Bitcoin and Saving

As a typical student, you are 40+ years away from retirement. Compare the performance of stocks, bonds, and precious metals over the last 50 years with the performance of Bitcoin and Ethereum since inception. If you would create a basket to save for your retirement, how would the basket look (% of the asset classes)? Make a mini survey in class to find out what your peers actually do today for retirement saving. Make recommendations to them.

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Chapter 1

Introduction

Planing his own retirement can be a difficult task, especially for young students who have not joined the work force yet. But as we all know time passes quickly and so it is essential to plan his retirement savings or investments to secure a comfortable life after retirement. Achieving such a financial freedom in plus 40 years with numerous asset classes to choose from, such as stocks, bonds, precious metals, and now crypto currencies like Bitcoin and Ethereum, makes the decision-making process overwhelming. To support this process, the authors of this report have thought about these issues and, with the help of a research part and a mini survey among our peers, want to provide recommendations.

Chapter 2

Background

Throughout this paper we will adopt the point of view of a student whose investment horizon is 40 years or more. This time horizon allows us to have a higher risk tolerance. None of the following is applicable if your investment horizon is less than 40 years! Although it is pretty difficult to give investment recommendations without knowing the specifics about the investor, we are going to give general investment principles and recommend a portfolio allocation.

Bitcoin and other cryptocurrencies were first regularly mentioned in mainstream media in late 2017 bull market. Due to this lack adoption pre 2018, we are going to elaborat their performance from 2018 onward. [1]

Keeping this report as relevant as possible for the core audience, we will compare the performance of Bitcoin, Ethereum, stocks, commodities and cash (in form of bonds) followed by an analysis of the performance of sample portfolios with and without crypto exposure. Since it is highly unlikely for a student who has not joined the workforce yet to be able to invest in real estate, we will not cover it further. We omit complex investment products like options as well as limited liquidity investments as their usage requires financial literacy the average recipient is unlikely to have. Last but not least, all data discussed is not adjusted to inflation.

Enough with boring preface, let's jump right into it.

2.1 Saving

Before we start to write about different ways of investing money, it is necessary to define the word or action saving. All the definitions we have looked at are quite similar, the only difference is the angle from which saving is defined (e.g. individual vs. nation), and therefore the goals in saving also differ. "Savings are the portion of income that is not spent on consumption goods. From a national perspective, savings are a source of funds that can be invested to generate future production, employment, and consumption. From an individual's perspective, savings are often viewed as a way to accumulate wealth, provide for future needs, and finance large purchases [2]."

Secure financial future through saving.

Now that we have defined saving, we can turn our attention to the different asset classes and their characteristics.

2.2 Asset Classes and their Characteristics

Asset classes are groupings of financial instruments that have similar financial structure, are traded in the same financial markets, behave in the market in similar manner and are subject to the same rules and regulations [3]. This makes it very enticing to consider Bitcoin and Ethereum as a single asset class. However, we are interested in the influence of Bitcoin and Ethereum on our portfolios and will therefore study them separately.

This section serves as a quick reminder of the key characteristics of the asset classes to be discussed. Cryptocurrencies (proxy to Bitcoin and Ethereum) are digital assets that use encryption techniques for security and function as a medium of exchange and have plenty of use-cases [4]. These digital assets exhibit the highest volatility but also the potential for the highest returns, and are not regulated by governments. Stocks are securities that represent ownership in a publicly traded company. Stocks are traded on stock exchanges and one can profit either through a rise in the share price or by receiving dividends. Commodities are tangible assets that are available in physical form like precious metals, oil or agricultural products. Commodities are very sensitive to supply and demand changes, thus showing a potential for high volatility and use as a hedge against inflation. Bonds are debt securities that represent a loan made by an investor to a borrower, typically a corporation or government entity. Bonds have relatively low-risk, low-return, are highly liquid and have a predetermined maturity date [3].

We will consider short-term treasury bills as bonds and thus identify bonds as cash or cash-equivalents. Whenever we speak about bonds one could interchange bond with cash or cash-equivalents.

2.3 Bitcoin

In 2009, Bitcoin (BTC), the digital currency and its decentralized system, was developed. What makes Bitcoin special is its decentralized structure, which distinguishes it from traditional currencies such as the Swiss franc. There is no central controlling authority that regulates the circulation of Bitcoin. Instead, the management and transfer of Bitcoin occurred through a distributed network known as the blockchain. It enables secure, transparent, and low-cost transactions to be carried out worldwide without the involvement of a central authority. The complex encryption of the blockchain also makes it much more difficult to manipulate and counterfeit. The limited amount of Bitcoin that will ever exist, 21 million, makes the digital currency a rare asset that increases in value as demand increases. In addition, its limited quantity is seen as a potential hedge against inflation and thus often considered an attractive investment due to its limitations. [5]

Despite the mentioned advantages, Bitcoin is associated with specific risks. Although it is a decentralized system, speculation and changes in legal situations in different countries can lead to high volatility [6].

2.4 Ethereum

Ethereum is a decentralized computing platform. It was firstly introduced by Vitalik Buterin in 2014 and launched in 2015. The ETH network is based on a flexible and programmable blockchain technology called Ethereum-Blockchain and allows in addition to transactions also developers and users to program smart contracts or diverse kinds of decentralized applications, called DApps. Because of that, the platform is often called the programmable money, because many application examples, like financial products up to digital identity are based on smart contracts. [7]

Transaction or application fees on the Ethereum platform are paid in the Ethereum

coin Ether (ETH). This is also the way validators or controllers are paid for their contribution to the security of the network. The maximum of ETH is not capped as it is with Bitcoin. This makes the price of ETH dependent on supply and demand. This factor, along with the factors mentioned at the end of the Bitcoin section, leads to higher volatility compared to Bitcoin. [8]

Ethereum was introduced and launched as Proof-of-Work (PoW). In the PoW various of miners have to perform multiplex mathematical calculations to validate transactions or to add blocks to the blockchain [8]. These steps are crucial for the high security requirements but extremely time and energy inefficient. Ethereum introduced their new concept of consensus mechanism, the Proof-of-Stake (PoS), to elaburate the problems/inefficiencies from the PoW. The new concepts allow users to have shorter transaction times and it is also more energy efficient, because less validators are used per transaction [9].

Historical Returns by asset class in % [10–14] Asset class 2018 2019 2020 20212022 Avg. Bitcoin -73% 95% 301% 90% -81% 65%142%Ethereum -83% -8% 464%404%-66% Stocks -4% 31%18%28%-18% 11% 7%Commodities -12% 8% -3% 27%15%6%23%0%Precious metals -4% 18%-5% 2%2%0%0%2%1%Bonds Inflation 2%2%1%5%8 % 4%

Risks and Return

We will start this section by comparing historical average returns.

2.5

Table 2.1

Astonishingly, despite turbulent socio-economic circumstances, the past five years averaged returns of traditional asset classes are fairly aligned with the average annual 50-year historical returns, which have been 10% for stocks (S&P 500) [15], 5% for commodities [16], and 3% for bonds [17].

Table 2.1 and the historical return rate of commodities and precious metals validate their inflation-hedging character in a portfolio.

If we compare the historical returns of traditional asset classes with those of BTC and ETH over the past five years, it is obvious that Bitcoin and Ethereum outperformed every asset class. However, there are two flaws: First, we compared different time lines. Nonetheless, the story is similar if we adjust the time lines. The second flaw is that we have to bear in mind that return is a direct consequence of risk, reflecting the old market saying:

There is no free lunch



Figure 2.1

Figure 2.1 clearly shows that cryptocurrencies exhibit much higher daily volatility compared to stocks. Thus, even though Bitcoin and Ethereum provide the possibility of high returns, up to 400% per year, their downside is significantly higher, at almost -83% in 2018. At first glance, this looks like a great trade-off. Let's do some quick math here: If we want to have a 400% gain, our investment needs to quadruple. However, if we want to break even after an 80% loss, our investment has to quintuple! In other words, digital assets can be a valuable addition to one's portfolio and increase one's overall performance; however, in choppy times, we have to acknowledge: The dose makes the poison!

Comparing the past two years performance of Bitcoin and Ethereum, one observes that Ethereum outperformed Bitcoin significantly. This can be explained by another investment principle:



Price is a consequence of utility

Figure 2.2: ETH Price Chart in BTC [18]

Ethereum's use case advantage over the past two years compared with Bitcoin [19] reflects directly in their price development, as seen in Figure 2.2.

Enough with comparing risks. Let's get our hands dirty. What is the best strategy to invest in high-risk, high-return investments like Bitcoin and Ethereum? To answer this question, we rely on one of the many principles every investor should follow:

Try not to be right, avoid being wrong

The following strategy is the reincarnation of this principle. Dollar-cost averaging, or DCA for short, allows us to take emotions out of the equation, ignore current market situations, and make use of the inherent upward bias of our economies. This will certainly not allow us to buy at the best prices, but it will allow us to avoid buying at the worst times.

Example: If we had started buying 10 USD of BTC weekly from January 1, 2018 to December 31, 2022, we would have turned 2.61k USD into 4.12k USD, a return of 58%. For comparison, if we had invested 2.61k USD as a lump sum, we would have received



Figure 2.3: 40-day Correlation plots

a profit of only 500 USD. This calculation can be reproduced using the link [20] in the literature. To make the power of DCA even more intriguing, we point out that the all-time high of BTC in 2022 was 62k USD, and the BTC price crashed over 80% in 2022. Quite fabulous, isn't it?

Finally, we aim to answer the following question: Is there a proxy for Bitcoin and Ethereum, and is there a chance to predict somewhat reliably predict the price movements of crypto currencies? To answer this question, we first look at some correlation plots:

Figure 2.3 shows impressively that cryptocurrencies exhibit a high correlation with the NASDAQ-100. Furthermore, Ethereum shows a strong correlation with Bitcoin. In other words, Bitcoin dictates price movements within the crypto ecosystem. This is of course partly due to its proportionally much higher market cap (Bitcoin's market share of the entire crypto market cap is almost 45% (Fig. 2.4)).



Figure 2.4: Bitcoin Dominance

It is always hard to draw conclusions only based on correlation. Keep in mind that correlation does not equal causation. However, the correlation shown between Tesla stock, the NASDAQ-100, and Bitcoin indicates that investors within these asset classes think similarly, and we feel confident concluding this section with the following thesis:

The macroeconomic situation drives the NASDAQ, and the NASDAQ drives crypto. On-chain data can only be used to predict price changes measured in other cryptocurrencies (e.g., ETH measured in BTC)

2.6 Portfolio Diversification

There are many ways to divide one's portfolio. The investor's creativity has no limits here. Depending on their expertise, time commitment, and desired rate of return, portfolios differ. The authors decided to focus on Bitcoin, Ethereum and Exchange Traded Funds in the next subsections.

2.6.1 Exchange Traded Funds

Stocks are shares of a company, which could be bought by investors. Through buying stocks, the investor is getting a part holder of the company. By owning his share, the investor has a say in decisions. However, buying individual stocks also carries the risk of concentrating too much on one company, which means that the portfolio is not sufficiently diversified. For this reason, many investors choose to buy passively managed Exchange Traded Funds (ETFs). These are medium to high diversified funds and have lower management fees. [6]

ETFs track a broad range of assets from specific regions, industries, or sizes. They are passively managed and known as index funds because they track the market index. This makes them a popular choice for investors who want to diversify their portfolio, as investment decisions are determined by changes in the index. Well-known examples of market indices are the S&P 500, the NASDAQ Composite, the Dow Jones Industrial Average (DJIA) and the Swiss Market Index (SMI). [21]

Index	Number of Stocks
S&P 500	500
NASDAQ	3,000+
DJIA	30
SMI	20

Table 2.2: Number of Stocks in Major Stock Indices [22–25]

2.6.2 Crypto

As we have seen in Chapter 2.5, crypto currencies exhibit extreme price fluctuations in both directions, positive and negative. An immediate follow-up question is: How does investing in cryptocurrency affect portfolio performance, and what is the minimum size of a crypto position needed to make a significant impact on portfolio returns? Additionally, is there a possibility that investing in crypto could have a negative impact on portfolio performance?

The purpose of this section is to understand the impact of crypto on portfolios. To illustrate this impact, it is sufficient to focus on stocks and Bitcoin/Ethereum. Therefore, we have omitted other asset classes like cash or commodities from the following analysis.



Figure 2.5

In Figure 2.5, we have plotted the performance of a portfolio consisting of stocks (MSCI ACWI) and Bitcoin/Ethereum for two possible scenarios. In scenario 1 (blue, orange, green, red and brown portfolio) an investor invested a lump sum at the beginning of 2020, and in scenario 2, an investor used the DCA method to mitigate risk and bought every six months starting in January 2020 (purple portfolio: 71.5% Stocks, 14.25% BTC, 14.25% ETH). It is fairly evident that a portfolio with a cryto position performed significantly better than a portfolio without a crypto position. In numbers, a portfolio consisting only of stocks would have yielded a return of 6% over the past three years, while any other portfolio had a return of at least 20%. Thus, our experiment showed that you should not have zero crypto in your portfolio, but too much crypto might put your portfolio on a roller coaster. We have to acknowledge the fact that our lump-sum crypto portfolios.

profited extremely from the bull run in 2021. If we had invested a lump sum in crypto at the end of 2021, we would have suffered severe losses, and a stock-only portfolio would have been better. What should one do if one wants to invest in cryptocurrencies but the high volatility causes sleepless nights? Lucky for you, as you might have already guessed, there is a solution for this problem named DCA. Our DCA portfolio outperformed a stock only portfolio significantly (a three-year return of 24%) while simultaneously being much less volatile than our lump-sum crypto portfolios. Moreover, our DCA portfolio represents the price development of a stock-only Bitcoin portfolio very well, which is kind of surprising as Bitcoin can be considered a proxy index for the entire crypto ecosystem.

Finally, a portfolio investing in stocks and Ethereum, omitting Bitcoin, would have performed the best. This is in line with what we have expected from Chapter 2.5 and is due to the fact that Ethereum is the smaller coin and thus offers a lot more room for growth, but also significantly higher price fluctuations.

2.6.3 Modern Portfolio Theory

In search of an optimal portfolio, several theories have been around. The Modern Portfolio Theory (MPT) is one that prevailed since 1953 and was originally pioneered by Harry Markowitz. The main goal of this theory is to build a portfolio containing different allocations that in result maximize the performance while taking as less risk as possible. In example this could be the combination of different stocks that follow individual trends. This means that an investor might take a stock which is characteristic for the high returns but also has the downside of higher volatility and combines it with a more stable stock. If two such stocks are combined, they can form a valuable portfolio that yields decent returns with minimal risk. Technically speaking, the stable stock flattens the volatility of the high performing stock, resulting in an overall risk reduction [26].

So far so good but ultimately the challenges of the modern portfolio theory are the selection of the right assets and the choice of percentual portfolio allocation to these assets. To solve the challenge of optimal portfolio allocation, computational power can be very useful. The so-called efficient frontiers are curves that can help an investor to choose an optimal ratio between risk and return. The y-axis of an efficient frontier represents the portfolio return, and the x-axis the standard deviation. The standard deviation accounts for the volatility involved in a specific portfolio and is, according to MPT, desired to be minimal. To compute an efficient frontier, firstly the preferred assets and their past performance timeframes are chosen. Secondly, hundreds of portfolios with random allocations to the different assets are generated. To finish, the standard deviation and the return is calculated for every generated portfolio and plotted on the efficient frontier. Therefore, every dot on the efficient frontier plot represents a portfolio with an individual asset allocation. For further information on the computation, the python code will be delivered on demand.

Let us come back to the main focus of this paper, which is the implementation of digital assets into a traditional portfolio. Following the Modern Portfolio Theory, Bitcoin and Ethereum can be a valuable component in a portfolio due to their high performance. To decrease the volatility of such assets, they need to be combined with stable, low-volatility assets. As an experimentation, four self-programmed efficient frontier curves are shown in Figure 2.6. The analyzed timeframe is from January 2018 until April 2023 in daily intervals. Be aware that this theory relays on past performance and does not guarantee the same performance in the future. Please note when comparing them, that the axis might be scaled differently, to give accent to the shape of the individual frontier.

The red colored efficient frontier is an example that shows a perfect curve. In this curve Apple stocks act as a high performing asset, while Caterpillar forms the stability. A smart but cautious investor would now choose to buy the exact portfolio that shows to have the minimal variance, also called Minimum Variance Portfolio. In this example that portfolio would consist of 0.508% AAPL and 0.492% CAT. A more performance-oriented investor could take a portfolio that is localized a little higher on the curve to make use of the relatively high increase in performance in respect to the volatility. Such a portfolio would contain some more percent of AAPL stocks and would give an estimated annual return of 30%.

Moving on to the blue curve that contains gold and the S&P500 index. The whole blue curve is in a lower return and lower risk segment than the red curve. This is caused by the stability of gold and S&P500. The minimum variance portfolio for these two assets would contain 68% Gold and 32% S&P500.



Efficient Frontiers

Figure 2.6

Looking at the green curve, it is safe to say that this curve is located in a very high volatility segment. The two assets in this curve are BTC and ETH. Compared to the red and the blue curve, this one is much flatter. The higher the return the more allocation was added to ETH, which is the more volatile of them. So, searching for a minimum variance portfolio in this curve would be rather useless since it would turn out to be a 100% investment into BTC because of its lower volatility.

Ultimately, the black curve includes BTC, ETH, Gold, and S&P500. This curve is nearly linear, what indicates that the higher the allocations to volatile assets, the higher the return. Out of all the computed portfolios in the black curve, the one with the lowest standard deviation, returned around 8.5% and had the following allocations: BTC = 2.85%, ETH = 4.08%, GOLD = 56.18%, S&P500 = 36.89%. So apparently, an overall allocation of around 7% into BTC and ETH shows to be valuable not only in terms of return, but also to diversify risks.

Unsurprisingly, the efficient frontiers of the modern portfolio theory show that even when combining different assets with different characteristics, one market theory stays the same:

Return is a function of risk.

2.6.4 Retirement Basket

When looking at the performance of different asset classes over the analyzed time period and the potential for building a retirement savings basket, there are two different approaches: a risk-tolerating and performance-oriented strategy and a risk-averse and stability-oriented strategy.

The risk tolerance basket, outlined in subchapter 2.6.2, includes an allocation of 71.5% into stocks (MSCI ACWI), 14.25% to BTC, and 14.25% to ETH. This approach recognizes the historical growth and potential of cryptocurrencies while maintaining a small stock allocation for diversification.

The risk-aversion basket, introduced in subchapter 2.6.3, prioritizes stability and includes an allocation of 2.85% in BTC, 4.08% in ETH, 56.18% in gold, and 36.89% for the S&P 500. This allocation takes gold's long-term stability into account as the reliable performance of the S&P 500 Index.

These two retirement savings baskets offer unique advantages and correspond to different risk and investment goals. The risk-averse basket embraces the potential for higher returns, while the risk-averse basket focuses on stability and diversification.

It's important to note that asset allocation decisions should be personalized based on an individual's risk tolerance, financial goals, and timeline. You should consult a financial advisor for personal advice and to ensure that an investment strategy is appropriate for your particular circumstances.

Chapter 3

Survey

After laying out the backgrounds of investing and saving with Bitcoin and Ethereum in the first part of this paper, the second part will cover an analysis of the saving attitude and behavior of the course participants in "Shaping a Decentralized Society" at ETH Zurich. Trends and comparisons to the theoretical background in chapter 2 should be investigated using a mini survey that includes five questions. The insights into the results of the survey will be presented and discussed in chapter 4.

The content and the structure of the survey is displayed in table 3.1. The survey allows to have junctions. If someone is not saving and answers NO at question 1, the person will be redirected to 2b, where the survey ends for that person. In case question 1 is selected with YES, the survey will run trough all the questions except for 2b.

All responses to this survey were handled anonymously and were only used for the purposes of this group work and the presentation in class. The acquired data will not be shared with anyone outside of this class and nobody was under any obligation to answer the questions.

Retirement Saving Survey				
Question				
1) Are you currently saving for re-	YES / NO			
tirement?				
2a) If YES, what percentage of	0-100%			
your income do you currently save				
for retirement?				
2b) If NO, briefly name some rea-	open question			
sons why you are not saving?				
3) What types of assets do you				
currently hold for retirement sav-				
ings and in what percentage?				
Cash	$0\% \mid 20\% \mid 40\% \mid 60\% \mid 80\% \mid 100\%$			
Stocks	0% $20%$ $40%$ $60%$ $80%$ $100%$			
Bonds	0% $20%$ $40%$ $60%$ $80%$ $100%$			
Precious Metals	0% $20%$ $40%$ $60%$ $80%$ $100%$			
Bitcoin or Ethereum	$\left \begin{array}{c c c c c c c c c c c c c c c c c c c $			
4) Are you comfortable with your	comfortable / overinvested / underinvested			
invested percentage in BTC or				
ETH?				
5) What are your main concerns	open question			
or reservations about investing in				
Bitcoin or Ethereum for retire-				
ment savings?				

 Table 3.1: Retirement Saving Survey

Chapter 4

Results and Discussion

The survey has been successfully sent to all course participants. 20 out of 45 participants have submitted a answer to the survey, which means that the overall survey return rate equals to 44%. Therefore, the following results do not fully reflect the saving behaviour of all course participants, but still provide valuable insights.

Starting of with the first question of the survey, the sample is immediately split into two groups. As shown in Figure 4.1, out of the 20 participants, 11 are not saving, while 9 are saving for their retirement. The ones that answered NO already took the junction to question 2b and then were finished with the survey.



Figure 4.1

Question 2b returned the following common reasons for not saving:

No income, No money, No reason to save, No time to think about investing

These results reflect the fact that not all students have the resources to already financially invest into their future.

In contrast, the 9 participants that can already profit from an income seem to save and invest an average of 17% of their income. One outlier is even saving 40% of his or her income. The percentual saving over the total income is displayed in the boxplot in Figure 4.2.



What percentage of your income do you currently save for retirement? (n=9)

Figure 4.2

Being able to save more of the total income can be achieved by either cutting expenses to a bare minimum or by earning a higher salary. Since the first mentioned option is only possible to a certain limit, it can be assumed, that the person that is investing 40% of his or her income, must be blessed with a pretty good salary in contrast to the other participants.

But now take a look at how the savings are allocated to the different asset classes. As it can be seen in Figure 4.3 the different portfolio allocations of the participants seem to vary a lot. While some are 80% invested into BTC or ETH, others are 80% into cash. But nobody seems to invest into bonds.

On one hand, looking at the portfolios with BTC or ETH positions that are 40% and



Figure 4.3

higher, we can deduct that the general willingness to take risk and volatility is pretty high. This might be a consequence of the low financial resources that a student has. As the investments into more stable assets tend to take longer to show big profits, the students might be looking into high-volatility/high-return assets such as BTC and ETH for quick and big money. Even tough it might work out for some, it would be smarter to follow the Modern Portfolio Theory and commit to Dollar Cost Averaging (DCA) as recommended in chapter 2. Therefore, combining the portfolio with different assets such as stocks and precious metals and then adding a around 10% position of BTC or/and ETH to it might be more reasonable, if stable performance and low volatility is considered to be a goal in the personal investing strategy.

On the other hand, investing 80% into cash can be just as risky as the case motioned before. Especially in saving a main goal is to invest the money into a good store of value. In best cases this even means that the savings increase in value over time. Looking at FIAT money, actually the opposite is reality. Inflation is known as a silent killer, which means that value stored in FIAT is slowly shrinking every year assuming that inflation rates are positive. Starting to invest money rather than keeping it on the bank, might be a valuable recommendation for a person that majorly is using FIAT as a saving storage.

But there is also one well diversified portfolio, which is important to mention. Only one portfolio show to diversify into four diffrent asset classes including precious metals as it can be seen in Figure 4.3.

After seeing how unbalanced some portfolio allocations of the participants tend to be, a interesting next step might be to look into the contentedness of them. Feeling overinvested but also having the feeling of being under-invested can be a problem. According to the results of the survey, surprisingly only a fraction of 22% does not feel absolutely comfortable with their investment into BTC or ETH. As shown in Figure 4.4 those 22% do even feel under-invested into BTC or ETH.



Are you comfortable with your invested percentage in BTC or ETH? (n=9)



In summary, the results show that only around half of the students that participated have the financial resources to invest. The ones that are investing show to have rather simple patterns and mostly tend to only invest into 2 assets and keep some of the income in cash. What's good to see is, that around 78% of the people saving, feel comfortable with their amount invested into BTC or ETH, which shows a clear sign of adaption of digital assets in this sample of course participants. But while the adaption seems to be present, also concerns and reservations about BTC and ETH persist. The most commonly named concerns according to question 5 are:

Government regulation, total collapse

But ultimately, the only way to confront those concerns is to stay eager for the future!

Chapter 5

Conclusion

In summary, based on our analysis of different asset classes and lessons from our peer survey, here are some key recommendations for students when it comes to saving and investing for retirement:

- Start saving early: Get started as early as possible to take advantage of the power of compound interest. The sooner you start, the more time your money has to grow.
- Set yourself clear financial goals: Determine your retirement goals and create a realistic savings plan. Having a clear goal in mind will help you stay focused and motivated. The minimal goal everyone should have is to create a investment strategy that is at least outperforming inflation. This means that the effective value of the savings are staying constant over time.
- **Regular backups:** Get in the habit of regularly setting aside a portion of your income for retirement savings. Even small contributions can add up significantly over time.
- Diversify your investments: Spread your investments across different asset classes. Consider a mix of stocks, bonds, precious metals and even digital assets like Bitcoin or Ethereum. Diversification can help reduce risk and maximize potential returns.
- **Perform Dollar-Cost-Averaging:** Timing the market can be stressful and time consuming. Perform DCA in regular intervals, reduce the average purchase price, and take advantage of the economic upward trend

• Ask an expert for advice: Consider consulting a financial advisor who specializes in retirement planning. They can offer personalized advice based on your specific situation and help you make an informed decision.

By following these recommendations, students can lay a solid foundation for their retirement savings. Remember that while retirement may seem a long way off, starting early and making informed decisions now will have a big impact on your future financial security and independence!

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