Learning Journal

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Capital Markets and Instruments

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AUTUMN TRIMESTER

Introduction

When writing a learning journal, one should endeavour to take an introspective approach to the discussion of content learned. To implement this method throughout this journal, I often posed questions to myself, such as 'what qualities of the course have I found the most intriguing?', or 'what aspects of the course do I find most applicable to modern investing strategies?'. Regarding the methodology of this journal, I have used it to build on from the considerable knowledge I have previously acquired by studying finance and insurance for my undergraduate degree and the industry knowledge I garnered from my prior internship. Thus, to illustrate the trajectory of my learning curve throughout this module, this journal will be segmented into three parts. Firstly, the main body of this journal is a somewhat chronological report of my ascertainment of knowledge on the most complex areas of this module, married with my own opinions, personal experiences, real-time events that occurred in conjunction with the module and extensive academic research. This discussion revolves around the concept of Behavioural Finance in capital markets; this area of academia was relatively new to me prior to starting this module, and thus, I feel like an in-depth discussion on this topic is far more beneficial to me than an overview of content I have previously studied. This main body is then supported by a far more chronologically arranged follow-up report on the in-session activities and the co-curricular information I learned. It is important to note at this time that to succinctly illustrate my learning curve throughout this module, I did not include all 10 sessions in this report – I included the 7 which I feel provided me with the most personal benefit. As a final note, while the main body of this journal focuses on the nuanced topic that is Behavioural Finance, the additional report has a far greater emphasis on personal opinions and real-life examples. Thus, it is the amalgamation of these two bodies of work that fully illustrates the opportunities this module gave me to become more learned in the capital markets.

Why Behavioural Finance?

Personally, one of the most interesting aspects of the financial markets over the past few months has been the effect of the increased numbers of retail investors in the market[1], as seen in *Figure 1* (Martin and Wigglesworth 2021).

[1] Credit Suisse has stated that there have been several instances over the course of 2021 where retail investors have accounted for a third of all market activity (ibid.)

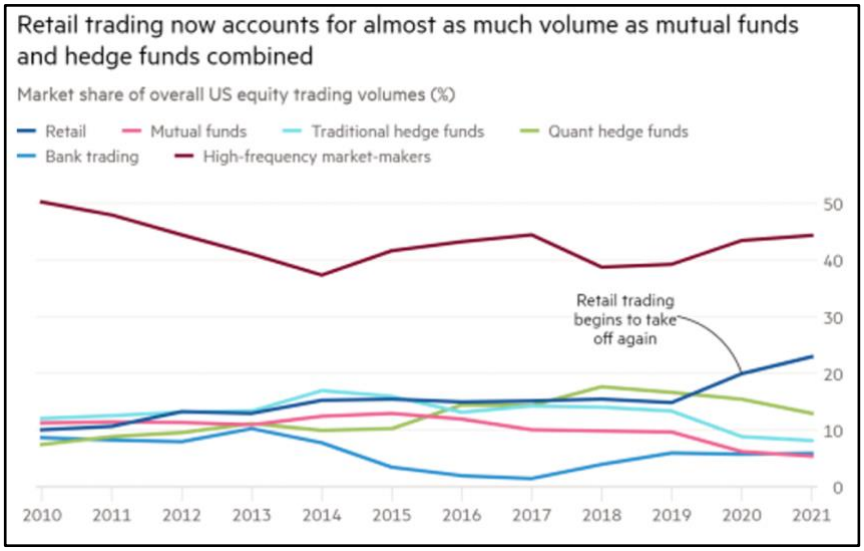

Figure 1

While the mix of improving technology alongside an increasing number of discount brokerages is undoubtedly fuelling this figure, there are also more pressing socio-economic issues at play. Changing demographics (*Figure 2*), compounded with growing uncertainties regarding underfunded state pensions means that there is an increased pressure on the individual to become financially self-sufficient to support their retirement (Healey *et al.* 2012). These changing demographics mean that in the near future there will be a higher proportion of people relying on these underfunded state pensions, which increases the pressure on these financial reserves. Essentially, as Donald (2020) shows in the context of NHS workers, individuals are going to have to take the future of their assets into their own hands.

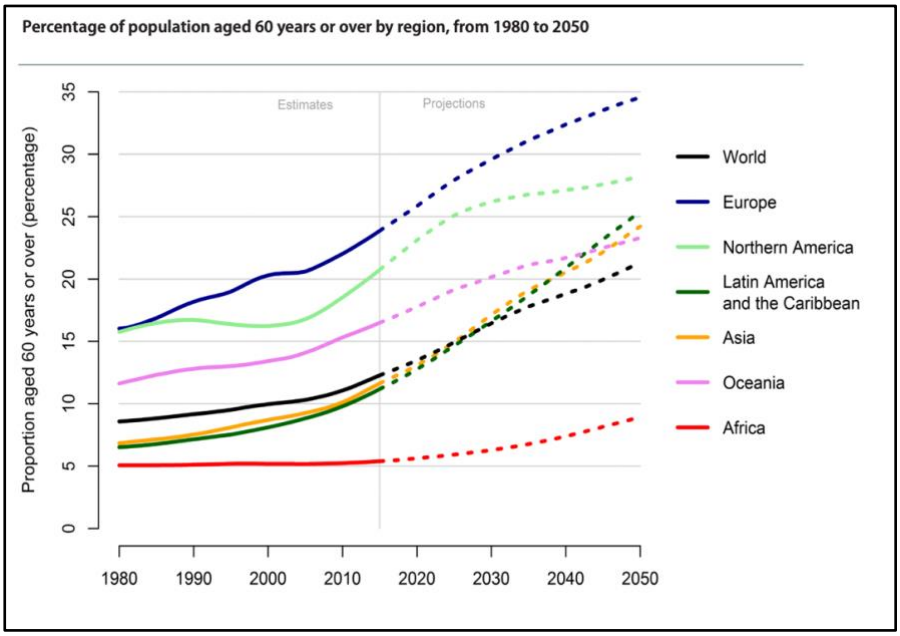

Figure 2

Thus, I believe that this quantity of amateur retail investors in the market is a permanent fixture, the effects of which are discussed below.

Traditional Portfolio Theory and Financial Markets

In Sessions 4 and 5 the Efficient Market Hypothesis (EMH) and the Capital Asset Pricing Model (CAPM) were discussed – concepts that are seminal to Traditional Finance (TF). The inception of TF can be considered to be marked with the publication of Markowitz (1952), with his proposed mean-variance portfolio[2]. As discussed in class, this work was then extended by Sharpe (1964) to produce the CAPM. Thaler (1999) highlights the assumptions underpinning both TF and these portfolio models: the rational investor makes decisions according to the theory of expected utility, markets are efficient, and asset prices are in line with their fundamental value. However, Behavioural Finance (BF) has responded to these models – they are only valid if unrealistic assumptions are made (McGoun 1993). Thus, as per Subrahmanyam (2007), to fully grasp the movement of security prices, one must now study the psychology of market participants. This is supported by Fakhry (2016) – the EMH merely states the price of the asset in regard to the information known about it, while BF shows how the reaction of market participants causes the securities price to fluctuate.

The Introduction of Behavioural Finance

In its essence, BF holds that the financial, sociological and psychological-based responses of investors to market events causes the prices of assets to deviate from their intrinsic value, which in turn causes theories like the EMH to suffer (Del Aguila 2009); (Ricciardi and Simon 2000). As per Kourtidis *et al.* (2011), it is now held in academia that the behaviour of amateur investors should be considered an anomaly – their decisions to eschew time-tested investment strategies in favour of personal 'strategies' is irrational behaviour. The impact that these market participants have on asset prices can be long-lived and substantial (Barberis and Thaler 2005); the gravity of which I believe is being considered far too slowly by institutions. Shefrin (2001) describes two of the driving forces of BF: heuristic-driven biases[3] and frame dependences[4]. These forces configure the type of securities investors find attractive, the biases to which investors are subject, and the kind of portfolios that investors choose (ibid.). The fundamental principle of TF is that individuals use statistical tools when processing data, which isn't true in the case of retail investors (Baker and Puttonen 2019). Instead, they maintain a predisposition to invest based on beliefs, powered by an illusion of control and experience, as well as an innate ability to forget their past mistakes, all of which affect asset prices (ibid.). Del Aguila (2009) focuses on two

[2] Rational investors should create portfolios using expected returns, expected volatilities and cross-correlations between assets.
[3] Heuristic biases refer to people finding things out for themselves and developing personal rules – BF holds that trading errors then occur due to practising these rules.
[4] The amateur investors perception of risk is highly influenced by how decision problems are framed.

heuristic-driven anomalies which I found to be pivotal to my learning on the behaviour of amateur investors: overconfidence and overreaction.

The Overconfidence Anomaly

A lack of experience in regard to the behaviour of the markets can promote unwarranted overconfidence in investors. For psychoanalytical support, this phenomenon can be tied back to the 'Dunning-Kruger Effect'[5] (Dunning 2011) and Prospect Theory[6] (Barberis *et al.* 2019). Weinstein (1980) proves that individuals are unrealistically optimistic about future events; an incident which ironically came into fruition in Session 5 when discussing rational decisions. When posed the decision-weighted question of "would you rather a have 50% chance of $1000, or a 100% chance of $500", I believe well over half the class opted for the former. A simple anecdote, however, it supports the point that we each consider ourselves to be luckier than those around us. This analogy holds true in regard to amateur investors – they make decisions that overweight smaller, more desirable outcomes, and under-weight moderate and high probabilities (Kilger and Levy 2010). Daniel and Titman (1999) propose two effects that cause overconfidence: the 'direct effect' is when amateur investors overestimate the quality of the information they collect themselves, while the 'indirect effect' is when individuals seek confirmation bias and ignore information that opposes their beliefs. This creates a feedback loop into their investment strategy and causes them to be dangerously confident.

In the case of retail investors, the ease of access to informal information sources such as chat forums and subscription programmes has fuelled this 'direct effect'; each individual investor thinks their own source of information is superior (Martin and Wigglesworth 2021). Daniel *et al.* (2004) support this by stating that the overconfidence of investors is further fuelled when they believe that their information sources are 'private'. However, I believe that in here lies a hidden danger for institutions. The fact that there is a small number of information sources means a large number of investors are investing with hyper-confidence from the same information, causing high volatility on a small number of stocks (Subrahmanyam 2007). As seen in *Figures 3 and 4*, this overconfidence also causes an increase in the level of trade frequency and volume, which as of recently has typically involved the use of margin debt or leverage in the form of options (Bikas *et al.* 2012)

[5] A cognitive bias where individuals believe they are far more capable in a certain field than they actually are.
[6] This theory holds that there are biases that influence people's choices under conditions of uncertainty, causing them to behave irrationally

Figure 3

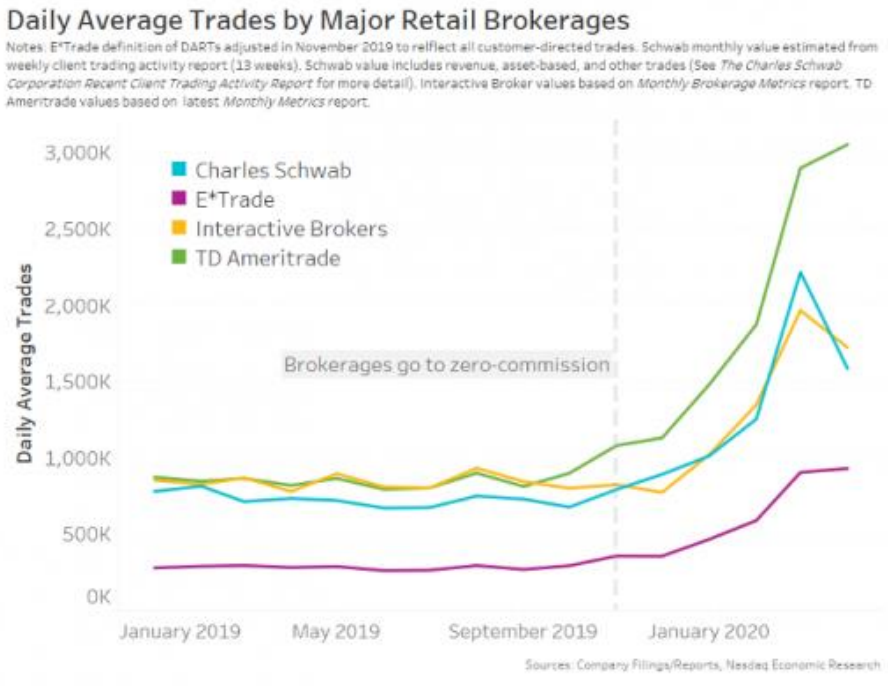

Figure 4

As shown in the example below, this ‘leveraged herd behaviour’ can be a deviously complex source of risk for investment banks, particularly those who practice the sale of options to investors.

The Dangers of Leveraged Herd Behaviour: The Gamma Squeeze

To demonstrate the all-encompassing dangers of these feedback loops, the effects of overconfidence and the heuristic-driven 'direct effect', this journal log develops on the concept of 'the short squeeze'[7]. This topic was discussed in class on Thursday 9th September in Session *2*, as my fellow classmates delved into a discussion on the power of retail to move the market. However, after doing my own research, I believe that the real driving force behind these volatile movements is not a short squeeze, but instead is a 'gamma squeeze'[8]. Due to the ease of access to derivatives and margin, retail investors have effectively 'weaponized' short-dated call options (Francus 2021). This phenomenon incidentally occurred to two stocks in tandem with this journal's construction: Offerpad Solutions Inc. ($OPAD) and Ironnet Inc. ($IRNT), on the 16th September 2021. I believe that these types of movements must now be considered in an institution's risk strategy, as due to widespread short-dated option purchasing, the gamma of a stock's options can rise rapidly in a manner of days. This in turn forces one to start buying the stock as collateral to stay delta neutral – which feedbacks into the delta exposure as the stock now has a higher chance of expiring ITM as its price rises due to increased demand. Essentially, this may cause institutions to incur a lot of losses via the sale of options, a practice that may need refinement if this trend continues.

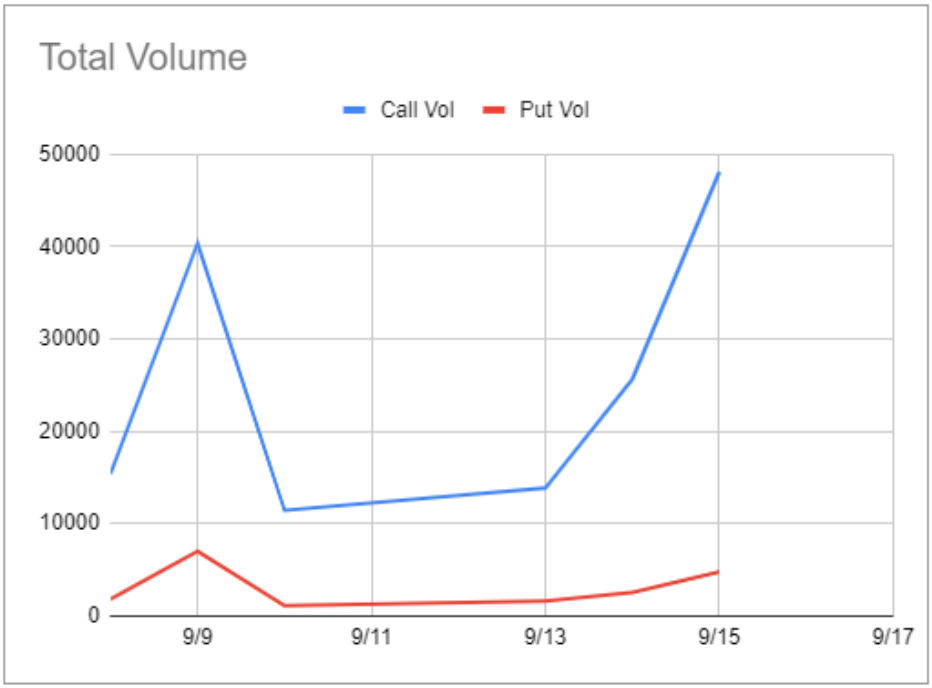

Figure 5 - Volume on Call Options of $OPAD on September 15th

[7] A short squeeze occurs when a stock price escalates due to the heightened demand for the stock by short sellers in order to close out their positions (Xu and Zheng 2016).

[8] A gamma squeeze occurs when there's rapid buying activity of short-dated call options – this can create a heightened demand for the stock as option sellers buy the asset in order to remain delta neutral, which results in even more call buying as the asset increases in value (Tengulov *et al.* 2021).

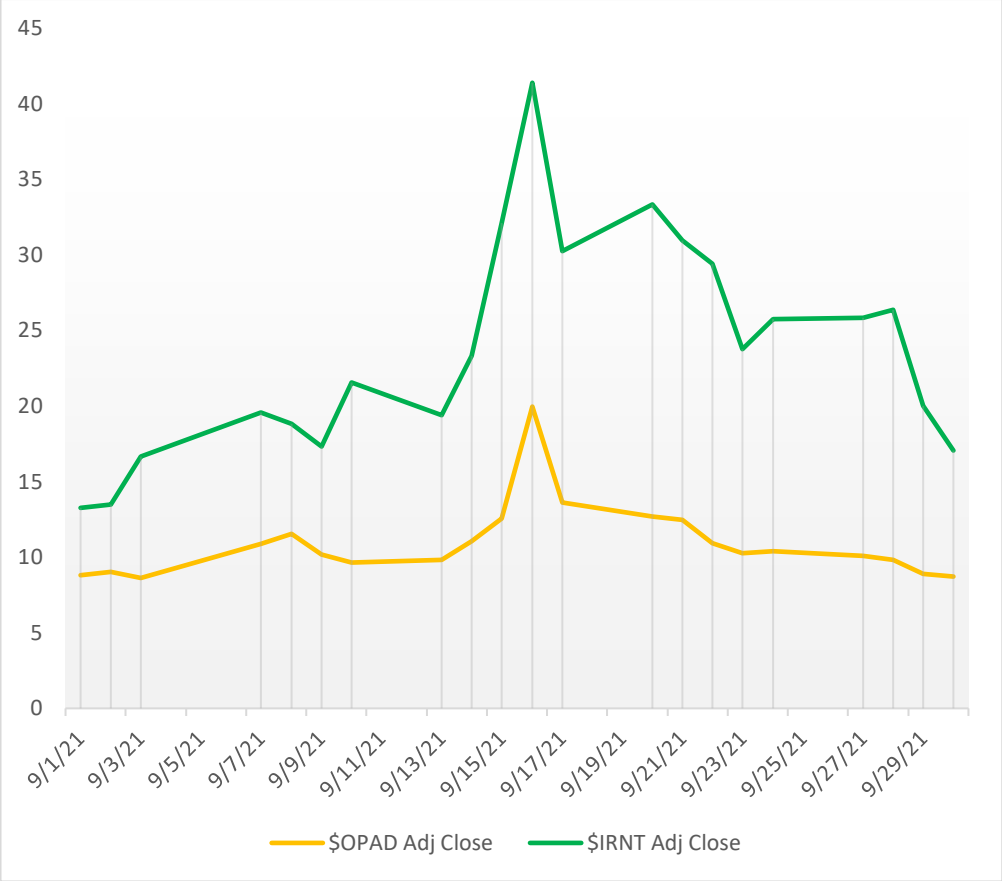

Figure 5 – The Resulting Gamma Squeeze on Asset Prices on September 16th

As extrapolated from the two graphs above, the widespread short-dated option purchasing drove the price up considerably, exposing the sellers of these options to unexpected loss exposures and volatility.

The Overreaction Anomaly

People tend to overweight recent information and underweight prior data – they overreact to unexpected news events, which causes a temporary and dramatic deviation from fundamental values (De Bondt 2000). Furthermore, Shefrin (2001) shows that investors overreact to 'winning stocks', making them become overpriced. Personally, I believe that this anomaly is closely related to the 4-Factor Carhart Model of momentum, as discussed in class (Carhart 1997). From my studies of both this model and this anomaly, I have learned that overpricing does not affect all securities equally. Momentum has a stronger effect on stocks whose valuations require the interpretation of ambiguous information, e.g., Tesla and other EV- companies. However, if one took a cynical approach to the future of capital markets, one could argue that there lies a catastrophe in waiting in the wake of retail investors and unexpected left-tail momentum. As Longin and Silnok (2001) show, market correlation increases with left-tail events. Marrying this with the explosion of margin debt (Mislinski 2021) and the fact that retail investors tend to overreact, could prove cataclysmic. Anecdotally, I experienced this increased left-tail correlation

while working as a fund analyst on a brief internship over the pandemic-inflicted Spring 2020. From my own experiences of monitoring funds and the behaviour I have observed in the market over the past 18 months, I postulate that if there was to be another black-swan event the results would be disastrous for retail investors – they would have to liquidate their highly leveraged, hedge-less portfolios at a loss to cover their margin liabilities.

Conclusion

To conclude, the surge in retail investors has upended the existing relations between fundamental values and market returns. Due to the anomalies of overconfidence and overreaction, retail investors are now creating additional volatility in the market. As discussed in class in Session 4 and 5, these anomalies are critiques of the EMH, as they imply that assets are not fairly priced. While the assumptions of CAPM and other pricing models might be considered outdated, I do still believe that they are an integral part of the financial learning curve, as they provide insight into the seminal papers from which all modern portfolio strategies are derived. From the content I've learned throughout the module, as well as my own study of the market, I would argue there to be a slight altercation to the earlier statement by Thaler (1999) on market efficiency; markets are efficient in the long run. While not all investors may be rational, those who are will earn abnormal profit by trading mispriced assets, thus recalibrating the prices. To succinctly summarize, this learning journal demonstrates that the behaviour patterns of amateur investors should be considered a new source of market risk, and should be considered at an institutional level when constructing portfolios.

Appendices [Session-by-Session Breakdown of Content]:

As specified in the introduction to the learning journal, I felt that it was prudent to focus on content that I had never studied before in the main body's discussion, so as to fully highlight the depth of the new content I have learned over the past few months. Nevertheless, this module still gifted me the opportunity to refine my pre-existing knowledge in other areas of finance, and allowed me to perform my own research in conjunction with the teachings of the content. As previously mentioned, this supporting report exists to demonstrate the additional knowledge I gathered from the module, and how I tied it back to real-life examples.

Session 1 – Markets and Securities, Utility, Background

From my time spent completing an internship in a private bank alongside my undergraduate studies in insurance and finance, I had already accumulated a considerable level of knowledge in these fundamental areas. However, this premier session granted me the opportunity to reinforce my knowledge in these elemental matters, as well as give an opportunity to appraise the application of utility theory in both the worlds of finance and insurance. I now postulate that the purchase of insurance by the insured is similar to the purchase of financial assets by the investor – both are allocating their resources to complex, intangible securities. While their forms of utility are different, the utility from these transactions still exists; the insured's utility comes from the sense of security provided by holding the policy, while the investor's utility comes from the expectation of future returns. From my further research in this content post-session, I garnered from the works of Arrow (1972) and Diacon & Ennew (1996) that trust is the driving force behind these economic activities – the insured has trust in the insurance provider, and the investor has trust in both the capital markets and his investment strategy. However, tying this back to the main arguments of my learning journal, the amateur investor possibly has unwarranted levels of trust in his investment strategy due to the previously discussed heuristic-driven biases surrounding overconfidence (Shefrin 2001).

Session 2 – Risk and Return, Issuing Securities

The subject of risk was frequently embedded throughout the learning curve of my undergraduate degree, in areas such as:

- The risk management strategies associated with asset management.
- The risk strategies associated with insurance operations, from the insurer's perspective.
- The study of the risk exposures that reinsurance companies face when calculating the environmental and catastrophic loss exposures held by direct insurers.

However, the opportunity to revise my knowledge of risk in regard to the capital markets was a welcome one. In regard to the risks associated with the intraday operations of institutional participants, one topic

that stood out to me from this class was the brief discussion we had on the current trend toward 24-hour global markets. Personally, I wonder to what extent this would affect the operations of financial institutions and what would be the repercussions for investment strategies – perhaps this will create the conditions necessary for new anomalies in the market. For example, as Basdekidou (2017) shows, there already exists empirical evidence for asset momentum surrounding an 'overnight anomaly' – perhaps this would be magnified by 24-hour markets.

Furthermore, we discussed the issuing of shares in primary markets – an area of keen interest to me in the market from 2020 to 2021. The rise of the Special Purpose Acquisition Company as a viable alternative to the standard IPO has been seen over the past two years, as in 2020 alone $79.87 billion was raised to bring 237 companies public (Saha 2020). These blank cheque companies were a market-favourite for both professional and retail investors, crowning 2020 as the 'year of the SPAC' (ibid.). However, I believe that the 'success' of these companies can be tied back to my arguments made about overconfidence and overreaction. Over the course of the year, overconfident retail investors pooled large amounts of capital into these investment vehicles, as they were convinced their strategies (self-sourced, or, sourced from online forums) were guaranteed abnormal returns. These investors then waited for a merger announcement; when said announcement came there was an overreaction to the good news, and one closed out the position for a profit post-merger. While these strategies may work for the minority of savvy retail investors, the long-term efficiencies of the market will always cause these inflated asset prices to return to their fundamental values. In fact, as of June 2021, the YTD performance of a strong majority of post-merger SPACs was negative (Burnett 2021), a statistic illustrated in *Figure 6* below (for Nikola Motors, XL Fleet, and ChargePoint).

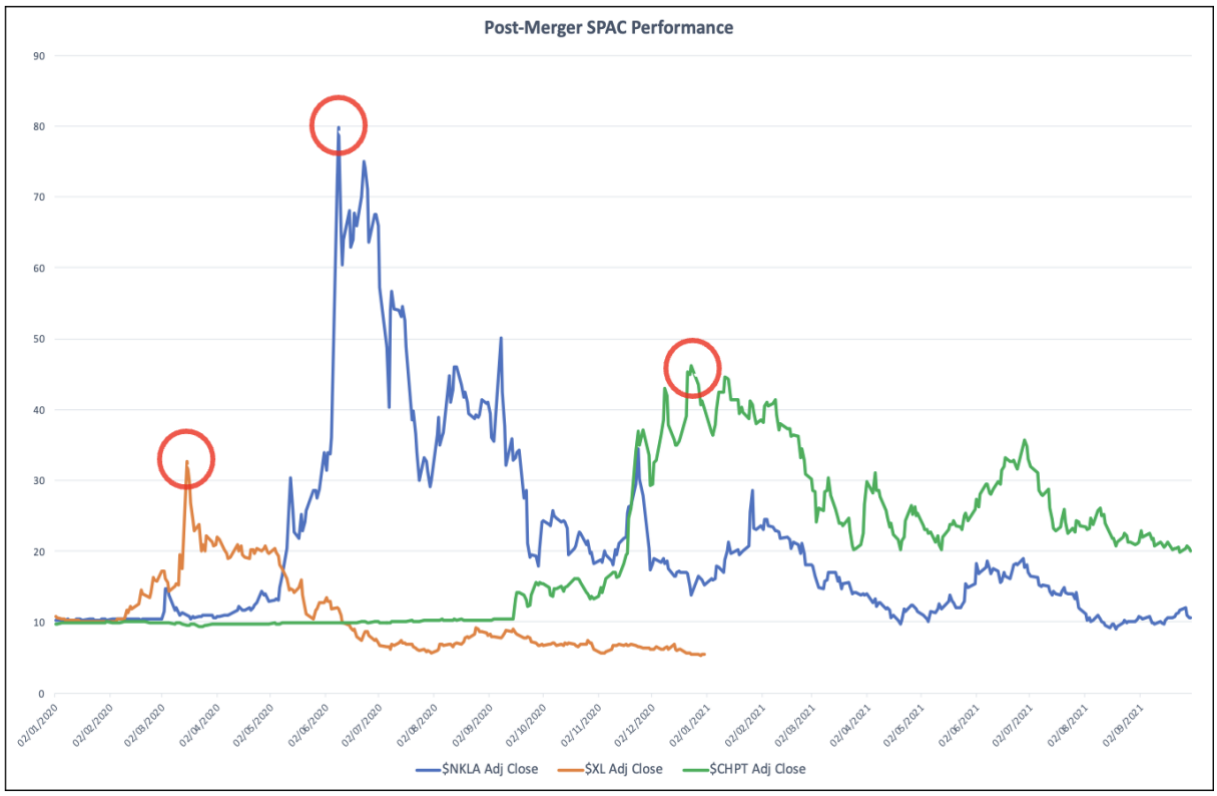

Figure 6

Circled in red is what I believe to be the transition from overreaction to market efficiency, as these stocks lose their momentum and efficient arbitrageurs trade these overpriced assets back into equilibrium. As a final note, it is important to remember that these blank cheque companies are still essentially IPOs; as discussed in class, IPOs tend to perform poorly in the long run (Ritter 1991).

Session 3 – Trading Costs, Diversification

Not only did this session 3 provide me with a well-needed refresher in regard to theory surrounding portfolio construction and efficient diversification, it also provided me with even more knowledge in some aspects of these areas, which personally was a massive gain. While I feel as if I have been successful in understanding the vast majority of the content discussed in this session, one issue I did face was the nuances associated with the regulation of capital markets. While I have formerly taken modules that have covered the legal environments surrounding businesses, the areas of regulation that I have studied tend to revolve around employee regulations, company formation regulation and unfair dismissal regulation. Thus, I believe that despite my best efforts to learn as much as I could about legislation such as ‘The Sarbanes-Oxley Act’ and ‘The Dodd-Frank Act’, I do think that I would need to become better-versed in this area if I was to pursue a career in investment banking.

Session 5 – Arbitrage Pricing Theory, Efficient Market Hypothesis

In my prior studies, I had briefly delved into the Arbitrage Pricing Theory, so this in-depth discussion was a welcomed addition to further enhance my learning. However, one issue I faced was the fact that the critiques of this theory were not discussed in-depth in class. Thus, to further deepen my education in this area, I followed up session 5 with my own research post-lecture. I found that there are three main problems associated with the APT, from my reading of Kim and Francis (2013):

- Firstly, there is no information given about the number of factors that are affecting the return of the asset.
- Secondly, even if this figure was known, there is still the predicament of identifying what these factors are.
- Finally, if one was to relax the assumption that there are no transaction costs, then one would observe a significant decrease in the arbitrage opportunities.

Despite this, Roll, Ross and Chen (1986) claim that in regard to the identification of factors, it is fair to assume that the most relevant factors are investor sentiment, shifts in the yield curve, the GNP and inflation. In regard to the Efficient Market Hypothesis, I still hold the belief that is it essential to learn this theory in order to develop a strong foundation of knowledge in Traditional Finance. Although some argue that the theory behind the EMH is becoming outdated with the increasing number of unsupportive publications, I do believe that the semi-strong form of the EMH holds true in the long term. However as discussed in the main body of this learning journal, I also believe that increased numbers of overconfident and overreactive retail investors in the market means that there is an increasing frequency of volatility periods in the market, which is having a negative effect on the short-term efficiency of the market.

Session 6 – Market Efficiency, Behavioural Finance

As clearly illustrated from the main body of this journal, I personally found that Behavioural Finance was the most noteworthy component of this module – it formed the essence of both my thought process and my learning curve in capital markets throughout the past few months. The profound effect that this subject had on me was compounded by the observations I have experienced in the capital markets over the past year. The thought of ‘what if investors don’t behave rationally?’ has been at the forefront of my co-curricular learning throughout the majority of this semester. As previously discussed, the presence of overconfidence, forecasting errors, and sample size neglect all influence the behavioural patterns of amateur investors. In fact, these behavioural patterns are so irrational that they are considered anomalous events – critiques of the Efficient Market Hypothesis. In regard to the theory surrounding efficient markets, I personally hold that one can disregard the existence of the ‘strong-form’ of the EMH. This form states that there is no type of information that can give an investor an advantage on

the market – that is to say that all private and public information is reflected in the price of an asset (Norman and Chisolm 2014). However, a quick study of the volume action of certain assets before a buyout is indicative enough that not all private information is reflected in the stock price. For instance, one can observe the volume of Azarga Uranium, which was bought out by EnCore Energy on the 7th September (around the time of Session 3) (*Figure 7*).

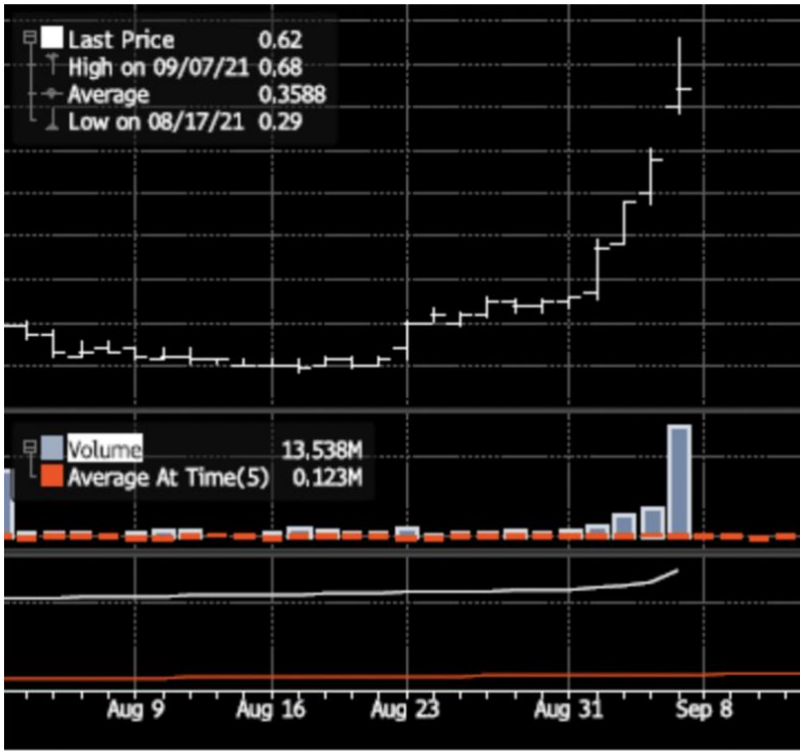

Figure 7

For the trailing 30 days prior to the 2nd September, the daily volume of shares traded did not exceed 0.95m. However, for the three trading days prior to the announcement, the daily volumes were: 1.349m, 2.597m and 3.447m. Those savvy individuals who purchased this asset on these final days earned upwards of 35% - while I wouldn't consider myself to be a cynic, I can't help but question why the volume on the last trading day pre-merger was 936.43% higher than the daily average of the above period – perhaps not all known private information was reflected in the asset price and insider trading does occur.

Session 8 – Investment Vehicles, International Diversification

To further enhance my knowledge of investment vehicles, I allocated time after session 8 to study some active Exchange Traded Funds. The Sprott Physical Uranium Trust is one that caught my eye in particular – a closed-end trust fund, its sole purpose is the acquisition of uranium, much like a gold or silver fund. Being a closed-end fund means that Sprott cannot sell on this uranium at a later price for

profit, they can merely accumulate (Sprott 2021). As of 13th October 2021, the fund holds $1.33bn in assets and raises cash on a typically daily basis by issuing shares. As demonstrated by our in-class discussions, there can be instances where the price of the ETF departs from the NAV. Typically, one would consider the positive, right-tail events when observing this statement, however it is the left-tail risk that one must consider in this instance. As per the prospectus of this fund, Sprott cannot issue new shares when trading at a discount to the NAV – an issue which could cause the income of the fund to dry up as the issuance of new shares will not be possible if there was to be a broad market crash (ibid.).

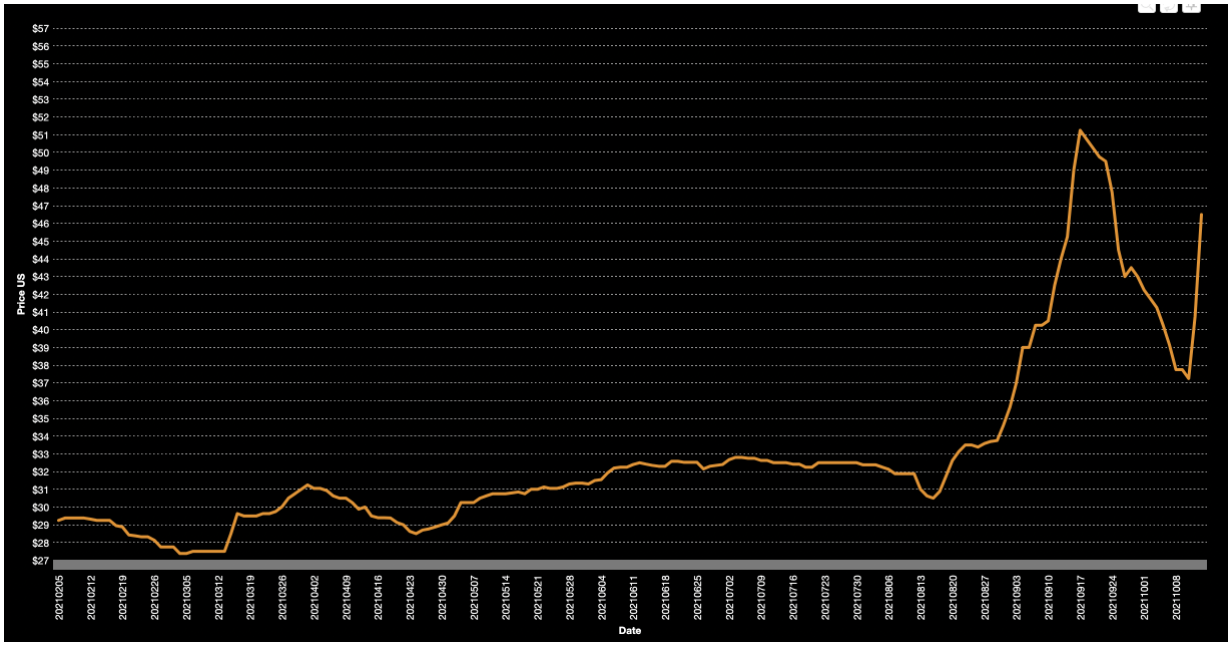

Figure 8

Sprott has had a significant impact on the price of uranium per pound since the inception of this fund, driving the price per pound up from $30/lb to $50/lb as seen in *Figure 8*. Although this may present itself as an appealing investment, non-American investors must also consider the dangers of currency exchange – as I learned in class this is a pertinent issue for European investors given the rate of dollar depreciation due to the printing by the Federal Reserve (Boehl *et al.* 2020).

Session 9 – Bonds, Interest Rates

Throughout this session, I found that I was intrigued by the versatile roles that bonds play in capital markets. As well as providing an option for the average organisation to raise capital, the power that bonds have transcends the commercial markets and finds its way into the reinsurance market via catastrophe bonds. As a direct result of my decision to enrol in the MSc. Renewable Energy and Environmental Finance, I find myself quite curious about the 'economics of the environment.' From my co-curricular studies alongside this module, I've learned that catastrophe bonds are pivotal to

combatting climate change, and, offer developing countries an opportunity to grow while mitigating environmental risk from their process of industrialisation. For example, take the works of Mattucci (2016); [bonds] could be used to "bridge the growing gap in emerging economics" by reimbursing them for the natural disasters that interrupt their industrialisation process. This implementation of risk mitigation would have a spill-over effect on other emerging economies that are struggling to balance financing for disasters and economic development (ibid.). To understand the real-life implications of these bonds, I studied the content on the Artemis website – a website dedicated to a discussion of these complex derivatives. The benefits of these bonds can be seen in the example of the IBRD CAR 120 catastrophe bond which was based in Peru; the 8.0 magnitude earthquake which struck the country on the 26th May 2019 resulted in a $60 million payout for its government from the World Bank. Thus, this allowed Peru to retain economic resilience to this natural event, enabling them to maintain their economic progression. While these bonds are undoubtedly extremely beneficial to combat the effects of climate change, investors of these bonds must be rewarded with coupons that are far higher than those associated with commercial bonds, to reimburse them for the higher risk they are retaining.

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