RESULTS OF REGRESSION BASED RELATIVE VALUATION MULTIPLE STOCK SCREEN

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SUMMARY

This study attempts to improve upon the traditional method of searching for potentially mispriced equities by comparing relative valuation multiples among a group of stocks by incorporating linear regression analysis into the process. That is, rather than simply rank ordering a set of stocks by a particular multiple, and determining that higher multiple stocks are more likely to be overvalued, this study aims to identify mispriced equities by comparing a stock's actual multiple to what a particular regression analysis predicts it should be. The greater the difference, the more that stock may be mispriced.

While my results suggest the regression approach is not quite as useful in identifying mispriced stocks as the simple rank ordering method, combining the two gives better results than using either method individually. Using both approaches also increases the sheer number of stocks that may meet a particular investor's selection criteria.

The following Russell 1000 and 2000 stocks are most likely to be over or undervalued as of 8/12/08, based on the results of this study:

Overvalued: AINV, AKR, AMT, ARE, ARTG, ATG, ATML, BDN, BFS, BRE, BLUD, BMI, BMR, CBB, CELG, CLHB, CLMS, CNQR, CPT, CPTS, CRM, CY, CYH, DBRN, DNEX, DRL, EGP, EPR, EQR, ESS, FWRD, GHL, GSAT, HEW, HIBB, HR, HTGC, HTV, HUBG, ICON, ISIS, ISRG, JEF, JOE, KNL, KRC, LABL, LAMR, LMNX, LSI, LTC, LXU, MAC, MDS, MIDD, MOT, MRVL, NGPC, NHP, NILE, NNN, NVT, O, OFG, OXPS, PNW, RAVN, RGLD, SAM, SCUR, SDTH, SLG, SNCR, SNH, SPWR, TASR, TCO, UDR, VOCS, WBSN, XNPT
Undervalued: ABR, ACE, ACF, ACGL, ACS, ACV, ADVNB, AFCE, AHR, ANN, ARB, ARO, ASFI, ATI, ATR, AVNX, AWH, AXS, BANR, BLL, CBON, CHKE, CIT, CLR, COO, CORS, CROX, CT, DHR, DLX, ECOL, EDS, EFX, ENH, FSNM, FSR, FTO, GCA, GKK, GPI, GRMN, GT, GW, GYMB, HBI, HEES, HHS, HIG, HMA, HNZ, HOC, HPY, HRZB, HTZ, HWCC, IAR, IFF, INDM, IRM, JCG, JLL, LAMR, LCAPA, LCAV, LEA, LRCX, LXK, MAN, MCGC, MCO, MEE, MHP, MO, MRH, MSTR, MVC, MVL, NFLX, NIHD, NRF, NWI, OMG, OMPI, OSK, PTP, PZZA, R, RF, RIG, RJET, RRR, SAH, SGMS, SM, SMG, SMOD, SPF, SPN, STX, SVU, TDS, TICC, TRA, TRID, TWX, UFS, UGI, UIS, UNT, URI, VLO, VMC, VSH, WHI, WNR, WON, WTI, ZEUS, ZION

My regression analysis yielded several interesting conclusions: 1.) TTM P/E and EV/EBITDA multiples tend to be the best for identifying mispriced stocks, while P/TVA and EVA spreads were not all that effective, 2.) different multiples work better for different sized stocks, 3.) being identified as potentially mispriced by only one regression equation produced higher alphas than being named by two or more equations (which runs counter to simple intuition), and 4.) stocks that were two or more standard deviations away from their predicted value generally produced higher alphas.

Overall, I believe using both the simple rank ordering and the regression approaches provides a very good starting point for further research. However, I must stress that this analysis is still very much a work in progress, since it only incorporates slightly less than two months worth of data. It remains to be seen whether the conclusions in this study will hold over the long-term.

INTRODUCTION/METHODOLOGY

The purpose of this study is to create a stock screen, based on relative multiple analysis, that will potentially identify over and undervalued equities. In my experience as an equity research analyst on Wall Street, I have found that most analysts (on the sell-side, anyway) attempt to identify mispriced stocks by simply rank ordering a set of valuation multiples. For example, investors would consider stocks with low P/E multiples to be undervalued, and those with high P/E multiples to be overvalued. The main problem with this approach, at least from a theoretical standpoint, is that a low or a high P/E multiple could be perfectly justified by a number of explanatory factors, such as a company's profitability, growth prospects, debt levels, and overall riskiness, just to name a few.

My stock screen attempts to account for these types of influences on the various valuation multiples by incorporating multiple regression analysis. More specifically, I will consider a stock to be potentially overvalued if an actual relative multiple is significantly higher than what a particular regression equation predicts it should be, and possibly undervalued if the actual multiple is significantly lower than its predicted value.

My analysis looks at six different relative valuation multiples: 1.) trailing twelve month price-to-equity (TTM P/E), 2.) trailing twelve month P/E-to 5-yr future earnings growth (TTM PEG), 3.) price-to-tangible book value (P/TBV), 4.) enterprise value-to-EBITDA (EV/EBITDA), 5.) enterprise value-to-sales (EV/S), and 6.) EVA spreads, which are the difference between a firm's return on invested capital and weighted average cost of capital, as calculated by Bloomberg. I computed separate regression equations for the first five of the multiples listed above for stocks in both the Russell 1000 (large cap) and Russell 2000 (smaller cap) universes. For the TTM P/E, TTM PEG, P/TBV, EV/EBITDA, and EV/S ratios, I began by regressing the suggested explanatory variables for each multiple that were published by Aswath Damodaran in Chapters 8 & 9 of his book *Damodaran on Valuation, 2nd Edition*. I actually did not run an EVA spread regression for this analysis, because I was more interested in determining whether the EVA spread itself explained stock market performance, and not what affects the EVA spread. Thus, I was already assuming investors consider the first five multiples when evaluating stocks, and I wanted to determine whether regression analysis would improve upon the performance of simply rank ordering those multiples from highest to lowest. For the EVA spread, I was more interested in determining whether this indicator had any explanatory value at all, and not what influences the spread, hence my decision to simply rank order stocks based on this indicator.

For each regression, I eliminated statistically insignificant independent variables, and changed the specifications of the x-variables (such as taking the logarithm of a variable when there was not a clear linear relationship present), until I found the most statistically significant model for each particular multiple.

The regressions are all based on market and fundamental data as of the close of trading on June 17, 2008. Stock return data are based on trading activity between June 17, 2008

and August 12, 2008. The stock return data do not include dividends, but do incorporate stock splits.

After determining the best regression equation for each multiple, I then calculated the difference between the actual and predicted value for each stock within the Russell 1000 & 2000 indices, and ranked those differences from highest to lowest. The higher the difference, the more the actual variable is from its predicted value, and therefore the more overvalued a particular stock may be. Conversely, the lower the difference, the more undervalued any given stock may be. Next, I calculated the combined alpha one would have earned by shorting the Top 5% overvalued stocks and going long the Top 5% undervalued stocks (which I will call the Top 5% stocks from this point forward) within both the Russell 1000 & 2000 indices, as measured against the performance of each respective index. I did the same thing for all stocks that were more than two standard deviations away from the average difference between the predicted and actual value for each particular multiple, which I call Z-Stocks. Finally, I recalculated the alphas for each Top 5% list excluding energy and commodity companies, given the sharp decline in commodity prices that started in early July. For example, natural gas prices fell by 36% from June 17-August 12, 2008. I did not remove the energy and commodity names from the Z-Score results, however, because those data sets were already very small.

For more detail on the regression process and the regression equations themselves, please refer to the Appendix at the back of this paper.

A FEW DISCLOSURES BEFORE TURNING TO THE RESULTS

The results of my regression analysis appear in Tables 1-3. Before I dive into specific conclusions from these tables, however, there are several important things that investors must consider:

1. I originally ran the regressions on June 17, 2008, based on market and fundamental data at that time. The overvalued stocks that appear in Table 2 were originally deemed to be overvalued on June 17, 2008, but that had either increased in value or fallen by no more than 10% on August 12, 2008. Similarly, the undervalued stocks in Table 2 were first pegged as being undervalued on June 17, 2008, but that had either declined or risen by no more than 10% as of August 12, 2008. Thus, the ticker symbols in Table 2 represent those potentially mispriced stocks that were first identified on June 17, 2008 but had yet to make a significant move in the predicted direction as of August 12, 2008.
2. I wanted to employ a bit of a time lag here in order to test the performance of those stocks the regression equations originally suggested were over or undervalued on 6/17/08, so the stocks listed in Table 2 are naturally different from those the regression equations originally identified on June 17th. The underlying fundamental data for the majority of the stocks had probably changed during this time, especially since many of these companies reported calendar 2Q08 earnings after June 17. This is obviously something of a drawback, but this analysis is

meant to be a starting point for determining which stocks ***may*** be over or undervalued, and not as an automatic rules based "quant" type of trading system. Investors would need to further investigate and value all stocks before committing any actual capital. Therefore, the list in Table 2 should still be quite useful, even if it is somewhat outdated.

3. The stock returns used to calculate the various alphas do not include transactions costs. It is therefore highly probable that the positive alphas generated by the various multiples would be significantly lowered (if not completely whittled away) by commissions, especially since many of the stock sample sizes have more than thirty names. I wanted to include the Top 5% of companies for each group, however, in order to generate enough stocks that satisfy Warren Buffett's mantra of only investing in simple businesses that are easy to understand. Again, this study is meant to be an initial stock screen, rather than a "rules based" quant model. But perhaps it would make more sense to trade just the top 1% of stocks, or just the Z-Score stocks for each of the four groups, in order to minimize transaction costs and required capital. That is the basis for another study on a different day.
4. This is still very much a work in progress, since the alphas are based on slightly less than two months worth of trading data. As a result, the conclusions drawn from Tables 1-3 may prove to be more relevant for traders or investors with a short-term time horizon. I will continue to monitor the performance of the stocks the various regression equations originally identified as being over or undervalued in the months ahead.

RESULTS/KEY TAKEAWAYS

Simple Rank Ordering Is Actually Slightly Better Than the Regression Approach, But Not As Good As Combining the Two

As it turns out, my regression based stock screen did not produce better results than the simple rank ordering approach as I had hoped (at least not in the short-term). In Table 1 below, I broke out the results of screening for mispriced stocks in both the Russell 1000 and 2000 indexes using the five relative multiples on which I ran regressions: TTM P/E, TTM PEG, P/TBV, EV/EBITDA, and EV/S. I grouped the overall results into four separate groups: Russell 1000 Overvalued, Russell 1000 Undervalued, Russell 2000 Overvalued, and Russell 2000 Undervalued. My regression approach produced a median alpha of 1.8% for the eighteen different multiples in Table 1 (the P/TBV regressions for the Russell 1000 Overvalued and Undervalued stocks were both statistically insignificant, so I removed them from this analysis), compared to a median alpha of 2.1% for the simple rank ordering approach. The average alpha for my regression equations was 1.9%, versus 3.3% for the simple rank ordering approach.

That is ***not*** to say the regression approach does not have its merits, however. The combination of the regression and the rank ordering methods actually provided better

statistics than did either one separately, as the combined approach yielded a median alpha of 4.3% (and an average alpha of 3.2%, which is in line with the average 3.3% alpha for the single rank ordering approach. But I believe the median statistic is the more telling figure).

Another method of comparing these three approaches is by looking at what I call the "Success Ratio," which is the ratio of the number of times a method produced the highest alpha for a particular multiple divided by the number of multiples considered within each approach. For example, among the Russell 1000 Overvalued stocks, the TTM P/E ratio produced an alpha of 5.5% under the regression based screen, 7.0% in the simple rank ordering approach, and 8.5% using the combination of the two. So the combined method produced the highest alpha in this particular case. Overall, the combination approach produced the highest individual alpha in 7 out of 15 cases, for a Success Ratio of 47%. Simple rank ordering had a Success Ratio of 44% (7 out of 18 cases), and the regression approach posted a Success Ratio of just 17% (3 out of 18 cases).

The early data show that rank ordering is superior to the regression analysis approach, but combining the two yields slightly better results than using the rank ordering approach alone. Thus, I believe investors would be well advised to use the regression approach to "fine tune" the results from the rank ordering method. Plus, using both approaches would increase the total number of potentially mispriced stocks generated by these methods, which in turn raises the number of companies that could satisfy a particular investor's investment criteria.

Table 1: Rank Ordering vs. My Regression Approach

Russell 1000 Overvalued

	# Stocks In Top 5%	# Stocks in Both Data Sets	% Same	*Regression Approach* Avg Return Regression	*Regression Approach* Alpha vs. Russell 1000	*Simple Rank Ordering* Avg Return Rank Order	*Simple Rank Ordering* Alpha vs. Russell 1000	*Combination of Both Methods* Top 5% in Both Reg & Rank	*Combination of Both Methods* Alpha vs. Russell 1000
TTM P/E	43	29	67%	-10.7%	5.5%	-12.2%	7.0%	-13.7%	8.5%
TTM PEG	43	30	70%	-11.9%	6.7%	-7.9%	2.7%	-11.6%	6.4%
P/TBV	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EV/EBITDA	37	27	73%	-3.8%	-1.4%	-6.1%	0.9%	-4.0%	-1.2%
EV/S	44	26	59%	-5.9%	0.7%	-7.1%	1.9%	-4.2%	-1.0%

Russell 1000 Undervalued

	# Stocks In Top 5%	# Stocks in Both Data Sets	% Same	*Regression Approach* Avg Return Regression	*Regression Approach* Alpha vs. Russell 1000	*Simple Rank Ordering* Avg Return Rank Order	*Simple Rank Ordering* Alpha vs. Russell 1000	*Combination of Both Methods* Top 5% in Both Reg & Rank	*Combination of Both Methods* Alpha vs. Russell 1000
TTM P/E	42	25	60%	-0.9%	4.3%	1.5%	6.7%	4.1%	9.3%
TTM PEG	43	30	70%	-7.2%	-2.0%	-4.5%	0.7%	-6.8%	-1.6%
P/TBV	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EV/EBITDA	37	27	73%	-3.2%	2.0%	-4.6%	0.6%	1.5%	6.7%
EV/S	44	0	0%	-7.3%	-2.1%	7.9%	13.1%	N/A	N/A

Russell 2000 Overvalued

	# Stocks In Top 5%	# Stocks in Both Data Sets	% Same	*Regression Approach* Avg Return Regression	*Regression Approach* Alpha vs. Russell 2000	*Simple Rank Ordering* Avg Return Rank Order	*Simple Rank Ordering* Alpha vs. Russell 2000	*Combination of Both Methods* Top 5% in Both Reg & Rank	*Combination of Both Methods* Alpha vs Russell 2000
TTM P/E	58	50	86%	-0.4%	1.5%	0.8%	0.3%	-0.6%	1.7%
TTM PEG	58	24	41%	0.6%	0.5%	0.8%	0.3%	-3.2%	4.3%
P/TBV	53	32	60%	3.6%	-2.5%	0.3%	0.8%	4.6%	-3.5%
EV/EBITDA	44	18	41%	-5.1%	6.2%	-5.6%	6.7%	-6.4%	7.5%
EV/S	60	32	53%	-4.5%	5.6%	-7.0%	8.1%	-4.6%	5.7%

Russell 2000 Undervalued

	# Stocks In Top 5%	# Stocks in Both Data Sets	% Same	*Regression Approach* Avg Return Regression	*Regression Approach* Alpha vs. Russell 2000	*Simple Rank Ordering* Avg Return Rank Order	*Simple Rank Ordering* Alpha vs. Russell 2000	*Combination of Both Methods* Top 5% in Both Reg & Rank	*Combination of Both Methods* Alpha vs Russell 2000
TTM P/E	58	50	86%	4.6%	3.5%	4.5%	3.4%	5.7%	4.6%
TTM PEG	58	3	5%	5.9%	4.8%	5.0%	3.9%	N/A	N/A
P/TBV	53	21	40%	-1.7%	-2.8%	3.4%	2.3%	1.9%	0.8%
EV/EBITDA	44	5	11%	5.2%	4.1%	-0.9%	-2.0%	N/A	N/A
EV/S	60	48	80%	1.2%	0.1%	2.6%	1.5%	0.9%	-0.2%

Average Alpha For All Indicators	1.9%	3.3%	3.2%
Median Alpha For All Indicators	1.8%	2.1%	4.3%
Number of Times Method Produced the Highest Alpha	3	8	7
Number of Multiples in the Screen	18	18	15
"Success" Rate	17%	44%	47%

Source: Bloomberg, personal calculations

The Regression Equations Produced Plenty of Potentially Mispriced Stocks from Which to Choose

Table 2 below lists potentially mispriced stocks as of 8/12/08, grouped into four separate groups: Russell 1000 Overvalued stocks, Russell 1000 Undervalued stocks, Russell 2000 Overvalued stocks, and Russell 2000 Undervalued stocks. As explained previously, the stocks that appear in the table were 1.) originally deemed to be over (under) valued by the regression and simple rank ordering approaches on 6/17/2008, and 2.) that either increased (decreased) in value or decreased (increased) by no more than 10% between 6/17/08 and 8/12/08.

Table 2: Potentially Over & Undervalued Stocks Based On the Combination of My Regression Screens and Simple Rank Ordering

Stock Index	Best Indicators	Screen Results	Notes (see Table 3)
Russell 1000 Overvalued	TTM PEG, TTM P/E	AMT, ATG, ATML, BDN, BRE, CELG, CPT, CRM, CY, CYH, DRE, EQR, ESS, HEW, HTV, ISRG, JEF, JOE, KRC, LAMR, LSI, MAC, MRVL, MOT, NVT, PNW, SLG, SPWR, TCO, UDR	Only two of the multiples produced positive alpha after accounting for the energy and commodity stocks, and neither alpha was more than 1.4%.
Russell 1000 Undervalued	P/TBV, TTM P/E, EV/EBITDA	ACF, ACE, ACGL, ACS, ACV, ANN, ATI, ATK, AWH, AXS, BLL, CIT, CLR, COF, COO, CPS, CROX, CSC, CTL, DHR, EDS, EFX, ENH, FTO, GRMN, GT, HBI, HHS, HIG, HMA, HNZ, HOC, HTZ, IAR, IFF, IRM, JLL, LAMR, LCAPA, LRCX, LXK, MAN, MCO, MEE, MHP, MO, NIHD, NWL, OSK, R, RE, RF, RIG, SGMS, SM, SMG, SPN, STX, SVU, TDS, TWX, UFS, UGI, UIS, UNT, URI, VLO, VMC, VSH, WNR, WTI, ZION	This is the only one of the four groups where P/TBV had a positive alpha, and at 7.6%, it produced the highest alpha for the undervalued Russell 1000 stocks. Also, EV/EBITDA had just a 2.0% alpha for the Top 5%, and a -17.5% alpha for the three Z-Stocks, but a positive 14.1% for the Top 5% stocks after removing all energy and commodity companies.
Russell 2000 Overvalued	EV/EBITDA, EV/Sales	AINV, AKR, ARE, ARTG, BFS, BLUD, BMI, BMR, CBB, CLHB, CLMS, CNQR, CPTS, DBRN, DNEX, EGP, EPR, FWRD, GHL, GSAT, HIBB, HR, HTGC, HUBG, ICON, ISIS, KNL, LABL, LMNX, LTC, LXU, MDS, MIDD, NGPC, NHP, NILE, NNN, O, OFG, OXPS, RAVN, RGLD, SAM, SCUR, SDTH, SNCR, SNH, TASR, VOCS, WBSN, XNPT	Every multiple but the EVA spread and P/TBV created a positive alpha. The 16.9% alpha generated by the four Z-Stocks was the highest alpha of any subcategory within the four groups.
Russell 2000 Undervalued	TTM PEG, EV/EBITDA	ABR, ADVNB, AFCE, AHR, ARB, ARO, ASFI, AVNX, BANR, CBON, CHKE, CORS, CT, DLX, ECOL, FSNM, FSR, GCA, GKK, GPI, GW, GYMB, HEES, HPY, HRZB, HWCC, INDM, JCG, LCAV, LEA, MCGC, MRH, MSTR, MVC, MVL, NFLX, NRF, OMG, OMPI, PTP, PZZA, RJET, RRR, SAH, SMOD, SPF, TRA, TICC, TRID, WHI, WON, ZEUS	The 4.8% Top 5% alpha for TTM PEG was the highest for the Russell 2000 undervalued stocks, but the lowest leading alpha among the four groups.

Source: Personal calculations

TTM P/E and EV/EBITDA Multiples Appear to Be the Best Overall Indicators

As shown in Table 3 below, the TTM P/E ratio was the only one of the six relative multiples that generated a positive alpha for the Top 5% Stocks for all four stock groups before accounting for commodity names. Ex-commodity stocks, the TTM P/E ratio was flat to slightly negative for estimating the Overvalued Russell 1000 & 2000 stocks, but it was still the most consistently effective multiple. This suggests that all relative multiple stock screens should incorporate the TTM P/E multiple, particularly when one has a shorter term time horizon.

EV/EBITDA provided one of the two highest Top 5% Stock alphas for two of the four groups (Russell 2000 Overvalued & Undervalued), and a robust 14.1% alpha for Russell 1000 Undervalued stocks after removing commodity stocks from that sample size. EV/EBITDA should be included in every stock screen as well.

Table 3: Summary of Regression Generated Stock Screen Alphas

OVERVALUED MULTIPLES ALPHAS

RUSSELL 1000			RUSSELL 2000		
RUI Index 6/17/08	743.32		RUT Index 6/17/08	736.57	
RUI Index 8/12/08	704.59		RUT Index 8/12/08	744.94	
% Gain	-5.2%			1.1%	
	Top 5% Overvalued	# of Obs		Top 5% Overvalued	# of Obs
TTM P/E	5.5%	43	TTM P/E	1.5%	58
TTM PEG	6.7%	43	TTM PEG	0.5%	58
P/TBV	-5.2%	42	P/TBV	-2.5%	53
EV/EBITDA	-1.4%	37	**EV/EBITDA**	**6.2%**	**44**
EV/Sales	0.7%	44	**EV/Sales**	**5.6%**	**60**
EVA Spread	1.5%	43	EVA Spread	-5.5%	71
4 Combined Multiples	-4.6%	4	4 Combined Multiples	N/A	N/A
3 Combined Multiples	**8.3%**	**10**	3 Combined Multiples	-3.5%	3
2 Combined Multiples	3.3%	35	2 Combined Multiples	1.6%	54
1 Combined Multiple	0.5%	128	**1 Combined Multiple**	**2.7%**	**225**
	Z Scores Overvalued	# of Obs		Z Scores Overvalued	# of Obs
TTM P/E	8.4%	24	TTM P/E	-3.0%	9
TTM PEG	**13.6%**	**8**	TTM PEG	0.4%	8
P/TBV	-2.8%	4	**P/TBV**	**3.9%**	**7**
EV/EBITDA	-1.7%	19	**EV/EBITDA**	**16.9%**	**4**
EV/Sales	-5.0%	9	**EV/Sales**	**6.1%**	**24**
EVA Spread	-3.0%	3	EVA Spread	-3.2%	23
	Top 5% Ex-Energy Overvalued	# of Obs		Top 5% Ex-Energy Overvalued	# of Obs
TTM P/E	0.0%	35	TTM P/E	-0.3%	54
TTM PEG	1.4%	35	TTM PEG	-0.6%	54
P/TBV	-5.2%	42	P/TBV	-2.7%	51
EV/EBITDA	-4.1%	34	**EV/EBITDA**	**4.5%**	**41**
EV/Sales	-2.2%	37	**EV/Sales**	**3.9%**	**57**
EVA Spread	0.2%	41	EVA Spread	-6.9%	68
4 Combined Multiples	-4.6%	4	4 Combined Multiples	N/A	N/A
3 Combined Multiples	-1.9%	7	3 Combined Multiples	-11.5%	2
2 Combined Multiples	-0.7%	30	2 Combined Multiples	1.3%	52
1 Combined Multiple	-1.2%	117	**1 Combined Multiple**	**1.9%**	**217**
	Top 5% Ex-Commodities Overvalued	# of Obs		Top 5% Ex-Commodities Overvalued	# of Obs
TTM P/E	0.0%	35	TTM P/E	-0.3%	53
TTM PEG	1.4%	35	TTM PEG	-0.7%	52
P/TBV	-5.2%	42	P/TBV	-3.2%	50
EV/EBITDA	-4.1%	34	**EV/EBITDA**	**4.5%**	**41**
EV/Sales	-2.2%	37	**EV/Sales**	**3.2%**	**53**
EVA Spread	0.2%	41	EVA Spread	-6.9%	68
4 Combined Multiples	-4.6%	4	4 Combined Multiples	N/A	N/A
3 Combined Multiples	-1.9%	7	3 Combined Multiples	-11.5%	2
2 Combined Multiples	-0.7%	30	**2 Combined Multiples**	**1.2%**	**50**
1 Combined Multiple	-1.2%	117	1 Combined Multiple	0.3%	215

UNDERVALUED MULTIPLES ALPHAS

RUSSELL 1000			RUSSELL 2000		
RUI Index 6/17/08	743.32		RUT Index 6/17/08	736.57	
RUI Index 8/12/08	704.59		RUT Index 8/12/08	744.94	
% Gain	-5.2%			1.1%	
	Top 5% Undervalued	# of Obs		Top 5% Undervalued	# of Obs
TTM P/E	4.3%	42	TTM P/E	3.5%	58
TTM PEG	-2.0%	43	**TTM PEG**	**4.8%**	**58**
P/TBV	**7.6%**	**43**	P/TBV	-2.8%	53
EV/EBITDA	2.0%	37	**EV/EBITDA**	**4.1%**	**44**
EV/Sales	-2.1%	44	EV/Sales	0.1%	60
EVA Spread	-3.8%	42	EVA Spread	-2.2%	71
4 Combined Multiples	N/A	N/A	4 Combined Multiples	N/A	N/A
3 Combined Multiples	-6.9%	10	3 Combined Multiples	N/A	N/A
2 Combined Multiples	**2.4%**	**29**	2 Combined Multiples	-2.8%	24
1 Combined Multiple	2.1%	156	**1 Combined Multiple**	**3.6%**	**297**
	Z Scores Undervalued	# of Obs		Z Scores Undervalued	# of Obs
TTM P/E	-10.8%	2	TTM P/E	N/A	0
TTM PEG	**5.6%**	**2**	**TTM PEG**	**7.4%**	**4**
P/TBV	**8.1%**	**4**	P/TBV	-5.4%	7
EV/EBITDA	-17.5%	3	**EV/EBITDA**	**5.0%**	**3**
EV/Sales	-1.9%	12	EV/Sales	N/A	0
EVA Spread	-2.2%	10	EVA Spread	-0.5%	4
	Top 5% Ex-Energy Undervalued	# of Obs		Top 5% Ex-Energy Undervalued	# of Obs
TTM P/E	**7.7%**	**37**	TTM P/E	3.5%	58
TTM PEG	2.6%	36	**TTM PEG**	**5.4%**	**56**
P/TBV	**7.6%**	**43**	P/TBV	-0.8%	51
EV/EBITDA	**14.1%**	**28**	**EV/EBITDA**	**4.5%**	**43**
EV/Sales	5.0%	33	EV/Sales	0.5%	59
EVA Spread	-1.5%	36	EVA Spread	-0.8%	66
4 Combined Multiples	N/A	N/A	4 Combined Multiples	N/A	N/A
3 Combined Multiples	-0.7%	6	3 Combined Multiples	N/A	N/A
2 Combined Multiples	4.1%	27	2 Combined Multiples	-2.8%	24
1 Combined Multiple	5.7%	139	**1 Combined Multiple**	**4.2%**	**290**
	Top 5% Ex-Commodities Undervalued	# of Obs		Top 5% Ex-Commodities Undervalued	# of Obs
TTM P/E	**7.7%**	**37**	TTM P/E	3.2%	56
TTM PEG	2.6%	36	**TTM PEG**	**6.6%**	**54**
P/TBV	**7.6%**	**43**	P/TBV	-0.8%	51
EV/EBITDA	**14.1%**	**28**	**EV/EBITDA**	**4.5%**	**43**
EV/Sales	5.7%	32	EV/Sales	0.5%	59
EVA Spread	-0.7%	36	EVA Spread	-0.3%	65
4 Combined Multiples	N/A	N/A	4 Combined Multiples	N/A	N/A
3 Combined Multiples	-0.7%	6	3 Combined Multiples	N/A	N/A
2 Combined Multiples	4.1%	27	2 Combined Multiples	-2.0%	23
1 Combined Multiple	5.9%	138	**1 Combined Multiple**	**4.2%**	**287**

Source: Bloomberg, personal calculations

P/TBV and EVA Spreads Did a Poor Job of Generating Positive Alpha

By contrast, the P/TBV and EVA spread indicators each produced negative alphas among Top 5% Stocks for three of the four groups. I think this makes sense, though, because I believe these two indicators are more indicative of long-term value, and this study only incorporates less than two months worth of trading data. As a deep value analyst, I have seen numerous occasions where a stock that has a very large positive EVA spread continues to decline in price over the short-term. Since the EVA spread is more of a long-term value measure, I think it makes sense to monitor the effectiveness of these indicators over a longer time period. It could also very well be that the EVA spread cannot be used reliably on its own, but rather, it needs to be used in conjunction with one or more other variables. For example, Joel Greenblatt argues in his book *The Little Book That Beats the Market* that stocks with both a high return on invested capital and a high earnings yield at a particular time (which form the basis of his "Magic Formula" statistic) tend to outperform the overall market over the next year.

Different Multiples Work Better For Different Sized Stocks

The best ratios for determining overvalued stocks in the Russell 1000 index are the TTM PEG Ratio (Top 5% Stocks alpha 6.7%, Z-Stocks alpha 13.6%) and the TTM P/E ratio (Top 5% Stocks alpha 5.5%, Z-Stocks alpha 8.4%). ***However, after removing energy and commodity stocks from the results, only two of the six variables for Russell 1000 Overvalued stocks had a positive alpha, and none were greater than 1.4%.*** I will monitor this over time to see whether this continues.

The results are very different for the Russell 2000 Overvalued stocks. Here, EV/EBITDA (Top 5% Stocks alpha 6.2%, Z-Stocks alpha 16.9%) and EV/Sales (Top 5% Stocks alpha 5.6%, Z-Stocks alpha 6.1%) were the two best indicators. In fact, the 16.9% alpha for EV/EBITDA Z-Stocks was the highest of any of the subcategories. Noteworthy too is these two multiples also generated the only two positive alphas for the group after removing the energy and commodity stocks from the data set. The different results for the overvalued Russell 1000 and 2000 stocks suggest that investors tend to focus more on non-earnings based multiples for smaller companies, and instead look at top-line growth and free cash flows. For larger companies, they tend to look more closely at earnings based multiples, and perhaps they assume these larger companies are already mostly free cash flow positive. That is, they reward smaller, faster growing companies for generating free cash flows, but not larger, slower growing firms, since those are already assumed to be free cash flow positive.

P/TBV (Top 5% Stocks alpha 7.6%, Z-Stocks alpha 8.1%) and TTM P/E (Top 5% Stocks alpha 4.3%, Z-Stocks alpha -10.8%, but there were only two stocks here) were the two best variables for determining undervalued stocks for the Russell 1000, but every variable other than EVA spread generated a positive alpha of at least 2.6% ex-energy and commodity stocks for this group. In fact, EV/EBITDA was the third highest indicator

among the Top 5% stocks, at 2.0%, but it generated a robust 14.1% alpha for non-energy and commodity stocks. Many of the names in this group were energy companies, so that certainly dragged down the alpha of the Top 5% Stocks alpha in this grouping.

TTM PEG (Top 5% Stocks alpha 4.8%, Z-Stocks alpha 7.4%) and EV/EBITDA (Top 5% Stocks alpha 4.1%, Z-Stocks alpha 5.0%) were the two best indicators for determining potentially undervalued stocks for the Russell 2002.

Quality Trumps Quantity When It Comes To the Regression Equations

While it would seem plausible that stocks that are identified as being over or undervalued by more than one multiple would generate higher alphas, the data suggest this is not the case. In Table 3, I listed the alphas generated by each of the different multiples for the four stock groups in Table 2, along with the alphas for the group of stocks that were deemed to be mispriced by 1, 2, 3, & 4 different multiples. The two or three highest producing alphas for each group of Top 5% stocks appear in bold print in Table 3. Being pegged as an over or undervalued stock by 2-4 different multiples produced a top three alpha in just two of the four groups: Russell 1000 Overvalued and Russell 1000 Undervalued. For the Russell 1000 Overvalued stocks, being pegged as an overvalued stock by three different multiples did produce a seemingly high alpha of 8.3%. However, that alpha fell to -1.9% after adjusting for commodity stocks. The 2.4% alpha for the Russell 1000 Undervalued names was a distant third behind P/TBV and TTM P/E within that group. So, when it comes to the regression equations, quality appears to be more important than quantity. That is, being deemed over or undervalued by the various key multiples that appear in Table 2 seems to be much more important than the sheer number of different regression equations that suggest a particular stock is mispriced.

Z-Stocks Are More Likely To Be Over or Undervalued

The Z-Stocks alphas are certainly more volatile than those for the Top 5% Stocks, but that is to be expected, given the relatively low Z-Stock sample sizes. More importantly, the Z-Stocks produced higher alphas than their Top 5% counterparts in 14 out of 22 cases (the Russell 2000 TTM P/E and EV/Sales indicators produced no Z-Stocks). This suggests that Z-Stocks are more likely to be over or undervalued, all other things being equal.

A Few Other Points

- Of the 205 different stocks that appear in Table 2, only one is listed as being both overvalued and undervalued (Lamar Advertising: Ticker LAMR). This is extremely important, since it goes a long way toward validating the reliability of these models. If a large number of stocks appeared to be both over and undervalued, then investors would have much less faith in validity of this screen.

- Many of the undervalued stocks are energy names, which is not all that surprising, given the major downturn in commodity and energy stocks during this time frame.

FOR FURTHER STUDY

- I need to continue to monitor the performance of the stocks produced by this screen, in order to determine whether the conclusions from this study hold up longer-term.
- It would also be wise to re-run each regression every quarter or so to test the long-term stability of the models.
- While the Z-Stocks tend to outperform the Top 5% Stocks, those results are quite volatile, and in many cases, the Z-Stock data set contains fewer than 10 companies. Perhaps trading the top 1% of stocks would ensure a greater number of tradable names, and still provide some diversification benefits, without generating excessive transactions costs.
- As noted in the Appendix, I only used the independent variables that Damodaran published for each equation in his book *Damodaran on Valuation, 2nd Edition.* It is therefore possible to achieve a higher R-square statistic for each equation by adding different x-variables, which I may try to do in the future.
- It would also be useful to run a regression on EVA spreads, to determine whether such an equation would do a better job of screening for mispriced stocks than does rank ordering (at least in the short-term).
- It would be interesting to re-run the TTM PEG regression by replacing the consensus 5-yr earnings growth estimate in the PEG ratio with the earnings growth rate that is suggested by a particular company's retention ratio and average historical return on equity (5-yr growth = retention ratio x ROE). This would eliminate Wall Street estimating bias, and place less emphasis on "below the line" earnings, such as earnings from minority subsidiaries, interest income, tax gains, and even non-recurring income. It would therefore place much more weight on the firm's ability to generate earnings from operations, and it would be easier to compare it to companies that have different tax rates.

APPENDIX: ANALYSIS OF THE REGRESSION CALCULATIONS

The following observations/notes are all based on the regression results that appear at the end of this section:

- I ran these equations in Microsoft Excel, which is not the best statistical program for multiple regression analysis. The reason is that Excel does not have sophisticated diagnostic techniques that are necessary to discover and fix potential problems with the data, such as multicollinearity, and especially heteroskedasticity (non-constant error term). However, even if heteroskedascity exists, which it very likely does for several of my equations, I note these equations are NOT meant to be used for predictive purposes per se, so the potential prediction error caused by the non-constant error term should not affect the usefulness of this study all that much. This analysis is meant to be an initial screen, not a final analysis. The user must investigate each stock further, such as building a discounted cash flow model, before determining whether to commit capital.
- Each regression equation represents the highest R-square statistic I was able to generate for each particular variable. I began by regressing each multiple against the independent variables that originally appeared in Damodaran's Book, and I removed and changed the form of those variables (i.e. took the logarithm of a particular variable) where appropriate. However, I limited myself to using only the x-variables that Damodaran used for each equation. It is entirely possible that I could have found a higher R-square for each y-variable by adding new x-variables to the equation, which I may do in the future.
- Only 70%-88% of the stocks in the Russell 1000, and 43%-71% of the stocks in the Russell 2000, had enough data to be used in the regression analysis for each particular variable. Clearly, this means that my regression equations failed to generate over and undervalued signals for a large number of stocks in these two indexes. However, as long as the stocks that were included in the analysis are a representative sample of the entire index, and I have no reason to think they are not, the various regression equations should be applicable for all stocks within each index.
- Most of these regression equations have R-square statistics that are no higher than 17%, but low R-square statistics are not uncommon for regression equations that are tied to stock price performance. There are so many variables that affect stock performance, and many of those (like human emotion) are difficult to quantify. It is noteworthy, however, that the EV/Sales regressions have R-squares of 99.0% and 47.3% for the Russell 1000 and 2000, respectively. I immediately suspected multicollinearity in these cases, but even the simple regression of EV/Sales to operating margin led to an extremely high R-square, so I do not think multicollinearity is a problem here. Despite their high R-square stats, EV/Sales multiples tended to produce lower alphas than the TTM P/E, TTM PEG and EV/EBITDA multiples, which makes these three latter multiples much more important indicators for this study. That makes me even less concerned about the low R-square statistics for these multiples.

- It is interesting that the 5-year growth rate, adjusted beta, and the payout ratios were all statistically significant for the Russell 1000 TTM P/E and PEG ratios, but only the 5-year growth ratio was statistically significant for those multiples for the Russell 2000 stocks. Smaller stocks tend to be growth stocks, and growth investors usually focus much more on the growth rate, so this result seems reasonable.
- As noted above, operating margins are by far and away the biggest driver behind EV/Sales regressions. So when comparing EV/Sales multiples for a group of stocks, it is always important to consider the corresponding operating margins as well. That is, one cannot just blindly compare the sales rates of two companies without taking their respective operating margins into account. Companies that are growing sales but whose returns on invested capital are less than their respective weighted average cost of capital are more likely to ***destroy*** value with those growing sales.
- None of the independent variables I regressed against P/TBV were statistically significant for the Russell 1000 stocks. Damodaran actually suggested regressing these x-variables against the standard price-to-book ratio, but I hate the P/B, because those usually carry so much worthless goodwill. As such, I simply rank ordered the highest and lowest P/TBVs for Russell 1000 stocks. I did the same thing for the EVA spreads for both Russell 1000 and 2000 stocks, since I was not trying to determine what explained the variability in those spreads, but rather, what effect EVA spreads have on stock prices.
- Although I ran my regressions more than two years after Damodaran published his results in 2006, it is noteworthy that not all of the independent variables he advocates for the regressions were statistically significant in my equations. This suggests that 1.) these relationships may not be stable over time, meaning these regressions would need to be recalculated on a periodic basis, and 2.) these variables affect small and large stocks differently.

Table 4: Differences between Damodaran's Suggested Variables & My Actual Results

Multiple (Y-Variable)	Damodaran's Suggested X-Variables	My Best Russell 1000 Regression Equation	My Best Russell 2000 Regression Equation
TTM P/E	Expected growth rate, payout ratio, beta	Same	Expected growth rate
TTM PEG	Expected growth rate, payout ratio, beta	Same	Expected growth rate
P/B*	Return on equity, payout ratio, expected growth rate, beta	None	Return on equity
EV/EBITDA	Expected growth rate, EVA spread, tax rate	Same	Expected growth rate, EVA spread
EV/S	Operating margin, expected growth rate, WACC, payout ratio	Same	Operating margin, Log WACC

*Damodaran regressed P/B, but I regressed P/Tangible-Book. I think P/B is an extremely flawed measure, since it contains lots of intangibles, and it is easy to manipulate by changing accounting assumptions.
**I did not run regression equations for the EVA Spread, as I explained earlier.
Source: Damodaran on Valuation, 2nd Edition, personal calculations

RUSSELL 1000 (Jun 17, 2008 - Aug 12, 2008)

Y-Variable: TTM P/E Ratio N = 865
R-Square: 16.8%

X-Variables	Coefficient	T-Score
Y-Intercept	-4.96	-1.51
5-Yr Growth	1.26	12.28
Adj Beta	9.38	3.34
Payout Ratio	0.02	4.00

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 1000	1	-5.2%			
Top 5% Overvalued	43	-10.7%	5.5%	15	28
Top 5% Undervalued	42	-0.9%	4.3%	21	21
Top Z Overvalued	24	-13.6%	8.4%	8	16
Top Z Undervalued	2	-16.0%	-10.8%	1	1
Top 5% Overvalued Ex-Energy	35	-5.2%	0.0%	15	20
Top 5% Overvalued Ex-Commodities	35	-5.2%	0.0%	15	20
Top 5% Undervalued Ex-Energy	37	2.5%	7.7%	21	16
Top 5% Undervalued Ex-Commodities	37	2.5%	7.7%	21	16

Y-Variable: TTM PEG Ratio N = 869
R-Square: 5.5%

X-Variables	Coefficient	T-Score
Y-Intercept	1.14	2.60
5-Yr Growth	1.22	3.23
Adj Beta	-0.05	-3.47
Payout Ratio	0.00	4.77

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 1000	1	-5.2%			
Top 5% Overvalued	43	-11.9%	6.7%	13	30
Top 5% Undervalued	43	-7.2%	-2.0%	20	23
Top Z Overvalued	8	-18.8%	13.6%	1	7
Top Z Undervalued	2	0.4%	5.6%	1	1
Top 5% Overvalued Ex-Energy	35	-6.6%	1.4%	13	22
Top 5% Overvalued Ex-Commodities	35	-6.6%	1.4%	13	22
Top 5% Undervalued Ex-Energy	36	-2.6%	2.6%	20	16
Top 5% Undervalued Ex-Commodities	36	-2.6%	2.6%	20	16

RUSSELL 2000 (Jun 17, 2008 - Aug 12, 2008)

Y-Variable: TTM P/E Ratio N = 1165
R-Square: 0.3%

X-Variables	Coefficient	T-Score
Y-Intercept	24.53	3.32
5-Yr Growth	0.69	1.71

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 2000	1	1.1%			
Top 5% Overvalued	58	-0.4%	1.5%	32	26
Top 5% Undervalued	58	4.6%	3.5%	31	27
Top Z Overvalued	9	4.1%	-3.0%	6	3
Top Z Undervalued	0	N/A	N/A		
Top 5% Overvalued Ex-Energy	54	1.4%	-0.3%	32	22
Top 5% Overvalued Ex-Commodities	53	1.4%	-0.3%	32	21
Top 5% Undervalued Ex-Energy	58	4.6%	3.5%	31	27
Top 5% Undervalued Ex-Commodities	56	4.3%	3.2%	30	26

Y-Variable: TTM PEG Ratio N = 1161
R-Square: 0.3%

X-Variables	Coefficient	T-Score
Y-Intercept	9.21	2.78
Log 5-Yr Growth	-3.37	-1.96

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 2000	1	1.1%			
Top 5% Overvalued	58	0.6%	0.5%	30	28
Top 5% Undervalued	58	5.9%	4.8%	38	20
Top Z Overvalued	8	0.7%	0.4%	5	3
Top Z Undervalued	4	8.5%	7.4%	3	1
Top 5% Overvalued Ex-Energy	54	1.7%	-0.6%	30	24
Top 5% Overvalued Ex-Commodities	52	1.8%	-0.7%	29	23
Top 5% Undervalued Ex-Energy	56	6.5%	5.4%	38	18
Top 5% Undervalued Ex-Commodities	54	7.7%	6.6%	38	16

Y-Variable: P/TBV N = 705

No R-Square. Model was insignificant, so rankings reflect straight ordering.

X-Variables	Coefficient	T-Score
Y-Intercept	28.14	1.90
ROE	0.10	0.57
Payout Ratio	0.00	0.19
5-Yr Growth	-0.09	-0.17
Adj Beta	-18.02	-1.48

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 1000	1	-5.2%			
Top 5% Highest P/TBV Ratios (Overvalued)	42	0.0%	-5.2%	28	14
Top 5% Lowest P/TBV Ratios (Undervalued)	43	2.4%	7.6%	31	12
Top Z Highest P/TBV Ratios (Overvalued)	4	-2.4%	-2.8%	1	3
Top Z Lowest P/TBV Ratios (Undervalued)	4	2.9%	8.1%	3	1
Top 5% Overvalued Ex-Energy	42	0.0%	-5.2%	28	14
Top 5% Overvalued Ex-Commodities	42	0.0%	-5.2%	28	14
Top 5% Undervalued Ex-Energy	43	2.4%	7.6%	31	12
Top 5% Undervalued Ex-Commodities	43	2.4%	7.6%	31	12

Y-Variable: P/TBV N = 1066

R-Square: 1.2%

X-Variables	Coefficient	T-Score
Y-Intercept	5.89	3.32
ROE	-0.24	-3.61

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 2000		1.1%			
Top 5% Overvalued	53	3.6%	-2.5%	34	19
Top 5% Undervalued	53	-1.7%	-2.8%	24	29
Top Z Overvalued	7	-2.8%	3.9%	3	4
Top Z Undervalued	7	-4.3%	-5.4%	3	4
Top 5% Overvalued Ex-Energy	51	3.8%	-2.7%	33	18
Top 5% Overvalued Ex-Commodities	50	4.3%	-3.2%	33	17
Top 5% Undervalued Ex-Energy	51	0.3%	-0.8%	24	27
Top 5% Undervalued Ex-Commodities	51	0.3%	-0.8%	24	27

Y-Variable: EV-EBITDA N = 745

R-Square: 9.7%

X-Variables	Coefficient	T-Score
Y-Intercept	8.04	11.86
5-Yr Growth	0.28	6.64
EVA	-0.02	-2.95
Eff Tax Rate	-0.01	-5.12

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 1000	1	-5.2%			
Top 5% Overvalued	37	-3.8%	-1.4%	19	18
Top 5% Undervalued	37	-3.2%	2.0%	18	19
Top Z Overvalued	19	-3.5%	-1.7%	9	10
Top Z Undervalued	3	-22.7%	-17.5%	1	2
Top 5% Overvalued Ex-Energy	34	-1.1%	-4.1%	18	16
Top 5% Overvalued Ex-Commodities	34	-1.1%	-4.1%	18	16
Top 5% Undervalued Ex-Energy	28	8.9%	14.1%	19	9
Top 5% Undervalued Ex-Commodities	28	8.9%	14.1%	19	9

Y-Variable: EV-EBITDA N = 873

R-Square: 3.2%

X-Variables	Coefficient	T-Score
Y-Intercept	18.93	4.07
5-Yr Growth	0.38	1.76
EVA Spread	-0.71	-4.92

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 2000	1	1.1%			
Top 5% Overvalued	44	-5.1%	6.2%	18	26
Top 5% Undervalued	44	5.2%	4.1%	28	16
Top Z Overvalued	4	-15.8%	16.9%	1	3
Top Z Undervalued	3	6.1%	5.0%	2	1
Top 5% Overvalued Ex-Energy	41	-3.4%	4.5%	18	23
Top 5% Overvalued Ex-Commodities	41	-3.4%	4.5%	18	23
Top 5% Undervalued Ex-Energy	43	5.6%	4.5%	28	15
Top 5% Undervalued Ex-Commodities	43	5.6%	4.5%	28	15

Y-Variable: EV-Sales N = 881

R-Square: 99.0%

X-Variables	Coefficient	T-Score
Y-Intercept	7.43	9.66
Op Margin (1-t)	-0.22	-269.80
5-yr Growth	0.09	4.20
WACC	-0.38	-4.48

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 1000	1	-5.2%			
Top 5% Overvalued	44	-5.9%	0.7%	18	26
Top 5% Undervalued	44	-7.3%	-2.1%	22	22
Top Z Overvalued	9	-0.2%	-5.0%	5	4
Top Z Undervalued	12	-7.1%	-1.9%	7	5
Top 5% Overvalued Ex-Energy	37	-3.0%	-2.2%	18	19
Top 5% Overvalued Ex-Commodities	37	-3.0%	-2.2%	18	19
Top 5% Undervalued Ex-Energy	33	-0.2%	5.0%	22	11
Top 5% Undervalued Ex-Commodities	32	0.5%	5.7%	22	10

Y-Variable: EV-Sales N = 1207

R-Square: 47.3%

X-Variables	Coefficient	T-Score
Y-Intercept	9.99	9.72
Op Margin (1-t)	-0.02	-32.58
Log WACC	-7.25	-6.94

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 2000	1	1.1%			
Top 5% Overvalued	60	-4.5%	5.6%	25	35
Top 5% Undervalued	60	1.2%	0.1%	31	29
Top Z Overvalued	24	-5.0%	6.1%	10	14
Top Z Undervalued	0	N/A	N/A		
Top 5% Overvalued Ex-Energy	57	-2.8%	3.9%	25	32
Top 5% Overvalued Ex-Commodities	53	-2.1%	3.2%	24	29
Top 5% Undervalued Ex-Energy	59	1.6%	0.5%	31	28
Top 5% Undervalued Ex-Commodities	59	1.6%	0.5%	31	28

Y-Variable: EVA Spread N = 845

No R-Square, since I didn't run a regression on this. I'm not trying to determine what affects the EVA spread, but rather what effects the EVA spread has on stock returns.

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 1000	1	-5.2%			
Top 5% Lowest Spreads (Overvalued)	43	-6.7%	1.5%	18	25
Top 5% Highest Spreads (Undervalued)	42	-9.0%	-3.8%	17	25
Top Z Lowest Spreads (Overvalued)	3	-2.2%	-3.0%	1	2
Top Z Highest Spreads (Undervalued)	10	-7.4%	-2.2%	7	3
Top 5% Overvalued Ex-Energy	41	-5.4%	0.2%	18	23
Top 5% Overvalued Ex-Commodities	41	-5.4%	0.2%	18	23
Top 5% Undervalued Ex-Energy	36	-6.7%	-1.5%	16	20
Top 5% Undervalued Ex-Commodities	36	-5.9%	-0.7%	16	20

SUMMARY OF RANKINGS	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 1000	1	-5.2%			
Overvalued Average All	177	-6.6%	1.4%	78	99
Overvalued Average 4	4	-0.6%	-4.6%	2	2
Overvalued Average 3	10	-13.5%	8.3%	3	7
Overvalued Average 2	35	-8.5%	3.3%	12	23
Overvalued Average 1	128	-5.7%	0.5%	61	67
Overvalued Average All Ex-Energy	158	-4.0%	-1.2%	78	80
Overvalued Average 4 Ex-Energy	4	-0.6%	-4.6%	2	2
Overvalued Average 3 Ex-Energy	7	-3.3%	-1.9%	3	4
Overvalued Average 2 Ex-Energy	30	-4.5%	-0.7%	12	18
Overvalued Average 1 Ex-Energy	117	-4.0%	-1.2%	61	56
Overvalued Average All Ex-Commodities	156	-3.7%	-1.5%	78	80
Overvalued Average 4 Ex-Commodities	4	-0.6%	-4.6%	2	2
Overvalued Average 3 Ex-Commodities	7	-3.3%	-1.9%	3	4
Overvalued Average 2 Ex-Commodities	30	-4.5%	-0.7%	12	18
Overvalued Average 1 Ex-Commodities	115	-3.6%	-1.6%	61	54
Undervalued Average All	195	-3.5%	1.7%	99	96
Undervalued Average 4	0	0.0%	N/A	N/A	N/A
Undervalued Average 3	10	-12.1%	-6.9%	4	6
Undervalued Average 2	29	-2.8%	2.4%	16	13
Undervalued Average 1	156	-3.1%	2.1%	79	77
Undervalued Average All Ex-Energy	172	0.0%	5.2%	99	73
Undervalued Average 4 Ex-Energy	0	0.0%	N/A	N/A	N/A
Undervalued Average 3 Ex-Energy	6	-5.9%	-0.7%	4	2
Undervalued Average 2 Ex-Energy	27	-1.1%	4.1%	16	11
Undervalued Average 1 Ex-Energy	139	0.5%	5.7%	80	59
Undervalued Average All Ex-Commodities	172	0.0%	5.2%	99	73
Undervalued Average 4 Ex-Commodities	0	0.0%	N/A	N/A	N/A
Undervalued Average 3 Ex-Commodities	6	-5.9%	-0.7%	4	2
Undervalued Average 2 Ex-Commodities	27	-1.1%	4.1%	16	11
Undervalued Average 1 Ex-Commodities	138	0.7%	5.9%	80	58

Y-Variable: EVA Spread N = 1411

No R-Square, since I didn't run a regression on this. I'm not trying to determine what affects the EVA spread, but rather what effects the EVA spread has on stock returns.

	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 2000	1	1.1%			
Top 5% Overvalued	71	6.6%	-5.5%	43	28
Top 5% Undervalued	71	-1.1%	-2.2%	37	34
Top Z Overvalued	23	4.3%	-3.2%	13	10
Top Z Undervalued	4	0.6%	-0.5%	3	1
Top 5% Overvalued Ex-Energy	68	8.0%	-6.9%	43	25
Top 5% Overvalued Ex-Commodities	68	8.0%	-6.9%	43	25
Top 5% Undervalued Ex-Energy	66	0.3%	-0.8%	36	30
Top 5% Undervalued Ex-Commodities	65	0.8%	-0.3%	36	29

SUMMARY OF RANKINGS	Obs	Avg Ret	Alpha	# Stocks Up	# Stocks Down
Russell 2000	1	1.1%			
Overvalued Average All	282	-1.3%	2.4%	142	140
Overvalued Average 4	0	0.0%	N/A	N/A	N/A
Overvalued Average 3	3	4.6%	-3.5%	2	1
Overvalued Average 2	54	-0.5%	1.6%	26	28
Overvalued Average 1	225	-1.6%	2.7%	112	113
Overvalued Average All Ex-Energy	271	-0.6%	1.7%	141	130
Overvalued Average 4 Ex-Energy	0	0.0%	N/A	N/A	N/A
Overvalued Average 3 Ex-Energy	2	12.6%	-11.5%	2	0
Overvalued Average 2 Ex-Energy	52	-0.2%	1.3%	27	25
Overvalued Average 1 Ex-Energy	217	-0.8%	1.9%	112	105
Overvalued Average All Ex-Commodities	267	-0.4%	1.5%	140	127
Overvalued Average 4 Ex-Commodities	0	0.0%	N/A	N/A	N/A
Overvalued Average 3 Ex-Commodities	2	12.6%	-11.5%	2	0
Overvalued Average 2 Ex-Commodities	50	-0.1%	1.2%	26	24
Overvalued Average 1 Ex-Commodities	215	0.8%	0.3%	112	103
Undervalued Average All	321	4.2%	3.1%	183	138
Undervalued Average 4	0	0.0%	N/A	N/A	N/A
Undervalued Average 3	0	0.0%	N/A	N/A	N/A
Undervalued Average 2	24	-1.7%	-2.8%	12	12
Undervalued Average 1	297	4.7%	3.6%	171	126
Undervalued Average All Ex-Energy	314	4.7%	3.6%	183	131
Undervalued Average 4 Ex-Energy	0	0.0%	N/A	N/A	N/A
Undervalued Average 3 Ex-Energy	0	0.0%	N/A	N/A	N/A
Undervalued Average 2 Ex-Energy	24	-1.7%	-2.8%	12	12
Undervalued Average 1 Ex-Energy	290	5.3%	4.2%	171	119
Undervalued Average All Ex-Commodities	310	4.9%	3.8%	182	128
Undervalued Average 4 Ex-Commodities	0	0.0%	N/A	N/A	N/A
Undervalued Average 3 Ex-Commodities	0	0.0%	N/A	N/A	N/A
Undervalued Average 2 Ex-Commodities	23	-0.9%	-2.0%	12	11
Undervalued Average 1 Ex-Commodities	287	5.3%	4.2%	170	117