Invited Editorial

Are stocks riskier than bonds? Not if you assess risk like Warren Buffett

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ABSTRACT Academics, practitioners and investors essentially agree that in the short term stocks are riskier than bonds. Which of these two assets is riskier in the long term, however, is controversial. This short article explores this issue by assessing long-term risk as suggested by Warren Buffett; that is, with the probability of losing purchasing power. If risk is viewed this way, a comprehensive data set spanning over 19 countries and 110 years clearly suggests that in the long term stocks are less risky than bonds.
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INTRODUCTION

> *The riskiness of an investment is not measured by beta … but rather by the probability … of that investment causing its owner a loss of purchasing power over his contemplated holding period. Assets can fluctuate greatly in price and not be risky as long as they are reasonably certain to deliver increased purchasing power over the holding period. And … a non-fluctuating asset can be laden with risk.* Warren Buffett (2012)

The conventional wisdom suggests that stocks are riskier than bonds. Clearly, most investors share this view and they often justify it simply by arguing that stocks fluctuate more than bonds. But is that what risk is all about? More importantly, *should* that be the main concern of investors when they assess the relative risk of these two assets?

Needless to say, risk can be defined in many different ways. And clearly, under most definitions of risk, stocks are riskier than bonds *in the short term*. But is the long term any less important than the short term? Is it not the case that many investors and institutions focus on the long term? Is it not the case that all individuals save for retirement, which can be 20, 30 or more years away. And, *is it the case that stocks are riskier than bonds also in the long term*?

This article explores the implications of Warren Buffett's view of risk and finds that, in the long term, stocks are *less* risky than bonds. This is the case for two reasons. First, the comprehensive evidence from 19 countries over 110 years clearly suggest that over holding periods of 20 and 30 years, stocks are far more unlikely to destroy purchasing power than bonds. And second, the same evidence shows that over holding periods of 20 and 30 years, stocks are very

unlikely to deliver less purchasing power than bonds. As long as investors find Buffett's view of risk plausible, then, the data clearly suggest that in the long term stocks are less risky than bonds.

The rest of the article is organized as follows. The section 'The issue' expands the discussion of the issue at stake. The section 'Evidence' discusses the evidence using a data set that spans over 19 countries and 110 years. And the section 'Assessment' provides an assessment.

THE ISSUE

Modern financial theory defines risk as the standard deviation of an asset's returns. Needless to say, a wide variety of other definitions have been proposed by academics and practitioners, and investors themselves view risk in many different ways. Importantly, different ways of assessing risk may lead to different views about how the relative risk of two assets evolves with the holding period. Although most investors agree that stocks are riskier than bonds in the short term, is that also the case in the long term? The answer to this question critically depends on how risk is defined.

The relationship between the relative risk of two assets and the holding period is one of the issues within the broader topic of time diversification. Estrada (2012) discusses the time diversification controversy at length and provides a broad overview of the evidence, which renders a comprehensive literature review here unnecessary. For our purposes, it suffices to highlight that there is a vast literature on both sides of the fence; that is, many argue that in the long term stocks are riskier than bonds, and many others argue the opposite. Perhaps unsurprisingly, the disagreements largely stem from considering different definitions of risk.

Four definitions of short-term risk and two definitions of long-term risk are considered in this article. In the short term, the risk of stocks and bonds is assessed with two general measures of uncertainty and two measures of downside risk. The former are given by volatility (the standard deviation of annual returns) and the spread between the highest and the lowest annual return over the sample period; the latter are given by the semideviation with respect to a 0 per cent benchmark (that is, volatility below 0 per cent, or the volatility of negative real returns) and the lowest annual return over the sample period.[1]

In the long term, the risk of stocks and bonds is assessed following Warren Buffett's view of risk. Buffett, well known for his long-term approach to investing, argues that (long-term) risk should not be measured by how much an asset fluctuates but by the probability that it destroys purchasing power over the intended holding period. In Buffett's (2012) words, when risk is viewed this way, bonds (as well as money market funds and bank deposits) are among 'the most dangerous of assets' and 'their risk is huge.' Assessing risk with the probability that stocks and bonds destroy purchasing power in the long term is further complemented with another measure of long-term risk, namely, the probability that stocks deliver less purchasing power than bonds.

More formally, long-term risk is assessed here with two probabilities, both approximated with historical frequencies. The probability that stocks and bonds destroy purchasing power, $P(R<0)$, is calculated as the number of 20/30-year periods in which stocks and bonds delivered negative *real* returns divided by the total number of 20/30-year periods in the sample. The probability that stocks deliver less purchasing power than bonds, $P(S<B)$, is calculated as the number of 20/30-year periods in which stocks underperformed bonds divided by the total number of 20/30-year periods in the sample.

EVIDENCE

The data used to evaluate the relationship between the relative risk of stocks and bonds

and the holding period comes from the Dimson-Marsh-Staunton (DMS) data set, which covers 19 countries and the world market over the 1900–2009 period.[2] All returns are annual, real (adjusted by local inflation), in local currency and account for capital gains/losses and cash flows (dividends or coupons).

On the basis of this sample, Table 1 reports four measures of short-term risk for the 19 countries in the sample and the world market. As discussed in the previous section, short-term risk is assessed with volatility, the spread between the highest and the lowest annual returns, downside volatility, and the lowest annual return. The message from Table 1 is unequivocal: In the short-term stocks are riskier than bonds.

On average, across all 19 countries stocks are almost twice as volatile as bonds (23.4 per cent versus 12.4 per cent) and they have spreads almost twice as large (154.0 per cent versus 87.7 per cent). Furthermore, when risk is measured this way, in no country of the 19 considered stocks are less risky than bonds.

Focusing on the downside further reinforces the idea that in the short term stocks are riskier than bonds. On average across all 19 countries, stocks have substantially more downside volatility than bonds (11.5 per cent versus 7.8 per cent) and substantially more severe worst annual losses (54.3 per cent versus 39.3 per cent). In no country of the 19 considered stocks have lower downside volatility than bonds, and in only three countries (Finland, France and Germany) stocks have a less severe worst annual loss than bonds.

In short, there seems to be little question that in the short term stocks are riskier than bonds. Not only do the data clearly suggest so but also academics, practitioners and investors seem to agree with this view. The disagreements arise when considering the long term.

Table 1: Risk in the short term

	SD		*SPD*		*SSD*		*MIN*	
	Stocks	*Bonds*	*Stocks*	*Bonds*	*Stocks*	*Bonds*	*Stocks*	*Bonds*
Australia	18.2	13.2	94.0	88.8	9.3	7.7	−42.5	−26.6
Belgium	23.6	12.0	166.6	71.2	12.6	8.3	−57.1	−30.6
Canada	17.2	10.4	89.0	67.6	8.5	5.5	−33.8	−25.9
Denmark	20.7	11.6	157.0	68.3	8.9	5.1	−49.2	−18.2
Finland	30.3	13.7	222.5	99.7	14.1	11.1	−60.8	−69.5
France	23.5	13.0	108.7	79.4	12.6	9.7	−42.7	−43.5
Germany	32.2	15.5	245.4	157.5	15.1	12.6	−90.8	−95.0
Ireland	23.1	14.6	133.8	95.3	12.2	7.9	−65.4	−34.1
Italy	29.0	14.1	193.5	92.9	15.8	11.9	−72.9	−64.3
Japan	29.8	20.1	206.6	147.3	15.5	15.0	−85.5	−77.5
Netherlands	21.8	9.4	152.0	50.9	10.4	5.2	−50.4	−18.1
New Zealand	19.7	9.0	160.0	57.8	9.2	4.9	−54.7	−23.7
Norway	27.4	12.2	220.5	110.2	11.9	7.0	−53.6	−48.0
South Africa	22.5	10.4	155.1	69.6	9.2	5.9	−52.2	−32.6
Spain	22.1	11.7	142.7	83.5	11.1	7.0	−43.3	−30.2
Sweden	22.8	12.4	133.3	104.8	10.9	6.1	−43.6	−36.7
Switzerland	19.8	9.3	97.2	77.5	10.3	4.3	−37.8	−21.4
United Kingdom	20.0	13.6	153.7	89.6	9.9	7.2	−57.1	−30.7
United States	20.3	10.1	94.5	54.5	10.6	5.3	−38.0	−19.4
Average	**23.4**	**12.4**	**154.0**	**87.7**	**11.5**	**7.8**	**−54.3**	**−39.3**
World	**17.7**	**10.3**	**110.5**	**58.7**	**9.4**	**5.6**	**−40.4**	**−27.1**

This table shows, for the series of annual returns, the standard deviation (SD), spread (SPD), semideviation for a 0% benchmark (SSD), and lowest return (MIN) for all the stock and bond markets in the Dimson-Marsh-Staunton (DMS) database over the 1900–2009 period. SPD is defined as the range between the highest and the lowest annual return over the sample period. Returns for all countries are annual, real (adjusted by local inflation), in local currency, and account for capital gains/losses and cash flows (dividends or coupons). Returns for the world market are in dollars and adjusted by US inflation. All figures in %.

As discussed in the previous section, following Buffett (2012), long-term risk is assessed in this article with the probability that stocks and bonds destroy purchasing power over 20/30-year holding periods, $P(R<0)$; and with the probability that stocks deliver less purchasing power than bonds over 20/30-year holding periods, $P(S<B)$. As already mentioned, both probabilities are approximated with historical frequencies. Table 2 reports $P(R<0)$ and $P(S<B)$ for the 19 countries in the sample and the world market.

Over 20-year holding periods, the average $P(R<0)$ for stocks (12.6 per cent) is over three times lower than that for bonds (43.9 per cent). In fact, the probability of destroying purchasing power is lower for stocks than for bonds in every single country in the sample with the sole exception of Switzerland. In almost one-third of the countries considered (six), there was *no* 20-year period in which stocks destroyed purchasing power.

Over 30-year holding periods, the average $P(R<0)$ for stocks (6.1 per cent) is over six times lower than that for bonds (38.6 per cent). In fact, $P(R<0)$ is lower for stocks than for bonds in every country but Switzerland (in which they are equal). Furthermore, although in every country but Switzerland $P(R<0)$ is positive for bonds, in 11 of the 19 countries considered this probability is 0 per cent for stocks; that is, in over half of the countries in the sample there was *no* 30-year period in which stocks destroyed purchasing power.

Assessing risk with the probability that stocks deliver less purchasing power than bonds further strengthens the view that in the long-term stocks are less risky than bonds. The last two columns of Table 2 show the relevant probabilities. Over 20-year holding periods, the average $P(R<S)$ is only 15.2 per cent, and in no country of the 19 considered this probability is higher than 30 per cent. Over 30-year holding periods, the average $P(R<S)$ is only 8.2 per cent;

Table 2: Risk in the long term

	$P(R<0)$				$P(S<B)$	
	20 *years*		30 *years*		20 *Years*	30 *Years*
	Stocks	*Bonds*	*Stocks*	*Bonds*		
Australia	0.0	51.6	0.0	35.8	2.2	0.0
Belgium	28.6	51.6	24.7	58.0	12.1	1.2
Canada	0.0	41.8	0.0	24.7	17.6	4.9
Denmark	0.0	29.7	0.0	18.5	20.9	14.8
Finland	17.6	50.5	1.2	59.3	1.1	0.0
France	28.6	48.4	13.6	59.3	22.0	18.5
Germany	26.4	44.0	27.2	59.3	19.8	1.2
Ireland	8.8	52.7	0.0	34.6	12.1	4.9
Italy	34.1	67.0	13.6	79.0	23.1	13.6
Japan	24.2	29.7	24.7	40.7	22.0	13.6
Netherlands	6.6	44.0	0.0	33.3	12.1	21.0
New Zealand	0.0	40.7	0.0	25.9	11.0	0.0
Norway	20.9	49.5	2.5	29.6	17.6	8.6
South Africa	0.0	44.0	0.0	42.0	3.3	0.0
Spain	23.1	49.5	8.6	45.7	19.8	6.2
Sweden	7.7	39.6	0.0	29.6	27.5	24.7
Switzerland	11.0	7.7	0.0	0.0	27.5	22.2
United Kingdom	1.1	49.5	0.0	30.9	13.2	0.0
United States	0.0	42.9	0.0	27.2	3.3	0.0
Average	**12.6**	**43.9**	**6.1**	**38.6**	**15.2**	**8.2**
World	**2.2**	**39.6**	**0.0**	**28.4**	**7.7**	**2.5**

This table shows the proportion of periods in which stock and bond markets delivered negative real returns, $P(R<0)$, and the proportion of periods in which stocks underperformed bonds, $P(S<B)$, over 20 and 30 years. The data is described in Table 1. All figures in %.

in no country this probability is higher than 25 per cent; and in almost one-third of the countries (six) this probability is 0 per cent.[3]

In short, then, the data clearly suggest that in the long term 1) stocks are very unlikely to destroy purchasing power; 2) stocks are far more unlikely to destroy purchasing power than bonds and 3) stocks are very unlikely to deliver less purchasing power than bonds.[4]

ASSESSMENT

Most investors think that stocks are riskier than bonds, and the vast majority of academics and practitioners agree that such is the case in the short term. In the long-term, however, there is no wide agreement about which of these two assets is riskier. This is largely because of the fact that risk has no universal definition, and different ways to assess it may lead to different conclusions about the relative risk of these two assets in the long term.

Warren Buffett has argued that in the long term on which he focuses risk should not be assessed with volatility; rather, it should be assessed with the probability of losing purchasing power. This way of assessing risk leads him to view stocks as being less risky than bonds in the long term, despite the fact that the former are more volatile than the latter.

The situation by the end of 2012 is a case in point. The yield on 10-year US Treasury Notes stood below 1.8 per cent. The US government is unlikely to default and therefore the cash flows of this note are perfectly predictable; does that mean it is not risky? Hardly. In fact, this note is almost certain to provide investors with a loss of purchasing power. Stocks, in contrast, have a dividend yield around 2.1 per cent, and over 10-year periods are much more likely to provide a capital gain than a capital loss. Hence, by the end of 2012, bonds are far more likely to provide a loss of purchasing power than stocks.

A comprehensive data set spanning over 19 countries and 110 years clearly suggest that stocks are riskier than bonds in the short term. In the long term, however, the data just as clearly suggest that stocks are very unlikely to destroy purchasing power; that they are far more unlikely to destroy purchasing power than bonds; and that they are very unlikely to deliver less purchasing power than bonds.

Academics, practitioners and investors assess risk in different ways, and therefore have different views about the relative risk of stocks and bonds, particularly in the long term. Hence, a very general conclusion about the relative risk of these two assets may not be appropriate. That being said, as long as investors agree with Warren Buffett's view of risk, the data clearly suggest that in the long term stocks are less risky than bonds.

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NOTES

1. The semideviation with respect to a benchmark B (Σ_B) is given by $\Sigma_B = \{(1/T)\Sigma_t \text{Min}(R_t - B)^2\}^{1/2}$, where R denotes returns, T the number of observations, and t indexes time. Throughout this article the benchmark used is 0 per cent. For a practical introduction to the semi-deviation, see Estrada (2006).
2. These data are described at length in Dimson *et al* (2002). Equity markets are represented by widely diversified portfolios of stocks, and bond markets by medium/long-term government bonds.
3. A similar analysis, considering more holding periods but only for the US market, can be found in Siegel (2008), chapter 2.
4. Although holding periods shorter than 20 years can hardly be thought of as the long term, for the sake of completeness Table A1 in the appendix reproduces the analysis in Table 2 considering holding periods of 5 and 10 years. Those results do not affect (in fact, reinforce) the conclusions just drawn.

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Appendix

Table A1: Risk in the medium term

	$P(R<0)$				$P(S<B)$	
	5 *years*		10 *years*		5 *Years*	10 *Years*
	Stocks	*Bonds*	*Stocks*	*Bonds*		
Australia	10.4	41.5	5.9	36.6	19.8	12.9
Belgium	33.0	46.2	36.6	46.5	33.0	24.8
Canada	19.8	39.6	8.9	40.6	29.2	22.8
Denmark	21.7	27.4	8.9	29.7	41.5	27.7
Finland	27.4	27.4	21.8	36.6	28.3	8.9
France	33.0	32.1	37.6	34.7	31.1	31.7
Germany	34.9	28.3	33.7	30.7	28.3	28.7
Ireland	31.1	49.1	21.8	52.5	28.3	13.9
Italy	45.3	37.7	40.6	40.6	36.8	35.6
Japan	29.2	32.1	26.7	36.6	32.1	27.7
Netherlands	29.2	45.3	21.8	49.5	27.4	25.7
New Zealand	17.9	32.1	5.9	32.7	18.9	12.9
Norway	22.6	39.6	21.8	46.5	34.9	25.7
South Africa	19.8	41.5	6.9	45.5	23.6	12.9
Spain	34.9	39.6	26.7	47.5	39.6	30.7
Sweden	21.7	35.8	14.9	41.6	23.6	23.8
Switzerland	31.1	23.6	21.8	21.8	31.1	27.7
United Kingdom	23.6	39.6	13.9	43.6	18.9	18.8
United States	23.6	35.8	13.9	41.6	26.4	16.8
Average	**26.9**	**36.5**	**20.5**	**39.8**	**29.1**	**22.6**
World	**24.5**	**34.9**	**15.8**	**32.7**	**26.4**	**23.8**

This table shows the proportion of periods in which stock and bond markets delivered negative real returns, $P(R<0)$, and the proportion of periods in which stocks underperformed bonds, $P(S<B)$, over 5 and 10 years. The data is described in Table 1. All figures in %.