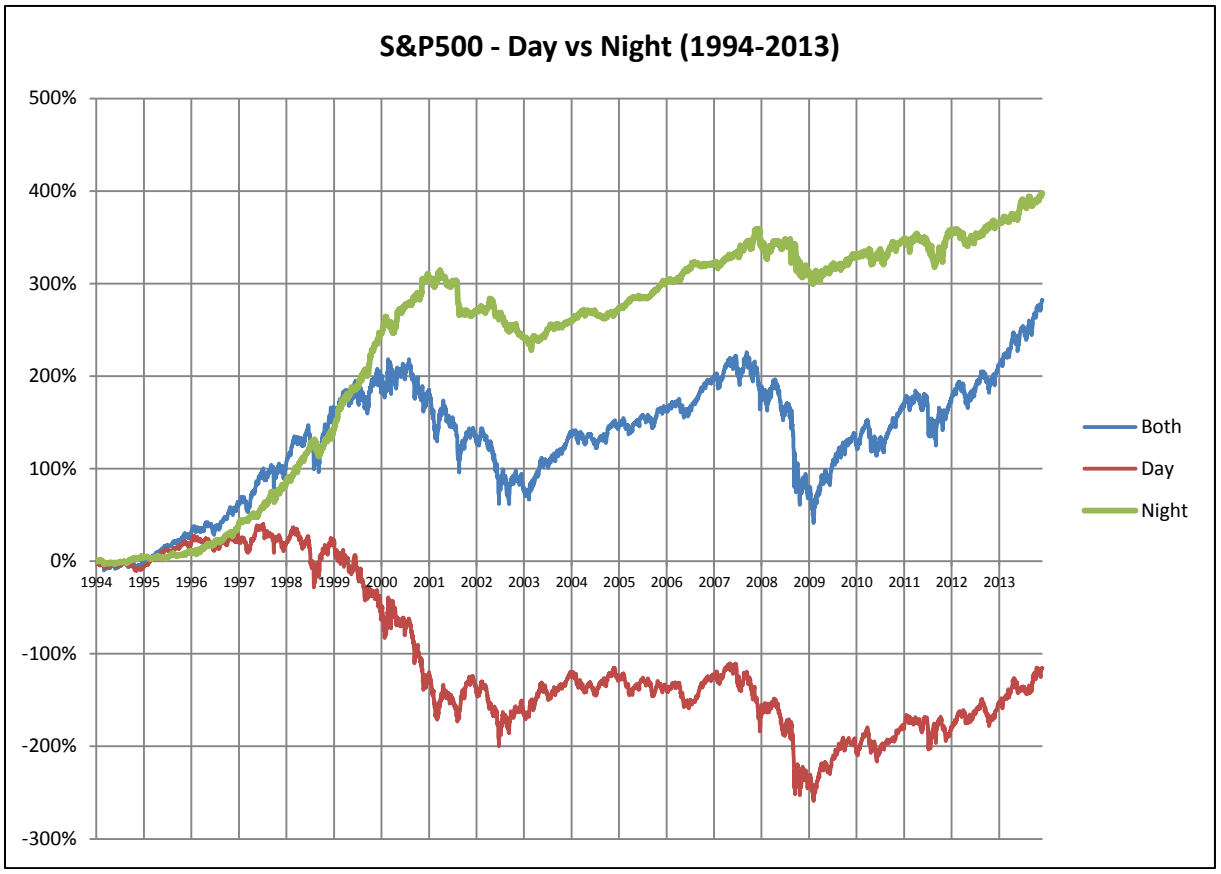
S&P500 Index: Daytime vs Nighttime Performance

In this study we break up the close-to-close daily S&P500 data into its intra-day and overnight components to determine the relative contribution of each to the overall performance of the index.

It is commonly believed that most of the stock market's price movements take place during the regular session – i.e. between 9:30 and 16:00 EST. This is true – the average true range (ATR) of regular sessions is consistently multiples greater than the ATR of the extended sessions (pre & post market). The profit opportunity being greater during the regular session, one would logically infer that daytime sessions would outperform nighttime sessions.

The chart below shows the relative contribution of daytime sessions (open-close) and nighttime sessions (close-open) to the overall performance of the S&P500 from 1994 to 2013, using Jan 1st 1994 as the base.



The difference in the performance of the two sessions is striking. During the 1994-2013 period the S&P500 index was up 282%. Of this, the overnight session contributed 398%, while the daytime sessions contributed -116%. So daytime sessions, despite their greater volatility and implied promise of positive price movement, hugely underperformed the less volatile nighttime sessions.

The regular sessions showed negative expectancy due to a low 50.82% win rate (probability of closing up for the day), coupled with a ratio of average winner to average loser of only 0.91. Nighttime sessions, on the other hand, gapped up 55.02% of the time and the ratio of average winner to average loser was a more reasonable 0.95.

During the 1994-2013 period, daytime sessions were profitable in 10 out of the 20 years, while nighttime sessions were profitable in 17 out of the 20 years. It should be noted that the bull

market of 2009 to 2013 has seen a strengthening of the daytime performance, with regular sessions outperforming overnight sessions in 4 of the past 5 years.

The table below summarizes the results:

	Both Sessions		Daytime		Nighttime	
Year	Delta	Up/Dn	Delta	Up/Dn	Delta	Up/Dn
1994	-5.11%	Down	-9.09%	Down	3.99%	Up
1995	34.38%	Up	28.95%	Up	5.43%	Up
1996	21.12%	Up	2.51%	Up	18.61%	Up
1997	30.83%	Up	-1.36%	Down	32.19%	Up
1998	26.79%	Up	-0.41%	Down	27.20%	Up
1999	20.16%	Up	-19.69%	Down	39.84%	Up
2000	-10.96%	Down	-32.00%	Down	21.04%	Up
2001	-12.80%	Down	0.64%	Up	-13.44%	Down
2002	-22.81%	Down	-14.00%	Down	-8.82%	Down
2003	25.76%	Up	19.46%	Up	6.30%	Up
2004	8.79%	Up	4.11%	Up	4.68%	Up
2005	2.99%	Up	-9.95%	Down	12.93%	Up
2006	13.63%	Up	5.82%	Up	7.81%	Up
2007	3.01%	Up	-9.53%	Down	12.54%	Up
2008	-38.28%	Down	-25.22%	Down	-13.06%	Down
2009	24.25%	Up	17.41%	Up	6.83%	Up
2010	12.76%	Up	7.30%	Up	5.46%	Up
2011	0.83%	Up	-2.96%	Down	3.79%	Up
2012	13.58%	Up	9.66%	Up	3.92%	Up
2013	26.85%	Up	16.02%	Up	10.83%	Up

It is generally understood that price action is driven by volume and news, and the daytime session receives considerably more of both than the overnight session. So one would expect the natural (positive) inflationary bias of the market to express itself mainly during the day. But that does not appear to be true.

Rather, it would seem that daytime sessions are dominated by uncertainty, mean-reverting tendencies, and lack of follow-through. This has resulted in an almost 50/50 average up/down day outcome. The notable exception is the unprecedented rally of the past 5 years, that has been predominantly driven by aggressive economic interventionism, specifically Quantitative Easing.

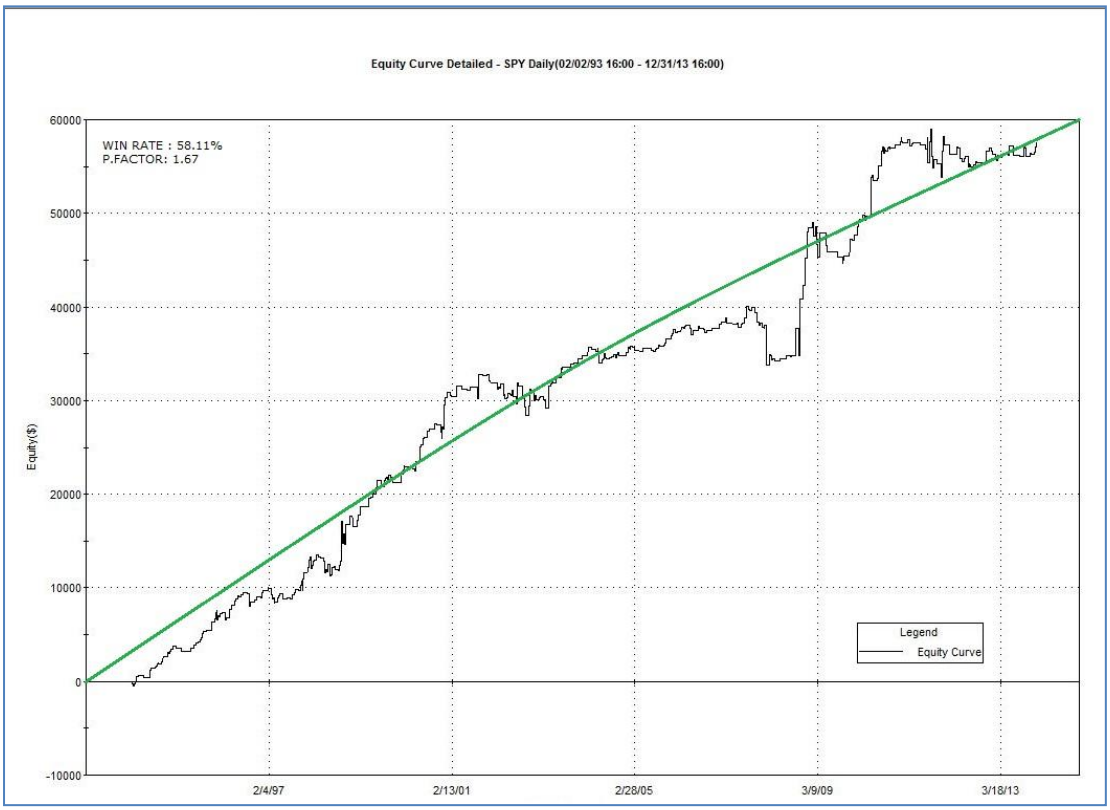
Nighttime performance, on the other hand, has been a lot more consistent. Below is a table that breaks down the overnight performance by day of the week:

	Day of Week	Total Trades	% Profitable	Win/Loss Ratio	ProfitFactor
1	All	5,033	55.02	0.95	1.19
2	Mon	949	54.90	1.05	1.32
3	Tue	1,031	54.90	0.92	1.15
4	Wed	1,032	53.88	0.94	1.14
5	Thu	1,013	55.58	0.83	1.06
6	Fri	1,008	55.85	1.01	1.34

All nights of the week have expressed a small positive edge, but Monday nights and Friday nights have performed the best. The reasons for this lie in two very powerful psychology-driven phenomenons:

1. "Relief Rally"

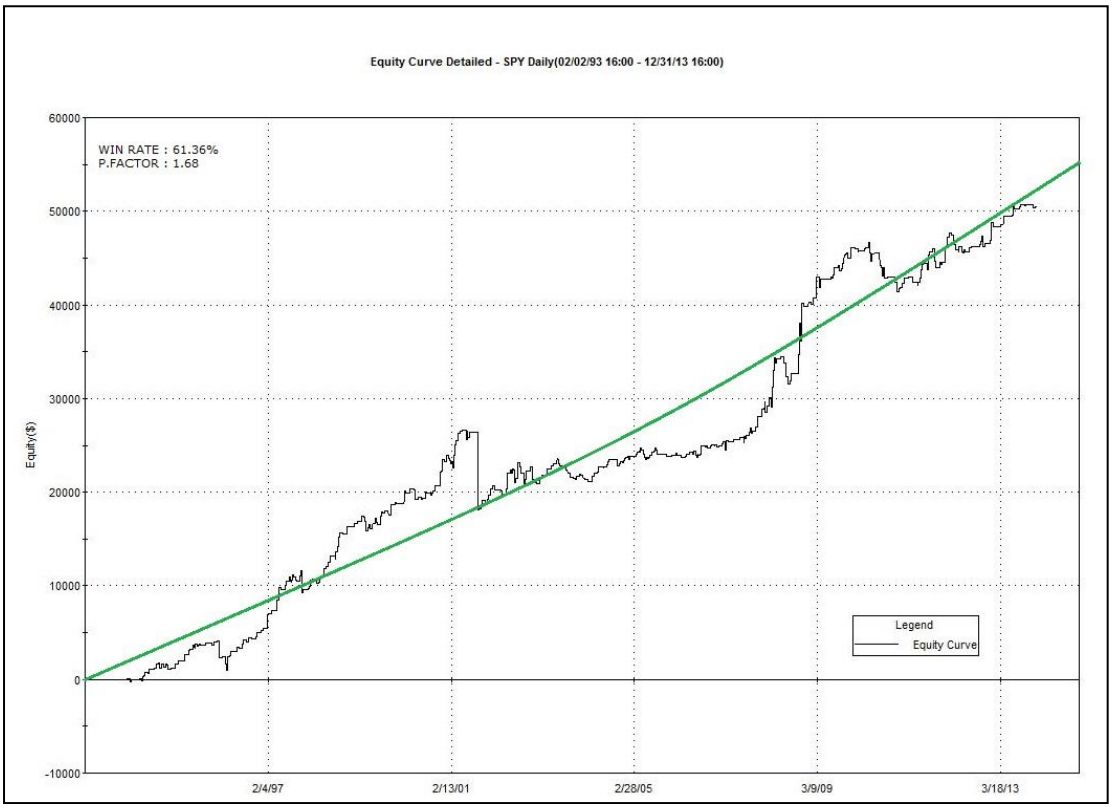
   This occurs over the weekend. The general anxiety of holding a position over the weekend slowly dissipates into Monday morning. And, with the realization that no dramatic event occurred while the markets were closed, the market has a tendecy to gap up at Monday's open. This "relief rally" edge is particularly pronounced if Friday was a down day. Below is an equity curve showing the results of buying the SPY (S&P500 ETF) on the close of a bearish Friday and selling at the open on Monday morning.



2. "Turnaround Tuesday"

   Mondays are key market days and tend to be more volatile than the other days of the week. Mondays that see a lot of selling have a tendency to attract a mean-reverting reaction on Tuesday morning known as "turnaround Tuesday". Much of this edge is felt throughout the day on Tuesday, but some of it is played out during Monday night. Below is

an equity curve showing the effect of buying the SPY (S&P500 ETF) on the close of bearish Mondays, and exiting at the open of the next trading day:



As seen above, daytime sessions over the past 20 years have generally been choppy and non-trending. During bullish periods daytime sessions have displayed flat to moderately negative expectancy, with the notable exception of the past 5 years. And during bearish periods these sessions have typically underperformed their nighttime counterparts.

Overnight sessions, in contrast, have displayed a more consistent positive bias. And while the objective of this paper is not to extrapolate trading strategies, it would appear that some of the more consistent edges present in specific day/price-action setups could be profitably exploited. Alternatively, swing traders familiar with these setups and aware of the positive overnight directional bias could possibly use this information to better time their entries and exits.

The S&P500's noted propensity towards up-gaps, for instance, means that entering short positions (or exiting long positions) at the next day's open instead of the day's close should have a positive impact on the profit expectancy of any multi-day trading strategy.