

Executive Summary

Since the introduction of Bitcoin, as the first digital currency, it has experienced an explosion in value. Its extreme price volatility has attracted the attention of the media, investors, regulators, financial institutions and society. Proponents argue that the elevated volatility offers investment opportunities, whereas opponents are sceptical about Bitcoin's fast growth over the last decade.

The global decentralized nature is not comparable to any other asset and leads to special considerations. There is no agreement on the appropriate classification of cryptocurrencies and Bitcoin's role is unclear. The broad disparity of regulation and the high volatility hold the institutional adoption of Bitcoin back. This is also true for pension funds which are showing low levels of adoption, even though several studies point to the benefits of Bitcoin as part of a diversified portfolio (Kajtazi & Moro, 2019; Li et al., 2021). Swiss pension funds face severe challenges to secure their long-term financial stability given the low interest rates and rising life expectancy. Therefore an improvement of the rate of their return on investments would significantly ease the burden on the second pillar.

In this study, Bitcoin's role in a Swiss pension fund model portfolio is examined by relying on the established portfolio theory of Markowitz (1952). Thus, I investigate if adding the optimal weight of Bitcoin to a Swiss pension fund portfolio has any effect on the risk-return ratio in respect of the optimization procedure. The pension funds' portfolio comprising Bitcoin is compared to the portfolio without the allocation of Bitcoin. The risk-return efficiency of the portfolios are measured by the Sharpe ratio. Furthermore, efficient frontiers are constructed to examine the effect of the optimal allocation of Bitcoin to the set of pension assets. To replicate the portfolio of a typical Swiss pension fund, the constraints concerning the allocation and weighting of asset categories dictated by the Swiss Federal Act on Occupational Retirement, Survivors' and Disability Pension Plans (BVG) are taken into account. The asset allocation was provided by Swisscanto Invest's Swiss Pension Fund Study and the sample assets are obtained from Thomson Reuters Datastream. The Bitcoin prices are collected from Bitstamp and limit the start of the sample period to December 2011. To examine the optimized allocation of Bitcoin, it is assumed that Swiss pension funds are most likely to fund an allocation from alternative investments. This assumption is based on the fact that Bitcoin is a different type of financial investment, distinct from traditional asset classes.

Given Bitcoin's unique properties, the results suggest that Bitcoin is a beneficial addition to a Swiss pension fund portfolio. The optimal portfolio weight of Bitcoin

of 0.63 percent significantly adds value in terms of an increase in the return and an improvement of the risk-adjusted performance. The correlation of monthly returns for Bitcoin and other assets is very low, which indicates that the inclusion of Bitcoin in a pension funds' portfolio offers diversification benefits. Nevertheless, Bitcoin's extreme volatility leads to an increase in the portfolio risk since its highly volatile nature is not offset by its diversification effect. With regard to the risk-adjusted performance, the higher risk of the pension funds' model portfolio comprising Bitcoin is overcompensated by the increase in return. The improvement of the Sharpe ratio shifts the efficient frontier upwards and the portfolio with the optimal addition of Bitcoin has for each level of risk a higher expected return. This finding highlights the investment benefits for pension funds that could be achieved with a small exposure of Bitcoin below 1 percent of the portfolio's total investment.