Advisor Investment Introduction
It’s good to meet you

Advisors often ask about the Betterment Institutional investment team, methods, and process. We cover the most commonly asked questions in this document, but if we don’t answer your question, feel free to get in touch. We’re happy to speak with you.

You can contact us at support@bettermentinstitutional.com or 888-646-2581.
The Investment Team
Investment Team

Our investment team integrates the diverse expertise necessary to design optimal 
investing software.

Jon Stein, CFA
CEO and Strategic Allocation
Jon started Betterment after years of consulting for Wall Street’s biggest
financial institutions. He studied
economics at Harvard University and
finance at Columbia Business School. He
is a Chartered Financial Analyst.

Dan Egan, MSc
Quantitative and Behavioral Finance
Dan was the Behavioral Finance Specialist
at Barclays Americas and helped found
the London team in 2007. He earned his
Master of Science in Decision Science
from the London School of Economics.

Lisa Huang, PhD
Quantitative Portfolio Management
Lisa holds a degree in Mathematics and
Biochemistry from UCLA and a PhD in
Physics from Harvard University. She
was previously a quantitative strategist
at Goldman Sachs, leading research
collaborations and building models for
fixed income strategies.

Alex Benke, CFP ®
Holistic Financial Planning
Prior to joining Betterment, Alex worked
at JPMorgan for 10 years in Credit
Markets and Risk Technology. He is a
Certified Financial Planner with a degree
in Operations Research Engineering from
Cornell University.

Rukun Vaidya
Capital Markets and Trade Execution
Rukun joined Betterment after five years
performing risk research at Highbridge
Capital, where he focused on statistical
arbitrage, quantitative macro, and
quantitative commodities. He has a degree
in Operations Research from Cornell
University.

Boris Khentov, JD
Tax and Securities Law
Boris is a tax and capital markets attorney,
with a law degree from Northwestern.
He has a BA in Computer Science from
Harvard University, bringing a unique mix of
engineering skills and legal and regulatory
experience to Betterment.
The Investment Team

Management

Alex Benke, CFP® is the lead Product Manager for Betterment’s financial advice and investing features. Alex is responsible for ensuring that Betterment’s advice and services are holistic and easy to use.

In his 14 years of experience working at the intersection of finance and technology, Alex has worked as a financial planner for an independent wealth management firm and also built large-scale derivatives risk management systems for JP Morgan.

Daniel Egan, MSc is the Director of Behavioral Finance and Investing at Betterment. He is responsible for maximizing customers’ take-home returns – returns after tax, costs, risk, and bad behavior. He ensures Betterment clients enjoy a behaviorally informed experience which drives optimal saving, investing, and behavior along the investment journey.

Prior to joining Betterment, Dan was a founding member of the Barclays Quantitative Behavioral Finance team. Dan has authored multiple behavioral economics articles in leading peer-reviewed publications and is frequently quoted in the financial press. He is a frequent guest lecturer at top universities globally including Columbia, Wharton, and the London School of Economics. Dan earned his Master of Science in Decision Science from the London School of Economics and Political Science and his B.A. (Distinction) in Economics from Boston University.

Lisa Huang, PhD is Betterment’s Portfolio Researcher, responsible for the heavy lifting of optimizing Betterment’s portfolio management and advice.

Prior to joining Betterment Lisa was a quantitative strategist at Goldman Sachs where she built pricing/trading models and analytic platforms for Fixed Income. She holds a PhD in Theoretical Physics from Harvard.

Boris Khentov, JD guides specialized advice in capital markets taxation law, ensuring that Betterment’s services surpass all regulatory and reputational standards.

Boris holds a computer science degree from Harvard and a JD from Northwestern Law, with a special focus on taxation. Both a lawyer and an engineer, Boris designs Betterment’s systems with an emphasis on tax-efficiency and compliance.

Jon Stein, CFA is responsible for Betterment’s strategic allocations and advice. Jon worked for years as a consultant to the investment industry, and Betterment was born of his desire for an optimal investment solution for most investors.

Rukun Vaidya is a broad specialist in capital markets, with a specific focus on Betterment’s trading execution and algorithms.
Ruk joined Betterment from Highbridge Capital Management, where he conducted quantitative research for the firm’s systematic investment strategies (including statistical arbitrage, systematic global macro and quantitative commodities) in addition to broader work on portfolio construction and analytics. He holds a B.S. in Operations Research and Information Engineering from Cornell University’s College of Engineering.

**Investment Committee**

In addition to the full-time investing experts, Betterment’s investment committee advises on significant updates to our advice and management methodology. The committee draws from both academic and commercial experts and contributes a broad array of perspectives and experience.

**Saman Majd** has a background in global bond markets and his perspective on our fixed income exposures is invaluable.

**Geert Baekert** brings a worldly view to Betterment, assists with our capital markets and returns assumptions as well as the mathematical nuances of portfolio optimization.

**Mark Zurack** brings deep experience in equity trading to Betterment from his days at Goldman Sachs, advising on the nuance of tax and execution risks in capital markets.

**Bruce Greenwald** is one of the world’s strongest advocates of value investing and assists Betterment with its asset allocation models.
Investment Philosophy
Investment Philosophy

At Betterment Institutional we seek to achieve the best take-home returns possible for clients. Take-home returns are defined as returns net of fees, taxes, and risk-borne and behavioral mistakes.

Seeking Global Market Beta

Betterment Institutional clients are standardly invested in our core globally diversified, index-tracking portfolio. Our investment team does not seek to add any form of market alpha by stock picking, sector weighting, or market timing. Our allocations are strategic, not tactical.

We aim to deliver the highest expected risk-adjusted returns by maximally diversifying client portfolios, using low-cost index-tracking ETFs.

Individual Investor Alpha

Our investment team does seek individual investor alpha - to help clients beat the average investor on a risk-adjusted, after-tax, and after-fee basis. To achieve this, we manage client portfolios on an individual level, systematizing optimal behaviors such as rebalancing, tax loss harvesting, and goal tracking with zero effort on the customers’ part.

Betterment Institutional monitor investors’ behaviors and educates them on decisions and consequences in order to protect clients from choices that may hinder performance.
Portfolio Optimization
Portfolio Optimization

Black Litterman

The Black Litterman methodology constructs highly diversified global portfolios. The Black Litterman process analyzes public market capitalizations to estimate allocation of investment classes across the world, with resulting proportions of each asset class taken as an optimally allocated portfolio.

Black Litterman, by assuming that the global market portfolio is optimal, inverts the usual portfolio optimization process - it allows us to find the expected returns required for each asset class to be held in that proportion.

The model requires three inputs:

1. The global portfolio weights
2. The expected covariance matrix
3. A risk-aversion parameter

Global Portfolio Weights

The graph below depicts the global anchor portfolio weights, which approximates to 42% stocks within the Betterment portfolio allocation.

US Total Stock Market: VTI 8.6%
US Large-Cap Value: VTV 8.7%
US Mid-Cap Value: VOE 2.8%
US Small-Cap Value: VBR 2.4%
Developed Markets: VEA 15.8%
Emerging Markets: VWO 3.2%
Inflation-Protected Bonds: VTIP 5.5%
US High-Quality Bonds: BND 20.5%
US Corporate Bonds: LQD 9.4%
International Bonds: BNDX 17.3%
Emerging Markets Bonds: VWOB 5.9%

Note that US Municipal Bonds replace parts of the above bond holdings in Betterment Taxable portfolios to improve net-of-tax returns.
Covariance Matrix

The covariance matrix is the only input that is based on historical data. We compute the covariance of every asset class from monthly total return data. We do not use this raw matrix, however, as we agree that "nobody should be using the sample covariance matrix for the purpose of portfolio optimization. It contains estimation error of the kind most likely to perturb a mean-variance optimizer."¹ We perform a transformation called shrinkage to counter this bias, as detailed in the paper above, and employ this 'shrunk' covariance matrix in our optimizations.

Integrating Divergent Views

One capability of Black Litterman that investment advisors often find attractive is the ability to systematically incorporate expected returns that diverge from market-implied views. In our core portfolios we use the market-implied views expressed by global markets and do not impose our own views.

Optimization

The global portfolio anchors us at 42% stocks, however we find optimal portfolios at every risk level - every stock interval from 0% stocks to 100% stocks.

This step employs optimizations using both mean-variance, as well as a downside-focused utility measure. Details of the downside optimization can be found in chapters 5 and 6². The resulting allocations are then modified to take practical requirements into account, such as minimal investment allocations.

De-risking the Portfolio

Because clients are US dollar-based investors, we de-risk the portfolio through three means:

1. **Inclusion of ‘cash’**: The portfolio employs very short-duration (< 1 year maturity ceiling, duration of 0.4) SHV ETF, which we consider ‘investment cash.’ At 100% bonds, the portfolio is 100% SHV. This ensures clients are in a portfolio with minimal volatility due to any given risk factor, including interest rate risk.

2. **Inflation-protected bonds**: For bond-heavy portfolios, we also include a short-duration, inflation-protected allocation. We use a short-duration, inflation-protected bond ETF as it tracks inflation better than longer duration TIP funds. Long-duration TIP funds move with inflation expectations and interest rate risk, which is too volatile at lower risk levels.³


³ For a good discussion of these issues, consult: [https://institutional.vanguard.com/iam/pdf/ICRLSTPS.pdf](https://institutional.vanguard.com/iam/pdf/ICRLSTPS.pdf)
3. Higher weights to lower-volatility assets within-basket: Within both the stock and bond baskets, we reduce the relative weight of higher-volatility assets (such as emerging market stocks and bonds) and tilt towards lower-volatility components (US large-cap stocks and US high-quality bonds).

Higher-Risk Portfolios

For higher-risk allocations, we increase the risk in the portfolio by increasing the relative weight within-basket to higher-volatility and diversifying assets. Within bonds, this means corporate bonds and emerging market bonds. Within stocks, this means US mid- and small-cap stocks and emerging market stocks.

Tax Location

Betterment Institutional further customizes these asset allocations depending on the tax status of the account being employed. Within taxable accounts, we replace taxable bonds with US Municipal Bonds and can manage state-specific, Muni-Bond ETFs for residents of California and New York.
**Key Portfolio Allocations**

**Taxable Accounts**

<table>
<thead>
<tr>
<th>Bond Type</th>
<th>10% Stocks</th>
<th>40% Stocks</th>
<th>60% Stocks</th>
<th>90% Stocks</th>
<th>100% Stocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Term Treasuries</td>
<td>50%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Inflation-Protected Bonds</td>
<td>10%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Municipal Bonds:</td>
<td>20%</td>
<td>32%</td>
<td>24%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>US Corporate Bonds</td>
<td>2%</td>
<td>4%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>International Bonds</td>
<td>6%</td>
<td>11%</td>
<td>9%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Emerging Market Bonds</td>
<td>2%</td>
<td>6%</td>
<td>5%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>US Total Stock Market</td>
<td>2%</td>
<td>8%</td>
<td>12%</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>US Large-Cap Value</td>
<td>2%</td>
<td>8%</td>
<td>12%</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>US Mid-Cap Value</td>
<td>1%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>US Small-Cap Value</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Developed Markets</td>
<td>3%</td>
<td>15%</td>
<td>24%</td>
<td>37%</td>
<td>40%</td>
</tr>
<tr>
<td>Emerging Markets</td>
<td>1%</td>
<td>3%</td>
<td>5%</td>
<td>11%</td>
<td>13%</td>
</tr>
</tbody>
</table>
## Tax-Advantaged Accounts

<table>
<thead>
<tr>
<th>Investment Type</th>
<th>10% Stocks</th>
<th>40% Stocks</th>
<th>60% Stocks</th>
<th>90% Stocks</th>
<th>100% Stocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Term Treasuries</td>
<td>51%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Inflation-Protected Bonds</td>
<td>10%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>US High Quality Bonds</td>
<td>13%</td>
<td>21%</td>
<td>14%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>US Corporate Bonds</td>
<td>5%</td>
<td>9%</td>
<td>7%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>International Bonds</td>
<td>9%</td>
<td>17%</td>
<td>13%</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Emerging Market Bonds</td>
<td>2%</td>
<td>6%</td>
<td>5%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>US Total Stock Market</td>
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<td>8%</td>
<td>12%</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>US Large-Cap Value</td>
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<td>16%</td>
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</tr>
<tr>
<td>US Mid-Cap Value</td>
<td>1%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>US Small-Cap Value</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Developed Markets</td>
<td>3%</td>
<td>15%</td>
<td>25%</td>
<td>36%</td>
<td>40%</td>
</tr>
<tr>
<td>Emerging Markets</td>
<td>1%</td>
<td>3%</td>
<td>5%</td>
<td>11%</td>
<td>13%</td>
</tr>
</tbody>
</table>
Investment Selection

When selecting investment vehicles, our investment team prioritizes the effect on take-home returns for your clients. Please read the full detail of our investment selection methodology.\(^4\)

Process for Ongoing Review

We make periodic changes to our core portfolio, and always communicate why and when given changes are taking place. Since our launch in 2010, there have been four substantive changes to the core portfolio:

1. Include Treasury Bonds (SHY) in the fixed-income basket (November 11, 2010).
2. Include international stocks in the stock basket (September 8, 2011).
3. Re-optimize the bond basket with a more diverse set of risk exposures (AGG, LQD, BNDX, VWOB) (December 16, 2013).
4. Include tax-location tailoring (MUB / CMF / NYF) & TLH alternate ETFs (July 7, 2014).

No Tactical Allocations

It’s important to note that we do not perform tactical weight shifts in our core portfolio. Changes in weights are always strategic and never in the pursuit of generating short-term out-performance.

Quarterly Review

Every quarter we review the core components of Betterment Institutional’s portfolio and digital advice. This includes:

**Investment Selection:** Are our chosen ETFs still the best in their class? Are there new ETFs which make accessing a risk premium more efficient for your clients?

**Risk-Free Forward Curve:** The current and future expected risk-free rates form an important part of our returns methodology. The risk-free forward curve and a client’s time horizon are the primary drivers of our savings advice.

Semi-Annual Review

**Asset Class Survey:** Twice a year, we review whether we should update our census of viable asset classes. Changes usually occur as a result of previously inaccessible asset classes becoming attractive due to a combination of improved liquidity or lower cost, or an improvement of tailoring to individual investor circumstances (for example, state-specific municipal bonds).

Global Market Capitalizations: The global portfolio’s weights change over time as markets reprice assets. To ensure our portfolio optimizations follow William Sharpe’s work on Adaptive Asset Allocation policies, we update our portfolio weights periodically.

Investment Management
Investment Management

Betterment Institutional automatically manages each client’s portfolio down to a goal level, using a clearly specified set of rules.

Cashflows

Inflows

Cash deposits into a goal facilitate taxless rebalancing by buying underweight securities. By logging into a customer account, you can see the recommended deposit amount that would prevent a taxable rebalance event.

Outflows

Withdrawals from the portfolio require selling, which involves a two-stage process. First, we sell the most overweight asset class to rebalance the portfolio. Second, for taxable accounts, within each asset class we will sell the specific ETF lots that minimize the tax burden, which is detailed below.

Rebalancing

Ongoing cashflows provide continuous taxless rebalancing, as discussed above, but Betterment Institutional monitors client portfolios on a daily basis to check whether portfolio drift is large enough (over 5%) to warrant an independent rebalance.

In a taxable account, selling in order to rebalance can incur capital gains taxes, and thus we must weigh tax drag against the desire to maintain target allocation. TaxMin, our lot-sorting method described below, will minimize the potential tax liability. In addition, our rebalancing algorithm will not sell lots that would realize short-term capital gains, but it may realize long-term capital gains.
Specific Lot Selling

Betterment Institutional employs a specific lot selling algorithm, TaxMin, by default, which minimizes the tax burden from any given sale transaction of an ETF. For more information, please read our explanation:

https://www.betterment.com/blog/2014/05/14/lowering-your-tax-bill-by-improving-our-cost-basis-accounting-methods/

Tax Loss Harvesting+

Betterment Institutional’s TLH+ is available clients with at least $50,000 under management. You can read a detailed account of TLH+ here:

www.betterment.com/resources/tax-loss-harvesting-white-paper/
Tailoring for Your Business
Tailoring for your business

Betterment Institutional’s core management is built around a “portfolio set,” with support for 101 risk levels (ranging from 0% to 100% stocks). A client may have multiple goals, and each can be set to a different level on this spectrum. If a client also has IRA assets on the Betterment platform, a separate IRA portfolio set brings the total to 202 possible asset allocations. Below is an example of the taxable core portfolio set.

The 101-allocation portfolio set provides a substantial amount of flexibility in tailoring allocations to client needs. However, different models and different views call for different solutions. We understand that firms may want to deviate from our models.

Customized Models

All customizations will be considered on a case-by-case basis, but the general guideline for custom portfolio support is a $50 million AUM commitment within one year. This guideline is in contemplation of custom models that fit within the 101 portfolio set framework, using either the ETFs in Betterment Institutional’s core portfolio set or other ETFs. Advisors are permitted to adjust custom model weights 1-2 times per year.
Certain customizations may require special back-office development or UX design alterations. Examples are ETFs with special tax or distribution characteristics or an approach that breaks with the 101 portfolio set model. Betterment Institutional is open to considering these additional customizations at larger commitment levels.

**Currently Supported Modifications**

The changes below are generally available at the advisor’s discretion.

**Changing existing component weights**

Our 12 portfolio components are detailed above. Advisors may change the portfolio weights at any of the 101 risk levels within a portfolio set to match their desired allocations, including zero weights.

For instance, an advisor may prefer not to value-tilt the portfolio. It is possible to set the allocation weights for value-tilt components to zero at each of the 101 allocation levels and re-allocate that weight to the remaining components.

**Introducing Non-Core ETFs**

Advisors may likewise come to different decisions in their investment selection process. Alternatively, may want to bring appreciated holdings onto the Betterment Institutional platform, consisting of ETFs that are not in the Betterment Institutional core portfolio. To support such assets, advisors may create their own model portfolio components.

Please note that for TLH+ to apply to a component in a custom portfolio set, the component must have a primary and alternate ETF. Betterment’s TLH+ algorithms assume that each primary/alternate pair does not meet the “substantially identical” criteria of the wash sale rule. When customizing these pairs, responsibility for this analysis falls on the advisor.

For TLH+ to operate across a taxable and IRA account, a component that appears in both portfolios must also be assigned a tertiary ticker in order to avoid wash sale collisions that could result in permanently disallowed losses.

**Complex Modifications**

More elaborate changes, like updating model assumptions such as expected returns are possible, but require the use of our in-house experts to implement correctly. As such, they will be considered on a case-by-case basis.

**Changing expected risk and returns**

As part of our asset allocation process, we produce expected returns and risk metrics (volatility and max drawdown). In the case that an advisor wants to deviate from our outputs, we will need to
understand how and why before implementing a change, in part because we want to ensure that the alternate metrics do not cause adverse effects in the user interface.

Breaking with the 101-allocation portfolio set
An advisor may want to depart from the 101-allocation model and offer, for example, only five discrete portfolios. To use this scenario as an example, we can work with the advisor to extrapolate from these five data points and fill in the rest of the 101-allocation matrix.

If, however, that is not a workable solution, substantial UX changes would be necessary. The Betterment user interface relies on an “allocation slider” which operates on 101 settings. A number of features are tied to this paradigm. Any work that would impact these features would likely require a substantial commitment.