The Night Effect is a phenomenon where equities have historically performed better at night when local exchanges are closed (i.e. the overnight session) than during the day when markets are open. Although the night session does not always outperform the day session, Night Effect has been shown to be persistent across multiple time periods and markets.

Academic research has proposed multiple reasons as to why the Night Effect exists. The frequently stated rationale for the Night Effect focuses on the timing of information flow/availability, risk management practices and liquidity premiums arising from differences in the trading volumes between the day and night sessions. We believe that these reasons make intuitive sense and align with how investors often make trading decisions.

With the launch of NightShares Exchange Traded Funds, investors now have the ability to make a decision as to whether to invest in the full 24 hour cycle or to target their exposure to the overnight portion of the market. Given this new option, it is worth exploring the Night Effect in greater detail.

Like with many facets of investing, relative performance varies over time. To better understand the Night Effect, we evaluated overnight performance compared to the full 24 hour and day trading cycles - looking across time periods and market outcomes. To provide a more granular view of the Night Effect while maintaining a long term focus, we evaluated 40 quarters of returns, from Q3 2012 through to Q2 2022. In addition, we evaluated both large cap and small cap equities. The Night Effect can be clearly seen in both market cap categories although it has been far more pronounced in small cap equities than in large caps.

To understand relative performance, we evaluated "up" and "down" markets. Moreover, we looked at not only all 40 quarters to explore "up" and "down" market periods, but also evaluated the tails of the distribution, i.e. the four quarters that each showed the strongest up and down performance. Given investing can have a strong emotional component[1], it is important to understand how the Night Effect plays itself out during periods at both ends of the return spectrum.

The Night Effect and Large Cap Stocks

US Large Cap stocks are often the single largest allocation in an investors' portfolio given the size of the US equity market. No exploration of the Night Effect would therefore be complete without a deeper understanding of how large cap returns differ between the overnight day and full 24 hour periods.

The 10 year period from 7/1/12 to 6/30/2022 was one of considerable growth in the equity market, with US large caps, as measured by the SPDR S&P 500 ETF (SPY), up a cumulative 235%[2]. That said, the overall return and corresponding sharpe ratio varies when distinguishing between the trading sessions:

[1] One critical behavioral component of investing is known as "loss aversion". In a piece to investors, Charles Schwab wrote, "loss aversion is the tendency to avoid losses over achieving equivalent gains. Broadly speaking, people feel pain from losses much more acutely than they feel pleasure from the gains of the same size...loss aversion can result in clients avoiding risk, leading to overly conservative portfolios that do not deliver the returns they need to achieve their goals. It can also push clients to sell during a stock market downturn simply to avoid further losses—which could mean they miss out on gains when the stocks hey have sold rebound."

[2] ETFs are used for calculation purposes, as opposed to indexes, because they provide a daily source of both opening and closing values.

Metric	Full 24 Hour Circle	Overnight Session	Day Session
Cumulative Return (%)	235	147	36
Annual Return (%)	12.9	9.5	3.1
Sharpe Ratio	0.81	0.88	0.31

Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (SPY), percentages may not total to 100% due to compounding of returns

During that 10 year period, there were 33 "up" quarters (> 0% return) and only 7 "down" quarters (< 0% return). While this was likely perceived as a good time to be in the market by most investors, an exploration of the Night Effect shows that some might have valued having exposure to just the overnight portion of the large cap market.

From an "up" perspective, the overnight session captured 62% of the average 5.93% quarterly return across the 33 "up" quarters:

Up Market Metrics	Full 24 Hour Cycle	Overnight Session	Day Session
Average Monthly Return (%)	5.93	3.69	2.23
% of Total Return	-	62	38

Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (SPY), percentages may not total to 100% due to compounding of returns

And while the Night Effect captured nearly two-thirds of the upside, it captured just one third of the downside across the 7 "down" quarters:

Down Market Metrics	Full 24 Hour Cycle	Overnight Session	Day Session
Average Monthly Return (%)	-8.79	-3.16	-5.36
% of Total Return	-	36	61

Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (SPY), percentages may not total to 100% due to compounding of returns

Quarters vary of course. In periods of "smooth sailing", it can be easy to stay the course and not let emotions impact investing decisions. However, the markets are not always "smooth".

Therefore, a thorough exploration of the Night Effect needs to include an evaluation of the tails, those periods when market returns are significantly above and below the average returns. To understand these

periods, we have defined the tails as the four quarters over the 10 year period that have delivered the highest and lowest return as measured across the full 24 hour cycle.

The table below shows the four quarters with the highest returns across the 10 year period:

Up Market Quarters Ending	Full 24 Hour Cycle	Overnight Session	Day Session
6/30/20	20.16	21.85	-1.39
3/31/19	13.52	2.00	11.30
12/31/20	12.12	14.23	-1.85
12/31/21	11.07	6.59	4.20

Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (SPY)

The overnight session did not always outperform the day session; however the overnight session consistently delivered a positive return, whereas the day session was negative in two of the four quarters. As a result, were one to calculate the average return of the night and full day session across the four quarters, the resulting overnight upside capture would be 79%, well above the 62% level seen across all 33 "up" quarters.

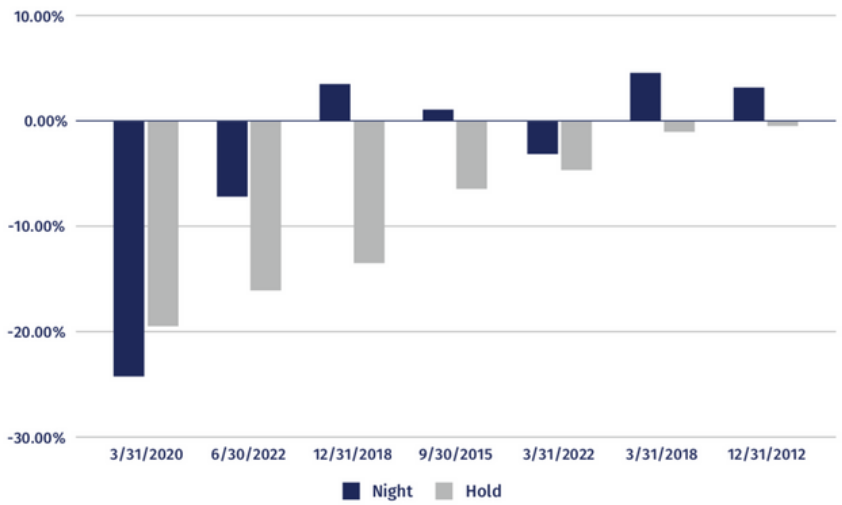
The market of course goes down, often with dramatic results. From a "left tail" perspective, the overnight session is also different than the full 24 hour and day time periods

Down Market Quarters Ending	Full 24 Hour Cycle	Overnight Session	Day Session
9/30/15	-6.45	1.10	-7.47
12/31/18	-13.52	3.52	-16.46
6/30/22	-16.11	-7.19	-9.61
3/31/20	-19.43	-24.29	6.43

Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (SPY)

Like in "up" markets, the relationship between the day and the overnight session varies by quarter in "down" markets. In this view of the Night Effect, there are two periods when the overnight session is down and three periods when the day session delivered a decline. Again based on averages across the four quarters, the Night Effect captured just 48% of the overall decline, more than was shown across all 40 quarters but still less than half of the total.

The chart below goes one level deeper in showing the relationship between the overnight session and full session when the market is down. As mentioned earlier, there were seven quarters when the full session was down, ranging from -0.38% to -19.43% With the exception of the most dramatic down quarter ending 3/31/20, the overnight session outperformed the full 24 hour cycle across the remaining six periods.



Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (SPY)

Finally, it is worth noting the outliers here, the two periods with the most varied performance. In the first quarter of 2020 (onset of the global COVID pandemic), the US large cap market fell by 19.43%, with the overnight session reflecting more than 100% of that decline. The second quarter of 2020, the other outlier, saw markets come back 20.16%, with the overnight session reflecting over 100% of that movement.

The Night Effect and Small Cap Stocks

US Small Cap stocks are also worth evaluating given the Night Effect has historically been stronger in this category than in the large cap category. Small caps, as measured by the iShares Russell 2000 ETF (IWM), turned in a strong performance during the 10 year period from 7/1/12 to 6/30/2022 with a cumulative return of 144%.[2] As noted earlier, there is a significant return difference between the overnight and day session - with the day session turning in a negative performance over the 10 year period.

Metric	Full 24 Hour Circle	Overnight Session	Day Session
Cumulative Return (%)	144	294	-38
Annual Return (%)	9.3	14.7	-4.7
Sharpe Ratio	0.53	1.15	0.21

Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (IWM), percentages may not total to 100% due to compounding of returns

Quarter by quarter performance for small caps varied relative to large caps with small caps being down in 10 of the 40 quarters, versus 7 down quarters for large cap stocks. With 25% of the quarters showing negative returns, exploring the Night Effect within small caps also involves an examination of both up and down periods.

From an up perspective, the overnight period captured 82% of the average quarterly 7.24% return:

Up Market Metrics	Full 24 Hour Cycle	Overnight Session	Day Session
Average Monthly Return (%)	7.24	5.97	1.33
% of Total Return	-	82	18

Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (IWM), percentages may not total to 100% due to compounding of returns

From a down perspective, the overnight period captured just one-quarter of the downturn, helping investors minimize losses during the 10 down quarters:

Down Market Metrics	Full 24 Hour Cycle	Overnight Session	Day Session
Average Monthly Return (%)	-10.33	-2.67	-7.83
% of Total Return	-	26	76

Source: NightShares research (4/1/12 to 3/31/2022), returns based on market open/closing prices of broad, market weighted ETF (IWM), percentages may not total to 100% due to compounding of returns

As with large caps, there is significant variation in the day and night time performance within the four quarters with the highest returns across the 10 year period:

Up Market Quarters Ending	Full 24 Hour Cycle	Overnight Session	Day Session
12/31/20	31.30	21.29	8.25
6/30/20	25.50	33.56	-6.03
3/31/19	14.64	2.10	12.28
3/31/21	12.90	15.00	-1.83

Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (IWM)

Within these four periods of double digit returns, the overnight session was consistently positive while the day session included two positive and two negative periods. As a result, the four overnight sessions delivered 85% of the total average quarterly upside.

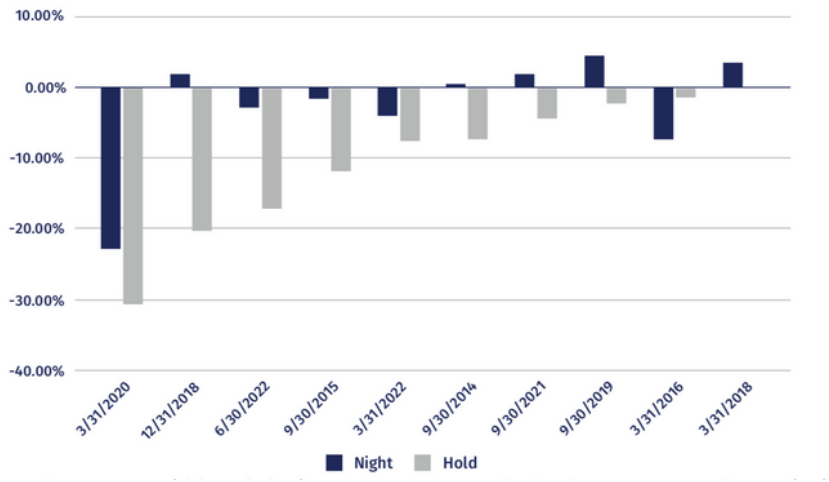
Small caps also had several periods with strong negative performance over the 10 years, including the first quarter of 2020 which saw a 30.65% decline. Once again, the investor exposed to just the night portion of the market would have seen a smaller decline than an investor exposed to the full market cycle:

Down Market Quarters Ending	Full 24 Hour Cycle	Overnight Session	Day Session
9/30/15	-11.90	-1.62	-10.44
6/30/22	-17.27	-2.92	-14.79
12/31/18	-20.29	1.85	-21.73
3/31/20	-30.65	-22.61	-10.38

Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (IWM)

The night session was down in all four quarters but given the magnitude of the declines, night managed to capture just 32% of the average decline during these four turbulent periods in the market.

The following chart shows the performance of the overnight session across the 10 quarters where the "full cycle investor" would have seen a negative quarterly return. In these 10 periods, the night session was positive in five of the periods and down less than the "hold" period in four of them (including the most significant downturn period among the ten).



Source: NightShares research (7/1/12 to 6/30/2022), returns based on market open/closing prices of broad, market weighted ETF (IWM)

Lastly, in an effort to fully explore the Night Effect within small cap equities, it is worth observing what happened during the first half of 2020, when the global COVID pandemic significantly impacted markets. As seen in the analysis, small cap stocks had significant negative returns in the first quarter, with the night

portion of the market down less than the full 24 hour holding period. In the second quarter of 2020, the small cap segment of the market, as measured by the iShares Russell 2000 ETF (IWM), generated a 25.50% return, with night up 33.56% and day down 6.03%.

Conclusion

Markets are constantly moving and very few time periods are identical to one another. Similarly, investors are idiosyncratic in their attitudes towards risk, with some being more adverse to seeing losses than others. This means that some investors may choose to "go flat" end of day by selling equity exposure at the close and others may exit the equity markets when they turn down in an effort to avoid further losses.

In exploring the Night Effect, it is clear that the overnight session often behaves better than the day session in that it frequently captures much of the upside while avoiding significant downturns. In a world where investors have choices about not only the "what" of their equity exposure (i.e. large or small cap) but also now the "when" (ie. full market cycle or the overnight session), an exploration of the Night Effect can help investors make better informed and more deliberate investing decisions.