Excess CAPE Yield Analysis of the Hang Seng Index

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A comprehensive valuation of the current stock market index of Hong Kong

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Introduction

It has been almost a year since COVID19 struck the world with full force, driving down the performance of the global economy as well as that of financial markets. After taking a steep dive, equity price has only gone up for most of the financial markets around the world. S&P 500 has gained almost 80% from the low of March 2020; Euro STOXX 600 has gained over 50%; Nikkei 225 has gained over 80%. The Hang Seng Index (HSI), after hitting its low of 21,139.26 on March 20 of last year, has also shown strong performance, gaining over 45% over 11 months.

The HSI has crossed the 30,500 level and is approaching its historical high. Performance of similar strength was only observed twice in the past, when the HSI reached almost 32,000 in 2007 and when it crossed the 33,000 level in 2018. Such bullish sentiment is being challenged with voices supporting a severe bubble, pointing out that global equity markets have gained historical amounts in a very short period, which is a phenomenon commonly seen before reaching the peak of a bubble.

With no doubt, investors are living in a very puzzling time; they either have to choose to remain conservative and assume the risk of missing out one of the best rallies that have not started yet, or to allocate their funds aggressively to the equity market and face the risk of losing a significant portion of their assets when the bubble bursts.

In the case of individual stocks, investors can conduct fundamental analysis on companies and equip themselves with information about potential future returns. If the research is done correctly, investors can hopefully reap benefits of investing into undervalued companies via realizing greater capital growth over time. The real question this report attempts to answer is then, can this principle be applied to the Hong Kong stock market as a whole?

The CAPE Ratio Analysis

Harvard and Yale professors Campbell and Shiller (1988) were the first to answer this question by analyzing the US stock market. They calculated a price-to-earnings ratio (PER) for the S&P 500 by dividing the value of index by the aggregate profits of all companies in the index. Results were incredibly insightful for investors, as the professors found out that periods of high market valuation were often followed by years with low returns.

However, the classic PER has several limitations that prevent it from being a consistent predictor of stock markets. First, corporate earnings are extremely volatile

and almost impossible to predict. In addition, it does not account for inflation nor the cyclical properties of company earnings, so the information it portrays could be misleading. Lastly, during times of crisis, negative growth in earnings boost the PER and stocks can look unattractive, when in fact they could be a bargaining opportunity for investors (Star Capital Research 2016).

Acknowledging these limitations, Campbell and Shiller (1998) developed a cyclically adjusted price-to-earnings ratio (CAPE), which puts the current market price in relation with the 10-year average of inflation-adjusted profits.

$$CAPE = \frac{market\ price\ index}{10\ year\ average\ of\ inflation\ adjusted\ earnings\ per\ share}$$

By averaging 10-year of profits, the indicator ensures that profits are smoothed out for more than one earnings cycle. Adjusting for inflation allows profits from different inflation regimes to be comparable with each other. Overall, the CAPE ratio is an improvement from the PER and displays higher accuracy and stronger predictive ability.

After the CAPE ratio was introduced, many follow-up studies confirmed the predictive ability of the indicator. Research by Bunn and Shiller (2014) and Klement (2012) illustrates that a high CAPE is usually followed by real losses and a low CAPE is followed by higher-than-average real returns; furthermore, their study suggests this relationship also applies in other international equity markets.

Figure 1: The graph shows the Cyclically Adjusted Price to Earnings Ratio (CAPE) of S&P 500. Source: The Big Picture (2020), Robert Shiller (2020)

Excess CAPE Yield

Last year, many experts quoted the high CAPE ratio as an evidence of overvalued equity markets. For instance, the CAPE ratio of S&P 500 reached 33.4 on December 2020. As seen in the graph above, a level that high was only seen twice in the past: the Great Depression and the Dotcom bubble.

In contrast, Professor Robert Shiller, the developer of the CAPE ratio, published an article stating that people should not be using the CAPE ratio to declare overvaluation of equity markets these days. He explains modern era can be characterized by extremely low interest rates, so investors should take this into consideration when valuing equity markets (Shiller 2020).

When interest rates fall, the lower discount rates used in Discounted Cash Flow Model (DCF) to value equities cause prices to increase, assuming ceteris paribus. To capture the effect of lower interest rates and compare stock investment with bond investment, Shiller introduced the Excess CAPE Yield (ECY).

To calculate the ECY, we simply invert the CAPE ratio to get the CAPE yield that represents the return of the equity market and then subtract the ten-year real interest rate. This measure is conceptually similar to the equity risk premium; a higher ECY indicates equities are more attractive relative to bonds and vice versa.

$$\boldsymbol{ECY} = \frac{1}{CAPE} - 10\ year\ real\ interest\ rate$$

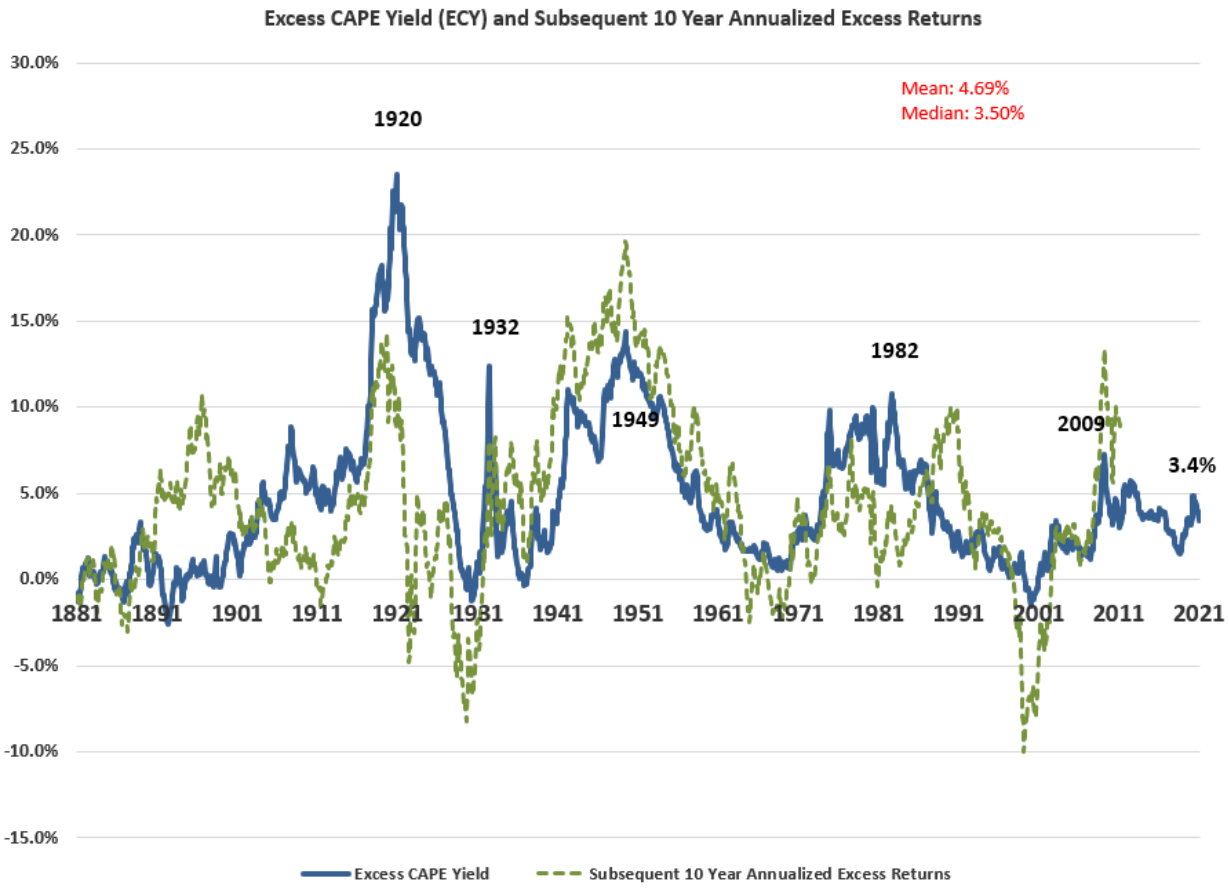

Figure 2: The graph shows Excess CAPE Yield of the US market (S&P 500 standard). Source: Robert Shiller (2021)

The ECY in the US is 3.4% right now. Though lower than both the historical mean and median (measured in red), it is significantly higher than the levels during the Great Depression and the Dotcom Bubble.

In other words, though stock price did increase at a very fast pace, real interest rates decreased significantly during the same period, so stocks remained attractive relative to low-yielding bonds. Thus, Shiller argues that it is too premature to conclude that the US market is in a bubble.

Unfortunately, Shiller did not seem to conduct ECY analysis on the Hong Kong stock market, so I decided to derive the ECY using the Hang Seng Index (HSI).

Discussion on Index Selection

Launched in 1969, the Hang Seng Index has grown along with Hong Kong. It consists of 50 companies and is the most widely known index of Hong Kong. However, the total market coverage ratio is 40.25% (as of Oct. of 2020), a rather small number to represent the entire Hong Kong stock market.

It is true that there is an index that has a better coverage ratio than the HSI: the Hang Seng Composite Index (HSCI). With 476 constituents and a market coverage ratio of 95% (Hang Seng Indexes 2020), the HSCI is arguably a better index to use to evaluate the Hong Kong stock market.

The Hang Seng Index is still chosen for practical reasons. As mentioned before, HSI is internationally recognized and undoubtedly the most frequently quoted performance indicator of the Hong Kong stock market. In addition, it is the most tracked index, with total AUM of listed products currently valued at USD 19.8 billion (Hang Seng Indexes). Finally, HSCI was launched in 2001, so there is significantly less data that can be extracted for analysis. Hence, for the purpose of this research report, HSI has been chosen as the benchmark index for analysis.

Methodology

To calculate the ECY, the CAPE yield of the Hang Seng index is calculated first. The historical index price data is from *investing.com*, and historical EPS data of the Hang Seng Index is derived from Bloomberg Terminal.

Earnings per share is adjusted for inflation using CPI data compiled by the Census and Statistics Department of Hong Kong. Considering the relative shortage of data on the Hang Seng Index, I decided to smooth out real-earnings by calculating the 5-year average instead of the 10-year average. The current index price is then divided by the smoothed out real earnings for each corresponding date point to derive the Cyclically Adjusted Price to Earnings ratio.

Then, the CAPE ratio is inverted to find the CAPE yield, which represents the equity market yield.

To calculate the 10-year real yield, the historical data on Hong Kong's 10-year bond yield is extracted from *investing.com*. After being adjusted for inflation using CPI, the real yield will be subtracted from the CAPE yield to derive the Excess CAPE yield of the Hang Seng Index.

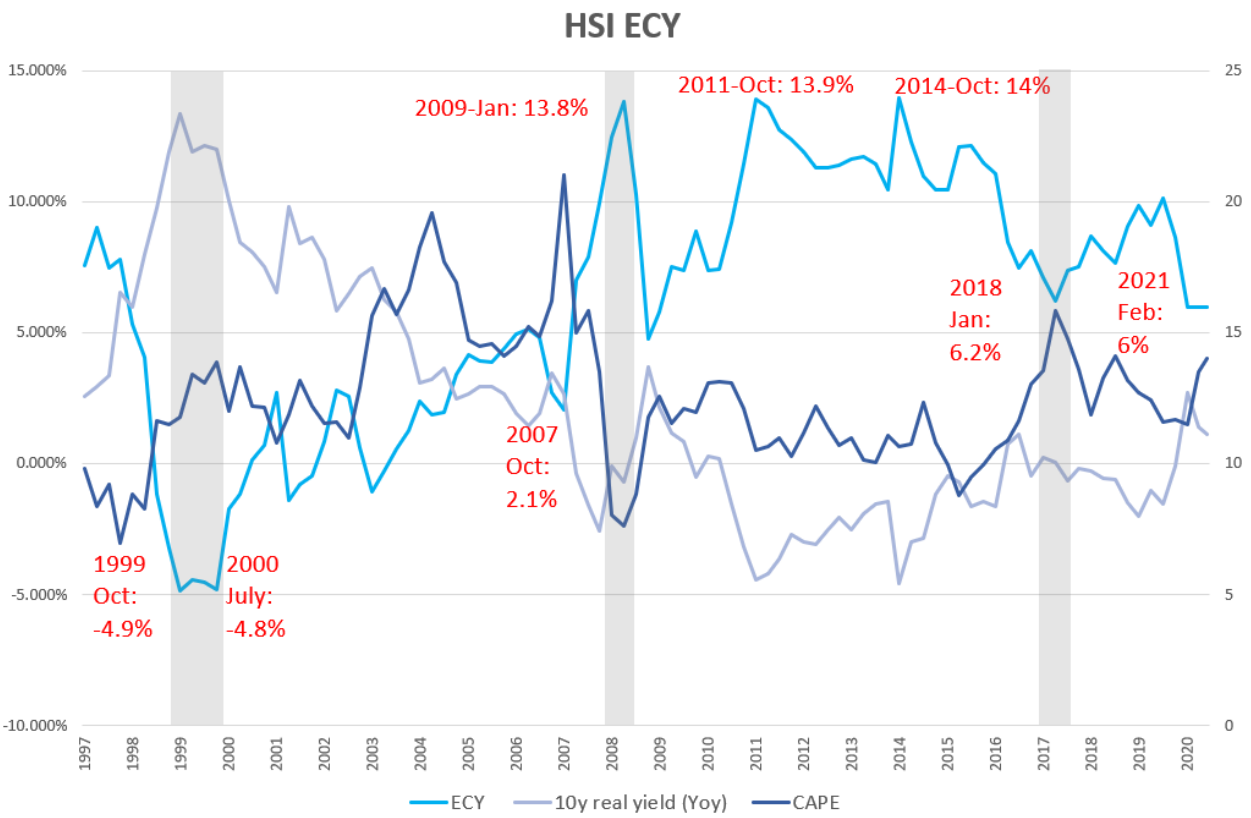

Figure 3: The graph shows the ECY of HSI as of Feb 2021. Areas highlighted in grey are periods of significant stock market volatility. Descriptions in red are dates and values of ECY at various peaks and troughs. Source: Bloomberg Terminal (2021), investing.com (2021)

ECY Analysis of HSI

The graph can be discussed by dissecting it to two parts: before the Global Financial Crisis of 2008 (GFC) and after the crisis. For 10 years before 2008, the ECY averaged to 1.7%, while the mean has been over 9% since the GFC.

1998~2008

According to the indicator, the equity risk premium reached negative regions during the tech bubble of 1999 ~ 2000. This indicated that relative to the 10-year bond yield, the equity market yield was extremely low (i.e., equity market was overvalued), and it would have been much more rational to sell at those points. In fact, the HSI reached a high of 18,397.5 in March 2000 before falling below the 10,000 mark in 2002.

However, ECY seemed to do a rather poor job in predicting the next peak, which occurred in October 2007, when the HSI crossed the 31,000 mark before losing over more than 50% of its market value in a

single year. Although the CAPE ratio reached an all-time high of 21 at that time, ECY was 2.1%, signaling that the equity market was not as overvalued as during the dotcom bubble. The confusing ECY value mainly owes to fact that the 10-year real yield was significantly lower compared to the dotcom bobble, conveying a message that seemed to say that though equity market was valued above its fundamental, it still provided an attractive yield relative to the bond market.

2009~Present

The ECY correctly predicted the next bottom, reaching 13.8% during January of 2009. If you bought the HSI index at this point, your 5-year return would have exceeded 75%. However, the ECY values for October 2011 and 2014 were 13.9% and 14% respectively, indicating that equity market promised an equally lucrative investment opportunity like the January of 2009. However, investing at these points would have resulted in a 5-year return of 15% and 12% respectively, showing that the ECY is inconsistent in predicting the exact magnitude of undervaluation or overvaluation.

In January 2018, the HSI reached an all-time high of 33,484 before taking a dive, and the ECY at that time was 6.2%. Though below the 10-year average of 10%, it was still above the levels achieved in the stock market peaks of 2000 and 2007, incorrectly suggesting that the stock market was not that overvalued.

Implications

Based on observations made until now, we can formulate several implications.

First, the absolute value of ECY should be studied taking into consideration the real interest rate level of that period. During the 10 years prior to the GFC, the mean of 10-year real yield in Hong Kong was 6.2%, while the mean of ECY was 1.7%, signifying investors were satisfied with a premium of approximately 1.7% when deciding to invest in the equity market over the bond market. However, for the 10 years after the GFC, the mean values of 10-year real yield and ECY were -1% and 9% respectively. Hence, during a high interest rate regime, investors were satisfied with a lower equity risk premium than in a low interest rate regime.

Second, the ECY is an inconsistent predictor of the peaks and troughs of the Hong Kong equity market, so it should not be used to make market timing decisions. For instance, an investor would have been tempted to sell Hong Kong equities during July of 2009 when the ECY dropped below 5%, a rapid decline of 8% from its January peak. However, investing at that point and holding the investment for 5 years would have actually generated a positive return of 20%, which is greater than the 5-year returns of investing in October 2011 and 2014.

Third, investors should use ECY and CAPE together to improve accuracy when seeking for future guidance. Although the ECY alone would not have helped an investor avoid the market crash of 2007, referring to the CAPE at that time (which reached an all-time high of 21) could have been more helpful. Thus, a peak is more likely if the corresponding CAPE is high and ECY is low and vice versa for a bottom.

Incorporating the insights above, we can make several statements on the current valuation of the Hong Kong stock market. The ECY as of February 2021 is 6%, which is below the 10-year average of 9% and close to the level seen in January 2018.

Furthermore, a rising 10-year real yield and CAPE seem to illustrate investors are expecting future inflation rate to increase mainly due to optimistic prospects, and this positive sentiment is reflected by the rally in the stock market, which normally precedes the future economic situation.

Because the burst in major bubbles were all accompanied by an increase in the 10-year real yield and CAPE, investors should be careful of excessive optimism that is being perpetuated right now in the market. However, the current CAPE ratio, which is 14, is not yet as high as the peak in 2018 and 2007, so it is also too rash to declare that we are currently at the peak of a bubble.

Conclusion

In conclusion, Robert Shiller's ECY method seems to hold some truth when applied to the Hong Kong market, but it is too inconsistent to be employed as a guiding tool of the stock market.

The accuracy of the indicator could be improved in the future if there is a large enough sample of EPS data to calculate the 10-year average instead of the 5-year average. It would also be interesting to investigate whether high equity risk premium is a unique characteristic of the Hong Kong equity market or a common property among Asian markets.

Finally, according to the ECY analysis, should an investor buy or sell Hong Kong equities? Not surprisingly, we do not know for sure. However, optimism on a rosy future is the dominant sentiment in the present market, and the ECY analysis seems to warn investors that letting the stock market run higher together with the real yield can be dangerous. Although it would be convenient to rely on some technical tools that predict the exact peak and trough of a stock market, it is almost impossible to accurately and consistently predict when the bubble will burst.

Hence, investors should seriously consider building a conservative portfolio and not worry about the exact timing to exit the

market. In addition, investors should pay close attention to the future movement in real yields and the acceleration of inflation rate that is observed in official data.

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