

Bitcoin for Retirement

A SPECIAL RESEARCH REPORT

16 September 2021

How much bitcoin do you need to retire?





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"I AM HODLING."

- GAMEKYUUBI, DECEMBER 18 ,2013

THE MOST IMPORTANT THING ABOUT THIS REPORT

This report is a hypothetical exploration of the considerations necessary to fund a retirement plan. It serves three main purposes:

- Educate people about the complexities involved in planning for retirement;
- Encourage people to seek professional advice when planning for retirement; and
- Offer a benchmark savings level for bitcoin as a supplemental or secondary retirement vehicle. This report should not be construed to suggest that bitcoin can or should be the sole means of preparing for retirement.

Within that framework, there are several important things you must understand before you read the financial tables at the end of this report:

- The report has a bias toward U.S. investors and retirees. Calculations were made in U.S. dollars, and discussions are given in the context of an investor/retiree in the United States.
- The calculations and presentations are based on a set of assumptions that may not apply to you and may not hold in the future. You should read these assumptions carefully to fully understand the conclusions presented in this report.
- The calculations and presentations do not consider all possible circumstances and leave out some materially important considerations such as taxes.
- There is not enough information in this report for you to make an investment decision, and you should not rely solely on this report to make any investment decision or undertake any purchase or sale of any asset. Proper planning and execution of a retirement plan requires the services of a professional financial advisor. You should seek such services if you are serious about your retirement.

CONSIDERATIONS FOR RETIREMENT

Age

The number of Americans aged 65 and older is projected to be 89 million by 2050. There are an estimated 52 million U.S. residents 65 years old and older. By 2030, the U.S. population is expected to become older with nearly 20% of U.S. residents aged 65 and older.

41% of millennials, 35% of Gen Xers and 30% of baby boomers have no access to an employee-sponsored retirement plan.

Social Security

According to the new 2021 annual report from the Social Security Trustees, the depletion date for the combined trust funds—retirement and disability—is 2033 without any changes to program benefits. That would be when today's 54-year-olds reach Social Security's Full Retirement Age.

The average Social Security retirement benefit payment is \$1,503 per month. However, because Social Security is fully funded until only 2033, there is a risk that benefits may drop due to funding shortfalls. This could lead to a reduction in benefits of 21%, resulting in an annual benefit of only \$14,500. By 2035, median income is expected to be \$59,000 per year, meaning retirees must personally fund 75% of their retirement income.

71% of Americans say that they are afraid that there will be no available Social Security funds when they retire.

Spending

The average retiree spends \$46,000 per year on living expenses. Of that, they spend \$4,300 out-of-pocket annually for health care expenses. Over time, these health care expense increase both nominally and as a percentage of total personal expenditures.

By 2035, the cost of living per retiree is expected to reach \$70,000 per year. The recommended retirement withdrawal rate is 4%. Social Security will only replace about 25% of lost income. This means that the average retiree must have at least \$1.6 million saved for retirement, just to cover annual expenses.

Savings

The greatest single financial worry of people of working age, at 64 percent, is that they won't have enough saved. This worry is justified. Americans age 55-64 have only saved 12 percent of what they need to fund a secure retirement.

More than 22% of Americans had less than \$5,000 saved for retirement and 15% had no retirement savings in 2019.

The average rate of return from a 401k is less than 7% per year. This rate of return is insufficient to fund the shortfalls associated with such low savings rates.

Of those who have saved something, most are ill-equipped to make the complex financial decisions associated with balancing retirement savings, growth, withdrawals, and taxes. 60% of non-retirees who hold self-directed retirement savings accounts, such as a 401(k) or IRA, have little to no comfort in managing their own investments.

Despite the overwhelming odds against them, only 1 in 3 retirees rely on professional help to manage their finances after they retire.

ASSUMPTIONS USED IN THE CALCULATIONS IN THIS REPORT

Current Age

Calculations assume that investing starts at age 25, 35, 45, or 55. This allows a reader to select an age appropriate to their circumstances and arrive at an estimated value suited to their age group. If in doubt, you should choose the *older* of the two ages. For example, a 30-year old should use the tables for a 35-year old.

Retirement Age

Calculations assume that a person retires at ages 45, 59, 65, or 72. This allows a reader to select a retirement goal appropriate to their desires and arrive at an estimated value suited to their age group. If in doubt, you should choose the *younger* of the two ages. For example, if you want to retire at age 50, use the tables for age 45.

Life Expectancy

Life expectancy at birth in the United States is about 79 years. However, this means that 50% of people will outlive that figure. Life expectancies are also expected to increase over time. Therefore, the life expectancy used in these calculations is 95 years for all age groups. This adds a conservative margin of safety to the estimates.

Investment Horizon

The investment horizon is the number of years from today until retirement age: *Retirement age – Current age*. Investment horizon is perhaps the single most important factor in determining terminal wealth, and the only one that is entirely in the investor's control.

Investment Return

Retirement planning requires an assumption about future investment returns. Such assumptions are for illustration purposes only and must not be considered forecasts or predictions of actual investment performance. No assurance can be made as to the reasonableness, accuracy, or suitability of these assumptions. These assumptions do not reflect the volatility inherent in bitcoin or any other investment.

Before Retirement

Annual returns are non-constant and assumed to follow a pattern consistent with the long-term growth rate of a single investment in bitcoin. These growth rates and assumptions underlying them are documented in the following research:

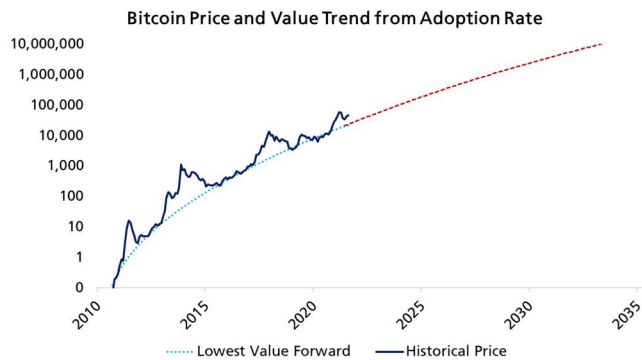
Peterson, T. (2018). "Metcalf's Law as a Model for Bitcoin's Value." *Alternative Investment Analyst Review*, Vol. 7, No. 2, 9-18. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3078248

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Cane Island Digital Research. (2019). "Why Bitcoin's Price Is Never Looking Back." <https://www.cane-island.digital/research-notes>.

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For this report, the bitcoin investment return rate assumptions are:

2022	30.25%	2030	44.50%
2023	83.00%	2031	39.00%
2024	77.50%	2032	33.50%
2025	72.00%	2033	28.00%
2026	66.50%	2034	22.50%
2027	61.00%	2035	17.00%
2028	55.50%	2036	11.50%
2029	50.00%	2037	6.00%

Since July 2010, the average annualized historical rate of return on bitcoin has been 233%. The calendar year annual returns for bitcoin are:

2011	1337%	2017	1247%
2012	212%	2018	-70%
2013	5372%	2019	86%
2014	-58%	2020	305%
2015	37%		
2016	126%		

Past performance is not necessarily indicative of future returns.

By the year 2038, it is assumed that bitcoin stops growing and/or becomes obsolete. At this point, a constant annualized return of 4% is used, assumed to be earned from a traditional investment portfolio.

During Retirement

Throughout the retirement period, a constant annualized return of 4% is assumed.

Inflation

Inflation reflects an assumed growth rate in income level commensurate with expected cost-of-living increases. Inflation is assumed to be 3% per year. Inflation is applied to the initial desired income level in Year 1 and compounds each subsequent year, through retirement.

Contributions

The calculations in this report assume a single, lump-sum investment into bitcoin made in the year 2021 at a price of \$45,000.

Subsequent, annual, or other ongoing contributions are not considered and are assumed to be zero.

If an investor contributes less than stated amount in 2021, it is likely that the total contributions in subsequent years will need to be greater than the stated amount. For example, periodic contributions (dollar cost averaging) will require more total outlays than a single, initial lump-sum contribution.

If an investor acquires bitcoin for more than \$45,000 in 2021, it is likely that the total contribution for the stated year will need to be greater than the stated amount.

Desired Income Level

The median individual income level in the United States was \$43,000. We assume the desired income level, in 2021 dollars, to be \$59,000, which is slightly above the median income. This adds a degree of conservatism to the estimated savings threshold amount.

Current Savings Balance

The calculations assume an investor has zero dollars (\$0) saved for retirement.

Social Security and Other Retirement Plans

The calculations assume an investor has no access to Social Security or any other retirement plan, qualified or otherwise, and that in the future such vehicles will not exist.

Taxes

This report makes no assumptions or considerations regarding taxes. Tax impacts of contributions are not factored into these calculations. For example, the results presented do not take into account whether contributions are pre-tax as in a traditional IRA or post-tax as in a Roth IRA. Neither is any consideration given to taxes on required withdrawals, taxes on short- or long-term gains, or on income.

Withdrawals

Withdrawals are estimated as annual deductions from assets in an amount equal to the inflation-adjusted Desired Income Level (\$59,000) for that year. For

example, if a withdrawal is made 20 years from now, the amount withdrawn is assumed to be

$$\$59,000 \times (1.03)^{20} = \$106,560$$

Other Important Considerations

Mandatory disbursements and other regulations are not considered. Results are only rough estimates, largely because of uncertainty in the rates of return, inflation, future salary, willpower to continue saving, unexpected life events, and other assumptions.

Interest compounds based on the number of payments per year, which is assumed to be 1.

This report and its contents should not be construed as professional financial advice. The results may not be suitable for your specific situation.

NON-US ESTIMATES

Good faith estimates for a selected number of countries are shown after the U.S. tables. The figures presented assume a 25-year-old investor. Income levels and inflation assumptions for each country are detailed below. Of these assumptions, inflation has the greatest impact because it determines the desired future income level and corresponding withdrawals. Consequently, all other things equal, countries with high inflation rates will have high withdrawal amounts and need a larger asset base to fund those withdrawals.

	Income Level (USD)	Inflation Assumption
Australia	49,000	4%
Brazil	8,000	10%
Canada	42,000	4%
France	38,000	3%
Germany	44,000	4%
Ireland	56,000	3%
Italy	31,000	3%
Japan	37,000	0%
Mexico	8,000	6%
Netherlands	48,000	3%
Poland	14,000	6%
Spain	22,000	3%
Switzerland	77,000	3%
Turkey	9,000	10%
United Kingdom	38,000	3%

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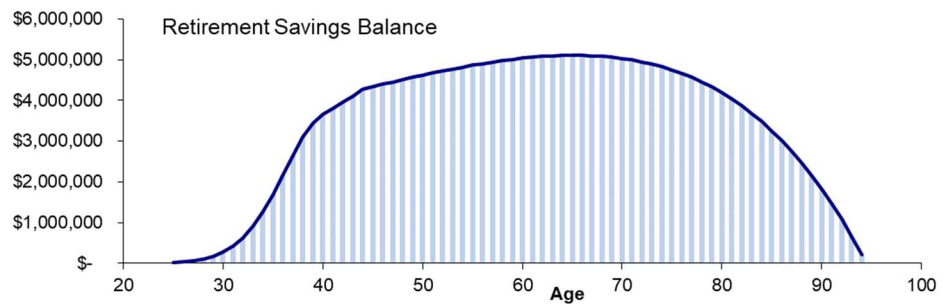
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“Median Income By Country 2021.” *Median Income by Country 2021*, World Population Review, worldpopulationreview.com/country-rankings/median-income-by-country.

0.40 BTC
\$18,000 USD

Years to pay out: 50
Years to invest: 23
Average return during accumulation: 36%
Salary at Retirement: \$107,000
Amount needed: \$4.3 million

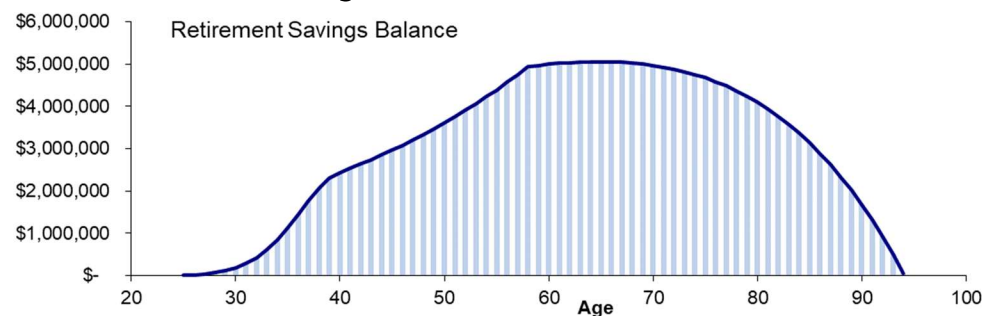
Retirement Age: 45



0.27 BTC
\$12,000 USD

Years to pay out: 36
Years to invest: 34
Average return during accumulation: 23%
Salary at Retirement: \$161,000
Amount needed: \$4.9 million

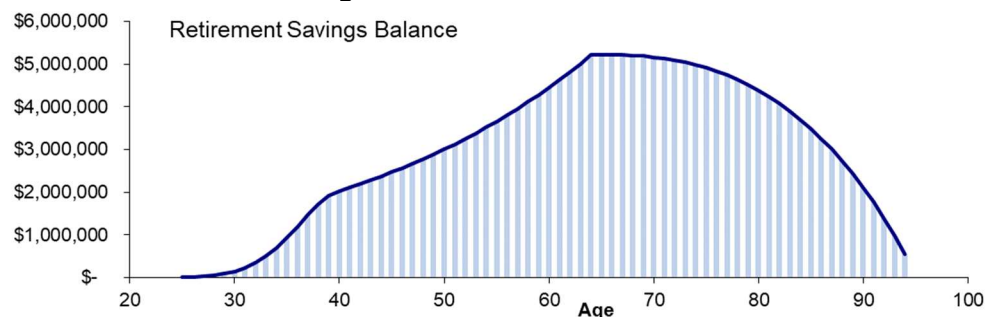
Retirement Age: 59



0.22 BTC
\$10,000 USD

Years to pay out: 30
Years to invest: 40
Average return during accumulation: 20%
Salary at Retirement: \$192,000
Amount needed: \$5.0 million

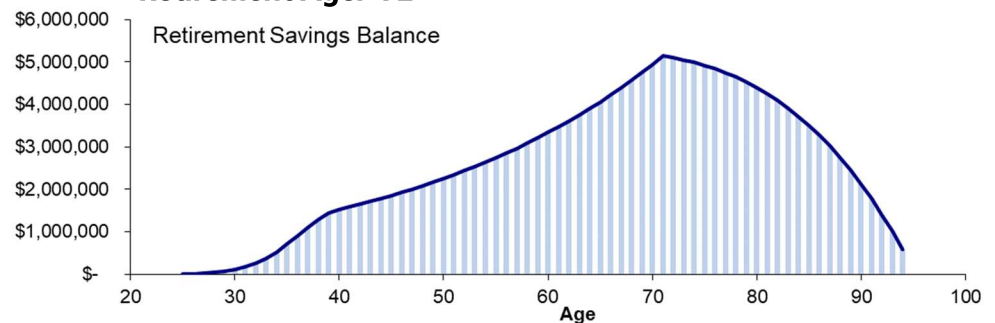
Retirement Age: 65



0.17 BTC
\$7,500 USD

Years to pay out: 23
Years to invest: 47
Average return during accumulation: 17%
Salary at Retirement: \$237,000
Amount needed: \$4.9 million

Retirement Age: 72

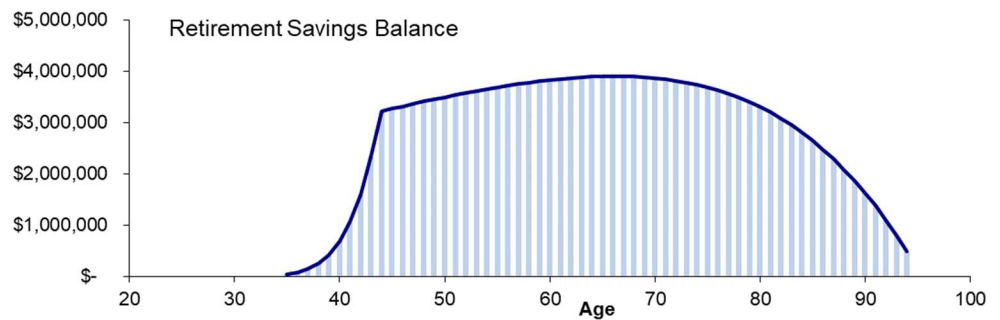


The amounts shown are suggested minimum values necessary to supplement, not replace, a traditional retirement plan.

1.00 BTC
\$45,000 USD

Years to pay out: 50
Years to invest: 10
Average return during accumulation: 58%
Salary at Retirement: \$79,000
Amount needed: \$3.2 million

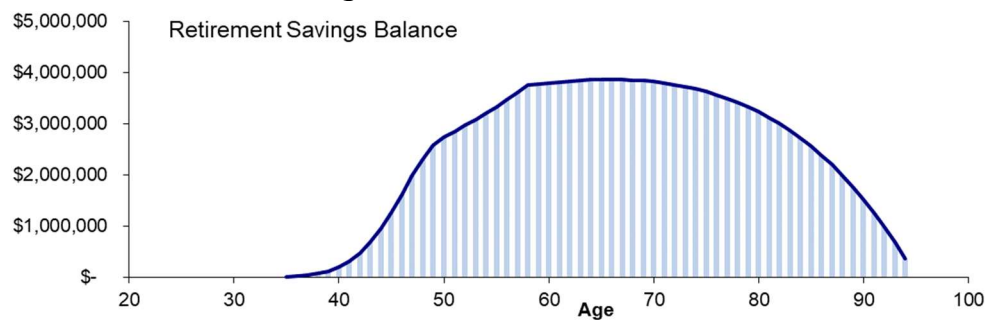
Retirement Age: 45



0.30 BTC
\$13,000 USD

Years to pay out: 36
Years to invest: 24
Average return during accumulation: 30%
Salary at Retirement: \$120,000
Amount needed: \$3.7 million

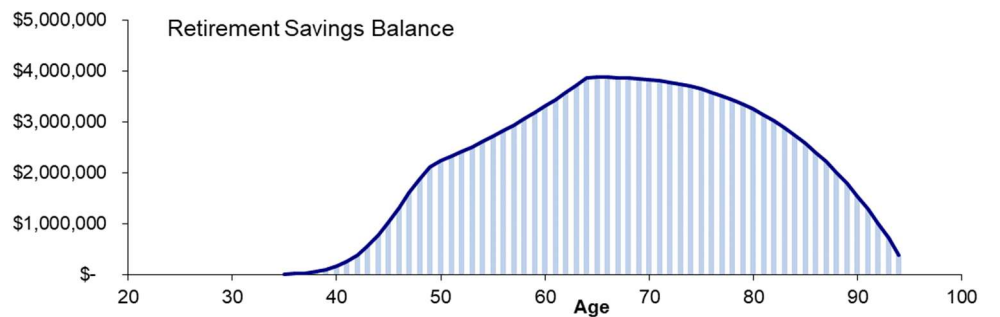
Retirement Age: 59



0.24 BTC
\$11,000 USD

Years to pay out: 30
Years to invest: 30
Average return during accumulation: 25%
Salary at Retirement: \$143,000
Amount needed: \$3.7 million

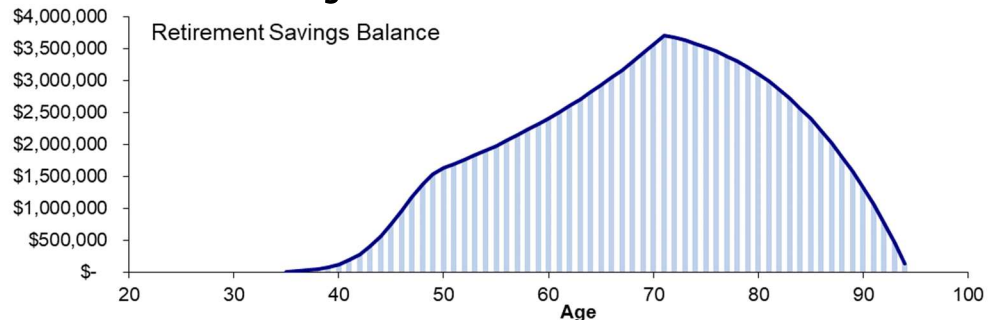
Retirement Age: 65



0.18 BTC
\$8,000 USD

Years to pay out: 23
Years to invest: 47
Average return during accumulation: 21%
Salary at Retirement: \$176,000
Amount needed: \$3.6 million

Retirement Age: 72

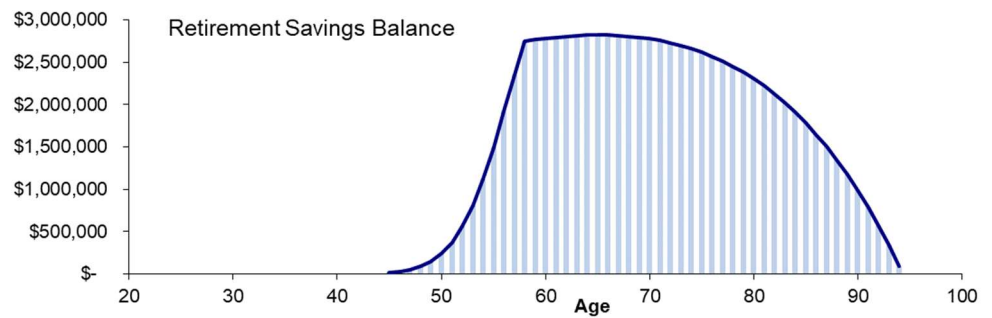


The amounts shown are suggested minimum values necessary to supplement, not replace, a traditional retirement plan.

0.36 BTC
\$16,000 USD

Years to pay out: 36
Years to invest: 14
Average return during accumulation: 49%
Salary at Retirement: \$89,000
Amount needed: \$2.7 million

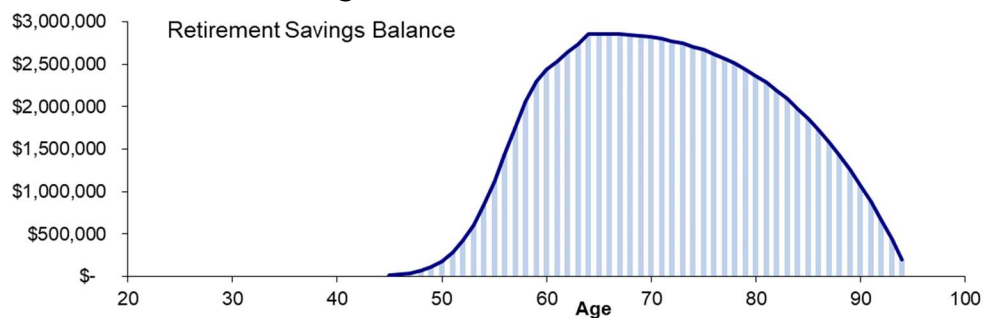
Retirement Age: 59



0.27 BTC
\$12,000 USD

Years to pay out: 30
Years to invest: 20
Average return during accumulation: 36%
Salary at Retirement: \$107,000
Amount needed: \$2.8 million

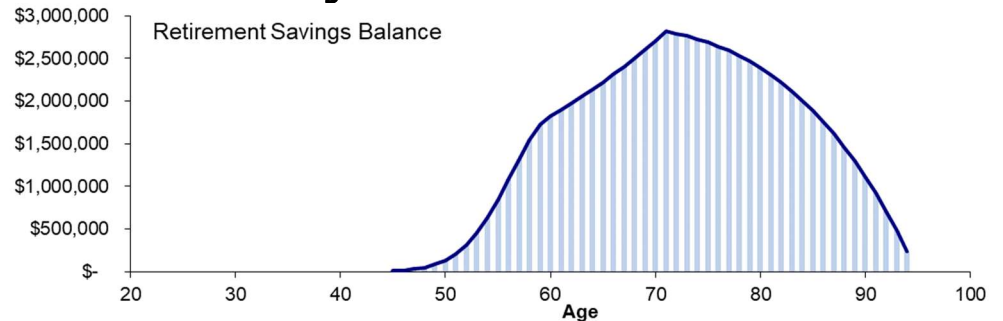
Retirement Age: 65



0.20 BTC
\$9,000 USD

Years to pay out: 23
Years to invest: 27
Average return during accumulation: 27%
Salary at Retirement: \$131,000
Amount needed: \$2.7 million

Retirement Age: 72

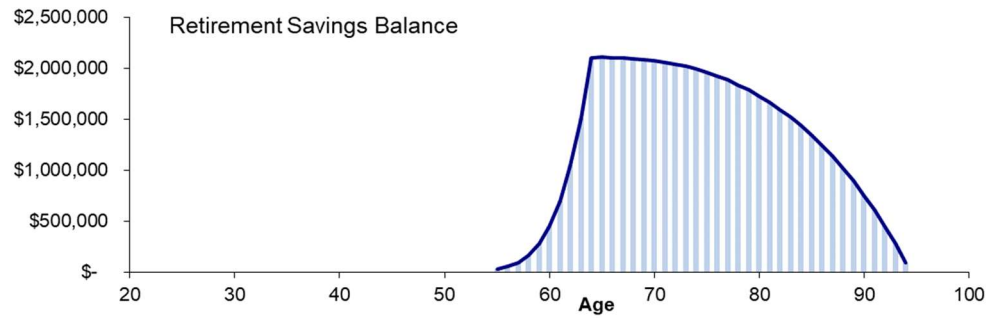


The amounts shown are suggested minimum values necessary to supplement, not replace, a traditional retirement plan.

0.67 BTC
\$30,000 USD

Years to pay out: 30
Years to invest: 10
Average return during accumulation: 60%
Salary at Retirement: \$79,000
Amount needed: \$2.1 million

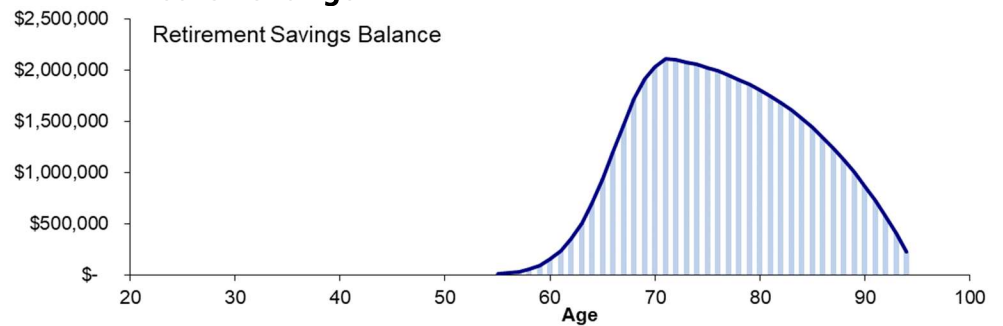
Retirement Age: 65



0.22 BTC
\$10,000 USD

Years to pay out: 23
Years to invest: 17
Average return during accumulation: 41%
Salary at Retirement: \$98,000
Amount needed: \$2.0 million

Retirement Age: 72



The amounts shown are suggested minimum values necessary to supplement, not replace, a traditional retirement plan.

<i>Retirement</i>								
<i>Age</i>	Australia	Brazil	Canada	France	Germany	Netherlands	Ireland	Italy
45	0.51	0.87	0.44	0.27	0.47	0.33	0.38	0.22
59	0.38	0.78	0.36	0.18	0.38	0.22	0.27	0.16
65	0.31	0.69	0.27	0.16	0.29	0.18	0.22	0.13
72	0.24	0.56	0.20	0.11	0.22	0.13	0.16	0.07

<i>Retirement</i>							
<i>Age</i>	Japan	Mexico	Poland	Spain	Switzerland	Turkey	U.K.
45	0.09	0.20	0.31	0.16	0.53	0.98	0.27
59	0.04	0.16	0.24	0.11	0.36	0.87	0.18
65	0.04	0.13	0.22	0.09	0.29	0.78	0.16
72	0.02	0.11	0.18	0.07	0.22	0.64	0.11

The amounts shown are suggested minimum values necessary to supplement, not replace, a traditional retirement plan.

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Charts and graphs are provided for illustrative purposes. Past performance is not necessarily an indication or guarantee of future results. The charts and graphs may reflect hypothetical historical performance. Index information presented herein is back-tested. Back-tested performance is not actual performance, but is hypothetical. The back-test calculations are based on the same methodology that was in effect when the index(es) was officially launched. However, it should be noted that the historic calculations of an index may change from month to month based on revisions to the underlying data used in the calculation of the index. Complete index methodology details are available at www.caneislandcrypto.com.

Prospective application of the methodology used to construct the index(es) as well as revisions to data may not result in performance commensurate with the back-test data shown. The back-test period does not necessarily correspond to the entire available history of the index(es).

Another limitation of using back-tested information is that the back-tested calculation is generally prepared with the benefit of hindsight. Back-tested data and/or information reflects the application of the index methodology and selection of index constituents in hindsight. No hypothetical record can completely account for the impact of financial risk in actual trading. For example, there are numerous factors related to financial markets in general which cannot be and have not been accounted for in the preparation of the index information set forth, all of which can affect actual performance.

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be 8.35% (or US \$8,350) for the year. Over a three-year period, an annual 1.5% fee taken at year end with an assumed 10% return per year would result in a cumulative gross return of 33.10%, a total fee of US \$5,375, and a cumulative net return of 27.2% (or US \$27,200).

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