AN IN-DEPTH LOOK AT OPTIMAL REBALANCING STRATEGIES

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MICHAEL E. KITCES
MSFS, MTAX, CFP®, CLU, CHFC, RHU, REBC, CASL
Partner. Director of Research, Pinnacle Advisory Group
Publisher. The Kitces Report, www.kitces.com
Twitterer. @MichaelKitces, www.twitter.com/MichaelKitces

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PORTFOLIO REBALANCING

• Conventional view on rebalancing:

Make sure you rebalance your portfolio.

Rebalancing is one of the few free lunches out there.

You’re generally selling things that have gone up the most and buying things that have gone down the most.

Cliff Asness, AQR Investments

Anness, Bursting the (Latest) Bubble. WSJ. 1/14/2004
**Portfolio Rebalancing**

- Concerns about rebalancing?

  When you buy risk assets during economic distress, there is a significant probability that, in the interim, your portfolio may suffer a greater decline than if you didn’t rebalance.

  In the short run, your probability of being fired as a fiduciary, of being blamed by clients you advise, and, most importantly, of marital strife, becomes moderately higher when you rebalance.

  Jason Hsu, Research Affiliates

  Hsu, Why We Don’t Rebalance, Research Affiliates, July 2012

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**Portfolio Rebalancing**

- The timing of rebalancing?

  “The market can remain irrational longer than you can remain solvent.”

  [Or employed]

  [Or happily married]

  John Maynard Keynes
PORTFOLIO REBALANCING

• An In-Depth Look At Rebalancing
  • What is rebalancing?
    • Does it enhance returns?
    • Does it increase risk? Does it reduce risk?
  • Does it matter what you rebalance between?
  • How often should you Rebalance?
    • What are the “best practices” for rebalancing?
  • What is rebalancing really worth at the end of the day?
    • What are the potential benefits?
    • What are the risks to consider?

PORTFOLIO REBALANCING

• What Is Rebalancing?
  • Setting the portfolio back to its original asset allocation, after market returns distort the original allocation

- Otherwise your portfolio risk exposure changes!
PORTFOLIO REBALANCING

• What Is Rebalancing?
  • Returns may be enhanced by selling what was up, and buying what was down!

Portfolio Value by Asset Class

<table>
<thead>
<tr>
<th>Year</th>
<th>No Rebalancing</th>
<th>Rebalancing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$950,000</td>
<td>$975,000</td>
</tr>
<tr>
<td>2</td>
<td>$1,000,000</td>
<td>$1,025,000</td>
</tr>
<tr>
<td>3</td>
<td>$1,050,000</td>
<td>$1,075,000</td>
</tr>
<tr>
<td>4</td>
<td>$1,075,000</td>
<td>$1,100,000</td>
</tr>
<tr>
<td>5</td>
<td>$1,100,000</td>
<td>$1,125,000</td>
</tr>
<tr>
<td>6</td>
<td>$1,125,000</td>
<td>$1,150,000</td>
</tr>
<tr>
<td>7</td>
<td>$1,150,000</td>
<td>$1,175,000</td>
</tr>
<tr>
<td>8</td>
<td>$1,175,000</td>
<td>$1,200,000</td>
</tr>
</tbody>
</table>

Final Portfolio Value: $1,166,750

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@michaelkitces
PORTFOLIO REBALANCING

• Fundamental benefit of rebalancing
  • Create sell-high-buy-low opportunities (return enhancement)
    • Buy stocks when they're down, using bonds that were up

PORTFOLIO REBALANCING

• Why Stock/Bond Rebalancing matters
  • Stocks also have better returns in the long run…
    • Causes the portfolio to overweight stocks over time!

![Chart showing the growth of stocks and bonds over time](chart.png)
PORTFOLIO REBALANCING

• The “problem” with stock/bond rebalancing
  • Return drift causes stocks to become overweight…
    • But rebalancing just reduces exposure to the higher returns!

PORTFOLIO REBALANCING

• Real-world stock/bond rebalancing
  • In practice stocks don’t always go straight up
    • They may temporarily decline and recover later
    • On average is it good more than it’s bad? Rarely.
PORTFOLIO REBALANCING

• Rebalancing between similar-return asset classes
  • Less return drag, and more opportunities for enhancement?
  • Still not necessarily much better, but at least ‘less bad’?!

Note: Based on Rolling 30-Year Returns, 50/50 Large Cap/Small Cap.

PORTFOLIO REBALANCING

• Impact of Rebalancing: Depends on WHAT You’re Rebalancing!?
  • Similar- or different-return asset classes?

<table>
<thead>
<tr>
<th></th>
<th>IMPACT ON EXPECTED RETURNS</th>
<th>IMPACT ON RISK MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investments with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Similar Returns</td>
<td>↑</td>
<td>→</td>
</tr>
<tr>
<td>Investments with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Different Returns</td>
<td>↓</td>
<td>↑</td>
</tr>
</tbody>
</table>
PORTFOLIO REBALANCING

• Optimal Rebalancing Frequency
  • How often SHOULD you rebalance?
    • Often enough to capture buy-low sell-high opportunities
    • Often enough to limit becoming too overweight to equities
  
  • But you can rebalance too frequently…

PORTFOLIO REBALANCING

• Frequent Rebalancing And Momentum
  • Monthly vs Annual Rebalancing in a Bear Market

Portfolio Comparisons based on Annual vs. Monthly vs. Buy & Hold Strategies, 2000-2002

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>S&amp;P 500</td>
<td>$930,000</td>
<td>$945,000</td>
<td>$960,000</td>
</tr>
<tr>
<td>Buy &amp; Hold</td>
<td>$930,000</td>
<td>$935,000</td>
<td>$940,000</td>
</tr>
<tr>
<td>Annual</td>
<td>$930,000</td>
<td>$935,000</td>
<td>$940,000</td>
</tr>
<tr>
<td>Monthly</td>
<td>$930,000</td>
<td>$935,000</td>
<td>$940,000</td>
</tr>
</tbody>
</table>
**Portfolio Rebalancing**

- Frequent Rebalancing and Momentum

- Monthly vs Annual Rebalancing in a Bull Market

Portfolio Comparisons based on Annual vs. Monthly vs. Buy & Hold Strategies, 2003-2005

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Annually</th>
<th>Quarterly</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. Equity Allocation</td>
<td>84.1%</td>
<td>60.5%</td>
<td>60.2%</td>
<td>60.1%</td>
</tr>
<tr>
<td>Annual Turnover</td>
<td>0%</td>
<td>1.7%</td>
<td>2.2%</td>
<td>2.7%</td>
</tr>
<tr>
<td>No. Rebalancing Events</td>
<td>0</td>
<td>83</td>
<td>335</td>
<td>1,008</td>
</tr>
<tr>
<td>Avg. Annualized Return</td>
<td>9.1%</td>
<td>8.6%</td>
<td>8.6%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Volatility</td>
<td>14.4%</td>
<td>11.9%</td>
<td>12.2%</td>
<td>12.1%</td>
</tr>
</tbody>
</table>

PORTFOLIO REBALANCING

- Momentum and Optimal Rebalancing Frequency
  - Often enough to capture the extremes
  - Not so often you cut off the momentum along the way
  - But is that even possible with multiple asset classes?

- Tolerance Band Rebalancing
  - If we’re trying to rebalance at the extremes, don’t do it based on the times, do it based on the extremes
Portfolio Rebalancing

- Tolerance Band Rebalancing
  - Can trigger rebalancing more or less frequently!

Portfolio Rebalancing

- Tolerance Band Rebalancing
  - Presumes that asset classes will only outperform or underperform each other by "so much" before snapping back
  - Sample tolerance band could be +/- 20% of target weighting
Portfolio Rebalancing

- Tolerance Band Rebalancing
  - If investments trend together, rebalancing trade frequency (and transaction costs) are just reduced
    - So it's really all about relative returns

- In a multi-asset-class portfolio, rebalancing only triggers for the investment(s) that actually cross the thresholds
PORTFOLIO REBALANCING

• Finding the Optimal Tolerance Bands
  • Absolute thresholds
    • Become impossible to trigger for small investments and with uneven weightings
    • If the portfolio is 90/10, then going +/- 10% will “never” trigger a bond trade, might have to be smaller
    • If the portfolio is 50/10/10/5/5/5/5 then a smaller threshold will trigger ‘constant’ rebalancing on the core!

• Relative thresholds becomes necessary
  • 20% of original target
    • 50% allocation is at +/- 10%
    • 5% allocation is at +/- 1%
    • Still has to beat everything else by ~20% to actually trigger this (even just for a 1% change)
Portfolio Rebalancing

- Finding the Optimal (Relative) Tolerance Bands
- Still has a similar challenge to manage momentum
  - Narrow tolerance bands trigger ‘extra’ trades and sell winners early or over-invest losers still falling
  - But wide tolerance bands never trigger at all!

![Diagram](image)

Portfolio Rebalancing

- Finding the Optimal Tolerance Bands
- What appears to work in multi-asset-class portfolios?

| Averages of Rebalance Return Benefits; 15 Rolling Periods with 12 Monthly Starts | Look Intervals in Market Days |
|---|---|---|---|---|---|---|---|
| | 250 | 125 | 60 | 20 | 10 | 5 | 1 |
| 0% | 0.13% | 0.07% | 0.08% | **0.02%** | **-0.16%** | **-0.40%** | **-2.44%** |
| 5% | 0.13% | 0.09% | 0.11% | 0.10% | 0.10% | 0.11% | 0.09% |
| 10% | 0.15% | 0.13% | 0.18% | 0.16% | 0.19% | 0.18% | 0.16% |
| 15% | 0.15% | 0.19% | 0.30% | 0.26% | 0.25% | 0.23% | 0.22% |
| 20% | 0.16% | 0.22% | 0.25% | **0.33%** | **0.38%** | **0.39%** | **0.38%** |
| 25% | 0.14% | 0.21% | 0.21% | **0.22%** | **0.27%** | **0.30%** | **0.35%** |
| 100% | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** |

Portfolio Rebalancing

• Rebalancing Strategies For Savers
  • For savers, simply add to the investment that is performing the worst!
    • You’re systematically buying low!
    • It even saves on transaction costs!

<table>
<thead>
<tr>
<th>Beginning of Year</th>
<th>End of Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Value</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>$50,000</td>
<td>$100,000</td>
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<tr>
<td>$100,000</td>
<td>$150,000</td>
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<tr>
<td>$150,000</td>
<td>$200,000</td>
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<tr>
<td>$200,000</td>
<td>$250,000</td>
</tr>
<tr>
<td>$250,000</td>
<td>$300,000</td>
</tr>
</tbody>
</table>

ADD NEW CONTRIBUTIONS HERE FIRST

Portfolio Rebalancing

• Rebalancing Strategies For Retirees
  • Works in reverse of savers – sell whatever is overweight
    • You’re systematically selling high!
    • Again saves on transaction costs!
    • Also indirectly manages sequence risk!

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<td>$150,000</td>
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<tr>
<td>$150,000</td>
<td>$200,000</td>
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<tr>
<td>$200,000</td>
<td>$250,000</td>
</tr>
<tr>
<td>$250,000</td>
<td>$300,000</td>
</tr>
</tbody>
</table>

ADD NEW CONTRIBUTIONS HERE FIRST

RETIREE SELLS THIS INVESTMENT FIRST
Portfolio Rebalancing

• Using Dividends & Interest For Rebalancing?
  • Better than just auto-reinvesting into the original?
    • But will depend on your transaction costs for reinvest (vs buying something new?)
  • May want to accumulate until cash is at a critical mass?
    • Large enough to manage transaction cost, low enough to avoid cash drag?
    • Unless you have NTF investment options?

Portfolio Rebalancing

• Tolerance Vs Time Interval Rebalancing
  • More favorable when markets are up on average

Reduces transaction costs!
• **Economic Benefits of Rebalancing**
  
  • Returns generally 0.50% lower from time-based rebalancing
  
  • Though *risk-adjusted* returns were improved

<table>
<thead>
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<td>12.1%</td>
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• Daryanani found slight return enhancement from tolerance bands
  
  • Long-term value of ~0.40%/year
  
  • Greater value in times of volatility?

<table>
<thead>
<tr>
<th>Averages of Rebalance Return Benefits; 15 Rolling Periods with 12 Monthly Starts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look Intervals in Market Days</td>
</tr>
<tr>
<td>Rebalance Bands</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>10%</td>
</tr>
<tr>
<td>20%</td>
</tr>
<tr>
<td>25%</td>
</tr>
</tbody>
</table>

• **Economic Benefits of Rebalancing**
  
  • Value depends on what you rebalance amongst?

<table>
<thead>
<tr>
<th></th>
<th>Expected Returns</th>
<th>Volatility</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good for Rebalancing</td>
<td>Similar</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Bad for Rebalancing</td>
<td>Different</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>
PORTFOLIO REBALANCING

• Psychological Benefits of Rebalancing
  • A systematic way of selling high and buying low?
    → May provide a unique ‘discipline’?
  • Effective way for savers to add more to what’s doing worst?
  • Comforting for retirees that they only ever sell what’s up and take gains off the table?

• Summary of Rebalancing
  • More about risk management than return enhancement
    → Across stocks/bonds, return improvement is modest at best
  • Time-based rebalancing is somewhat inefficient
    → Excess frequency and transaction costs in momentum markets
    → And can miss short-term opportunities in volatility
    → Improves risk-adjusted returns “in spite of” itself?
  • Tolerance-band strategies appear more favorable
    → Can target ~20% bands
    → Check often, trade when necessary
    → Target existing inflows/outflows to further minimize transaction costs
Questions?

Handouts & additional materials:
www.kitces.com/NAPFADC19

Contact: questions@kitces.com