

## What?

Management of our financial portfolio needs to be evaluated. Have we been successful or have we failed?

Obviously, having positive returns usually translates as having success. However, as part of our portfolio management, we are not only interested in positive returns. It is important to assess whether we followed our investment policies and whether we reached our investment goals.

Just as important is our relative success or failure. Our risk and return will be compared to those of major benchmarks.

## Our portfolio

Let's start with defining our portfolio. We will include an equity ETF (DIA) with a portfolio weight of 70% and a bond ETF (BND) with a weight of 30%.

## Treynor Ratio

One of our performance ratios is the Treynor ratio. Treynor ratio is based on the undiversifiable market risk (i.e. Beta). With this ratios, we evaluate how much return we realize per market risk level.

Let's evaluate our portfolio's performance with respect to Treynor ratio. We will compare our performance to several popular equity ETFs. SPY is the SPDR S&P 500 ETF. IJH is the iShares Core S&P Mid-Cap ETF. IJR is the iShares Core S&P Small-Cap ETF. OEF is the iShares S&P 100 ETF. QQQ is the Invesco QQQ Trust (NASDAQ). IWM is the iShares Russell 2000 ETF. IYR is the iShares U.S. Real Estate ETF. VEU is the Vanguard FTSE All World Ex US ETF.

```
local symbols = "BND DIA SPY IJH IJR OEF QQQ IWM IYR VEU"
fetchyahoquotes `symbols', freq(d) chg(ln) start(31dec2017)
gen ln_portfolio = (ln_BND*0.30)+(ln_DIA*0.70)
collapse (sum) ln*
save temp1.dta, replace
fetchyahoquotes `symbols', freq(d) chg(ln) start(31dec2017)
gen ln_portfolio = (ln_BND*0.30)+(ln_DIA*0.70)
foreach aa in `symbols' "portfolio" {
    reg ln_`aa' ln_SPY
    mat temp=r(table)
    local beta_`aa' = temp[1,1]
    mat drop temp
}
collapse (sd) ln*
append using temp1.dta
erase temp1.dta
xpose, clear varname
rename v1 sd
rename v2 return
rename _varname symbol
replace symbol = substr(symbol, "ln_", "", .)
order symbol sd return
gen beta=.
foreach aa in `symbols' "portfolio" {
```

```
    replace beta = `beta_`aa'' if symbol=="`aa'"
}
gen treynor_ratio = return / beta
gsort -treynor_ratio
browse symbol treynor_ratio
```

symbol	treynor_ra-o
BND	.5952549
IYR	.0874643
QQQ	.0486508
DIA	.0426678
IJR	.0388547
portfolio	.0357563
OEF	.0351087
SPY	.0319648
IWM	-.0088897
IJH	-.0110993
VEU	-.146526

Notice that, with respect to the Treynor ratio, our portfolio outperformed five of the equity ETFs including the ETF for the S&P-500 index.

These results are specific to 2018.

Let's test our portfolio during 2017. This would be referred to as out-of-sample testing.

```
local symbols = "BND DIA SPY IJH IJR OEF QQQ IWM IYR VEU"
fetchyahoquotes `symbols', freq(d) chg(ln) start(31dec2016) end(31dec2017)
gen ln_portfolio = (ln_BND*0.30)+(ln_DIA*0.70)
collapse (sum) ln*
save temp1.dta, replace
fetchyahoquotes `symbols', freq(d) chg(ln) start(31dec2016) end(31dec2017)
gen ln_portfolio = (ln_BND*0.30)+(ln_DIA*0.70)
foreach aa in `symbols' "portfolio" {
    reg ln_`aa' ln_SPY
    mat temp=r(table)
    local beta_`aa' = temp[1,1]
    mat drop temp
}
collapse (sd) ln*
append using temp1.dta
erase temp1.dta
xpose, clear varname
rename v1 sd
rename v2 return
rename _varname symbol
replace symbol = substr(symbol, "ln_", "", .)
order symbol sd return
gen beta=.
foreach aa in `symbols' "portfolio" {
    replace beta = `beta_`aa'' if symbol=="`aa'"
}
gen treynor_ratio = return / beta
gsort -treynor_ratio
browse symbol treynor_ratio
```

symbol	treynor_ra-o
portfolio	.3153981
DIA	.2776645
VEU	.270553
QQQ	.2201913
OEF	.1960367
SPY	.1828807
IYR	.1402709
IJH	.1036202
IWM	.0801447
IJR	.0707307
BND	-.3224191

For the year 2017, our portfolio outperforms all our benchmarks.