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THE SCIENCE BEHIND THE NUMBERS: PART 3 - UNDERSTANDING REBALANCING?

At Hummel Financial Group it is our responsibility to provide clients with the greatest probability of long-term investment success. In "The Science Behind the Numbers", Parts 1 and 2, we worked through the importance of indexing and persistence in the portfolio construction process. Once this portfolio construction is complete, it must be managed over the life of the portfolio. A rebalancing methodology is a critical component of any sound investment strategy.

Rebalancing is the process of realigning the weightings of an investment portfolio. Rebalancing serves three main functions:

1. The primary goal of rebalancing is to minimize risk relative to a target asset allocation. A portfolio's asset allocation is the major determinant of a portfolio's risk and return characteristics. Failure to rebalance causes the portfolio to drift from its target asset allocation, which significantly increases the long-term risk of the portfolio.
2. Our approach advocates long-term thinking. Investment decisions are based on our disciplined investment process and not shifting market perspectives (market timing), which are susceptible to irrational emotional behavior.
3. Systematic rebalancing is a scientific form of market timing that removes emotion from the buy/sell decision. It systematically buys asset groups where short-term returns have lagged the portfolio average (buying low) and sells asset groups that have outpaced the portfolio average (selling high).

So, what do the numbers say? Does rebalancing minimize long-term risk? Does it provide market timing functions? And is there an optimal frequency or threshold for rebalancing? Our answer to these questions lies in dissecting numerous years of mutual fund and stock market data.

The Results…

Extensive research has been done on best practices for portfolio rebalancing, and why rebalancing is so important. These reports measure the trade-off between rebalancing decisions and a portfolio's risk and return characteristics, and outlines the pros and cons of rebalancing and how it controls portfolio risk.

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FUNCTION 1 AND 2: MINIMIZE RISK & UTILIZE LONG-TERM INVESTMENT THINKING

Equity assets outperform bond assets in the long-run due to a phenomenon called **equity risk premium**. This exists because markets reward investors who take more risk. As the equity component in a portfolio increases, the expected return of the portfolio, and the volatility of the portfolio, increase as well. The asset allocation decision is the most important decision in creating an investment plan as it strikes the balance between the expected return and risk profile of the portfolio. Selecting the proper asset allocation for a client is based on numerous variables; investment time horizon, client risk appetite, cash flow needs, etc.

By staying focused on systematic rebalancing, it creates an investment atmosphere focused on the long-term perspective of a portfolio. It ensures an investor sticks to their target asset allocation, which was specifically designed to help them achieve their investment goals. If an investor fails to rebalance, the portfolio drifts away from the original asset allocation and changes the risk dynamics of the portfolio. **Figure 3** below compares a constantly rebalanced portfolio to a portfolio that is never rebalanced. This shows the asset allocation drift that can occur when a portfolio is not properly rebalanced.

In this scenario, an original 50% stock/50% bond portfolio drifted to ending weights of 81% stocks and 19% bonds. This asset allocation drastically increases the risk level of the portfolio, while only modestly increasing portfolio return.

Portfolio drift of this kind significantly exposes an investor to market volatility. An important thing to note is in an investment plan, an investor's risk tolerance may decrease as the investor approaches their planned goals. If an investor does not properly rebalance their portfolio they are actually increasing their portfolio's risk level. Thus over time a non-rebalanced portfolio and an investor's planned risk tolerance diverge, and the portfolio drift magnifies an investors relative risk exposure.

Figure 3. Comparing a hypothetical 50% global stocks/ 50% global bonds annually rebalanced portfolio versus a 50%/50% never-rebalanced portfolio: 1926 through 2014

	Annually rebalanced	Never-rebalanced
Maximum stock weighting	60%	97%
Minimum stock weighting	35%	27%
Average stock weighting	51%	81%
Final stock weighting	49%	97%
Average annualized return	8.1%	8.9%
Annualized volatility	9.9%	13.2%

Notes: This illustration is hypothetical and does not represent the returns of any particular investment. We assumed a portfolio of 50% global stocks/50% global bonds. All returns in nominal U.S. dollars. For benchmark data, see box on page 2. There were no new contributions or withdrawals. Dividend payments were reinvested in equities; interest payments were reinvested in bonds. There were no costs. All statistics were annualized.

Sources: The Vanguard Group, Inc., calculations, based on data from FactSet. Stock weightings rounded to nearest whole number.

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Figure 5. Comparing hypothetical portfolio rebalancing results for 'time-only' strategy: Various frequencies, 1926 through 2014

Monitoring frequency	Monthly	Quarterly	Annually	Never
Threshold	0%	0%	0%	NA
Average equity allocation	50.1%	50.2%	50.6%	80.6%
Costs of rebalancing				
Annual turnover	2.6%	2.2%	1.7%	0.0%
Number of rebalancing events	1,068	355	88	0
Absolute framework				
Average annualized return	8.0%	8.2%	8.1%	8.9%
Annualized volatility	10.1%	10.1%	9.9%	13.2%

Notes: This illustration is hypothetical and does not represent the returns of any particular investment. We assumed a portfolio of 50% global stocks/50% global bonds. All returns in nominal U.S. dollars. For benchmark data, see box on page 2. There were no new contributions or withdrawals. Dividend payments were reinvested in equities; interest payments were reinvested in bonds. There were no costs. All statistics were annualized.

Sources: The Vanguard Group, Inc., calculations, based on data from FactSet.

Figure 5 compares hypothetical portfolios that are rebalanced monthly, quarterly, annually, and never. The results show that as our sample portfolio is rebalanced more frequently it stays more true to the original 50% equity allocation, this is intuitive as the higher frequency of rebalancing minimizes portfolio drift. That said, there are minimal effects on the actual average annualized return and annualized volatility of the three rebalanced portfolio's. Material differences only arise when a portfolio is not rebalanced at all.

This tells us that frequency of rebalancing is not as important as the actual practicing of it. Investors have flexibility in their chosen rebalancing frequencies as long as the rebalancing strategy remains consistent. Rebalancing ensures investors recapture the original risk-return characteristics of their planned portfolio and minimize risk relative to their target asset allocation.

What the Numbers Tell Us, and our Resulting Strategy…

We base our investment strategy on empirical market research and the data tells us this:

- Rebalancing minimizes the risk of a portfolio by keeping a portfolio's asset allocation in tune with the investment objectives originally achieved in the portfolio construction process.
- Rebalancing focuses decision making on the long-term investment goals. Rebalancing portfolios consistently aligns expected return and risk characteristics with the investment strategy, instead of focusing on short-term trendy asset classes.
- Rebalancing is a form of empirical market timing and is often counter intuitive.

At Hummel Financial Group we manage our portfolios by staying intensely focused on our clients' long-term investment goals. We build strong investment portfolios in the construction phase, and then we stick to this asset allocation via regular rebalancing. This ensures we do not fall into a trap of short-term, emotionally-driven decision making, thus giving our clients the greatest odds of long-term investment success.

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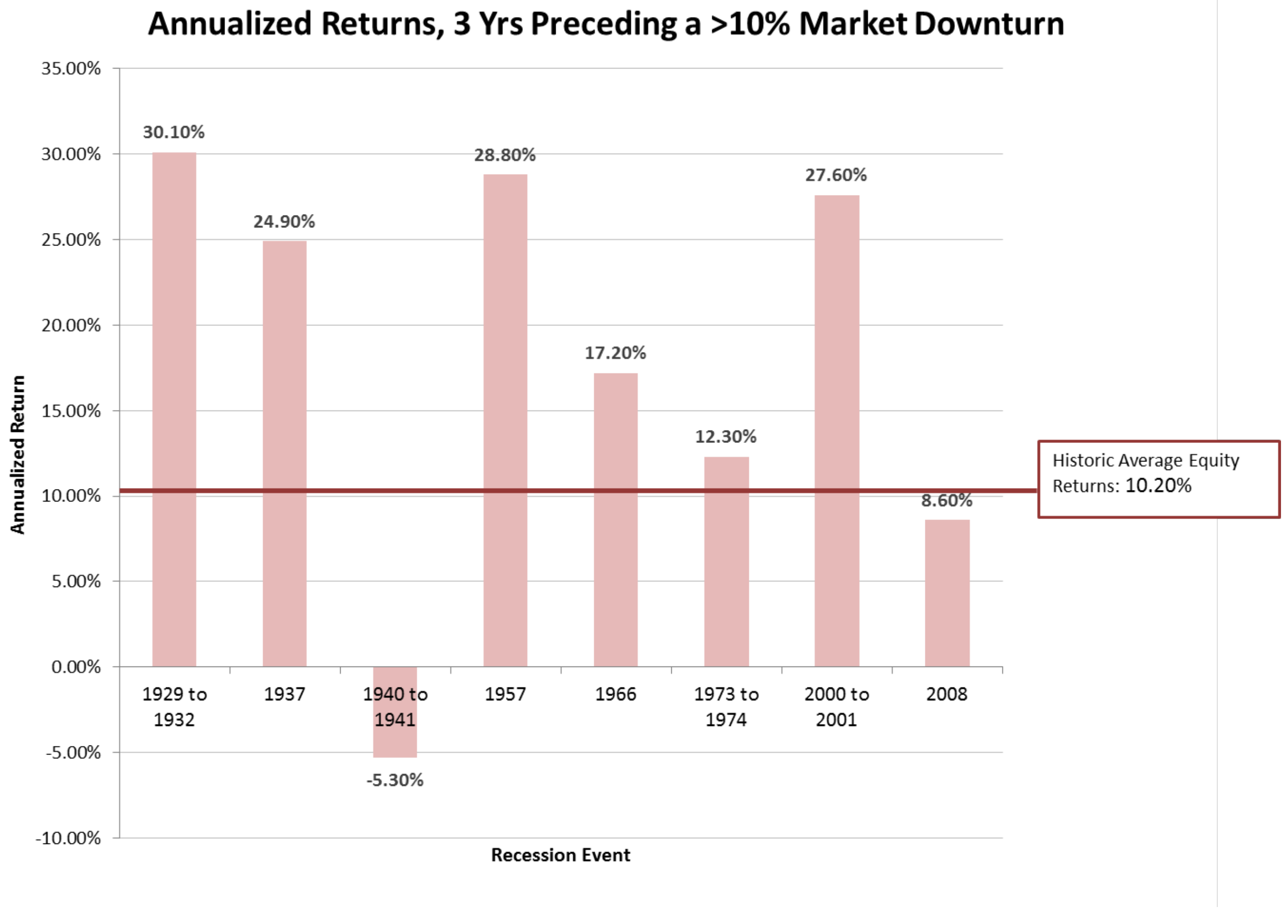
FUNCTION 3: INDIRECT MARKET TIMING

Rebalancing seems practical in nature, but can be very challenging in reality. In times of distress it becomes difficult for investors to rebalance their portfolios because investors are reluctant to purchase assets which have recently underperformed. It is equally difficult to rebalance in bull markets because investors hesitate to sell asset classes that have had exceptional performance in order to purchase assets that have had weaker performance. For these reasons it is vital to construct a portfolio with pre-set asset allocations, and then re-balance consistently back to these allocations. By doing so we take some of the emotion out of the investment decisions. Markets cycle and trend back to their long-term return averages, which is why it is important to rebalance out of elevated assets and into depressed assets. Consider the following illustrations *(this illustration was drawn from data taken from source number three)*:



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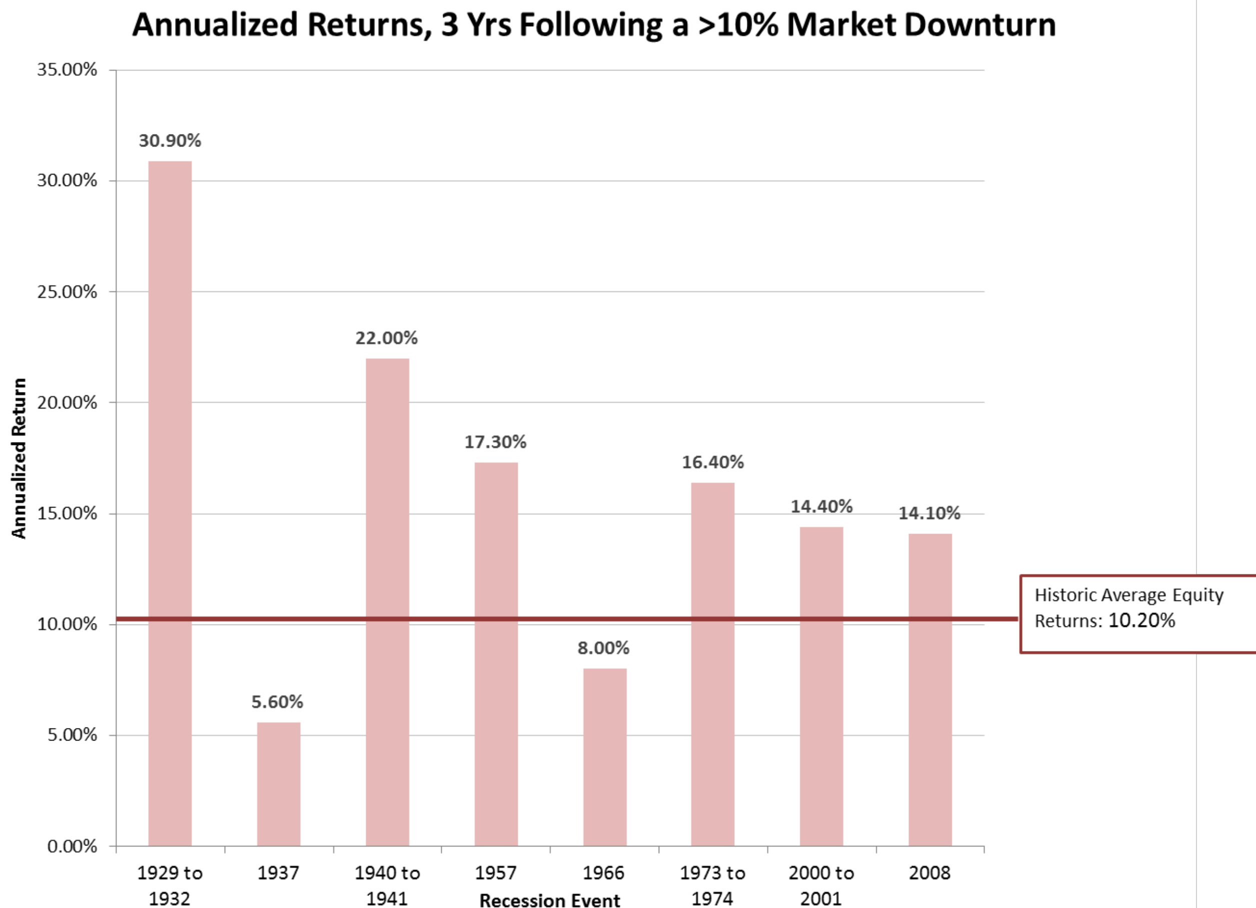
On the previous page, the graph shows 3-year annualized returns preceding all 10% or greater market downturns. The data shows that for six out of the eight events, annualized returns preceding the downturns were significantly above the long-term average equity return. In the graph below this same concept proves true as well. Six of the eight three-year periods following a 10% downturn event also have average returns greater than the long-term historic average equity return. This concept makes sense due to the cyclical nature of the equity markets.

What these graphs reveal is that strong equity markets tend to proceed and follow recessions due to a reversion back to their average long-term growth rate. By having a scientific methodology towards rebalancing, we are leveraging this "reversion to the mean" concept by buying into weak markets and selling out of strong markets using quantitative mechanisms *(this illustration was drawn from data taken from source number three)*:



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What the Numbers Tell Us, and our Resulting Strategy...

We base our investment strategy on empirical market research, and what the numbers tell us is this. Investors who do not rebalance their portfolios either:

a. Miss out on subsequent equity returns by failing to increase their equity allocation during difficult stock markets

   or

b. Maintain a portfolio that is overweight in equities after a bull market, and therefore are increasingly vulnerable to equity market corrections.

At Hummel Financial Group we design our portfolio asset allocations based on a client's needs, and stick to this asset allocation via systematic rebalancing. This ensures we do not fall victim to short-term, emotionally-driven, decision making.

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Sources:

1. Vanguard. (2015). Best practices for portfolio rebalancing. Retrieved from Vanguard Research (https://www.vanguard.com/pdf/ISGPORE.pdf)

2. Vanguard. (2010). Best practices for portfolio rebalancing. Retrieved from Vanguard Research (https://www.vanguard.com/pdf/icrpr.pdf)

3. Dimensional Fund Advisors LP. (2018). Matrix Book 2018 – Historical Returns Data Canadian Dollars.

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