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Point and Figure Relative Strength Box Sizes

Relative strength is a very robust tool for security selection. Also referred to as momentum, a relative strength strategy selects securities that are stronger than the other securities in the investment universe and holds those securities until they become weak. There have been hundreds of academic studies published over the years demonstrating the power of the momentum factor.

Our June 2014 whitepaper, "Point and Figure Relative Strength Signals" showed how basic point and figure signals perform on a large basket of U.S. stocks over a long time horizon. (For more on point and figure charting visit www.dorseywright.com). The point and figure aspect of our research was unique. Most of the other research uses a time-based factor to define momentum. For example, momentum might be defined as the trailing twelve month or six month return of all the securities in the universe. Those securities are then ranked from best to worst trailing performance. There has been quite a bit of research on what is the optimal time horizon to define momentum. Generally speaking, a six to twelve month window tends to work the best over time. That window can be shortened for multi-asset portfolios or universes of non-volatile securities. But all of the research has shown that momentum is an intermediate term factor. Very short term ranking systems like a one month window perform very poorly over time because there is a lot of mean reversion at short term time horizons. There is also a lot of mean reversion at longer term horizons over a couple of years. This has led to momentum being knows as an intermediate term factor.

One of the unique aspects of point and figure analysis is time is removed from the equation. Unlike a daily bar or line chart, if nothing of significance happens on a given day no new plot is made. On a point and figure chart volatility is the key driver for plotting the chart. A stock that exhibits large price swings or large moves relative to the market benchmark will have a chart with many more columns than a non-volatile stock like a large utility company. Time is essentially removed from the equation in a point and figure chart. As a result, where more conventional momentum definitions rely on time to determine what an intermediate time horizon is, you must use volatility to define intermediate using point and figure. While there has been a tremendous amount of research on the time based definitions of momentum there has been very little done using volatility to define an intermediate term horizon.

Point and figure charts use box sizes to control the volatility of the chart. A large box size filters out more short term movements than a smaller box size. As a result, a chart with a small box size can

have many more columns than the same chart with a larger box size. The goal is to find a box size that is small enough to pick up the intermediate term trend, but large enough to filter out the short term trading gyrations that lead to whipsaws. Years ago (before computers were used heavily to produce charts) a company called Chartcraft produced point and figure charts with a standard box size depending on price. When price was below $20 the box size was $0.50, but if the price moved above $20 the box size was increased to $1.00. This method helped keep price movements relatively similar in terms of box sizes while still maintaining simplicity because the charts were posted by hand.

The Chartcraft standard boxes were also widely used for relative strength charts. The relative strength charts were created by taking the price of a security, dividing it by a market benchmark and then plotting it like you would a price chart. This led to some interesting characteristics, most importantly, different percentage moves versus the market registered differently on the relative strength chart depending on the stock's price. A stock split, for example, could affect the relative strength status of a stock. Another drawback of the old box sizes was apparent after the 2002 bear market. Very low priced stocks took huge moves to reverse up on their relative strength charts. To correct for these drawbacks we began plotting relative strength charts on a percentage scale rather than a fixed number scale over ten years ago. We felt that any move relative to the market should be registered the same whether the security was low priced or high priced. Putting everything on the same percentage scale allowed us to make an apples to apples comparison of every stock in the universe.

That brings us back to the original question of, "what box size should I use?" The data in Table 1 summarizes a strategy that buys stocks with strong relative strength characteristics. We use the same methodology we used in our previous study (see Point and Figure Relative Strength Signals, June 2014). The universe is comprised of the top 1,000 U.S. stocks by market capitalization. We include companies that have been delisted for any reason. Each month a point and figure relative strength is calculated. As we demonstrated in our previous study, those stocks having the best momentum characteristics (on a point and figure "buy" signal and in a column of "x's") performed the best over time. For the original study we used a 6.5% box size for equities versus a broad market benchmark, which is the default box size for equities on the Dorsey, Wright research database. We now extend that study by calculating point and figure relative strength charts for each stock using box sizes ranging from 1.5% all the way up to 10.5% at 1.0% intervals. Each month the average equal weighted return for the group of stocks on point and figure buy signals and in a column of x's is calculated. All of the stocks are held for one month and then the group is reconstituted and reweighted.

The data in Table 1 helps us determine what the equivalent of an intermediate term horizon is in terms of point and figure box sizes. Much like the time-based methods, the returns suffer when the box size is too small or too large. In the case of the former, the system picks up too much of the short term trading noise. In the case of the latter, too much has to happen in order for the point and figure chart to register a change. The sweet spot is in the 6.5% to 7.5% box size range. Using a 6.5% box size means that a security has to underperform the broad market by 19.5% in order to change columns and be shifted out of the group that qualifies as hav-

Table 1: PnF Box Size Returns

	Point And Figure Box Size									
Date	**1.50%**	**2.50%**	**3.50%**	**4.50%**	**5.50%**	**6.50%**	**7.50%**	**8.50%**	**9.50%**	**10.50%**
12/29/89										
12/31/90	-9.1%	-3.1%	-2.3%	-2.2%	-0.1%	-0.7%	-2.4%	-3.9%	-4.5%	-4.7%
12/31/91	44.1%	47.3%	50.9%	52.7%	53.3%	55.5%	55.8%	55.4%	54.9%	44.5%
12/31/92	15.3%	12.8%	13.2%	14.6%	14.3%	13.3%	12.1%	11.8%	10.5%	8.2%
12/30/93	12.5%	11.7%	12.7%	13.3%	13.9%	14.6%	14.5%	13.6%	13.9%	10.1%
12/30/94	-6.6%	-5.8%	-6.7%	-5.4%	-5.0%	-4.6%	-5.0%	-5.6%	-5.3%	-6.3%
12/29/95	23.0%	30.9%	33.9%	34.8%	36.1%	37.6%	37.3%	37.7%	37.5%	38.1%
12/31/96	14.5%	14.3%	17.9%	21.2%	21.3%	24.6%	24.1%	23.4%	23.5%	23.8%
12/31/97	19.8%	23.9%	29.2%	32.3%	32.5%	35.7%	34.2%	34.1%	33.2%	36.8%
12/31/98	5.7%	7.5%	14.7%	16.9%	20.4%	20.6%	20.1%	19.3%	20.3%	23.9%
12/31/99	18.2%	33.6%	38.6%	36.6%	42.0%	45.9%	49.4%	46.9%	45.9%	36.8%
12/29/00	-19.3%	-4.3%	2.8%	6.9%	3.2%	2.0%	1.7%	1.3%	3.0%	0.1%
12/31/01	-17.6%	-16.0%	-14.7%	-14.0%	-13.2%	-12.4%	-12.6%	-11.8%	-13.1%	-12.7%
12/31/02	-14.8%	-14.6%	-14.0%	-14.6%	-14.4%	-13.6%	-12.7%	-13.6%	-13.1%	-13.5%
12/31/03	34.5%	32.9%	31.5%	33.0%	34.7%	33.6%	33.6%	33.9%	33.6%	31.5%
12/31/04	15.8%	18.3%	18.7%	19.2%	19.9%	21.2%	21.1%	21.6%	22.3%	19.1%
12/30/05	11.3%	11.7%	12.6%	13.0%	13.7%	12.5%	13.3%	13.4%	13.3%	15.4%
12/29/06	16.4%	15.8%	15.7%	16.1%	15.7%	17.1%	17.4%	16.9%	16.3%	15.1%
12/31/07	16.7%	19.3%	18.2%	17.8%	16.0%	16.7%	16.8%	16.1%	16.5%	16.6%
12/31/08	-41.8%	-38.3%	-34.9%	-33.2%	-33.3%	-33.8%	-33.4%	-34.2%	-35.3%	-37.7%
12/31/09	30.0%	31.9%	29.2%	29.6%	28.9%	29.2%	28.0%	27.0%	26.8%	24.9%
12/31/10	21.5%	24.0%	23.3%	24.2%	24.3%	23.7%	24.7%	24.3%	24.8%	22.3%
12/30/11	-0.2%	2.4%	2.6%	2.4%	3.2%	2.4%	2.5%	2.8%	3.0%	3.2%
12/31/12	13.0%	12.8%	13.9%	13.0%	13.5%	15.1%	15.1%	15.5%	15.2%	16.3%
12/31/13	38.9%	37.4%	38.2%	38.7%	38.2%	36.4%	36.9%	35.2%	35.0%	34.2%
Cum	542.3%	1104.6%	1627.3%	2002.2%	2216.8%	2461.3%	2444.5%	2206.6%	2137.1%	1610.4%
Annual	8.1%	10.9%	12.6%	13.5%	14.0%	14.5%	14.4%	14.0%	13.8%	12.5%
St Dev	20.1%	19.6%	19.6%	19.6%	19.9%	20.5%	20.7%	20.6%	20.6%	19.7%

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ing the best relative strength. The large percentage reversal required may surprise many people, but relative price moves in the 20% to 25% range exhibit the best long term performance. The magnitude of these moves indicates how important it is to stick with a strong stock during the dynamic part of its price appreciation cycle. We have noticed over the years that stocks with strong momentum characteristics are often volatile and are prone to sharp pullbacks before continuing to new highs. Trying to "get out in front" of the trend change by using a smaller box size will certainly be a better method when the

trend change happens, but the data indicates this is hard to predict .

The data in this study has focused on groups of common stocks. For less volatile securities or ET-F's it is sometimes better to use smaller box sizes as their price changes aren't subject to the same volatility as individual equities. It can also be advan-tageous to use smaller box sizes when doing stock versus stock comparisons in a point and figure relative strength matrix (not covered in this study). But for securities with the volatility characteristics of stocks it is best to use box sizes that provide reversals in the 20% to 25% range. This allows the stocks to correct as a normal part of the trend, but also allows the strategy to adapt to changing leadership over time.

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