PRESENTATION BY ROGER IBBOTSON: HISTORICAL RETURNS, PREMIUMS, AND POPULARITY

Roger Ibbotson: Thank you, Larry. It's a wonderful group you put together here.

A lot of my old friends, but also a really accomplished group.

My work was probably the earliest here, but it didn't come out of a vacuum. I was at the University of Chicago, and Larry Fisher and James Lorie had put together the Center for Research in Security Prices (CRSP). All the data were available there. So, by writing some code, I had a great opportunity to put together the kind of data that are in *Stocks, Bonds, Bills, and Inflation*. Fisher and Lorie's stock market data actually mentioned total returns, which was pretty unusual at the time because most people worked on price indices, not total returns that included dividends.

Even with dividends available on the CRSP tapes, most researchers treated dividends separately. You might think it's a trivial thing to add dividends and capital gains together, but that wasn't done at the time. When investment managers reported their results, they basically reported capital gains and dividends separately as well.

We also had some data on the bond side. We have Marty Leibowitz here today, and working with Sidney Homer, he did a lot on bond data at the time.

What motivated me most was the capital asset pricing model (CAPM), because the equity risk premium came out of that. At the time, in the early 1970s, the CAPM was the dominant model of security prices—and to implement that model, you had to have a measure of the equity risk premium. All of the researchers were talking about equity risk premiums and other risk premiums—everything was all about risk at the time. And we didn't have any real measures of any of these premiums. We had some data on stocks—the Fisher and Lorie data—which were not up to date. We had some data on bonds and other assets, but they weren't brought together in a form where you could look at risk premiums.

Comparative Returns on Stocks, Bonds, Bills, and Inflation

Please refer to **Exhibit 4**. Many of you have seen it—the "Stocks, Bonds, Bills, and Inflation" chart. This is Morningstar data at this point, because I sold Ibbotson Associates to Morningstar back in 2006.

The whole purpose of this study was to look at premiums, which Exhibit 4 displays as the differences between the rates of return. This dataset is available now from CFA Institute Research Foundation. It's updated monthly and is available to any CFA Institute member,[1] so it's being circulated again.

What you see in these data most vividly, though, are the different premiums. The dark blue line is the stock market's total return, which shows the explosive growth of the markets. Over 95 years, $1 in the US stock market total return index has grown to almost $11,000. People are always astonished to see the amount of growth you get if you can compound the annual rates of return over long periods of time.

These are nominal indexes. The inflation index grew by a factor of 15, so you can divide the nominal indexes by 15 to get real (inflation-adjusted) indexes, but the real returns are still very large numbers. The real return on equities is the premium of equities over inflation.

You can see the other premiums: bonds versus bills, bills versus inflation, and small-cap stocks versus large-cap stocks. We didn't have small stocks in the original study.

The first release of these data came out in two *Journal of Business* articles in 1976.[2] At that time, we used the data not only to show historical performance but also to make a forecast for the next 25 years—to the year 2000. We took 50 years of historical data and then made 25-year future projections. Looking back from 2000, those forecasts turned out to be pretty close to correct.

Arithmetic versus Geometric Mean Returns

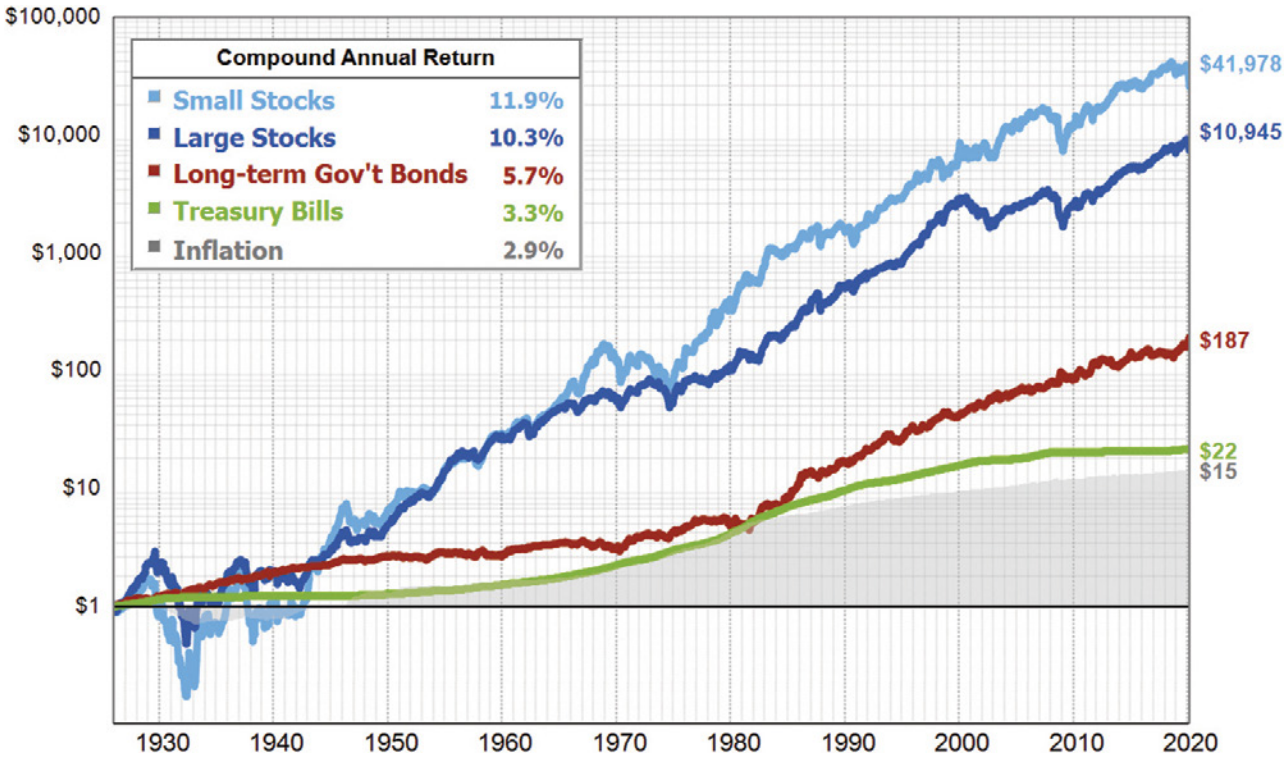
Exhibit 5 shows the summary statistics of the data in Exhibit 4. Over the years, people have been confused between geometric mean (compound annual) returns and arithmetic mean returns.

Premiums can be measured in either arithmetic or geometric mean terms, and the two can be very different. The difference relates to the standard deviation—the bigger the standard deviation of the series, the bigger the difference between the arithmetic and geometric mean. This relationship has become a key element in understanding asset returns.

[1]In the mainland of China, CFA Institute accepts CFA® charterholders only.

[2]See Ibbotson and Sinquefield (1976a, 1976b).

Exhibit 4. Ibbotson SBBI: Stocks, Bonds, Bills, and Inflation, 1926–2020



Source: Data from Stocks, Bonds, Bills, and Inflation (SBBI) and Morningstar, Inc.

With highly volatile series, there can be huge differences. The premium between small caps and large caps or, for that matter, between stocks and riskless assets—the equity risk premium itself—differs greatly depending on whether it is measured arithmetically or geometrically. We tend to talk about it both ways.

Long-Term versus Short-Term Riskless Assets

We also get very different numbers for the equity risk premium depending on whether we are comparing stocks to long-term or short-term riskless assets. All these estimates of the equity risk premium are useful—if I were making a long-term forecast, I would want an equity risk premium that was measured relative to long-term Treasury bonds, and if I were making a short-term forecast, I would use the equity risk premium relative to Treasury bills.

So, in making the choice of arithmetic versus geometric and long versus short-term horizon equity risk premiums, there are a lot of issues to address. For now, I am just defining the terms. Another issue is the starting date, which at the time I started the study was 1926 because those were the available data.

Components of Returns: The Riskless Rate and Risk Premiums

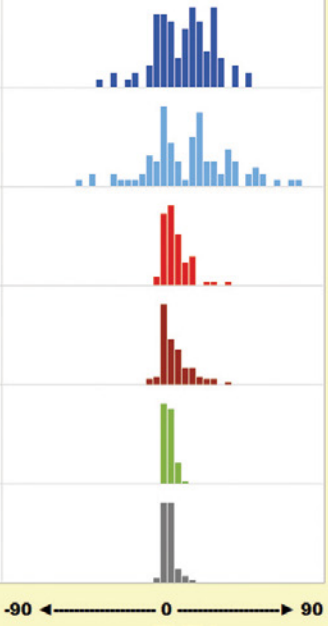
In **Exhibit 6** and **Exhibit 7**, we break the returns on each asset class into their component parts. In doing so, we identify different types of premiums by taking either arithmetic or geometric differences between one asset class series and another. The premiums include a small-cap premium, a corporate bond default risk premium, a bond horizon premium, and a real riskless rate of interest.

All these premiums, plus the real riskless rate, come out of this analysis. To make the analysis visually clear, I sometimes stack the components as in Exhibit 6. Look, for example, at "cash" (Treasury bills), where the Treasury bill return itself has two pieces: inflation and the real interest rate. For premiums, we can talk about either the realizations (past returns) or the expectations. The current discussion is mostly about the expected, or future, equity risk premium.

The second column or "tower" in Exhibit 6 includes the equity risk premium. This premium can be measured relative to long-term bonds, or it can be measured relative to Treasury bills. We can put the small-cap premium or value premium on top of that. Today, of course, there is a lot of

Exhibit 5. Summary Statistics of Returns on Stocks, Bonds, Bills, and Inflation, 1926–2020

	Compound annual return	Arithmetic annual return	Risk (standard deviation)	
Large Stocks	**10.3%**	**12.2%**	**19.7%**	
Small Stocks	**11.9%**	**16.2%**	**31.3%**	
Long-term Corporate Bonds	**6.2%**	**6.5%**	**8.5%**	
Long-term Government Bonds	**5.7%**	**6.1%**	**9.8%**	
Treasury Bills	**3.3%**	**3.3%**	**3.1%**	
Inflation	**2.9%**	**2.9%**	**4.0%**	



Source: Data from SBBI, Morningstar, Inc.

debate about whether those premiums even exist or what other premiums might exist, with many opinions on what these premiums should be. I think there's little doubt that there's a liquidity premium, though, in all asset classes and situations.

On the bond side, you can use the same sort of stacking methods. The Treasury bond has a premium relative to "cash" (Treasury bills), and I call that the horizon premium, referring to the time horizon of the bond. I took out the word "risk" in some of the boxes. I think it was Rajnish Mehra who said, "that's not necessarily a *risk* premium." It really has to do with matching the time horizons of investors and issuers, so the difference in yields or returns between short- and long-term bonds isn't necessarily a premium for risk specifically.

When you move to the right in Exhibit 7 to consider a bond that can default, you have a default risk premium. The risk premium that you expect to realize is only part of the yield spread between the corporate and Treasury bonds—you don't get the whole yield spread because you'll have some defaults along the way.

Summary

Let me wrap up by summarizing where I think we are going today.

There are different methods of estimating the equity risk premium. The historical method basically asks, "What do historical returns tell us about the future?" That's the approach in *Stocks, Bonds, Bills, and Inflation*. Next, you'll hear from Elroy Dimson with the Dimson–Marsh–Staunton research on many different countries. In a related area, Will Goetzmann and I are currently working on some more data back to 1815 for the New York Stock Exchange. Jeremy Siegel has also done a lot of work on historical returns. Many of us who are here today are working in this area.

The demand side is a different approach. What returns do investors demand for taking on the risk and other characteristics of securities? The CAPM addresses that question because it says that people are risk-averse and therefore demand an equity risk premium. Some of Rajnish's major work is on this topic—looking at utility curves and asking, "What are investors demanding here?"

Exhibit 6. Stacking Equity Premiums

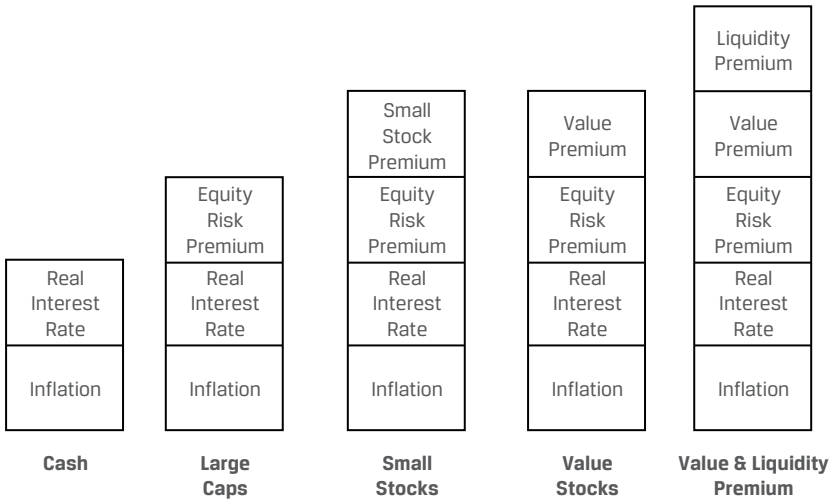
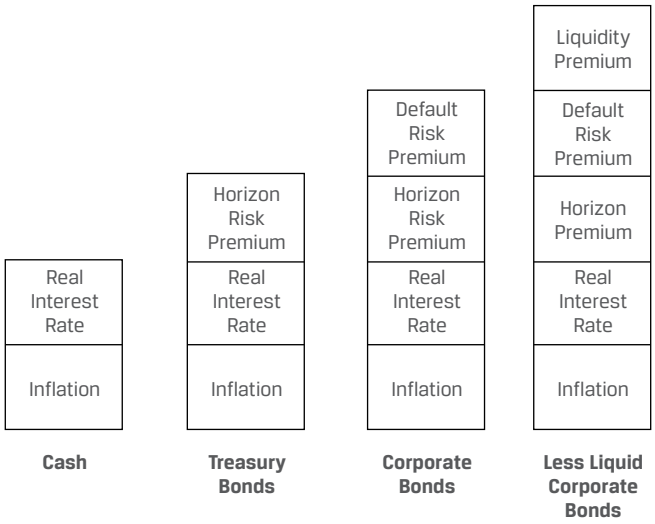


Exhibit 7. Stacking Fixed-Income Premiums



I've been working on the demand side with a set of papers and a CFA Institute Research Foundation Monograph called *Popularity: A Bridge between Classical and Behavioral Finance*.[3] My co-authors are Tom Idzorek, Paul Kaplan, and James Xiong. They're all from Morningstar. It says that if you have a preference for an asset characteristic—if you really like it—you're going to raise the valuation of assets with that characteristic. The same future cash flows will have a higher valuation or price in the present; that means the asset will have a *lower* expected return. If we don't like a characteristic, assets with that characteristic will have *higher* expected returns.

From the supply side, the question is: What cash flows does the economy supply to investors? I recently published some work on this with Philip Straehl, looking at buybacks, because buybacks are now actually a bigger part of cash flow to investors than dividends.[4] We definitely want to correct dividend discount models (DDMs) for buybacks. DDM models are in the supply realm. Marty Leibowitz is going to talk about growth estimates, so his work would fit into the supply category.

The last approach to estimating the equity risk premium is surveys, in which you might simply ask people what

[3]See Ibbotson, Idzorek, Kaplan, and Xiong (2018).

[4]See Straehl and Ibbotson (2017).

returns they expect or think they should earn. Conceptually, this idea is good, but the questions in the surveys tend to be ambiguous. When people ask me what return I expect, I don't know if they're talking about the arithmetic mean, the geometric mean, the long term, or the short term. I would give very different answers depending on these conditions, and usually these surveys are not designed well enough for you to know which question you're answering.

Discussion of Roger Ibbotson's Presentation

Robert Arnott: It will come as no surprise to you, Roger, that I view buybacks as partly real and partly mirage. So, I'd push back on the arithmetic of suggesting that buybacks are, sustainably on a long-term basis, larger than dividends. You and I have already had that back-and-forth discussion in the Letters section of the *Financial Analysts Journal*,[5] so I'll let it go with that.

Laurence Siegel: Rob, can you summarize what you mean by "mirage"?

Robert Arnott: Buybacks are often done to facilitate management stock option redemption. So you noisily announce you're buying back 10 million shares of stock. Roughly concurrent with that announcement, management redeems 10 million shares of stock options. The aggregate float doesn't change. So, what we found historically is that float for the aggregate market tends to go up, not down. A buyback isn't a buyback if the float doesn't go down.

And if you go through the arithmetic on market aggregates, as reported by CRSP, you find that dilution of shareholders collectively across the index is the overwhelming norm for the S&P 500, with occasional bouts of net buybacks.

The net buybacks are also usually overwhelmed by net new share issuance, if only by the index changing its composition. If you kick out AIG and put in Tesla, for example, you're forcing everyone holding the index to sell 1.5% of every stock they already have in order to bring in this giant new company—so the aggregate float goes up, not down. Taking that into account, you find that indexes are diluted by an average of 2% a year historically. There have been bouts in the 1980s and in the mid-aughts and mid-teens (of the current century) where buybacks for the S&P exceeded new share issuance and other forms of dilution, but…

Roger Ibbotson: I don't think that Rob is right on this, but this discussion has been in the *Financial Analysts Journal*. I don't think buybacks are going away, because they're a much more flexible way of paying out cash flows. There is no signaling with buybacks: You don't have the problem of cutting dividends and having investors interpret that as bad news. You can buy back or not buy back stock whenever you want.

Jeremy Siegel: Buybacks are also tax efficient.

Roger Ibbotson: They are. We are out of time, but that's a great discussion.

Laurence Siegel: Depending on what everyone wants to talk about in the afternoon, we might be able to bring this topic back.

Appendix to Roger Ibbotson's Presentation: Further Reading

Historical: What do historical returns tell us about the future? See:

Dimson, Elroy, Paul Marsh, and Mike Staunton. 2021. *Credit Suisse Global Investment Returns Yearbook 2021 Summary Edition.* Credit Suisse Research Institute. https://www.credit-suisse.com/media/assets/corporate/docs/about-us/research/publications/credit-suisse-global-investment-returns-yearbook-2021-summary-edition.pdf.

Ibbotson, Roger G., and James P. Harrington. 2021. *Stocks, Bonds, Bills, and Inflation® (SBBI®): 2021 Summary Edition*. Charlottesville, VA: CFA Institute Research Foundation. https://www.cfainstitute.org/-/media/documents/book/rf-publication/2021/sbbi-summary-edition-2021.ashx.

Demand Methods: What do investors demand? See:

Ibbotson, Roger G., Thomas Idzorek, Paul Kaplan, and James Xiong. 2018. *Popularity: A Bridge between Classical and Behavioral Finance*. Charlottesville, VA: CFA Institute Research Foundation. https://www.cfainstitute.org/research/foundation/2018/popularity-bridge-between-classical-and-behavioral-finance.

Supply Methods: What does the economy supply? See:

Straehl, Philip U., and Roger G. Ibbotson. 2017. "The Long-Run Drivers of Stock Returns: Total Payouts and the Real Economy." *Financial Analysts Journal* 73 (3): 32–52.

Surveys: What do investors and economists anticipate? See:

Fernandez, Pablo, Alberto Ortiz, and Isabel Fernandez Acín. 2017. "Market Risk Premium Used in 71 Countries in 2016: A Survey with 6,932 Answers." *Journal of International Business Research and Marketing* 2 (6): 23–31. Updated at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3861152.

[5]See Arnott and Bernstein (2018); Straehl and Ibbotson (2018).