
Issue Date	3/16/2015	sEntStrike Cost / Gain	\$61.50	642.78
Maturity Date	3/15/2023	sAAP Cost / Gain	\$61.50	642.78
		CloStrike Cost / Gain	\$6.82	71.26

**2**

Trade Details		
Trade Date	03/16/18	
Face Value /K	\$17,200.00	
Principal /K	\$17,042.78	
Price	99.0859	
Side	<b>Buy</b>	
Broker	MERRILL LYNCH PIERCE FENNER	
Manager	PIMCO US TREASURIES	
Trader		

Security Details		Market Details		
Security Name	10-Yr Nts Due 02/15/2028	Previous Close:	First Tick:	
Security Type	Govt/Treasury/Central Bank	Close:	\$99.16	
Sector	Sovereign	Measurement Details		
Currency	USD	/K	BP	Universe (BP)
Issue Date	2/15/2018	sEntStrike Cost / Gain	\$39.96	23.45
Maturity Date	2/15/2028	sAAP Cost / Gain	\$39.96	23.45
		CloStrike Cost / Gain	\$12.09	7.10

**3**

Trade Details		
Trade Date	01/31/18	
Face Value /K	\$670.00	
Principal /K	\$783.10	
Price	116.8800	
Side	<b>SELL</b>	
Broker	BAIRD, ROBERT W., & CO. INCORPORATED	
Manager	STONE HARBOR	
Trader		

Security Details		Market Details		
Security Name	10.5% Sr Ser B Guar Nts Due 2024	Previous Close:	First Tick: \$116.70	
Security Type	Corporate	Close:	\$116.75	
Sector	Manufacturing	Measurement Details		
Currency	USD	/K	BP	Universe (BP)
Issue Date	2/6/2017	sEntStrike Cost / Gain	\$39.39	502.96
Maturity Date	4/1/2024	sAAP Cost / Gain	\$39.39	502.96
		CloStrike Cost / Gain	\$0.87	11.12

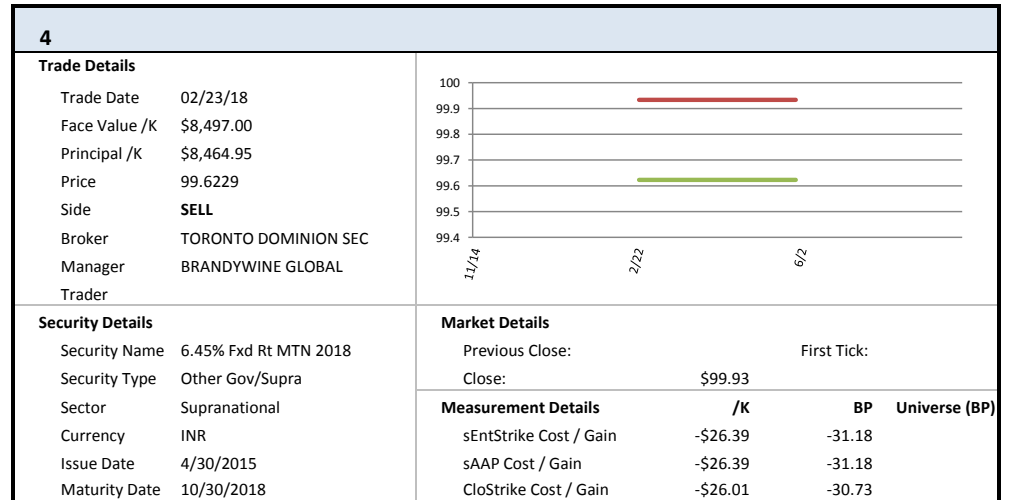
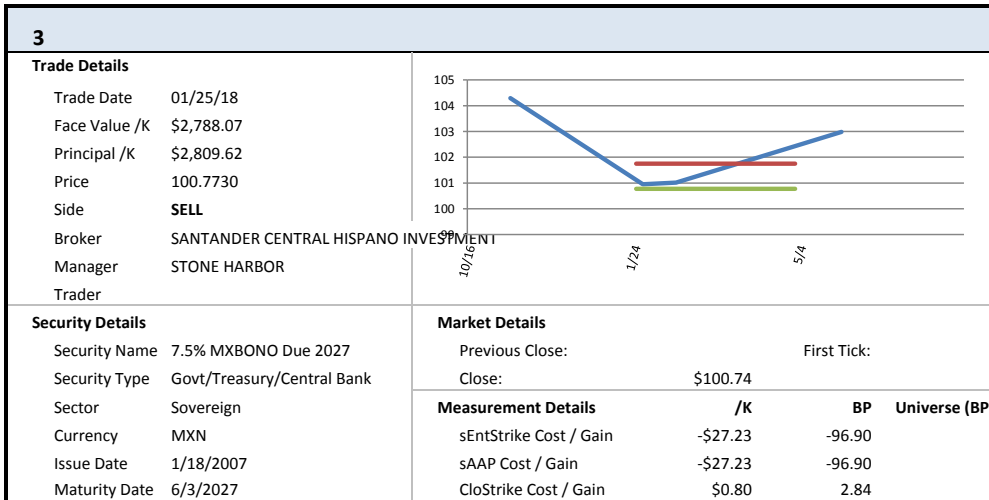
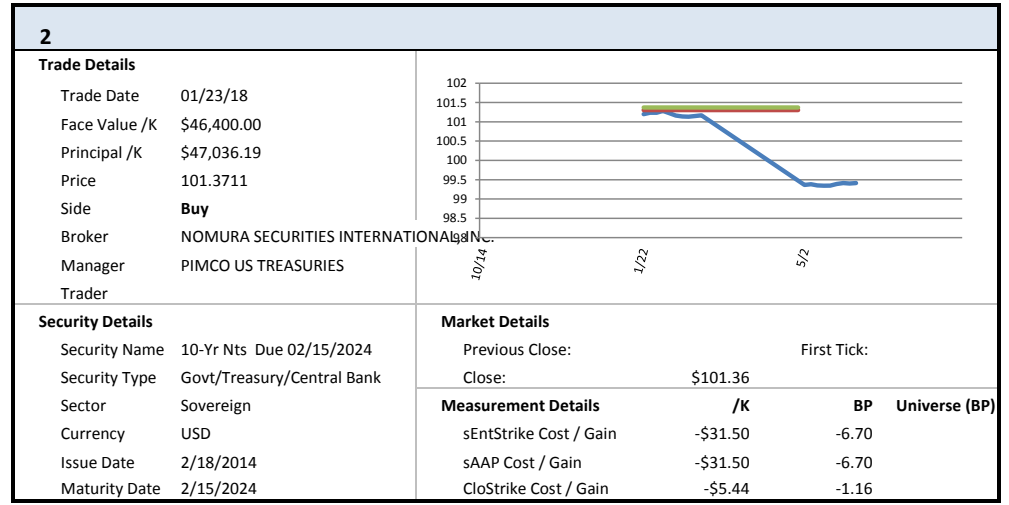
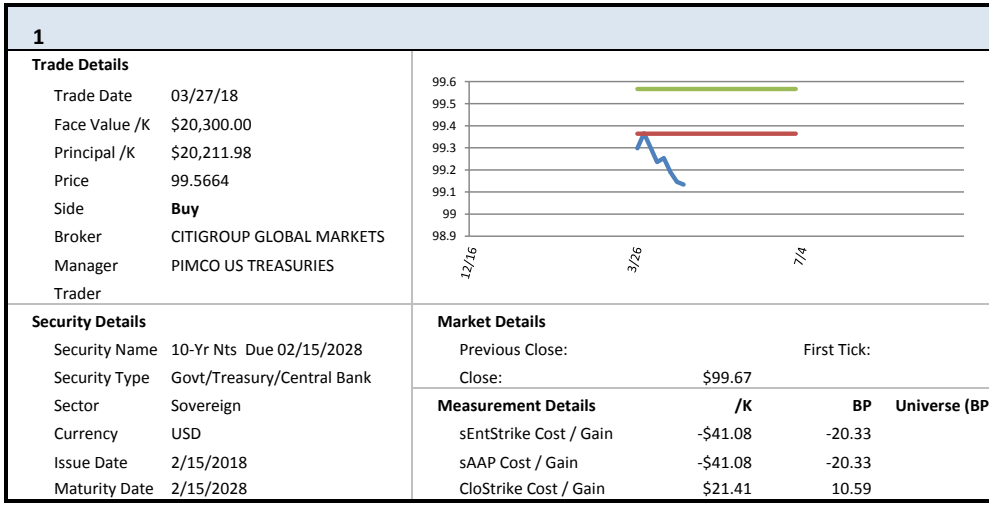
**4**

Trade Details		
Trade Date	02/23/18	
Face Value /K	\$2,331.52	
Principal /K	\$2,321.93	
Price	99.5890	
Side	<b>Buy</b>	
Broker	CITIGROUP GLOBAL MARKETS	
Manager	STONE HARBOR	
Trader		

Security Details		Market Details		
Security Name	7.5% MXBONO Due 2027	Previous Close:	First Tick:	
Security Type	Govt/Treasury/Central Bank	Close:	\$100.22	
Sector	Sovereign	Measurement Details		
Currency	MXN	/K	BP	Universe (BP)
Issue Date	1/18/2007	sEntStrike Cost / Gain	\$34.62	149.11
Maturity Date	6/3/2027	sAAP Cost / Gain	\$34.62	149.11
		CloStrike Cost / Gain	\$14.82	63.84

Legend: AAP — Trade — Market —

Highest Cost Trades by sAAP /K



Legend: AAP — Trade — Market —



Largest Trades by Principal /K

**1**

Trade Details		
Trade Date	02/05/18	
Face Value /K	\$909.00	
Principal /K	\$956.72	
Price	105.2500	
Side	<b>SELL</b>	
Broker	BAIRD, ROBERT W., & CO. INCORPORATED	
Manager	STONE HARBOR	
Trader		

Security Details		Market Details																	
Security Name	6.5% 144A Sr Sec 2nd Lien Nts Du	Previous Close:	First Tick: \$105.25																
Security Type	Corporate	Close:	\$104.50																
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Currency	USD																		
Issue Date	3/16/2015																		
Maturity Date	3/15/2023																		

**2**

Trade Details		
Trade Date	03/16/18	
Face Value /K	\$17,200.00	
Principal /K	\$17,042.78	
Price	99.0859	
Side	<b>Buy</b>	
Broker	MERRILL LYNCH PIERCE FENNER	
Manager	PIMCO US TREASURIES	
Trader		

Security Details		Market Details																	
Security Name	10-Yr Nts Due 02/15/2028	Previous Close:	First Tick:																
Security Type	Govt/Treasury/Central Bank	Close:	\$99.16																
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Trade Details		
Trade Date	01/31/18	
Face Value /K	\$670.00	
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Price	116.8800	
Side	<b>SELL</b>	
Broker	BAIRD, ROBERT W., & CO. INCORPORATED	
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Trader		

Security Details		Market Details																	
Security Name	10.5% Sr Ser B Guar Nts Due 2024	Previous Close:	First Tick: \$116.70																
Security Type	Corporate	Close:	\$116.75																
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Principal /K	\$2,321.93	
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Side	<b>Buy</b>	
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Security Name	7.5% MXBONO Due 2027	Previous Close:	First Tick:																
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Legend: AAP — Trade — Market —