Is Dow's Concept of Confirmation Still Relevant?

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ABSTRACT

Charles Dow is often regarded as the father of Western technical analysis, and the influence of his concepts can be seen in modified applications by today's practitioners. One such concept, and the focus of this paper, is the technical concept of Confirmation, which has its roots in managing returns in a framework which considers risk. In this paper, Confirmation is modeled using modern technical analysis methods, to produce objective signals. When a modern adaptation of a Confirmed Uptrend (CU) model is applied, to the Dow Jones Industrial Average (DJIA) and the Transportation Average (TRAN), to time buying the DJIA, improved metrics of risk and returns over randomly buying DJIA are achieved at consistent intervals within the first year of the signal. This suggests merit to the concept of Confirmation.

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Summary

Historical

Confirmation Concept

Charles Dow was concerned with actively managing returns in the context of risk. Dow understood that stock speculation was, “based on the perception of a stock’s value and the underlying market movements”.[1] To guide investment decisions, Dow focused on defining and identifying trends in consensus value and market movements.

Dow defined a longer-term trend through a series of successive price patterns, and posited that trends could do more than identify the current direction. Qualified trends could indicate the future direction as, “signals of danger or encouragement for those that read with care.”[2]

Hence, he created industrial and railroad averages to measure trends for his model. “Dow argued that the railroad and the industrial averages had to confirm each other for a signal to be conclusive in judging future trends.”[3] When both averages are trending in the same direction, it indicates that economics and psychology agree - that is a state of Confirmation.

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[1] The Evolution of Technical Analysis: Financial Prediction from Babylonian Tablets to Bloomberg Terminals (Hoboken, New Jersey: John Wiley & Sons, 2010), Chapter 5.
[2] C. H. Dow, *Scientific Stock Speculation: A Condensed Statement of the Principles upon Which Successful Stock Speculation Must Be Based*, ed G. C. Selden (New York: The Magazine of Wall Street, 1920), 15; as quoted in de Goede 2005, p. 108.
[3] As quoted in The Evolution of Technical Analysis: Financial Prediction from Babylonian Tablets to Bloomberg Terminals (Hoboken, New Jersey: John Wiley & Sons, 2010), Chapter 5.
Thomas, *The Plungers*, 12; Gartley, *Profits*, 54.

Scope of Paper

This paper examines Dow's technical concept of Confirmation. It does not attempt to recreate Dow's specific rules for investing. Additionally, it does not attempt to summarize research already done on Charles Dow's theories. There are numerous writings and research on Dow Theory, including some of the following:

The Evolution of Technical Analysis: Financial Prediction from Babylonian Tablets to Bloomberg Terminals - MIT's Andrew W. Lo and Jasmina Hasanhodzic (Hoboken, New Jersey: John Wiley & Sons, 2010), Chapter 5.

The Dow Theory: William Peter Hamilton's Track Record Reconsidered - Stephen Brown, William Goetzmann, and Alok Kumar

Revisiting the Strength of Dow Theory in Assessing Stock Price Movement - Sarbapriya Ray

Dow Theory for the 21st Century: Technical Indicators for Improving Your Investment Results - by Jack Schannep

Dow Theory Unplugged: Charles Dow's Original Editorials and Their Relevance Today - by Charles Dow (Author), Richard Russell (Author), Charles Carlson (Author), Paul Shread (Author), Laura Sether (Editor)

Confirmation You Can Count On?

Dow was motivated by the need to solve real-world problems with investing: knowing when to put capital to work and how to monitor risk, while keeping emotions in check. These problems are just as relevant to the modern investor. Dow's technical concept of Confirmation provides a framework, to create an objective model, for identifying likely market regimes constructive to investing. It is then possible to make informed investment decisions based on logic.

Confirmation Redefined with Initial Premise

A moving average summarises the average price over a rolling window of time. Technical analysis makes the assumption that the average price represents the consensus price. Hence, price is trading above consensus indicates an optimistic perception of value, while the opposite indicates pessimism.

Throughout this paper trend will be determined using a 1-year simple moving average (SMA). If the daily closing price is above the SMA, the average is in a defined uptrend and vice versa. The DJIA (blue) and TRAN (orange) are depicted in Figure 1 with their respective 1-year SMAs (both red).

FIGURE 1
DJIA and TRAN with 1-Year Simple Moving Averages
1934 - 2016

The following pseudo code definitions will be used to examine Dow's concept of Confirmation.

Defining Trends:

- Uptrend = (Close > 1-Year Moving Average of Close)
- Downtrend = (Close <= 1-Year Moving Average of Close)

Defining States of Confirmation:

- **Confirmed Uptrend = (DJIA Uptrend) AND (TRAN Uptrend)**
- Unconfirmed Uptrend = (DJIA Uptrend) AND (TRAN Downtrend)
- Confirmed Downtrend = (DJIA Downtrend) AND (TRAN Downtrend)
- Unconfirmed Downtrend = (DJIA Downtrend) AND (TRAN Uptrend)
- **Opposite of Confirmed Uptrend = (Unconfirmed Uptrend) OR (Confirmed Downtrend) OR (Unconfirmed Downtrend)**

Defining Confirmed Uptrend

The concept of a **Confirmed Uptrend (CU)** is modeled using longer-term SMAs to filter for trend direction, with additional logic used for confirmation. For an uptrend to be confirmed, both the DJIA and the TRAN are required to be in an uptrend. Here is the pseudo code:

```
//First define uptrends for each average.
DJIA Uptrend = CLOSE > 1-Year Moving Average of DJIA
TRAN Uptrend = CLOSE > 1-Year Moving Average of TRAN

//Logical condition of both averages in uptrend.
If DJIA Uptrend == True AND TRAN Uptrend == True :
        Confirmed Uptrend
Else:
        Opposite Confirmed Uptrend
```

Visualizing Confirmed Uptrends

Over the test period, the DJIA was in CU states 56.6% of the time (11,893 days CU state / 21,020 total days). CU states for DJIA are shaded green in Figure 2 and Figure 3.

Visual inspection of Figure 2 suggests CU states are frequently present during persistent uptrends and less frequently during downtrends and high volatility. This is aligned with Dow's original concept.

Figure 3 zooms into more recent decades for the DJIA. Here, it can be seen that CU states can frequently switch on and off. This will be addressed later in the paper.

FIGURE 2
DJIA and Confirmed Uptrends, 1934 - 2016

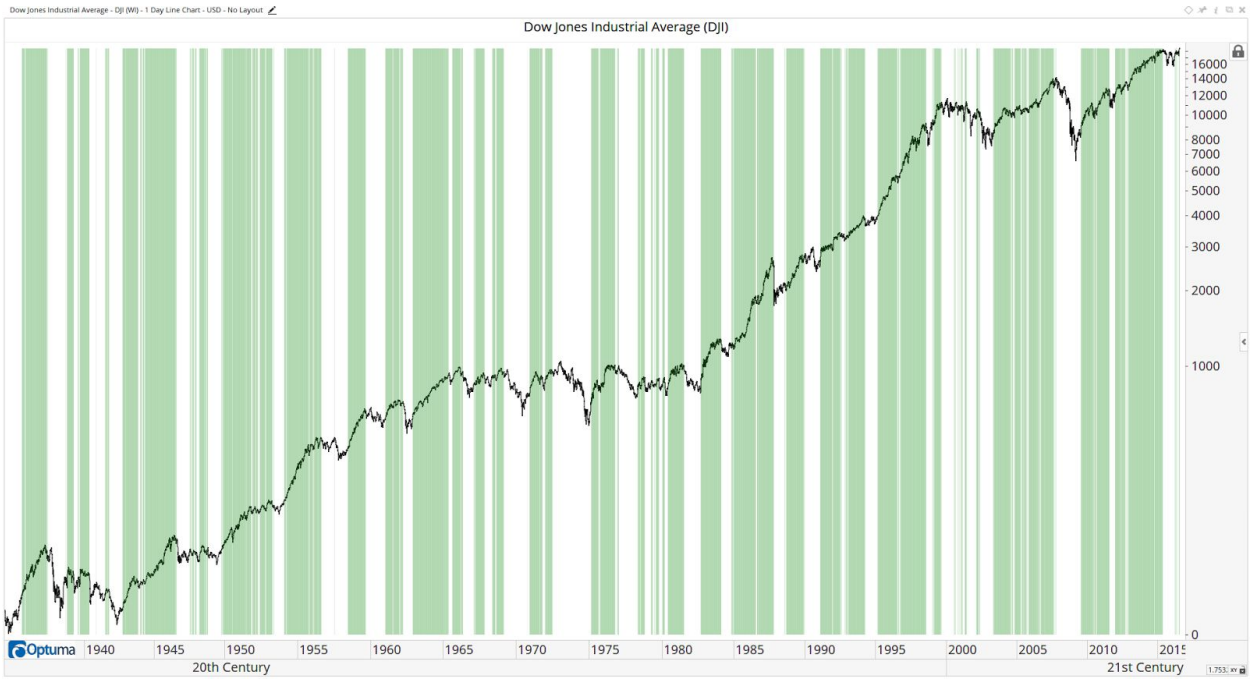
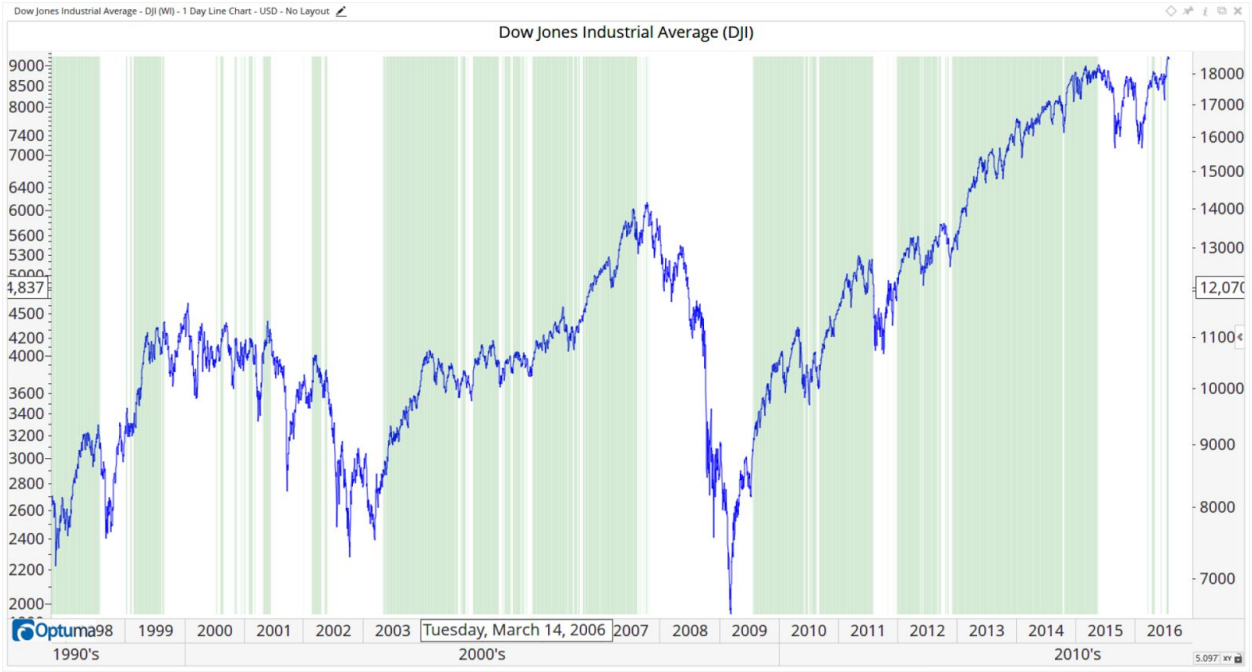


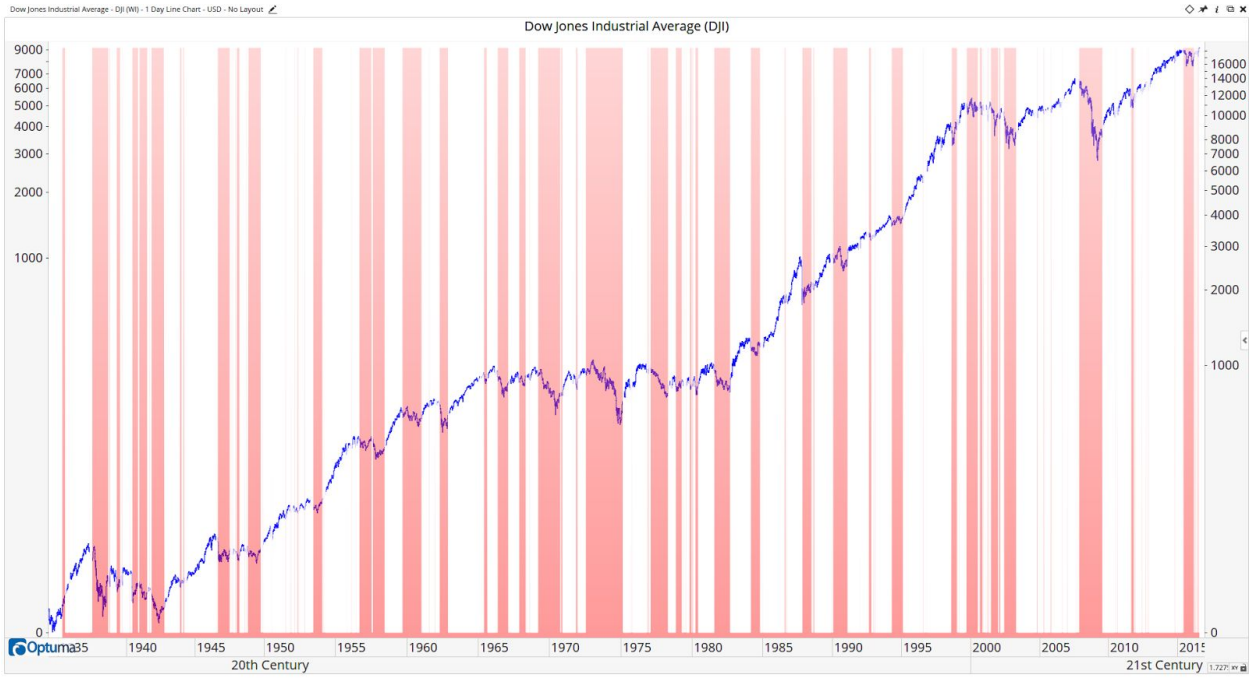
FIGURE 3
DJIA and Confirmed Uptrends Zoomed In, 1997 - 2016



Absence of Confirmed Uptrends Frequent Downtrends

It is often helpful to visualize opposite states. The **Opposite of Confirmed Uptrends (OCU)**, defined earlier, include all other scenarios when both averages are not trending up. These are shaded red on the chart below of DJIA.

FIGURE 4
DJIA and Absence of Confirmed Uptrends, 1934 - 2016



OCU states are observed occurring frequently during many downtrends and secular bear markets. From a risk perspective, this anecdotally demonstrates the potential benefit of applying a confirmation-based model. This also aligns with one of the main drives of Dow's concept of Confirmation: using objective technical methods to manage risk.

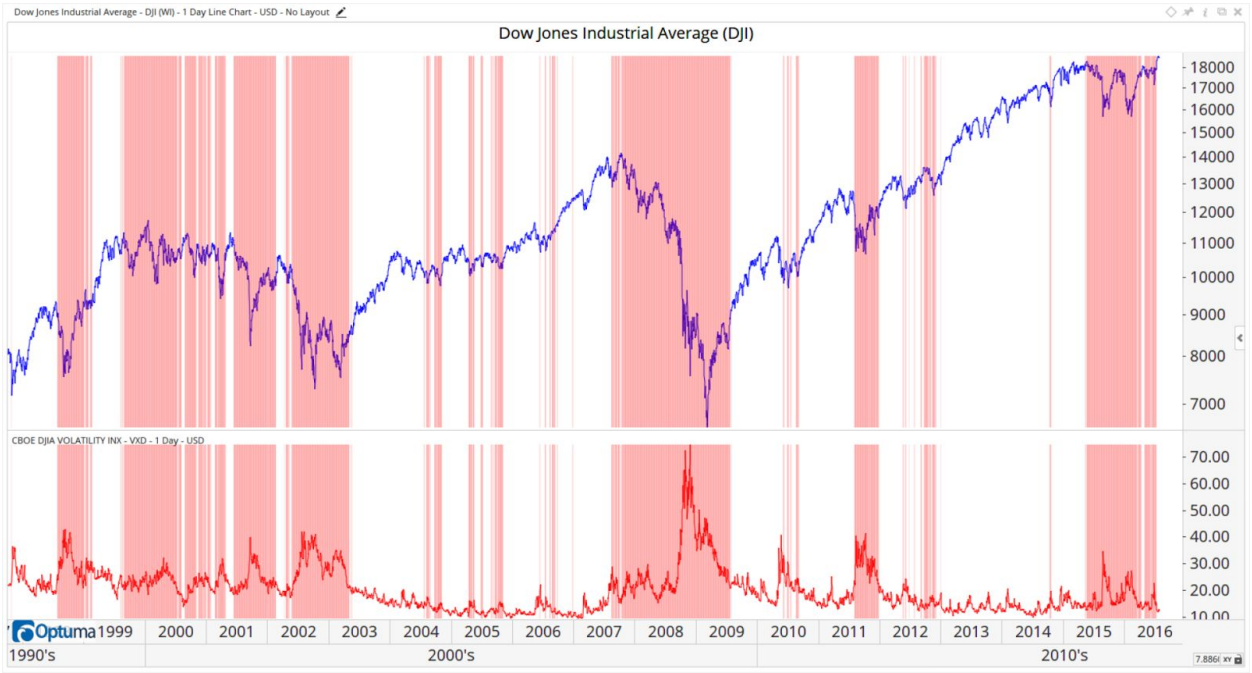
Absence of Confirmed Uptrends Frequent High Future Expectations of Volatility

The DJIA chart below, including DJIA Volatility Index (VXD), suggests a relationship between OCU states and implied volatility. Different than historical volatility, implied volatility is designed to reflect investors' consensus view of *future (30-day) expected stock market volatility*.[4] Periods of elevated implied volatility consistently accompany OCU states.

[4] The CBOE DJIA Volatility Index (VXD) is based on real-time prices of options on the Dow Jones Industrial Average℠ (DJIA, with an options ticker of DJX), and is designed to reflect investors' consensus view of future (30-day) expected stock market volatility - CBOE microsite http://www.cboe.com/micro/vxd/

FIGURE 5

DJIA, Absence of Confirmed Uptrends and Implied Future Expectations Volatility, 1997 - 2016



Measuring future expectations can be viewed as a measure of sentiment. As a CU state persists, investors gain confidence the future consensus is for lower future volatility. As the CU state switches to an OCU state, the future consensus is for higher volatility. Hence, the relationship highlights the behavioral underpinning of Dow's concept of Confirmation.

Without the benefit of implied volatility data, Dow observed that "There is always a disposition in people's minds to think the existing conditions will be permanent," Dow writes, and went on to say: "When the market is down and dull, it is hard to make people believe that this is the prelude to a period of activity and advance. When the prices are up and the country is prosperous, it is always said that while preceding booms have not lasted, there are circumstances connected with this one, which make it unlike its predecessors and give assurance of permanency. The fact pertaining to all conditions is that they will change."[5]

[5] As quoted in R. Russell, *Dow Theory Today* (Flint Hill, VA: Fraser Publishing, 1997), 17.

Testing Confirmed Uptrends

Signal Testing

Rather than systematizing the concept of a CU state and testing based on a portfolio equity-curve performance approach, this paper will use a signal-based approach.[6] Signal-based testing has the benefit of isolating and measuring the phenomenon for comparison and further analysis. Specific rules for portfolio management can then be data-driven from insights gained from signal analysis.

Test Data

The Dow Jones Industrial Average (INDU) and the Dow Jones Transports Average (TRAN) are used from 4/16/1934 to 7/25/2016, seen in Figure 6. That time span includes 21,020 trading days, covering a myriad of market regimes. Data is from Bloomberg.

FIGURE 6
DJIA and TRAN, Semi Logarithmic, 1934 - 2016

[6] Signals are explicitly defined conditions (rules) which can be tested objectively. The Confirmed Uptrend Signals in this paper are used to time when to buy the DJIA within the test period. The DJIA is bought on the opening of the next trading day and returns are logged for every day during a 1-year holding period.

Step 1 - Benchmark - Randomly Buying DJIA

The benchmark will be the results of buying DJIA and holding for 1 year, measuring the unmanaged forward returns for each day over this holding period. This is repeated for each day of the time series, treating each day as an individual signal to buy DJIA. The returns from these signals are used to derive the average returns plot (Figure 7) and summary statistics (Figure 8) for comparison to signals from CU states.

FIGURE 7
Randomly Buying Dow Industrial Average
Average Daily Returns, 1-Year Hold, 1934 - 2016

FIGURE 8
Random Entry Benchmark Summary Statistics
Summary Statistics
1934 - 2016

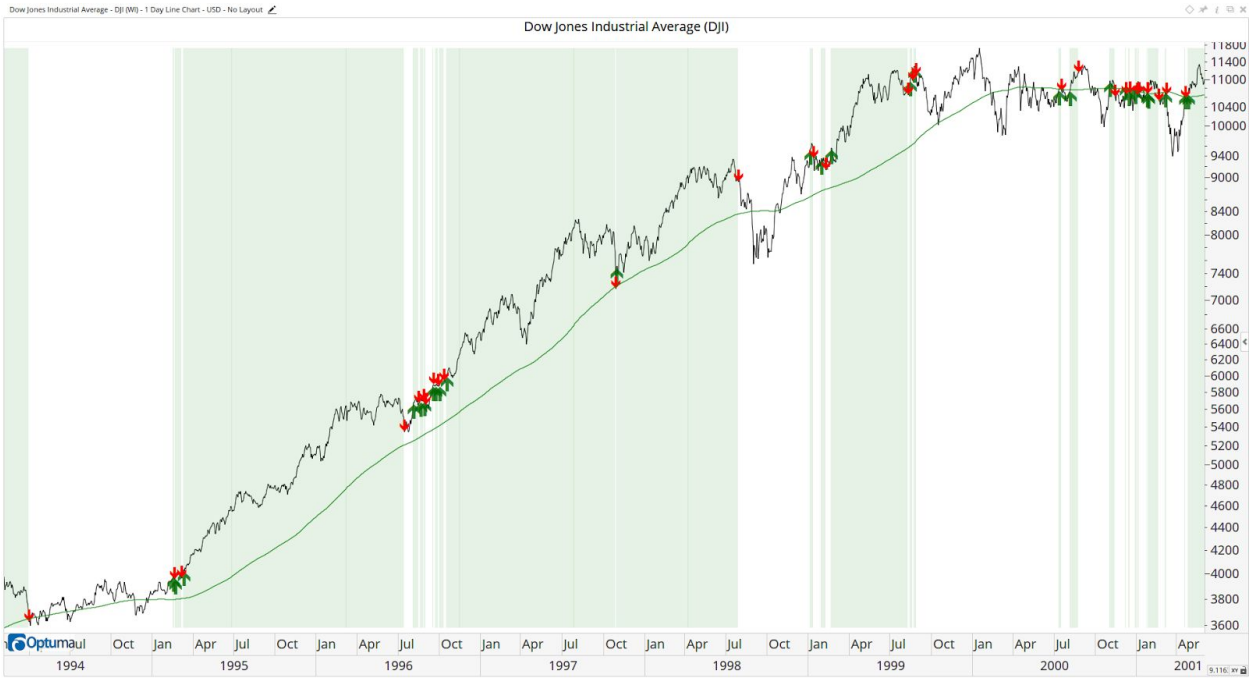
	3 Months	6 Months	9 Months	12 Months
Probability of Gain %	62.9	66.7	67.4	69.7
Probability of Loss %	37.1	33.3	32.7	30.3
Mean Return %	1.87	3.80	5.78	7.76
Median Return %	2.29	4.07	6.06	7.48
80th Percentile Return %	7.76	12.6	16.9	21.3
20th Percentile Return %	-3.61	-4.56	-5.07	-5.90
Standard Deviation	7.53	11.03	13.9	16.3

Step 2 - Confirmed Uptrend Signal

Figure 9 shows the DJIA with CU states in shaded green regions, representing constructive periods for investment exposure and the application of that information. A testable signal is constructed assuming investment the day after confirming an uptrend in the DJIA - when the state switches from OCU to CU, shown with green arrows.

FIGURE 9

Dow Jones Industrial Average, Confirmed Uptrend States and Signals, 1994 - 2016



To observe the opposite, another signal is constructed representing when the uptrend is no longer confirmed, when the state switches from CU to OCU, shown with red arrows. These objective signals allow for exploring the logic codified from assumptions, testing and comparison against the random benchmark, and exploring outcomes of scenarios from different applications of the information from indicators and models.

As discussed earlier, switching states sometimes cluster with high frequency, due to the simplistic SMA model of defining trending. Examples of this in Figure 9 are mid-1996 and late-2000 throughout early-2001. This clustering effect, represents confusion from opposite indications of trend direction occurring so close together. This effect is common enough in trend-following to have made it into the colloquial financial markets lexicon, with terms like “head-fakes” and “whipsaws”.

To reduce the clustering effect (reduce noise) and better measure a switch to a CU state, additional logic is needed. Dow’s Confirmation concept was already concerned with qualifying longer-term uptrends and and the additional logic will reflect this objective.

Step 3 - Confirming Confirmation - Reducing Noise for Confirmed Uptrend Signals

Adding a wait-and-see logic, introducing a delay, will be defined with the following pseudo code:

```
//added wait-and-see confirmation logic
Window = 5 // in days, which is 1 week
If  OpposingSignal == True AND TimeSinceSignal <= Window :
        Signal == False
Else:
        Signal == True
```

This delay allows additional time for uptrend to develop and to wait for opposing signals. The length of the delay needs to balance lag of measure and loss of opportunity. Since Dow elaborated to, “great swings covering from four to six years” introducing a five day delay (1 trading week) is reasonable. [7] Optuma Scripting Language for the new CU state signal:

```
// get DJIA time series
d= GETDATA(CODE=DJI:WI) ;
//1-year moving average
dma = MA(d, BARS=252, CALC=Close) ;
// uptrend
c1= d > dma ;

// get TRAN time series
x=GETDATA(CODE=TRAN:BLMB) ;
//1-year moving average is 252 trading days
tma = MA(x,BARS=252, CALC=Close) ;
// uptrend
c2= x > tma ;

// DJIA Confirmed Uptrend and OCU
InGear = c1 and c2 ;
OutOfGear = InGear == 0 ;
// switching between OCU and Confirmed Uptrend States
s1=SWITCH(InGear,OutOfGear) CrossesAbove 0.9 ;
s2= SWITCH(InGear,OutOfGear) CrossesBelow 0.9 ;

// 5-day delay
z=OFFSET(s1, OFFSET=5) and (BARSTRUE(s2, LOOKBACK=5) <= 0) ;
z
```

[7] As quoted in Schultz and Coslow, *A Treasury*, 11.

Step 4 - Testing Confirmed Uptrend Signals

CU Signals, using the delayed logic, occurred 132 times during the test period. The median of all CU Signals are plotted in Figure 10. Summary statistics are given at quarterly intervals in Figure 11. Average returns were strong and increased at every interval. Probability of gains were also high at every interval.

FIGURE 10
Confirmed Uptrend Signals - Average Daily Returns, 1-Year Hold, 1934 - 2016

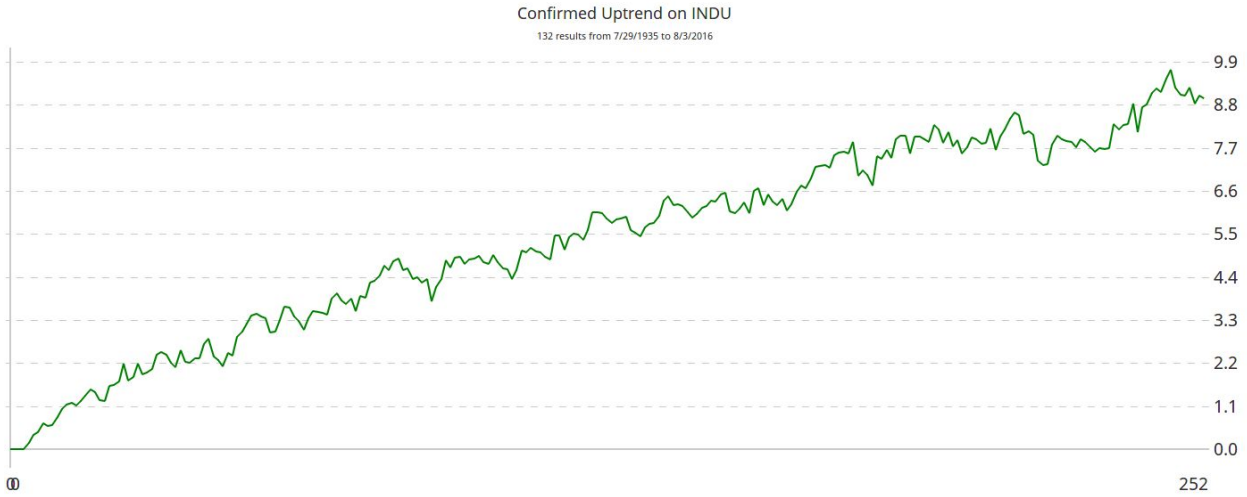


FIGURE 11
Confirmed Uptrend Signals - Summary Statistics, 1934 - 2016

	3 Months	6 Months	9 Months	12 Months
Probability of Gain %	68.7	76.9	73.9	73.9
Probability of Loss %	31.3	23.08	26.1	26.1
Mean Return %	2.92	4.95	7.05	9.31
Median Return %	3.36	5.90	8.01	8.97
80th Percentile Return %	8.56	13.5	17.4	20.6
20th Percentile Return %	-1.95	-0.73	-2.32	-2.08
Standard Deviation	6.18	10.3	13.2	15.3

Confirmed Uptrend Signal Versus Random Entry

For comparison, summary statistics for the Random Entry Benchmark (R) and the Confirmed Uptrend Signals (CU) are collated in Figure 12.

FIGURE 12
Confirmed Uptrend Signals versus Random Entry - Summary Statistics, 1934 - 2016

	3 Months		6 Months		9 Months		12 Months	
	R	CU	R	CU	R	CU	R	CU
Probability of Gain %	62.9	68.7	66.7	76.9	67.4	73.9	69.7	73.9
Probability of Loss %	37.1	31.3	33.3	23.08	32.7	26.1	30.3	26.1
Mean Return %	1.87	2.92	3.80	4.95	5.78	7.05	7.76	9.31
Median Return %	2.29	3.36	4.07	5.90	6.06	8.01	7.48	8.97
80th Percentile Return %	7.76	8.56	12.6	13.5	16.9	17.4	21.3	20.6
20th Percentile Return %	-3.61	-1.95	-4.56	-0.73	-5.07	-2.32	-5.90	-2.08
80th / 20th Tail Ratio	2.15	4.39	2.76	18.5	3.33	7.50	3.61	9.90
80th - 20th Spread	11.3	10.5	17.1	14.2	22.0	19.7	27.2	22.7
Standard Deviation	7.53	6.18	11.0	10.3	13.9	13.2	16.3	15.3

CU Signals resulted in a lift across all metrics, at all intervals. The one exception was the 80th Percentile (Absolute) Returns at 12 months - adjusting for risk, this too is higher than random. To summarize the lift:

- Higher risk-adjusted returns are are observed at every interval.
- Probabilities of gain increased over random.
- Mean and median returns increased over random.
- The tail-ratio (using 80th / 20th percentile returns) as a form of reward to risk ratio, is consistently more than double random.
- The interdecile range, between 80th to 20th percentile, indicates less variability of returns than random.
- Standard deviation, another *estimate* of risk using volatility, is reduced from random.

For comparison, lift of CU Signals over Random Entry is expressed in absolute terms (A) and as a percentage (%) in Figure 13.

FIGURE 13
Confirmed Uptrend Signals versus Random Entry - Lift, 1934 - 2016

	3 Months		6 Months		9 Months		12 Months	
	A	%	A	%	A	%	A	%
Probability of Gain %	5.8	9.22	10.2	15.3	6.50	9.64	4.2	6.03
Probability of Loss %	-5.8	-15.6	-10.2	-30.3	-6.60	-20.2	-4.2	-13.9
Mean Return %	1.05	56.2	1.15	30.3	1.27	22.0	1.55	20.0
Median Return %	1.07	46.7	1.83	45.0	1.95	32.2	1.49	19.9
80th Percentile Return %	0.80	10.3	0.90	7.14	0.50	2.96	-0.7	-3.29
20th Percentile Return %	1.66	46.0	3.83	84.0	2.75	54.2	3.82	64.8
Standard Deviation	-1.35	-17.9	-0.7	-6.36	-0.7	-5.04	-1.00	-6.13

Summarizing Figure 13, comparing UC Signals to Random Entry:

- Absolute gains accompanied reductions in standard deviation.
- All metrics describing distribution of returns (mean, median, 80th and 20th percentiles) shifted towards higher returns, and reduced losses.
- Using the 20th percentile returns as a risk measure, losses are reduced by 46, 84, 54 and 65% at 3, 6, 9, and 12 months respectively.
- The spread of returns between CU Signals and Random Entry increased at every quarterly interval, indicating persistence.

Figure 13 paints a picture of the consistency and the magnitude of improvement of UC Signals over Random Entry. These results suggest an advantage to modelling constructive markets using the technical concept of Confirmation - a concept with underpinnings in economics and psychology.

Summary

Dow applied his technical concept of Confirmation with the purpose of qualifying favorable market environments for investing. This paper explores the effects of applying a modernized version of Confirmation towards the investment process.

A simple model of Confirmation was extended to define Confirmed Uptrends, which allowed for constructing objective versions of Dow's "signals of encouragement". These signals were then used to explore the effects of making informed investment decisions, based on the logic for detecting a newly Confirmed Uptrend.

Buying the DJIA when a Confirmed Uptrend is detected historically results in improved probabilities of gain, improved median and mean returns, and improved risk metrics and risk-adjusted returns when compared to Random Entry Benchmark. This quantitative evidence suggests merit to Dow's technical concept of Confirmation.