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Searching for higher-performance, income-generating assets: a mutual fund assessment on asset-backed securities

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Abstract

Purpose – In the search for alternative income-generating assets, the paper addresses the following question, one that the literature has yet to answer: what is a reasonable allocation, if any, to asset-backed securities within a 60–40% stock-bond balanced portfolio of mutual funds?

Design/methodology/approach – The authors apply the Black–Litterman model of Modern Portfolio Theory to test the efficacy of adding asset-backed securities to the classic 60–40% stock-bond portfolio of mutual funds. The authors use out-of-sample tests of one, three, five, and ten years to determine a reasonable asset allocation. The data are monthly and range from January 2000 through September 2021.

Findings – The statistical evidence indicates a modest reward-risk added value from the addition of asset-backed securities, as measured by the Sharpe "reward-to-variability" ratio, in holding periods of three, five, and ten years. Based on the findings, the authors conclude that a reasonable asset allocation for income-seeking, risk-averse investors who follow the classic 60%–40% stock-bond allocation is 8%–10%.

Research limitations/implications – The findings apply to a stock-bond balanced portfolio of mutual funds. Other fund combinations could produce different results.

Practical implications – Investors and money managers can use the findings to improve portfolio performance.

Originality/value – For investors seeking higher income-generating securities in the current record-low interest rate environment, the authors determine a reasonable asset allocation range on asset-backed securities. This study is the first to provide such direction to these investors.

Keywords Mutual fund, Sharpe ratio, Asset-backed securities, Black–Litterman model

Paper type Research paper

The global financial crisis of 2007–2009 triggered an unprecedented worldwide monetary expansion that has generated record-low interest rates, further dampened by central bank responses to the global pandemic. While such broad-based economic stimulus has been needed to offset the steep downturn in the product and capital markets, it has come at a significant expense for income-seeking investors. The efficacy of traditional fixed-income instruments, such as government bills, notes, and bonds, investment-grade corporate debt and bank certificates of deposits, has markedly diminished, leading to a rising demand for alternative income-producing assets. What were once considered secondary, higher-risk sources by issuers and investors, such as preferred stocks, high-yield bonds, step-up bonds, student loan-backed debt, collateralized loan obligations and structured products, have been moving toward the forefront as the financial world continues to step into the third decade of this century.

As evidence, SIFMA (2020) reports preferred stock issuance in the US climbed from $5.5 billion in 2011 to $42.4 billion in 2020, a compound annual growth rate (CAGR) of 20.4%, rising from 3.3% of total equity issuance to 21.4%. High-yield bond issuance rose from $42 billion in 2008 to $435 billion in 2020, surpassing the previous decade-long high of $332.0 billion reached in 2013, a CAGR of 21.5%. Additionally, collateralized loan obligations more than tripled from 2011 through 2020, rising from $264 billion (Federal Reserve Board of Governors, 2019) to $845 billion (SIFMA, 2021a, b).

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Among the alternative group, asset-backed securities (ABS) have emerged not only as an income-producing source but also as a potential diversification instrument. They provide a pooling of assets that would otherwise be too illiquid to be easily marketable. They include collateral agreements that extend well beyond the traditional ones found in mortgage-backed securities, including automobiles, credit cards, capital equipment, and consumer loans. Although their total market value of $1.5 trillion, as of year-end 2020, is sizeable, it is small compared to the $11.2 trillion mortgage-backed securities (MBS) market (SIFMA, 2021a, b). Consequently, they tend to be overlooked, as also seen in their lack of incorporation into the Bloomberg–Barclays US Aggregate Index.

Depending on debt ratings and industry focus in normal times, investment-grade ABS may yield a premium of 100–400 basis points over traditional investment-grade securities, a significant difference for income-seeking investors. For example, from January 2000 through September 2021, the annual returns, respectively, on investment-grade auto ABS, credit card ABS and equipment ABS, three dominant categories, are 3.89%, 4.55%, and 4.97%. By comparison, the annual interest rate on three-month US Treasury bills is 1.52%, which drops to 0.55% from January 2008 through September of 2021, a period encompassing the global financial crisis and the fallout from it, as the three ABS categories register significantly higher yields of 3.18%, 3.69%, and 3.98%, respectively. Differences of this magnitude appeal to the investment community, as the literature on "reaching for yield" indicates (e.g. Choi and Krunland, 2018) [1].

Although ABS have structural protections that restrict free cash flow to equity, and may therefore be viewed as debt-holder friendly, these higher premiums come at a price: higher default, liquidity and prepayment risks. While high investment-grade ABS have rarely defaulted since their inception in the mid-1980s, their perception as a fragile instrument have always been a concern and can cause spikes in prices. As evidence, spreads in the option-adjusted AAA ABS automobile sector leaped to 1800 basis points during the global financial crisis and spiked by over 300 basis points between March 10, 2020 and March 31, 2020 in response to the global pandemic.

The following quote from PIMCO (2021) aptly and succinctly describes the reward-risk tradeoff that prospective ABS investors face:

> ABS can offer attractive yields over U.S. Treasuries and, at times, over corporate bonds, in exchange for accepting various levels of risk. Because most ABS typically receive the highest credit rating of AAA, they can also fill a need for high-quality investments in a bond portfolio and help investors diversify away from other top-rated instruments [2].

It motivates the following question, which is central to this study: what is a reasonable ABS allocation, if any, for risk-averse, income-seeking investors? Evidence of a sizeable reward-risk addition, for example, would signal a need for investors and portfolio managers to increase the asset allocation to ABS. The lack of such evidence, including a reduction in performance, would indicate otherwise.

The question fits into the literature on "reaching for yield," as seen in Becker and Ivashina (2015) on insurance firms, Di Maggio and Kacperczyk (2017) on money market funds, and Choi and Kronlund (2018) on corporate bond mutual funds. Of special note, Choi and Kronlund find that "reaching for yield" leads to negative risk-adjusted returns. Their finding is reference point in this study.

Investors and portfolio managers seeking an answer to this question will not find recourse either from the academic or from the professional investment literature. The closest study is by Pan (2004). Using data from 1998 through 2003, he finds that AAA-rated ABS provided a premium of 41 basis points over that of AAA-corporate bonds and at a lower volatility, suggesting corporate treasury mispricing. His period of study, however, is relatively short and two crises and three recessions have followed since 2003, each of which limits the

relevancy of the evidence. Unfortunately, more-recent and related literature is contested. Deteriorating credit quality, for example, has raised the concerns of researchers, market observers and regulators (e.g. Musatov and Watts, 2014; Culp and Forester, 2015; Booth, 2018; Campbell, 2019; Adelson, 2020; Choi *et al.*, 2020; Kothari, 2020; Wack, 2020). Others (e.g. Klacik, 2020; Xu and Ortiz-Eggenberg, 2020) find these concerns to be overstated. While certainly instructive, none of these studies addresses the question under study.

The need for direction is even more apparent with the launch of J.P. Morgan's ABS Index in 2015 and the emergence of ABS investment funds from Morgan Stanley, iShares, Janus Henderson, and Yieldstreet. As a result, answering the question can provide not only needed direction to income-seeking investors and money managers but also needed direction to a contested literature. To do so, we first note the concise and excellent summary work by Diltz and Rakowski (2018) on mutual fund performance, long a topic of interest in this journal (e.g. Apap and Collins, 1994; Goldreyer *et al.*, 1999; Noulas *et al.*, 2005; Arugasian *et al.*, 2008; Devaney *et al.*, 2016; Koutsokostas and Papathansiou, 2017).

Next, with portfolio performance and the classic 60%–40% stock-bond allocation in focus, we refer to Modern Portfolio Theory (MPT) and apply the model of Black and Litterman (1992) to well-known Vanguard mutual funds and an ABS index, to our knowledge the first study to do so. We then track portfolio performances in a series of one-, three-, five-, and ten-year out-of-sample tests. The approach follows those found in Statman and Sheid (2002) in "foresight" versus "hindsight" and in Elton *et al.* (2019) on offering investors mutual fund solutions. The idea underpins the choice of the Vanguard Balanced Index, which not only represents the 60–40% stock-bond allocation but also follows the spirit of the discussions on "the perfect portfolio" (Lo and Foerster, 2021).

The next section provides an overview of the Black–Litterman model. Sections on fund selection and data follow, along with results, additional consideration, and concluding remarks. Overall, the findings point to statistically significant, modest reward-risk benefits from adding ABS to a balanced portfolio, with an asset allocation of 8–10%, a finding that points to greater upside in "reaching for yield" than the literature to date indicates.

The Black–Litterman model

A motivation for using the Black–Litterman model is seen in a statement by Benninga (2008, p. 349):

> It is possible to come away from a standard textbook discussion of portfolio optimization with the impression that a fixed set of mechanical optimization rules, combined with a bit of knowledge about personal preferences, suffices to define an investor's optimal portfolio. Anyone who has tried to implement portfolio optimization using market data knows that the results are often a nightmare.

The Black–Litterman model addresses this difficulty by using standard CAPM equilibrium returns as the starting point in a Bayesian framework. Although current literature favors multi-factor models, Cederberg and O'Doherty (2015) and Kolari *et al.* (2021) provide empirical support for one-factor models. Regardless, the CAPM-estimated returns are an improvement over the often-used realized historical returns because they represent forecasts (Black, 1993; Elton, 1999). To overcome input sensitivity, the model uses the CAPM-estimated returns as an output rather than as an input. A process called "reverse optimization" determines the market-capitalized weights, leading to the implied returns for portfolio optimization (Idzorek, 2011).

The determination of the market-capitalized weights begins by estimating the standard single-index model to obtain a beta coefficient for each security. The betas are then used to estimate the CAPM equilibrium returns based on a risk premium. At this point, the investor has two choices: either use CAPM returns in the optimization process or supplement the

CAPM returns with additional information in the optimization process. The information may include, for example, private information, mean reversion, momentum, or the perception of mispricing. The first choice – the one used in this study – assumes semi-strong form efficiency; that is, the CAPM returns are a good approximation for the true equilibrium returns. These returns are considered to be the "prior" estimates within the Bayesian framework because they do not include additional information. The inclusion of additional information would represent the "posterior" estimates.

In addition to the CAPM returns, the optimization process incorporates a risk-aversion coefficient (λ). It can be estimated by the market risk premium relative to the variance of the market portfolio. It represents the rate at which an investor will trade lower return for lower risk. In the reverse optimization, it scales the estimates of the variance-covariance matrix in the classic return-risk trade-off. The lower the coefficient, the lower will be the implied returns. Based on the vector of CAPM returns, the risk-aversion coefficient and the respective risks of the securities, the optimization process searches for the combination of securities that maximizes the "reward to variability" ratio of Sharpe (1994). The equation is formally expressed within the vector of implied equilibrium returns, as follows:

$$\prod = \lambda \sum W_m \tag{1}$$

Where,

Π is the implied excess equilibrium return vector ($N \times 1$ column vector);

λ is the risk aversion coefficient, which incorporates the expected return-risk tradeoff;

Σ is the variance-covariance matrix of excess returns ($N \times N$ matrix); and,

w_m is the market capitalization weights ($N \times 1$ column vector) of the assets [3].

Lee (2000) demonstrates that the model reduces the forecast errors that lead to statements aligned with Benninga's (e.g. Michaud, 1989; Simaan, 1997; Kan and Zhou, 2007). Although questions arise about the efficacy of MPT versus a portfolio of equal-weighted securities, as seen for example, in DeMiguel *et al.* (2009), Bessler *et al.* (2014), and Allen *et al.* (2019) show its efficacy compared to one of equal weights. In this respect, we use standard optimization, as opposed to those that rely on "shrinkage," based on the findings of Jorion (1991). The process is also outlined in Hoadley (2017).

Fund selection and data

With a risk-averse, passive investor in focus, we refer to the Vanguard mutual fund family, well known for its index-based funds. Omitting student loan ABS, we add an equally-weighted index across three dominant categories in the ABS market, autos, credit cards, and capital equipment, to assess the impact of an ABS allocation on the overall reward-risk performance of the portfolios. Two reasons motivate this index. First, data on ABS mutual fund pricing is in a nascent stage, having too few observations for testing. Second, although the Bloomberg–Barclays ABS Index, in existence since 2001, is a possible selection, its composition is almost exclusively in auto ABS, leaving little room for the higher-yielding credit card and equipment ABS [4].

The choice of the Vanguard funds follows the work of Elton *et al.* (2019) on the use of investable strategies and Statman and Sheid (2002) on the need for out-of-sample testing. They show that most studies on performance evaluation use benchmark indices, such as the Fama and French (1992) three-factor model, for which a passive benchmark is non-existent, and draw inferences strictly from historical results.

We use the widely-followed Vanguard Balanced Index as the benchmark, an industry standard (Bartalos, 2020). It is constructed in line with the 60%–40% portfolio, consisting of the CRSP Total Market Index and the Bloomberg–Barclay's Float-Adjusted Aggregate Index of investment-grade securities, but not ABS. As of year-end 2020, the asset value of the Vanguard fund totaled $51 billion.

The period of study is from January 2000 through September 2021, a timely period for testing security price movements. It encompasses record-low interest rates, the longest-running bull market in stocks, three recessions, a global financial crisis, and a worldwide pandemic. The mutual funds and the ABS index are illustrated in Table 1. In addition to the Vanguard Balanced Index, the Vanguard Total Stock Market Index, the Vanguard Long-Term US Treasury Index, and the Vanguard Long-Term Investment-Grade Index are the funds in focus. Aligned with the "60–40" portfolio composition, each of the funds and the ABS index are allocated a maximum weight, as follows: 65% for the stock fund and 25% each for the fixed-income funds and the ABS index. The assignment of these weights allows for variation in the "60–40" composition.

The choice of the Vanguard stock and bond funds follows the construction of the Vanguard Balanced Index. It allows for a test of the efficacy of adding the ABS index to the stock-bond portfolio of the three Vanguard funds. Because the Vanguard Balanced Index is not constructed from mean-variance efficient principles, we expect some deviation from the "60–40" allocation when applying the Black–Litterman model. Vanguard, in fact, states that the fund invests "roughly 60% in stocks and 40% in bonds" [5].

The mutual fund price data are from Yahoo Finance, supplemented by Vanguard. The ABS data, which are equally weighted across the three ABS categories, come from Bloomberg and record the following annual returns: auto, 3.89%; credit cards, 4.55%; and equipment, 4.97%. Each has a respective standard deviation of 2.53%, 4.06% and 3.43%, respectively. By comparison, the three-month US Treasury bill rate averages 1.52% with a standard deviation of 6.05%. These differences are additional evidence of a potential added value from ABS. We do not find any issues that might compromise the results. Following Elton *et al.* (1996) and Xu and Loviscek (2008), we use three years of monthly data, or 36 observations, to construct each portfolio.

To perform the test of whether ABS can enhance portfolio performance, following the steps outlined on the Black–Litterman model in the previous section, we first construct 38 portfolios, 19 without ABS and 19 with ABS. We follow this with the out-of-sample tests. For example, we use monthly rates of return from January 2000 through December 2002 to construct the first two portfolios, one without and one with ABS. The performance of each

Table 1.
The mutual funds that comprise the portfolios with their initial respective assigned asset allocations

Index	Underlying security type	Index description	Allocation cap
Vanguard Balanced Index	US stocks and bonds	Corresponds to a 60–40% allocation between US equities and investment-grade bonds	Benchmark
Vanguard Total Stock Market Index	US equity	Represents entire US equity market, including (small-, mid-, and large-cap growth and value stocks)	65%
Vanguard Long-Term Treasury Index	Treasury bonds	Targets US Treasury bonds with average maturities of 10 to 25 years	25%
Vanguard Long-term Investment Grade Index	Corporate bonds	Focuses on medium- and high-quality investment grade corporate bonds with average maturities of 15–20 years	25%
US ABS index	Asset-backed securities	Centers on investment grade, US asset-backed securities with average maturity of approximately 3.5 years	25%

portfolio is then assessed for one, three, five, and ten years: for 2003, for 2003–2005, for 2003–2007, and for 2003–2012. The assessment relies on the "reward to variability" ratio of Sharpe. We then move to the next group of monthly returns, those from January 2001 through January of 2003, and construct two more portfolios, one without and one with ABS, and test their respective out-of-sample holding performances for one, three, five, and ten years by using the Sharpe ratio, a procedure repeated for the remaining three-year periods.

Of special note, we examine the Sharpe ratios for a "value-add" of the ABS group against that of the group without ABS and against the Vanguard Balanced Index. Consistently higher Sharpe ratios would signal added value. These out-of-sample tests follow the recommendations of Statman and Sheid (2002) and Elton *et al.* (2019) on the preferred method of testing portfolio performance: "foresight" as opposed to "hindsight," or "forecasting" as opposed to "back-casting." The generation of results across the various holding periods also provides investors with direction on the length of the holding period before rebalancing is in order.

Results

Table 2 illustrates (geometric) mean returns and volatilities, as measured by annual standard deviations, and Sharpe "reward to variability" ratios from January 2000 through September 2021 for the Vanguard Balanced Index (V-BAL), the Vanguard Total Stock Market Index (V-STOCK), the Vanguard Long-Term Treasury Index (V-GOV), the Vanguard Long-Term Investment-Grade Index (V-CORP), the constructed US ABS index (ABS), and the annual three-month Treasury bill rate (T-BILLS). Although the results are in-sample, they provide preliminary insights into the potential efficacy of ABS.

At 7.54%, V-CORP registers the highest return, followed by V-STOCK at 7.41%, which also has the highest average volatility, or standard deviation, at 15.65%. In contrast, ABS records the lowest mean return, at 4.43%, but 291 basis points higher than that on US Treasury bills. It also displays the lowest mean volatility, at 3.12%, suggesting portfolio risk reduction potential. While outsized risks emanating from the financial crisis of 2007–09 resulted in the large, double-digit losses that make up the minimum returns, they are countered with large, mean-reverting returns, as seen in ABS, at 24.53%, its highest return. However, the global pandemic is responsible for the largest average standard deviations, with V-STOCK and V-BAL showing 28.00 and 17.60%, respectively, followed by V-GOV, at 15.97%, and V-CORP, at 14.22%.

The Sharpe ratios offer additional perspectives. For example, although ABS displays the lowest average return, at 4.43%, its average standard deviation leads to a ratio of 0.93, the highest among the funds, and more than double that of V-STOCK, at 0.38, the lowest in the group. At 0.64, V-CORP has the second highest ratio, followed by V-BAL, at 0.54.

For additional insights, Table 3 reports the market-capitalization weights produced by applying the Black–Litterman model to the funds for the entire period, one without ABS (W/O ABS) and the other with ABS (W/ABS). While V-STOCK gets the maximum at 63.89%, the impact from ABS, at 8.13%, lowers this weight to 61.69% and those of V-GOV and V-CORP to

Table 2. Summary statistics, including the annual (geometric) means, volatilities, as measured by standard deviations, and Sharpe "reward to variability" ratios, January 2000–September 2021, for the V-BAL, the V-STOCK, the V-GOV, the V-CORP, the ABS, and the T-BILLS, which measures the risk-free return

	V-BAL	V-STOCK	V-GOV	V-CORP	ABS	T-BILLS
Mean return	6.70%	7.41%	7.00%	7.54%	4.43%	1.52%
Max return	21.53	33.62	24.68	18.95	24.53	6.17
Min return	−22.26	−37.17	−15.21	−6.74	−5.05	0.01
Mean volatility	9.63	15.65	11.41	9.40	3.12	1.40
Max volatility	17.60	28.00	15.97	14.22	6.96	3.90
Min volatility	3.05	4.40	6.04	3.09	0.77	0.04
Sharpe ratio	0.54	0.38	0.48	0.64	0.93	–

11.11% and 19.06%, respectively. This is additional evidence of the potential reward-risk added value of ABS in a standard "60–40" balanced portfolio. More definitive conclusions require more testing, however, in particular because the results are in hindsight only, and only for the entire period, not in foresight or for any holding periods.

Table 4 reports the annual out-of-sample rates of returns, volatilities, and Sharpe ratios for V-BAL and for the Black–Litterman W/O ABS and W/ABS portfolios. As discussed previously, each year represents the results from the previous three-year portfolio construction period. The ABS weights range from 2.19% to 15.20% across the 19 portfolio construction periods [6].

The annual results account for various years in which an investor could have purchased ABS. For example, an investor who bought the 2000–02 ABS portfolio would have earned 21.73% in 2003, 172 basis points higher than V-BAL but would have absorbed a standard deviation of 8.31%, the highest in the group. The result is a Sharpe ratio of 2.49, the lowest in the group. For the 2003–05 portfolio, however, the return in 2006 is 11.63%, with a standard deviation of 4.93%, leading to a Sharpe ratio of 1.40, the highest in the group.

Broadly, the highest returns are in 2019, as V-STOCK alone rose by 30.67%. High returns also occur in 2009. They reflect the reversal of the large, double-digit negative returns emanating from the financial crisis. The largest standard deviations surround the crisis

Table 3.
The respective weights generated by the Black–Litterman model for the mutual funds, V-STOCK, V-GOV, V-CORP and ABS, one excluding ABS (W/O ABS) and one including it (W/ ABS), January 2000–September 2021

	V-STOCK	V-GOV	V-CORP	ABS
W/O ABS	63.89%	16.27%	19.84%	–
W/ABS	61.69%	11.11%	19.06%	8.13%

Table 4.
Annual out-of-sample rates of return, volatilities, as measured by annual standard deviations, and Sharpe ratios for the V-BAL, the Black–Litterman portfolios without ABS (W/O ABS), and the Black–Litterman portfolios with ABS (W/ABS), with the annual three-month Treasury bill rate as the risk-free rate of return, based on three-year portfolio construction periods

	Returns			Volatilities			Sharpe		
	V-BAL (%)	W/O ABS (%)	W/ ABS (%)	V-BAL (%)	W/O ABS (%)	W/ ABS (%)	V-BAL (%)	W/O ABS (%)	W/ ABS (%)
2003	20.01	25.18	21.73	7.36	7.73	8.31	2.56	3.12	2.49
2004	9.22	10.48	9.61	4.95	6.03	5.31	1.58	1.51	1.55
2005	4.73	5.80	6.07	5.26	5.34	5.53	0.30	0.50	0.53
2006	10.98	10.94	11.63	5.20	5.30	4.93	1.20	1.17	1.40
2007	6.10	5.95	5.67	6.14	5.84	6.13	0.28	0.27	0.22
2008	−22.26	−23.07	−23.45	14.30	16.13	15.99	−1.65	−1.16	−1.55
2009	20.32	18.74	19.13	14.23	16.58	16.60	1.42	0.95	1.14
2010	13.32	14.82	14.44	11.07	11.29	11.36	1.19	1.30	1.26
2011	4.15	9.29	8.93	10.91	8.22	8.25	0.38	1.12	1.08
2012	11.30	13.16	12.78	6.10	6.15	6.05	1.81	2.12	2.10
2013	18.13	13.09	15.93	6.46	7.06	6.90	2.79	1.85	2.30
2014	9.76	16.02	14.32	5.75	6.22	6.40	1.69	2.57	2.24
2015	0.30	−1.21	0.10	8.37	9.17	9.03	0.03	−0.14	0.01
2016	8.62	6.67	8.58	5.97	6.80	6.15	1.39	1.08	1.34
2017	13.84	16.97	16.66	3.06	3.02	3.07	4.22	5.30	5.13
2018	−3.05	−5.23	−3.60	9.64	10.31	10.26	−0.52	−0.70	−0.54
2019	21.53	23.97	24.63	7.99	6.74	7.75	2.43	3.25	2.98
2020	15.24	17.03	18.20	17.06	19.02	19.38	0.84	0.88	0.93
3Q21	12.36	12.22	13.15	6.91	8.19	7.82	1.77	1.48	1.68
Mean[a]	*8.69*	*9.46*	*9.65*	*9.01*	*9.62*	*9.66*	*0.84*	*0.87*	*0.88*

Note(s): [a]The average Sharpe ratios are based on the average (geometric means) and the average volatilities

years, 2008, 2009, 2010 and 2020. They display relatively large double digits, as high as 16.60% for the W/ABS portfolio in 2009 and 19.38% and in 2020, each likely reflecting a temporary flight from ABS securities. With a few exceptions, all other years display single-digit standard deviations, as low as 3.02% for the W/O ABS portfolio in 2017, a time in which all three portfolios register standard deviations from 3.02% to 3.07%.

Yearly comparisons show significant swings across the Sharpe ratios, as seen, for example, in 2013, in which the range is from 1.85 to 2.79, and in 2019, in which the range is from 2.43 to 3.25. A year-by-year comparison, however, of the Sharpe ratios does not show a distinct pattern of outperformance by the W/ABS portfolio, signaling efficient pricing of ABS. In 19 comparisons, it outperforms the W/O ABS portfolio ten times and V-BAL ten times. The mean differences in returns and standard deviations are relatively small, leading to similar Sharpe ratios, with the 0.88 of the W/ABS portfolio recording the highest.

Table 5 displays the outcomes for the three-year out-of-sample holding periods. For example, the 2003–05 results are based on the 2000–02 portfolio construction period. The 2004–06 results come from the 2001–03 construction period, and so on. Expectedly, negative returns mark the three-year periods from 2006 through 2009, with V-BAL registering the smallest losses, −2.90% and −0.25%. The same observation applies with respect to the volatilities, or standard deviations, 10.24 and 12.97%, respectively. These negative returns revert to double-digit positive returns from 2009 through 2011, reflecting the recovery from the global financial crisis. Double-digit returns also hold from 2011 through 2014, with 2013 being the bull market year in which V-STOCK records its highest annual return, 33.62%. Despite the global pandemic, the highest returns are from 2019 through September 2021, with the W/ABS registering the leading return of 20.65%.

Expectedly, the periods from 2006 through 2011 display the highest volatilities, from 10.24% for V-BAL to 15.76% for the W/O ABS portfolio. Similar numbers are seen from 2018 through 2020, with the rise reflecting the economic impact of the global pandemic. Nonetheless, the combination of the double-digit positive returns and the associated

	Returns			Volatilities			Sharpe		
	V-BAL (%)	W/O ABS (%)	W/ ABS (%)	V-BAL (%)	W/O ABS (%)	W/ ABS (%)	V-BAL (%)	W/O ABS (%)	W/ ABS (%)
2003–05	11.14	12.29	12.42	6.03	6.76	6.68	1.54	1.55	1.58
2004–06	8.27	8.94	8.38	5.05	5.46	4.83	1.03	1.07	1.10
2005–07	7.24	7.24	7.60	5.44	5.18	5.50	0.58	0.61	0.64
2006–08	−2.90	−3.77	−3.45	10.24	11.82	11.22	−0.62	−0.61	−0.62
2007–09	−0.25	−1.87	−1.07	12.97	14.34	14.52	−0.17	−0.27	−0.21
2008–10	1.06	1.70	1.75	14.07	15.76	15.46	0.10	0.10	0.08
2009–11	12.4	11.94	13.89	11.95	12.02	12.52	1.03	0.98	1.10
2010–12	9.52	10.98	11.08	9.44	8.22	9.48	1.00	1.33	1.16
2011–13	11.05	11.19	11.95	8.04	6.75	6.77	1.36	1.65	1.76
2012–14	13.00	15.04	14.18	6.04	6.61	6.10	2.14	2.27	2.31
2013–15	9.15	3.32	9.62	7.02	7.30	7.19	1.30	1.13	1.33
2014–16	6.14	7.07	3.74	6.70	7.25	6.74	0.90	0.96	0.54
2015–17	7.44	7.99	8.72	6.20	7.03	6.82	1.13	1.08	1.21
2016–18	6.23	5.84	6.71	6.86	6.71	6.57	0.75	0.71	0.86
2017–19	10.28	11.77	11.88	7.74	7.99	8.15	1.12	1.27	1.28
2018–20	10.74	11.90	12.13	12.44	13.85	13.42	0.75	0.75	0.82
2019-3Q21	16.84	19.69	20.65	11.94	13.01	12.77	1.36	1.47	1.48
Mean	*7.97*	*8.08*	*8.68*	*9.17*	*9.67*	*9.70*	*0.74*	*0.71*	*0.77*

Table 5. Three-year out-of-sample rates of return, volatilities, as measured by annual standard deviations, and Sharpe ratios for the V-BAL, the Black–Litterman portfolios without ABS (W/O ABS), and the Black–Litterman portfolios with ABS (W/ABS), with the annual three-month Treasury bill rate as the risk-free rate of return

volatilities in 2012–14 leads to the highest Sharpe ratios, from 2.14 for V-BAL to 2.31 for the W/ABS portfolio, followed by those in 2011–2013, ranging from 1.36 to 1.76.

Across the 17 period-by-period comparisons of the Sharpe ratios of the W/ABS portfolio with those of the W/O ABS portfolios, the W/ABS portfolio outperforms 13 times. The same holds with respect to V-BAL. The higher mean return on the W/ABS compared to that of the W/O ABS portfolio, or 8.68% versus 8.08%, combined with an equivalent volatility leads to a higher Sharpe ratio, 0.77 versus 0.71. Overall, these results suggest a modest advantage for the W/ABS portfolio. The same conclusion applies with respect to V-BAL, which carries a lower mean return but a lower mean volatility, leading to a Sharpe ratio of 0.74.

Table 6 shows the five-year out-of-sample holding period results. As also seen in Table 5, the lowest performances encompass the global financial crisis, as seen in the low returns – the lowest across all periods – in 2004 through 2008 and in 2005 through 2009. They lead to negative Sharpe ratios, ranging from −0.24 to −0.01. As expected, these small returns revert to double-digit returns from 2009 through 2014, leading to the highest Sharpe ratios, from 1.32 for V-BAL in the 2009–13 portfolio to 1.67 in the W/O ABS portfolio in 2010–2014. As displayed in Tables 4 and 5, the highest volatilities are found in the periods that include the global financial crisis, as seen in periods from 2005 through 2012, and the global pandemic, as seen from 2017 through 3Q21. Among the average volatilities, the W/O ABS portfolio registers the lowest, at 9.09%, just below the 9.11% of V-BAL.

In a period-by-period examination of the Sharpe ratios, the W/ABS portfolio exceeds those of the W/O ABS portfolio in 11 of the 15 comparisons and those of V-BAL in 12 instances. While the mean return for the W/ABS portfolio is the highest, at 8.43%, so is its standard deviation at 9.66%. Nonetheless, its Sharpe ratio, at 0.77, is the highest in the group by a margin of 0.02 over that of the W/O ABS portfolio and by 0.04 over that of V-BAL, suggesting a modest advantage to the W/ABS portfolio.

Table 7 presents the ten-year out-of-sample holding portfolio performances. Among all the results in Table 4 through 7, they display the least variation. Across the 30 returns, 22 are in the range of 6–10%, indicating a leveling across the decades, which includes the three bear markets. The highest returns are posted in the last decade, 2012-3Q21, from 10.56% to

Table 6.
Five-year out-of-sample rates of return, volatilities, as measured by annual standard deviations, and Sharpe ratios for the V-BAL, the Black–Litterman portfolios without ABS (W/O ABS), and the Black–Litterman portfolios with ABS (W/ABS), with the annual three-month Treasury bill rate as the risk-free rate of return

	Returns			Volatilities			Sharpe		
	V-BAL (%)	W/O ABS (%)	W/ ABS (%)	V-BAL (%)	W/O ABS (%)	W/ ABS (%)	V-BAL (%)	W/O ABS (%)	W/ ABS (%)
2003–07	10.08	10.80	10.82	5.83	6.30	6.21	1.23	1.25	1.27
2004–08	0.92	1.41	1.09	8.60	0.09	8.78	−0.24	−0.17	−0.22
2005–09	2.90	2.11	2.66	10.55	11.14	11.98	0.02	−0.06	−0.01
2006–10	4.53	2.11	4.42	10.55	11.14	12.36	0.21	0.22	0.18
2007–11	3.21	2.98	3.45	12.12	12.66	13.13	0.17	0.14	0.17
2008–12	4.21	4.20	5.13	12.15	12.18	13.01	0.32	0.32	0.37
2009–13	13.30	12.81	14.60	10.00	10.06	10.53	1.32	1.27	1.38
2010–14	11.24	12.83	12.85	8.22	7.62	8.36	1.36	1.67	1.53
2011–15	8.56	9.36	9.93	7.68	7.14	6.93	1.11	1.30	1.43
2012–16	9.47	10.47	10.26	6.57	7.41	6.70	1.43	1.40	1.52
2013–17	9.97	9.62	10.82	6.15	6.50	6.35	1.57	1.44	1.66
2014–18	5.70	6.27	7.15	6.91	7.08	7.60	0.78	0.79	0.85
2015–19	7.88	8.48	9.11	7.51	8.16	8.03	0.91	0.91	1.02
2016–20	10.92	11.24	12.01	10.02	9.43	9.36	0.98	1.08	1.18
2017–3Q21	11.73	13.94	13.27	10.32	11.36	11.08	1.05	1.15	1.12
Mean	*7.58*	*7.83*	*8.43*	*9.11*	*9.09*	*9.66*	*0.73*	*0.75*	*0.77*

12.49%, leading to Sharpe ratios from 1.17 to 1.26. The highest Sharpe ratios, however, are in the decade 2010–19, reaching the high of 1.28. The range in the volatilities is even tighter, with 28 of the 30 ranging from 8% to 11%.

The W/ABS Sharpe ratios outperform the W/O ABS Sharpe ratios in seven of the Securities Industry and Financial Markets Association SIFMA (2021b) ten comparisons, and in all ten comparisons with V-BAL. They lead to average Sharpe ratios that range from 0.77 for V-BAL and to 0.85 for the W/ABS. Combined with the results for the three-year and five-year periods, the W/ABS portfolio displays a modest advantage over the V-BAL and W/O ABS portfolios, which should be of interest to investors and wealth managers. Further testing, however, is in order before drawing firm conclusions.

To test for differences in the Sharpe ratios, we refer, once again, to the nonparametric, distribution-free Wilcoxon Signed-Rank statistic. It is well suited to small samples, and with the capability of generating robust results (Higgins and Peterson, 1998; Anderson and Loviscek, 2005; Broad *et al.*, 2017). Furthermore, Sharifzadeh and Hojat (2012) show its application to Sharpe ratios, overcoming the limitation of parametric tests, as proposed, for example, by Jobson and Korkie (1981) and Lo (2002). The intuition behind the test parallels that of a treatment effect. Does the effect lead to a significant improvement? In this study, the treatment is the addition of ABS to the "60–40" balanced portfolio.

Table 8 displays the outcomes of applying the Wilcoxon tests to the Sharpe ratios of the V-BAL, W/O ABS and the W/ABS portfolios. The *Z*-values and the respective *p*-values confirm the observations that the W/ABS portfolios add a modest value, with a significant difference at the 5% level when comparing the W/O ABS portfolio with the W/ABS portfolio for three, five, and ten years. The results are somewhat stronger with respect to V-BAL, with significance beyond the 1% level for five and ten years.

These results support the quote from PIMCO about potential diversification benefits of ABS. They also align with the work of Klacik (2020) and Xu and Ortiz-Eggenberg (2020), who conclude that ABS securities may be more resilient than perceived. Furthermore, they indicate that "reaching for yield" has a higher added value than studies to date indicate. They point to additional returns that somewhat more than compensate for the additional risks, a finding that should be of interest to investors and money managers. As a result, and to answer the question under study, given the range of weights for the W/ABS portfolios, from 2.19% to 15.20%, with an average of 8.13%, a reasonable asset allocation range is 8–10%.

	Returns			Volatilities			Sharpe		
	V-BAL (%)	W/O ABS (%)	W/ ABS (%)	V-BAL (%)	W/O ABS (%)	W/ ABS (%)	V-BAL (%)	W/O ABS (%)	W/ ABS (%)
2003–12	7.10	8.48	7.88	9.51	9.86	10.25	0.57	0.69	0.61
2004–13	6.93	6.75	7.30	9.48	9.43	9.13	0.57	0.54	0.63
2005–14	6.99	7.17	7.89	9.48	9.43	10.32	0.59	0.61	0.63
2006–15	6.53	6.71	7.28	9.70	10.75	10.25	0.56	0.52	0.60
2007–16	6.30	6.30	7.03	9.74	10.27	10.54	0.58	0.55	0.60
2008–17	7.05	7.26	8.28	9.62	9.83	10.34	0.70	0.71	0.77
2009–18	9.44	9.61	10.85	8.62	8.94	9.23	1.05	1.03	1.14
2010–19	9.55	10.58	10.84	7.85	7.82	8.15	1.14	1.28	1.27
2011–20	9.73	10.51	10.97	8.90	8.61	8.30	1.03	1.15	1.26
2012–3Q21	10.56	12.49	11.47	8.56	9.49	8.93	1.17	1.26	1.23
Mean	*8.01*	*8.57*	*8.97*	*9.17*	*9.48*	*9.58*	*0.77*	*0.81*	*0.85*

Table 7. Ten-year out-of-sample rates of return, volatilities, as measured by annual standard deviations, and Sharpe ratios for the V-BAL, the Black–Litterman portfolios without ABS (W/O ABS), and the Black–Litterman portfolios with ABS (W/ABS), with the annual three-month Treasury bill rate as the risk-free rate of return

Other considerations

The results are based on a representation of the classic "60–40" balanced portfolio. Other portfolio combinations could produce different results, as found, for example, in all-fixed-income portfolios [7]. Nonetheless, the results indicate that "reaching for yield" with ABS may be more profitable than the current literature indicates. They also point to a way to outperform the passively-managed Vanguard Balanced Index and similar broad-based balanced funds, suggesting inefficiency in financial markets.

Additional considerations include management fees and taxes. Although low-cost brokerage services have existed for several decades, some investors still prefer investment advisory services, which carry up-front fees of up to 2%, which are in addition to the expense ratios charged for actively-managed ABS funds. These fees and expenses reduce the income advantage of ABS over traditional income-earning securities, a reduction that increases with taxes. Except for interest income earned from municipal bonds, income generated from any fixed-income security is taxed at ordinary rates in the US, unlike the more-favorably treated, long-term capital gains. Because the holding periods investigated involve portfolio reconstructions as part of the out-of-sample tests, not only is the income subject to tax but so are any realized capital gains. Investors would do well to give themselves an after-tax advantage by using tax-deferred accounts if they wish to keep pace at least with a representative market index, such as the Vanguard Balanced Index.

As one more consideration, the results also indicate the efficacy of the application of MPT. This can be a contested issue, as seen in Kan and Zhou (2007), Benninga (2008), and DeMiguel *et al.* (2009). The results in this study align with those of Bessler *et al.* (2014) and Allen *et al.* (2019).

Conclusion

As a response to the global financial crisis of 2007–09, monetary authorities unleashed unprecedented monetary expansion that has led to record-low interest rates, reinforced by central bank responses to the global pandemic. While such broad-based economic stimulus has been needed to offset the steep downturns in the product and capital markets, the low interest rates have greatly diminished the efficacy of traditional income-generating instruments, such as government bills, notes, and bonds, investment-grade corporate debt, and bank certificates of deposit. The search for alternative income-generating assets has led to a burgeoning market in asset-backed securities (ABS). Although these securities generate higher income returns and have low default rates, their opaqueness, liquidity risk, and prepayment risk relative to traditional fixed-income securities lead to the following question: what, if any, is a reasonable ABS allocation? We address this question from the viewpoint of the classic 60–40% stock-bond portfolio in the interest of providing direction to investors.

Table 8. Wilcoxon signed-rank test *Z* statistics and associated *p*-values comparing the Sharpe "reward-variability" ratios of the W/O ABS and V-BAL portfolios with those of the W/ ABS portfolio at the 5% level

	Z-value	*p*-value
Sharpe ratios V-BAL ABS vs. W/ABS		
One year	−1.49	0.07
Three years	−2.51	0.01
Five years	−2.98	0.00
Ten years	−2.80	0.00
Sharpe ratios W/O ABS vs. W/ABS		
One year	−0.10	0.46
Three years	−1.85	0.05
Five years	−1.90	0.05
Ten years	−1.73	0.05

The data are monthly, from January 2000 through September 2021. In the interest of investors and money managers, we use the following mutual funds: the Vanguard Total Stock Market Index, the Vanguard Long-term Treasury Index, and the Vanguard Long-term Investment-Grade Index. To this group, we add an equally-weighted ABS index across auto, credit card, and equipment ABS. The benchmark is the Vanguard Balanced Index, an industry standard.

Using three years of data, we first construct 38 mean-variance efficient portfolios, 19 without ABS and 19 with ABS by using the Black–Litterman model. We then track the respective performances of the ABS portfolios against those without the ABS and against the Vanguard Balanced Index in a series of one-, three-, five-, and ten-year out-of-sample tests. The statistical evidence indicates a modest reward-risk added value from the addition of ABS, as measured by the Sharpe "reward-to-variability" ratio, in holding periods of three, five and ten years. Thus, based on the findings, we conclude that a reasonable asset allocation for income-seeking, risk-averse investors who follow the classic 60%–40% stock-bond allocation is 8%–10%.

Notes

1. As an additional draw for investors, the US. Federal Reserve System's Term Asset Backed Securities Loan Facility, created as a response to the liquidity crisis of 2007–09, allows the central bank to lend, on a non-recourse basis, to investors holding AAA-rated ABS that are collateralized by recently originated consumer and business loans. Investors in AAA ABS reaped double-digit returns as recovery from the crisis commenced and spreads contracted. The central bank reopened the facility on March 23, 2020, further lifting investor confidence for significant gains from ABS.
2. Guggenheim (2017) provides a concise and detailed overview of ABS securities, including returns and risks.
3. As a simple illustration with reference to the section on fund selection and data, the following section, we use the Vanguard Balanced Index as "the market." Based on monthly returns from January 2000 through September 2021 for it and the Vanguard Total Stock Market Index and the Vanguard Long-term Treasury Index, the respective CAPM estimates are 0.1225 and 0.0445, based on a market risk premium of 0.065. The respective variances are 0.0317 and 0.0204, with the covariance at -0.005. The optimization leads to a maximum Sharpe ratio of 0.594, with corresponding respective market-capitalized weights of 0.712 and 0.288. The portfolio's variance of 0.0142 and the market risk premium of 0.065 lead to a risk aversion coefficient (λ) of 4.59. Thus, the respective implied excess equilibrium returns are 0.0969 and 0.0107. As explained in the next section, this illustration represents the steps used to construct the 19 portfolios without ABS and 19 with ABS, each of which is tested forward for one, three, five and ten years.
4. For purposes of information, the index contained, as of 2020, 381 securities, 88.5% of which was allocated to auto ABS, 9.7% to credit card ABS, and 1.8% to equipment ABS. Given that ABS have existed through a global financial crisis, a global pandemic and three recessions during this century, and noting the emergence of ABS-type funds since 2015, these observations are a motivation for investigating the potential reward-risk enhancement of ABS.
5. Across the applications without ABS, the Black–Litterman model generated an average weight for the Vanguard Total Stock Market Fund of 61.03%, with a range of 55.22%–65%.
6. Using the non-parametric Wilcoxon Signed-Rank Test, which can be used to test differences in Sharpe ratios (Sharifzadeh and Hojat, 2012), we find ten instances in which the W/O ABS portfolio exceeds that of V-BAL, a difference significant only at the 20% level. This indicates that the W/O ABS portfolio is a fair representation of V-BAL, setting up the test for the added reward-risk value of ABS.
7. For additional insight, we also used the Bloomberg–Barclays ABS Index. The results indicate efficient pricing; that is, ABS neither add to nor subtract from portfolio performance. As indicated, however, this index is heavily weighted toward the lower-yielding auto ABS, by up to 100 basis

points, and therefore does not represent an accurate cross-section of ABS funds as well as one that is equally weighted. Nonetheless, the results from this index indicate that "reaching for yield" does not hurt reward-risk portfolio performance, unlike the results found by Choi and Krunland (2018) in corporate bond mutual fund performance.

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