



AUGMENTING THE FRAMEWORK

- As highlighted in several recent commentaries, the investment management team at Innealta perpetually strives to “get smarter.” One such pursuit goes via enhancements to our quantitative modeling framework. Our focus for this commentary is on recent research we conducted as part of such efforts to enhance that framework, similar to the bottom-up country analysis highlighted in our April note.
- These preliminary analyses begin with a thorough investigation of the evolution and dynamics of revenue growth and net margins through time. We then focus our attention on the link between these variables and equity market conditions (i.e. can we isolate information from these variables that will enhance the quantitative modeling framework?).
- The model development process is ongoing at Innealta as we seek continuously to integrate additional value-relevant signals into our framework. Sometimes this process results in signals that may have small incremental value or that are simply redundant with other pieces already included in the framework. In this case, very preliminary data suggest that there may be valuable information contained in both rates of revenue growth and change in profit margins.
- Our next steps involve rigorous review of the supplemental metrics constructed from revenue growth and net margins. We must evaluate critically the information contained in this signal, both from an econometric standpoint and from the standpoint that the variable must be justified theoretically. Further, we need to be convinced the enhancement is truly that and not merely repeating the information contained in other fundamental measures.

RECENT R&D FOR OUR QUANTITATIVE FRAMEWORK

As highlighted in several recent commentaries, the investment management team at Innealta perpetually strives to “get smarter.” One such pursuit goes via enhancements to our quantitative modeling framework. The “model” is the lens through which we view the current investment landscape and it is a critical tool used by the investment committee in decisions regarding portfolio allocations. Frequently we identify new variables and modeling techniques that we believe have the potential to complement our current framework. Our focus for this commentary is on recent research we conducted as part of such efforts to enhance that framework, similar to the bottom-up country analysis highlighted in our April note.

WHAT TO CONSIDER NEXT?

While our framework already incorporates many fundamental metrics, we note that in recent years there has been a pronounced trend, in both the financial press and among financial professionals, towards increased attention to corporate revenue growth. Much of this enhanced visibility stems from the broader availability of revenue data, both actual results and analyst forecasts. For instance, only recently has it become common for equity analysts to publish revenue forecasts, whereas they have published earnings forecasts for decades. Recent academic studies present compelling evidence that equity prices react to revenue surprises in addition to earnings-per-share surprises.¹ A clear implication of these studies is that market prices reflect important information contained in revenue figures in addition to the information contained in corporate earnings. More specifically, they have shown that revenue numbers contain incremental information that is non-redundant to the information in corporate earnings.

Revenue

From where might the incremental information of revenue stem? Here, it is important to recognize a key distinction between revenue and earnings. Specifically, revenue growth is, in a sense, a ‘cleaner’ measure of firm performance in that it is relatively manipulation-free and is not influenced by tax laws or corporate financing choices.² Revenue growth also paints a clearer picture of “sustainable” growth, whereas earnings growth may result from cost-cutting, which, although a positive outcome, is not a sustainable source of growth. Revenue growth also sheds light on firms’ market share when compared to competitors’ results. Of course, from the shareholder’s view, a limitation of the revenue number is that residual owners’ claims are not measured as accurately via revenue as they are by bottom line earnings. Additionally, revenue numbers do not reflect firms’ cost control efforts.

Earnings

Compared to revenue, earnings growth reflects not only the influence of the firm’s sales, but also accounts for the firm’s capital structure choices (i.e. how the firm chooses to finance its assets) and the firm’s tax bill. The process of translating the revenue growth figure to a bottom-line earnings number involves considerable discretion over numerous, complicated corporate accounting rules. The fact that earnings more accurately represent equity holders’ claims to corporate earnings is no doubt a key driver behind much of the focus on earnings. Clearly equity markets respond positively to favorable revenue and earnings reports.

¹ See Rees, L. and K. Sivarmakrishnan, 2007, The effect of meeting or beating revenue forecasts on the association between quarterly returns and earnings forecast errors, Contemporary Accounting Research, and Henderson, B. and J. Marks, 2012, Predicting Forecast Errors Through Joint Observation of Earnings and Revenue Forecasts, George Washington University Working Paper, among others.

² Some discretion persists from flexibility regarding the timing of revenue recognition.

Profit Margins

Tying together earnings and revenue, profit margins contain additional value-relevant information. Specifically, margins reflect not only corporate cost control efforts and financing choices, but also reflect important business conditions. Highly competitive industries, which are often mature industries or those with low barriers to competitive entry, often have lower profit margins. In contrast, less competitive sector environments, which are often newer sectors or those having high barriers to entry, enjoy typically higher margins, implying a larger fraction of sales end up in shareholders' pockets after costs and taxes. Of additional note, profit margins are highly cyclical within industries and exhibit mean-reversion.

Forecasts

In addition to analyzing the valuation-relevant information contained in revenue growth and net margins, other opportunities may be present through combining these two metrics in light of evidence that investment professionals are prone to mis-extrapolating current trends into the future. To provide a specific example, one influential academic study finds that equity analysts tend to extrapolate high and low growth rates too far into the future, implying that at least some financial professionals exhibit biases in the way they forecast growth rates.³ Analysts also tend to issue forecasts of macroeconomic variables that can be deemed less than accurate.

TRENDS IN REVENUE AND PROFIT MARGINS

It is in this spirit that we proceed with our recent analysis. Specifically, we begin the analysis with a thorough investigation of the evolution and dynamics of top-line revenue growth and net margins through time. We then focus our attention on the link between these variables and equity market conditions (i.e. can we isolate information from these variables that will enhance the quantitative modeling framework?). For the purposes of this commentary we focus on U.S. sectors.

We often find it useful to begin any analysis with several visuals of the data as a means to understand the historical variation in the variables of interest. The first of the following figures, Exhibit 1, illustrates the year-over-year percentage change in corporate revenue per sector. The chart presents the average annual revenue growth for all sectors, where the U.S. equity space is subdivided into ten sectors (along the lines of our Sector Rotation Portfolio). Additionally, to illustrate the movement of individual sectors relative to the average, Exhibit 1 presents the annual revenue percentage growth figures for three separate industries: technology, financials and energy.

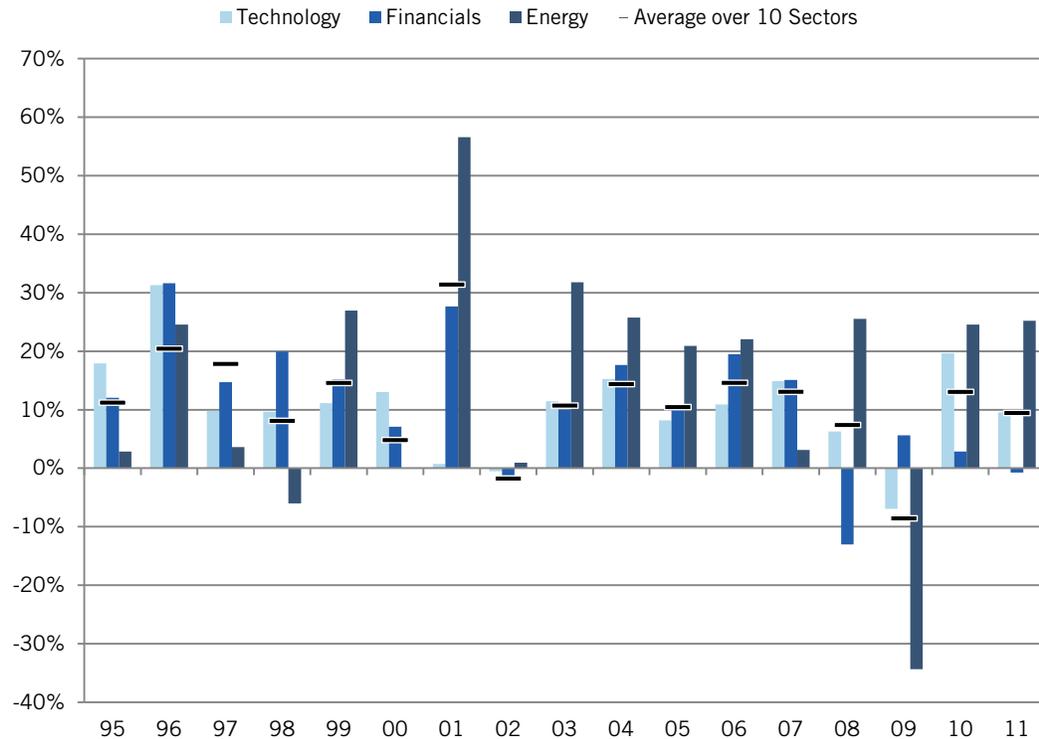
First, we note that the all-sector average year-over-year growth rate of revenue exhibits significant variation, although the growth rate is generally positive. The all-sector average exhibits negative year-over-year growth in only two out of the 17 sample years with a maximum change of +30% and minimum of -9%.

The three sectors on an individual basis exhibit large variation in year-over-year revenue growth rates. The Energy sector exhibits the most variation, with a maximum annual percentage increase of nearly 60% and a minimum of -30%. This sharp contraction in the revenue growth rate for Energy firms took place during 2009—the year in which commodities prices sharply declined following what many market participants and regulators have referred to as the “commodities price bubble.” The Financials sector also exhibits large variation, showing negative revenue growth rates during 2002, 2008 and 2011. Although volatile, the Technology sector has not exhibited years of as extreme year-over-year changes in revenue growth rate over the past 17 years compared to Financials and Energy. At first blush, this may seem surprising, since the sample period covers the dot-com bubble and ensuing bust. However, readers should recall that we are analyzing sales figures, not profit margins.

³ Chan, L., J. Karceski, and J. Lakonishok, 1993, The level and persistence of growth rates, *Journal of Finance*

During the bubble years, many dot-coms contributed little to sector revenue growth numbers and the bubble was with respect to valuations. Those valuations that were built on the illusion of future sales and profit numbers, capitalized any paltry sales numbers at astronomically high rates. Thus, when these companies imploded, the effect was not as great on the overall sector. In contrast, during the financial crisis and the bursting of the commodities price bubble in 2009, the entire industries' sales numbers suffered meaningfully.

Exhibit 1: Revenue—Year-over-Year Percentage Changes

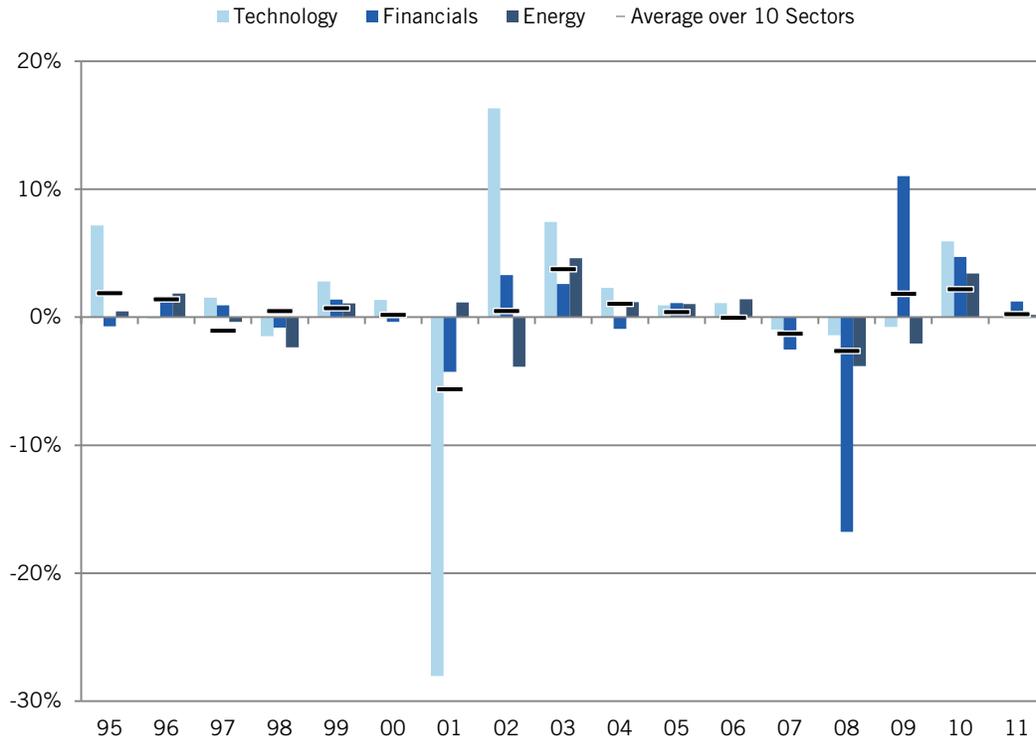


SOURCE: Innealta using data from Thomson Financial via Datastream

As we noted previously, revenue growth does not provide evidence on changes to all the variables in between revenue and earnings that affect the rate at which sales find their way into the pockets of equity holders. For example, although revenue growth was flat year-over-year for the Technology sector during 2001 when the dot-com bubble burst, we see that sector margins suffered greatly. Likely drivers of this shift were enhanced competitiveness for incremental revenue, spikes in costs associated with laying off part of the workforce or from being forced to dump accumulated inventory at cut rate prices during the economic downturn.

Exhibit 2 presents, for the same groups of industries, historical year-over-year absolute changes in profit margins. Margins exhibit cyclical behavior, as evidenced by the fact that years of expanding and declining margins tend to cluster together. Across all sectors, the average change in margins tends to be close to zero. Margin changes at the sector level, however, exhibit much more variation. For example, margins in the Financial sector generally expanded by small amounts during the years 1996-1999, but showed large declines during 2001, 2007 and especially 2008 at the peak of the financial crisis. Technology sector margins exhibit large variations as margins contracted dramatically in 2001 when many technology companies experienced losses in the wake of the dot-com era. Finally, margins in the energy sector have been more stable over the recent period, though they still exhibit cyclicity.

Exhibit 2: Net Margins—Year-over-Year Absolute Changes



SOURCE: Innealta using data from Thomson Financial via Datastream

In order to expand the view to include all ten sectors, we next present a summary highlighting the average, minimum and maximum year-over-year values across all ten sectors. Exhibit 3 presents the average annual revenue growth rates for each sector over the years 1995-2011 along with the max/min annual growth rates. Additionally, the table presents the avg/max/min absolute annual changes in margins for each sector.

A review of Exhibit 3 confirms that revenue growth rates by sector exhibit much variation through time and across sectors. The sector with the lowest average annual growth rate is Consumer Goods while Energy and Telecom exhibit the highest. Energy and Utilities exhibit the largest extreme movements (-34% to 57% and -39% to 105%, respectively). Across the sample, revenue on average increase across all ten sectors. It is also useful to recall our May commentary, in which we discussed alternative indexing methodologies, some of which may use revenue as a weighting variable. The large year-over-year growth rates across highlight the high turnover involved with such weighting schemes.

Margins also exhibit significant variation, both through time and across sectors. Materials is the sector with the largest average absolute change in margins over the sample, expanding at an average rate of 0.40% per year. Utilities is the only sector to exhibit margin compression on average. Margins in the technology sector exhibited the largest range of fluctuations, ranging from -28% to +16% year-over-year.

The descriptive figures and charts presented to this point demonstrate considerable variation across sectors and through time in sector-level top-line revenue growth and profit margins. Turning such variation into informative signals in order to complement the current framework of our quantitative model is our next focus. It is important to recall that asset price changes result in changes to investors' expectations about future prospects. Thus, the next step is to determine whether changes in these variables relate to equity market

conditions, after which we examine metrics for extracting this information in a real-time manner consistent with an investible strategy.

Exhibit 3: Revenue Growth and Margin Change

	Revenue: Growth Rates (annualized)			Margins: Absolute Changes (annualized)		
	Average	Min	Max	Average	Min	Max
Energy	15.0%	-34.3%	56.6%	0.2%	-3.9%	4.6%
Materials	8.9%	-22.8%	31.0%	0.4%	-5.6%	4.4%
Industrials	9.4%	-12.7%	17.5%	0.1%	-2.4%	2.7%
Cons. Goods	7.1%	-8.8%	21.9%	0.2%	-2.5%	3.5%
Healthcare	12.2%	2.1%	28.8%	0.1%	-3.2%	3.6%
Cons. Services	12.8%	-0.4%	24.2%	0.1%	-7.7%	9.3%
Telecom	14.8%	-1.1%	67.1%	0.2%	-11.7%	9.9%
Utilities	10.0%	-39.0%	105.1%	-0.1%	-3.8%	4.5%
Financials	11.4%	-13.0%	31.6%	0.1%	-16.8%	11.0%
Technology	10.7%	-6.9%	31.3%	0.8%	-28.1%	16.3%

SOURCE: From 1995 through 2011. Innealta using data from Thomson Financial via Datastream

RELATING CHANGES IN REVENUE GROWTH AND MARGINS TO EQUITY MARKET CONDITIONS

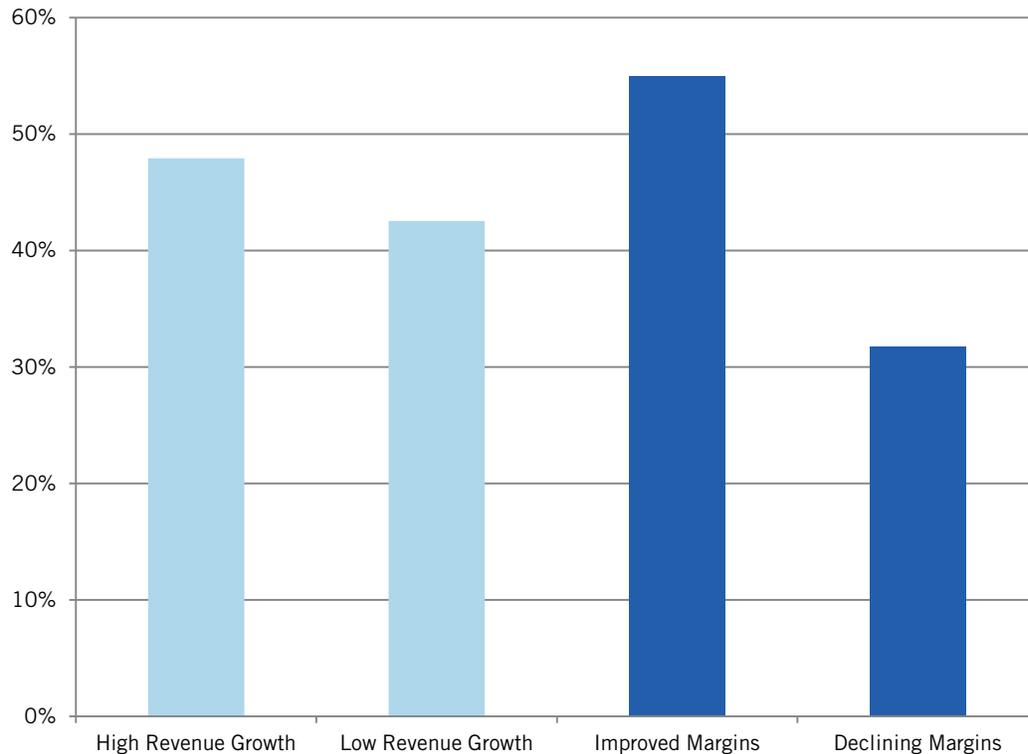
Ultimately, our goal is to forecast risk-adjusted returns. To achieve that goal, we begin by verifying that the variables we model (forecast) are in fact related to returns. In this context, we are asking the question “At the sector level, how do changes in revenue growth and profit margins relate to equity returns?” Put differently, “are the sector equity portfolio returns high (low) when sales grow at relatively high (low) rates and margins expand (contract)?” A simple sort of industries into groups with above- and below-average sales growth and margin expansion suggests that the quick answer is “yes,” encouraging further analysis.

We proceed by assigning sectors to one of two groups based on their annual sales growth rates relative to the average growth rate across each sector. This assignment is done annually, on the first of the year. We then track the returns to the sector portfolios falling in the two buckets: “high revenue growth” and “low revenue growth.” The results presented in Exhibit 4 demonstrate that industries with higher levels of sales growth tend to have higher returns to shareholders than the low sales sectors. On average, high sales growth industries have approximately 2.5% higher returns annually than low sales growth industries.

We repeat the analysis, sorting industries based on sector margins and the results are even more dramatic. Specifically, average returns to industries with above-average expanding margins are on average 4.3% per year greater than the complement set of industries. Return volatility also appears to differ between the two buckets. The following figure presents the average returns per unit risk for each of the portfolios (high/low revenue growth and margins).

Encouraged that returns and risk appear to differ across revenue and sales regimes, we next turn to modeling techniques to determine whether or not we can extract predictive signals from the data series.

Exhibit 4: Sector Annual Return / Standard Deviation by Rate of Revenue Growth and Changes in Profit Margins



SOURCE: From 1995 through 2011. Innealta using data from Thomson Financial via Datastream

CONSTRUCTING INFORMATIVE METRICS

The previous analysis highlighted intriguing contemporaneous relationships between sector portfolio returns and both revenue growth rates and margin expansions. We now turn to the task of constructing informative signals in a predictive sense, i.e. a strategy that is forward looking and investible. Most importantly, any strategy must be conceptually and empirically defensible and stand up to the high bar that measures our standards at Innealta Capital.

Without burdening the reader with technical details and without divulging proprietary details of the quantitative framework, we will refer to signals constructed by the sales and margins data under the generic names “Revenue Signals 1 and 2.” Similar names are given to the Margins signals. Finally, we intersect the information in the two signals to form an amalgamated score named “Intersect (Revenue + Margins).” The joint strategy invests in the sector equities only if both the revenue and margins signals are bullish, otherwise it invests in the Barclays Aggregate index at all other times.

To construct the “back test,” we model each sector separately and assume that the constructed signal is binary, i.e. that when the signal is “bullish,” the portfolio invests in the sector. Otherwise the portfolio rotates out of the sector and instead invests in the Barclays Aggregate index. The test design selection is intentional so the strategy corresponds directly to Innealta’s classic framework.

The following table presents the average annualized returns to each sector portfolio over the back test period (01.01.1995 through 05.31.2012). For each of the ten industries, the table presents the average return to the

long-only portfolio that invests in the sector portfolio at all times, as well as the portfolios that rotate tactically between the sector and fixed income based on the constructed signal.

As can be seen from Exhibit 5, in many cases, the Revenue, Margins and Intersection (Revenue + Sales) strategies produce higher average returns than the long-only return. What is less clear is which strategy produces the highest returns. Take for example, the Telecom sector. Each of the Revenue Signal 2, both Margins Signals 1 & 2 and Intersect (Revenue + Margins) produce higher average returns than the long-only strategy and Revenue Signal 2 produces the largest returns. Among other industries, however, such as Energy, Revenue Signal 1 produces the highest return.

In addition to presenting the analysis for each sector, we also consider the portfolio strategy in which each sector comprises 10% of the portfolio. Assuming daily rebalancing, the buy-and-hold portfolio of the ten sectors has average annual return of 5.43%. It is clear that the strategy portfolios exhibit similar, if not slightly higher, average returns, ranging from 5.24% to 7.05%.

When analyzing these results, it is important to focus not only on the raw returns, but also on the **risk-adjusted returns**. For example, it may appear that in many cases, returns to the long-only sector portfolios are pretty consistently higher than the portfolios constructed based on the revenue and sales signals. Additionally, determination must be made as to whether the results are a phenomenon of the particular sample period selected or whether the strategy produces desirable investment results “out of sample.” We also ask readers to defer judgment until we analyze the riskiness of the various portfolios.

Exhibit 5: Average Annualized Returns

Sector	Buy & Hold	Revenue, Signal 1	Revenue, Signal 2	Margins, Signal 1	Margins, Signal 2	Intersect (Revenue + Margins)
Energy	11.26%	12.84%	7.46%	9.39%	4.37%	11.11%
Materials	8.85%	11.05%	6.76%	2.83%	14.31%	4.20%
Industrials	6.83%	7.29%	6.79%	2.54%	8.77%	4.65%
Cons. Goods	2.78%	3.00%	4.22%	7.08%	2.82%	5.96%
Healthcare	4.08%	4.93%	2.82%	5.76%	4.10%	7.13%
Cons. Services	6.18%	4.82%	3.63%	6.54%	10.79%	4.45%
Telecom	-0.02%	-1.57%	5.35%	2.78%	2.00%	2.68%
Utilities	3.75%	7.99%	6.10%	6.41%	7.32%	8.70%
Financials	3.65%	4.23%	6.17%	7.22%	8.52%	7.80%
Technology	6.97%	7.08%	3.09%	4.76%	7.49%	6.51%
ALL	5.43%	6.17%	5.24%	5.53%	7.05%	6.32%

SOURCE: From 1995 through 2011. Innealta using data from Thomson Financial via Datastream

Exhibit 6 presents the average annualized return standard deviations to the portfolios. It is clear that for the majority of industries, the buy and hold portfolios exhibit higher volatility. This is of course not surprising since they contain 100% equity exposure at all times. For some industries, the dynamic strategies' volatility reduction is dramatic. For example, the Technology sector buy and hold portfolio has over 31% annualized return volatility. The strategies constructed on revenue signals reduces that to 25% and 28% and the strategies constructed on margin signals reduce to 26% and 22%. The strategy built on the intersection of the revenue and margins signals, reduces this further to just under 20%, a full 33% reduction in risk. Overall, the Margins signals appear to reduce volatility further than the revenue signals, which is not surprising when one considers that the margins signal on average tends to be bearish more frequently. Thus, these portfolios hold the bond portfolio

more frequently. Since bonds historically have been a less volatile asset class than equities, more frequent exposure to bonds tends to reduce volatility. The amalgamated signal, Intersect (Revenue + Margin) on average contains the least equity exposure and results in generally the lowest volatility. Interestingly, as we noted previously, this amalgamated signal does not always result in lower returns, implying it likely produces superior risk-per-unit-returns.

Especially striking is the degree to which the portfolio "ALL," which contains all ten sectors equally weighted, exhibits significant reduction. Recall that this portfolio had average annualized returns that were comparable to, and in some cases greater than, the buy-and-hold portfolio of the ten equally-weighted sectors. The total risk of the strategy portfolios are significantly lower than the buy and hold portfolios, indicating that the strategies produce attractive risk-adjusted returns.

Exhibit 6: Average Annualized Standard Deviations

Sector	Buy & Hold	Revenue, Signal 1	Revenue, Signal 2	Margins, Signal 1	Margins, Signal 2	Intersect (Revenue + Margins)
Energy	27.94%	24.08%	24.69%	22.83%	21.58%	20.98%
Materials	29.33%	27.51%	25.96%	24.19%	18.25%	22.13%
Industrials	23.92%	19.50%	21.85%	18.73%	15.05%	14.43%
Cons. Goods	19.62%	14.93%	18.51%	11.34%	11.99%	7.82%
Healthcare	17.52%	16.02%	17.22%	10.60%	13.32%	9.73%
Cons. Services	21.88%	20.34%	21.22%	16.01%	13.25%	14.59%
Telecom	24.75%	22.97%	20.06%	15.23%	20.31%	12.34%
Utilities	19.86%	18.03%	17.00%	15.18%	13.34%	13.42%
Financials	29.99%	28.43%	19.39%	17.89%	15.83%	15.14%
Technology	31.29%	25.11%	28.38%	26.27%	22.29%	19.59%
ALL	20.19%	17.17%	16.26%	12.25%	10.26%	9.89%

SOURCE: From 1995 through 2011. Innealta using data from Thomson Financial via Datastream

In Exhibit 7 we present annualized Sharpe ratios for the various sector strategies. For each sector, one of the strategies has a meaningfully higher Sharpe ratio than the long only portfolio. The two most consistent signals across all industries are Margins Signal 2 and the Intersect (Revenue + Margins) Signal. Referring to the Technology sector, the long-only portfolio has a Sharpe ratio of 0.22 whereas the Margins Signal 2 Sharpe ratio is 0.34 and the Intersect Sharpe ratio is 0.33. The largest value-added seems to come from the Utilities sector, where the long-only portfolio has a Sharpe ratio of 0.19, while the amalgamated signal produces a Sharpe ratio of 0.65, an amazing increase of over 200%.

Exhibit 7: Average Annualized Sharpe Ratios

Sector	Buy & Hold	Revenue, Signal 1	Revenue, Signal 2	Margins, Signal 1	Margins, Signal 2	Intersect (Revenue + Margins)
Energy	0.40	0.53	0.30	0.41	0.20	0.53
Materials	0.30	0.40	0.26	0.12	0.78	0.19
Industrials	0.29	0.37	0.31	0.14	0.58	0.32
Cons. Goods	0.14	0.20	0.23	0.62	0.24	0.76
Healthcare	0.23	0.31	0.16	0.54	0.31	0.73
Cons. Services	0.28	0.24	0.17	0.41	0.81	0.30
Telecom	0.00	-0.07	0.27	0.18	0.10	0.22
Utilities	0.19	0.44	0.36	0.42	0.55	0.65
Financials	0.12	0.15	0.32	0.40	0.54	0.52
Technology	0.22	0.28	0.11	0.18	0.34	0.33
ALL	0.27	0.36	0.32	0.45	0.69	0.64

SOURCE: From 1995 through 2011. Innealta using data from Thomson Financial via Datastream

NEXT STEPS

The model development process is ongoing at Innealta as we seek continuously to integrate additional value-relevant signals into our framework. Sometimes this process results in signals that may have small incremental value or that are simply redundant with other pieces already included in the framework.

In this case, very preliminary data suggest that there may be valuable information contained in both rates of revenue growth and change in profit margins. Our next steps involve rigorous review of the supplemental metrics constructed from top-line revenue and net margins. We must evaluate critically the information contained in this signal, both from an econometric standpoint and from the standpoint that the variable must be justified theoretically. Further, we need to be convinced the *enhancement* is truly that and not merely repeating the information contained in other fundamental measures.

ENVIRONMENT AND POSITIONING

Not more than a month ago, we had been seeing among a very specific set of industries and countries some manner of improvement in fundamentals, and even some improvement in levels of risk. The gains were minor, but they were there. In the past few weeks, many of those metrics not only have turned more unfavorable, they have done so rather materially. With the exception of the Energy market, currently held in the Sector Rotation Portfolio, and the Russian Market, currently held in the Country Rotation Portfolio, there are very few additional markets of interest. Most measures tracked within our quantitative framework, when combined in the aggregate, in fact, remain decidedly bearish.

This is not necessarily surprising, considering the continued pressure on global growth that is presented by weakness in the Chinese economy and the otherwise much less robust state of affairs in Brazil and India. That's not to mention the fact that most of the European Union is in recession, now threatening to bring down Germany along with the rest of the lot. Meantime, the U.S. economy continues to plod along a 'recovery' that can't even be considered mediocre. At least we remain in positive growth territory. Still, it won't in our view take much more for this scenario to break down, as what might be qualified as a minimally healthier domestic picture is further weighted by still mounting negative pressures abroad.

Again, these views are very much expressed by our quantitative framework, a review of which continues to warrant, broadly speaking, very defensive positioning across the board in our portfolios. The fixed income portfolio remains focused on the U.S. Corporate space, with approximately half of the portfolio exposed to investment grade debt, shifted to a moderately longer duration, a quarter in high yield, and the remainder divided among the U.S. fixed income aggregate and two individual local-currency-denominated emerging market debt. Otherwise, our Risk-Based portfolios remain fully underweight the secular tactical asset allocations within equity.

IMPORTANT INFORMATION

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Investment in emerging markets subjects a fund to a greater risk of loss than investments in a developed market. This is due to, among other things, greater market volatility, lower trading volume, political and economic instability, high levels of inflation, deflation or currency devaluation, greater risk of market shut down and more governmental limitations on foreign investment policy than those typically found in a developed market. In addition, the financial stability of issuers (including governments) in emerging market countries may be more precarious than in other countries. As a result, there will tend to be an increased risk of price volatility in a fund's investments in emerging market countries, which may be magnified by currency fluctuations relative to the U.S. dollar.

Diversification does not protect against loss in declining markets.

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For more information, contact Scott Silverman at 949.540.7307 or your financial advisor.

AFAM | Innealta Capital
12117 FM 2244 Bldg. 3 -#170
Austin, TX 78738
P: 512.354.7041 F: 512.402.1014