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# FIXED INCOME & CRYPTOCURRENCY COMPENDIUM

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January 2020

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## Featured Companies

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*Brookfield Residential Properties (BRP)*  
*Ally Financial Inc. (ALLY)*  
*Netflix, Inc. (NFLX)*  
*Deutsche Bank AG (DB)*



*Exclusive Marketers of  
The Fixed Income Contrarian Report*

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# FIXED INCOME & CRYPTOCURRENCY COMPENDIUM

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## *Murray's Musings*

### THE TRANSFORMATION OF THE FIXED INCOME ASSET CLASS

Fixed income is an investment that is a type of loan. A borrower is obligated to make payments of a predetermined amount, and the principal must be paid on the maturity date. The legal predetermination of the payments is the origin of the term *fixed*. In other words, fixed means predetermined. This legal definition will not change.

An exceedingly low level of interest rates changes the character of this type of investment in extraordinary and not so obvious ways. It should be evident that a fixed income investment that pays a coupon of less than 2% is, both before and after taxes, a negative real (after inflation) return instrumentality. For a New York City resident of means, even a fixed income instrument that yields 4% or less, is a negative real return instrumentality. Although there is surprisingly little discussion of this reality, it should be self-evident to investors.

It is less obvious—although nonetheless true—that bonds, in this historically low interest rate period, if sold short, are actually incredibly inexpensive put options. An example will serve to illustrate this point. Consider that the Bank of America 4.44% bonds due January 20, 2048 are now priced, on a yield-to-maturity basis, at 3.31%. They trade well above par value and at maturity must be worth par value. Prior to maturity, which is almost 30 years from now, a variety of circumstances could occur in which these bonds could be worth considerably less than par.

If, for instance, U.S. government bonds for some reason yield 5% instead of the present level of 2.2%, the Bank of America bonds would probably yield 7.45%—even assuming that credit quality does not deteriorate.<sup>1</sup> Quite obviously, the bonds would trade well below par value.

Hence, two possibilities exist for these Bank of America bonds. The first is that interest rates will never increase. As a result, the Bank of America bonds will not be priced at par value until the maturity date of January 20, 2048. The short seller will simply lose the 3.31% annual yield to maturity. A short seller in the 50% tax bracket (Federal, State, and local) will effectively lose half that sum after the benefit of tax deductions. Consequently, one would pay 1.66%—half of 3.31%—for a long-term put option on interest rates. Which is incredibly cheap—just try to price a multi-year put option on long-term interest rates with a broker-dealer.

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<sup>1</sup> At the time of this writing, a 30-year Treasury bond yields 2.22%. If the yield of that bond increases to 5%, it would produce 2.25x more yield. Increasing the 3.31% yield of the Bank of America bonds by 2.25x produces a yield of 7.45%. A bond with a 4% coupon that yields 7.45% would trade below par.

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The other possibility is that interest rates do increase. In that event, the bonds might trade substantially below par value—depending upon how high interest rates rise. These bonds are effectively a put option for which the premium is the yield to maturity. The potential loss for a bond (absent default), or in this case for a near-30-year put option on the bond, is limited to the yield to maturity. In other words, the loss is limited to the amount of the current price premium for the bond, just as for the option premium for a conventional put option.

This similarity to a put option is problematic on a broader systematic basis, because it changes the incentives for investing in bonds. Consider the matter from the perspective of an investor who might purchase a U.S. Treasury bond due in 2048 that has a yield to maturity of 2.23%. What if, alternatively, that bond were used as collateral to establish a small short position in a Bank of America bond, say a short equal to 10% of the long position. The investor puts \$100 into the U.S. Treasury bond yielding 2.23%, then takes \$10, or 10%, shorting that amount of Bank of America debt for which they must pay a yield to maturity rate of 3.31%. In terms of that investor's new risk/reward profile, the first aspect of this hedged position is that the net yield on it is actually a positive 1.9% carry.

An investor considering such a trade must contemplate whether or not it is better to sacrifice 33 basis points of annual income in exchange for the possibility that the creditworthiness of Bank of America might deteriorate. If Bank of America creditworthiness deteriorates, as occurred in 2008, the bank's debt might trade at 50% of par value, as it did at that time. A 10% short position with a loss of possibly 60% in price would produce a portfolio-level trading gain of 6%.

One might argue that such a trade is outside of the ambit of a conventional bond investor and therefore unlikely to be made. But it is not outside of the ambit of an investor who would be inclined to sell short Bank of America common stock. The shares now yield 2.17%, so that is a cost of the short sale. Moreover, the shares can appreciate. Thus far, in 2019, the shares have increased in value by 32.67%. That would have been the loss to a short seller.

Why might a short-seller have been attracted to the Bank of America shares? The net income for the first nine months of 2019 was \$19.25 billion—a decline of 2.07% versus the comparable period in 2018, when it was \$19.657 billion.

What if a hypothetical short seller were sufficiently astute to predict that in 2019, the net income of Bank of America would decline. This hypothetical short seller would have predicted, as well, the bank's difficulty with overnight borrowing in September of that year. Although this investor might reasonably have anticipated that Bank of America shares would decline, what could not have been reasonably anticipated is that its stock would in fact appreciate by 32.67%.

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Establishing a hedge against a banking-related issue with systemic dimensions can be very expensive, carry costs aside, in terms trading risk, until the problem finally manifests itself. Selling short a bank bond substantially eliminates the trading or directional risk, since the bond will ultimately mature at par value. That is to say, if an investor is worried about possible banking risks, short sale of bank stock is too blunt an instrument to use as a hedge, there being many circumstances in which bank shares could rise considerably in price, creating an extremely expensive hedge.

## *Surveying Both Idiosyncratic and Systemic Risks in Low-Yield Bonds*

There exist many long-term bonds that, in principle, have high price convexity paired with extraordinarily low yields to maturity. One example might be San Francisco City & County Water 6.95% due November 1, 2050, which trades at a price of 159.21 with a 3.22% yield to maturity. Apart from higher interest rates, variables that could cause the bonds to decline are fluctuations in the creditworthiness of the city or an earthquake that could severely damage the water system, requiring extensive repairs.

All U.S. bonds trade in relation to Treasury bond yields. Yet, with less than a 100-basis point spread over Treasuries, it is clear that municipal bonds, project finance bonds, or corporate bonds have unique risks that are not being priced into them. For example, consider the Comcast 4.00% Notes due November 1, 2049, trading at 110.82 with a 3.41% yield to maturity. Major changes are clearly evident in Comcast's delivery of content to subscribers and in the company's ability to sell advertising. Although no investor is in a position to predict the financial conditions of Comcast over the 30-year life of this bond, the valuation is predicated upon the belief that there is no realistic possibility of a significant deterioration in its financial position.

The same statement might be made about AT&T, which is actually a fairly leveraged enterprise. Its 5.7% bonds due March 1, 2057—a 38-year life—are priced at 125.38 with a yield to maturity of 4.32%.

Universities are now issuing debt, despite their huge endowments, because the cost of debt capital is so low, while the likelihood is high that the university will ultimately repay the debt in inflated dollars. As an example, Princeton University 5.70% bonds due March 1, 2039 trade at 139.32 with a yield to maturity of 3%. Similarly, Harvard has issued a 4.875% bond due October 15, 2040 now trading at 130.80 with a yield to maturity of 2.9%.

If one sells short the Princeton or Harvard bonds, all one needs for a substantial profit is a modest rise in interest rates. A rise in long-term Treasury yields of perhaps 150 basis points for any reason would cause the Harvard bonds to trade at par value. A 30-year U.S. Treasury now yields 2.2%; 150 basis points higher, and it would yield 3.72%. If the Harvard bond were to trade a yield spread of 115 basis points above the Treasury, it would be priced at par value almost 31 points lower. In fact, because any meaningful rise in interest rates would

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probably severely reduce the market value of the Harvard endowment, the assessment of Harvard's creditworthiness would probably be reduced as well, such that the spread to Treasuries would probably rise as well.

The State of Texas 5.52% bonds due April 1, 2039 are priced at 138 with a yield to maturity of 2.82%. Surely, one could envisage a diminution of creditworthiness if, for some reason, extraction of fossil fuels were to be prohibited in the United States. In a less extreme scenario, the same outcome might be achieved by a severe reduction in oil and gas prices. The bond market does not appear very concerned about this possibility, at least judging by the present yield of the State's debt.

If the production of coal were to be forbidden in the U.S., it would negatively impact the fortunes of Union Pacific Corporation (UNP). Union Pacific managed to issue a 4.375% bond due November 15, 2065 which now trades at 109.85 with a yield to maturity of 3.91%. In fact, even a severe recession could lower an investor's perception of the credit worthiness of Union Pacific. The company also issued 3.84% bonds due March 20, 2060 presently trading at 102.32 with a yield to maturity of 3.73%.

Altria Group, Inc. (MO) managed to sell 6.20% bonds due February 14, 2059, presently trading at 117.33 with a yield to maturity of 5.16%. The mere existence of such a bond is more than a statement about the long-term real rate of return on bonds. It is effectively a statement that large-scale smoking in the U.S. will continue past the year 2059.

Here is where it becomes yet more interesting.

The University of California issued 4.77% bonds due May 15, 2115, now priced at 126.36 with a yield to maturity of 3.75%. It is virtually a certainty that the person buying this bond will not live to the maturity date. Ohio State University managed to sell 4.80% bonds due June 1, 2111, now trading at 129.45 with a yield to maturity of 3.68%.

Guardian Life Insurance Company of America has issued 4.85% bonds due January 24, 2077. they trade at 124.87, a yield to maturity of 3.78%. A life insurance company is an interesting case relative to long-term bonds. If interest rates increase, it would surely have a negative impact on the market values of the debt. On the other hand, if rates *decrease* sufficiently from this point, the company might experience difficulty earning enough from its bond portfolio to pay its annuity liabilities. Viewed from the perspective of the bond buyer, the best-case scenario is that interest rates remain at present levels and neither materially increase nor decrease for many decades.

If an investor buys a 57-year bond from a life insurance company whose entire investment portfolio is comprised almost entirely of long-term bonds, and if one of the many long-term

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bonds in its investment portfolio loses value, then the collateral for your bond will lose value, as well.

These bonds are only a small sample of many that have a similar character. The common denominator is that the rate of compensation above that of Treasury bonds is less than 200 basis points per annum and sometimes even less than 100 basis points, despite the fact that many of the bonds have maturity dates far longer than the 30-year Treasury. The University of California bond will mature in 91-years or 3x the maturity of the longest-term U.S. Treasury bond. It does not appear that much, if any, marginal compensation is paid for the extra 60-year life of the bond. In the light of such pricing, there is no room for any rise in interest rates or any deterioration of credit quality. Yet, history demonstrates that such eventualities frequently occur.

The expense of selling such bonds short is small relative to the reward possible if history repeats itself. Ergo, such bonds and many others are now effectively low-cost, low-risk put options with heretofore unimaginably lengthy times to expiration.

If shorting, I prefer to sell short bonds—not stocks—because they are a much more reasonable hedge against uncertainty. There is a limit to how much money one can lose, and one knows what that limit is—as opposed conventional hedge instruments, in which the potential loss is infinite.

*Q:* I have a hypothetical question relative to the circumstance of a 75-year-old investor who expects to live ten additional years and who invests in long-term bonds that yield 4.8% with good credit, as with the University of California issue. Playing devil's advocate, what would be wrong with that, if rates stay roughly the same over that period?

*A:* What would be wrong with that? If that investor has to live off the principal—not just the income—and the bond declines in market value, there would be plenty wrong with it. That person would be forced to sell the bond for money to live on, and the sale might not produce adequate funds. That person might die without enough money. An alternative risk is that this investor is fortunate enough to be in very good health and live longer than the expected additional 10 years, but with each passing year, the cost of living rises above the purchasing power of that bond's coupon income. That investor would not be very happy with that outcome. That is what's wrong with it.

## *Industry Thoughts*

### CRYPTOCURRENCY MINING

Below, I will explain some of the basic principles of cryptocurrency mining, because few people know them. That is the focus and purpose of this section.

The popular press, in its discussion of cryptocurrency in general, and bitcoin in particular, has offered the public no information about the extraordinary efficiencies that have been achieved in cryptocurrency mining. Because the cost of mining equipment and the need for electric power are critical factors in the trading price of bitcoin, this information should be widely disseminated. The economics of mining have changed radically in the past two years.

At the end of 2017, one could have purchased a Bitmain S9 Antminer for approximately \$2,100 from the manufacturer. One states *approximately* because, at the time, in the frenzy to purchase cryptocurrency mining equipment, buyers occasionally paid higher prices for the S9, a 13.5 terahash (TH) machine.

Today, a 14 terahash per second (TH/s) S9 Antminer is available from Bitmain for \$101. Thus, two years ago, the price per TH/s was \$155.55; today, the price is \$7.21. Measured in this way, the price decline is 95.36%.

This does not properly measure the decline, because the S9 Antminer is almost obsolete. A much more sensible purchase lately is the Antminer S17 Pro-53TH/s, which is available for \$1,566. One pays \$29.55 per TH/s. In normal function mode, this device draws 2,094 watts, which implies an energy cost of 39.51 watts per TH/s. The modern S9 14TH/s device will draw 1,148 watts or 82 watts per TH/s. Obviously, it is much cheaper to operate the S17.

The proper comparison, though, for the modern S17 would be versus the S9 of two years ago. That latter rig was a 13.5TH/s device that would draw 1,400 watts and consume electric power at the rate of 103.7 watts per TH/s, and for which one paid \$155.55 per TH/s. In contradistinction, the modern S17 costs \$29.55 per TH/s and consumes power at the rate of 39.51 watts per TH/s.

The purchase price of a mining machine has effectively declined by 81%, and the operating cost, by 61.91%. The modern device dissipates heat more efficiently, so that it is less likely to overheat. Overheating can either trigger the machine to cease operating or cause it to run at a lower clock speed, thereby reducing profitability.

These factors become highly deflationary relative to bitcoin, because they dramatically reduce the cost to create a bitcoin, if other factors remain equal—which they never do.



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Viewed from this perspective of production, bitcoin is no different than any commodity, such as wheat. When the cost of bitcoin production declines, the price drops, because various producers compete to produce the coins and sell at least some of them to pay for the operating expenses—their sell/funding decision creates more circulating supply.

Bitcoin, however, is not otherwise similar to any other commodity. One of its unique properties is that unlike, say, wheat, the production rate of bitcoin is fixed according to a schedule embedded within the bitcoin protocol. Consequently, when more miners try to mine bitcoin, the incremental supply does not increase; rather, the volume of production per miner declines. This reduction can be measured by the hash rate.

On November 22, 2017 (according to [bitinfocharts.com](http://bitinfocharts.com)), the aggregate bitcoin hash rate—the combined processing power of all the computers in the bitcoin network—was 11.4 exahash. Presently, the hash rate is approximately 100 exahash. (That was the rate at the time of this writing; however, it fluctuates wildly every hour.) Hence, although it is true that a contemporary miner has dramatically lower expenses, the miner collects only 11.4% of the coins per block cycle versus two years ago. The production cost per bitcoin is actually more expensive than it was two years ago, while its price is modestly higher.

One compares the cost per device (down 81%) and the operating cost (down 61.91%) with the number of coins one previously received (only 11.4%). This latter figure is arithmetically equivalent to saying that the yield is down by 88.6%—the reciprocal of 11.4%.

The next complexifying factor is that bitcoin will experience a so-called halving in May 2020. The protocol will permit the production of only half as many bitcoin per block cycle as now produced. Thus, assuming that the hash rate is constant (which it might not be), one will receive only 5.7% (half of 11.4%) as much bitcoin as in November 2017.

In principle, this is highly inflationary for the bitcoin price: the cost to produce the coins remains constant, while the rate of production declines. Ergo, the cost to produce a coin rises. It is worth repeating that this is true if present conditions remain constant. If they do not, this might not be true.

One scenario is that most miners will replace old S9 devices with more power-efficient machines. The incentive to do this is intense because the halving is a knowable event that might substantially raise the aggregate hash rate and inflate the price of bitcoin. Alternatively, the less-efficient miners might simply cease production, and a new profit equilibrium might be established at a much lower hash rate at a lower price. This actually occurred with the litecoin halving event earlier this year. The litecoin hash rate declined from 474TH/s in August 2019 to 172TH/s in November 2019. In this circumstance, mining can be reasonably profitable using theoretically obsolete L3 devices. More power-efficient

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litecoin miners are available from Innosilicon; however, the cost efficiencies are not as dramatic as with bitcoin.

Relative to bitcoin, it is extremely difficult at recent prices to earn a profit with old S9 equipment. The incentive to purchase new equipment is very powerful. Theoretically, this should, in the coming months, raise the aggregate hash rate to hitherto unprecedented levels and markedly inflate the bitcoin price.

The caveat to this outcome is that a deflationary force could arise if the manufacturers can, by May 2020, create improved machines that are more power efficient at a lower price per TH/s. In trying to predict the price of a bitcoin, one must consider the economics of mining. A constant tension exists between the inflationary force of a higher hash rate versus the deflationary force of cheaper and more power-efficient equipment.

As with any device, bitcoin will eventually arrive at a point where the equipment cannot be significantly improved, and the mining economics will become very different. At the present time, one can clearly see that major improvements are still possible. Those modifications to the economics of bitcoin create the bitcoin volatility that one observes.

*Q:* Once you come to the point where the mining economics cannot be improved, does that mean that the price of bitcoin could still be volatile, although it would be volatile for a different reason?

*A:* No, it will not be volatile.

*Q:* Not at all?

*A:* It will be very stable. It will trade in a certain relationship to the dollar at a very stable rate: the inflation rate of bitcoin relative to the inflation rate of a dollar—as with any currency.

*Q:* Do you think that bitcoin will be much higher in price at that point in time—playing catch-up?

*A:* At the moment, that is the predominant variable.

*Q:* Now with the new 70TH/s miners, do you see further technological improvements?

*A:* The hash rate of a rig is not a technological improvement in itself; you can have a 100TH/s machine. It is just a question of how many chipsets you want to put in there.

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The question is: What does it cost to produce the chips? It is possible to go to 5-nanometer chips at a higher yield, and they could become cheaper. It is even likely that that is going to occur. Although it will not happen tomorrow, it will obviously happen.

*Q:* How will quantum computers affect the security of the bitcoin blockchain?

*A:* I am frequently asked this type of question. Will bitcoin be less secure because quantum computers are coming and hackers will, in a few minutes, crack the secure hashing algorithm 256 (the SHA-256 algorithm)?

My response is, “Well, if the SHA-256 algorithm is not secure because of quantum computers, then I had better start worrying about my Visa Card and my bank account.” Most people who own bitcoin own a hundredth of one. It seems to me that it would take plenty of effort to break the 256 algorithm to access those accounts as opposed to hacking any of the major banks, or the Federal Reserve, or Visa and Mastercard, where a lot more money is held. The simplistic idea that criminals somehow will use quantum computers to hack cryptocurrency and not simultaneously use quantum computers to hack anything else is just preposterous.

And more to the point, the defense against such attacks is the quantum computer itself. As with frequency hopping in secure communications, a quantum computer can enable the algorithm to change every nanosecond or even every fraction of a nanosecond. It is not as if the quantum computer will be available exclusively to criminals intent on hacking the accounts of the citizenry, financial institutions, and corporations, yet not be available as a defense for their presumptive victims. It is ludicrous in and of itself.

## *Facts & Figures*

### OTHER ULTRA LONG -TERM BONDS

Some other interesting examples of long-term bonds are listed below. One can find all of these bonds in a bond index.

Table 1: Other Ultra Long-term Bonds

<u>Company</u>	<u>%</u>	<u>Due</u>	<u>Trading</u>	<u>YTM</u>
Massachusetts Institute of Technology	5.600%	July 1, 2111	\$158.35	3.48%
Republic of Argentina	7.125%	June 28, 2117	42.47	16.77%
Massachusetts Institute of Technology	4.680%	July 1, 2114	132.53	3.50%
Électricité de France S.A.	6.000%	June 22, 2114	118.42	5.06%
Norfolk Southern Corp.	5.100%	August 1, 2118	118.85	4.20%
Massachusetts Institute of Technology	3.875%	July 1, 2116	114.01	3.39%
Massachusetts Mutual Life Insurance	3.730%	October 15, 2070	98.66	3.79%
Cleveland Clinic Foundation	4.860%	January 1, 2114	125.02	3.86%

Source: Bloomberg, Vanguard, iShares

Massachusetts Institute of Technology (MIT) issued 5.6% bonds due July 1, 2111; these trade at 158.35 with a yield to maturity of 3.48%.

By comparison, Republic of Argentina (dollar denominated) 7.125% bonds due June 28, 2117, trade at 42.47 with a yield to maturity of 16.77%. The idea to purchase a 100-year bond from Argentina, a country that defaulted on six separate occasions, is an extraordinary statement of faith. The question is not whether the buyer of this bond will receive par value on June 28, 2117, because that is certainly not happening. The question is whether the 7.125% coupon will even be paid, because it might not be.

MIT 4.68% bonds due July 1, 2114 trade at 132.53 with a yield to maturity of 3.5%. Électricité de France S.A. (dollar denominated) 6% bonds due June 22, 2114 trade at 118.42 and a 5.06% yield. Norfolk Southern Corp. 5.1% bonds due August 1, 2118 trade at 118.85 and a 4.2% YTM, while the MIT 3.875% bonds due July 1, 2116 trade at 114.01 and an even lower 3.39% YTM.

Massachusetts Mutual Life Insurance bonds have similar characteristics to those of Guardian Life Insurance discussed in the previous section. Massachusetts Mutual Life Insurance 3.73% bonds mature on October 15, 2070 trade at 98.66 with a yield to maturity of 3.79%. Both of these insurers' bonds become increasingly interesting because the variable of higher interest rates that would reduce the value of these bonds is actually the same variable that would lower the value of the collateral for the bonds, which is the insurers' bond portfolios.

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## THE RISE OF THE LONG-TERM HIGH YIELD BOND

Later we will address the question of why a person would buy a long-term bond. There are reasons for it related to the search for yield. One of the reasons is that there is a yield desert (you might recall a discussion of the yield famine in a prior *Compendium*), so that high-yield bonds, which for the last 10 or 12 years have had only short maturities, are starting to be issued with longer maturities—not just longer, but very long.<sup>2</sup> The following table lists some examples.

Table 2: The Rise of the Long-term High Yield Bond

<u>Ticker</u>	<u>Company</u>	<u>%</u>	<u>Due</u>	<u>Trading</u>	<u>YTM</u>
FITB	Fifth Third Bancorp	5.100%	December 31, 2049	\$101.65	4.87%
VIAB	Viacom, Inc. Class B	6.250%	February 28, 2057	109.15	5.40%
AER	AerCap Holdings N.V.	5.875%	October 10, 2079	104.68	5.80%
BPL	Buckeye Partners, L.P.	6.375%	January 22, 2078	73.88	8.19%

Source: Bloomberg

Among them, Fifth Third Bancorp 5.10% due December 31, 2049, trades at 101.65 with a yield to maturity of 4.87%, the Viacom 6.25% due February 28, 2057 trades at 109.16 for a 5.4% YTM, and Buckeye Partners 6.375% due January 22, 2078 trades at 73.88 for a YTM of 8.19%.

The reason for the higher Buckeye Partners yield is that pipelines are confined to a geographical area, and when production switches to another area—as when production moves from the Marcellus Shale to the Permian Basin—less throughput flows in that pipeline. It becomes more difficult to pay the fixed charges on the outstanding debt, and credits such as that become somewhat questionable. That is why it is a high-yield bond.

The St. Louis Federal Reserve provides some interesting statistics on the M2 Money Supply. As per this organization, on April 22, 2019, the M2 Money Supply was \$14.516 trillion (seasonally adjusted). On November 11—the last day for which we have statistics at this time—the M2 Money Supply was announced as \$15.296 trillion, which reflects a 5.37% increase in just over six months. If this rate of increase continues, at some point it will seriously disturb the bond market.

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<sup>2</sup> *The Logical Consequences of the Income Famine*, Fixed Income Contrarian Compendium, May 2016.

## *Featured Companies*

### BROOKFIELD RESIDENTIAL PROPERTIES (BRP)

Brookfield Residential 6.25% bonds mature on September 29, 2027, and they trade at 103.75 for a 5.625% YTM. Although Brookfield Residential is a member of the high-yield index, it is a conservatively-financed home developer. All of the equity is owned by Brookfield Asset Management, which has a very substantial balance sheet and liquidity. Several years ago, the company was publicly traded. The equity market, however, never gave the company a valuation commensurate with what the company believed was its normalized return on equity. Consequently, Brookfield Asset Management acquired the public's minority interest.

As a home developer, Brookfield Residential's earnings are cyclical. It is possible and actually quite likely that in a housing recession, the company will operate at a loss. In the present 2019 fiscal year, it is likely that the company will generate an approximate 6.5% return on equity.

The balance sheet holds \$64 million of cash and more than \$2 billion of debt against a hard book value attributable to the company of \$1.8 billion. In the present environment, a 5.625% yield to maturity is very good for a clearly cyclical company with that volume of credit.

Ultimately, the bulk of the assets are invested in land inventory, because the company's business strategy is to not build homes as much as it is to buy land at weak points in the economic cycle, develop the land in preparation for building homes, and in many instances, sell the land to other entities wishing to build homes. The risk is that the land might decline in value during an economic downturn.

The carrying value of the land in both consolidated and unconsolidated subsidiaries on the Brookfield Residential balance sheet is approximately \$4.55 billion. A 35% drop in land value during a downturn, and the associated balance sheet write-down, would potentially efface 90% of shareholders' equity, which is why Brookfield is a high-yield credit.

The maturity schedule of the corporate debt is fairly well distributed. There is \$500 million of unsecured corporate debt maturing in July 2022; \$189 million, in May 2023; \$350 million, in May 2025; and \$600 million maturing in September 2027.

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Table 3: Maturity Schedule of Corporate Debt

<u>Unsecured Notes</u>	<u>Notes Due</u>
\$500	July 1, 2022
189	May 15, 2023
350	May 15, 2025
600	September 15, 2027

*Source: Company filings*

The \$600 million of unsecured notes due September 23, 2019 was recently refinanced by the 2027 notes that are now on the balance sheet.

The \$600 million of unsecured notes due September 23, 2019 was recently refinanced by the 2027 notes that are now on the balance sheet. It is reasonable to expect a refinancing of the 2022 notes in the not too distant future, and the company will have a well-timed maturity schedule until 2025.

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# FIXED INCOME & CRYPTOCURRENCY COMPENDIUM

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## ALLY FINANCIAL INC. (ALLY)

The Ally Financial 5.125% bonds due September 30, 2024, yield 3.0% to maturity. Investors are advised to sell those bonds short—not the stock, which possibly should be sold short as well. (That’s a topic for another report.)

Ally Financial is an automobile finance company with a small mortgage finance business. Recently, about 33% of customer auto finance originations were below prime credit quality or, in industry terms, subprime. In the modern parlance, subprime borrowers are further divided into Near-Prime, Non-Prime, and Sub-Prime, whereas historically anything that was not prime was considered to be subprime.

At present, this is not problematic for Ally. Delinquent contracts exceed \$2 billion out of a total loan balance of \$129 billion. In a typical recent quarter, net charge-offs approach—but do not exceed—\$200 million. Provision for loan losses is at a similar level. With these statistics, the subprime default rate is manageable relative to performing loans. The extremely high interest rates charged on such loans gives the company a high spread against the more traditional banking deposits that form an increasingly larger part of the funding base.

In aggregate Ally’s retail auto loans now have a 6.58% net interest margin. Hence, the company is extremely profitable and can continue to build tangible equity while repurchasing stock.

Total assets are now at the level of \$180 billion, while total equity equals \$14.3 billion. Hence, equity is 7.94% of total assets. One year ago, total assets were \$171 billion, and total equity was \$13.139 billion. The ratio of equity to assets was then 7.68%. Thus, the balance sheet is now somewhat stronger.

A very modest expansion of loan loss, however, would render the company unprofitable. The auto finance business earns \$459 million per quarter on a pretax basis.

A total of 0.73% of all loans are nonperforming, resulting in \$200 million of bad debt expense quarterly. Although a 2.20% nonperforming balance might generate as much as \$600 million of bad debt expense, a 2.20% nonperforming rate is quite good compared to the magnitude of the subprime loans carried by Ally Financial.

Bad debt of that size would be sufficient to render Ally Financial a questionable credit and would be reflected in the price of the company’s bonds. On the other hand, if creditworthiness does not deteriorate, only a very modest expense for holding these bonds in a short sale position is required. This bond is effectively a five-year put option on subprime auto loans, with a 3% annual premium.



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# FIXED INCOME & CRYPTOCURRENCY COMPENDIUM

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## NETFLIX, INC. (NFLX)

Netflix 5.375% bonds due November 15, 2029, which should be sold, have a yield to maturity of 4.79% at this time. Netflix is the overwhelmingly dominant video streaming company worldwide. It faced minimal competition until recently, when it began to encounter incursions from Disney and Apple. Although it is early to render a reasoned judgment, the marketplace appears to be rather unimpressed with the Apple competitive offering thus far. The Disney offering, known as Disney Plus, appears to be more impressive. So far, the new content is not close to the quantity offered by Netflix, although that differential will almost certainly change. In 2020, Netflix will be forced to compete with AT&T and Comcast, as well.

All competitors must spend large sums on new original content. Apple certainly has the balance sheet and cash flow to spend enormous sums of money, as is true of Disney. Although Netflix reports GAAP income approaching \$2 billion in 2019, it is actually cash flow negative by more than \$500 million of cash flow per quarter, or over \$2 billion per annum. There is a reasonable chance that Netflix will be forced to spend additional capital.

An increase in Netflix spending is necessary because Apple, Disney, Comcast, and AT&T will bid for competitive talent in the creative field, increasing the expense for scripts, production, and actors. Netflix proposes to use the high-yield bond market as its funding source. This is potentially problematic because, to place the scale of these companies' financial capabilities in context, Netflix's annual negative cash flow of \$2 billion is less than the annual interest income that Apple receives on its cash balance.

It should not escape notice that Apple and Disney have determined to compete with Netflix on price, charging approximately 50% of the Netflix subscription fee. If these competing firms eventually attain meaningful market share, Netflix could be compelled to lower prices. Netflix, as now configured, produces a 19.3% pretax margin. A 19.3% price reduction—if all other variables remain unchanged—would reduce Netflix to a breakeven level on a GAAP basis.

This reduction would surely influence the price of Netflix debt. Netflix has \$6.9 billion of shareholders' equity and \$12.4 billion of debt. The financial pressures that its larger competitors exert on Netflix would be exacerbated by its proposal to borrow substantially more money and thus further erode its balance sheet ratios.

Consequently, if Netflix is successful, it will have a more leveraged balance sheet, and its bonds should trade at a higher yield. If it is not successful, it will have a much more leveraged balance sheet, and the bonds should trade at a much higher yield. In extremis, Apple, Disney, Comcast, and AT&T could collectively damage the Netflix franchise. At a 4.97% YTM, the bonds are a low-risk short sale—effectively a put option on Netflix.

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# FIXED INCOME & CRYPTOCURRENCY COMPENDIUM

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## DEUTSCHE BANK AG (DB)

Deutsche Bank 4.875% bonds due December 1, 2032, trade at \$89.92 and have a yield to maturity of 5.75%. Deutsche Bank is arguably the most problematic of the large global banks. It is not profitable. Some of its challenges relate to expense management. The more serious—and potentially fatal—matters involve loan quality and poor capitalization ratios.

Viewed from the perspective of a potential investor, the bank is inscrutable. One might suspect a host of loan-related difficulties; however, the bank is not forthcoming with specific information about them. The most serious issue involves capital ratios. The bank has €1.5 trillion in total assets and only €4.6 billion in shareholders' equity.

The European Union or the German government—or perhaps some other multilateral financial institution—could, in principle, recapitalize Deutsche Bank. The problem is that the Italian banks, the Greek banks, a variety of German and Spanish banks, and many others require recapitalization, which a variety of laws seemingly forbids. An aggregate recapitalization is beyond the means of the system without massive money creation. Although this would solve the matter of bank recapitalization, it would create other very serious challenges.

It is no exaggeration to state—at least theoretically—that, in the light of its balance sheet, Deutsche Bank as an institution is in existential peril. If this theory is accurate, why do Deutsche Bank bonds yield only 5.75% to maturity? The answer is that no one can conceive of a circumstance in which governments would allow Deutsche Bank to actually become insolvent. The problems created merely by derivative collateral posts in a default would be unimaginable.

Consequently, the Deutsche Bank bonds are not merely a put option on the creditworthiness of the Deutsche Bank. These bonds are actually a put option on the banking system in which Deutsche Bank operates. Deutsche Bank stock itself has a €6.7 billion market capitalization and trades at almost one-quarter of book value. The stock market does not place much faith in the value of the Deutsche Bank book value.

A bank that trades at one-quarter of book value should not have bonds that yield 5.75%. The bank is obviously existentially challenged. Ultimately, the yield on the bonds will reflect the existential challenges of the bank, even if the bank does not succumb to its problems. The bonds are a ten-year put option on the creditworthiness of Deutsche Bank and of the system in which it operates. The 5.75% yield to maturity is merely the inexpensive annual put option premium.

## *Post-Musings*

### WHY WOULD ANYONE PURCHASE A 100-YEAR BOND?

The fee pressure from indexation not only upon passive management but also upon active management in bonds is inexorable. The only way to become profitable is to raise a large sum of money and achieve economies of scale; however, the only way to raise a large sum of money is to outperform the competitors.

Outperforming competitors is more difficult in bonds than in stocks. The difference between first-quartile and third-quartile performance in bonds is generally only a handful of basis points. Any bond that offers a handful of basis points yield advantage is considered to be very attractive.

The problem is that any bond that active managers choose to purchase will trade. Any bond that trades will be included in the bond indexes against which the managers are compared. This creates natural index buying, since the indexes almost always receive funds inflow. Hence, the active managers must overweight the yield advantaged bonds to have any chance of outperforming the index.

Consequently—if one even wondered—this is how the Republic of Argentina 7.125% dollar denominated debt due June 28, 2117 was able to enter the index. The problem is that the bonds now trade at 42 cents on the dollar. These bonds are an exception. Increasing numbers of ultra-long maturity debt are entering the system, creating a type of risk that did not exist in the world of bonds since the idea of indexation was created.

*Q:* The U.S. Treasury is considering selling long-term bonds, like 50-year bonds, right?

*A:* So would I, if I were the Treasury. Little by little—or maybe not so little by little—the maturity length on new issuance is expanding, as you would expect borrowers to do when interest rates are at all-time lows. The creditors—they being, nowadays, the index funds—have no alternative except to continue purchasing whatever is offered. If you compare the interest rate on 100-year bonds with the rate on money market funds, the difference is not sizeable. If you wonder why investors do it, now you have the answer. They—the investors being represented by index funds—are in the business of *raising* money, not in the business of *making* money. It's all relative.

You could earn 1.5% interest in the money market as opposed to the amount of money you could have earned by buying longer-dated debt that has appreciated roughly 18% year to date.

# FIXED INCOME & CRYPTOCURRENCY COMPENDIUM

## WEALTH INDEX (Ticker: RCH Index)

As of September 30, 2019

<u>Annualized Total Return</u>	<u>1 Year</u>	<u>3 Years</u>	<u>5 Years</u>	<u>7 Years</u>	<u>10 Years</u>	<u>15 Years</u>	<u>20 Years</u>	<u>Since Incep. 1991 - Sep '19</u>
Wealth Index	-5.04%	8.38%	6.41%	10.66%	12.48%	10.52%	8.53%	12.18%
S&P 500	4.25%	13.39%	10.84%	13.26%	13.24%	9.01%	6.33%	10.21%
S&P 500 Eq. Wgt.	3.40%	11.05%	9.46%	13.14%	13.41%	9.97%	9.24%	11.90%
Russell 3000	2.92%	12.83%	10.44%	13.00%	13.08%	9.10%	6.72%	10.35%
Russell 2000	-8.89%	8.23%	8.19%	10.43%	11.19%	8.19%	7.99%	10.39%
Excess Return vs. S&P 500	-9.29%	-5.02%	-4.42%	-2.60%	-0.76%	1.51%	2.19%	1.98%
Excess Return vs. S&P 500 Eq. Wgt.	-8.44%	-2.67%	-3.04%	-2.49%	-0.93%	0.54%	-0.72%	0.28%
Excess Return vs. Russell 3000	-7.95%	-4.46%	-4.03%	-2.35%	-0.60%	1.42%	1.80%	1.83%
Excess Return vs. Russell 2000	3.85%	0.15%	-1.77%	0.22%	1.29%	2.33%	0.53%	1.79%

\*Note: Calculated Using Total Returns

<u>Risk Adjusted Return</u>	<u>1 Year</u>	<u>3 Years</u>	<u>5 Years</u>	<u>7 Years</u>	<u>10 Years</u>	<u>15 Years</u>	<u>20 Years</u>	<u>Since Incep. 1991 - Sep '19</u>
Wealth Index	(0.21)	0.53	0.42	0.74	0.79	0.56	0.40	0.61
S&P 500	0.23	1.10	0.91	1.19	1.06	0.65	0.43	0.72
S&P 500 Eq. Wgt.	0.16	0.84	0.75	1.11	0.97	0.62	0.56	0.76
Russell 3000	0.15	1.02	0.86	1.14	1.01	0.64	0.45	0.72
Russell 2000	(0.36)	0.48	0.51	0.68	0.65	0.44	0.41	0.56

\*Note: Calculated As Annualized Total Return Divided By Annualized Total Return Volatility (Uses Monthly Total Returns)

<u>Information Ratio</u>	<u>1 Year</u>	<u>3 Years</u>	<u>5 Years</u>	<u>7 Years</u>	<u>10 Years</u>	<u>15 Years</u>	<u>20 Years</u>	<u>Since Incep. 1991 - Sep '19</u>
Wealth Index vs. S&P 500	(1.33)	(0.70)	(0.65)	(0.40)	(0.12)	0.18	0.21	0.20
Wealth Index vs. S&P 500 Eq. Wgt.	(1.89)	(0.54)	(0.61)	(0.53)	(0.20)	0.10	(0.08)	0.03
Wealth Index vs. Russell 3000	(1.30)	(0.71)	(0.67)	(0.42)	(0.11)	0.19	0.19	0.21
Wealth Index vs. Russell 2000	1.07	0.03	(0.32)	0.04	0.22	0.34	0.05	0.18

\*Note: Calculated As Annualized Excess Total Return Divided By Annualized Excess Total Return Volatility (Uses Monthly Excess Total Returns)

### Wealth Index Batting Average

	<u>Roll 1 Year</u>	<u>Roll 3 Year</u>	<u>Roll 5 Year</u>
vs. S&P 500	53.89%	57.42%	60.14%
vs. S&P 500 Eq. Wgt.	53.89%	51.29%	51.05%
vs. Russell 3000	55.99%	57.42%	64.69%
vs. Russell 2000	56.59%	61.29%	68.53%

\*Note: Calculated Using Total Returns

<u>Annualized Volatility</u>	<u>1 Year</u>	<u>3 Years</u>	<u>5 Years</u>	<u>7 Years</u>	<u>10 Years</u>	<u>15 Years</u>	<u>20 Years</u>	<u>Since Incep. 1991 - Sep '19</u>
Wealth Index	24.29%	15.75%	15.18%	14.32%	15.84%	18.49%	21.39%	19.95%
S&P 500	18.75%	12.18%	11.93%	11.10%	12.55%	13.81%	14.59%	14.11%
S&P 500 Eq. Wgt.	20.90%	13.20%	12.59%	11.84%	13.74%	16.07%	16.54%	15.62%
Russell 3000	19.48%	12.54%	12.17%	11.38%	12.97%	14.30%	14.94%	14.37%
Russell 2000	24.87%	17.21%	16.16%	15.40%	17.29%	18.64%	19.54%	18.53%

\*Note: Calculated Using Total Returns

<u>Annualized Tracking Error</u>	<u>1 Year</u>	<u>3 Years</u>	<u>5 Years</u>	<u>7 Years</u>	<u>10 Years</u>	<u>15 Years</u>	<u>20 Years</u>	<u>Since Incep. 1991 - Sep '19</u>
vs. S&P 500	7.00%	7.13%	6.85%	6.51%	6.53%	6.29%	10.37%	9.76%
vs. S&P 500 Eq. Wgt.	4.47%	4.93%	4.96%	4.69%	4.68%	5.46%	9.46%	8.75%
vs. Russell 3000	6.10%	6.25%	6.00%	5.64%	5.67%	7.43%	9.58%	8.94%
vs. Russell 2000	3.60%	5.13%	5.55%	5.33%	5.80%	6.84%	10.70%	9.85%

\*Note: Calculated Using Total Returns

<u>Wealth Index Beta</u>	<u>1 Year</u>	<u>3 Years</u>	<u>5 Years</u>	<u>7 Years</u>	<u>10 Years</u>	<u>15 Years</u>	<u>20 Years</u>	<u>Since Incep. 1991 - Sep '19</u>
vs. S&P 500	1.27	1.16	1.15	1.16	1.16	1.24	1.32	1.26
vs. S&P 500 Eq. Wgt.	1.15	1.14	1.15	1.15	1.11	1.12	1.17	1.16
vs. Russell 3000	1.23	1.16	1.16	1.17	1.15	1.22	1.32	1.27
vs. Russell 2000	0.97	0.87	0.88	0.87	0.86	0.94	0.95	0.94

\*Note: Calculated Using Total Returns

<u>Calendar Year Total Returns</u>	<u>Wealth Index</u>	<u>S&amp;P 500</u>	<u>S&amp;P 500 Eq. Wgt.</u>	<u>Russell 3000</u>	<u>Russell 2000</u>	<u>ER v. SP500</u>	<u>ER v. SP500 EW</u>	<u>ER v. R3000</u>	<u>ER v. R2000</u>
1991	44.25%	30.47%	35.51%	33.68%	46.04%	13.78%	8.73%	10.57%	-1.80%
1992	20.20%	7.62%	15.63%	9.59%	18.41%	12.58%	4.56%	10.61%	1.79%
1993	3.38%	10.08%	15.12%	10.86%	18.88%	-6.70%	-11.75%	-7.50%	-15.50%
1994	0.33%	1.32%	0.95%	0.19%	-1.82%	-0.99%	-0.62%	0.14%	2.15%
1995	31.31%	37.58%	32.03%	36.80%	28.45%	-6.27%	-0.72%	-5.49%	2.86%
1996	23.09%	22.96%	19.02%	21.82%	16.49%	0.13%	4.06%	1.27%	6.59%
1997	27.31%	33.36%	29.05%	31.78%	22.36%	-6.06%	-1.74%	-4.48%	4.94%
1998	24.95%	28.58%	12.19%	24.14%	-2.55%	-3.63%	12.76%	0.81%	27.49%
1999	44.68%	21.04%	12.03%	20.90%	21.26%	23.64%	32.66%	23.78%	23.43%
2000	-19.16%	-9.10%	-9.64%	-7.46%	-3.02%	-10.06%	-28.80%	-11.70%	-16.14%
2001	-10.80%	-11.89%	-0.39%	-11.46%	2.49%	1.08%	-10.41%	0.65%	-13.29%
2002	-15.49%	-22.10%	-18.18%	-21.54%	-20.48%	6.61%	2.69%	6.05%	4.99%
2003	45.41%	28.68%	40.97%	31.06%	47.25%	16.72%	4.44%	14.35%	-1.85%
2004	17.97%	10.88%	16.95%	11.95%	18.33%	7.09%	1.02%	6.02%	-0.36%
2005	3.20%	4.91%	8.06%	6.12%	4.55%	-1.61%	-4.74%	-2.82%	-1.25%
2006	22.61%	15.79%	15.80%	15.71%	18.37%	6.81%	6.81%	6.89%	4.24%
2007	1.73%	5.49%	1.53%	5.14%	-1.57%	-3.76%	0.20%	-3.41%	3.30%
2008	-43.67%	-37.00%	-39.72%	-37.31%	-33.79%	-6.68%	-3.95%	-6.37%	-9.89%
2009	72.80%	26.46%	46.31%	28.34%	27.17%	46.33%	26.49%	44.46%	45.62%
2010	31.51%	15.06%	21.91%	16.93%	26.85%	16.45%	9.60%	14.58%	4.65%
2011	5.11%	2.11%	-0.11%	1.03%	-4.18%	3.00%	5.22%	4.09%	9.29%
2012	13.53%	16.00%	17.65%	16.42%	16.35%	-2.48%	-4.13%	-2.89%	-2.82%
2013	41.08%	32.39%	36.16%	33.55%	38.82%	8.69%	4.92%	7.53%	2.25%
2014	7.06%	13.49%	14.49%	12.56%	4.89%	-6.63%	-7.43%	-5.50%	2.17%
2015	-6.87%	1.38%	-2.20%	0.48%	-4.41%	-8.26%	-4.67%	-7.35%	-2.46%
2016	16.85%	11.96%	14.80%	12.74%	21.31%	4.89%	2.05%	4.12%	-4.45%
2017	19.44%	21.83%	18.90%	21.13%	14.65%	-2.39%	0.54%	-1.69%	4.80%
2018	-13.80%	-4.38%	-7.64%	-5.24%	-11.01%	-9.42%	-5.16%	-8.54%	-2.79%
2019 YTD	17.00%	20.55%	20.10%	20.09%	14.18%	-3.56%	-3.11%	-3.10%	2.82%

\*Note: Calculated Using Total Returns

Source: Horizon Kinetics LLC, International Securities Exchange, Bloomberg  
See important disclosures for additional information.

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# FIXED INCOME & CRYPTOCURRENCY COMPENDIUM

Index Constituent Changes: 1. Nuveen Investments Inc (JNC US) was delisted from the US Security Exchange effective 11/14/2007 and has been removed from the index. 2. Alliance Financial Corp (ALNC US) was delisted from US Security Exchange effective 03/11/2013 and has been removed from the index. The divisor has been adjusted accordingly for each of these changes. 3. Fortress Investment Group (FIG US) was delisted from US Security Exchange effective 12/27/2017 and has been removed from the index.

## Money Manager Index

From Aug 1983 to November 2019

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr. End	Index	Yearly return	Annualized return (since inception)
1983								1.00	0.81	0.76	0.87	0.75	1983	0.75	(60.5)%	(50.2)%
1984	0.75	0.71	0.70	0.66	0.67	0.67	0.61	0.83	0.79	0.76	0.67	0.65	1984	0.65	(13.5)%	(26.5)%
1985	0.92	0.93	0.99	0.95	1.20	1.30	1.32	1.38	1.28	1.50	1.86	2.02	1985	2.02	211.8%	33.7%
1986	2.46	2.78	2.47	2.31	2.36	2.33	2.03	2.23	1.98	2.37	2.34	2.34	1986	2.34	15.9%	28.2%
1987	3.21	3.27	3.16	2.55	2.37	2.30	2.39	2.47	2.22	1.56	1.44	1.52	1987	1.52	(35.0)%	9.9%
1988	1.80	1.87	1.79	1.79	1.69	1.94	1.92	1.96	2.01	1.97	1.95	2.07	1988	2.07	36.0%	14.3%
1989	2.42	2.37	2.54	2.63	2.64	2.64	2.93	3.12	3.07	3.05	3.23	3.26	1989	3.26	57.8%	20.2%
1990	3.12	3.15	3.53	3.06	3.47	3.45	3.30	2.70	2.68	2.40	2.52	3.02	1990	3.02	(7.3)%	16.1%
1991	3.08	3.49	3.70	3.68	3.71	3.61	3.86	4.05	4.07	4.69	4.47	5.72	1991	5.72	89.4%	23.0%
1992	5.76	5.61	5.30	5.12	4.98	4.99	5.93	6.06	6.19	6.56	7.25	7.36	1992	7.36	28.6%	23.6%
1993	8.06	8.04	8.20	7.94	8.15	8.57	9.05	10.00	9.99	9.31	8.97	8.90	1993	8.90	21.0%	23.4%
1994	9.52	8.73	8.05	7.85	7.81	7.53	7.66	8.31	8.15	8.52	7.88	7.95	1994	7.95	(10.6)%	19.9%
1995	7.74	8.38	8.72	8.77	9.20	9.35	9.93	10.78	11.22	10.53	10.89	10.40	1995	10.40	30.8%	20.8%
1996	11.12	11.50	11.33	11.62	11.86	12.53	11.91	12.36	13.32	14.03	14.42	15.02	1996	15.02	44.4%	22.4%
1997	16.04	16.81	15.32	17.27	18.42	20.29	22.28	21.39	25.31	24.95	24.95	25.50	1997	25.50	69.8%	25.2%
1998	25.67	29.00	29.89	30.60	28.90	30.44	27.67	21.33	21.74	25.16	27.27	25.41	1998	25.41	(0.4)%	23.3%
1999	26.00	23.71	23.92	26.77	28.94	29.74	28.78	26.74	25.89	27.73	28.54	30.55	1999	30.55	20.2%	23.2%
2000	31.07	31.19	36.01	35.60	35.20	40.32	43.58	45.75	45.62	48.69	44.05	49.84	2000	49.84	63.1%	25.2%
2001	50.23	46.41	44.27	46.96	48.90	49.98	50.67	49.70	46.47	44.81	48.04	51.91	2001	51.91	4.2%	23.9%
2002	53.62	53.74	55.11	52.52	52.83	50.48	42.58	44.92	41.54	42.66	45.78	43.17	2002	43.17	(16.8)%	21.4%
2003	42.72	41.18	42.36	45.98	49.02	50.71	53.47	53.97	53.46	56.12	55.83	58.49	2003	58.49	35.5%	22.1%
2004	64.38	65.08	64.63	61.68	60.86	62.30	58.71	64.08	65.73	68.86	73.53	78.16	2004	78.16	33.6%	22.6%
2005	76.46	77.94	74.06	72.83	77.02	80.25	83.59	83.07	86.03	89.19	96.58	97.35	2005	97.35	24.6%	22.7%
2006	107.62	111.44	110.75	111.88	101.89	100.61	100.62	104.98	114.61	116.64	113.78	118.05	2006	118.05	21.3%	22.6%
2007	125.73	123.77	122.62	127.58	133.57	134.68	126.61	124.07	133.57	148.09	135.13	135.56	2007	135.56	14.8%	22.3%
2008	127.53	115.76	115.94	121.58	130.51	115.68	119.94	120.55	109.69	72.70	62.95	67.91	2008	67.91	(49.9)%	18.1%
2009	57.51	51.76	65.63	79.49	85.67	90.79	99.97	101.69	107.32	107.36	110.94	115.01	2009	115.01	69.4%	19.7%
2010	106.84	110.32	118.13	114.91	100.18	88.17	97.65	89.64	103.59	108.29	108.64	119.58	2010	119.58	4.0%	19.1%
2011	122.80	128.28	127.94	127.97	126.06	121.03	115.49	104.25	91.32	102.44	103.79	103.98	2011	103.98	(13.1)%	17.8%
2012	109.46	120.12	125.37	121.64	108.44	114.12	113.56	118.33	123.18	127.91	131.76	135.00	2012	135.00	29.8%	18.1%
2013	151.20	155.13	165.52	166.55	174.89	164.20	179.01	168.47	176.12	192.14	197.16	208.44	2013	208.44	54.4%	19.2%
2014	194.17	196.87	203.88	196.24	195.40	206.41	194.00	207.06	201.07	205.28	212.28	215.25	2014	215.25	3.3%	18.6%
2015	203.96	217.70	215.97	218.17	217.01	211.12	203.85	184.77	175.53	195.50	198.54	181.68	2015	181.68	(15.6)%	17.4%
2016	165.64	164.85	183.47	190.06	194.22	177.37	187.78	190.19	185.87	173.66	194.88	199.52	2016	199.52	9.8%	17.2%
2017	196.14	209.63	205.70	207.52	210.37	221.66	230.87	225.39	239.74	245.52	261.47	264.79	2017	264.79	32.7%	17.6%
2018	278.34	266.70	266.44	253.48	256.42	243.56	250.69	238.98	234.72	209.04	213.62	194.43	2018	194.43	(26.6)%	16.0%
2019	203.57	219.59	213.65	234.81	206.43	229.48	229.27	210.59	223.22	225.90	239.32		2019	239.32	23.1%	16.3%

S.No.	Ticker	Name	Amount Invested	Shares Purchased	Date of Investment	Current Index Value
1	AMG US Equity	Affiliated Manager	\$22,947	1,377	11/30/1997	\$ 117,979
2	BLK US Equity	BlackRock	\$23,205	1,658	9/30/1999	\$ 820,320
3	WDR US Equity	Waddell & Reed	\$27,513	1,587	3/31/1998	\$ 25,635
4	EV US Equity	Eaton Vance	\$2,641	3,998	1/31/1986	\$ 188,604
5	TROW US Equity	T. Rowe Price	\$2,423	2,014	4/30/1986	\$ 248,831
6	BEN US Equity	Franklin resources	\$908	1,263	4/30/1985	\$ 104,171
7	LM US Equity	Legg Mason	\$1,000	462	8/31/1983	\$ 18,062
8	FII US Equity	Federated Inv	\$26,381	2,206	5/31/1998	\$ 74,543
9	PZN US Equity	Pzena Investment Management	\$122,426	6,317	10/31/2007	\$ 56,159

# FIXED INCOME & CRYPTOCURRENCY COMPENDIUM

Index Constituent Changes: 1.New Star Asset Management (NSAM LN) was delisted from the London Security Exchange effective 03/10/2009 and has been removed from the index. 2. Australia Wealth Management (AUW AU) was delisted from Australian Security Exchange effective 05/18/2009 and has been removed from the index. 3. Bluebay Asset Management/UNI (BBAY LN) was delisted from the London Security Exchange effective 12/20/2010 and has been removed from the index. 4.Everest Financial Group Limited (EFG AU) was delisted from the Australian Security Exchange effective 7/19/2011 and has been removed from the index. 5. RAB Capital Plc (RAB LN) was delisted from the London Security Exchange effective 9/2/2011 and has been removed from the index. 6. Invista Real Estate (INRE LN) was delisted effective 8/13/2012 and has been removed from the index. 7. F&C Asset Management Plc (FCAM LN) was delisted effective 5/8/2014 and has been removed from the index. 8. Charlemagne Capital Ltd (CCAP LN) was delisted effective 12/14/2016 and has been removed from the index.The divisor has been adjusted accordingly for each of these changes. 9. Henderson Group Plc (HGG LN) was delisted from London Security Exchange effective 5/30/2017 and has been removed from the index. 10. Aberdeen Asset Management Plc (ADN LN) was delisted from London Stock Exchange effective 8/14/2017 and has been removed from the Index.

## International Money Manager Index

From Nov 1986 to November 2019

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr. End	Index	Yearly return	Annualized return (since inception)
1986											1.00	1.02	1986	1.02	10.0%	10.0%
1987	1.25	1.37	1.48	1.48	1.37	1.33	1.39	1.40	1.33	0.81	0.76	0.73	1987	0.73	(27.7)%	(23.3)%
1988	0.75	0.92	1.02	0.95	0.80	0.89	0.88	0.82	0.86	0.88	0.89	0.93	1988	0.93	26.4%	(3.4)%
1989	1.03	1.02	1.06	1.17	1.19	1.18	1.25	1.16	1.17	1.20	1.21	1.28	1989	1.28	37.8%	8.1%
1990	1.24	1.24	1.18	1.19	1.22	1.24	1.26	1.26	1.23	1.24	1.25	1.33	1990	1.33	3.7%	7.0%
1991	1.34	1.52	1.56	1.58	1.57	1.47	1.52	1.64	1.81	1.89	1.94	1.92	1991	1.92	44.8%	13.5%
1992	2.01	1.93	1.88	2.14	2.19	2.13	2.08	1.99	1.95	2.14	1.77	1.96	1992	1.96	1.9%	11.5%
1993	1.98	2.03	2.20	2.39	2.42	2.45	2.54	3.05	3.01	3.07	3.01	3.30	1993	3.30	68.7%	18.1%
1994	3.72	3.39	3.17	3.04	2.99	2.89	3.01	3.14	3.13	3.19	3.15	3.15	1994	3.15	(4.7)%	15.1%
1995	3.07	3.12	3.28	3.41	3.56	3.59	3.87	3.76	3.76	3.77	3.70	3.73	1995	3.73	18.6%	15.4%
1996	3.76	3.85	3.70	3.79	3.96	3.90	3.75	3.96	4.16	4.47	4.90	4.86	1996	4.86	30.3%	16.8%
1997	5.11	5.37	4.99	4.96	5.43	5.94	6.57	6.32	7.45	7.24	6.80	7.19	1997	7.19	47.9%	19.3%
1998	7.12	8.05	8.78	9.25	8.95	8.74	8.91	6.67	6.08	7.01	7.51	7.71	1998	7.71	7.3%	18.3%
1999	7.99	8.21	8.68	9.07	8.71	8.61	8.63	8.43	8.47	8.79	9.80	10.79	1999	10.79	39.9%	19.8%
2000	11.23	12.27	13.95	13.50	13.73	15.39	15.85	16.82	17.07	16.31	14.43	16.76	2000	14.43	33.8%	20.7%
2001	17.42	15.88	13.46	15.14	15.84	15.15	14.21	13.61	10.77	11.43	13.90	14.12	2001	14.12	(2.2)%	19.1%
2002	14.74	13.78	15.09	15.11	16.38	14.14	12.92	12.10	11.23	11.06	11.33	10.50	2002	10.50	(25.6)%	15.7%
2003	10.18	9.52	9.69	10.62	12.17	13.04	13.98	15.38	16.67	17.88	18.16	18.07	2003	18.07	72.1%	18.4%
2004	20.00	22.41	29.98	35.46	26.68	30.80	25.37	25.20	23.67	23.34	27.56	31.48	2004	31.48	74.2%	20.9%
2005	32.19	32.57	31.88	27.79	27.36	29.05	30.38	31.49	33.39	32.24	32.95	37.18	2005	37.18	18.1%	20.8%
2006	41.01	40.97	43.69	46.45	42.39	41.58	40.60	43.32	43.55	43.70	44.58	49.38	2006	49.38	32.8%	21.3%
2007	50.95	51.18	53.59	56.09	58.16	56.37	53.90	48.65	50.96	57.03	48.21	45.75	2007	45.75	(7.3)%	19.8%
2008	38.71	39.71	38.59	40.18	39.25	35.10	34.59	33.33	26.09	18.72	14.50	15.79	2008	15.79	(65.5)%	13.3%
2009	14.62	13.24	14.96	19.63	22.82	23.73	26.14	27.05	28.41	28.53	28.69	29.83	2009	29.83	89.0%	15.8%
2010	28.50	27.58	29.90	29.58	25.53	24.72	27.82	26.74	30.36	33.68	31.85	34.52	2010	34.52	15.7%	15.8%
2011	34.91	36.17	36.51	39.63	37.86	35.31	35.83	32.76	29.28	32.04	31.23	30.59	2011	30.59	(11.4)%	14.56%
2012	32.12	34.36	35.67	35.08	31.03	32.92	32.66	34.17	36.33	37.28	38.11	40.73	2012	40.73	33.1%	15.22%
2013	43.61	42.58	44.42	49.29	50.40	47.75	50.58	49.32	52.49	55.65	55.41	58.88	2013	58.88	44.6%	16.19%
2014	55.35	58.98	61.86	59.92	59.05	59.89	57.84	58.64	55.47	54.37	55.77	54.31	2014	54.31	(7.8)%	15.24%
2015	52.77	58.87	58.99	62.11	62.25	60.43	60.71	56.91	55.46	60.65	60.93	59.48	2015	59.48	9.5%	15.04%
2016	55.01	53.65	59.90	61.89	61.45	55.81	58.56	58.48	60.83	60.64	58.86	59.91	2016	59.91	0.7%	14.53%
2017	63.15	64.71	65.79	71.50	74.59	75.64	80.02	78.81	81.32	81.68	83.28	84.08	2017	84.08	40.3%	15.28%
2018	94.34	87.65	87.29	86.78	83.38	82.63	84.75	85.31	85.67	76.31	72.64	66.46	2018	66.46	(20.9)%	13.94%
2019	74.78	79.39	81.00	86.52	82.17	91.43	91.77	89.72	89.03	91.00	99.15		2019	99.15	49.2%	14.91%

S.No.	Ticker	Name	Initial Amount Invested	Shares Purchased	Date of Investment	Current Index Value
1	IGM CN Equity	IGM Financial Inc	\$1,000	73	31/11/1986	\$ 2,112
2	IVZ US Equity	Invesco Plc (Previously Amvescap)	\$1,357	1,153	1/31/1991	\$ 10,298
3	SDR LN Equity	Schroders Plc	\$1,208	505	3/31/1991	\$ 21,546
4	RAT LN Equity	Rathbone Brothers Plc	\$1,208	736	3/31/1991	\$ 20,268
5	CIX CN Equity	CI Financial Corp.	\$2,585	3,224	6/30/1994	\$ 50,775
6	EMG LN Equity	Man Group Plc	\$2,862	6,344	10/31/1994	\$ 9,466
7	AGF/B CN Equity	AGF Management Ltd-CI B	\$3,343	1,346	1/31/1996	\$ 6,322
8	8739 JP Equity	Sparx Group Co Ltd	\$11,762	108	12/31/2001	\$ 25,224
9	AZM IM Equity	Azimut Holding Spa	\$21,908	4,977	7/31/2004	\$ 125,673
10	PGHN SW Equity	Partners Group-Reg	\$36,848	578	3/31/2006	\$ 487,949
11	ASHM LN Equity	Ashmore Group Plc.	\$36,688	9,873	10/31/2006	\$ 60,787

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# FIXED INCOME & CRYPTOCURRENCY COMPENDIUM

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