

Exchange Traded Funds

Assessing the benefits, drawbacks and potential dangers

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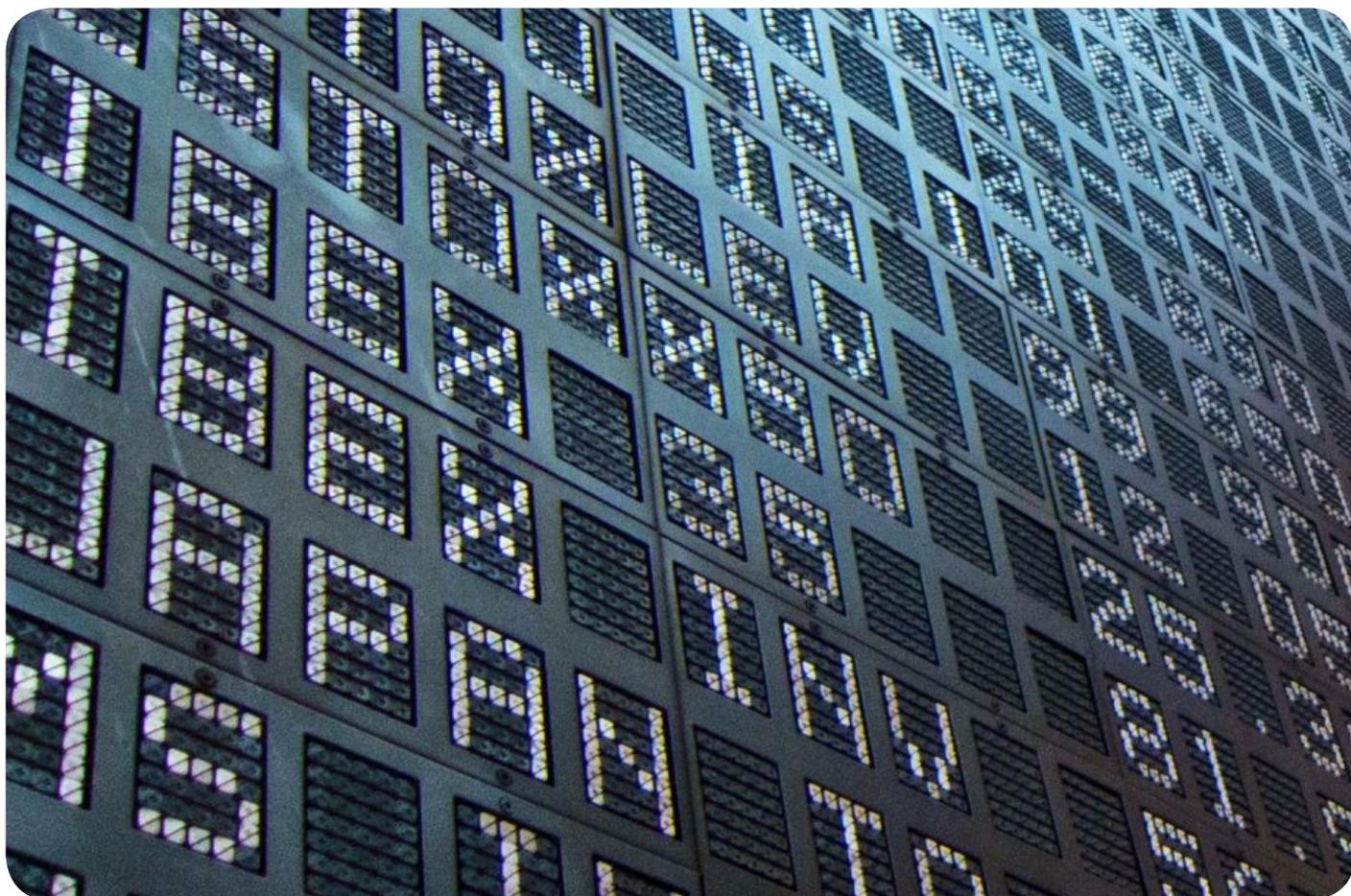


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Executive summary

Exchange-traded funds (ETFs) are no longer the simple, transparent products they once were.

While originally conceived as a cost efficient alternative to traditional asset management, which was frequently found to miss even its basic objectives, ETFs have since mutated into complicated, leveraged structures where investors have often unknown exposures to large investment banks. As a result, derivatives are being sold to the general public, despite people not having the expertise to understand that this will often result in the return on their investment differing significantly from the return on the underlying market that their money is tracking. While comparisons with the ill-fated Collateralised Debt Obligations (CDO) market exaggerate the risks to the global financial system currently posed by these products, the ETF industry is nevertheless in urgent need of reform. The products are typically not transparent, and many should no longer be marketed to the general public.

Mis-selling products

The first ETFs attempted to mimic the performance of major indices, such as the FTSE 100, by simply buying the appropriate mix of shares. However, nowadays, ETFs often enter into off-exchange derivatives contracts with investment banks. This means that (a) the performance of the fund will frequently differ from that of the advertised index it is tracking; and (b) many investors are unaware that their investment is dependent on the financial health of major investment banks.

ETFs that track commodities provide another example. These funds buy 'futures contracts', a type of derivative that must be 'rolled over' periodically, if investors are to avoid having the commodity delivered to their doors. This rolling process is often highly expensive, and can result in investors losing money, even when the price of the commodity itself has increased. More to the point, what percentage of the public who have bought such ETFs understand 'rolling', and how it may impact on their investment?

It is irresponsible and inappropriate to sell complicated products to the general public, which they are highly unlikely to ever fully understand. Unfortunately, such practices are currently widespread in the ETF industry.

Lack of transparency

ETFs that use derivatives can leave investors exposed to large investment banks. If such a bank goes bust, the public may lose their ETF investments, or be left with collateral that sometimes has no relation to the market they believed they were invested in. However, very little information is currently provided to investors about such a scenario. For example, investors are not typically informed of which investment banks they are exposed to, and what type of collateral the ETF is prepared to accept from its counterparties.

In a bid to boost fund-manager returns, many ETFs now lend investors' assets out to banks and other financial institutions. While such lending is generally very short term and collateralised, and, thus, is low risk, the ETF generally provides very little information as to how the proceeds are split between fund investors and fund managers. As a result, fund managers may frequently be taking the lion's share of the returns, despite it being investors who are shouldering the risks.

Interference with the smooth-running of markets

There are concerns that ETFs may be disrupting markets that are typically less popular with investors, such as those for small companies or emerging markets. This is because ETF investment may be a significant percentage of total investment in such markets. ETFs buy all, or a selection, of the stocks in

an index, rather than pick stocks on a basis of their individual merits. Thus, if ETF investment is a significant driving force in a market, then this may interfere with market discipline, where well-managed companies should see the price of their stock rise and, in contrast, poorly-managed companies should decrease in value.

Similarly, there is a risk that speculative ETF investment is interfering with the smooth-running of commodities markets. While the debate as to whether or not speculation impacts on food prices is on-going, regulators should surely err on the side of caution and be careful not to prioritise investor's interests over the stability of these vitally important markets. Whilst speculation undoubtedly can bring valuable liquidity to a market and help smooth volatility, speculators now constitute the majority of participants in many commodities markets. A cursory glance through economic history, at the many bubbles and crashes that have occurred, demonstrates that speculators often seriously misprice assets, and regulators should thus be taking this threat seriously.

Build-up of risk in the financial system

Regulators have already begun to issue warnings that investment banks may not be able to cope if investors pull out en-masse from an ETF. In addition, there are concerns that investment banks may be relying on ETFs for cheap funding, for example, by posting undesirable collateral to them. If this is the case, then investment banks may suffer a funding shock if a large number of investors pull out of such funds.

ETFs also magnify the interconnectedness of investment banks with the rest of the financial system. For example, members of the general public may have direct exposure to major investment banks, and could lose their investment, or a significant percentage of it, if such a bank failed.

While investment in ETFs remains a small percentage of, for example, investment in traditional mutual funds, it is unlikely that the industry poses a large risk to the financial system. However, if ETFs continue to grow in popularity at the rate seen in recent years, this may soon no longer be the case.

A window of opportunity for reform

Regulators from around the world have already issued warnings about ETFs, and, as the industry continues to be in the spotlight in the aftermath of the rogue ETF trader at UBS, there is currently a real opportunity for meaningful reform. If these hopes are realised, then ETFs could once again be the simple, transparent investment vehicle they were originally conceived as, rather than the cause for concern they have since mutated into.

Summary of Recommendations

Physically backed ETFs still retain many advantages over mutual funds. However, there are some pitfalls to watch out for.

Summary of recommendations for investors

For example, management fees are often excessive given what such funds actually do, and tracking errors, which result from ETFs purchasing only a sample of the stocks in an index, can also be significant. Furthermore, there are concerns that when tracking illiquid markets, ETFs are not actually passive at all. For example, ETFs may be increasing the correlation between stocks, and thus, undermining the corporate governance function that stock markets are supposed to perform. Similarly, investors should not be fooled by the illusion that ETFs can transform the illiquid into the liquid. This is akin to alchemy, and, in reality, ETFs that track illiquid markets are only liquid as long as investment banks are prepared to make markets in these assets. As demonstrated by the 'Flash Crash' of 2010, in times of high volatility one can't take such liquidity for granted.

Some questions that investors should try to get answers to before investing in physically backed ETFs include: (a) whether or not the fund buys all components of an index, or merely a selection; (b) whether or not the fund lends out the assets purchased; (c) if so, what percentage of the proceeds from securities lending goes to fund investors, and what percentage goes to the fund provider; and (d) what the resulting counterparty risks are. However, some of this information may be difficult or impossible to find. For example, very few funds currently disclose how the proceeds from securities lending is split.

When investing in synthetic ETFs, investors should understand that they have effectively swapped tracking error for counterparty risk. Thus, counterparty and collateral risks pose a threat to investors, and some questions that investors should try to get answers to before investing in synthetic ETFs include: (a) to what extent the trades are collateralised with each swap-counterparty; (b) what type of collateral the fund accepts from each swap-counterparty; (c) who the swap-counterparties are; (d) is the collateral received in lent out; (e) if so, how are the proceeds of this securities lending split between fund investors and the fund provider? However, some of this information may be difficult or impossible to find. For example, very few funds currently disclose who their swap counterparties are. It is also worth investors remembering that if an ETF is an Undertakings for Collective Investments in Transferable Securities (UCITS) fund then they are guaranteed a given level of protection. For example, at least 90 per cent of any derivatives trade with an investment bank must be collateralised. However, investors should be warned that the UCITS directive does not specify what type of collateral funds should accept.

In general, investors should be wary of investing in synthetic ETFs if they aren't familiar with the concept of daily swap rebalancing. The latter can result in a fund's return deviating significantly from the return of the underlying index that the fund is tracking, if the investment is held for more than one day. Moreover, the more volatile the market, and the longer the investment is held for, the larger these differences are likely to be. In particular, retail investors should avoid leveraged ETFs, as the associated leveraged will further exacerbate the severity of any unpleasant surprises. **Leveraged ETFs should be thought of as very short-term, speculative products that shouldn't be used by anyone focussed on long-term investment strategies.**

It would also be wise for investors to avoid actively managed ETFs, at least for now. This market is currently essentially untested, and faces many potential hurdles. For example, will the industry be able to attract good fund managers, and will the fact that these funds are more transparent than mutual funds lead

to front running? Alternatively, will the fact that such funds are less transparent than traditional ETFs lead to a break down in the arbitrage mechanism between ETF units and the underlying securities? No sensible investor should want to be a guinea pig! Furthermore, as these funds are essentially new, few have established track records for investors to look at and compare with other funds. Finally, it is worth remembering that the ETF industry originally arose out of claims that the mutual fund industry was not delivering on its promise of being able to outperform markets. It is, thus, somewhat bizarre that ETFs themselves are venturing into the world of active fund management.

With regards to synthetic Exchange-traded commodities (ETCs), there is an ongoing, extensive debate about whether or not these funds are really passive at all, or if they are, in fact, increasing food prices and volatility. It is very difficult to come to a conclusion based on the empirical evidence currently available, but theoretical links do exist. Ultimately the debate appears to come down to the question: 'are markets always efficient? Or do they sometimes make mistakes?' Very few people would disagree with the fact that speculation has, in many instances throughout history, disrupted other markets; however, some still maintain that completely free commodities market can be trusted to always reflect supply and demand fundamentals. Given the high levels of speculation in some commodities markets, we would recommend that caution is prioritised over investors' financial interests. Thus, **we advise that responsible investors should avoid such funds, as the associated risks simply cannot be justified in light of the vital importance of, for example, food and energy markets.**

However, in addition to the moral concerns listed above, there are also cost issues associated with synthetic ETCs. For example, management fees are typically quite large, and investments may be eroded via negative roll yields. Unfortunately, just because a market exhibits backwardation today, does not automatically mean that it will do so next week. Furthermore, these costs could be exacerbated by hedge funds exploiting the opportunity to 'pre-roll'. It is unlikely that retail investors will fully understand the dynamics of rolling futures contracts, and how this may affect their returns. Consequently, **we recommend that retail investors avoid synthetic ETCs.**

Concerns have also been expressed that physically backed ETCs might exacerbate any existing shortages in metal markets, which, in the case of base metals, may increase costs for the construction and manufacturing industries, and, in turn, have knock-on effects on the real economy. Thus, **investors should avoid markets with current or predicted shortages.** Moreover, avoid any base metals markets where physically backed ETC investors make up a large percentage of total investors. However, this currently isn't the case for any base metal market, and is unlikely to become so, as storage charges for base-metals ETCs are often prohibitively expensive.

Investors should also always investigate the aforementioned storage fees before investing in base metals. How much would the market need to rally for you to even simply break even? For many base metals, such as aluminium, you would have to be extremely bullish for long-term investment to be sensible. Investment in such metals may only be viable when one is dealing with a very short investment time horizon, and retail investors generally should not be attempting short-term, speculative investment.

In sum, it appears that **physically backed ETCs that invest in precious metals, such as gold, silver, platinum and palladium, may be viable additions to an investment portfolio.** In contrast, physically backed ETCs that invest in base-metals, such as copper, aluminium, zinc and nickel, should most probably be avoided, for reasons varying from high storage cost to concerns that any profits accruing to you may be coming at the expense of the real economy.

Summary of recommendations for regulators

ETFs are currently generally perceived to be simple, transparent products. While some ETFs undoubtedly are, there is a danger that retail investors will automatically assume that this is true of the entire spectrum of products available.

The European Securities and Markets Authority (ESMA) is currently exploring the possibility of explicitly labelling some ETFs as 'complex', "for the purposes of the appropriateness test". This is a welcome development, as it is time for regulators to seriously question whether it is really appropriate for synthetic ETFs to be marketed to retail investors. Will retail investors be able to understand why daily rebalancing can introduce tracking errors? Will they appreciate that these tracking errors are exacerbated by volatility? This is more than just an academic point, as some funds have deviated significantly from the returns a naive investor would have expected. For example, some leveraged funds have lost money despite the underlying market rallying. We hope that when ESMA has completed its consultation, it will conclude that changes are necessary, and that other regulators will, in turn, follow suit.

If regulators disagree and feel that such action would be excessively draconian, at the very least **ETFs must be sold with very clearly displayed warnings that the fund's returns may differ significantly from that of the market being tracked.** This information must not simply be buried in the fund's prospectus; it must be prominently displayed on all marketing screens and material.

ESMA is also considering making it mandatory for an ETF's type, e.g. physical, synthetic or active, to be explicitly stated in the fund's name. This suggestion also has a lot of merit, but it must be accompanied by a prominently displayed explanation as to what, for example, an actively managed ETF is. Once again, this information must not be buried deep in a prospectus.

For physical ETFs, regulators must ensure that funds explicitly disclose the following: (a) whether or not the fund buys all components of an index, or merely a selection; (b) whether or not the fund lends out the assets purchased; (c) if so, what percentage of the proceeds from securities lending goes to fund investors, and what percentage goes to the fund provider; and (d) what the resulting counterparty risks are. **Regulators should also consider mandating that instead of investors being allowed to 'opt-out' of securities lending, they instead have to 'opt-in' before the fund is allowed to use their assets in this way.**

Some physical ETFs also suffer from very large tracking errors as a result of only buying a selection of an index. Whilst a moderate amount of tracking error is understandable, some funds miss their targets to a very significant degree.

Regulators should consider imposing a threshold for tracking errors, and, if this threshold is breached, the fund should then not be allowed to market itself as a 'tracker'.

For synthetic ETFs, regulators must ensure that funds explicitly disclose the following: (a) to what extent the trades are collateralised with each swap-counterparty; (b) what type of collateral the fund accepts from each swap-counterparty; (c) who the swap-counterparties are; (d) is the collateral received in lent out; (e) if so, how are the proceeds of this securities lending split between fund investors and the fund provider? Regulators should also consider imposing a minimum number of swap counterparties that a synthetic ETF must have in order to be authorised. This would help reduce the extent that investors are exposed to any given investment bank.

Regulators should also monitor the size of the synthetic ETF industry in comparison to, for example, the mutual fund industry. As ETF assets under management increase, so do the chances of ETFs becoming a source of systemic risk.

ETFs should only be allowed to accept very liquid, easy to independently value collateral, such as cash, and government bonds issued by the major economies, e.g. Treasuries, Gilts, Bunds, and Obligations Assimilables du Trésor (OATs). Or alternatively, the collateral should closely mimic the underlying index being tracked. Ensuring that swap-counterparties can only post high-quality collateral would also protect against banks becoming reliant on cheap funding via posting illiquid securities as collateral to their in-house ETFs. This would help minimise the funding shock that an investment bank would incur in the event of

an en masse withdrawal from a synthetic ETF. The ETF should also impose haircuts on the collateral it receives from swap counterparties if their credit ratings fall below a given (high) level. Non-European regulators should also be guided by the UCITS framework, in the sense of mandating a high overall level of collateralisation (UCITS specifies that 90 per cent of an ETF's investment must be collateralised).

Regulators should be aware that ETFs are particularly vulnerable to panic selling during a sell-off, as they can be sold intra-day, unlike mutual funds. **Regulators should thus consider introducing circuit breakers into ETF markets** in anticipation of such events. In fact, some regulators, such as the US Securities and Exchange Commission (SEC), have already started to do this.

Also, as seen during the 'Flash Crash', market makers may withdraw liquidity during volatile times, which means that the arbitrage mechanism, through which the price of an ETF unit is kept in line with the value of the underlying securities, may break down. The chance of this occurring decreases as the number of market makers increases. Thus, **regulators should perhaps consider imposing a minimum number of 'authorised participants' that each ETF must have in order to get authorisation.**

Regulators should seriously question whether retail investors will be able to understand concepts such as 'roll yield' and, crucially, how roll yield can impact on their investment. We believe this is highly unlikely and thus **we recommend that regulators do not permit the marketing of futures-based ETCs to retail investors.**

Furthermore, while the debate as to whether or not speculation impacts on food prices is on-going, regulators should surely err on the side of caution and be careful not to prioritise investor's interests over the stability of these vitally important markets. Whilst speculation undoubtedly can bring valuable liquidity to a market and help smooth volatility, speculators now constitute the majority of participants in many commodities markets. A cursory glance through economic history, at the many bubbles and crashes that have occurred, demonstrates that speculators often seriously misprice assets. Thus, taking this threat seriously **regulators should impose precautionary position limits on speculation.** The aim should not be to eliminate speculation, but rather to ensure that speculation is "as bubbles on a steady stream of enterprise."

Similarly, many analysts argue that investment in physically backed ETCs can help fund the storage of metals that are in greater demand in the future than they are today. However, many others maintain that, as ETC investors are not 'sophisticated' investors, they may continue to buy even when the market is suffering from a near-term shortage. For precious metals, this is less of a concern, but for base metals, this could increase costs for the construction and manufacturing industries, and thus have knock-on effects in the real economy. While ETC investment is currently only a very small percentage of total investment in base metals, this risk is negligible. However, regulators should monitor this ratio, and, in addition, the ratio of total speculators to physical users. If speculation begins to dominate base-metal markets to the extent already seen in some agricultural futures markets, regulators should consider imposing position limits on speculators. In particular, if base-metals ever become a substitute for gold, i.e. if they start benefiting from flights to quality or being used as a hedge against inflation, speculative position limits should be introduced.

If any ETF providers introduce physically backed ETCs that track agricultural commodities, regulators should not authorise such funds. There is too great a risk that ETF investment may exacerbate existing shortages, and, when dealing with food markets, this risk is simply unacceptable.

Finally, when considering ETCs, there is another issue on the radar: how cost efficient are such investments? To help the public invest their money wisely, **regulators should ensure that ETC providers explicitly provide details on how much a given fund lost or gained the previous year as a result of roll yield. Or, for physically backed ETCs, what the storage and insurance costs were for the previous year.**

Summary of recommendations for ETF providers

A key quality of ETFs is that they are supposed to be highly transparent. However, in the wake of the innovation in recent years, this basic principle appears to have been forgotten. Thus, **the top priority of any responsible ETF provider should be to increase the information available to investors, and to ensure that the key facts for each fund are highly accessible.**

For example, a warning that the return on a synthetic ETF can vary significantly from the return on the underlying market, if the investment is held for more than one day, and that such discrepancies are exacerbated by volatility in the underlying market, should be prominently displayed on all ETF marketing material and screens. It should also be made explicitly clear in a fund's name whether the fund is physically backed, synthetic, leveraged or active. ETF providers should also think about suitability. Is it very probable that retail investors will be able to understand the mechanics of daily swap rebalancing or roll-yield when dealing with commodities futures? A responsible provider should ensure that such funds are marketed with a warning along the lines of: "This is a complex, derivatives-based product, which is only suitable for very experienced investors."

For physical ETFs, providers must ensure that all their funds explicitly disclose the following: (a) whether or not the fund buys all components of an index, or merely a selection; (b) whether or not the fund lends out the assets purchased; (c) if so, what percentage of the proceeds from securities lending goes to fund investors, and what percentage goes to the fund provider; and (d) what the resulting counterparty risks are. Responsible fund providers should also ensure that instead of investors being allowed to 'opt-out' of securities lending, they instead have to 'opt-in' before the fund is allowed to use their assets for such a purpose.

For synthetic ETFs, providers must ensure that all their funds explicitly disclose the following: (a) to what extent the trades are collateralised with each swap-counterparty; (b) what type of collateral the fund accepts from each swap-counterparty; (c) who the swap-counterparties are; (d) is the collateral received in lent out; (e) if so, how are the proceeds of this securities lending split between fund investors and the fund provider? Having multiple swap counterparties for each fund will also help reduce investors' exposure to any individual investment bank.

ETF providers should also work hard to negotiate good terms with the funds' trading partners. For example, credit support annexes (CSAs) should specify that the ETFs will only accept very liquid, easy to independently value collateral, such as cash, and government bonds issued by the major economies, e.g. Treasuries, Gilts, Bunds, and OATs. Or alternatively, the collateral should closely mimic the underlying index being tracked. Similarly, haircuts should come into effect if the credit rating of a counterparty falls below a given, high threshold.

ETF providers should also ensure that all of their funds have many 'authorised participants'. This will help minimise the chances of arbitrage between ETF units and the underlying shares breaking down, a risk in times of extreme volatility, as seen during the 'Flash Crash'.

For obvious reasons, it is of paramount importance that food markets work as well as possible, and all other concerns should be subordinate to this. The recent global financial crisis has shaken most people's faith in the hypothesis that free markets can always be relied upon to be self-regulating and efficient. Given the many high profile failures in other markets, it is both bizarre and worrying that some still maintain that unconstrained commodities markets can be relied upon to reflect the underlying fundamentals of supply and demand. Although there is currently no widely accepted consensus on whether or not speculation is interfering with the functioning of commodities markets, it is a theoretical possibility. **ETF providers should think carefully about whether or not they are comfortable taking the risk that they may be contributing**

towards disruption in the food markets. Surely the responsible approach is to err on the side of caution. However, if regulators impose position limits on speculators, to protect against markets becoming dominated by speculation, then ETC providers can be less concerned with the issues raised above.

With base metal physically backed ETCs, many commentators argue that the market is incentivising investors to store physical commodities, as prices reflect the fact that these resources are needed more in the future than in the present. However, there are serious doubts as to whether ETC investors are savvy enough to respond to the market signalling that there is a near time shortage. If such fears are realised, then ETC investment could exacerbate such shortages, which could increase costs for the manufacturing and construction industries, and, in turn, impact on the rest of the economy. Thus, once again, **responsible fund providers should consider whether offering base metal physically backed ETFs is appropriate.** If base metal ETCs increase in popularity, this question will become all the more relevant.

Even if an ETC provider has complete confidence in the efficiency of free markets, it is also worth thinking about the reputational risks that might be incurred as a result of participation in the commodities speculation industry.

Finally, when considering ETCs, there is another issue on the radar: how cost efficient are such investments? To help the public invest their money wisely, **providers should explicitly provide details on how much a given fund lost or gained the previous year as a result of roll yield. Or, for physically backed ETCs, what the storage and insurance costs were for the previous year.**

1. Introduction

Exchange-traded funds (ETFs) were first developed in Canada in 1990, before launching in the USA and Europe in 1993 and 2000, respectively.¹

The rise of ETFs

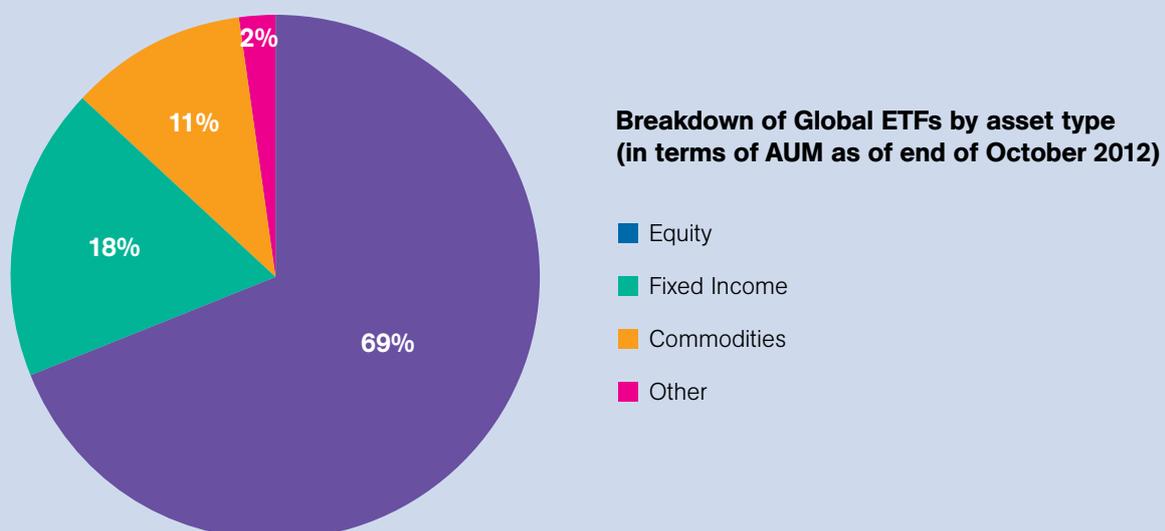
Originally ETFs just tracked equity markets, but in 2000 fixed income ETFs were introduced, followed by commodities ETFs in 2001. Figure 1 shows the global breakdown of ETFs across asset classes as of the end of October 2012. There are now over 3900 ETFs on offer, yet 80 per cent of these are supplied by only six ETF Providers.² Assets under management have increased 349 per cent in a period of five years, to \$1,839 bn in 2012.³ Although ETFs still have yet to truly rival mutual funds, as the former are currently only 6 per cent of the size of the latter, the rate at which ETF assets under management have grown over the past decade (approximately 40 per cent per year), completely eclipses growth rates in the mutual fund industry (approximately 5 per cent per year).⁴

Recent estimates anticipate that the amount of US ETF assets under management will reach \$2,000 bn by 2015.⁶ Moreover, many market commentators predict that actively managed ETFs will soon become very popular.⁷

The rise of ETFs can partly be attributed to perceived failings of the US mutual fund industry, and the emergence of empirical studies concluding that mutual funds generally struggle to fulfil their mandate, i.e. they struggle to out-perform the market. For example, a report from Harvard Business School found that:

The evidence on mutual fund performance discussed above indicates not only that these 115 mutual funds were on average not able to predict security prices well enough to outperform a buy-the-market-and-hold policy, but also that there is very little evidence that any individual fund was able to do significantly better than that which we expected from mere random chance. It is also important to note that these conclusions hold even when we measure the fund returns gross of management expenses (that is assume their bookkeeping, research, and other expenses except brokerage commissions were obtained free). Thus on average the funds apparently were not quite successful enough in their trading activities to recoup even their brokerage expenses.⁸

Figure 1. Breakdown of Global ETFs by asset type.⁵



However, despite such findings, over 96 per cent of American mutual funds are 'actively managed'.⁹ This led many investors to conclude that if one cannot consistently beat the market, one should instead simply try to track the market. This is exactly what ETFs were originally developed to do.

An ETF attempts to track a given asset or baskets of assets. For example, ETFs often track indices, such as the FTSE 100. Like mutual funds, ETFs hold assets that belong to a pooled group of individuals. Physically backed ETFs buy and hold the stocks or bonds in the index that the ETF is tracking. By contrast, synthetic ETFs invest in derivatives in order to gain exposure to a market.

Role of market makers

Market makers carry out the creation and redemption of ETF units in the market, and are usually investment banks. The ETF provider, often a fund management company, holds the underlying securities that back the Fund.

Market makers who have been deemed 'authorised participants' can buy 'creation units' from the ETF provider in exchange for the underlying shares, in the case of a physically backed ETF, or cash, in the case of a synthetic ETF. (The terms 'physically backed' and 'synthetic' ETFs will be explained in detail later on in this report.) Similarly, market makers can redeem creation units and receive the underlying shares back from the ETF provider. Market makers then sell ETF units on to other investors. Table 1 shows the top ETF providers globally, in the USA, and in Europe, and Table 2 shows the main market makers in American ETFs.

Table 1. Top ETF providers.¹⁰ AUM = Assets under management.

Top Global ETF Providers (as of end of October 2012)			
Rank	Provider	AUM [\$bn]	% of total American AUM [\$bn]
1	iShares	\$718.9	39.1%
2	State Street Global Advisors	\$319.6	17.4%
3	Vanguard	\$232.5	12.6%
4	Powershares/Deutsche Bank	\$72.7	4.0%
5	Db x-traders/ db ETC	\$49.0	2.7%
6	Lyxor Assets Management	\$40.8	2.2%
7	ETF Securities	\$29.6	1.6%
8	Van Eck Associates Corp	\$28.5	1.5%
9	ProShares	\$22.3	1.2%
10	Nomura Asset Management	\$21.2	1.2%

Top American ETF Providers (as of end of October 2012)			
Rank	Provider	AUM [\$bn]	% of total American AUM [\$bn]
1	iShares	\$529.8	41.1%
2	State Street Global Advisors	\$302.9	23.5%
3	Vanguard	\$231.9	18.0%
4	Powershares/Deutsche Bank	\$70.3	5.5%
5	Van Eck Associates Corp	\$28.5	2.2%
6	ProShares	\$22.3	1.7%
7	Wisdom Tree Investments	\$16.8	1.3%
8	Guggenheim Funds/Rydex SGI	\$11.8	0.9%
9	BNY Mellon	\$9.3	0.7%
10	PIMCO	\$ 8.4	0.6%

Top European ETF Providers (as of end of October 2012)			
Rank	Provider	AUM [\$bn]	% of total American AUM [\$bn]
1	iShares	\$129.8	37.1%
2	db x-trackers/db ETC	\$48.1	13.8%
3	Lyxor Asset Management	\$40.5	11.6%
4	ETF Securities	\$24.8	7.1%
5	Credit Suisse Asset Management	\$17.2	4.9%
6	Zurich Cantonal Bank	\$16.2	4.6%
7	UBS Global Asset Management/UBS AG	\$14.0	4.0%
8	Source Markets	\$12.0	3.4%
9	Amundi ETF	\$10.8	3.1%
10	Swiss&Global	\$6.9	2.0%

Table 2. Top American ETF Market Makers.¹¹

Top American ETF Market Makers (as of end of June 2011)		
Rank	Provider	% Market Share
1	Credit Suisse	13.3%
2	Knight Securities	11.3%
3	BofA Merrill Lynch	10.0%
4	UBS	9.8%
5	Barclays Capital	7.4%
6	Citigroup Global Markets	6.2%
7	JPMorgan Chase Bank	5.1%
8	Deutsche Bank Securities	4.5%
9	MF Global	4.4%
10	Citadel Securities	4.0%

It is via this creation and redemption process that any deviations in the value of the ETF and the value of its composite shares are theoretically arbitrated away by market makers. For example, consider the case where the price that ETF units are trading at in the secondary market is higher than where it should be when compared to the underlying stocks. In such situations, market makers will buy the underlying stocks, deliver them to the ETF provider in exchange for ETF units, and then sell these ETF units in the secondary market. This selling will depress the price at which ETF units are traded in the secondary market, and this process will continue until the ETF units are trading at their appropriate level. Thus, ETFs are reliant on efficient market arbitrage between ETF creation units and the underlying stock to ensure that the value of an ETF reflects the value of the underlying shares. In short, the value of an ETF is a function of the supply and demand of existing ETF units, in addition to the creation and redemption of ETF units.

Comparing ETFs with mutual funds

Other than providing an accessible way to track the market instead of attempting to beat it, there are a number of differences between ETFs and mutual funds:

1. ETFs are traded on exchanges, like stocks. Thus, ETFs have an advantage over mutual funds in that they can be traded intra-day, rather than just at the end of the day.
2. ETFs are also generally cheaper than mutual funds, not just because management fees are often lower (as management is generally passive rather than active), but also because all other investors in an ETF do not incur trading costs every time an investor buys into or leaves the fund. Similarly, all other investors do not see capital gains or losses every time a given investor leaves the fund, and so are not subject to capital gains tax as frequently as investors in mutual funds are.
3. As ETF units can be traded like shares, this allows investors to pursue investment strategies they might otherwise not have access to. For example, by short selling ETF units, one is effectively going short an index. Investors can also trade using limit orders, etc. Such strategies cannot be deployed when investing in mutual funds.
4. As ETF units can be traded like shares, options and other derivatives based upon ETFs can be created.

Excluding the capital gains tax perks, ETFs also have these advantages over British unit trusts.

It is also worth keeping in mind that mutual funds and unit trusts are subject to a sales commission, which is generally a fixed percentage of the deal, whereas ETFs are subject to brokerage fees. This means that fees are proportionate to the size of the investment in unit trusts, but investing a lot of money into an ETF is much more cost-effective than investing only a small amount.

Potential risks of ETFs

As ETFs have grown more and more prominent, many have begun to wonder about the risks that they may pose, not just to individual investors, but also to the financial system as a whole. Moreover, while ETFs started off as transparent 'vanilla' funds that simply purchased a given set of assets, as a result of innovation they have since evolved into very different creatures altogether.

The list of regulatory bodies and central banks to have raised concerns about the industry now includes:

- Financial Stability Board (FSB)¹²
- US Securities and Exchange Commission¹³
- The UK's Financial Services Authority¹⁴
- Hong Kong Securities and Futures Commission¹⁵
- Reserve Bank of Australia¹⁶

This report explores these concerns, and provides practical investment advice to asset managers considering using ETFs as part of their investment strategies.

2. Physically backed ETFs

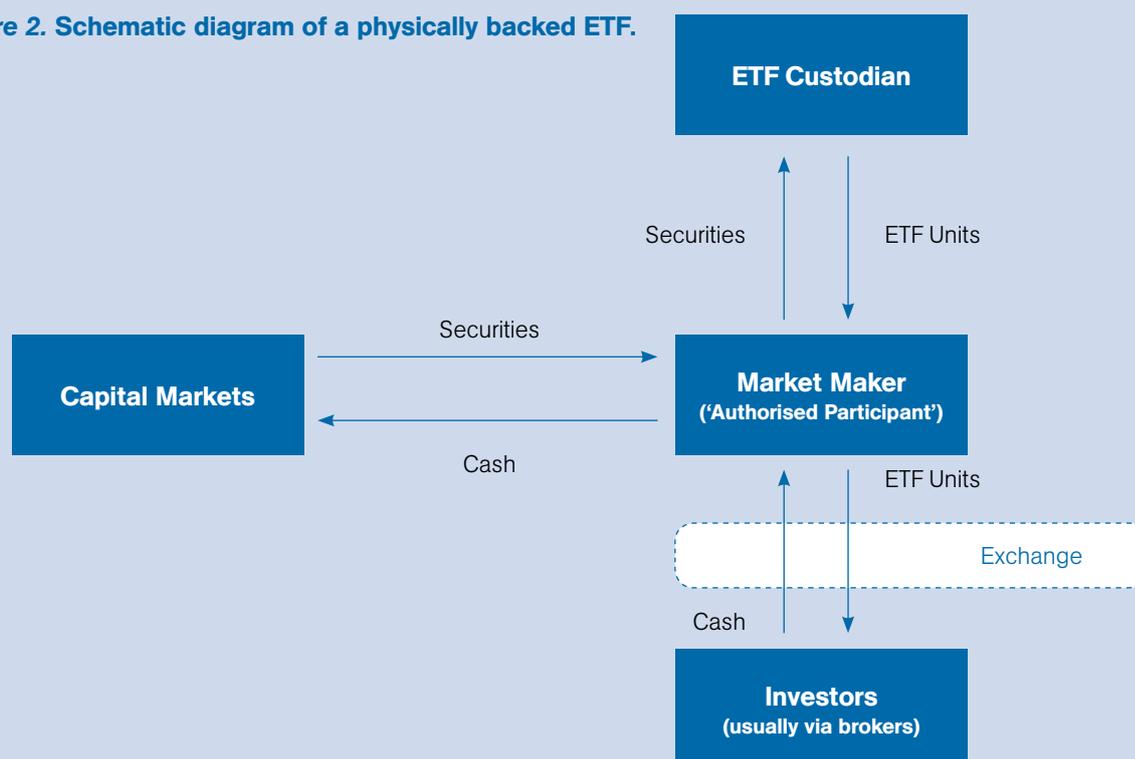
Physically backed ETFs buy and hold the stocks or bonds in the index that the ETF is tracking. Figure 2 shows how physically backed ETF units are created by market makers and then sold to investors.

Risks to investors

In theory, these ETFs should be extremely cheap, as they simply passively track a given market. However, in reality, fees vary enormously, even for ETFs that track large, liquid indices. For example, the fees associated with ETFs that track the FTSE 100 have been reported to vary by 1.7 percentage points from one fund to another.¹⁷ Thus, the first thing that a prospective investor should consider, is whether or not the fees for a given ETF are appropriate, as in many cases they may not be.

The second factor for an ETF investor to consider is whether or not their investment is actually passive at all. In other words, does large-scale ETF investment impact the underlying markets that they are supposedly tracking? For example, correlation arises out of the arbitrage process, whereby arbitrageurs will trade the underlying stocks versus ETF units until the ETF is trading at its appropriate value. Whilst this mass buying or selling of the underlying stocks may have little effect on a very liquid index, such as the FTSE, the same cannot be said for an illiquid market, such as a small-cap market. Moreover, small-cap companies do not have the same level of research analyst coverage that their larger counterparts do, so market participants are less likely to notice and exploit the arbitrage opportunity if their share prices start to no longer reflect fundamentals. In fact, some have suggested that this divorce of small-cap share prices from fundamentals may be discouraging small-cap companies from listing at all. These concerns are not merely academic; for example, as of the end of October 2012, there were \$51.5 billion AUM in ETFs tracking US small-cap equity markets.¹⁸ Furthermore, as of the end of October 2012, 12.9 per cent of all ETF AUM globally were tracking emerging equities markets.¹⁹

Figure 2. Schematic diagram of a physically backed ETF.



The International Monetary Fund (IMF) has issued a warning about such dynamics:

The disproportionately large size of some ETFs compared with the market capitalization of the underlying reference indices poses a risk of disruptions in some markets from heavy ETF trading.²⁰

In addition, some market commentators are concerned that as ETFs become increasingly popular, we may observe such disruption in large-cap markets as well and, in fact, there have already been such reports. For example, 2009 and 2010 saw the correlations between large-cap stock prices at their highest levels since 1929, and JP Morgan has named the 'increased use of index based products' as a key factor behind this trend'.^{21, 22}

For these reasons, there is evidence to suggest that responsible investors should steer clear of physically backed ETFs that track illiquid markets, to ensure that any investment they make is truly passive. Furthermore, investors tracking large-cap markets should keep an eye on reports of disruption in these markets.

Investors should also be aware that many physically backed ETFs may not be packaged exactly as they may have assumed. For example, while initially a physically backed ETF would buy shares in all the companies listed in a given index, as the industry has evolved, it has become commonplace for ETFs to purchase only a selection of the shares in an index. This makes investment cheaper, which may translate into lower fees and higher ETF returns. However, it is important to note that an ETF that physically replicates only a subset of an index may not actually mimic the index accurately. This is called 'tracking error', and such errors can, in fact, be very large. For example, Deutsche Bank has observed that:

Presently, an index fund can have a consistent tracking error of 10 per cent compared with its stated benchmark and still be allowed to be called a tracker.²³

There is also evidence to suggest that investors should be wary of the historical tracking error quoted in an ETF's prospectus. For example, research from the University of Bristol found that, when varying the reference days chosen for calculating an ETF's return, the latter could change by up to 5 per cent.²⁴ In addition, one of the co-authors warned that many ETFs have very short track records. There are doubts as to whether or not such records can be used to predict a fund's future performance anyway:

A lot of newer assets like ETFs don't have a long returns history ... Even if you calculate things over five years, it's still a problem. You need so many years of data for it to become stable that it essentially becomes meaningless ... When factsheets quote beta based on three years' data, I really don't take any notice at all ... Performance data is only historic and that, as we know, is no indication of the future.²⁵

Investors should note that no ETF is completely without tracking error, as fees alone mean that an ETF will never perfectly track an index. However, that being said, the more illiquid the underlying market is, the larger an ETF's tracking error would be expected to be.²⁶ For example, ETFs following emerging markets can suffer from tracking errors that approach 18 per cent.²⁷ ETFs tracking illiquid market also generally have significantly larger management and brokerage fees.

In addition to purchasing only a selection of the shares in a given index, as time progressed, ETF providers realised that they could further increase their returns by lending out the assets held by the fund. As a result of this 'securities lending', such ETFs do not qualify as Unit Investment Trusts in the USA. However, interestingly, they can qualify as Undertakings for Collective Investments in Transferable Securities (UCITS) funds in the EU.

Increased competition and slight margins in the ETF market have encouraged ETF sponsors to use securities lending to boost returns, and the benefits of this may be passed on to investors via lower fees. In fact, the FSB reports that some ETF

sponsors generate more revenue from securities lending than from traditional management fees.²⁸ Consequently, most physically backed ETFs now deploy such tactics.

While ETF investors may benefit from securities lending, it also introduces additional risks. For example, securities lending means that ETF investors are exposed to further counterparty risks, and the FSB has warned investors of this:

Since securities lending is a bilateral collateralised operation, it may create similar counterparty and collateral risks to synthetic ETFs.²⁹

There is also a lack of transparency surrounding the securities lending process. The fees that an ETF sponsor earns from securities lending are generally not explicitly disclosed to investors. Neither is the percentage of such fees that are passed on to fund investors. Currently, many investors should be concerned that they are not being adequately compensated for securities lending, a process that increases the risks inherent to an ETF in order to bring in additional revenue to its sponsors, in an attempt to boast their otherwise low management fees.

Most ETFs allow investors to opt out of securities lending; it is arguable that it would be more appropriate for this instead to take the form of an opt-in. We only need to look at the controversy surrounding payment protection insurance (PPI) to see that the public often, for various reasons, does not opt out when it is in its interest to do so. In fact, anecdotal evidence suggests that, as with the case of PPI, many investors are simply unaware that they can opt out of such arrangements.³⁰

Systemic risks

We have discussed the risks posed by ETFs to individual investors, so let us now turn our attention to the systemic risks they may introduce into our financial system.

Some commentators argue that the danger of ETFs may actually lie in their liquidity, as, in the midst of a panic, one can immediately start selling ETF units, whereas one would have to wait until the end of the day to start selling one's holdings in, for example, mutual funds. In addition, risks may be introduced via the generally held perception that all ETFs are highly liquid, regardless of the index they track. In fact, the idea that an ETF that tracks a highly illiquid market will always be very liquid is akin to alchemy. For example, in its June 2010 *Financial Stability Report*, the Bank of England warns that:

Market makers typically provide continuous intraday liquidity in ETFs so are exposed to changes in the value of the shares between trading with investors and closing out those positions with the fund. These exposures are hedged, often through high frequency trading, especially in equities. This hedging helps arbitrage price differences between the fund's share price and the underlying securities. Sizable deviations are possible where underlying securities are not highly liquid, however. Commodity ETFs are reported to be most prone to these deviations. And market makers are not obliged to make markets at all times, so may withdraw liquidity in volatile markets, exacerbating differences between the value of the fund and the underlying securities.³¹

An example of this can be found in the 'Flash Crash' of 6 May 2010, when stock markets went into free-fall, only to recover minutes afterwards. ETFs suffered greater losses during the Flash Crash than shares themselves. For example, according to the FT:

ETFs accounted for 70 per cent of the cancelled trades that ensued – despite representing only 11 per cent of securities in the US.³²

Many experts attribute this to the nature of price discovery in the ETF market. For example, the chief market strategist at Convergex has said:

But for ETFs, price discovery has to take place in two stages, first at the level of the index's underlying securities, and then at the level of the ETF itself... These are complex dynamics, and when you have disruption in market making activity such as the one we saw last May, ETFs are going to be particularly affected.³³

The US Securities and Exchange Commission (SEC) and Commodity Futures Trading Commission (CFTC) put ETF disruption during the Flash Crash down to the ETF market's dependence on major market makers for liquidity. When the latter withdrew liquidity during the Flash Crash, the market for many ETFs seized up. This differed from the markets for large-cap stocks, where a wider range of investors provide liquidity.

The IMF has also drawn attention to the risks to ETFs highlighted by the Flash Crash:

While most ETFs are supported by one or more market makers, there is no guarantee of active trading under illiquid conditions. Analysts point to the so-called flash crash in May 2010 as an example of the risks ETFs are susceptible to, when market makers were overwhelmed by a surge in computer-driven selling.³⁴

Conclusions: Factors to consider

On the basis of this analysis, we suggest that the following seven factors merit careful consideration before buying physically backed ETFs:

- 1.** Remember that ETFs are generally passive funds that should have minimal fees, although these fees will, of course, be higher for ETFs that track illiquid indices.
- 2.** Do not buy physically backed ETFs that track illiquid markets, as there are concerns that such investment is actually disrupting the underlying markets, resulting in prices becoming divorced from fundamentals. Such ETFs also generally have larger tracking errors and management fees, and trading them in the secondary market is likely to be subject to a large bid-offer spread. This is because buying or selling the stocks in order to create or redeem the ETF units will also be subject to relatively large bid-offer spreads.
- 3.** Remember that the ETF will not perfectly track the underlying market due to management fees and tracking error. Has the ETF been around for a while, and does it have a record for low tracking errors? While such a history is, of course, encouraging, remember that it is easy to vary the official tracking error of a fund by changing the days used in the calculation period.
- 4.** Check to see if the fund is involved in securities lending and to what extent this lending is collateralised. Most funds are not very transparent, so you may struggle to find this information. In particular, you are unlikely to find information on what types of securities are accepted as collateral.
- 5.** Check to see how the proceeds of securities lending is split between fund investors and the ETF provider. Does this split seem reasonable given the additional risks that you are taking on?
- 6.** Be aware that arbitrage between the underlying shares and ETF units may break down during highly volatile times. Moreover, market makers, on which the ETF pricing process is very strongly dependent, may simply choose to withdraw liquidity completely during such times.
- 7.** Remember that the accurate pricing of ETFs in relation to their underlying markets is reliant on market makers arbitraging between stocks and ETFs units. Thus, investors should consider how likely an arbitrage break-down is for a given ETF. For example, if there is only one market maker dealing with a particular ETF's units, then arbitrage is more likely to get disrupted than if many market makers are dealing.

3. Synthetic ETFs

We have seen how the market maker can create new physical ETF units by delivering the underlying securities to the ETF sponsor in exchange for new units. Synthetic ETFs are not backed by the underlying securities whose performance the fund seeks to track.

How do synthetic ETFs work?

In this case, when the market maker creates a new synthetic ETF unit, it puts forward cash rather than the underlying securities, which the ETF sponsor will then give to its 'swap' counterparty, which is generally a major investment bank. The latter then uses this money to purchase securities, which it will then post to the ETF sponsor as collateral.

The collateral posted will be determined by the terms of the bilateral collateral agreement between the ETF and the swap counterparty. Consequently, the assets are often completely unrelated to the market that the ETF is tracking. The swap counterparty will then also pay the ETF the return on the desired underlying index over a given period of time in exchange for receiving the return on the collateral basket. See Figure 3 for a simplified diagram of this process.

Synthetic ETFs are popular because it is cheaper to buy derivatives than to buy the underlying securities. However, management fees are generally significantly higher for synthetic ETFs, and they are typically less 'tax efficient' than their vanilla counterparts, as daily resetting (more on this later) can trigger frequent capital gains.³⁵

Synthetic ETFs generally take two forms: inverse and leveraged.

Figure 3. Simplified schematic diagram of a synthetic ETF.

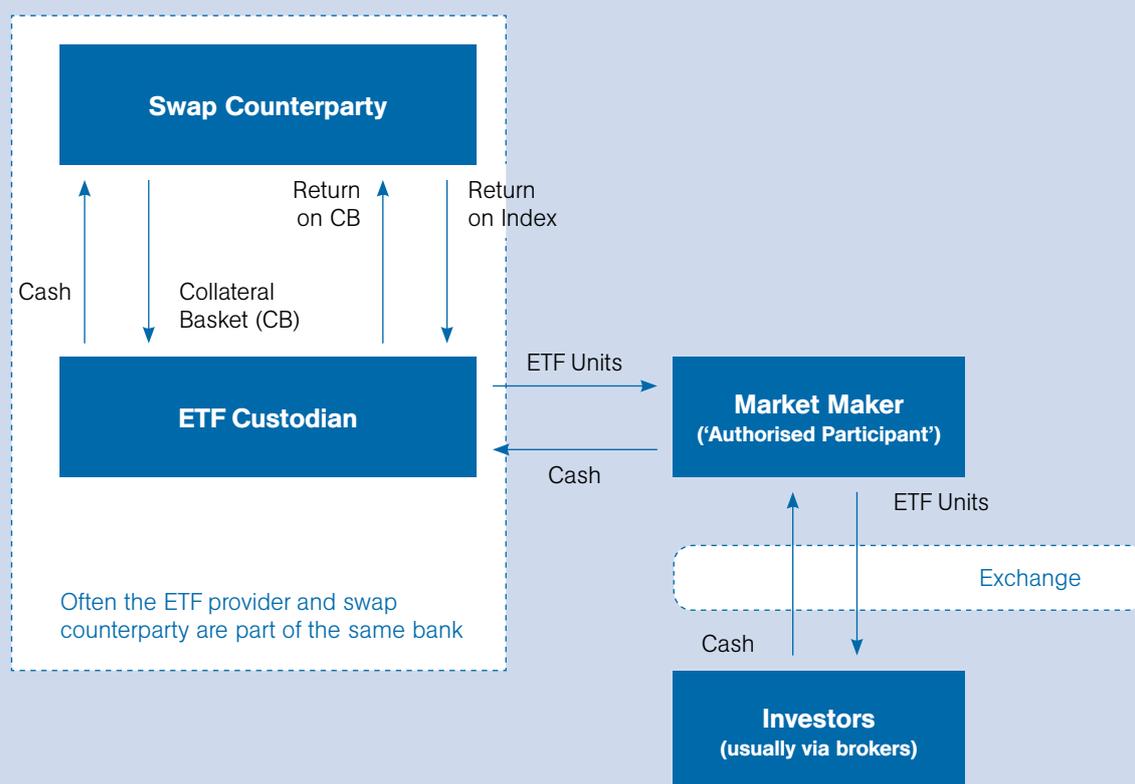
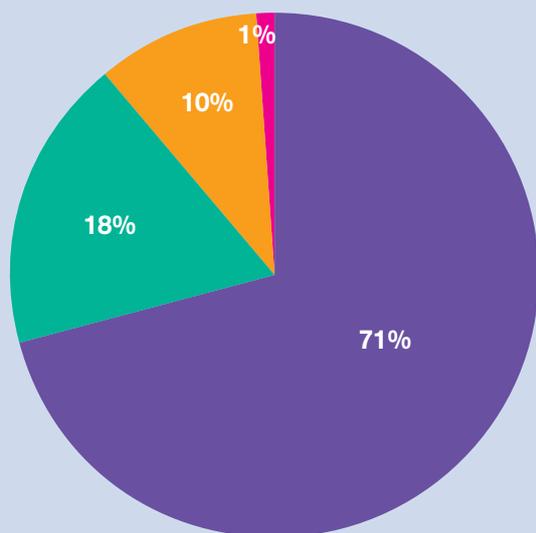
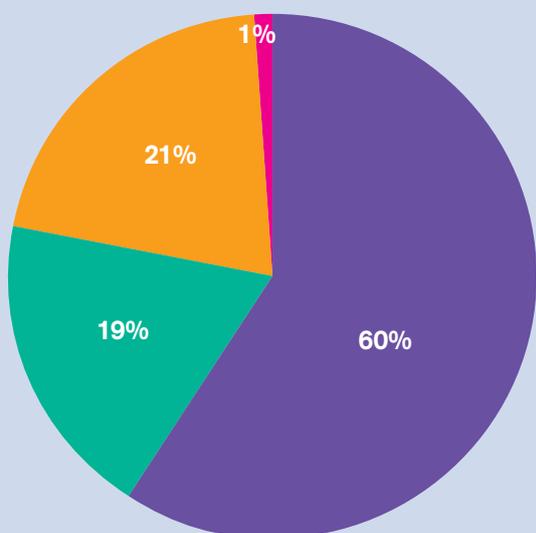


Figure 4. Breakdown of ETFs by asset type.³⁶



Breakdown of American ETFs by asset type (in terms of AUM as of end of October 2012)

- Equity
- Fixed Income
- Commodities
- Other



Breakdown of European ETFs by asset type (in terms of AUM as of end of October 2012)

- Equity
- Fixed Income
- Commodities
- Other

An *inverse* ETF provides investors with a return if a given index or asset falls in value. For example, if we invest in a -1X gold ETF, and the price of gold falls by 10 per cent, then the value of our ETF holdings will increase by 10 per cent.

A *leveraged* ETF gives investors a payout that is a multiple times the return on a given index or asset. For example, if we invest in a 3X Goldman Sachs Commodities Index (GSCI) ETF, and the GSCI rises by 10 per cent, then the value of our ETF holdings will rise by 30 per cent. Only about 3 per cent of ETF assets under management are invested in such leveraged schemes; however, they are disproportionately represented in ETF trading volumes, which suggests that they are generally used for short-term speculation rather than long-term investment.³⁷

As a result of regulatory differences, ETFs in the USA and Europe generally take a very different format. For example, synthetic replication of equity or bond indices is rare in the USA, and physical replication is much more common, yet approximately 37 per cent of applicable ETFs in Europe deploy synthetic methods.^{38, 39}

The breakdown in ETFs between different asset classes is compared between the USA and Europe in Figure 4. Leveraged and inverse ETFs currently constitute only a small fraction of the total AUM in ETFs: 3 per cent and 2 per cent in the USA and Europe, respectively. This has led many to claim that leveraged and inverse ETFs cannot be looked upon as a source of systemic risk. However, before dropping our guard towards synthetic funds, it is important to note that 1X synthetic funds, i.e. funds that deploy derivatives to match the return generated by an index, are not classified here as leveraged or inverse ETFs. When taking 1X funds into account,

synthetic ETFs have enjoyed extraordinary growth in recent years. For example, in 2005 AUM in synthetic ETFs only amounted to 25 per cent of total AUM in European ETFs. However, as of the end of May 2012, this proportion had risen to 37 per cent. Thus, synthetic ETFs are certainly a sector worth keeping an eye on.

Risks to investors

Synthetic ETF investors are not exposed to tracking error, as this risk has been passed onto the swap counterparty. Instead, investors are exposed to the risk of their swap counterparty defaulting; in other words, they have swapped tracking error for counterparty exposure. This counterparty risk is less of a concern for short-term speculators, who are likely to have a trade on for only a minimal period of time, and so the risk of their swap counterparty defaulting should generally be relatively easy to gauge. However, for longer-term investors, this risk is a more serious concern. Problems with ETF swap counterparties are not unprecedented. For example, during the AIG crisis in 2008, trading had to be suspended on ETFs that had swaps on with AIG, after market makers essentially refused to continue serving these markets.⁴⁰

It is therefore crucial that investors in synthetic ETFs keep an eye on the quality of the collateral that is backing their investment. Some suppliers now provide daily updates on the collateral basket, but many others do not. If the market were to call into question the quality of the collateral in the basket, at the same time as the swap counterparty was experiencing funding problems, then ETF holders might lose their investment. This is particularly a risk if the assets posted are significantly correlated with securities issued by the swap counterparty (e.g. shares and bonds). Moreover, a financial crisis can increase the probability of such a relationship, as markets that were previously uncorrelated may crash together.

Many investment banks insist that this fear is unfounded, and maintain that they only post high-quality liquid collateral, specifically to avoid such liquidity problems.⁴¹ Moreover, ETF providers point out that they are required to reveal far more information about the assets their investors hold than mutual fund providers are required to do. Some have suggested that the mutual fund industry is threatened by ETFs and is thus lobbying hard to have the latter characterised as dangerous.

The UCITS directive specifies that the value of the collateral basket cannot fall below 90 per cent of the value of whatever the ETF is tracking. If it does, the swap sponsor will be required to post new collateral. However, ETFs that are not covered by the UCITS directive, such as Asian ETFs, may have a far greater counterparty exposure. For example, in 2011, an iShares MSCI India tracker was 20–25 per cent under-collateralised, a UOB China A share ETF was approximately 66 per cent under-collateralised, and a Hong Kong-listed iShares A50 ETF was 75 per cent under-collateralised.⁴² To make matters worse, investors should be aware that the ETF sponsor is able to lend out the assets in the collateral basket. This securities lending is once again utilised to increase the return of the fund.

The UCITS directive is very flexible on what collateral can be posted, which results in the collateral that ETFs hold often being very different from the securities that the ETF is tracking. For example, the FT report that:

Company filings of Deutsche Bank db x-tracker non-bond ETF products, for example, show that investors buying exposure to European equity ETF products would, in the event of failure, actually have had recourse, in many cases, to Japanese equities for the most part of 2009... The collateral composition of the funds, meanwhile, is only publicly released once a year on the firm's website in the funds' annual report – although the bank says that more recent information is available upon request... It is worth stressing, though, that db x-trackers says that all of its funds are over-collateralised up to 115 per cent.⁴³

Under the UCITS directive, the haircut for collateral, i.e. the extent to which a trade is over-collateralised, is dependent on the jurisdiction in which the ETF is

registered. As a result, many synthetic ETFs are registered in Luxembourg, where haircuts are bilaterally negotiated rather than determined by law. Of course, this generally means that synthetic ETFs based in Luxembourg are not as over-collateralised as those based in other European jurisdictions.⁴⁴

Furthermore, as we have seen with structured credit products, the perceived quality of collateral has not always matched up with reality. Investors should not become over-confident simply because a given ETF is over-collateralised.⁴⁵

Potential conflicts of interest

It is important to note that, for many ETFs, the ETF sponsor and the total return swap counterparty will be the same institution. This may introduce conflicts of interest. For example, the Bank for International Settlements (BIS) has warned that investment banks may post illiquid securities to its in-house ETF sponsor as collateral, as this reduces the cost of funding such assets, which either cannot be repo-ed at all, or can be, but only with a very large haircut. The more illiquid the assets, the greater the reduction in funding costs. Furthermore, posting illiquid collateral in exchange for purchasing the securities needed to generate the ETFs return may be cheaper for the investment bank from a capital adequacy requirement perspective. Similarly, the FSB warns that:

The synthetic ETF creation process may be driven by the possibility for the bank to raise funding against an illiquid portfolio that cannot otherwise be financed in the repo market.⁴⁶

In short, investors should be aware that in-house provision of all synthetic-ETF-related functions is extremely profitable for investment banks, as they can derive multiple income streams from dealing ETF units, ETF management fees, and providing the total-return swap. This is not to say that investors should completely steer clear of ETFs with in-house swap counterparties, but rather that investors should be alert to the opportunity for conflicts of interest, and should carefully monitor the collateral accepted by the ETF. Thankfully, UCITS prevents ETF sponsors from using in-house swap counterparties. As a result, the aforementioned risks may primarily lie with ETFs developed outside of Europe.

Tracking error: How synthetic ETFs deviate from straightforward leverage

Having said that synthetic ETFs are free from tracking error, we must now introduce a caveat: most inverse and levered ETFs reintroduce tracking error if they are held for more than one day, as they are reset daily. The latter occurs because if the underlying index rises or falls, the original total-return swap deployed will no longer give the fund its advertised return. Whilst this will be acknowledged in the ETF's prospectus, there is evidence to suggest that many investors have either failed to notice the warning, or did not understand the technical jargon and thus failed to appreciate how this would affect their investment. The SEC has also acknowledged this problem, for example, by issuing the following warning:

The SEC staff and FINRA are issuing this Alert because we believe individual investors may be confused about the performance objectives of leveraged and inverse exchange-traded funds (ETFs). Leveraged and inverse ETFs typically are designed to achieve their stated performance objectives on a daily basis. Some investors might invest in these ETFs with the expectation that the ETFs may meet their stated daily performance objectives over the long term as well. Investors should be aware that performance of these ETFs over a period longer than one day can differ significantly from their stated daily performance objectives.... The following two real-life examples illustrate how returns on a leveraged or inverse ETF over longer periods can differ significantly from the performance (or inverse of the performance) of their underlying index or benchmark during the same period of time.

** Between December 1, 2008, and April 30, 2009, a particular index gained 2 percent. However, a leveraged ETF seeking to deliver twice that index's daily return fell by 6 percent—and an inverse ETF seeking to deliver twice the inverse of the index's daily return fell by 25 percent.*

** During that same period, an ETF seeking to deliver three times the daily return of a different index fell 53 percent, while the underlying index actually gained around 8 percent. An ETF seeking to deliver three times the inverse of the index's daily return declined by 90 percent over the same period.⁴⁷*

Research by Hammond Associates (HA) explains how such deviations arise.⁴⁸ HA initially considers a two-day investment horizon:

Without daily rebalancing, the value of your investment would be as follows:

$$L(1+r_1)(1+r_2) - (L-1) \tag{i}$$

where, L = leverage, which, if you haven't invested in a levered ETF, is achieved by investing £1 in the ETF, and borrowing £(L-1) to also invest in the ETF (and that must be repaid on Day 2).

$$R_1 = \text{index's return on day 1}$$

$$R_2 = \text{index's return on day 2}$$

When investing £1 in a levered ETF (i.e. so you have daily rebalancing), the value of your investment would be:

$$1(1+L*r_1)(1+L*r_2) \tag{ii}$$

Thus, the difference between these two investment methods is: (ii) - (i)

$$(L_2 - L)(r_1*r_2) \tag{iii}$$

Given that there are no levered ETFs offering fractional exposure to an index (e.g. there are no 1/2X or -1/2X ETFs), the first term in (iii) will always be greater than zero, and will get larger as L increases. Thus, the second term in (iii) will determine whether or not a levered ETF outperforms or underperforms traditional leverage. This explains why levered ETFs underperform if they track volatile markets, when markets are likely to fall one day and rise the next (as if $R_1 < 0$ and $R_2 > 0$, or vice versa, then $R_1 * R_2 < 0$).

HA then extends this analysis to beyond a two-day investment horizon, and finds that:

- In volatile markets, levered ETFs will underperform the advertised levered return on the index that they are tracking.
- As volatility increases, so does the underperformance.
- As the investment horizon increases, so does the underperformance.

This third point indicates that levered and inverse ETFs are more suited to short-term speculation, rather than long-term investment. This is especially interesting in light of the fact that many inverse ETFs are marketed as tools that can be used to hedge an existing exposure an investor may have to a market.⁴⁹

Let us consider a couple of examples that illustrate why volatility is associated with underperformance. First, imagine that we have invested in an inverse levered ETF that tracks the FTSE, which is currently at 100. After Day 1, the FTSE is at 105, and by Day 2, the FTSE is back at 100. The levered ETF will have lost 0.5 per cent (Box A).

Box A

$$5/100 = 0.05$$

$$5/105 = 0.0476 \text{ (3sf)}$$

$$1(1-0.05)(1+0.0476)-1 = -0.00476 \text{ (3sf)} = -0.5\%$$

Now let us instead imagine that the FTSE had instead risen to 120 after Day 1, and fallen back to 100 after Day 2. In this scenario, the inverse levered ETF would have lost -6.7 per cent (Box B).

Box B

$$20/100 = 0.2$$

$$20/120 = 0.167 \text{ (3sf)}$$

$$1(1-0.2)(1+0.167)-1 = -0.0667 \text{ (3sf)} = -6.7\%$$

Moreover, even with ETFs that track very liquid and, thus, less volatile indices, such as the S&P 500, there are examples of ETFs returning 6.75X rather than 2X the index.⁵⁰ There are also examples of inverse ETFs that fail to generate an inverse return at all.⁵¹

It is important to also note that levered ETFs generally come with large management fees, as a result of being rebalanced on a daily basis. Consequently, there are times when they will underperform, even if Equation (iii) would suggest outperformance.

In short, if we hold a levered ETF with daily rebalancing for more than one day, the return may not match the ETF's stated objective. This fact alone should in general mean that non-traditional ETFs are not suitable for retail investors, as the vast majority of the latter will not be clear on how such discrepancies arise, even after the situation has been explained to them.

Some leveraged ETFs now offer monthly rather than daily rebalancing. However, we should remember that if an investor is planning to hold the ETF for more than a month, they once again may not get the return that they are expecting

Systemic risks

A number of additional concerns surround synthetic ETFs. For example, the FSB has warned that there is a risk that swap counterparties may not be able to cope if investors pull out en masse from a fund. First, the ETF sponsor may struggle to return the collateral if they had loaned a large proportion of it out. Secondly, if a large proportion of the collateral posted is in illiquid securities, then the swap counterparty may struggle to sell this collateral in order to redeem cash to withdrawing investors. (Although, swap counterparties that trade with ETFs that permit 'in-kind' redemption are less likely to find themselves in such a liquidity crisis.) Finally, if the swap counterparty has become reliant on cheap funding as a result of posting illiquid securities as collateral, then mass withdrawals from the fund may also create a funding shock for the investment bank.

If the swap counterparty fails, the ETF investors will be left with a basket of collateral which could be both highly illiquid and also completely unrelated to the assets that the ETF was tracking. A realisation of the latter may encourage investors to pull out of the fund if they believe that the swap counterparty may be in trouble. This increases the probability of mass withdrawals, which will only exacerbate the swap counterparty's troubles.

The Economist has issued a similar warning about the liquidity risks associated with synthetic ETFs:

*The rapid trading of ETFs is an area of concern, especially when the underlying assets are illiquid. Creating a synthetic ETF does not eliminate this illiquidity risk, but merely transforms it into a bet on the creditworthiness of a bank. One day that bet will go wrong.*⁵²

Apologists argue that many ETFs have clauses in their registration paperwork that specify that the fund can reject redemption requests under extreme circumstances.⁵³ However, so do many hedge funds, and, in 2008, as investors desperately tried to pull out of distressed hedge funds, but were unable to do so because of such clauses, this fuelled the general panic and precipitated the withdrawal of funds from healthy hedge funds that were not suffering from a liquidity crisis, and could not invoke such defences.⁵⁴ When viewed in this light, such redemption clauses are perhaps not wholly reassuring.

Investors in synthetic ETFs should ensure that they have exposure to a variety of swap counterparties, so that they are not excessively reliant on the solvency of any one investment bank. However, it should be noted that the market itself has taken small steps towards trying to mitigate such risks. For example, in 2009 so-called third-generation ETFs were born, which ask multiple counterparties to provide total-return swap.⁵⁵

Levered ETFs pose an additional systemic risk: they are not subject to the leverage limits and margin requirements that are applicable when buying on margin, the traditional technique used to gain leverage.⁵⁶ Because investors do not need to borrow in order to gain access to this leverage, derivatives are instead deployed. This legal loophole has yet to be closed, despite the fact that excessive leverage in the financial system has been the cause of many of the worst financial crises, including the current one and the Great Depression. It also means that investors who are not permitted to borrow on margin are able to gain access to leverage by buying levered ETFs. Moreover, an article in the *Seattle University Law Review* has warned that:

In addition to the built-in leverage, leveraged ETFs can be purchased on margin themselves... This creates 'super margin'. For example, if an investor purchases a 200% leveraged ETF with a margin requirement of 50%, the resulting exposure is 400%, or 4-to-1.⁵⁷

There is also a common misconception that because an infinite number of synthetic ETF units can, in theory, be created, that ETF markets cannot suffer from 'short squeezes'.

A short squeeze occurs when there are a large number of shorts pending in a market, yet the share price rises due to an improvement in fundamentals. Short sellers will then be required to post margin to their stock lender and, at this point, some will decide to close out their short positions. The latter will further inflate the share price, and shorts will be required to post even more margin. And so on and so forth. The result is a share price that overshoots where it should be according to fundamentals.

Many incorrectly claim that ETFs cannot suffer from short squeezes as theoretically an infinite number of ETF shares can be created. Consequently, a short seller looking to close out their position can buy the appropriate shares and exchange them for an ETF share, which circumvents the lack of supply that would otherwise have pushed up prices. However, whilst this share buying will not inflate prices in a very liquid market, the same cannot be said in an illiquid market. As a result, short squeezes can occur with ETFs that track illiquid markets. This is not just an academic discussion, as some ETFs are highly shorted.⁵⁸ In fact, some investment banks offer 'create-to-lend' facilities, which have the specific purpose of helping hedge funds short ETFs. Thus, in such facilities, share creation is solely motivated by hedge funds' demands for stock borrowing.⁵⁹

Finally, a recent report from BIS warns of the build-up of systemic risk due to the widespread use of ETFs:

Crisis experience has shown that as the financial intermediation chain lengthens, it becomes complicated to assess the risks of financial products due to a lack of transparency as to how risks are managed at different levels of the intermediation chain. Exchange-traded funds, which have become popular among investors seeking exposure to a diversified portfolio of assets, share this characteristic, especially when their returns are replicated using derivatives products. As the volume of such products grows, such replication strategies can lead to a build-up of systemic risks in the financial system.⁶⁰

However, it should be noted that ETF-associated total-return swaps constitute only approximately 2 per cent of all equity-based over-the-counter (OTC) trades and, thus, apologists argue that synthetic ETFs should not be viewed as a source of systemic risk.⁶¹

How passive are synthetic ETFs?

Many commentators have attributed increased volatility at the end of the trading day to the boom in synthetic ETFs. For example, an analyst at Barclays noted:

Short leveraged exchange traded products can lead to large rebalancing volumes at the close [of the market] if the underlying [index] experiences a significant move... Since the direction of the rebalancing flows is the same as that of the move in the underlying, this can lead to an increase in volatility of the underlying.⁶²

In other words, because synthetic ETFs are now very popular and must be rebalanced on a daily basis, this rebalancing may be introducing something called 'end-of-day' volatility. While many analysts have warned of these dynamics, it is, however, important to note that the theory is not universally subscribed to. For example, researchers at Credit Suisse have argued that there, while end-of-day trading volumes have dramatically increased in recent years – for example, from 14 per cent to 19 per cent between 2006 and 2011 in small-cap US companies, there is no link between increased end-of-day trading volumes and volatility.⁶³ Conversely, a separate Credit Suisse analyst argued that the volatility was partially down to ETFs, but also a result of other factors, such as:

With the higher volatility, people don't want to carry positions overnight, so instead of gradually liquidating big positions over a few days, they often dump a lot of stock late in the day. But on the other side, there are a lot of people closing out short positions before the close, so it's not just selling pressure.⁶⁴

In short, there is no consensus yet on what is driving this unusual volatility. There has undoubtedly been a significant increase in the percentage of equity trades that now take place right at the end of the trading day. In 2006, for example, 6 per cent of all trades in US equities took place in the last ten minutes of the trading day. In contrast, in 2008, this percentage had increased to 8 per cent. However, the role that synthetic ETFs have played here is still up for debate.

What can be stated confidently, however, is that there is a greater risk of ETF investment causing disruption and volatility in illiquid markets, such as small-cap markets, where market makers hedging swaps put on with ETFs may constitute a significant percentage of total trading volumes in that market.

Conclusions: Factors to consider

In short, ETFs are no longer completely transparent products. This is similar to the problem that occurred with collateralised debt obligations (CDOs), and we can only hope that the ETF market will not share a similar fate. As ETFs get more and more complicated, this risk surely only increases. The Bank of England has reached a similar conclusion:

One risk is that the benefits of ETFs become outweighed by complexity, opacity and contingent risks. Swap-based ETFs have already come in for some criticism for their complexity, while a number of ETFs are not fully transparent about the risks arising from securities lending and counterparty risks from derivative exposures.⁶⁵

US regulators have historically taken a harder line against ETFs than their European counterparts. This trend looks set to continue, as in March 2010, the SEC announced that it was opening a review into synthetic ETFs. Consequently, until the review is complete, no new synthetic funds are being authorised in the USA.

We are now in a position to put forward some factors for investors to consider before buying synthetic ETFs:

1. Who is the ETF's swap counterparty? Is this an investment bank that you want exposure to? If possible, try to invest in a synthetic ETF that has multiple swap counterparties, to ensure you are not wholly reliant on any given individual investment bank.

2. Is the ETF a UCITS fund? This will at least ensure, for example, a certain level of diversification and that collateral valuing at least 90 per cent of the fund's NAV will be received from the swap counterparty. If the ETF is not a UCITS fund, then to what extent is it under-collateralised?
3. What types of securities are accepted by the fund as collateral?
4. To what extent does the ETF lend out the securities that have been posted to it as collateral?
5. Is an in-house swap counterparty used? If so, be aware that this may lead to conflict of interest, i.e. illiquid collateral may be posted to and accepted by the ETF.
6. Counterparty risks will be less with ETFs that deploy regular 'swap resetting'.
7. Be aware that swap counterparties may struggle if investors pull out en masse from a fund, although this pressure will be slightly less for swap counterparties that deal with ETFs that accept in-kind redemption.
8. Synthetic ETFs cannot be expected to deliver the desired return when held for longer than their reset period, which is generally one day. This means that synthetic ETFs are more suited to short-term speculation than long-term investment.
9. Be aware that daily swap-rebalancing may be contributing to end-of-day volatility in markets.
10. Retail investors may struggle to understand daily rebalancing and its consequences. Thus, a responsible fund manager should seriously consider whether such products are appropriate for retail clients, especially given that such products appear to primarily be useful tools for short-term speculation.
11. Synthetic ETFs that track illiquid markets may suffer from short squeezes.

Clearly that are some concerns with synthetic ETFs, but it is important to note that many of the problems raised in this section also exist in the mutual fund industry.⁶⁶

4. Actively managed ETFs

In recent years, we have also witnessed the rise of actively managed ETFs, which do not seek to track a market, but rather enlist management expertise in an attempt to beat the market. This new type of ETF was first launched in March 2008.

Given that ETFs developed in response to criticism of the mutual fund industry, i.e. the observation that active managers have generally struggled to consistently outperform the market, the development of actively managed ETFs may sound somewhat counter-intuitive. However, some argue that while active asset management has come in for heavy criticism, under given market conditions it may still be appealing. For example, some have postulated that during times of economic crisis, when stocks in general perform poorly, stock picking may become a more astute investment strategy.⁶⁷ Others have noted that stock picking in small-cap markets has also generally tended to be a profitable enterprise.⁶⁸

Moreover, the idea is that active ETFs will still have an edge over traditional mutual funds, as they retain all the other aforementioned advantages; for example, they can be traded throughout the day, rather than only at the end of the day, and are traded like stocks and, thus, limit orders, etc., can be executed. However, it is worth noting that the management fees associated with actively managed ETFs will naturally be higher than those of their passive counterparts.

As with all actively managed funds, there is, of course, a fundamental tension between the secrecy necessary to prevent the market from 'front-running' trades, i.e. to prevent the market trading in advance of the fund, thus exploiting the fact that the fund is destined to trade in a certain way, and the transparency necessary if investors are to know what they are getting involved in. Moreover, transparency does not just lead to front-running; it can also result in other investors copying the fund's investment strategy.

Given that ETFs are traded on exchanges, actively managed ETFs have to maintain higher levels of transparency than mutual funds.⁶⁹ Thus, if we were to imagine a spectrum with passive ETFs at one end and actively managed mutual funds at the other, actively managed ETFs would lie somewhere in the middle, as actively managed ETFs and mutual funds currently must disclose their holdings daily and quarterly respectively.⁷⁰

At this point, we should note that traditional ETFs can also suffer from front-running. For example, when the constituents of indices change, market participants will know that ETFs will soon have to make these changes in their own holdings. Some argue that the costs of such front-running actually exceed other costs, such as management fees. For example, ETF Consultants LLC argues that:

The focus of most fund analysis on expense ratios is misplaced. Trading costs for many index funds, especially when we include the costs of trading transparency, are greater – often much greater – than the funds' disclosed expenses.⁷¹

Such dynamics have even led some ETFs to track so-called silent indices. These are essentially funds that act like indices, except that they are not marketed as indices, and they do not publically announce index changes until associated ETF fund managers have had an opportunity to make the necessary adjustments.⁷² In addition, the rules that determine when and how the index changes are sufficiently randomised, for example, with regard to the timing of changes, so

that front-runners cannot second guess the index. However, there is a downside to tracking such indices: they are not well-known brands like the S&P 500 and, thus, are significantly harder to market to investors.

Actively managed ETFs unfortunately have an additional problem: the pricing of ETF units is dependent on market makers arbitraging between ETF units and the underlying assets, by creating or destroying and selling or buying ETF units (this mechanism was described in detail in Section 1 of this report). Market makers won't be able to properly participate in the process if they are unaware of the content of the actively managed fund. This could result in significant trading departures from a fund's true net asset value (NAV), and the SEC has already expressed concerns about this.⁷³ Asset managers, such as Blackrock, have attempted to circumvent creation and redemption issues by allowing market makers to exchange cash, rather than the underlying assets, for ETF units.⁷⁴ However, this is unlikely to prevent NAV uncertainty. In an attempt to resolve the latter, some have suggested that intra-day trading could instead take the form of placing limit orders that authorise trading within a given range around a fund's NAV.⁷⁵

Some analysts argue that actively managed ETFs will be particularly vulnerable to panic selling as, given that they do not simply track popular indices, rumours of bad investment decisions could easily quickly undermine confidence in the funds.⁷⁶ Of course, mutual funds are also susceptible to this, but they are much harder to dump at a second's notice, as they can only be traded at the end of the day.

It is difficult to make concrete statements about actively managed ETFs, as the industry has yet to really take off. For example, as of May 2011, US assets under management in this industry only made up approximately 5 per cent of the total assets under management in American ETFs.⁷⁷ While many expect such funds to be a huge area of growth in the future, there is of course a possibility that the industry won't ever become particularly popular. Moreover, as such funds are still in their infancy, investors do not yet have significant fund track records to scrutinise, and thus it is difficult to comment on the overall success of this investment structure, let alone analyse any given individual fund.

One of the key benefits of choosing ETFs over mutual funds is that they are generally much cheaper, but actively managed ETFs surrender much of this advantage. Moreover, given that ETFs, by definition, must have reasonably high levels of transparency, it is perhaps doubtful whether this industry will ever be able to attract expert fund managers who, naturally, are extremely reluctant to share their methods with the world. McKinsey has argued that if the industry can successfully attract these high-profile asset managers, this may trigger a sudden rise in the demand for active ETFs.⁷⁸ Others have suggested that the conversion of existing popular mutual funds into active ETFs may instead be a likely route forward.⁷⁹

At any rate, before deciding whether or not to make such investments, it seems wise to wait until this industry is properly established, and to see if actively managed ETFs demonstrate that they can overcome the aforementioned problems.

5. Exchange-traded commodities (ETCs)

Funds tracking commodities merit discussion in their own right, as their contribution towards recent food price spikes and volatility has been hotly debated by academics, market participants, and the press.

ETCs are hugely dominant in the market for commodities investment as, prior to their creation, many investors could not easily gain access to this market. ETCs are mainly bought by institutional investors; however, retail investors are also becoming increasingly interested in them.⁸⁰ Crucially, commodities ETFs allow smaller-sized investments than other commodities products. For example, we can invest \$40 in an oil-based ETF, whereas we would be required to commit approximately \$7000 in order to purchase a single oil futures contract.⁸¹ However, we should note that management fees for commodity ETFs, which typically come in at around 1 per cent, are generally much larger than those for their equities counterparts.⁸²

Commodities ETFs have soared in popularity in recent years. For example, assets under management in commodities ETFs totalled only \$16 billion in 2006; however, by April 2011, this figure had risen by over 1100 per cent to \$197 billion.⁸³ Although ETFs are now available across a wide variety of commodities, from copper to wheat, precious metals are the most popular choice by a wide margin. For example, as of April 2011, 70 per cent of all commodities ETFs tracked precious metals.⁸⁴

ETFs that only track a narrow range of assets, such as a single commodity, cannot qualify as mutual funds (or UCITS funds) as they are not sufficiently diversified. Instead they have to register as trusts, which is why they are called exchange-traded commodities (ETCs) rather than ETFs.⁸⁵ Some ETCs buy and store physical commodities, generally metals. This type of ETC will be the subject of a later section in their report. Other ETCs instead deploy derivatives contracts, in particular, futures, and these will be our immediate focus.

Synthetic ETCs

These ETCs are particularly popular as they do not need to shoulder the expensive storage costs that come with their physical-replication counterparts. Moreover, some commodities, such as food commodities, can only be physically stored for a limited period of time, as they are perishable.

The first thing that any investor must understand is that when they invest in a synthetic ETC, they are tracking a commodity's futures price, not the price of the physical commodity itself, and that the latter and the former are not the same thing at all. For example, if the ETF is investing in futures, the 'roll yield' will be a significant factor determining how well the fund performs.

When ETFs buy futures contracts, in order to track the future price over a long period of time, they have to roll the futures contract as it gets nearer to expiry, otherwise they would be forced to take a physical delivery of the commodity. For example, an ETF may buy a futures contract that is set to expire in two months. A month later, the contract will be set to expire in one month. The ETF will sell the one-month contract and buy a two-month contract. This process will be repeated at the end of every month. The investor will consequently make or lose money, depending on the price at which the contract is bought and the price at which it is subsequently sold. The pick-up or loss an investor incurs as a result of this activity is called the 'roll-yield'.

If the price of a given future contract falls as the contract approaches maturity, then the market is said to be in 'contango' (Figure 5), and the roll-yield will negatively impact on the ETF's performance. This is because the fund will be forced to buy contracts at a high price, and later sell them at a low price. Conversely, if the price of a given future contract increases as the contract approaches maturity, then the market is said to be in 'backwardation' (Figure 5), and the roll yield will positively impact on the ETF's performance. Backwardation is a somewhat unusual state for a market to be in, as, given inventory costs and the cost of tying up capital without interest or dividends, we would typically expect a market to be in contango. Thus, backwardation is typically interpreted as a sign that there is a near-term shortage in the market.

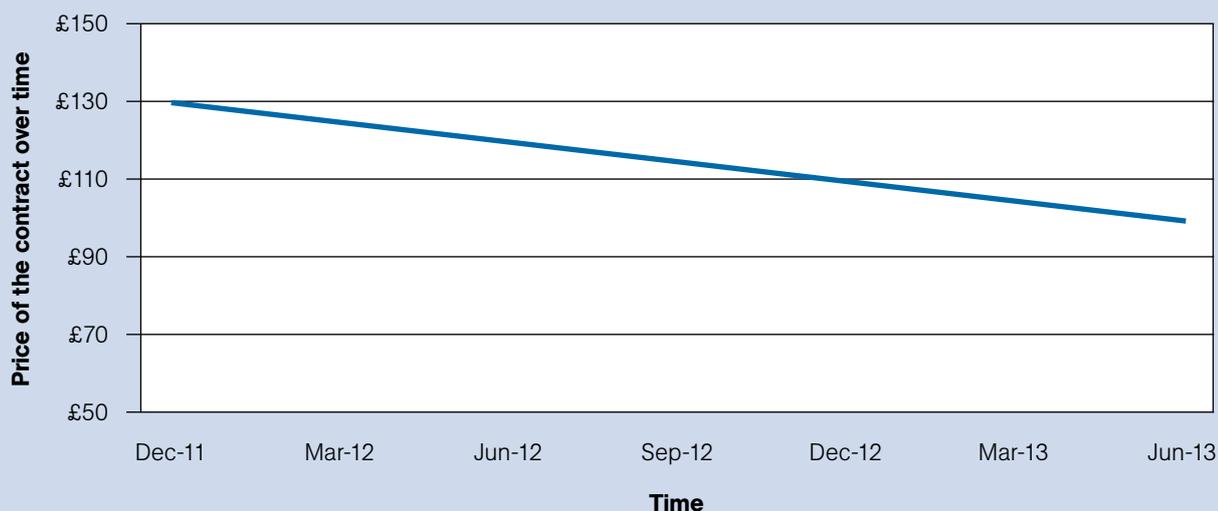
When a market is in contango, negative roll yield can mean that investors lose money even if the price of the commodity in question actually increases.⁸⁶ For example, energy markets ETFs were popular investments in 2008 and 2009, yet ultimately performed poorly as a result of contango.⁸⁷

As articulated by the FT:

This roll yield is hugely important long-term and probably accounts for a large component of total long-term, returns.⁸⁸

Figure 5. Contango and backwardation

Contango – The price of a given future contract falls as the contract approaches maturity



Backwardation – The price of a given future contract increases as the contract approaches maturity

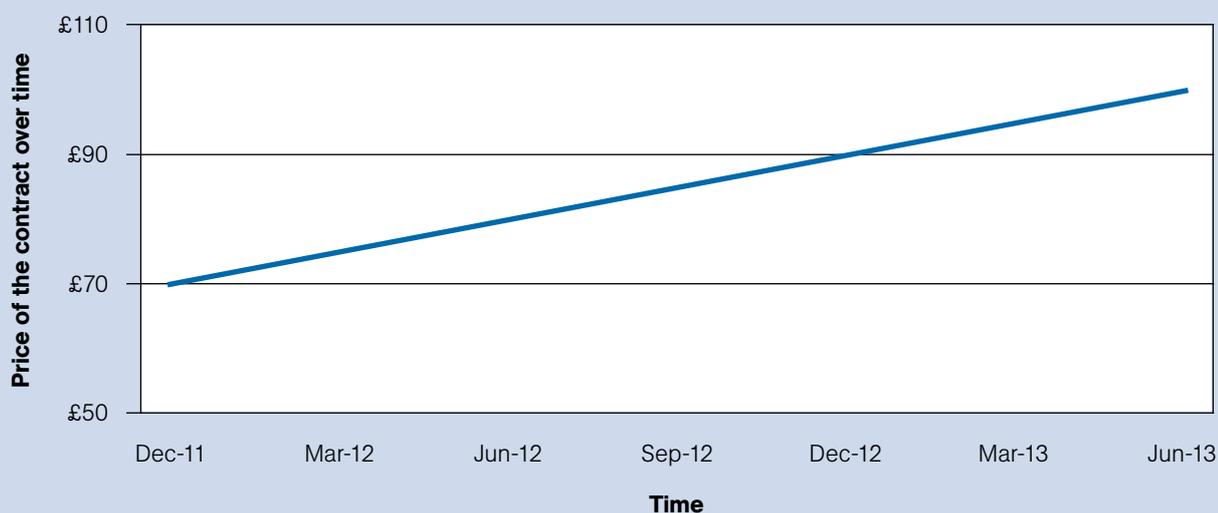


Table 3. A sample of annualised ETF roll yields.^{89,90}

A Sample of Annualised ETF Roll Yields					
ETF Code	Commodity	Annualised Roll Yield (as of May 2011)	May 2011 Rank	Annualised Roll Yield (as of December 2010)	December 2010 Rank
UGA	Gasoline	44.45%	1	8.71%	3
BAL	Cotton	35.12%	2	54.48%	2
NIB	Cocoa	15.92%	3	-3.38%	9
LD	Lead	6.80%	4	2.28%	4
JO	Coffee	0.21%	5	-3.43%	10
JJN	Nickel	-0.25%	6	-1.63%	7
JJT	Tin	-0.70%	7	1.12%	5
JJU	Aluminium	-0.77%	8	-1.96%	8
SGG	Sugar	-2.47%	9	62.33%	1
CORN	Corn	-3.96%	10	-7.88%	12
COW	Livestock	-4.45%	11	-23.54%	16
UHN	Heating Oil	-4.78%	12	-5.5%	11
JJC	Copper	-5.38%	13	-0.84%	6
USO	WTI Crude Oil	-6.51%	14	-9.68%	14
JJG	Grains	-8.20%	15	-9.64%	13
UNG	Natural Gas	-17.98%	16	-10.40%	15

Roll yield also comes into play when choosing which commodities index one would like to track, as different indices assign very different weights to individual commodities. For example, crude oil is 52 per cent, 35 per cent and 12.5 per cent of the GSCI, DBC and DJ-AIG respectively.⁹¹ Thus, if the market for crude oil is in backwardation, then the associated positive roll yield will be most strongly felt by an ETF that tracks the GSCI. As a result, futures-based ETFs that track energy commodities, or indices that track a basket of different commodities yet are heavily weighted towards energy, such as the GSCI, are particularly popular, as energy futures curves generally exhibit backwardation. (However, as was demonstrated in 2008 and 2009, and described earlier, there is no guarantee that such markets will always be in backwardation.)

Table 3 gives a sample of the annualised roll yields for ETFs tracking a range of commodities, as of May 2011 and December 2010. We can see that a wide variety of roll yields are possible, with some ETFs benefiting from a pick-up of 62.33 per cent, and others losing 24.46 per cent. Moreover, we can see that markets can quickly change from being in backwardation to being in contango, or vice versa. For example, the ETFs tracking cocoa and coffee saw their annualised roll yields change from negative to positive between December 2010 and May 2011. In contrast, the ETFs tracking tin and sugar saw their annualised roll yields change from positive to negative. The ETF tracking gasoline saw the largest increase over this period, with its annualised roll yield increasing by 35.74 percentage points. The ETF tracking sugar saw the largest decrease over this period, with its annualised roll yield decreasing by 64.80 percentage points.

Some ETFs have taken to rolling contracts in a more dynamic manner, in a bid to reduce the cost of contango roll yield.⁹² For example, a fund manager may decide to vary how frequently or at which points on the futures curve contracts are rolled depending on the form that the market takes at the time. However, as such a fund is more actively managed than a traditional ETF, management costs will, of course, be higher.

As ETFs trade in a predictable manner when rolling contracts over at the end of the month, other investors, such as hedge funds can exploit this, for example, via an investment strategy known as 'pre-rolling'. Consider once again the example of rolling futures contracts put forward earlier in this section. As ETF investors will be pursuing such a strategy en masse, hedge funds can, in advance of the roll period, buy the two-month contract and short the one-month contract, safe in the knowledge that ETFs will soon increase and decrease the prices of the former and latter, respectively. If many hedge funds pursue such a strategy,

then this activity will negatively impact ETF investors by pushing up the price at which they buy the two-month contract, and depressing the price at which they sell the one-month contract. For example, one commodities trader has said:

*These index funds get eaten alive by people like me.*⁹³

Some commentators also argue that this activity by hedge funds and ETF investors is responsible for increasing market volatility during roll-periods.

A responsible fund manager must consider whether retail investors are likely to fully understand roll yield and its associated risks and benefits. We believe this is highly unlikely, and thus do **not recommend that futures-based ETFs are marketed to retail investors.**

Of course, not all commodities ETFs invest in commodity futures directly. Some instead put on a total return swap with an investment bank, and the investment bank will then go out and purchase futures to hedge their position. In such cases, the ETF investors are no longer exposed to the risk of roll yield moving against them, as this risk has been passed on to the investment bank. They will instead have exposure to counterparty risk, just like regular synthetic ETFs do. Of course, these counterparty risks can be minimised by having a high percentage of the trade collateralised; however, once again, investors must ensure they are receiving high-quality, liquid collateral. Other familiar concerns, such as the systemic risks resulting from swap counterparties struggling to cope with en masse withdrawals from funds, also emerge once again. Thus, swap-based synthetic ETFs, whilst avoiding roll-yield issues, are far from problem-free.

A further interesting development is the emerging trend for commodities companies to go into business with ETF providers. For example, Shell and ETF Securities launched a futures-backed ETF in 2005, in which ETF Securities bought all its futures contracts from Shell directly, rather than via an exchange.⁹⁴ Of course, a side effect of this is that ETF investors' money was essentially being loaned to Shell. This is a further factor for investors to consider. If an investor is interested in, for example, investing in projects that do not help undermine the fight against climate change, then such an ETF may be inappropriate for their purposes. Moreover, there is a very real danger that investors will simply be unaware that their money is *directly* helping finance companies like Shell.

Risks: Impact on underlying markets and volatility

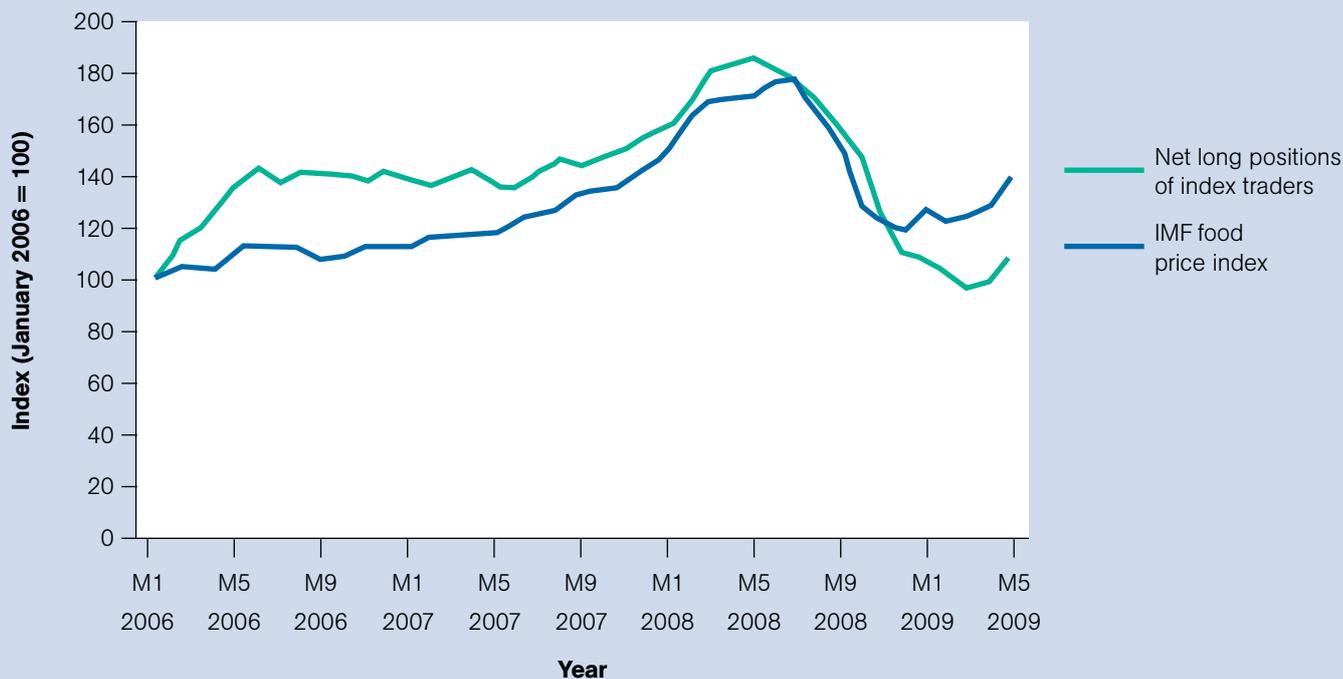
We have not yet discussed what effect speculation may be having on commodities prices. This is a highly contentious issue, and one that has received extensive attention in the press. Index funds and ETFs have come under particular fire because they are long-only investors, i.e. they do not extensively study supply and demand fundamentals like hedge funds often do, and instead are banking on long-term price rises. Newspaper headlines such as: 'People die from hunger while banks make a killing on food', are not uncommon.⁹⁵ However, apologists counter along lines such as: 'Although there is a clear link between commodities prices and politicians' denunciations of speculators ... the relationship between speculation and commodity prices is not as obvious.'⁹⁶ But which of these arguments is correct?

Risks: Empirical evidence

There is a strong correlation between the level of many commodities indices and the level of investment in index funds (Figure 6). However, econometrics tells us that correlation does not necessarily imply causation. There could instead be a third, omitted variable that is driving both commodities indices and index fund investment. If this were the case, then the observed correlation would be spurious.

Apologists argue that this is the case, and that the omitted third variable is supply and demand fundamentals. Critics disagree and maintain that price movements over the past few years cannot be explained by fundamentals. For example, a World Bank working paper argued that:

Figure 6. Index of estimated net long positions of index traders and the IMF food price index (January 2006 – May 2009).⁹⁷ Reproduced with permission.



Between the second half of 2007 and the first half of 2008, production of petroleum increased from 85.8 million barrels per day to 86.8 million barrels per day. Consumption fell from 86.5 million barrels per day to 86.3 million barrels per day. Prices should have fallen. In December 2007, crude oil averaged \$90 per barrel, while in June 2008 it averaged \$132 per barrel, almost 50% up.⁹⁸

Others point to increased correlation between commodities as further evidence of the 'financialisation of commodities'. For example, researchers at Princeton University found that as institutional investors started to invest en masse in funds tracking commodities indices, such as the GSCI:

Futures prices of non-energy commodities became increasingly correlated with oil after 2004. In particular, this trend was significantly more pronounced for indexed commodities than for those off the indices... While this trend intensified after the world financial crisis triggered by the bankruptcy of Lehman Brothers in September 2008, its presence was already evident and significant before the crisis.⁹⁹

Many researchers have attempted to investigate the effect of speculative investment on commodities prices empirically, but the findings, so far, have been mixed. The result has been a plethora of studies, with some supporting the critics and others supporting the speculators, depending on the data and methodology used.

For example, those that find no evidence that speculation affects food prices include:

- The IMF in 2006:

All in all—and subject to the data limitations stressed at the outset—the results for the five commodities in the sample provide little support for the hypothesis that speculative activity (as measured by net long non-commercial positions) affects either price levels over the long run or price swings in the short run. In contrast, there is evidence (both across commodities and over time) that speculative positions follow

price movements. These findings are consistent with the hypothesis that speculators play a role in providing liquidity to the markets and may benefit from price movements, but do not have a systematic causal influence on prices.¹⁰⁰

- Researchers from Vanderbilt University in 2010:

In brief, we conclude: a) commodity index investment is not speculation, b) commodity index rolls have little futures price impact, and inflows and outflows from commodity index investment do not cause futures prices to change, and c) failure of the wheat futures price to converge to the cash price at the contract's expiration has not undermined the futures contract's effectiveness as a risk management tool.¹⁰¹

- Irwin, Sanders & Merrin in 2008:

Available statistical evidence does not indicate that positions for any group in commodity futures markets, including long-only index funds, consistently lead futures price changes.¹⁰²

In contrast, those that do find evidence in support of the hypothesis that speculation is affecting commodities prices include:

- Researchers from Yale University and Singapore Management University in 2010:

A bubble first emerged in the equity market during mid-1995 lasting to the end of 2000, followed by a bubble in the real estate market between September 2000 and June 2007 and in the mortgage market between August 2005 and July 2007. After the subprime crisis erupted, the phenomenon migrated selectively into the commodity market and the foreign exchange market, creating bubbles which subsequently burst at the end of 2008, just as the effects on the real economy and economic growth became manifest.¹⁰³

- The United Nations Conference on Trade and Development (UNCTAD) in 2011:

Financialization has strongly affected the functioning of commodity markets. Due to the increased participation of financial players in those markets, the nature of information that drives commodity price formation has changed. Contrary to the assumptions of the efficient market hypothesis (EMH), the majority of market participants do not base their trading decisions purely on the fundamentals of supply and demand; they also consider aspects which are related to other markets or to portfolio diversification. This introduces spurious price signals to the market.¹⁰⁴

- Researchers from Princeton University and Renmin University in 2010:

This paper finds that concurrent with the rapid growing index investment in commodities markets since early 2000s, futures prices of different commodities in the US became increasingly correlated with each other and this trend was significantly more pronounced for commodities in the two popular GSCI and DJUBS commodity indices. This finding reflects a financialization process of commodities markets and helps explain the synchronized price boom and bust of a broad set of seemingly unrelated commodities in the US in 2006-2008. In contrast, such commodity price comovements were absent in China, which refutes growing commodity demands from emerging economies as the driver.¹⁰⁵

In short, there is currently no consensus on whether or not the theoretical link between speculation and prices has been realised. Many empirical studies have been conducted, but the results have varied and both sides of the debate have no shortage of research they can call on to support their stance.

To explain the discrepancies between conclusions, researchers often strongly criticise the statistical methodologies deployed by academics that have results that conflict with their own. For example, a widely known study by Irwin & Sanders in 2010, which was commissioned by the OECD, concluded that there was no evidence to suggest that speculation was pushing up food prices, and that speculation instead actually appeared to reduce food price volatility.¹⁰⁶ This study is frequently referenced in publications such as *The Economist*, in articles where the latter is arguing against curbs on speculation. However, other economists have pointed out that the study utilises a ‘granger causality test’, which is inappropriate when dealing with volatile data. This point is even acknowledged by Irwin & Sanders in a footnote in their report:

The time-series tests may lack statistical power to reject the null-hypothesis because the dependent variable – the change in futures price – is extremely volatile.

In addition, the lag that was chosen to offset the two datasets has also come under criticism. A think-tank comprised of former traders was particularly dismissive of the research, and issued a mock conclusion for the report:

Applying statistical techniques that aren't applicable to volatile data sets like the ones used in this study, and using proxies for energy commodities that the authors themselves argue are unsuitable, we found little historical correlation between how much money flowed into commodities futures one week, and how commodities prices behaved the following week... For corn and cotton, we actually did find a significant correlation.¹⁰⁷

This exchange is representative of the arguments that take place between researchers on opposing sides of the argument.

In short, there isn't an empirical consensus on this issue, and there is unlikely to be for some time.

Risks: Theoretical links

Instead of further exploring the empirical debate, let us consider the theoretical mechanism via which speculative investment in derivatives could, in theory, affect the price of the underlying physical commodity.

Most commodities speculators invest via futures. Some may put on a total-return swap with an investment bank; however, the investment bank will then generally hedge its position using futures. Thus, we will concentrate our efforts on examining the link between futures markets and spot markets.

First, commodities derivatives, which are much more liquid than the physical commodities themselves, are used to help ‘discover’ prices in the spot market. For example, the CTFT has said:

In many physical commodities (especially agricultural commodities), cash market participants base spot and forward prices on the futures prices that are ‘discovered’ in the competitive, open auction market of a futures exchange.¹⁰⁸

The International Cocoa Association (ICCO) has also described this process:

The [futures] markets for cocoa in London and New York play a vital role in the formation of prices for physical cocoa throughout the world. Indeed, in this respect, London and New York function as the benchmark for prices paid. Hence, when prices in the two [futures] markets increase, prices paid to farmers increase. When prices in the [futures] markets fall, traders immediately react by paying lower prices to farmers. In addition, the [futures] markets provide a mechanism for market participants to hedge against price risk. For these reasons, it is of extreme importance that the [futures] markets are efficient and competitive markets.¹⁰⁹

We can see that the ICCO has touched upon another way in which futures and spot markets interact: producers generally want to hedge their exposure to price changes and to do this they need a well-functioning futures market, not an excessively volatile one. The latter may increase producers' hedging costs, and thus drive up prices in the physical market.

Finally, arbitrage occurs between the futures and spot markets, which will be described in greater detail later in this section.

One defence that is commonly put forward hinges on the idea that theoretically an infinite number of futures contracts can be entered into. This is because most investors will close out their positions before they are required to take delivery of the physical commodity, and it means that the amount of a commodity promised via futures contracts can actually exceed the total amount of that commodity in existence. Apologists argue that because theoretically there are no supply constraints in futures markets, the only factor affecting the price of futures contracts is the current expectation of future spot prices. In other words, the price of a futures contract will change when the market receives new information, which alters participants' expectations of prices in the future. Consequently, it is argued, ETCs cannot be pushing up prices, as ETC investors do not study supply and demand fundamentals intently like hedge funds investors do, and, thus, their buying does not bring new information to the market.

However, this argument ignores liquidity concerns, i.e. it ignores the fact that speculators have to find someone to take the other side of the trade. If the market is flooded by buyers, this will push up futures prices, as liquidity is important in futures markets. For example, Goldman Sachs has argued that the presence of index fund investors wanting to buy futures, i.e. take the other side of the trade from producers, who want to sell futures, has helped drive up the price at which producers can agree to sell future produce. Previously this market was dominated by producers, who were forced to sell futures contracts at low prices, because there was limited appetite for taking the other side of the trade.

Another common argument put forward is that because index investors roll futures contracts before they expire, i.e. before they are required to take delivery of the physical commodity, they do not interfere with the physical market. However, this ignores the price discovery and hedging functions of the futures markets described earlier, and arbitrage between futures and the physical market.

For example, if futures prices have been driven up by speculators so that they are higher than spot prices, then investors may be incentivised to store the commodity for sale at a later date, i.e. by buying the relatively cheap physically commodity and storing it, and, at the same time, selling a relatively expensive futures contract that promises delivery of the commodity at a later date. Some economists, such as Paul Krugman, the Nobel prize-winning Princeton-based economist, have argued that such activity did not occur during the 2008 food price spike, as inventories didn't rise, and have thus concluded that speculators were not responsible for driving up prices.¹¹⁰ However, others have pointed out that inventories data is often incomplete. For example, many private stocks are not included in official inventories data, and some foreign inventories are also excluded.¹¹¹ In addition, in the case of oil, inventories that are yet to be extracted from the ground are not included in inventory data.¹¹² In short, Krugman's critics argue that one should not be using incomplete inventory data to draw strong conclusions about something as important as commodities markets.

Interestingly, even if we are happy to place our faith in inventory data, the conclusions that can be drawn from it vary. For example, in 2009, Krugman revised his opinion on commodities speculation:

Last year I was skeptical about claims that speculation was central to the price rise, because what I considered the essential signature of a speculative price rise – physical withholding of oil from the market, in the form of high inventories – just wasn't showing.

This time, however, oil inventories are bulging, with huge amounts held in offshore tankers as well as in conventional storage. So this time there's no question: speculation has been driving prices up.¹¹³

Another argument frequently put forward is that commodities without accompanying futures markets also saw large price rises in 2008, and that, therefore, speculation with futures cannot be behind the price rises. However, the demands for different commodities are often linked, as many commodities are substitutes for one another. For example, when the price of palm oil increases, the demand for palm oil falls and the demand for soybean oil increases. Also, many commodities markets are also affected by price changes in the oil market. For example, if the price of oil rises then this increases the cost of fertilisers and transportation. Speculation in the oil market can have knock-on effects in many other markets.

Thus, despite arguments to the contrary, there does appear to be a mechanism by which speculation via futures can, in theory, impact on physical commodities prices. The IMF has confirmed this link:

A price bubble is certainly a theoretical possibility and a periodic occurrence in financial and housing markets. Excessive speculation in the commodity futures market could, in principle, push up futures prices and (through arbitrage opportunities) spot prices above levels justified by fundamentals. However, an alternative view is that increased investor activity, by providing the necessary liquidity, is simply a vehicle to translate changing views about fundamentals into changing prices. In this case, higher prices would be the cause (rather than the effect) of increased investor participation. In the intermediate case, there could be a two way causality between prices and speculation, so that higher prices induce an increase in speculation, which in turn pushes prices up further until a new equilibrium is achieved.¹¹⁴

As has the UK government:

Some commentators have argued that a 'wall of speculative money' has had a distorting impact on agricultural commodity prices. Data imperfections, and the nature of the statistical tests that can be performed, make it impossible to definitively prove or disprove such arguments. Whilst theory allows for the possibility of speculation having an impact on prices in various ways, a review of the various potential mechanisms whereby speculation might have distorted markets suggests scepticism that speculators have played a significant causal role in the price spikes.¹¹⁵

Conclusions

We have seen that synthetic ETCs do not always behave as investors may anticipate. For example, when using futures-based ETCs, returns can be boosted or eroded as a result of roll yield. The first question a responsible investor should ask is whether or not retail investors will be able to understand where roll yield comes from, and how it may affect their investments. Moreover, it should be understood that just because a market currently exhibits backwardation, this does not mean that it won't become contango in the future. Whilst ETCs that deploy dynamic rolling may minimise roll-yield costs, they also come with higher management fees. We believe it is highly unlikely that retail investors will fully comprehend these dynamics, and thus recommend that futures-based ETCs are not marketed to retail investors.

Some synthetic ETCs utilise total-return swaps instead of futures. Such funds do not need to worry about roll yield, as this risk has been passed on to swap counterparties, who generally hedge their exposure using futures. However, other problems associated with synthetic ETFs more generally, such as counterparty risk, collateral quality concerns, and systemic risks stemming from investment banks struggling to cope with en masse withdrawal from funds, once again emerge.

On top of the above concerns, many analysts have also questioned whether synthetic ETCs are really passive at all, or if they instead interfere with the

markets that they track. Many empirical studies have probed this issue, but the evidence, so far, is inconclusive, with some studies supporting the argument that speculation reduces volatility in commodities markets, and other results vindicating the opposing conjecture. However, despite many commentators putting forward arguments to the contrary, there does appear to be a mechanism through which speculation could, at least in theory, impact on the underlying physical market.

The debate as to whether speculators facilitate price discovery and smooth volatility or cause asset bubbles and increased volatility, appears to essentially come down to whether or not one believes in the efficient market hypothesis. Those who have full confidence in markets believe that as more speculators enter a market, volatility will decrease. However, many researchers have cautioned against blind belief in free markets. For example, the following prominent economists have argued that factors such as market psychology, ill-informed noise traders, technical analysis, algorithmic trading, and high-frequency trading can lead to markets not reflecting fundamentals:

- John Maynard Keynes
- Hyman Minsky (Washington University)
- Andrei Shleifer (Harvard University)
- Robert Shiller (Yale University)
- George Akerlof (University of California, Berkeley and Nobel laureate)
- Daniel Kahneman (Princeton University and Nobel laureate)

Behavioural economics is now an established economic discipline, and 'herd instincts' have been well documented, and some academics have linked 'irrational exuberance' to market bubbles and crashes.¹¹⁶

For example, researchers from the IMF and University College London found that:

*... informational cascades (i.e., situations in which every agent chooses the same action regardless of his own private information) can indeed arise in financial markets. As a consequence, financial markets can fail to aggregate private information efficiently, and misalignments of the price with respect to the fundamental can occur. Furthermore, we show that informational cascades can spread from one market to another, thus generating financial contagion.*¹¹⁷

Similarly, researchers at the World Bank concluded:

*... by analyzing unique, monthly asset-level data from the pioneer case of Chile, this paper shows that pension funds tend to herd. This is consistent with pension funds copying each other in their investment strategies as a way to extract information, boost returns, and reduce risk.*¹¹⁸

For further evidence that markets are not always driven by fundamentals, we can turn to research from Ohio State University and the University of Michigan that investigated whether sunny days improve stock market performance:

*We find that sunshine is highly significantly correlated with daily stock returns... These results are difficult to reconcile with fully rational price-setting... The broadest message of this paper is that to understand security price movements, it is important to go beyond the statistical behavior of prices and fundamentals to study what influences investor moods and emotions.*¹¹⁹

Moreover, a cursory glance through economic history, at the many bubbles and crashes that have occurred, demonstrates that financial speculators often seriously misprice assets. The financial crisis of 2008 demonstrated

that unregulated markets are not safe; they do not necessarily lead to the best outcomes for society or for the economy. Even Alan Greenspan, the former Chairman of the Federal Reserve, has acknowledged that too much faith was placed in free markets in the run-up to the crisis.¹²⁰ However, despite the crash being a powerful advertisement for the failure of laissez-faire financial markets, many traders, lobbyists, and the UK government still maintain that unconstrained commodities markets work and can be relied on to reflect the underlying fundamentals of supply and demand.

Many prominent international organisations have spoken out against speculators and have urged regulators to clamp down on them. Those calling for limits on speculation in the food markets include:

- OPEC¹²¹
- George Soros¹²²
- United Nations Conference on Trade and Development (UNCTAD)¹²³
- International Food Policy Research Institute¹²⁴
- Heads of developing nations, for example, the Dominican Republic¹²⁵
- Forty-eight agricultural ministers from countries such as Brazil, Russia, and China¹²⁶
- US government¹²⁷

The concern is that herding behaviour from speculation has begun to dominate the commodities derivatives markets, instead of supply and demand fundamentals. In addition to possibly driving up prices, this speculation may be exacerbating volatility, by causing the market to over and undershoot in response to its news on fundamentals. Market volatility can be just as harmful to food markets as high prices; for example, as explained by the World Development Movement:

Increases in price volatility have a hugely damaging impact on food producers. They rarely gain from price increases when markets are volatile. When prices fall the reductions are passed down the supply chain to producers whose costs and margins are squeezed. However when prices recover benefits are absorbed by other participants in the supply chain, such as food processing corporations, leaving food producers still suffering from lower prices.¹²⁸

The risk of excessive speculation should not be dismissed given that speculators now constitute the majority of total participants in many commodities markets. As we can see from Figure 10, on average, speculators made up 66 per cent of market participants in 2008. The markets for natural gas and WTI crude were the least speculative, with speculators comprising only 38 per cent and 41 per cent of these markets respectively. In contrast, the markets for wheat and live cattle were the most speculative, with speculators holding 84 per cent and 87 per cent of these markets respectively. Moreover, the rate at which speculation has increased over the past decade, as shown in Figure 11, gives rise to serious concern. While speculation undoubtedly brings valuable liquidity to a market, this does not mean that speculators should not be subject to some limitations. As famously articulated by Keynes:

Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation.¹²⁹

Given that excessive speculation has disrupted other markets, regulators must take this threat seriously.

In addition, as commodities markets are so important, caution must surely be prioritised over investors' interests.

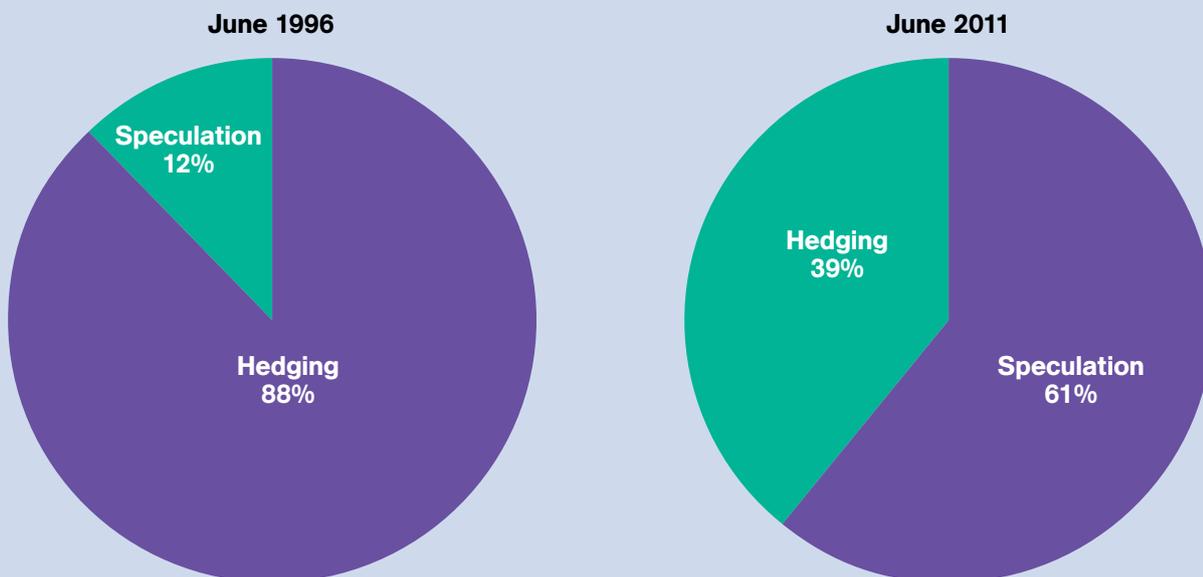
Table 4. Market share of long open interest in commodities markets.¹³⁰

Market Share of Long Open Interest in Commodities Markets in 2008				
Commodity	Physical Hedger	Traditional Speculator	Index Speculator	Speculation Total
Natural Gas	62%	10%	28%	38%
WTI Crude Oil	59%	10%	31%	41%
Soybean Oil	46%	22%	32%	54%
Corn	41%	24%	35%	59%
Gasoline	41%	20%	39%	59%
Sugar	38%	19%	43%	62%
Heating Oil	37%	16%	47%	63%
Cocoa	33%	48%	19%	67%
Cotton	32%	27%	41%	68%
Soybean	30%	28%	42%	70%
Silver	27%	46%	28%	74%
Coffee	26%	35%	39%	74%
Gold	22%	55%	23%	78%
Lean Hogs	18%	20%	63%	83%
Wheat	17%	20%	64%	84%
Live Cattle	13%	27%	63%	87%
Average	33%	27%	39%	66%

To make matters worse, many commentators argue that the statistics displayed in Table 4 and Figure 7 actually underestimate the amount of speculation in these markets; a consequence of how speculators and hedges are classified according to the CFTC. Large investment banks such as Goldman Sachs are classified as hedgers, because such banks often need to hedge exposure they have taken on while market making. However, critics argue that investment banks also engage in proprietary trading, partly because this is an essential component of market making that distinguishes market makers from brokers, but also because they often have additional proprietary trading desks. As a result, anti-speculation campaigners have taken issue with the fact that Goldman Sachs's trades are put in the same category as producers' and consumers' hedging, rather than classified as speculators, and question how this may impact the results drawn from empirical studies.

Given the life-supporting importance of food and energy markets, taking a gamble, by confidently concluding that there is no link between speculation and food prices, would be neither prudent nor proportionate.

**Figure 7. Market share of hedgers and speculators in the Chicago wheat futures market.¹³¹
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If investors do not find such arguments compelling, they should also note that the regulatory environment surrounding ETC investing is uncertain. The US Dodd-Frank Act legislated for position limits against speculators to be introduced. However, NGOs have expressed concern that the financial lobby are influencing the CFTC, and that the position limits ultimately introduced are likely to be too generous and thus ineffectual. The European Commission is also considering taking action against commodities speculators, and so, in short, the regulatory situation for commodities-tracking ETFs is currently unclear, but there is a serious possibility that action may be taken on both sides of the Atlantic to crack down on this form of speculation. Thus, even if they could confidently reject the hypothesis that ETF investment has affected food prices, investors still should be cautious about investing in this sector.

In sum, we recommend that responsible investors avoid synthetic ETCs.

Physically backed ETCs

Some ETCs do not invest in derivatives, but instead buy and hold the physical commodity itself. Such funds track the spot price of the metal, rather than the price of the futures. Investors can avoid roll-yield risks by investing in physical commodities, but instead incur expensive storage costs and charges associated with tying up capital in a non-interest- or dividend-bearing vehicle. In fact, these penalties may well outweigh any gains in the commodity itself. Originally, physically backed ETCs only existed for precious metals, with gold being particularly popular, as it is relatively cheap to store in relation to its value, and it generally has a negative roll yield, which makes futures an unattractive investment vehicle.¹³² However, there are now also physically backed ETCs that invest in base metals, such as copper.

Risks: Impact on underlying markets and volatility

Many have raised concerns about the effect that physically backed ETFs may be having on metal prices, i.e. is ETC investment pushing up costs for industrial users? For example, the IMF issued the following warning:

The recent increase in commodity price volatility has been partly attributed to the strong flows into commodities based funds, particularly gold ETFs, amid mounting concerns that the flows are distorting prices away from fundamental factors. Gold ETF funds received net inflows of around \$12 billion in 2009 and another \$9 billion in 2010 as prices surged 62 percent in the two years to over \$1,400 an ounce. However, flows sharply reversed course in January 2011, with \$3 billion in outflows in one month alone, driving prices sharply lower. Such dynamics raise concerns that a reversal of investor flows from other commodity-based funds could potentially increase volatility in the broader market and influence price action in related sector indices.¹³³

Apologists argue that those who invest in physical commodities do so because the market is indicating that these resources will be in greater demand in the future. In other words, the market is incentivising investors to store physical commodities, as prices reflect the fact that these resources are more needed in the future than in the present. However, of course, this argument only holds if future prices are accurately reflecting supply and demand fundamentals, which, as was explained in the previous section of this report, is a matter of some debate.

Goldman Sachs nevertheless argues that:

Ultimately, a physical base metal ETF would be a product that allows those without the ability to buy futures to take a metal position in a time of surplus with forward views of metal appreciation, thus bringing new capital to the market and financing the storage of metal for future use.

In order for the product to be seen as store of value, the buyer of the ETF would have to believe that there is sufficient shortage in the future at the entry price as to earn a return great enough to overcome the opportunity cost of forgoing a dividend or yield on that capital, on top of paying the fees for storage.

Fundamentally, we don't see a physical ETF as anything different than the contango in a futures curve, and not 'new demand', but just another player in the fundamental role of financing the storage of a commodity needed in the future.¹³⁴

Such investment activity is likely to raise short-term prices and depress future prices.

Goldman Sachs does, however, acknowledge that:

... such a fund could also build inventories that might be a little more "sticky" than traditional working capital management.¹³⁵

Let us investigate this scenario in a little more detail. What happens if investors are still buying units in physically backed ETFs even when the market is in backwardation? Backwardation is a somewhat unusual state for a market to be in, as, given inventory costs and the cost of tying up capital without interest or dividends, we would typically expect a market to be in contango. Thus, backwardation implies that there is a near-term shortage in the market, and, if the market is working efficiently, it will incentivise those holding inventory to start selling this stock. But, if ETF investors do not respond to this signal and instead continue buying, they could actually exacerbate the problem and push prices up even further.

Some metal markets are at greater risk than others in this regard. For example, there is a particular focus on price disruption in the copper market, and, the Managing Director of Bloomsbury Minerals Economics has warned that:

For the next two years there's a predicted shortfall in production of copper against consumption... Introducing new investment buyers of the physical stock could have an explosive upward pressure on prices in copper.¹³⁶

Similar concerns have been raised by Citigroup:

Fundamentally copper is tight anyway... Add an ETF to that and it becomes explosive.¹³⁷

And by Goldman Sachs:

However, what can't totally be discounted is that a closed-end product launches anyway in a tight market like copper or tin, therefore exacerbating short-term price movements by deploying committed capital into a deficit market, thus bringing forward critical shortages by removing inventory or competing for material in a deficit market.¹³⁸

However, Goldman Sachs argues that this risk is small, and that it is even smaller in the markets for many other metals, such as that for aluminium:

Based on our balance tables and current exchange inventories, we believe an initial aluminum ETF would have to be well over a million tonnes to disrupt the market, over half a million for zinc, and over 50 thousand tonnes for nickel and copper.

By value, this would equate to over 2 billion US dollars worth of aluminum, over 1 billion USD in zinc or nickel, and nearly half a billion USD for copper. Though these are not large numbers compared to the size of other asset markets, or even the roughly USD75 billion in physical gold ETF holdings, collectively or individually they are large amounts for an initial position to launch, which is where we see the most volatility created from these products.¹³⁹

However, ETF investors are generally long-term long-only investors in the market, and many may not be savvy enough to sell when the market is in backwardation. Not only does this risk disrupting current prices, it also means that the investor

does not get the benefit of backwardation roll yield, as they are investing in the physical commodity, rather than futures. While base-metal ETFs are unlikely to ever be as popular as precious-metal ETFs, as they are less cost-effective (more on this later), it does not seem unreasonable to assume that the thresholds suggested by Goldman Sachs could very easily be reached. Finally, it is worth remembering that, with many investment banks now offering both ETFs and storage facilities, the banks pushing ETFs onto customers will enjoy high management and inventory fees, regardless of whether or not ETF investors are making money themselves. Providing storage facilities for commodities is now a significant source of revenue for many investment banks.¹⁴⁰ For example, Goldman Sachs owns 79 per cent of the London Metal Exchange (LME)-approved warehouses in Detroit.¹⁴¹

An additional risk has also been suggested by some analysts: that other metals might one day be viewed as a substitute for gold, e.g. that they may also be seen as a safe-haven amidst a 'flight to quality', or used as a hedge against inflation.¹⁴² Such dynamics risk causing disconnects between prices and supply and demand fundamentals in metals markets.

Moreover, for many commodities, high inventory costs, insurance costs to protect against the risk that stock may be stolen from the warehouse, and the cost of tying up capital without interest or dividends, will make investing in physically backed ETFs very risky, particularly for retail investors. As articulated by Standard Chartered:

Overall, we think investing in physical base metal ETFs is an expensive way of gaining exposure to commodity markets and long-term investors would have to see a persistent rise in prices over time just to break even.¹⁴³

For example, as noted by Barclays:

If you invest in aluminium physically-backed ETFs, just to break even, you need to generate 5% of the return over a year to match the warehousing cost.¹⁴⁴

Société Générale has also issued such a warning:

With aluminium currently at \$2,400/t, rent, insurance and other costs would absorb around 4-5% of the cost of aluminium per year.¹⁴⁵

As has RBC Capital Markets:

It's one thing to store gold or silver for ETFs, but when you start paying for warehouse charges, for rent and insurance and the issuer's own fees on something like copper or aluminium, you're starting the year down several percentage points... You've got to really be bullish.¹⁴⁶

As already mentioned, precious metals – such as gold, silver, platinum, and palladium – generally have much lower storage costs than base metals – such as copper and aluminium – as they have greater value per unit of volume. Thus, for base metals, the vast amount of the metal that would have to be stored for a fund to have significant value, would, in many cases, result in prohibitively large fees. This has led many analysts to conclude that physically backed base-metal ETFs are unlikely to ever truly take off. In contrast, storage costs are far less likely to undermine the viability of physically backed precious metal ETFs.

In a bid to avoid these high costs, some providers of base-metal ETFs, such as Glencore, have suggested using cheaper warehouses that are not part of the LME.¹⁴⁷ Moreover, even though it is unclear whether many regulators will sign off on ETF products that utilise non-LME storage facilities, some analysts are hypothesising that the time will come when commodities are stored in the ground, i.e. never removed from the ground in the first place.¹⁴⁸ Anticipation of such a trend may indeed be why some commodities producers have teamed up with ETF providers to co-sponsor new funds. In fact, the FT has argued that this progression:

... is really the re-direction of financial capital to the producers directly... The bigger picture, hence, is the elimination of the conventional banking intermediary in commodity financing... The question, though, is will investors realise that putting money into physically-backed ETFs essentially means they are funding producers direct? – albeit through exchange-trade (debt) notes, rather than secured loans or other forms of debt capital, as per traditional finance.¹⁴⁹

One risk to investors that should be noted before we move on is the fact that if a physically backed ETF eventually amassed a significant share of a given market, LME rules dictate that the fund would then have to start lending the metal out to others.¹⁵⁰ This would introduce counterparty risk.

Finally, investors should be aware of the fact that investment in physically backed ETCs has already been thought by many to have pushed up prices in gold. For example, Deutsche Bank has listed 'growth in physically backed ETFs' as one of the key factors driving up gold prices.¹⁵¹ While gold is not significantly used in manufacturing and construction, and thus, a gold bubble is of less concern than a bubble in a metal, such as copper, that has productive industrial uses, ETC investment in gold serves to illustrate how, if investment in base metals takes off, speculators may benefit at the expense of the real economy.

Conclusions

As physically backed ETCs become increasingly popular and expand into metals beyond gold and silver, many analysts have expressed concern that this investment will start to interfere with the markets for many metals that are crucial components in industry, construction, and manufacturing. For example, some commentators have speculated that other metals may one day become a substitute for gold, in which case investment could become driven by flights to quality or inflation hedging, instead of by supply and demand fundamentals. However, even if the latter never occurs, there are concerns that ETCs may exacerbate shortages in already tight markets, such as that for copper.

Investment banks, such as Goldman Sachs, argue that the market is incentivising investors to store physical commodities, and that prices reflect the fact that these resources are more needed in the future than in the present. Thus, such investment activity is likely to raise short-term prices but depress future prices. However, this hypothesis makes the assumption that ETC investors are savvy enough to respond to market signals, and that they will sell when prices indicate that the market is suffering from a near-term shortage. Given that ETCs are frequently marketed to retail investors, who do not extensively study supply and demand fundamentals, this is perhaps an overly optimistic outlook.

Of course, investment in physically backed ETFs that track base metals has, so far, only been very moderate.¹⁵² If this remains the case, then ETC investment is unlikely to become a significant factor behind any price disruption in these markets. However, if investment picks up, then price effects may emerge, as have already been seen in the gold market. This is becoming more probable, as an increasing number of ETF providers express interest in launching base-metal funds.¹⁵³

The sheer size of some *individual* ETCs also gives cause for concern. This is an issue that the FT has highlighted:

This evolution opens up some potentially very worrying issues about scale – take gold and the huge success of just one US-based ETF, the Street Tracks Gold Trust. ... Launched just a few years ago it is already worth a staggering \$20 billion and sits on 659 metric tons of the stuff, which is more than held by the Bank of England and most other central banks. According to one report this one fund is buying up every year between 13 per cent and 14 per cent of annual mine supply and has more assets than the next five largest gold mutual funds combined. Such a huge concentration of physical ownership, especially by a legion of private investors through a fund, raises the possibility that a sudden loss of confidence in gold could spark a run, with the ETF selling huge quantities of gold overnight, causing prices to plummet even further.¹⁵⁴

Table 5. Main uses for metals.

Main Uses for Metals	
Aluminium	Is mainly used by the transportation, packaging and construction industries
Copper	Is mainly used in electronics, but is also used in construction and transportation
Lead	Is mainly used to make batteries, but is also used to manufacture chemicals and pigments
Zinc	Is mainly used in galvanising, ie, protecting other metals against rust and corrosion, but is also used to make brass and other alloys
Nickel	Is mainly used to make stainless steel and other alloys
Tin	Is mainly used to make solders and tin plate, which protects against corrosion
Gold	Is mainly used in jewellery, electronics, dentistry and engineering
Silver	Is mainly used in jewellery, silverware and electronics
Platinum	Is mainly used in catalytic converters, laboratory equipment and jewellery
Palladium	Is mainly used in catalytic converters, electronics and jewellery

Of course, it is highly unlikely that investment in base metals will ever become anywhere near as popular as investment in gold, as storage costs are far higher, and, in many cases, may in fact prove to be prohibitively expensive. However, ETCs that track other precious metals, such as silver, platinum and palladium, are likely to grow in popularity. Thus, these are the markets to watch for potential price disruption. Tight markets, such as copper, where even a relatively small amount of ETC investment (in comparison to gold) may exacerbate existing shortages, should also be carefully monitored.

While speculating on metals is obviously a less sensitive issue than speculating on food, it is important to remember that metals are of crucial importance in industry (Table 10). Even metals such as gold and silver, which are generally perceived to be 'useless' and just of aesthetic value, have industrial uses, for example, in electronics. However, it is the markets for metals that are used in large quantities, for example metals used in manufacturing and construction, where price disruption is likely to have the largest knock-on effects in the real economy. Such metals are typically base metals, rather than precious metals, and so these are the markets that responsible investors should seriously question whether or not their investment will really be passive at all. In tight markets, such as copper, this is doubtful, and investors should consider whether they are comfortable exacerbating shortages and thus pushing up prices for those who will actually put the metal to a productive use. Is this really what 'investment' is supposed to mean?

We are now in a position to put forward some factors for investors to consider before buying physically backed ETCs:

1. Do not invest in physical ETCs that invest in markets that are already suffering from shortages or predicted shortages.
2. Check the storage charge for any base metal in which you are considering investing. Calculate to what extent prices will have to rise in order for you to simply break even. Be aware that for many base metals – for example, aluminium – storage charges are so high that you would have to be extremely bullish for long-term investment to be sensible. Investment in such metals may only be viable when you are dealing with a very short investment time horizon, and most retail investors will not be interesting in engaging in very short-term speculative investment, and, indeed, should not be encouraged to do so.
3. Be conscious of the fact that if other metals are one day viewed as a substitute for gold, i.e. if investment is sometimes driven by flights to quality or inflation hedging, then this is a sure sign that markets are becoming divorced from supply and demand fundamentals. Should a responsible investor be taking part in such activity? The answer to this will almost

certainly depend on the metal concerned. If you are dealing with a precious metal that is only used in small quantities in industry, then this is of far less concern than if you are dealing with a metal that is used extensively in construction and manufacturing.

4. Be aware of what percentage ETC investment is in any given market. If the market is not suffering from a shortage, and ETC investment is only a small percentage of total investment in that market, then it is unlikely that your investment will contribute towards price disruption. However, if ETC investment becomes anywhere near as popular in other metals as it is currently for gold, then a responsible investor should begin to consider whether or not their investment is really passive at all. If ETC investment is interfering with the functioning of a market, then, depending on the metal concerned, this may or may not be an appropriate market for investment.
5. Currently there are no physically backed ETCs that track agricultural commodities. This will very likely remain the case, as ETC investment in physical produce would be so politically sensitive, that it is unlikely such funds would ever be given the go-ahead. However, if such funds do emerge, a responsible investor should not participate in these markets. As previously discussed, food markets are so vitally important that caution must surely be prioritised over investors' interests. There would also be enormous reputational risks from investing in such products.

When weighing up all these considerations, it appears that physically backed ETCs that invest in precious metals, such as gold, silver, platinum and palladium, may be viable additions to an investment portfolio. In contrast, physically backed ETCs that invest in base metals, such as copper, aluminium, zinc, and nickel, should most probably be avoided; reasons vary from high storage costs to concerns that any profits accruing to your fund may be coming at the expense of the real economy.

6. Conclusion

ETFs have thrived over the past two decades, and global assets under management now exceed \$1.4 trillion.

Originally, ETFs were simple, vanilla products that emerged in response to criticisms of the mutual fund industry. They have since moved on from their equities roots, and now cover a wide range of asset classes, including fixed income, currencies, and commodities. Moreover, their fundamental structure has evolved and mutated over time.

First, in a bid to boost returns, ETF providers started lending out ETF assets, thus, introducing counterparty risks where there had once only been tracking errors. However, this was only the tip of the iceberg, as the emergence of synthetic ETFs signalled a fundamental departure from their originally conceived simplicity. Tracking errors had now formally been swapped for counterparty risks; moreover, the accompanying leverage and increase in complexity prompted concern from regulators. What systemic risks may slowly be building up?

Many analysts have drawn comparisons between ETFs and the ill-fated industry for CDOs, whereas other commentators have dismissed such reasoning as 'unnecessary and sensationalist'.¹⁵⁵ In many ways, the risks posed by ETFs seem far less significant than those posed by credit derivatives. For example, the risks associated with CDOs were severely underestimated because analysts incorrectly assessed the level of correlation between the assets that made up the CDO. ETFs have also not been given unjustified first-class grades from credit rating agencies (CRAs); in fact, they are not rated by CRAs at all. (Although, admittedly, ETFs are generally perceived to be 'safe', and this may give investors a false sense of security that could one day prove to have been dangerous.) In addition, while ETF collateral risks should not be downplayed, it is unlikely that the collateral posted will turn out to be as worthless as many of the assets backing CDOs. Similarly, a much higher percentage of CDOs were leveraged than ETFs.¹⁵⁶ Nevertheless, there are some similarities between the products and their evolution. For example, both industries undoubtedly saw rapid growth, conflicts of interest, innovation leading to rapidly increasing complexity, leverage and long supply chains, and poor levels of transparency. So while the products are extremely different, some general themes do emerge.

In this report, we have explored the issues surrounding ETFs, in all their forms, and our analysis had led us towards a very simple conclusion. There is a lot of merit in the initial conception behind ETFs. Under 'normal' market conditions, many investors will be better served by passive rather than active investment strategies. In addition, physically backed ETFs have other benefits over mutual funds and unit trusts, such as increased transparency and intra-day tradability. This is not to say that physically backed ETFs should be bought indiscriminately; there are many other factors to consider. For example, management fees can often be excessively high, and investors are sometimes not properly compensated from the risks they shoulder as a consequence of securities lending. Finally, it is crucial to note that ETFs tracking small-cap markets may be disrupting these markets and, thus, responsible investors should avoid such investments.

Commodities-based, exchange-traded products should also be treated with caution for exactly the same reason. While physically backed ETCs that track precious metals appear to be both financially viable, due to low inventory costs, and minimally disruptive to the real economy, ETCs that track base metals are likely to be both extremely expensive, from a storage perspective, and could possibly interfere with the efficient running of metals that are extensively used in the manufacturing and construction industries. The probability of the latter

occurring increases in a market that is already suffering from a shortage, such as that for copper, but also as the ratio of ETC investment to total investment in the market increases.

However, as we have seen many times before with other financial products, while the initial idea behind ETFs may have plenty of merit, subsequent 'innovation' can erode many of the original benefits, such as simplicity and transparency, and introduce a whole host of new problems. Synthetic ETFs are no exception. Investors may now find themselves looking at perplexing changes in the value of their investments, as a result of daily rebalancing and volatility, exposures to large investment banks that they may not even have been aware of, and illiquid collateral as a result of conflicts of interest. They may unwittingly even be part of the build-up of a new kind of systemic risk. In addition, derivatives mean leverage and, as we have seen with the rogue ETF trader at UBS, leveraged products have the ability to destabilise major global banks. Investors may also look to the arrival of actively managed ETFs, as a perfect example of how initial concepts may be completely forgotten amidst the frantic hurry to innovate.

In addition, there is an on-going heated debate about whether or not extensive investment in synthetic ETCs has led to commodity prices becoming divorced from supply and demand fundamentals. So far, the empirical evidence has been inconclusive, with some studies supporting and others disproving the hypothesis. However, there is a theoretical link between speculation in the futures market and prices in the spot market, so, in this light, is it disappointing to see investors' interests being prioritised over the functioning of these vitally important markets. While we cannot conclusively say that speculation is increasing prices and volatility, we would encourage responsible investors to err on the side of caution.

Of course, total AUM in ETFs are still only a small fraction of the total AUM in mutual funds. As noted by the New York University Stern School of Business:

While size is only one of the many determinants of an entity's ability to generate systemic risk, the fact that the ETF industry is so much smaller than the mutual fund industry means that the ETF industry is likely to be much less capable of generating systemic risk than the mutual fund industry.¹⁵⁷

This is undoubtedly true, but it does not detract from the fact it is clearly worth keeping a vigilant eye on this industry. If the popularity of ETFs continues to increase at the same pace as witnessed in recent years, and, in particular, if synthetic ETFs grow to become a more significant percentage of total ETF AUM, then ETFs could very plausibly become a serious source of systemic risk. For now, responsible asset managers should take care to avoid becoming part of the problem, for example, by avoiding ETFs based on illiquid markets. In addition, responsibly investors should ensure that they are not pushing complex, hard-to-understand products on retail clients. For example, synthetic ETFs, which may deviate from their advertised target return if held for more than one day, should not be marketing to the general public.

The list of regulatory bodies and central banks to have raised concerns about the industry now includes the FSB, the US SEC, the Financial Services Authority, the Hong Kong Securities and Futures Commission, and the Reserve Bank of Australia. In addition, Blackrock, the owner of iShares and, thus, the No. 1 provider of ETFs globally, has called for more transparency around ETFs.¹⁵⁸

The regulatory situation in Europe is currently unclear, as the European Securities and Markets Authority (ESMA) is holding a consultation into, for example, how reporting requirements should be tightened and whether or not the way ETFs are labelled should be altered so that it is clearer for consumers what each fund actually does. However, if regulators take this opportunity to thoroughly reform the industry, then ETFs could once again prove to be simply, transparent investment vehicle, rather than a cause for concern.

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