Investment Methodology White Paper

Wahed

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Introduction

Wahed Invest LLC. is an SEC registered investment adviser that seeks to deliver an automated investment management service maximizing the net-of-fee, real investment return as per each client's specific appetite for risk. This paper lists the methodology we implement to achieve our mission objective. All securities chosen by Wahed Invest are deemed Shari'ah compliant and constantly monitored for compliance by our Shari'ah advisory board that is run by Straightway Ethical Advisory and headed by Mr. Taha Abdul-Basser.

Our veteran investment management committee has designed a streamlined service that starts with a portfolio diversified across relatively uncorrelated asset classes, modified for an individual's precise tolerance for risk. Our investments are equity oriented to maximize long-term returns. Each of our selected asset classes is represented by a low cost, Shari'ah compliant ETF. If such an ETF is not available, a security, fund, or instrument is chosen to mimic the profile of the asset class in question. At Wahed, we continuously monitor and periodically rebalance your portfolio to significantly improve your chance of investment success for the long run.

We integrate Modern Portfolio Theory (MPT) into our methodology, which is the most widely accepted framework for managing diversified investment portfolios. MPT helps us assemble the ideal portfolio for each client. Developed by economists Harry Markowitz and William Sharpe, MPT proves to be one of the most influential economic theories regarding investment. The economists received the Nobel Prize in Economics in 1990 for their pioneering research. MPT has its limitations, especially around very low probability significant downside scenarios, but we believe it is the best foundation on which to build a compelling investment management service.

Established investment management services were initially available only to wealthy investors through financial advisors. These advisors generally charge annual management fees exceeding 1%, while account minimums require at least $1 million. By employing an entirely software-based solution, informed by world-class financial expertise, and governed by a reputed Shari'ah board, Wahed Invest provide its automated investment management service at much lower cost, to a global audience. We democratize access to high-quality financial advice for Muslim investors around the world.

Our investment methodology consists of five steps:
1. Identify an ideal set of asset classes for the current investment environment
2. Select low cost ETFs and/or securities to represent each asset class
3. Determine your risk tolerance to create a suitable portfolio for you
4. Apply Modern Portfolio Theory to allocate among the chosen asset classes for your risk tolerance
5. Monitor and periodically rebalance your portfolio

Finding Asset Classes

Regarding MPT, the optimal way to maximize returns for a given level of risk is to assemble a portfolio of asset classes rather than individual securities (Markowitz, 1952; Sharpe, 1964). This launches the first step in our methodology, which is to identify a wide range of diversified asset classes to portray the foundation for our portfolios.

We account for each asset class's long-term historical behavior in different economic scenarios, risk-return relationship conceptualized in asset pricing theories, and expected behavior going forward based on long-term secular trends and the macroeconomic environment. Wahed also measures each asset class on its potential for capital growth and income generation, volatility, correlation with the other asset classes (diversification), inflation protection, cost to implement via ETF and tax efficiency.

We diversify across asset classes broadly categorized by: equities, fixed income (Sukuks), commodities and real estate. Despite their high volatility, stocks give investors exposure to economic growth and offer the opportunity for long-term capital gains. Additionally, stocks provide effective long-run inflation protection and are relatively tax efficient due to the favorable tax treatment on long-term capital gains and stock dividends (relative to the way ordinary income is taxed). Bonds(Sukuks) and bond-like securities are the most vital income-producing asset classes for income-seeking investors. While bonds have lower return expectations, they provide a cushion for stock-heavy portfolios during economic turbulence due to their low volatility and minimal correlation with stocks.

Real Estate and Commodities are assets that shield investors from inflation in both moderate to high inflation environments. Their prices are inclined to be highly correlated with inflation.

The asset classes listed in the table below are based on our investment team's in-depth analysis.

Asset Class	Benefits
US Stocks	Capital growth, long-run inflation protection, tax efficiency
Emerging Markets Stocks	Capital growth, long-run inflation protection, tax efficiency
Global Large-cap Stocks	Capital growth, long-run inflation protection, tax efficiency
Global Fixed Income	Income, low historical volatility, diversification
Real Estate	Income, diversification, inflation protection
Commodities	Diversification, inflation protection

Allocating Assets

Mean-Variance Optimization

Wahed Invest determines the optimal selection of our chosen asset classes by solving the "Efficient Frontier" using Mean-Variance Optimization (MVO) (Markowitz, 1952), the foundation of Modern Portfolio Theory. The Efficient Frontier characterizes the portfolios that generate the maximum return for each level of risk. Each portfolio is created by choosing a combination of asset classes that maximizes the expected return for a specific level of risk, or equivalently, one that minimizes the risk for a specific expected return. MVO calculates the best risk-return trade-off when combining the asset classes in portfolios.

Moreover, Wahed also uses MVO as a vital quantitative tool to determine how many asset classes should be used in a portfolio. If adding an asset class to the mix raises the efficient frontier, then it improves the risk-return trade-off from the portfolios, (i.e. it offers a higher return for the same risk level or lower risk for the same return level).

Additionally, MVO provides a commanding mathematical framework for evaluating portfolio risk-return trade-offs. We also apply other quantitative approaches and qualitative assessment when choosing portfolios to manage.

Capital Market Assumptions

MVO requires estimates for each asset class's standard deviation, correlation and expected return.

Estimating an asset class's standard deviation (volatility):

We consider its long-term historical standard deviation, its short-term standard deviation, and the expected volatility implied by its pricing in the options markets. Long-term historical estimates benefit from a larger sample size, short-term estimates capture market evolution and the option markets imply forward-looking volatility. To estimate correlation, we consider long-term historical correlation and short-term correlation.

Estimating an asset class's expected returns:

We start with the Capital Asset Pricing Model (CAPM) (Sharpe, 1964) as the baseline estimate. CAPM derives expected returns in market equilibrium under certain assumptions, and states that the expected return of an asset class is dictated by its systematic risk as measured by beta. Riskier asset classes command higher expected returns. Both MVO and CAPM are important constituents of Modern Portfolio Theory (MPT). We also form views on long-term return expectations for each asset class based on interest rates, credit spreads, dividend yields, GDP growth and other macroeconomic variables. We use the Black-Litterman model (Black & Litterman, 1992) and the Gordon growth model (Gordon, 1959) to adjust the CAPM returns with our views. We subtract ETF expenses from the gross return of each asset class to estimate its net-of-fee expected return.

At Wahed, we update our estimates annually which likely results in small changes to our recommended asset allocations. Existing clients' portfolios are rebalanced to account for the new estimates if the changes in estimates leads a specific asset class percentage to fall outside the parameters described in the rebalancing section below.

Portfolio Constraints

We enforce minimum and maximum allocation constraints for each asset class to ensure suitable portfolio diversification, mitigate parameter estimation errors and represent investor preferences. To deliver meaningful diversification benefits, we selected 5% as a minimum allocation, anything less does not provide significant benefits in our estimation. Excluding fixed income, we selected 35% as the maximum allocation to ensure sufficient diversification from meaningful allocations to the other asset classes. Sources including (Swensen, 2005) recommend similar min and max allocations by asset class.

Investment Types

Wahed Invest uses cost-effective, index-based Exchange Traded Funds (ETFs) to represent each asset class. In contrast, many financial advisors have historically recommended actively managed mutual funds. Mutual funds were convenient because they could be chosen easily using a well-known rating system offered by Morningstar. In 2010, Morningstar admitted its rating system did not successfully identify mutual funds that could outperform the market in the future (Kinnel, 2010). Unsurprisingly, a significant amount of research has been published that shows most mutual funds (65-75%) underperform the market (Bogle, 2009; Malkiel, 2012) and those that outperform in one period are unlikely to outperform in subsequent periods. A highly-cited paper on the subject showed mutual funds underperformed the Vanguard S&P 500® index fund by an average of 2.1% per year pre-tax over a 20-year period due to high fees and poor stock selection (Arnott, Berkin, & Ye, 2000).

Wahed Invest periodically reviews the entire population of Shari'ah compliant ETFs to identify the most appropriate ones to represent each of its four recommended asset classes. We look for ETFs that minimize cost and tracking error, offer ample market liquidity, and adhere to Islamic standards.

If such an ETF is not available, a security, fund, or instrument is chosen to mimic the profile of the asset class in question.

Determining Your Risk

Typically, financial advisors ask 25 questions to identify one's risk tolerance, however, Wahed Invest has explored behavioral economics research to simplify our risk identification process to only a few questions. For instance, we can project an individual's income growth and saving rate based on her age and current income. We ask prospective clients questions to evaluate both their objective *capacity* to take risk and subjective *willingness* to take risk. We believe that advanced algorithms can provide a better evaluation of risk than the *average* traditional advisor.

Subjective risk questions are asked to determine both the level of risk an individual is willing to take and the consistency among her answers. The less consistent the answers, the exponentially less risk tolerant the investor is likely to be. For example, if an individual is willing to take a lot of risk in one case and very little in another, then she is inconsistent and is therefore assigned a lower risk tolerance score than the simple weighted average of her answers.

Objective risk questions are asked to estimate whether the individual is likely to have enough money saved at retirement to afford her expected spending needs. The higher the excess income, the more risk the customer can take. Conversely if her expected retirement income is less than her likely retirement spending needs, then she cannot afford to take much risk with her investments.

Wahed will email its clients quarterly to determine if anything in their financial profile has changed that may affect their risk tolerance. For instance, getting married, having kids or being promoted to a significantly higher paying job can have a major impact on the risk score we apply and therefore one's ideal investment mix. In addition, we gradually adjust clients' investment mixes as they age to make sure they have less volatility as their retirement approaches.

We allow clients to adjust their assigned risk score once every 90 days, in the event they want a more conservative or aggressive allocation based on their individual circumstances. We warn them in advance that it might not be appropriate for their ultimate goals. We restrict the risk score to be changed only once every 90 days as we don't believe it should be used as a market timing tool. We also may limit the number of times a client can change her risk score to further discourage attempts to time the market. Wahed Invest discourages market timing because we believe attempting to time the market is one of the most serious mistakes an individual investor can make.

Rebalancing and Ongoing Monitoring

Rebalancing and ongoing monitoring of your portfolio is an essential part of our management process. A portfolio created using MPT-based techniques will not stay optimized over time. The composition of any investment portfolio will naturally drift as capital markets move and certain holdings outperform others. This typically results in two adverse outcomes: (1) portfolio risk increases as the equity portion of the portfolio grows beyond its original allocation, and (2) allocations become sub-optimally mixed. To maintain one's intended risk level and asset allocations, a portfolio must be periodically rebalanced back to its original targets.

We consider the volatility associated with each of our chosen asset classes when deciding when and how to rebalance. We do not consider tax implications.
We continually monitor client portfolios as our platform is engineered to alert our investment management team when any portfolio steps outside its assigned standard deviation and/or assigned optimal asset allocation mix.

Conclusion

Wahed Invest combines the judgment of its expert optimization team with state of the art modernized optimization tools to assemble efficient portfolios. We strive to deliver the maximum net-of-fee, after-tax, real investment return for each client's tolerance for risk. This means we will continue to look for relevant ways to improve our investment methodology in the future while continuously monitoring and periodically rebalancing our clients' portfolios to maximize returns while maintaining their calculated risk tolerance. We believe following this process will lead to outstanding long-term financial outcomes for our clients. In the long run, we plan to launch our own ETFs to provide our clients with the most efficient portfolio possible.

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