November 4th – TLH project update

1. Coded a simple TLH model with the following assumptions:

Client assumptions:

* + - 1. 100,000 initial deposit, no subsequent withdrawls/deposits during investment horizon
      2. 70%/30% initial allocation in Vanguard Total Stock Market ETF (VTI) and iShares 1-5 year laddered corporate bond index (CBO). No re-balancing.
      3. 30 year investment horizon, capital tax rate constant at 0.5\*(0.29 + 0.1316) = 21.08%.
      4. At the end of investment horizon, client liquidates portfolio at capital tax rate 10%.

Model assumptions:

* + - 1. TLH is executed whenever the cumulative depreciation of VTI or CBO exceeds the threshold. Cumulative depreciation is calculated daily with respect to the last harvest date. TLH is also executed whenever the cumulative depreciation of the correlated ETFs to VTI or CBO exceeds the threshold.
      2. Harvested tax losses for a calendar year are invested at the beginning of the following year, earning returns equal to the portfolio for the investment horizon.
      3. Client incurs 0.2% transaction costs (bid-ask spread) for selling an ETF and purchasing a correlated ETF.
      4. For both VTI and CBO, there exists a perfectly correlated ETF available for substitute. That is, the daily returns are identical.

1. Downloaded daily price data (close price, adjusted for splits but not dividends) for VTI and CBO, calculated the daily log-returns, and fed it into the TLH model. VTI data back to Jun-2001, CBO data back to Feb-2009. Model run on the intersection of these periods.



1. Ran the TLH model for combination of thresholds varying from 5% to 20%. The optimal combination of threshold to execute TLH is 11% for VTI. CBO was never tax-harvested. The after-tax dollar growth is **$66,841**. The after-tax dollar growth without TLH is **$65,778**. Period is Feb-26-2009 to Oct-31-2014.

Next Steps: 1. Download data for other ETFs and include it in the model. 2. Estimate statistical model of returns and simulate future daily returns, and run TLH model based on these.

November 5th – TLH update

1. Fixed TLH code to make it run faster. It can handle a portfolio of multiple assets for an arbitrary time horizon.
2. Re-ran TLH model for daily return data for VTI and CBO. Period is Feb-26-2009 to Oct-31-2014. Thresholds are varied from 2% to 20%. Optimal threshold is 11.0% for VTI and 2.5% for CBO. After-tax growth using these thresholds is **$88836**. After-tax growth with no TLH is **$85250**.
3. Ran model on portfolios consisting of single ETFs with the following parameters: $100,000 initial deposit, 21.08% capital tax rate during investment horizon, 10% capital tax rate at end of investment horizon. Position is fully liquidated at end of investment horizon. TLH threshold is varied from 2% to 20% (by 0.5% increments) to determine the optimal threshold. Optimal in the sense that after-tax gain is maximized. See next page for some graphics.
   1. VTI: Optimal threshold: 14.5%. After-tax gain: $94,747. After-tax gain without TLH: $78,181.
   2. CBO: Optimal threshold: 3.0%. After-tax gain: -$2,636. After-tax gain without TLH: -$2,820.
   3. XIC: Optimal threshold: 15.0%. After-tax gain: $85,660. After-tax gain without TLH: $74,220.
   4. IEFA: Optimal threshold: 2.5%. After-tax gain: $20,151. After-tax gain without TLH: $19,935.
   5. IEMG: Optimal threshold: 4.5%. After-tax gain: $5,145. After-tax gain without TLH: $4,125.
   6. XHY: Optimal threshold: 6.0%. After-tax gain: $7,370. After-tax gain without TLH: $6,596.
4. Found some articles and blogposts on benefits of TLH:
   1. Wealthfront TLH Whitepaper: <https://www.wealthfront.com/whitepapers/tax-loss-harvesting>. Computes an annual Tax Alpha of about 1-2% for most scenarios. But they neglect the (much) larger capital tax gain paid at liquidation.
   2. Betterment TLH Whitepaper: <https://www.betterment.com/resources/research/tax-loss-harvesting-white-paper/>. Estimates a 0.77% to a typical customer’s after-tax return annually. They also identify types of investors who benefit most (and least) from TLH.
   3. Michael Kitces’s detailed criticism to Wealthfront Whitepaper: <http://www.kitces.com/blog/wealthfront-tax-loss-harvesting-white-paper-how-not-to-calculate-tax-alpha/>

Graphics for 3)

 

 

 

 



 