Diversifying with Emerging Market ETFs

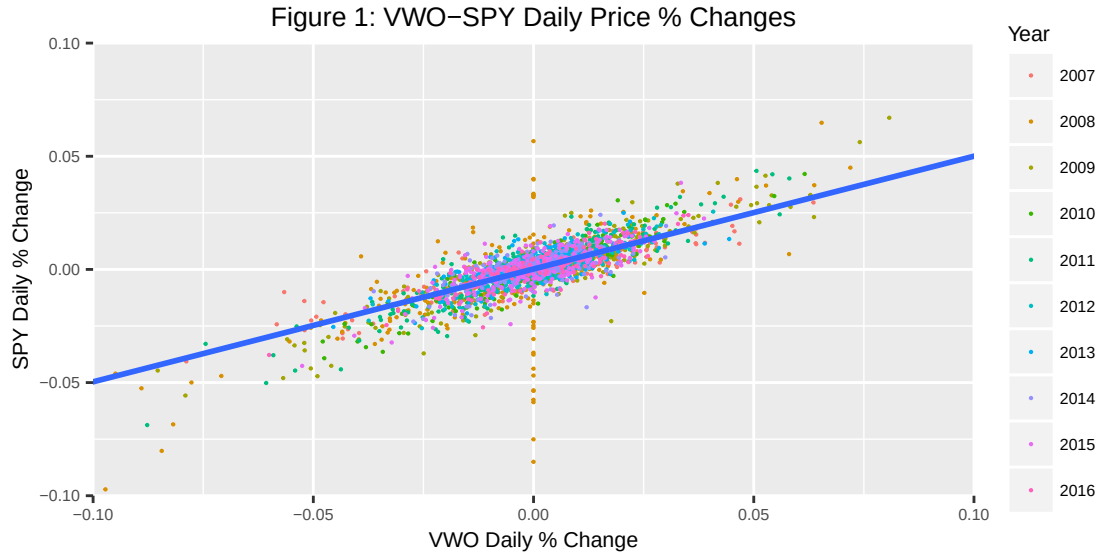
We briefly explore a position arguing **against** the inclusion of an emerging market ETF in a portfolio centered around US large cap holdings. In this exploratory salvo we ignore fees/expenses, market timing, market impact, etc. We assume a core holding of SPY (tracking the S&P 500) and explore the inclusion of VWO (tracking the FTSE Emerging Market Index).

1. We look at historical trends;
2. We do some portfolio backtesting.

Portfolio Objectives: For completeness we target: a diversified portfolio with a moderate to high risk appetite; an investment horizon of ~5-10 years of committed capital.

Rationale for inclusion: The allure of emerging market equities is high single digit returns uncorrelated with mature markets. Emerging market equities have however shown a high degree of linkage with and dependence on the US economy and the USD.

1. Historical Trends

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##     Estimate   Std. Error      t value     Pr(>|t|)
##  0.498503587  0.009841762 50.651866122  0.000000000
```

Changes in VWO are highly correlated with changes in SPY, with a slope of ~ 0.5. This relationship has been been consistent over the sampled years.

Yet the prices of the two assets have diverged significantly over time.

Figure 2: SPY−VWO Daily Prices

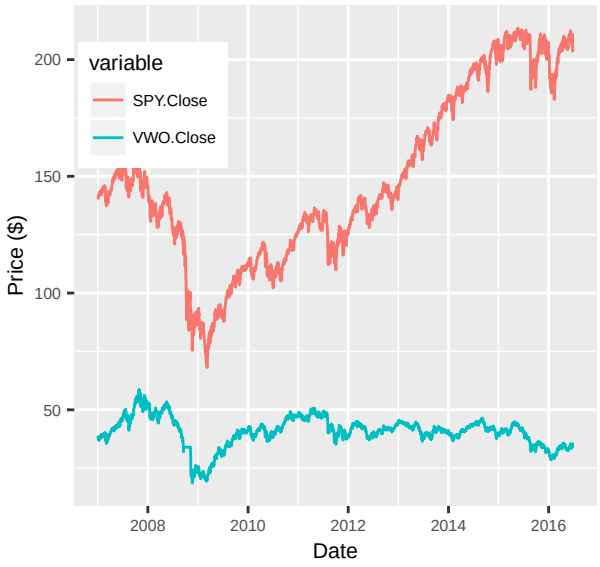

Figure 3: VWO−SPY Daily Price Plot

If we look at the slightly unorthodox price scatter plot (Figure 3), we can begin the see a story. Daily % changes in SPY and VWO are highly correlated (Figure 1), yet the price paths for these assets have diverged greatly (Figure 2). Unlike SPY, VWO is not able to hold onto increases in value, but rarely exits the narrow band of $30-$50.

This infact suggests an interesting pairs trade - buying SPY and selling VWO. We could capture the long-term SPY increases over VWO, and in the short-term reduce portfolio volatility since SPY-VWO price movements are correlated. (The coefficient from our linear fit in Figure 1 suggests holding VWO in a ratio of -0.5:1 to fully hedge price movements).

2. Portfolio Backtesting

We perform some back-testing on a two-asset portfolio of SPY and VWO, with 90-day rebalancings.

Table 2: Optimal VWO Holdings

Category	Quantity Maximized	Optimal VWO Amount
Return	Final Value	-93.05%
Return	Final Rebaance Period	-104.98%
Volatility	Lifetime Average-to-Trough	-20.15%
Volatility	Lifetime Peak-to-Trough	-17.00%

'Lifetime Average-to-Trough' refers to minimizing the Average-to-Trough value over all rolling 90-day periods, and similarly for the Lifetime Peak-to-Trough.

When we impose the constraint that VWO holdings remain positive the optimal VWO holdings are 0%. This begs the question if it doesn't make sense to hold VWO when our universe is SPY and VWO, could it make sense to hold VWO with SPY if our asset universe expands? This author has tried to think of sample cases where this could happen, but has not had much luck.

Conclusion

Our primary contention is that VWO does not hold its price well. Moreover, summary measures of expected return & variance can be misleading - we would have a different picture of VWO by just looking at expected returns and variance-covariances. Relationships where certain assets only move within narrow price bands despite price movements being strongly correlated to other assets are surprisingly common in our sentiment-driven financial markets. These relationships can fly below the radar of many portfolio optimization techniques that form allocations based on expected returns and variance-covariances (Markowitz model, Black-Litterman, etc.). It is not clear how to expand a portfolio optimization paradigm to incorporate dynamics of this kind, though targeted back-testing could unclear this.