



How Do Our CMA Forecasts Stack Up Against the Reality:

A Decade's Worth
of Results

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Introduction

Investnet's Quantitative Research Group (QRG) issued its first set of capital markets assumptions (CMA) forecasts back in 2009. The Financial Crisis of 2008 was still very much on everyone's mind, and forecasting CMAs, as we well knew, in such volatile circumstances was particularly challenging. More generally, regardless of the degree of sophistication of the CMA forecasting methodology, the task of making long-term expected return as well as risk forecasts inherently involves a wide set of likely outcomes due to a myriad of unforecastable factors, such as geo-political events, unprecedented changes in government's fiscal or monetary policies, and emergence of innovative and disruptive technologies.

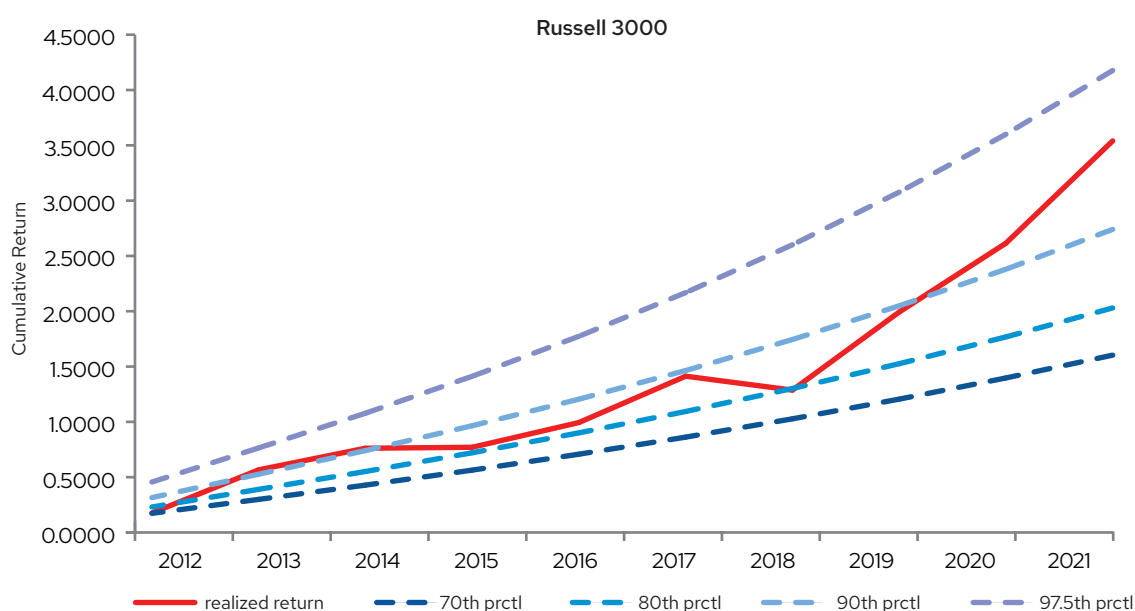
With more than a decade's worth of forecasted CMAs as well as realized return data, we can now assess the quality of our CMA performance, and at the same time give explanations on the trends that we see in the forecasting error. In this whitepaper we delve into the details of our CMA forecasting performance. We discuss the main drivers of this performance and offer detailed analysis on the parts of the methodology that performed as expected and the parts that saw deviations with the realized return, along with explanation for these deviations.

Forecasted vs Realized Performance

The table within the Appendix contains all of the CMA forecasts from 2009 up through 2022. However, in this paper we will focus on a particular set of CMAs – those issued in 2012. Since we make ten-year forecasts and do so at the beginning of the year, the 2012 forecast period closes at the end of 2021, which happens to also be the latest annual period for which we have realized returns.

Figure 1 contains realized cumulative return as well as a range of percentiles for the simulated cumulative return distribution, using the 2012 CMAs for the All Cap, Intermediate Bond, and Cash asset classes.¹ In addition, Table 1 gives the realized average return for years 2012 through 2021 and the associated distribution of the average return based on forecasted CMAs for the All Cap, Intermediate Bond, and Cash asset classes.

Figure 1: Realized return vs forecasted return distribution (2012/01-2021/12)



¹ We proxy All Cap, Intermediate Bond and Cash asset classes by Russell 3000, Bloomberg Intermediate US Govt/Credit TR, and Citigroup 30-day U.S. T-bill Indexes, respectively.

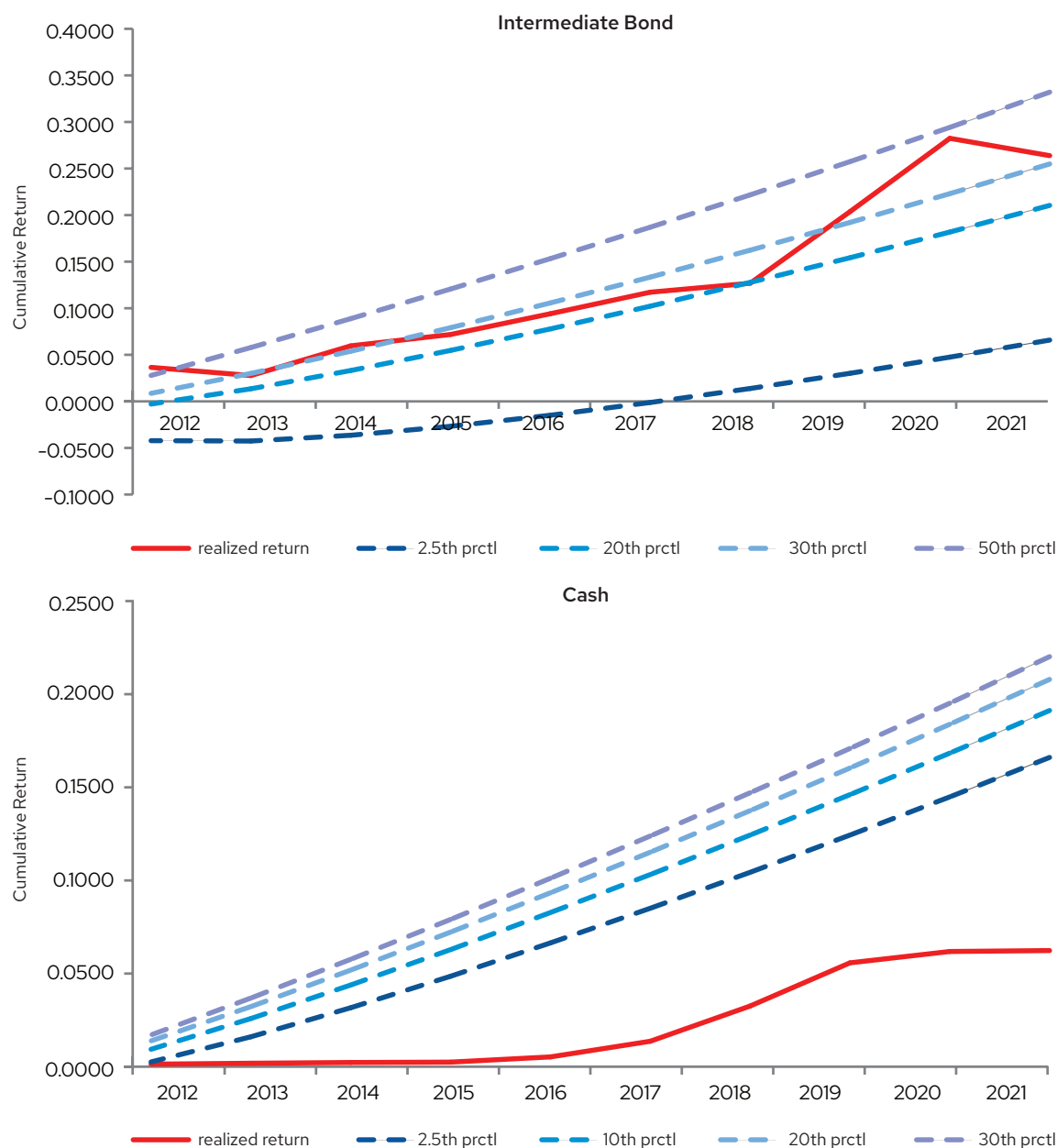


Table 1: Realized average returns and confidence intervals (2012/01-2021/12)

		2.5th prctl	10th prctl	20th prctl	30th prctl	50th prctl	70th prctl	80th prctl	90th prctl	97.5th prctl
Russell 3000	asymptotic	-0.0145	0.0187	0.0406	0.0565	0.0836	0.1111	0.1282	0.1523	0.1901
	realized return	0.1538								
Cash	asymptotic	0.0154	0.0177	0.0191	0.0201	0.0218	0.0235	0.0245	0.0259	0.0281
	realized return	0.0055								
Intermediate Bond	asymptotic	0.0070	0.0149	0.0200	0.0237	0.0299	0.0360	0.0397	0.0449	0.0528
	realized return	0.0241								

The two main observations from Figure 1 and Table 1 are as follows:

1. The All Cap asset class performed significantly better during the period 2012 through 2021, as compared to our ten-year forecasts at the beginning of 2012. In particular, the realized cumulative return at the end of 2021 falls close to the 95th percentile of the distribution that is simulated using the 2012 CMAs. In other words, if the 2012 CMAs are the correct specification of the underlying return distribution, the cumulative return outcome that we observed should happen with about five percent probability. We reach the same qualitative conclusion when analyzing Table 1. As a result, we conclude that the 2012 CMAs are unlikely to be correct, and, more precisely, they are very likely to be too low.
2. On the other hand, as suggested by Figure 1 and Table 1, our Cash forecasts of 2012 turned out to be too high. In fact, there is only about one percent probability that our 2012 Cash forecasts were correct. Also, while the realized Intermediate Bond return falls much closer to the median (i.e., our 2012 CMA forecast is much more likely compared to the realized return), the main reason for the Intermediate Bond asset class's relatively better performance has to do with outsized capital gains during years 2019 and 2020, which resulted from a precipitous fall in the Fed Funds rate and yields during this time period (we will analyze this in more detail later on).

As we will see from the analysis in the next section, the above two results are interconnected. That is, the Cash asset class underperforming is intrinsically linked to the All Cap asset class outperforming, and both of these empirical facts are tied to an unforecastable event – in this case, an unprecedentedly lax monetary policy followed by the Fed and other central banks in the world.

Reasons for the Forecasting Error

In this section we will look at the components of what drove the realized performance of equity and fixed income during the time period of 2012 through 2021, compared with our forecasts at the beginning of 2012.

Equity:

Equity return performance (forecasted as well as realized) can be broken down into the following components:² dividend yield, growth rate in nominal earnings, and growth rate in pricing multiples, P/E.³ Table 2 gives the decomposition of the forecasted as well as realized returns for the time period 2009 through 2022. For our purposes, we want to focus on the decomposition of the forecasted return for 2012 and the decomposition of the realized return for the subsequent ten years, that is, years 2012 through 2021. Looking at the averages of the realized dividend yield, growth rate in nominal earnings, and growth rate in P/Es across the ten years, we make the following observations.

First, the realized dividend is close to the forecast. At the beginning of 2012, we forecasted an annual dividend of 1.93 percent over the next ten years, and the realized average dividend over the period 2012 through 2021 came out to be 2.17 percent. This result is not too surprising, as, in the aggregate, dividend yields change very slowly through time. Second, the realized nominal earnings growth rate is also reasonably close to the forecasted level: 3.94 vs 4.6 percent despite a great deal of volatility associated with the realized earnings growth rate, as it has ranged from a low of -46 percent to a high of 62 percent.

² See QRG white-paper "Expected Course of the Expected Equity Returns," 2017..

³ Note that these are "nominal geometric" rates of return.

Third, and most important, the realized P/E growth for the period 2012 through 2021 has far exceeded our 2012 forecast. In particular, our forecast P/E growth rate in early 2012 for the subsequent ten years was 0.6 percent. The average realized P/E growth rate came out to be 10.56 percent per year. To wit, the P/E for the S&P 500 in January 2012 was 14.87, while it reached 26.08 at the beginning of January 2022.⁴ Thus, despite experiencing nominal earnings growth rate of 3.94, prices rose at a considerably faster pace, pulling the overall P/E growth rate to the unprecedented ten-year average of 10.56(!) percent per year.

Importantly, the main driver behind this growth in P/E were the extraordinary monetary policies adopted by the Fed and other central banks in the world, which brings us to the analysis of the fixed income CMA performance.

Table 2: Components of forecasted and realized equity expected returns

forecasted:	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
D/P	1.93%	2.07%	1.86%	1.83%	2.00%	1.79%	1.65%	1.83%	1.90%	1.24%	1.13%
nominal earnings growth	4.60%	4.60%	4.60%	4.30%	4.00%	4.00%	4.10%	4.00%	3.50%	4.20%	4.30%
pricing mult adj	0.60%	-0.32%	-0.33%	-0.52%	-0.86%	-0.79%	-0.82%	-0.17%	-0.05%	-1.27%	-0.78%
nom geom	7.13%	6.35%	6.13%	5.61%	5.14%	5.00%	4.93%	5.66%	5.35%	4.17%	4.65%
infl	2.20%	2.30%	2.10%	1.90%	1.90%	2.00%	2.10%	2.10%	2.00%	2.00%	2.40%

realized:	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	12-'21
D/P	2.44%	2.60%	2.11%	1.95%	2.32%	2.28%	1.75%	2.48%	2.07%	1.66%	2.17%
nominal earnings growth	-5.48%	12.82%	-0.22%	-16.72%	5.86%	11.29%	13.90%	1.65%	-46.18%	62.47%	3.94%
pricing mult adj	20.37%	13.36%	11.44%	13.81%	7.06%	7.35%	-21.45%	27.44%	62.27%	-36.01%	10.56%
nom geom	17.33%	28.77%	13.33%	-0.96%	15.24%	20.93%	-5.80%	31.57%	18.16%	28.12%	16.67%
infl	1.68%	1.56%	-0.23%	1.24%	2.51%	2.10%	1.50%	2.46%	1.36%	7.53%	

Fixed Income:

The realized versus forecasted performance of the Cash and Intermediate Bond asset classes is given in Figure 1 and Table 1. The realized performance of Cash came in far below the forecasted amount, while Intermediate Bonds performed closer to the forecast. However, the main reason for the better relative performance of Intermediate Bonds is the collapse of the yields (due to the steeply decreasing Fed Fund rates) during 2019 and 2020, leading to large capital gains for this asset class.

This brings us to ask the obvious: why were we (and many other asset managers in our position), so far off in our Cash return forecasts, given that Cash is a very low volatility asset class? The reason is that we were (and are) guided by market variables, such as yields, in our forecasts.⁵ We use the current yield curve to extract the market's views on future yields. The market, in turn, combines information from various sources, one of the most consequential being the "dot plots," which are put out quarterly by the Federal Open Market Committee – a committee within the Federal Reserve System charged by law to set the so-called Federal Funds rate and, more generally, guide the monetary policy. The Fed Funds rate is used by banks to transact between each other overnight, and therefore acts as the fundamental building block on which all the other yields are built.

⁴ The difference between 10.56 percent P/E growth rate and the annualized growth rate implied by the 14.87 and 26.08 P/E difference (5.78 percent) has to do with the difference between arithmetic and geometric rates of growth.

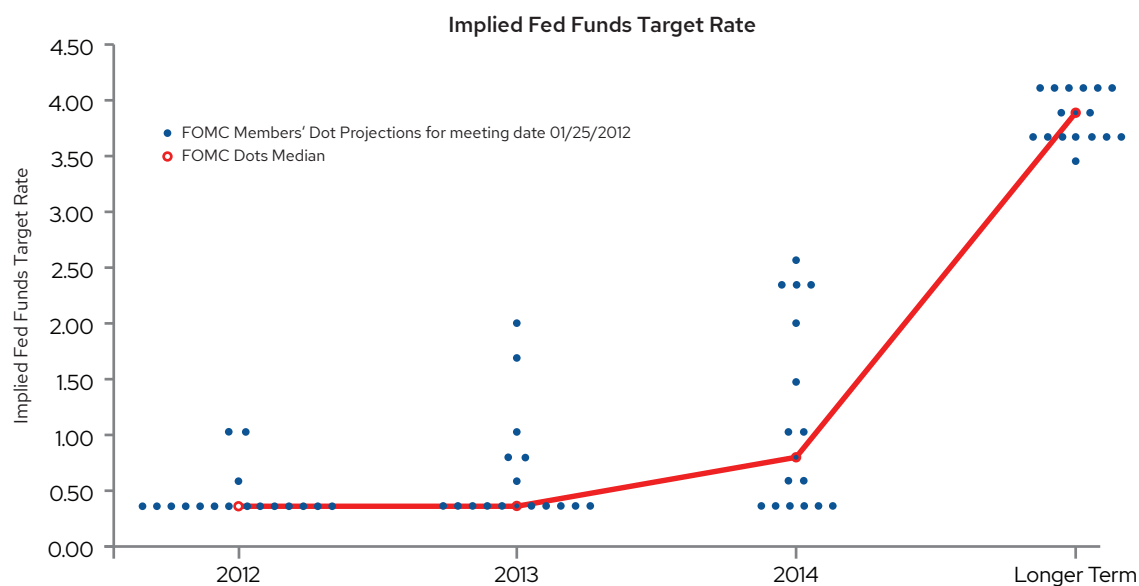
⁵ In fact, a theoretical decomposition of a long-term yield is equal to the sum of the all the expected short-term yields over the life of the bond plus a term called "Bond Risk Premium" that compensates an investor for taking on the risk of investing in a long-term bond rather than rolling over assets in successive short-term bonds.

With the above in mind, let's review the "dot plots" that were put out by the Federal Open Market Committee (FOMC) over time (Figure 2) by comparing them with the realized Fed Funds rate (Figure 3). In a nutshell, the ability of the FOMC members to forecast the rate that they themselves will set in the future is extremely poor. This applies especially to their "Longer Term" forecast. For example, on January 25, 2012, the lowest forecast (out of seventeen) was 3.75 percent, while the highest was 4.5 percent. For comparison, the highest that Fed Funds rate reached was 2.25–2.5 percent range for a brief period at the beginning of 2019 (see Figure 3). This pattern of poor guidance of the future Fed Funds rates has been present in virtually all the forecasted "dot plots" throughout the period 2012 through present.⁶

Conclusions

Forecasting CMAs is an inherently challenging exercise, since the quality of the result is strongly affected by unpredictable events, such as unprecedented monetary policies or worldwide pandemics. When assessing the quality of our predictions, we discovered that the forecasting error was driven almost entirely by the Fed's unprecedentedly lax monetary policy after the Financial Crash of 2008. Still, we are comfortable with our methodology, as it is driven by widely accepted theoretical ideas and captures the most relevant available market information. Given the danger that last year's high realized inflation is in risk of becoming endemic, the Fed has no choice but to "normalize" its Fed Funds rate levels and, more generally, its monetary policy. When this happens, we expect to see the realized equity and fixed income returns come out much closer to the forecasted.

Figure 2: Fed "Dot Plots"



⁶ Federal Open Markets Committee makes these forecasts at quarterly intervals.

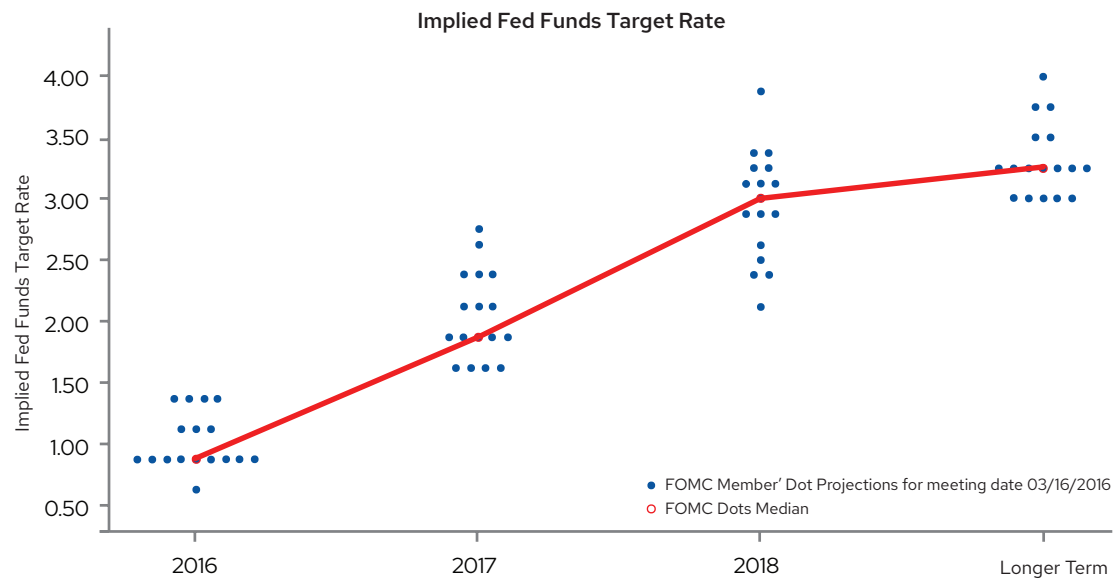
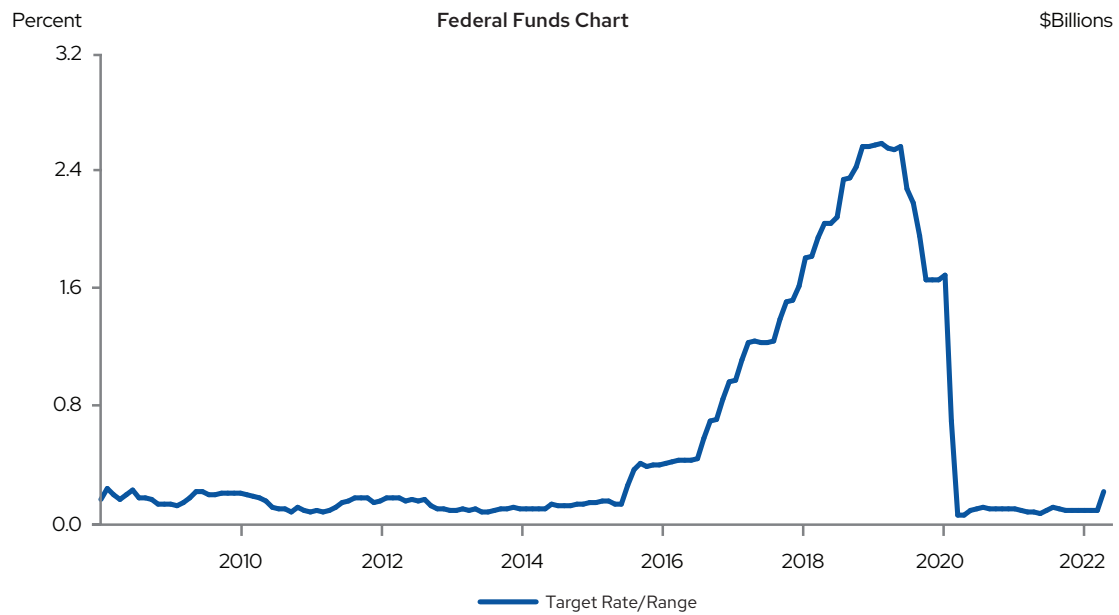


Figure 3: Realized Fed Funds Rate



Appendix

Appendix: Expected Return Forecasts (2009 – 2022)

Asset Class	2009	2010	2011	2012	2013	2014	2015
All Cap	9.24%	8.68%	8.37%	8.50%	7.93%	7.64%	6.88%
Alternative			6.29%	5.24%	4.94%	5.88%	5.21%
Bank Loan				4.53%	4.53%	4.85%	4.63%
Cash	3.68%	3.68%	2.63%	2.18%	1.85%	1.93%	2.29%
Commodity	7.11%	6.40%	6.02%	6.02%	5.71%	5.83%	4.71%
Emerging-Markets Bond				5.83%	5.83%	6.08%	6.11%
High Yield	7.46%	6.09%	6.36%	6.45%	5.90%	6.02%	5.84%
Intermediate Bond	5.06%	4.60%	3.94%	2.99%	2.89%	3.27%	3.23%
Intermediate Muni	4.31%	3.22%	3.11%	2.80%	2.55%	3.03%	3.27%
International Bond	5.21%	5.45%	5.40%	4.94%	2.93%	3.00%	2.30%
Int'l Developed Mkts	9.30%	9.07%	8.86%	8.97%	8.54%	8.27%	7.97%
Int'l Emerging Mkts	11.68%	11.26%	11.92%	12.20%	11.91%	10.93%	10.76%
Large-Cap Core	9.16%	8.63%	8.31%	8.43%	7.87%	7.57%	6.82%
Large-Cap Growth	8.68%	8.47%	8.19%	8.34%	7.68%	7.49%	6.66%
Large-Cap Value	8.91%	8.79%	8.43%	8.53%	8.04%	7.64%	6.99%
Long Bond	6.43%	5.61%	5.80%	4.54%	3.16%	4.18%	2.36%
Long Muni	4.75%	3.83%	3.24%	3.10%	2.88%	3.37%	2.88%
Mid-Cap Core	10.18%	9.61%	9.30%	9.43%	8.85%	8.41%	7.77%
Mid-Cap Growth	10.37%	9.68%	9.24%	9.36%	8.71%	8.35%	7.59%
Mid-Cap Value	10.00%	9.55%	9.36%	9.49%	8.98%	8.47%	7.98%
REITs	9.17%	9.21%	9.27%	9.34%	8.69%	8.56%	7.60%
Short Bond	4.59%	4.24%	3.44%	2.48%	2.55%	2.65%	2.93%
Short Muni	3.97%	3.05%	2.63%	2.40%	2.08%	2.25%	2.94%
Small-Cap Core	10.09%	9.36%	9.05%	9.30%	8.65%	8.45%	7.67%
Small-Cap Growth	9.84%	8.95%	8.67%	8.96%	8.24%	8.15%	7.21%
Small-Cap Value	10.31%	9.75%	9.45%	9.64%	9.03%	8.76%	8.14%
TIPS	4.72%	4.64%	4.46%	3.81%	2.89%	3.53%	3.57%
Inflation	2.00%	2.20%	2.20%	2.20%	2.30%	2.10%	1.90%

Asset Class	2016	2017	2018	2019	2020	2021	2022
All Cap	6.40%	6.19%	6.11%	6.82%	6.50%	5.37%	5.83%
Alternative	4.59%	5.07%	5.49%	5.02%	3.29%	3.66%	4.41%
Bank Loan	3.11%	3.64%	4.38%	4.67%	5.17%	2.67%	2.96%
Cash	2.04%	1.67%	2.23%	2.75%	0.55%	0.56%	0.91%
Commodity	4.07%	4.32%	4.79%	5.16%	3.56%	3.12%	3.41%
Emerging-Markets Bond	4.78%	4.31%	4.53%	4.57%	4.34%	2.99%	3.78%
High Yield	5.38%	4.72%	5.03%	5.19%	6.02%	3.14%	3.51%
Intermediate Bond	2.63%	2.91%	3.21%	3.24%	1.77%	1.62%	2.10%
Intermediate Muni	2.12%	2.65%	2.31%	2.27%	1.76%	1.04%	1.32%
International Bond	1.97%	2.85%	3.11%	3.12%	1.15%	1.40%	1.80%
Int'l Developed Mkts	7.52%	7.30%	7.19%	7.63%	7.28%	6.22%	6.68%
Int'l Emerging Mkts	9.68%	8.76%	8.45%	8.85%	8.11%	7.28%	7.89%
Large-Cap Core	6.36%	6.15%	6.06%	6.79%	6.48%	5.35%	5.81%
Large-Cap Growth	6.00%	6.01%	5.90%	6.76%	6.40%	5.24%	5.70%
Large-Cap Value	6.74%	6.28%	6.23%	6.81%	6.58%	5.47%	5.93%
Long Bond	3.27%	3.70%	3.95%	4.03%	2.54%	2.42%	2.43%
Long Muni	2.23%	2.49%	2.41%	2.45%	1.87%	1.05%	1.40%
Mid-Cap Core	7.35%	6.83%	6.55%	7.13%	6.68%	5.61%	6.13%
Mid-Cap Growth	7.03%	6.83%	6.45%	7.12%	6.61%	5.55%	6.07%
Mid-Cap Value	7.68%	6.83%	6.62%	7.13%	6.73%	5.64%	6.16%
REITs	6.39%	5.80%	5.82%	6.20%	5.85%	5.72%	6.04%
Short Bond	2.40%	2.32%	2.75%	2.99%	1.21%	0.77%	1.59%
Short Muni	2.03%	1.70%	2.08%	2.07%	1.44%	0.56%	1.30%
Small-Cap Core	6.96%	6.69%	6.74%	7.17%	6.85%	5.68%	6.17%
Small-Cap Growth	6.50%	6.66%	6.72%	7.15%	6.82%	5.53%	6.00%
Small-Cap Value	7.44%	6.71%	6.76%	7.19%	6.88%	5.83%	6.33%
TIPS	2.07%	2.77%	3.21%	3.24%	1.28%	1.60%	2.01%
Inflation	1.90%	2.00%	2.10%	2.10%	2.00%	2.00%	2.40%

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