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## **The Treasury Yield Curve and Its Impact on Insurance Company Investments**

A commonly used term in the capital markets is “yield curve.” The significance of the yield curve lies in that it is fundamental to the pricing of most fixed-income investments, from government securities, to basic corporate bonds, to highly structured transactions. The yield curve that is typically used is the U.S. Treasury curve, which compares the three-month, two-year, five-year and 30-year interest rates as a proxy for the risk-free rate.

With the Federal Reserve's QE2 program — the second round of asset purchases to stimulate the economy — coming to an end in June 2011, interest rates will likely begin to increase soon thereafter. The impact of changing interest rates on insurance company investments, as well as historical interest rates and yield curves, are discussed below.

### ***Theoretical Yield Curves***

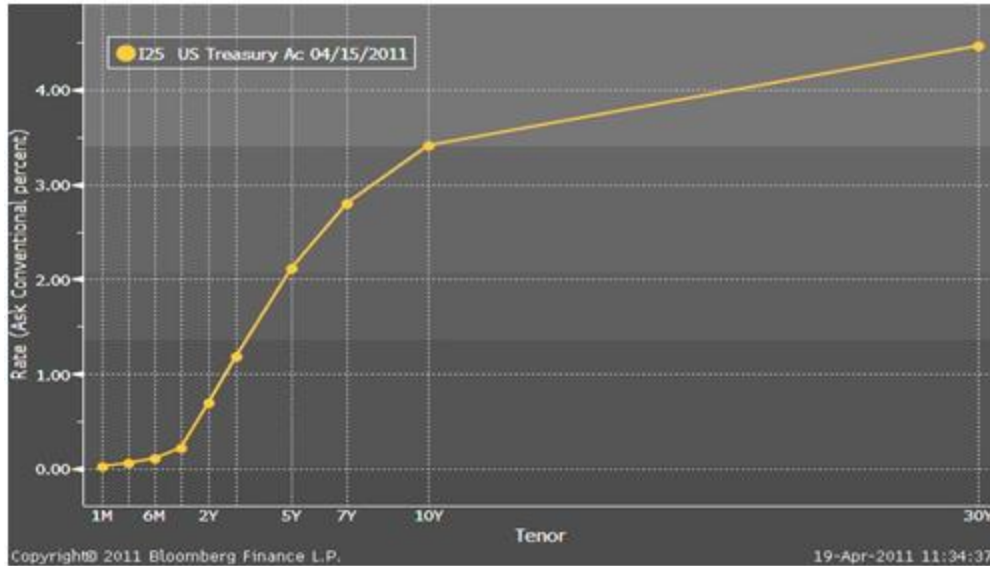
The shape of the yield curve provides insight into the market's expectations for interest rates, as well as economic activity. The yield curve normally is positively sloping. As the time to maturity increases, the yield that investors require increases. Longer-term maturities, in theory, entail more risk because there is more uncertainty about economic conditions the farther out in time the investor goes; therefore, investors demand a greater yield in return. The positive slope of the yield curve also reflects investors' expectations for a growing economy, as well as expectations that inflation will rise.

An inverted yield curve is one where long-term maturities have a lower yield than short-term maturities. In this case, long-term investors are willing to settle for locking in lower yields today if they believe the economy will slow or decline in the future, leading to even lower interest rates. An inverted yield curve, therefore, signals an economic recession. An inverted curve also can result from basic market dynamics, such as the Federal Reserve forcing up short-term rates through monetary policy. Inverted yield curves do not occur that often, and generally when they do occur, do not last long.

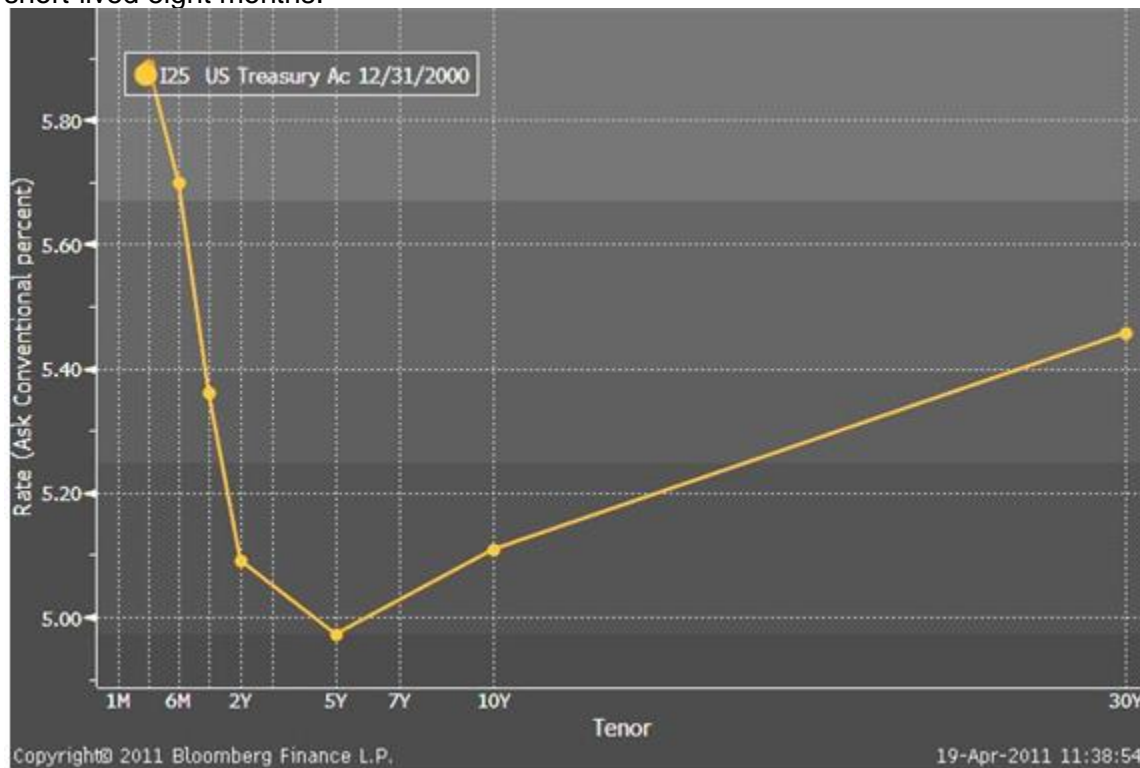
Another possible shape of a yield curve is a flat curve. A flat yield curve occurs when all maturities have similar yields and signals uncertainty in the economy. This type of yield curve is often seen during transitions between normal and inverted curves.

### ***Actual Historical Yield Curves***

As seen in the chart below, today's yield curve is positively sloped and relatively steep. The yield differential between the short end and the long end is more than 400 basis points (bps); typically the differential is approximately 100 bps to 200 bps in a normal environment. The steepness in the curve is, in part, a function of short-term rates being directly tied to the Federal Reserve's near-zero interest rates (discount rate and targeting Fed Funds rate) and demand for longer maturity Treasuries declining due to higher inflation expectations. A steep yield curve is typically seen at the end of a recession, when economic expansion is under way. However, to date, other factors — such as high unemployment and the weak housing market — have worked against an improving economy.

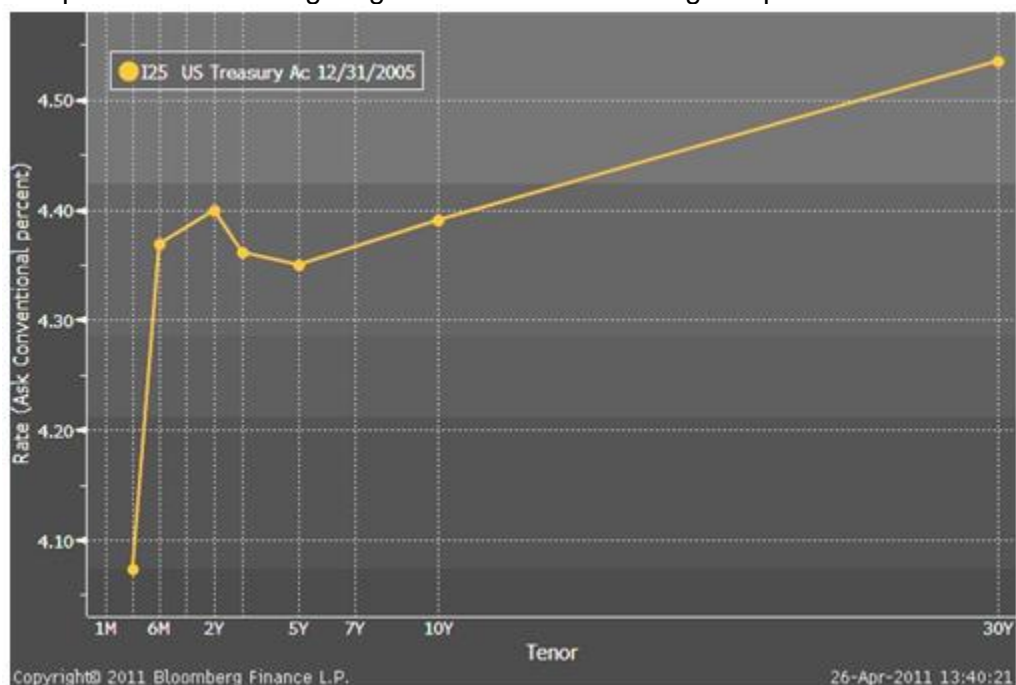


At the end of 2000, the yield curve was inverted, which generally signals a recession in the near future, as illustrated in the following chart. The inversion in the yield curve began in July 2000 and remained so through April 2001. The leading cause of the inversion was the tightening of monetary policy in an effort to slow the growth of aggregate demand in 1999 and 2000. The Federal Reserve raised short-term interest rates in an effort to increase the cost of borrowing and constrict spending to slow the pace of growth. Soon thereafter, according to the National Bureau of Economic Research, the United States entered into a recession in March 2001 for a short-lived eight months.



As shown in the chart below, the most recent period when the yield curve was relatively flat was in 2005, in the midst of the residential housing boom. The yield curve was positively sloped, but

the differential between the short end and the long end was only 45 bps. As such, there was little premium for holding longer-term securities during this period.



The table below provides historical interest rates across the curve for the past 30 years and offers insight into trends in interest rates during the past three decades. Although interest rates ended 2010 at relatively low levels, they were off of the historical lows in 2008. In addition, the last column represents the difference between the 30-year benchmark Treasury and the one-year benchmark Treasury and reflects the steepness or flatness of the yield curve. At the end of 2010, the yield curve was at one of its steepest points in the past few decades.

	3 mo	6 mo	1 yr	2 yr	5 yr	7 yr	10 yr	30 yr	30yr - 1yr
1980	N/A	N/A	13.78	13.06	12.59	12.49	12.43	11.98	(1.80)
1985	7.28	7.44	7.55	7.98	8.49	8.87	9.00	9.27	1.72
1990	6.63	6.73	6.94	7.15	7.68	8.00	8.08	8.26	1.32
1995	5.10	5.17	5.26	5.18	5.38	5.49	5.58	5.96	0.70
2000	5.89	5.70	5.31	5.11	4.99	5.16	5.12	5.46	0.15
2001	1.74	1.83	2.34	3.07	4.38	4.84	5.07	5.48	3.14
2002	1.22	1.23	1.41	1.61	2.78	3.36	3.83	4.78	3.37
2003	0.95	1.02	1.27	1.84	3.25	3.77	4.27	5.07	3.80
2004	2.22	2.59	2.77	3.08	3.63	3.94	4.24	4.83	2.06
2005	4.08	4.37	4.35	4.41	4.35	4.36	4.39	4.53	0.18
2006	5.02	5.09	4.97	4.82	4.70	4.70	4.71	4.81	(0.16)
2007	3.36	3.49	3.49	3.05	3.45	3.70	4.04	4.45	0.96
2008	0.11	0.27	0.38	0.76	1.55	1.87	2.25	2.69	2.31
2009	0.06	0.20	0.47	1.14	2.69	3.39	3.85	4.63	4.16
2010	0.12	0.18	0.26	0.59	2.01	2.70	3.29	4.33	4.07

### **Impact on Insurance Company Bonds**

Let's take a closer look at how bond prices are impacted by changes in interest rates. Duration measures a bond's price sensitivity to yield — or the percentage change in price for a parallel shift in yields. For example, a five-year non-callable bullet corporate bond has a duration of approximately 4.65, and a 10-year non-callable bullet corporate bond has a duration of approximately 7.96. The 10-year corporate bond has a higher duration, and its price will, therefore, be impacted at a greater degree for a given change in yield.

The following table illustrates the percentage change in price for non-callable bullet corporate bonds under various parallel shifts in the yield curve. The 30-year corporate bond's price is the most sensitive to changes in interest rates, whether they increase or decrease.

	5-year corporate bond	10-year corporate bond	30-year corporate bond
- 300 bps	9.71%	27.69%	62.15%
- 200 bps	9.64	18.08	36.86
- 100 bps	4.84	8.69	16.39
no change	0.00	0.00	0.00
+100 bps	-4.61	-7.90	-13.13
+200 bps	-8.98	-15.08	-23.71
+300 bps	-13.12	-21.59	-32.32

### ***Interest Rate Risk and Life Insurance Companies***

Interest rate risk refers to the risk of market value losses due to fluctuations in interest rate levels. Insurance companies, in general, are subject to interest rate risk, given their investments in fixed-income assets; however, life insurance companies are particularly sensitive to interest rate risk, given their investments in longer duration fixed-income assets. The higher level of interest rate risk at life insurance companies is considered in the C-3 component of the risk-based capital (RBC) formula. The interest rate risk calculation accounts for the surplus necessary to provide for a lack of synchronization of asset and liability cash flows due to the risk of losses from changes in interest rate levels.

In a decreasing interest rate environment, a life insurer's existing portfolio would gain in value, given that bond prices increase as yields decrease. However, the increase in the value of the existing portfolio would not be realized unless the portfolio was sold, and the benefits of doing so would likely be partially offset by lower yields for the proceeds being reinvested. In addition, prepayments are likely to increase, which would result in additional funds being reinvested at lower yields. This is known as reinvestment risk; i.e., the risk that future proceeds will have to be reinvested at a lower potential interest rate. This scenario was evident in the mid- to late-1980s, when interest rates gradually declined from the high interest rates experienced in the late 1970s and early 1980s. The high coupon debt of that period was called/prepaid by the issuer in order to take advantage of the lower interest rates and to issue new debt at much lower yields. In an increasing interest rate environment, the existing portfolio would lose value as bond prices decrease with higher yields. However, the loss would be unrealized unless the assets were sold. Given their long-term investment horizon, life insurance companies typically can hold on to investments until maturity and can withstand fluctuations in the market.

The worst-case scenario for life insurance companies is an inverted yield curve. Fortunately, this environment tends to be atypical. In such an environment, it would be quite difficult for life insurance products to compete effectively, given the lower yields it would be receiving on the long end. In fact, any investor would likely prefer to invest in shorter maturities, given the higher yield — but, for life insurance companies, that might result in an asset-liability mismatch. A flat yield curve is similarly challenging, as life insurance companies would also have difficulty differentiating their products from competing shorter-term products.

A rapidly rising interest rate environment can also be disadvantageous for life insurance companies. Under this scenario, surrenders might increase if market rates increase faster than insurers can increase their crediting rates. For example, whole life insurance participants might opt to “cash out” their existing policy and reinvest the proceeds in a new, higher-yielding product. Furthermore, given the higher interest rates, the bonds that would be liquidated to satisfy the surrenders would likely be sold at a loss. The longer the bond’s duration, the larger the loss — potentially resulting in a negative impact to an insurer’s capital position.

### ***Alternative Benchmarks to the Treasury Yield Curve***

As mentioned previously, the Treasury yield curve serves as a benchmark for pricing other fixed-income securities. U.S. Treasuries are an ideal benchmark because they represent risk-free interest rates — free of default risk — and the market for Treasuries is large and liquid. However, market participants have speculated for some time on whether another market might serve as a future benchmark. Given Standard & Poor’s recent change in the United States’ long-term sovereign rating outlook to negative, this issue is at the forefront once again. A market that has been considered a potential benchmark is the interest rate swaps market.

An interest rate swap is an agreement between two parties to exchange one stream of interest payments (e.g., fixed interest rate payments) for another stream (e.g., floating interest rate payments). The floating rate is often based on the London Interbank Offer Rate (LIBOR); i.e., the rate that banks charge one another for funds in the Eurodollar market. Swap rates are quoted in terms of the fixed rate that must be paid to convert to a floating rate. The swap curve is similar to the Treasury yield curve and identifies the relationship between swap rates and varying maturities. The interest rate swaps market is an active and liquid market with relatively narrow bid-ask spreads. The size and liquidity of the market, therefore, easily lends itself to being a suitable benchmark. However, the counterparty credit risk — i.e., the risk that a counterparty in a swap defaults on its end of the agreement — in interest rate swaps hinders its attractiveness, as swaps created by different parties are not perfectly fungible. This adversely affects the overall liquidity of interest rate swaps and its ability to serve as an ideal benchmark. In some (specialized) markets, alternatives already exist. The U.S. municipal bond market is a large market, at \$2.9 trillion of debt outstanding. Municipal bonds are generally priced in comparison with AAA-rated municipal equivalents.

The bund is the German government’s federal bond and is of the highest quality: AAA. The 10-year bund is Europe’s benchmark government security and is used to price all euro-denominated government debt. It is a highly liquid and large market in Europe.

April 22, 2011

Major Insurer Share Prices

		Close	Change %			Prior		
			Week	QTD	YTD	Week	Quarter	Year
Life	Aflac	\$53.66	2.7	1.7	(4.9)	\$52.25	\$52.78	\$56.43
	Ameriprise	63.52	3.1	4.0	10.4	61.61	61.08	57.55
	Genworth	12.02	(2.0)	(10.7)	(8.5)	12.26	13.46	13.14
	Lincoln	29.83	3.3	(0.7)	7.3	28.87	30.04	27.81
	MetLife	44.38	1.0	(0.8)	(0.1)	43.96	44.73	44.44
	Principal	31.81	1.3	(0.9)	(2.3)	31.40	32.11	32.56
	Protective	26.18	1.7	(1.4)	(1.7)	25.74	26.55	26.64
	Prudential	61.73	1.2	0.2	5.1	61.00	61.58	58.71
	UNUM	25.80	0.4	(1.7)	6.5	25.69	26.25	24.22
PC	ACE	\$65.32	(0.9)	1.0	4.9	\$65.88	\$64.70	\$62.25
	Axis Capital	35.38	(1.2)	1.3	(1.4)	35.82	34.92	35.88
	Allstate	31.65	0.8	(0.4)	(0.7)	31.41	31.78	31.88
	Arch Capital	101.61	(0.3)	2.4	15.4	101.93	99.19	88.05
	Cincinnati	32.12	(0.2)	(2.0)	1.4	32.18	32.79	31.69
	Chubb	61.56	(0.5)	0.4	3.2	61.87	61.31	59.64
	Everest Re	89.77	(1.5)	1.8	5.8	91.14	88.18	84.82
	Progressive	21.12	(1.4)	(0.0)	6.3	21.43	21.13	19.87
	Travelers	61.32	2.5	3.1	10.1	59.80	59.48	55.71
	WR Berkley	31.76	0.3	(1.4)	16.0	31.67	32.21	27.38
	XL	24.19	(1.1)	(1.7)	10.9	24.47	24.60	21.82
Other	AON	\$52.18	(0.6)	(1.5)	13.4	\$52.47	\$52.96	\$46.01
	AIG	32.16	(3.9)	(8.5)	(33.4)	33.46	35.14	48.27
	Assurant	38.11	0.5	(1.0)	(1.1)	37.91	38.51	38.52
	Fidelity National	14.95	0.1	5.8	9.3	14.94	14.13	13.68
	Hartford	27.54	2.8	2.3	4.0	26.80	26.93	26.49
	Marsh	29.78	0.9	(0.1)	8.9	29.52	29.81	27.34
Health	Aetna	\$39.06	4.4	4.4	28.0	\$37.43	\$37.43	\$30.51
	Cigna	45.29	1.8	2.3	23.5	44.48	44.28	36.66
	Humana	72.34	2.2	3.4	32.2	70.78	69.94	54.74
	United	47.81	6.3	5.8	32.4	44.98	45.20	36.11
	WellPoint	72.27	4.1	3.6	27.1	69.41	69.79	56.86
Monoline	Assured	\$17.13	(2.7)	15.0	(3.2)	\$17.60	\$14.90	\$17.70
	MBIA	10.89	3.9	8.5	(9.2)	10.48	10.04	11.99
	MGIC	8.07	(7.9)	(9.2)	(20.8)	8.76	8.89	10.19
	PMI	2.01	(8.6)	(25.6)	(39.1)	2.20	2.70	3.30
	Radian	5.52	(12.1)	(18.9)	(31.6)	6.28	6.81	8.07
	XL Capital	24.19	(1.1)	(1.7)	10.9	24.47	24.60	21.82

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Major Market Variables	Close	Change %			Prior		
		Week	QTD	YTD	Week	Quarter	Year
		Dow Jones Ind	12,505.99	1.3	1.5	8.0	12,341.83
S&P 500	1,337.38	1.3	0.9	6.3	1,319.68	1,325.83	1,257.64
S&P Financial	216.86	(0.2)	(1.7)	1.0	217.27	220.71	214.77
S&P Insurance	193.82	1.1	(0.6)	3.0	191.70	194.96	188.22
US Dollar \$		Change %			Prior		
/ Euro	\$1.45	0.8	2.8	8.7	\$1.44	\$1.42	\$1.34
/ Crude Oil bbl	112.29	2.4	5.2	21.8	109.66	106.72	92.22
/ Gold oz	1,503.20	1.2	4.5	5.8	1,485.30	1,438.90	1,420.78
Treasury Ylds %	%	Change			%	%	%
1 Year	0.22	(0.02)	(0.07)	(0.06)	0.23	0.28	0.27
10 Year	3.39	(0.02)	(0.08)	0.10	3.41	3.47	3.30
30 Year	4.47	(0.00)	(0.04)	0.13	4.47	4.51	4.34
Corp Credit Spreads -bp		Change %			Prior		
CDX.IG	80.48	(1.2)	(4.0)	(5.3)	81.47	83.81	85.00

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Major Insurer Bond Yields

Company	Coupon	Maturity	Price			Spread		
			Current	Change	Yield	B.P.	Change	
Life	Aflac	8.500%	5/15/2019	\$121.81	\$0.19	5.15%	209	(3)
	Ameriprise	5.300%	3/15/2020	\$107.60	\$0.14	4.26%	103	1
	Genworth	6.515%	5/15/2018	\$100.82	\$0.38	6.37%	348	(7)
	Lincoln National	8.750%	7/15/2019	\$127.57	\$0.19	4.66%	154	(4)
	MassMutual	8.875%	6/15/2039	\$139.22	\$1.22	5.98%	152	(6)
	MetLife	4.750%	2/15/2021	\$101.29	\$0.34	4.58%	116	(4)
	Mutual of Omaha	6.800%	6/15/2036	\$106.78	\$3.49	6.26%	198	(25)
	New York Life	6.750%	11/15/2039	\$115.58	\$0.65	5.65%	117	(4)
	NLV Financial	7.500%	8/15/2033	\$115.32	(\$0.36)	6.22%	209	4
	Northwestern Mutual	6.063%	3/15/2040	\$106.84	\$0.33	5.58%	109	1
	Pacific Life	9.250%	6/15/2039	\$133.00	\$0.56	6.64%	220	(1)
	Principal	6.050%	10/15/2036	\$105.08	\$1.00	5.67%	135	(6)
	Prudential	4.500%	11/15/2020	\$99.26	\$0.46	4.60%	122	(6)
	TIAA	6.850%	12/15/2039	\$114.57	\$0.09	5.80%	133	1
P&C	ACE INA	5.900%	6/15/2019	\$111.59	\$0.03	4.20%	110	(0)
	Allstate	7.450%	5/15/2019	\$120.02	(\$0.04)	4.46%	138	(2)
	American Financial	9.875%	6/15/2019	\$124.01	(\$0.10)	6.09%	302	3
	Berkshire Hathaway	5.400%	5/15/2018	\$110.85	\$0.03	3.64%	80	(0)
	Travelers	3.900%	11/15/2020	\$95.87	\$0.21	4.44%	108	(1)
	XL Group	6.250%	5/15/2027	\$99.79	\$1.69	6.27%	245	(14)
Other	AON	5.000%	9/15/2020	\$102.11	(\$0.05)	4.72%	137	0
	AIG	5.850%	1/15/2018	\$105.09	\$0.20	4.95%	217	(6)
	Fidelity National	7.875%	7/15/2020	\$111.25	\$0.00	6.25%	419	(3)
	Hartford	5.500%	3/15/2020	\$102.91	(\$0.03)	5.09%	184	1
	Marsh	9.250%	4/15/2019	\$128.07	\$1.41	4.94%	190	(12)
	Nationwide	9.375%	8/15/1939	\$125.46	\$1.01	7.24%	281	(4)
Health	Aetna	3.950%	9/15/2020	\$97.52	\$0.03	4.27%	90	(1)
	CIGNA	5.125%	6/15/2020	\$105.06	\$0.12	4.44%	111	(2)
	United Healthcare	3.875%	10/15/2020	\$96.25	\$0.25	4.36%	98	(3)
	Wellpoint	4.350%	8/15/2020	\$100.46	\$0.34	4.29%	98	(2)

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