# **OTPP Project 2: Design and Analysis of Economic Indicator and Systematic Trading Signal**

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**Part 1: Economic Indicator**

From my understanding of the US economy, consumer behavioural patterns I can make a number of intuitive inferences that maybe indicative of the health of the US economy and therefore the stock market

* As the US economy matured it has evolved from a primarily manufacturing based to a service- based economy where more than 2/3 GDP is derived via consumer spending on services. Consequently, changes in service industry employment is likely to be a more significant driver of the US economy than manufacturing payrolls
* Durable goods (part of Industrial Production) spending is highly cyclical due to the fact that they are durable which leads to a more frequent cyclical volatility relative to the larger business cycle driven by services spending
* When consumers spending retrenches for whatever reason they are likely to retrench in the largest ticket items first – Homes Sales, Auto Sales, Durable goods before spending retrenches more broadly across the US economy

To verify that veracity of the above observations I have plotted in Exhibit 1 below the US Stock Market (ES1) vs US industrial Production (Cyan), New Home Sales (Green), GDP (Yellow, also shown as subgraph with zero axis) and Unemployment Rate (Red, inverted for directional similarity).

Exhibit 1:

Chart

Description automatically generated

Based on the limited historical sample size displayed the co-movements in Unemployment and ES1, New Home Sales, Industrial production are consistent with my inferences.

**Part 2: Trading Signal**

Using the the stock market as a proxy for the strength of the economy the most simple and basic indicator I can think of is to use a 12mth moving average crossover on the Unemployment Rate:

Strategy 1:

Let the 12mth mov. Avg of Unemployment rate be represented by 12AVG\_U

1. When the Unemployment Rate crosses above 12AVG\_U is a BUY signal
2. When the Unemployment Rate crosses below 12AVG\_U is a SELL signal

Using unemployment as a signal has the advantage that it exhibits a low noise-to-signal ration – this is apparent in Fig. 1 where Unemployment (red) exhibits much less volatility compared to New Home Sales (Cyan), and GDP (Yellow).

However, intuitively unemployment is likely to be a lagging indicator because businesses are reluctant to terminate employees until they are certain that the economy is going to deteriorate further otherwise it will be extremely costly to re-hire, or retrain new personnel.

To improve the timeliness of the above trading signal we can implement the following SELL signal:

Strategy 2:

1. When both the New Home Sales, and Industrial Production cross below their respective 12mth mov. Avg
2. The slope of 12AVG\_U approaches zero

Strategy 3:

1. Use the original buy/sell trading signals provided in the assignment but overly the above 12AVG\_U as a filter to avoid the large drawdowns during the 2000-2003, and 2008-2009 US recessions.