MILLIMAN REPORT

Exchange Traded Funds during COVID-19

A Case Study

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Victor Huang, FIAA
Bryan Chen, CFA, FRM

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Executive Summary

Exchange Traded Funds (ETFs) performed a crucial and important role within markets during the COVID-19 financial crisis. Despite the highest levels of market implied volatility since inception of the VIX index[1] in March 1990 (82.69 on the 16th March 2020), and both equity markets and credit markets coming under a great deal of pressure, ETFs provided a level of stability, price discovery and liquidity that effectively allowed them to be a pressure valve during the one of the largest and most extreme crises that global markets have ever experienced.

Rather than fuelling concerns from parts of the market regarding how ETFs would perform in a crisis, this crisis proved that in fact, ETFs do not exacerbate crises but rather perform the role they were designed for - a vehicle for transparency and market efficiency.

Introduction

ETFs have turned into a substantial market force since their inception in the early 1990s and their entrance into the domestic Australian market in 2001.

In 2020 they remain a dominant part of the Australian market, attaining AUD 70 billion dollars at their pre-COVID-19 peak. Globally some USD 7 trillion dollars (AUD 9.6 trillion dollars) are invested in ETFs.

As their dominance continues to increase, question marks have arisen over the previous decade as to whether they hinder overall market activity. Their behaviour within the marketplace has been called into question by regulators and policymakers, who are concerned that they amplify market movements rather than temper them.

The COVID-19 crisis of March 2020, when markets became extremely volatile as global economies went into forced hibernation due to the coronavirus pandemic, provides a case study for how ETFs perform in times of severe market stress. In this paper we will compare how ETFs behaved during that month, as compared to the entire period of Australian ETF trading in the previous year.

ETFs – A primer

ETFs origins as a market slave

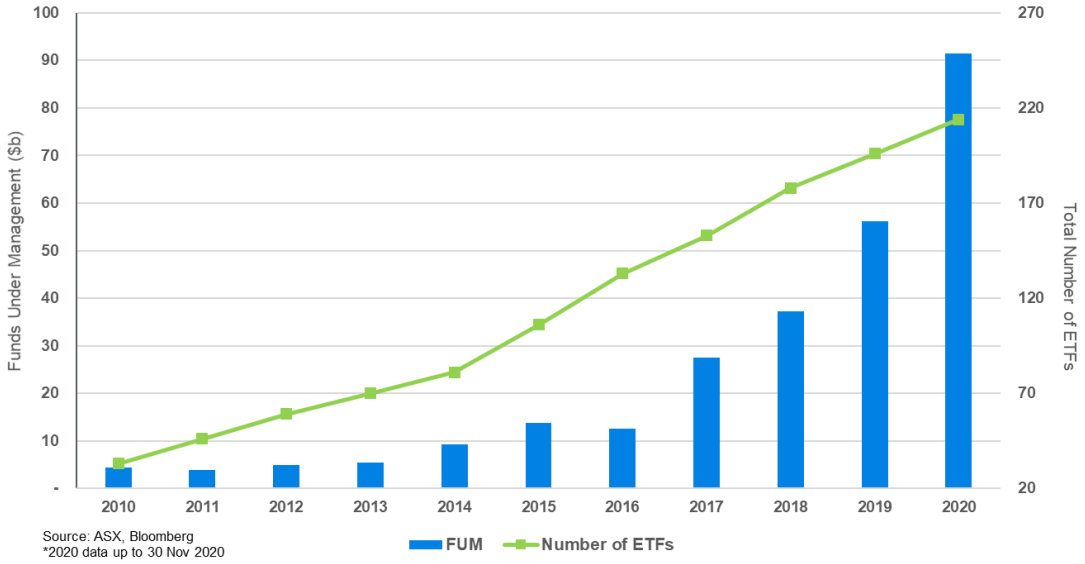
ETFs were introduced in 1993 as an answer to the stock market crash of October 1987. They were designed with the specific ability to provide liquidity and price discovery in markets that were otherwise volatile. This ability of ETFs to trade securities that were otherwise unable to be traded is a key reminder and a starting point when assessing their behaviour in markets' most recent crisis.

[1] VIX Index - The VIX Index is a financial benchmark designed to be an up-to-the-minute market estimate of the expected volatility of the S&P 500® Index, and is calculated by using the midpoint of real-time S&P 500 Index (SPX) option bid/ask quotes. Source: Bloomberg.

Overall market

As of 30th November 2020, the total asset under management for Australia ETFs reached AUD 92 billion dollars. The size of the ETFs currently constitutes only a small fraction of the equity market in Australia: approximately 2.3% in terms of market capitalisation. Market commentators speculate that the FUM could reach 100$B by 2022[2].

FIGURE 1: AUSTRALIAN ETF GROWTH 2010 - 2020



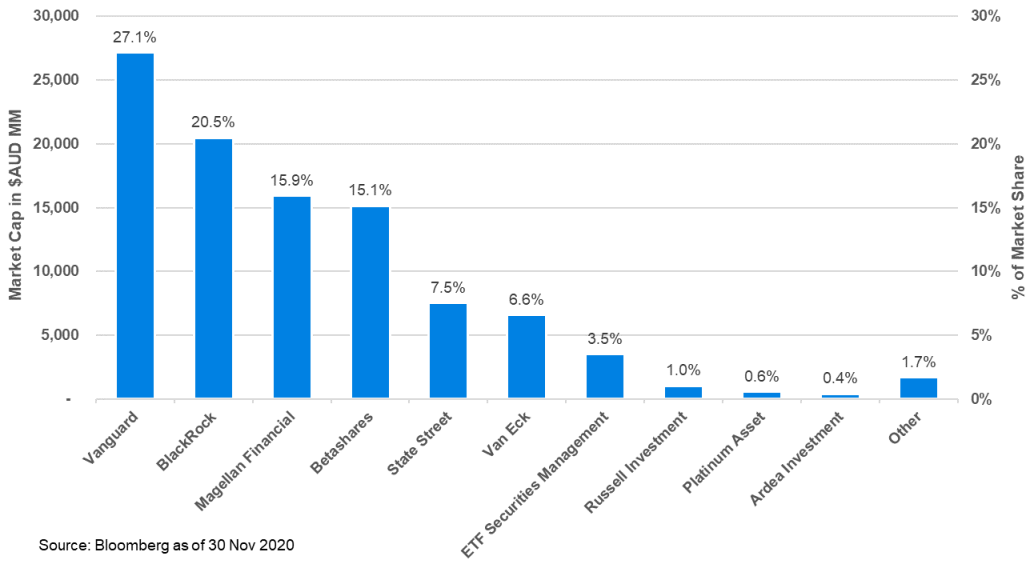
Globally, the number reached USD 7 trillion (AUD 9.6 trillion) in August 2020. These are staggering numbers; put into perspective, the Australian ETF market size is currently only about 0.7% of the global ETF market. ETFs in Australia only represent a small fraction of the market.

Australian ETF providers

While there are some 200 funds available, the vast majority of the funds are produced by a handful of the main providers. In fact, nearly 80% of the assets are managed by the 4 largest ETF providers.

[2] https://www.smh.com.au/money/investing/australian-etf-market-could-be-worth-100-billion-by-2022-20190710-p525wz.html

FIGURE 2: ETF MARKET SHARE IN AUSTRALIA[3]

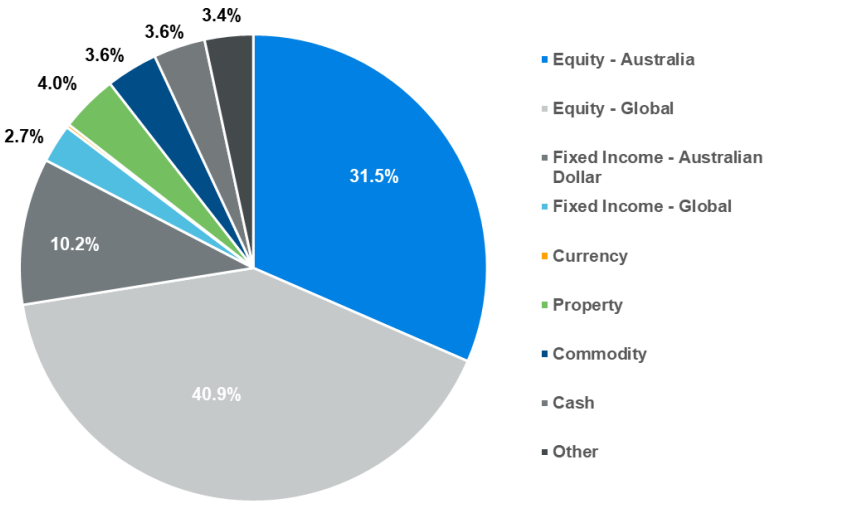


Source: Bloomberg as of 30 Nov 2020

Market composition

What is true for providers is also true for asset classes - equities and fixed income collectively make up 85% of the market. Specialist alternative asset class ETFs, while diverse in their offerings, do not add up to a significant part of the market.

FIGURE 3. ETF FUM BY ASSET TYPE



Source: Bloomberg as of 30 Nov 2020

[3] In November 2020, Magellan's Global Fund was converted into a listed trust. As a result, the market cap for Magellan's ETF products increased by 13.5bn.

The COVID-19 Market Crash

Crisis events

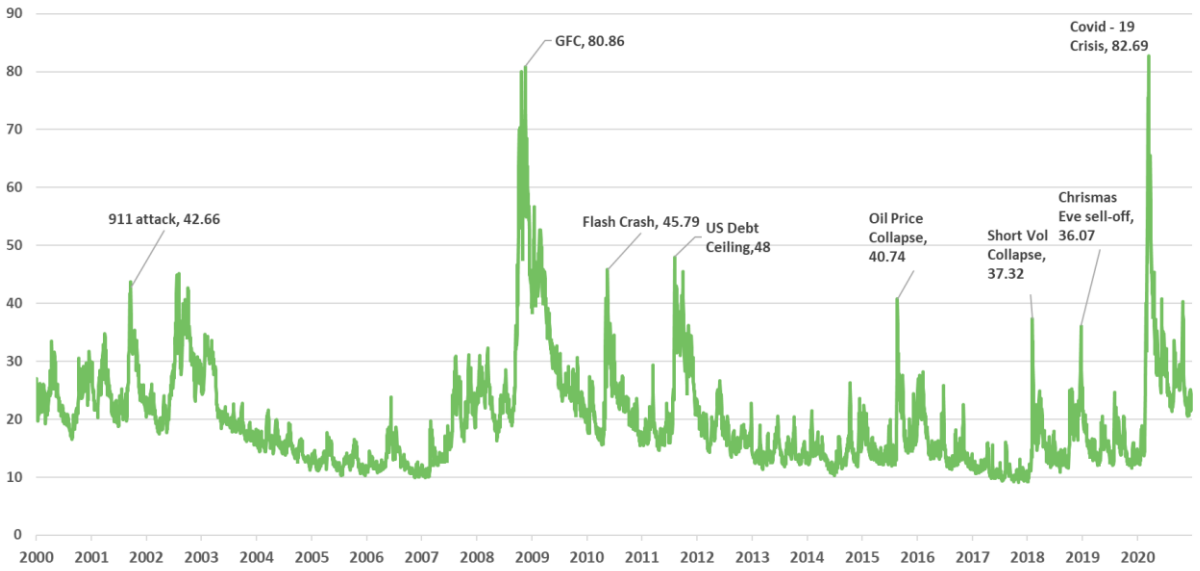
Over the course of February and March 2020, the full extent of the COVID-19 pandemic was beginning to show its effects on the financial markets, as people began to understand the economic burden of a pandemic induced forced shutdown.

Between the 20th February and 23rd March 2020, the ASX All Ordinaries Index fell over 37%, representing the 2nd fastest drawdown in the history of the index. By the end of March, financial markets had fallen precipitously, with Wall Street experiencing its fastest ever drop in overall value over the course of the month[4].

Market volatility

Despite the major falls, there were days of sharp recoveries in between, which created an unprecedented level of volatility in financial market. The VIX index, which represents a measure of market volatility (also colloquially called "the fear index"), surpassed levels seen during the Global Financial Crisis, and in a much shorter time frame.

FIGURE 4. VIX MOVEMENTS 2000-2020



Source: Bloomberg

Credit markets

The market falls extended beyond listed equities markets around the world. During the middle of March, the economic shutdown triggered a selloff in credit assets, grinding the credit markets to a halt and bringing with it a liquidity crisis. The crisis was relatively quickly averted thanks to central bank support in various countries, particularly the corporate bond purchase scheme announcement by the U.S. Federal Reserve on March 23rd.

[4] Source: Bloomberg

Australia experienced its own domestic version of this crisis briefly, until the Reserve Bank of Australia declared it would include investment grade corporate bonds as part of its list of collateral eligible for short term loans.

Market recovery

Since March 2020 there has been overall market growth to replace the significant losses experienced in March. By the end of August 2020, the S&P 500 has already achieved a full recovery on the back of record levels of monetary and fiscal policy, stronger than expected economic data, and news of COVID-19 vaccine developments. The All Ordinaries saw a similarly fast recovery, though still under 2.3% below its pre-COVID-19 highs as of 31st December 2020.

ETF Performance during the COVID-19 Crisis

There has been a concern by small cohort of critics that ETFs have the potential to exacerbate market movements, in particular, caused by the systematic rebalancing the underlying assets from geared ETFs.

However, it is worth taking a closer look at how ETFs behaved during the COVID-19 crisis. Our analysis suggests that this reputation has been undeserving over the years, and especially when it comes to crises, ETFs perform a valuable role for investors.

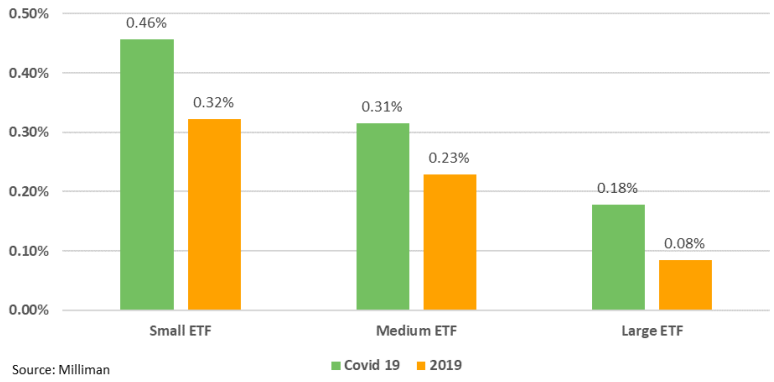
In this analysis we focus particularly on how passive domestic equity ETFs and domestic fixed income ETFs performed.

Domestic equity ETFs

Generally, larger ETF will tend to have lower spreads as shown below. This is due to a number of factors including market maker competition on regularly traded ETFs and natural buyers and sellers crossing the spread as they transact during the trading day.

The cost of trading for all domestic equity ETFs, as measured by average daily bid-ask spreads increased during the initial COVID-19 drawdown. This increase reflects the market risk during this period with fast moving cash and futures markets positions are more difficult to hedge intraday and there is additional risk on real time valuations.

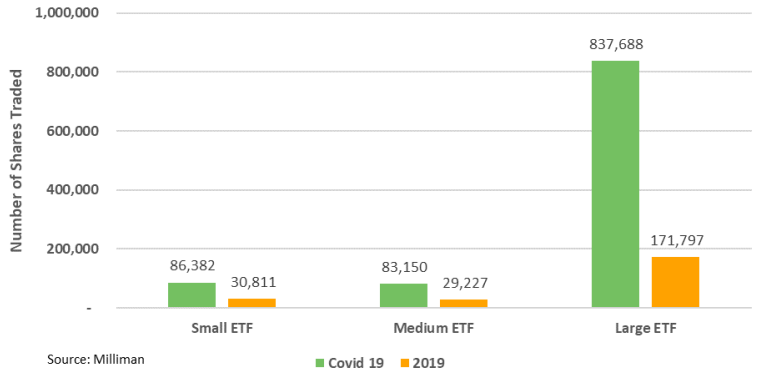
FIGURE 5. AVERAGE DAILY SPREAD – DOMESTIC EQUITY



Source: Milliman

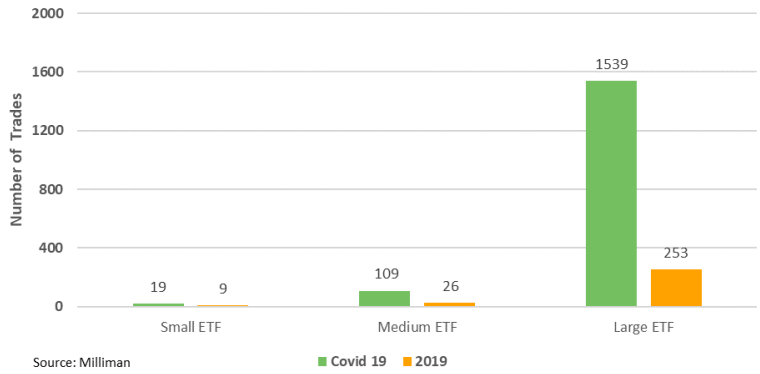
As for trading volumes, the average number of shares traded per day increased but the number of trades increased more so during the COVID-19 period indicating a rise in retail investors. This premise is consistent with ASIC's analysis, trading volumes in ETFs increased significantly throughout the COVID-19 period. The proportion of this attributed to retail brokers increased marginally from 58% to 61%[5].

FIGURE 6. AVERAGE DAILY TRADING VOLUME – DOMESTIC EQUITY



Source: Milliman

FIGURE 7. AVERAGE DAILY NUMBER OF TRADES – DOMESTIC EQUITY



Source: Milliman

[5] Retail investor trading during COVID-19 volatility, ASIC, May 2020

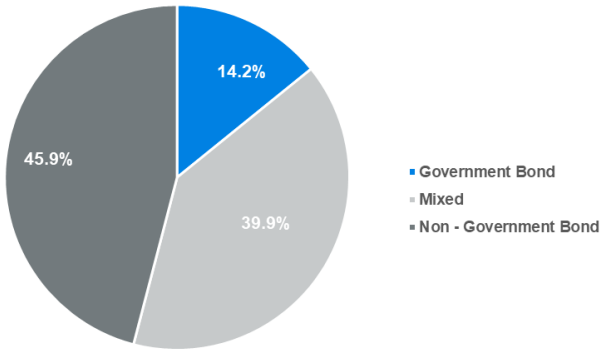
The key point is that even though spreads (as expected) increased, investors were still able to express their investment view intraday with a diverse portfolio of securities via a single ETF trade. In short, during the crisis the domestic equity ETF market performed as intended.

Domestic fixed income ETFs

Domestic fixed income ETFs are better assessed through the lens of their underlying asset classes. In Australia, fixed income ETFs provide investors with the ability to access debt securities in a low cost and efficient manner, which they wouldn't otherwise be able to obtain as easily.

Domestic fixed income ETFs represent approximately $7.3B in various fixed income assets ranging from government bonds, semi-government fixed income securities, through to corporate bonds and other credit securities.

FIGURE 8. MARKET SHARE BY ASSET TYPE – DOMESTIC FIXED INCOME

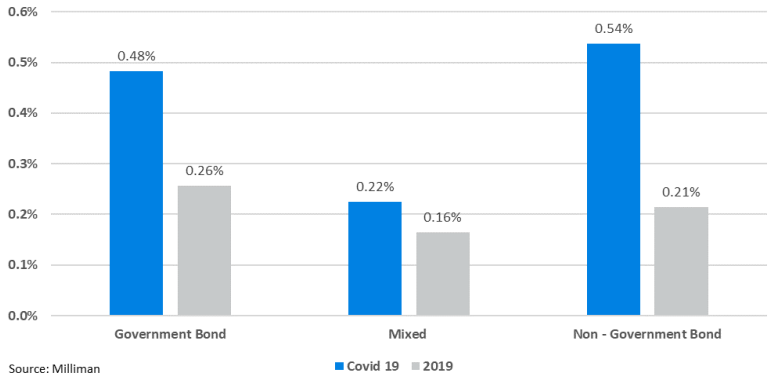


Source: Bloomberg as of 30 Nov 2020

The impact of sub-optimal credit markets

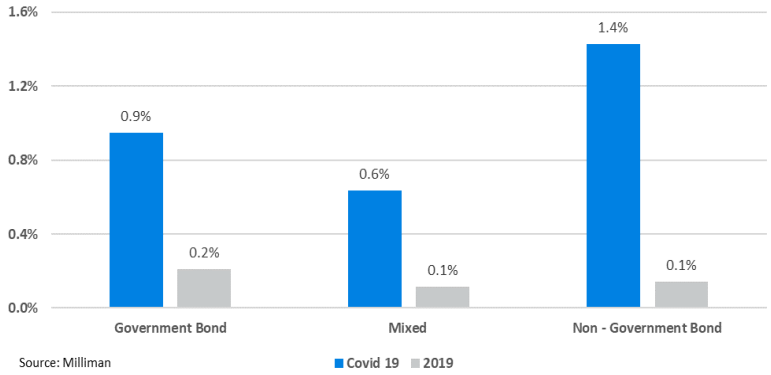
Given the reduced liquidity of credit markets during the COVID-19 crisis, the behaviour of fixed income ETFs over the same period became even more important. Figure 9 shows how domestic bond ETFs NAVs were tracking at a higher error compared to their benchmarks than usual.

FIGURE 9. AVERAGE DAILY TRACKING ERROR – DOMESTIC FIXED INCOME



Source: Milliman

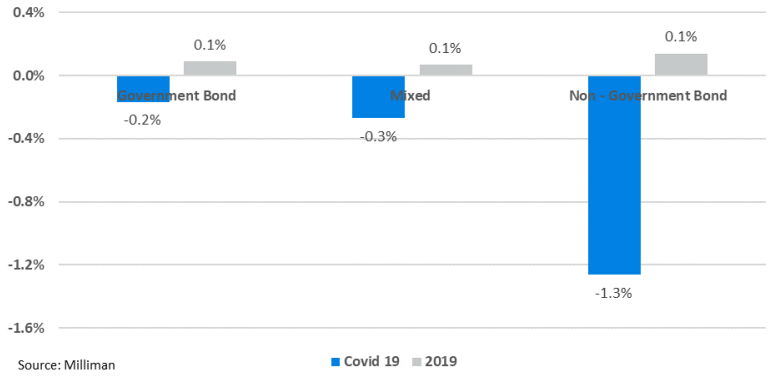
FIGURE 10. AVERAGE DAILY SPREAD – DOMESTIC FIXED INCOME



Source: Milliman

Cost of trading for all domestic fixed income ETFs as measured by bid-ask spreads were also wider than usual, and significantly more so for non-government bond ETFs. This is consistent with the additional pricing risk and reduced levels of liquidity in the underlying instruments. In addition, the spread incorporates the general increase in cost of trading the underlying securities via a creation/redemption of ETF units (all costs are generally passed back to the transacting party).

FIGURE 11. PRICE PREMIUM AND DISCOUNTS – DOMESTIC FIXED INCOME



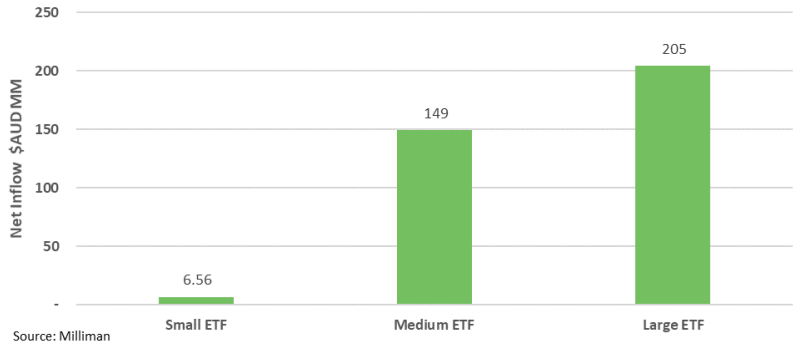
Source: Milliman

All three types of ETFs, however, traded at discount (vs NAVs) during the stressed period. Non-government bond ETFs traded, on average, a 1.3% discount to net asset values (NAV). The widening spreads (as outlined above) would impact the premium/discount during this period, however it is also worth mentioning that at times of market stress, the ETF can trade more frequently than the underlying securities and as such some market participants see the ETF as a more accurate representation of an executable risk prices for the specific exposure.

Comparing equity and fixed income fund flows

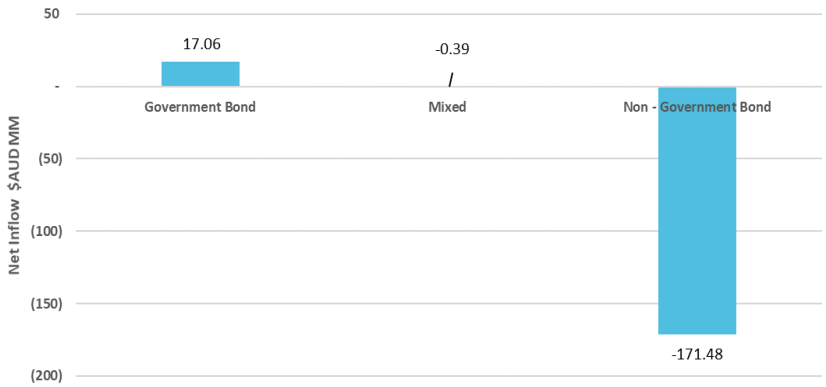
Overall flows of both types of ETFs show that domestic equity ETFs attracted the largest net inflows during COVID-19, taking in approximately $361 million.

FIGURE 12 ETF FUND FLOW – DOMESTIC EQUITY



Source: Milliman

FIGURE 13 ETF FUND FLOW – DOMESTIC FIXED INCOME



Source: Milliman

To contrast, domestic fixed income ETFs were in net outflow during the same period. In fact, only three domestic fixed income ETFs (19 ETFs in total) recorded a net inflow, and 7% of assets under management were lost by just redemption in March.

Of all the sectors, non-government bonds suffered the largest outflow of approximately $171.5 million.

Explaining ETF behavior

Institutional grade management

Many of the passive ETFs observed were shown to continue to track their benchmark (measured using the fund NAV). This can be attributed to portfolio management process and robust creation and redemption mechanisms. Below a couple of point to note:

- Some ETFs lend out their securities to short sellers and are able to charge a short-term borrowing fee which can offset some of the management cost.

- Many ETFs don't implement a full replication strategy to the benchmark. This is done in some exposures in order to optimise their tracking error relative to incurred transaction costs.

- Less frequent transactions in the underlying securities, with fewer creations/redemptions due to secondary market (exchange i.e., ASX or Chi-X) liquidity. Plus robust process (often involving the delivery of securities) with all costs passed back to the transaction party.

Investor sentiment

ETFs act as a receipt of the sentiment surrounding their market exposure. They provide a cost effective method for obtaining a market exposure in a single trade, where trading the underlying securities is potentially more expensive and often very difficult in the case of the bond market.

As detailed in this document, during the COVID-19 volatility period equity ETF experienced inflows while the flows for Australian Fixed Income ETF went the opposite direction. This is generally an indication of a "risk on" investor sentiment with expectations of future gains in the Australian equity market (which given the recovery post March this sentiment was correct).

Providing price discovery and liquidity

It's worth noting that within ETFs there exists a primary and secondary market. The primary market makers of ETFs - largely investment banks and issuing fund managers - create and redeem ETF shares. These transactions typically result in trades spread across the broader market, avoiding concentrated trading in a handful of securities.

In the case of investment bank participants, they may also use ETFs as a distribution vehicle, as well as to transfer risk to the market; packaging up securities that are on their books.

The existence of the primary and secondary market for ETFs means that not all ETF trades need to result in transactions in the underlying securities, but rather, they are traded between investors or added to market makers inventories.

As a result, ETFs in a market crisis can in fact improve overall market liquidity and pricing discovery rather than hampering it.

Conclusion

In assessing ETF market behaviour during the COVID-19 market turbulence, there remains little doubt that ETFs performed as expected providing investors with a cost effective vehicle to express their investment view during the crisis, and the period saw a big growth in ETF users.

While the trading cost did increase this was expected due to increased pricing/hedging risk and costs of creations/redemption. But the important point was that there was liquidity for investors to buy and sell on the exchange.

Policymakers and industry participants can take comfort from these positive outcomes, and going forward recognise the key role that ETFs will likely play again during any future extreme market events.

Glossary

- COVID-19 period is defined as the global stock market crash that began on 20 Feb 2020 and ended on 23 March 2020.

- Normal period is defined as the period between 1st Jan 2019 to 31st Dec 2019.

- Tracking difference is the difference in return between an ETF and its benchmark over a certain period of time.

- Tracking Error measures the standard deviation of the differences between the daily fund NAV return and the benchmark return.

  Tracking Error = $\sqrt{\frac{\sum_{i=1}^{n}(R_f - R_b)^2}{N-1}}$

  Where:

  R_f = Daily ETF NAV return

  R_b = Daily benchmark price return

  N = number of days

- Average daily trading Volume measures the average number of shares traded on the ASX during a period.

- Daily number of trades measures the total number of trades per day for an ETF.

- Average spread is the average of all bid and ask spreads taken as a percentage of the mid-price.

  Average Spread = $\sum_{i=1}^{n} \frac{(Ask_i - Bid_i)}{Mid_i}$ x 100

  Where:

  n = number of valid bid-ask points on that day

- Premium and discount measures the percentage difference of an ETF's daily close price and its net asset value.

- Net asset value for an ETF is determined by subtracting the liabilities from the ETF's liabilities from the ETF's assets, and dividing that figure by the number of outstanding shares.

- Fund flow calculates the net value of all creation and redemption activities for an ETF over a period.

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CONTACT

Victor Huang
victor.huang@milliman.com

Bryan Chen
bryan.chen@milliman.com