



Exchange Traded Funds and Structured Products

This chapter examines exchange traded funds (ETFs) and ‘structured products’. Some, but not all, ETFs and structured products are effectively derivatives.

Exchange traded funds

ETFs are investment funds that can be bought or sold on an exchange like a share. They may be of two types:

- ‘Index mutual funds’ or ‘Cash ETFs’ whose composition and performance matches a specified equity or other price index; such funds may hold the actual underlying asset in the same proportion as the index. For example, an ETF mirroring the Nifty index might hold the shares comprised in the Nifty in exactly those proportions; a gold ETF will hold gold. Cash ETFs may be geared up by borrowing.
- Synthetic funds whose performance matches a specified underlying without actual ownership of the underlying.

ETFs usually trade close to, but not exactly at, their Net Asset Value (NAV) although depending on demand and supply they can trade at significant premia/discounts. The NAV is the value of the assets owned by the fund but the shares of the fund may trade at values higher or lower than that underlying value. To the extent the fund actually owns income-earning assets; ETFs may have a yield through dividends.

Most ETFs have an annualised expense ratio – ranging from 0.1 per cent of the price or NAV to around 2 per cent, depending on the liquidity, quantity of assets under management and strategy. (A strategy requiring more frequent trading or ‘rolling over’ of underlying assets will require higher costs than one involving passive holding of a fixed set of assets.) In this respect, the cost of holding the index fund is different from an actual holding of the underlying.

As with company shares, unless there is an Initial Public Offering (IPO) or Follow-on Public Offering (FPO), most trading takes place in the secondary market. Only some dealers buy ETF units in large blocks called ‘creation units’ directly from the ETF distributor. The rest of the trading is between secondary

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market participants. ETFs were first successfully introduced in the United States in 1993.

Table 16.1 below lists examples of the ETFs traded on Indian bourses to give readers a flavour of the kinds of schemes available.

Table 16.1: ETFs traded in India
(Top 50 by AUM, as of August 2016) along with their annualised returns

Schemes	Latest price	Percentage change	Asset size ₹ cr.	NAV ₹	1 year	2 year	3 year
SBI - ETF Nifty 50	87.61	0.61	7,625.01	87.92	5.3	--	--
SBI - ETF Sensex	297	1.66	2,210.55	296.71	3.6	6	15.2
GS CPSE ETF	22.94	0.61	2,136.27	22.91	-0.5	-2.6	--
GS Gold BeES	2,870.25	0.13	1,790.05	2,923.65	22.8	4.8	2.1
Kotak Banking ETF		--	1,430.43	192.76	5.1	--	--
R*Shares Gold ETF	2,730.15	0.03	1,410.93	2,827.74	22	3.7	1.7
GS Liquid BeES	1,000.00	0	1,072.29	1,000.00	--	--	--
GS Nifty BeES	880.64	0.68	1,045.14	884.21	4.7	6.3	15.3
SBI - ETF Gold	2,882.70	-1.02	1,011.24	2,999.68	22.8	4.7	2.1
GS Bank BeES	1,914.98	1.31	705.89	1,921.80	4.7	12.9	23.8
HDFC Gold Exchange Traded Fund	2,917.45	-0.23	637.97	2,975.11	22.2	4.5	1.9
Kotak Gold ETF	273.7	-0.33	515.31	291.62	22.6	4.6	1.9

EXCHANGE TRADED FUNDS AND STRUCTURED PRODUCTS

Schemes	Latest price	Percentage change	Asset size ₹ cr.	NAV ₹	1 year	2 year	3 year
UTI Gold Exchange Traded Fund	2,833.90	-0.26	483.12	2,929.04	22.9	4.7	2
R*Shares Banking ETF	2,063.10	1.36	349.87	2,069.05	5.1	13.6	24.8
Kotak Nifty ETF	870	0.81	345.96	875.3	3.7	5.7	14.7
Axis Gold ETF	2,843.95	0.14	235.67	2,977.54	22.6	4.6	2
UTI Nifty Exchange Traded Fund	880	1.31	226.76	880.71	--	--	--
Birla Sun Life Nifty ETF	88.87	0.7	191.02	91.27	5.4	7.2	16.2
ICICI Pru Gold iWIN ETF	92.51	1.44	125.72	302.11	-87.7	-66.9	-52.7
Kotak PSU Bank ETF	307.74	6.88	108	303.26	-10.8	-7.8	9.5
GS Junior BeES	225.2	-0.05	107.49	226.84	8.4	17.9	25.9
IDBI Gold Exchange Traded Fund	2,907.05	-0.35	101.29	3,058.25	22.8	4.8	2
Birla Sun Life Gold ETF (G)	2,980.00	0.85	85.01	3,060.49	22.8	4.8	1.8
Can Gold Exchange Traded Fund	2,955.00	0	79.67	2,955.03	20	3.7	0.7
SBI - ETF Nifty Bank	87.61	0.61	71.13	192.74	5.2	--	--

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Schemes	Latest price	Percentage change	Asset size ₹ cr.	NAV ₹	1 year	2 year	3 year
LIC NOMURA G-Sec LTE Fund - RP (G)	16	0	70.86	15.87	12.5	--	--
Motilal MOSSt Shares NASDAQ 100 ETF	306.99	-0.89	66.35	319.02	9.3	15.8	18.6
Quantum Gold Fund	1,407.80	-0.49	65.33	1,457.19	22.6	4.6	2
HDFC Nifty ETF	874.3	0.83	45.7	874.46	--	--	--
Motilal MOSSt Shares Midcap 100 ETF	15	0	39.74	15.48	8.9	17.8	29.4
GS PSU Bank BeES	328.75	5.34	38.18	329.63	-10.8	-5.7	11.1
Motilal Oswal MOSSt Shares Gold ETF	2,440.05	0	29.66	2,529.56	-6.1	-7.5	-4.2
ICICI Prudential CNX 100 iWIN ETF	92.51	1.44	27.62	92.31	5.4	8.5	21.1
R*Shares Nifty ETF	89.68	0.65	26.19	90.06	5.2	7.2	--
Motilal MOSSt Shares M50 ETF	81.44	-0.07	22.5	83.67	4.3	3.8	16.6
GS Infra BeES	291.22	0.08	17.06	293.51	-8	-2.3	11.3

EXCHANGE TRADED FUNDS AND STRUCTURED PRODUCTS

Schemes	Latest price	Percentage change	Asset size ₹ cr.	NAV ₹	1 year	2 year	3 year
R*shares Consumption ETF	40.27	1.46	16.2	40.15	10	14.8	--
UTI Sensex Exchange Traded Fund	284.3	0.41	15.04	285.12	--	--	--
R*Shares Dividend ETF		--	13.83	22.39	10.1	5.6	--
SBI - ETF Nifty Next 50	228.3	1.87	11.56	227.98	9.5	--	--
Edelweiss ETS - Nifty (Nifty EES)	6,800.00	0	11.11	8,857.63	5.3	--	--
Kotak Sensex ETF	288	1.03	11.11	288.64	3.4	4.2	14
R*shares CNX 100 ETF	90.02	0.75	7.99	90.3	4.8	8	17.1
GS Hang Seng BeES	2,021.59	-2.23	5.8	2,301.83	-0.1	2.4	6
ICICI Pru SPICe Plan	289.1	0.94	5.29	289.71	3.6	5.4	11
HDFC Sensex ETF	2,831.70	0.77	2.14	2,850.36	--	--	--
GS Shariah BeES	199.94	0.47	2.02	198.99	3.5	7.2	13.6
IIFL Nifty ETF		--	1.5	891.36	10.7	21.5	20
SBI - ETF BSE 100	89	0	1.17	90.69	5.9	--	--

Source: Moneycontrol.com.

The table shows both the latest price and the NAV. The difference between them is the premium or discount. For example, the second largest ETF by assets under management (AUM) in India – SBI ETF Sensex – was trading at a premium since the market price exceeded the NAV. The column on asset size shows the size of aggregate assets in the fund. Going by asset size, Gold ETFs appear to be one of the most popular ETF sub-categories on Indian bourses. While Indians were already buying equities and mutual funds in ‘dematerialised’ or ‘demat.’ form, gold was generally confined to actual physical gold. This entails risks and costs, especially if the gold bought was a relatively small quantity as it is in most middle-class purchases.

In terms of sheer depth and diversity for ETFs – as in the case of many other financial instruments – the American market is unparalleled. Table 16.2 shows some leading American listed ETFs.

Table 16.2: Leading American-listed and traded ETFs (data as of August 2016; all ETFs have AUM greater than US\$10B)

Symbol	Name	AUM
SPY	SPDR S&P 500 ETF	\$199,078,733
IVV	iShares Core S&P 500 ETF	\$78,848,730
VTI	Vanguard Total Stock Market ETF	\$64,331,846
EFA	iShares MSCI EAFE ETF	\$60,625,338
VOO	Vanguard S&P 500 ETF	\$50,650,128
GLD	SPDR Gold Shares ETF	\$42,263,875
VWO	Vanguard FTSE Emerging Markets ETF	\$42,247,219
AGG	iShares Core U.S. Aggregate Bond ETF	\$40,462,518
QQQ	PowerShares QQQ ETF	\$39,819,856
VEA	Vanguard FTSE Developed Markets ETF	\$36,054,093
VNQ	Vanguard REIT ETF	\$35,748,349
LQD	iShares iBoxx \$ Investment Grade Corporate Bond ETF	\$32,175,395
BND	Total Bond Market ETF	\$32,062,416

EXCHANGE TRADED FUNDS AND STRUCTURED PRODUCTS

Symbol	Name	AUM
IWF	iShares Russell 1000 Growth ETF	\$30,585,770
EEM	iShares MSCI Emerging Markets ETF	\$30,506,950
IWD	iShares Russell 1000 Value ETF	\$29,964,000
IJH	iShares Core S&P Mid-Cap ETF	\$29,674,013
IWM	iShares Russell 2000 ETF	\$29,372,266
VTV	Vanguard Value ETF	\$22,713,427
VIG	Vanguard Dividend Appreciation ETF	\$22,644,358
VUG	Vanguard Growth ETF	\$21,605,198
IJR	iShares Core S&P Small-Cap ETF	\$19,721,208
BSV	Short-Term Bond ETF	\$18,245,990
TIP	iShares TIPS Bond ETF	\$18,208,030
PFF	iShares U.S. Preferred Stock ETF	\$17,530,434
MDY	SPDR S&P MIDCAP 400 ETF	\$17,382,205
HYG	iShares iBoxx \$ High Yield Corporate Bond ETF	\$16,511,902
DVY	iShares Select Dividend ETF	\$16,366,456
IWB	iShares Russell 1000 ETF	\$16,304,662
IEMG	iShares Core MSCI Emerging Markets ETF	\$15,736,560
XLF	Financial Select Sector SPDR Fund	\$15,498,854
VYM	Vanguard High Dividend Yield ETF	\$15,359,723
USMV	iShares MSCI USA Minimum Volatility ETF	\$15,193,750
VO	Vanguard Mid-Cap ETF	\$14,971,021
SDY	SPDR S&P Dividend ETF	\$14,725,942
XLE	Energy Select Sector SPDR Fund	\$14,088,528
EWJ	iShares MSCI Japan ETF	\$14,041,405

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Symbol	Name	AUM
VEU	Vanguard FTSE All-World ex-US ETF	\$13,978,451
IVW	iShares S&P 500 Growth ETF	\$13,948,014
VB	Vanguard Small-Cap ETF	\$13,868,835
VCSH	Vanguard Short-Term Corporate Bond ETF	\$13,541,048
XLV	Health Care Select Sector SPDR Fund	\$13,226,073
IWR	iShares Russell Mid-Cap ETF	\$13,052,762
XLK	Technology Select Sector SPDR Fund	\$12,691,361
DIA	SPDR Dow Jones® Industrial Average ETF	\$12,546,637
IEFA	iShares Core MSCI EAFE ETF	\$12,354,174
JNK	SPDR Barclays Capital High Yield Bond ETF	\$12,147,962
VGK	Vanguard FTSE Europe ETF	\$11,809,001
CSJ	iShares 1-3 Year Credit Bond ETF	\$11,189,394
GDX	VanEck Vectors Gold Miners ETF	\$10,890,787
IVE	iShares S&P 500 Value ETF	\$10,585,491
BIV	Intermediate-Term Bond ETF	\$10,371,104
SHY	iShares 1-3 Year Treasury Bond ETF	\$10,218,202
DBEF	Deutsche X-trackers MSCI EAFE Hedged Equity ETF	\$10,174,016
RSP	Guggenheim S&P 500® Equal Weight ETF	\$10,062,811

Source: Etfdb.com.

The annual expense ratios of these large ETFs are low (often below 0.25 per cent of the NAV), and the trading costs are also low because of the high liquidity. There are futures as well as call/put options with relatively thin bid-ask spreads often up to two years in the future on these ETFs. All this makes the execution of trade strategies very easy. A combination of all the above ETFs, and a few others (there are many non-US country-specific equity ETFs), can be used by investors to execute almost any strategic asset allocation plan.

Are ETFs derivatives?

Market commentators sometimes describe ETFs as derivatives. Going by the ‘simple’ definition in chapter 1 – that the price of the instrument is derived from the price of the underlying – it may appear that ETFs are indeed derivatives. However, whereas derivatives are ‘side contracts’ on some underlying security, many ETFs represent actual ownership. Hence, since they are actually collections of the underlying assets, they do not fulfil the second part of the definition in chapter 1 – of not being merely a collection of the underlying assets. Felix Salmon of Reuters summarised the position concisely:¹

The E-Mini is a derivative product by dint of being a derivative. It’s a futures contract, a zero-sum game, an instrument whose value at expiry is a wholly transparent function of the value of some other financial instrument.

The SPY, by contrast, is a derivative product only by dint of the fact that it’s a product – a security, not a derivative – which is derived from aggregating 500 different stocks. You couldn’t have the SPY without the S&P 500, so in that sense the SPY is derived from the S&P 500. But if you own shares of SPY, you have real wealth: real claims on real assets of 500 real companies in the real world.

... If all of the shares of SPY were to become vaporised tomorrow, then the S&P 500 itself would rise, since the total number of shares outstanding in the stock market would have fallen. Since the value of those 500 companies wouldn’t have changed, the value per share would be higher.

If all of the world’s E-Mini contracts were to become vaporised tomorrow, by contrast, then the effect on the S&P 500 would be *de minimis*. E-Mini contracts are side bets on the S&P 500: they’re not real-world claims on it

Therefore, for most ETFs, the answer to the question ‘is it a derivative?’, is ‘no’. However, where the ETF is not a simple aggregation of certain shares, the answer could in some cases be ‘yes’.

Cash-based ETFs

Cash-based ETFs (or ‘cash ETFs’) are simple aggregations of the underlying assets without gearing. They are not ‘derivatives’ and are a substitute for holding

1 <http://blogs.reuters.com/felix-salmon/2010/10/01/etfs-arent-derivatives/>.

the underlying. ETFs mimicking stock market indices and gold ETFs are examples. Cash ETFs themselves may fully replicate the exact combination of assets in the underlying index or may include only a representative sample of the components of the underlying index. If a representative sample is used, the ETF may not exactly match the movement of the underlying; the extent of non-matching is called the 'tracking error'.

Geared or leveraged ETFs

Geared or leveraged ETFs are ETFs which, through borrowing, promise a higher exposure (say two times or three times exposure, long or short) to the underlying, which may be a price index of shares or financial instruments or of one or more commodities. Thus, if a particular index moves up or down by 1 per cent, the ETF will move up or down by 2 per cent or 3 per cent. However, in a technical sense, these are still 'collections of assets' because the higher volatility is achieved by borrowing and then investing in the underlying; hence these are not derivatives in the strict sense.

Geared ETFs enable investors to gear up their portfolio without explicitly taking loans. Many investors prefer cash accounts to margin accounts because they do not want to entertain the possibility of any sort of 'margin call'. Moreover, in some jurisdictions and under certain circumstances, margin accounts may not be allowed to begin with. (For example, Indian residents are allowed margin accounts to trade in Indian markets, but not in foreign markets.)

Yet gearing can boost returns. One way of getting gearing without directly borrowing or running the risk of margin calls, would be to buy leveraged ETFs. For example, SSO (*+2x ProShares Leveraged Long S&P 500*) claims to offer just that. It has almost 2.5 billion dollars in assets, and seems to give '2x' returns (vis-a-vis the S&P 500) on a daily basis. But on a longer-term basis, the return from June 2006 to May 2017 was 83 per cent whereas the SPY ETF (a proxy for the S&P 500) returned 58 per cent over this period; in other words SSO did not yield twice the return of SPY.

Synthetic ETFs

Synthetic ETFs do not actually own the underlying asset. Instead the fund is invested in derivatives. Instead of actually holding components of an underlying

index, synthetic ETFs use swaps and other derivatives to get an equivalent exposure. The holding of derivatives is such that the position is equivalent to holding the underlying index. Such ETFs often appear to have lower tracking error (that is, they follow the underlying index more accurately and with lower costs) than asset-holding ETFs. However, the disadvantage is the *additional counterparty risk* in relying on derivatives like swaps – which are mostly over-the-counter – to get the required exposure; if the parties to the swap contracts default on their obligations, the ETFs will lose heavily and fail to track the index.

Asia, Europe and North America all have synthetic ETFs but they are increasingly under regulatory scrutiny, and fund flows to ‘physical’ ETFs are growing. The exchange symbols of synthetic ETFs often start with the letter ‘X’.

Structured ETFs

While, in a sense, all ETFs are ‘structured’, some bring together a combination of equity, debt and derivative exposure and these are known as ‘structured ETFs’ (see also structured products below). For example, the PowerShares S&P 500 Buy-Write Index (PBP) that has 218 million dollars assets under management is expected to underperform in bullish markets but over-perform in bearish markets. This is because, as the name suggests, such an ETF buys the SPY equivalent, but also sells OTM call options on it. This gives it regular premium, but it means PBP fails to participate fully on the upside in those periods when the underlying index performs well.

Exchanged-traded notes

Exchanged-traded notes (ETNs) are similar to structured ETFs, but they are ‘notes’ issued by a bank or a financial institution. As in the case of synthetic ETFs, the credit risk remains because the ‘underlying’ is not physically owned.

Inverse ETFs

Inverse ETFs are ETFs which take real or synthetic short positions in the underlying asset. By adding gearing, the ETF may be able to produce a ‘2x’ or ‘3x’ short position. (These are leveraged or geared inverse ETFs.) Examples at the time of writing² are SH (*-1x ProShares Short S&P500 Index*), TBF (*-1x*

² The mention of any individual ETF or other fund is not entitled to imply any

ProShares Short 20+ Year Treasury), *DGZ (-1x PowerShares DB Short Gold ETN)* and *REK (-1x ProShares Short DJ Real Estate)* which are ETFs that can be used to take a simple short exposure to equities, treasuries, gold, and real estate in America, for instance. The *TMV (-3x Direxion Lev Short 20-Year Treasury)* provides a 'three times the index' short position on US Treasury bonds.

These ETFs can be used to get a short position on an account without actually short-selling any asset.

Volatility ETFs

Volatility ETFs are funds that allow the investor to 'buy' a volatility index. When the volatility index increases, the ETF rises in price and vice versa. As an example, the *VXZ* ETF (S&P 500 VIX mid-term futures) basically buys, as the name suggests, mid-term volatility futures on the S&P 500. There are also short-term volatility futures.

Structured products

Structured products are customised financial 'products' which are 'structured' (i.e., non-standard). They are usually created for large investors by combining the features of different kinds of financial instruments, often involving derivatives. They may offer the investor a combination of risk and return which cannot be easily obtained through any non-structured market instrument – for example, unlimited profit potential with guaranteed return of initial investment. The institution offering the product often breaks down the amount received from the investor into a combination of cash and one or more derivatives to be able to meet its obligation on the structured product and earn a return for itself.

Example 16.1

In 2014, a private bank offers a structured product that promises to give 60 per cent of the upside of the Indian Nifty 50 share index from July 2014 to June 2017 to investors, while guaranteeing that even if the index is lower on expiry, the initial amount invested would be returned. The Nifty is currently at 7,000. Because the initial investment is protected this is sometimes known as 'capital preservation', and many such products are named after this feature. How is the bank able to do this?

endorsement or criticism; the purpose is purely illustrative.

Solution:

Assume this investment product's minimum investment size is ₹ 10 lakhs. 60 per cent thereof is ₹ 6 lakhs. By buying call options equivalent in value to ₹ 6 lakhs, it is possible to get the benefit of appreciation in the Nifty. The bank would carry out the following transactions:

- *Buy ₹ 6 lakhs of call options on the NIFTY with an expiry date in June 2017 and the (ATM) strike price of 7,000. The number of options needed is $600,000/7,000 = 85.7$ or 86. Say these options are available at ₹ 1,744 per contract. Therefore, ₹ 150,000 will be spent on buying these. (Readers should note that because the options are ATM, any increase in the Nifty will be reflected in an equal increase in the intrinsic value of the option.)*
- *(From the amount received, after spending ₹ 1.5 lakhs on option premium, ₹ 8.5 lakhs will be left.) Invest this in a fixed deposit at the three-year interest rate. Assume the annually compounded interest rate is 8 per cent*

Assume that in 2017, the Nifty has risen to 9,000. The return payable to the investor is:

[60 per cent \times $(9,000 - 7,000)/7,000$] \times 10,00,000 = ₹ 1,71,428. In addition, the initial capital of ₹ 10 lakhs has to be repaid.

The Nifty options with July 2017 maturity and 7,000 strike would (on maturity date) have an intrinsic value of:

$(9,000 - 7,000) \times 86 = ₹ 1,72,000.$

This will cover the return payable to the investor.

In addition, the fixed deposit would have matured. A three year deposit of ₹ 8.5 lakhs at 8 per cent compound interest would have appreciated to ₹ 10,70,755. This is more than the capital sum of ₹ 10 lakhs. The extra 70,755 rupees goes towards the bank's administrative and transaction costs along with their profit. (Note that, when designing the structured product, the extent of upside that can be given would vary based on interest rates, option prices etc.; the particular figures used here are hypothetical and only for illustration.)

There are medium to long term (three-five years) equity index options in India enabling this kind of transaction to be placed in this simple way. This may not always be the case: exactly corresponding options may not exist or may not have enough liquidity. In such cases, the intermediary bank may cover itself via various OTC derivatives, which may have higher transaction costs. In most cases, there are no exact hedges, and the intermediary's risk management is as much art as it is science, especially for the more 'bespoke' or customised products. It should be noted that there is credit risk in as much as the cash portion is invested by the intermediary. If the intermediary uses the cash internally and /or becomes insolvent, there is a risk of default.

The French government used a similar structured product to convince workers in a nationalised industry (Rhone-Poulenc) to take shares in the company when it was being privatised in the 1990s. The workers were given a guaranteed return and this persuaded them to accept part compensation in stock options instead of cash.³ The structured product was offered through an investment bank.

Economic effects of ETFs and structured products

While ETFs offer many advantages to investors, it is not clear that their overall economic effect is positive. Israeli, Lee and Sreedharan have argued based on empirical studies that ETF ownership is associated with higher trading costs, a decline in analyst coverage and other negative effects.⁴

3 Raghuram G. Rajan and L. Zingales, *Saving Capitalism from the Capitalists*, Crown Books, 2003.

4 D. Israeli, C. M. C. Lee, S. A. Sridharan, 'Is there a Dark Side to Exchange Traded Funds: An Information Perspective', *Review of Accounting Studies*, forthcoming, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2625975, accessed on 14 May 2017.