



***Building a Balanced Portfolio with
iShares ETF's***

***Geoff Considine, Ph.D.
Quantext, Inc.***

Introduction

One of the most cost-effective ways to build a balanced portfolio of stocks and bonds is to invest in Exchange Traded Funds, or ETF's. For an individual investor, ETF's are like very low cost index funds (<http://www.sec.gov/answers/etf.htm>). One of the better-known (and oldest) families of ETF's is *iShares* (<http://www.ishares.com>).

A good way to learn the basics of ETF's is at the *Yahoo! Finance ETF Center* (<http://finance.yahoo.com/etf>). The Yahoo! Finance ETF Center provides the basic information about different ETF's and their fund families.

The iShares family includes ETF's focused on a wide range of different sectors. When we searched for twenty of the best performing iShares ETF's from the most recent five years, we got a short list—and then we swapped out some stock ETF's for candidates that could add a bit more style diversification and added two bond ETF's:

Fund Name	Ticker	Category
iShares Dow Jones US Utilities	IDU	Specialty-Utilities
iShares Goldman Sachs Networking	IGN	Specialty-Technology
iShares Cohen & Steers Realty Majors	ICF	Specialty-Real Estate
iShares Dow Jones US Real Estate	IYR	Specialty-Real Estate
iShares Goldman Sachs Natural Resourc	IGE	Specialty-Natural Res
iShares S&P Global Energy Sector	IXC	Specialty-Natural Res
iShares Dow Jones US Energy	IYE	Specialty-Natural Res
iShares Dow Jones US Healthcare	IYH	Specialty-Health
iShares Russell 2000 Value Index	IWN	Small Value
iShares S&P SmallCap 600/BARRA Growth	IJT	Small Growth
iShares Russell 2000 Index	IWM	Small Blend
iShares MSCI Singapore (Free) Index	EWS	Pacific/Asia ex-Japan Stk
iShares S&P MidCap 400/BARRA Value	IJJ	Mid-Cap Value
iShares Russell Midcap Value Index	IWS	Mid-Cap Value
iShares Russell Midcap Growth Index	IWP	Mid-Cap Growth
iShares Russell Midcap Index	IWR	Mid-Cap Blend
iShares MSCI EAFE Index Fund	EFA	Foreign Large Blend
iShares S&P Europe 350 Index	IEV	Europe Stock
iShares Lehman 1-3 Year Treasury Bond	SHY	Bond - Short Government
iShares Lehman 20+ Year Treas Bond	TLT	Bond - Long Government

This shows a sample of a range of ETF styles, ranging from focus by market capitalization, geographic focus, and sector specific. All of these ETF's have been around for a while, which means that there is some history to look at. You can check the fee structure for these ETF's and others at *Yahoo! Finance*.

The appeal of ETF's, much like the appeal of index mutual funds, is the ability to invest in a sector rather than simply buying stock in an individual company. You can buy and sell ETF's through a broker, just as you buy and sell a stock. Obviously, you can simply buy an S&P500 index fund or ETF (such as SPY) and be done with it. For many investors, however, ETF's provide a way to build a tailored portfolio that matches their specific risk-return requirements more closely than simply investing in the broader market index.

Historical Risk and Return

The ETF's listed above includes those from a range of sectors and with varying risk levels. You can review the historical returns over the most recent three years for these funds here:

<http://finance.yahoo.com/etf/browser/mkt?k=9&c=0&f=7>

These statistics allow you to look at the highest returning ETF's from the iShares family, but this alone is not enough to really help at all in asset allocation choices. The top twenty ETF's from the iShares family have generated annual average returns between 20% and 50% per year over the past three years. This is pretty good, right? Before you rush out and invest in any or all of these funds, you have to remember two things. First, the fact that a sector has generated high returns over the past few years does not mean that it will continue to. Second, even if the expected future return is very high, you must be careful about how much risk you are carrying when you invest. Asset classes that can generate high returns are also usually quite risky. If you look at the RISK section of the ETF page from Yahoo!, you can see some risk statistics:

<http://finance.yahoo.com/etf/browser/rk?f=7&c=0>

For many people, these risk statistics don't really help all that much. The first risk measure that you will see for each ETF is Beta. Beta is a commonly used somewhat misunderstood risk measure. What do measures of risk such as Beta mean for you, the (potential) investor?

Portfolio Projections

The real question that you may wish to ask is as to the projected risk and return that you might expect from a portfolio of these ETF's in the future. Even if an ETF has averaged 30% return per year over the past three years, you certainly don't want to simply assume that the fund will always return this, right? It is a far better idea to generate an outlook of future returns that assumes that the future returns will be consistent with the observed levels of risk in the fund. This process is called Risk-Return Balancing. Results from Risk-Return Balancing depend on the future risk and return that is assumed for the market as a whole. When we assume a future return on the market as a whole of 8.3% per year and that the risk associated with the market over the past three years is a reasonable basis for projecting into the future, we can simulate the future risk and return of a portfolio of these ETF's that is equally allocated between all of them (Figure 2). This chart shows the projected future risk and return for portfolio of ETF's with asset allocations shown. These projections are made using a Monte Carlo simulation model. While this portfolio, allocated equally into 20 different ETF's, has generated a very impressive average 23% return per year over the past three years but the Monte Carlo model is projecting that the expected return as we go forward is around 10.5% per year. This is not to say that getting a year with a 23% return will be uncommon, but rather that the recent years some of the better-performing years than can be expected rather than the average.

			Portfolio Stats					
Fund Name	Percentage of Funds	Average Annual Return	Average Annual Return	Standard Deviation (Annual)				
IDU	5.0%	8.64%	9.96%	9.59%				
IGN	5.0%	22.10%						
ICF	5.0%	10.63%						
IYR	5.0%	10.52%	Historical Data					
IGE	5.0%	11.15%	Start: 10/31/2002	End: 10/31/2005				
IXC	5.0%	11.17%	Average Annual Return	Standard Deviation (Annual)				
IYE	5.0%	11.74%	20.95%	10.62%				
IYH	5.0%	7.45%	Historical Beta: 89.46%					
IWN	5.0%	10.19%						
IJT	5.0%	9.79%						
IWM	5.0%	10.96%						
EWS	5.0%	9.19%						
IJJ	5.0%	9.19%						
IWS	5.0%	8.43%						
IWP	5.0%	9.40%						
IWR	5.0%	8.55%						
EFA	5.0%	8.91%						
IEV	5.0%	9.61%						
SHY	5.0%	3.47%						
TLT	5.0%	8.42%						
Sums to	100.0%							
<div style="border: 1px solid black; background-color: yellow; padding: 5px; text-align: center;"> Simulated Portfolio Beta 89.46% </div>			<div style="border: 1px solid black; background-color: #cccccc; padding: 5px;"> Market Index (S&P500) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Average Annual Return</th> <th>Standard Deviation (Annual)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">8.30%</td> <td style="text-align: center;">10.24%</td> </tr> </tbody> </table> </div>		Average Annual Return	Standard Deviation (Annual)	8.30%	10.24%
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Figure 2: Sample portfolio, equally allocated into all ETF's

The total portfolio risk is described by a statistical measure called the *Standard Deviation* in return (under Portfolio Stats). Standard Deviation is a statistic that describes the typical range of annual returns. The Monte Carlo model is projecting that this portfolio is likely to have returns that range between 9.96% +/- 9.59% most of the time. But let's get a little more detailed. If we look at the projected returns over a calendar year for this portfolio, what are the odds of losing say 10% in a year?

Percentile	Portfolio Value	Gain / Loss	Return
1%	\$88,588	-\$11,412	-11%
5%	\$93,865	-\$6,135	-6%
10%	\$97,317	-\$2,683	-3%
15%	\$99,782	-\$218	0%
20%	\$101,846	\$1,846	2%
25%	\$103,244	\$3,244	3%
30%	\$104,879	\$4,879	5%
35%	\$106,483	\$6,483	6%
40%	\$107,645	\$7,645	8%
45%	\$108,912	\$8,912	9%
50%	\$110,145	\$10,145	10%
55%	\$111,377	\$11,377	11%
60%	\$112,461	\$12,461	12%
65%	\$113,662	\$13,662	14%
70%	\$115,088	\$15,088	15%
75%	\$116,375	\$16,375	16%
80%	\$117,871	\$17,871	18%
85%	\$119,657	\$19,657	20%
90%	\$121,819	\$21,819	22%
95%	\$126,095	\$26,095	26%
99%	\$132,298	\$32,298	32%
Average	\$109,955	\$9,955	10%

Figure 3: Projected one year performance for equally allocated portfolio

The Monte Carlo calculation allows us to look at the probabilities of certain returns on this portfolio, and these are expressed in percentiles. Most people are familiar with percentiles for test scores, for example. If you scored in the 90th percentile on a test, 90% of people did worse than you and 10% of people did better than you. Percentiles are also useful for looking at portfolio performance. The 5th percentile 12-month return for a portfolio means that you have a 5% chance of having a return worse than this level and a 95% chance of having a return better than this level over any 12-month period.

Assuming that we have a portfolio worth \$100,000, for example, this portfolio is projected to generate returns greater than zero 85% of the time (Figure 3). The 15th percentile return is 0%. About 20% of the time, this portfolio will yield a return less than 2% for a 12-month period. Conversely, this portfolio is likely to generate a return that is greater than 2% in 80% of 12-month periods. The average return is about 10% per 12 month period. The 1% percentile is a return of -11%, which means that you have about a 1% chance of losing more than 11% in a year.

This portfolio has an historical value of Beta of about 89%, and Beta is preserved in the simulation. So what does a projected portfolio Beta of 89% mean? This means that the portfolio tends to diminish volatility in the broader market (say in the S&P500). A 1% gain in the S&P500 will tend to correspond to a gain of only 0.89% in this portfolio, and vice versa. The forces that drive the market index do not drive this portfolio quite as strongly. Many people like the idea of a portfolio that is less reactive to the volatility of the market as a whole, and this is why it is of value to manage Beta.

The average annual return over the past three years for this portfolio (Figure 2—Historical Data table) is 20.95%—very impressive. The projected annual return for this portfolio from the Monte Carlo is only 9.96% per year. Why is the projected return so much lower than the recent returns? We started building this portfolio by looking at the best performing sectors over the past several years, as so many people tend to do. The recent high returns from energy and real estate cannot be expected to continue at this level. If you really expected them to do so, this is where you would park all of your money. Of course, people who followed that logic would have had all of their money in tech stocks during the popping of the dot-com bubble. It is a bad idea to assume that the sectors that have led the market over recent years will continue to lead. It is far better to assume that the long-term balance between risk and return will be maintained. We accomplish this using Risk-Return Balancing. Using the Monte Carlo model with Risk-Return Balancing, we have projected this equally allocated portfolio to generate an average annual return of about 10% under the assumption that the average return on the S&P500 will only be 8.3% per year, with a total risk roughly equal to the market as a whole. This is not a bad portfolio.

Beta Managed Portfolio

If you wanted a more conservative portfolio from these ETF's, this is quite easily accomplished. While conventional wisdom suggests that investing in international stocks provides portfolio diversification and helps to manage risk, this may not be the case.

Ticker	Category	Beta
IDU	Specialty-Utilities	49%
IGN	Specialty-Technology	267%
ICF	Specialty-Real Estate	64%
IYR	Specialty-Real Estate	71%
IGE	Specialty-Natural Res	72%
IXC	Specialty-Natural Res	58%
IYE	Specialty-Natural Res	61%
IYH	Specialty-Health	56%
IWN	Small Value	128%
IJT	Small Growth	114%
IWM	Small Blend	140%
EWS	Pacific/Asia ex-Japan Stk	73%
IJJ	Mid-Cap Value	114%
IWS	Mid-Cap Value	103%
IWP	Mid-Cap Growth	115%
IWR	Mid-Cap Blend	105%
EFA	Foreign Large Blend	103%
IEV	Europe Stock	116%

Figure 4: Beta for stock ETF's over the past three years

The degree to which an ETF provides diversification is determined by the Beta. Beta measures the degree to which the returns on an instrument (stock or fund) tend to move with the S&P500, and there is a quite a range in the values of Beta in this group of iShares ETF's (Figure 4).

Beta for the S&P500 is 100%, by definition of Beta. A Beta greater than 100% means that a 1% change in the S&P500 will drive a change of more than 1% in that stock or fund. The values above were calculated by Quantext, but they are very close to those that you will find on Yahoo! Finance in the link provided earlier for risk statistics for these ETF's.

If you want a portfolio that is generally not too sensitive to market risk, you must manage Beta in the total portfolio. This does not mean that we don't want to invest in high Beta ETF's, but rather that we will want to mix ETF's with high and low Beta values to achieve an optimal portfolio. Figure 4 shows that the European focused ETF in this group (IEV) has Beta greater than 100%. This will not, therefore, be the optimal choice

for managing risk in the portfolio. The Foreign Large Blend ETF also has Beta greater than 100%. The Pacific/Asian ETF (EWS) has a Beta of 73%, so this fund will be useful in managing portfolio risk.

After a bit of experimentation, we have found that we can build a diversified portfolio that takes account of Beta effects in the design of the portfolio:

Ticker	Category	Beta	Allocation
IDU	Specialty-Utilities	49%	10%
IGN	Specialty-Technology	267%	-
ICF	Specialty-Real Estate	64%	10%
IYR	Specialty-Real Estate	71%	-
IGE	Specialty-Natural Res	72%	15%
IXC	Specialty-Natural Res	58%	15%
IYE	Specialty-Natural Res	61%	15%
IYH	Specialty-Health	56%	-
IWN	Small Value	128%	15%
IJT	Small Growth	114%	-
IWM	Small Blend	140%	-
EWS	Pacific/Asia ex-Japan Stk	73%	-
IJJ	Mid-Cap Value	114%	-
IWS	Mid-Cap Value	103%	-
IWP	Mid-Cap Growth	115%	-
IWR	Mid-Cap Blend	105%	-
EFA	Foreign Large Blend	103%	-
IEV	Europe Stock	116%	-
SHY	Bond - Short Government	-3%	-
TLT	Bond - Long Government	-16%	20%

Figure 5: Beta managed portfolio

This portfolio was designed to take advantage of Beta effects in designing a portfolio with lower risk than the equally allocated portfolio. The projected risk and return in this portfolio accomplish this goal. This portfolio has money in only seven ETF's, but it has some very nice qualities, as we show below.

Portfolio Stats	
Average Annual Return	Standard Deviation (Annual)
10.22%	7.83%
Historical Data	
Start: 10/31/2002	End: 10/31/2005
Average Annual Return	Standard Deviation (Annual)
22.40%	10.82%
Historical Beta: 55.90%	

Recall that Portfolio Stats are the projected portfolio statistics from the Monte Carlo model. Beta for this portfolio is about 55% (as compared to the value of almost 90% in the equally allocated portfolio – see Figure 2). The standard deviation in annual return is projected to be 7.8% per year (as compared to the value of 9.6% for the equally allocated portfolio – see Figure 2). When you look at the percentiles of return over one year (Figure 6), the effects of managing Beta are clear. The 5th percentile annual return for the Beta managed portfolio is -3% (Figure 6), while the 5th percentile return for the equally allocated portfolio is -6% (See Figure 3). This reduction in risk through managing Beta has not reduced the average return, however.

Percentile	Portfolio Value	Gain / Loss	Return
1%	\$92,780	-\$7,220	-7%
5%	\$97,087	-\$2,913	-3%
10%	\$99,904	-\$96	0%
15%	\$101,916	\$1,916	2%
20%	\$103,600	\$3,600	4%
25%	\$104,741	\$4,741	5%
30%	\$106,076	\$6,076	6%
35%	\$107,385	\$7,385	7%
40%	\$108,333	\$8,333	8%
45%	\$109,367	\$9,367	9%
50%	\$110,373	\$10,373	10%
55%	\$111,379	\$11,379	11%
60%	\$112,264	\$12,264	12%
65%	\$113,244	\$13,244	13%
70%	\$114,408	\$14,408	14%
75%	\$115,458	\$15,458	15%
80%	\$116,679	\$16,679	17%
85%	\$118,137	\$18,137	18%
90%	\$119,901	\$19,901	20%
95%	\$123,391	\$23,391	23%
99%	\$128,453	\$28,453	28%
Average	\$110,219	\$10,219	10%

Figure 6: Projected one year performance for Beta managed portfolio

Aggressive Portfolio

If we want a more aggressive portfolio, this can also be accomplished within reason using this set of ETF's. We will have fewer bonds and a higher emphasis on high-return / higher risk ETF's:

Ticker	Category	Beta	Allocation
IDU	Specialty-Utilities	49%	10%
IGN	Specialty-Technology	267%	20%
ICF	Specialty-Real Estate	64%	15%
IYR	Specialty-Real Estate	71%	-
IGE	Specialty-Natural Res	72%	10%
IXC	Specialty-Natural Res	58%	10%
IYE	Specialty-Natural Res	61%	10%
IYH	Specialty-Health	56%	-
IWN	Small Value	128%	15%
IJT	Small Growth	114%	-
IWM	Small Blend	140%	10%
EWS	Pacific/Asia ex-Japan Stk	73%	-
IJJ	Mid-Cap Value	114%	-
IWS	Mid-Cap Value	103%	-
IWP	Mid-Cap Growth	115%	-
IWR	Mid-Cap Blend	105%	-
EFA	Foreign Large Blend	103%	-
IEV	Europe Stock	116%	-
SHY	Bond - Short Government	-3%	-
TLT	Bond - Long Government	-16%	-

Figure 7: More aggressive ETF portfolio

In this portfolio, there are no bonds and 20% of the portfolio is focused on small firms and an additional 20% is focused in technology stocks. This portfolio is projected to generate a considerably higher annual return than either of those shown so far, albeit with considerably greater risk, as measured from the Standard Deviation in return and the portfolio Beta (see below):

Portfolio Stats	
Average Annual Return	Standard Deviation (Annual)
12.87%	14.19%
Historical Data	
Start: 10/31/2002	End: 10/31/2005
Average Annual Return	Standard Deviation (Annual)
27.70%	15.10%
Historical Beta: 120.15%	

This portfolio has Beta of about 120%, which means that the portfolio tends to amplify market volatility. Recall that we are assuming that the Standard Deviation of the 12-month returns on the S&P500 will be about 10.25%, so the projected total volatility in this portfolio is considerably greater than for the market as a whole. We can see the impact of this high volatility (read: risk) by looking at the projected percentiles of return (Figure 8).

Percentile	Portfolio Value	Gain / Loss	Return
1%	\$81,270	-\$18,730	-19%
5%	\$89,073	-\$10,927	-11%
10%	\$94,179	-\$5,821	-6%
15%	\$97,824	-\$2,176	-2%
20%	\$100,876	\$876	1%
25%	\$102,943	\$2,943	3%
30%	\$105,362	\$5,362	5%
35%	\$107,733	\$7,733	8%
40%	\$109,451	\$9,451	9%
45%	\$111,325	\$11,325	11%
50%	\$113,148	\$13,148	13%
55%	\$114,970	\$14,970	15%
60%	\$116,574	\$16,574	17%
65%	\$118,350	\$18,350	18%
70%	\$120,459	\$20,459	20%
75%	\$122,361	\$22,361	22%
80%	\$124,574	\$24,574	25%
85%	\$127,215	\$27,215	27%
90%	\$130,412	\$30,412	30%
95%	\$136,735	\$36,735	37%
99%	\$145,908	\$45,908	46%
Average	\$112,868	\$12,868	13%

Figure 8: Projected one year performance for aggressive portfolio

This aggressive portfolio generates negative returns at the somewhere between the 15th and 20th percentile. The probability of loss over a 12-month period is far higher than that in the other two sample portfolios that we have shown here. On the other hand, more aggressive investors tend to be focusing on the chances of substantial gains and this portfolio has a 95th percentile 12-month return of 37%! This much higher than the 95th percentile returns in the other two sample portfolios.

Summary

Exchange-Traded Funds (ETF's) allow investors to build portfolios that are tuned to their specific risk profiles. The goal for all of us is to generate the highest possible returns for the level of risk that we bear. While some people may have the ability to analyze stocks and determine which stocks are likely to outperform the market, the vast majority of people do not have the ability or inclination to attempt this. So, what is the average investor to do? One of the best ways to build a good portfolio is to apply *strategic diversification*. This does not mean that you simply buy some of everything, however. Warren Buffett has said that "wide diversification is only required when investors do not understand what they are doing." I do not disagree. The key to effective diversification is to understand how certain asset classes and sectors tend to either move relative to one another. If real estate and bonds tend to go up when stocks are going down, a strong argument can be made that a combination of real estate, stocks, and bonds may help you to control risk in your portfolio. Similarly, if you wish to invest in tech stocks but you have a specific limit on the amount of risk that you wish to bear in your portfolio, including some utilities stocks may allow you to carry a concentration in tech stocks while still keeping risk in manageable bounds. Strategic diversification means that you carefully choose your portfolio to ensure that the components work well together--this is not the same thing as buying some of everything.

ETF's allow an investor to create a cost-effective strategically allocated portfolio which takes advantage of the diversification opportunities across asset classes and sectors. Strategic allocation will tend to result in a better portfolio than simply buying some of everything, as we have shown in the examples in this paper. While we have shown a few examples, there are essentially an infinite variety of strategic allocations that can be developed, depending on the risk tolerance and preferred sectors that an investor wishes to focus on. iShares ETF's cover a nice broad range of sectors, in a sufficiently targeted allocation to allow the investor to strategically allocate his or her portfolio.

The examples shown in this paper were developed and modeled using a Quantext Portfolio Planner, a Monte Carlo portfolio simulation. A range of papers about this Monte Carlo model are available at www.quantext.com.