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The ETF Revolution: International and Brazilian Perspectives

Marco Avellaneda

New York University
Finance Concepts LLC

Exchange-traded funds

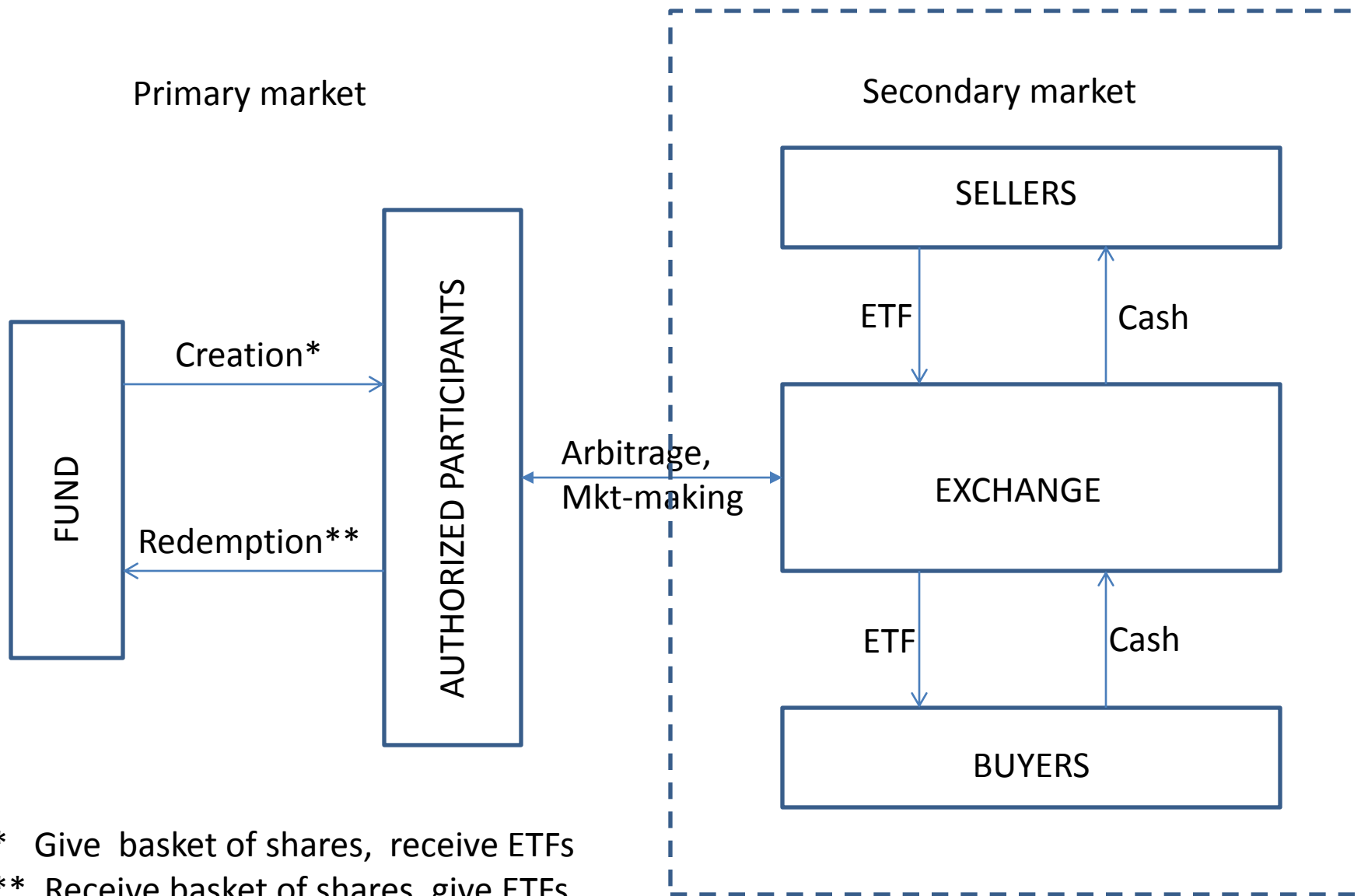
Similar to mutual funds, with additional flexibility:

- shares trade on exchanges
- trading is similar to stocks (bid/ask, short, margin)
- options on ETFs available
- began as as index trackers
- actively managed and synthetic ETFs since mid 2000's

Arbitrage: authorized participants can **create or redeem** ETFs in ``creation units''

- creation units: 25K to 100K shares
- APs often act as market makers, providing liquidity

Basic ETF Structure



Brief History

Milestones:

1993: first US ETF

1998: first European ETFs

2006-2008: ETPs, first actively managed ETFs

History:

1989: Index Participation Shares, stopped by Chicago Mercantile Exchange (IP prob.)

1993: SPY Tracking S&P 500 (a.k.a. Spiders or SPDRS, issuer: State Street)

1996: BGI creates WEBS (World Equity Benchmark Shares), later called iShares (*e.g.*: EWZ: MSCI Brazil Index Fund)

1998: Sector SPDRS track 9 sectors of the S&P 500

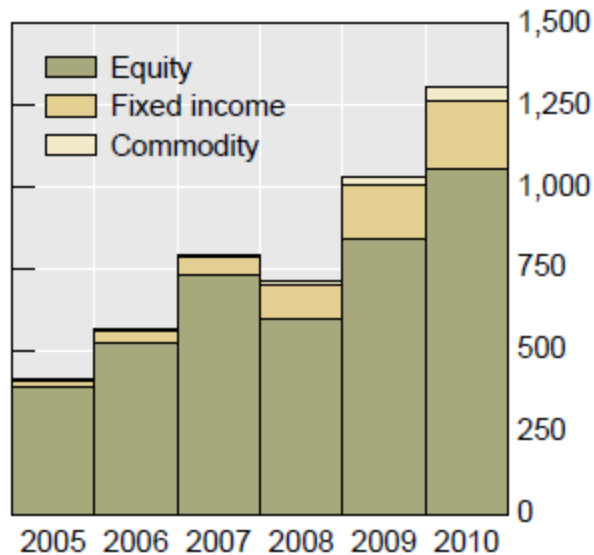
2008: 680 ETFs in US with 610B in assets, increase of 125B in 12 months

January 2010: US ETF market breaks the 1,000 billion mark in AUM

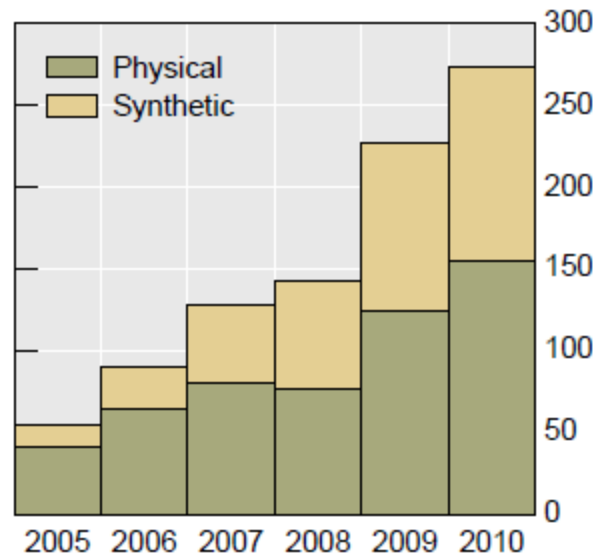
ETPs= ETFs covering, fixed-income, FX, Commodities, Volatility

ETF AUM Growth in Different Markets

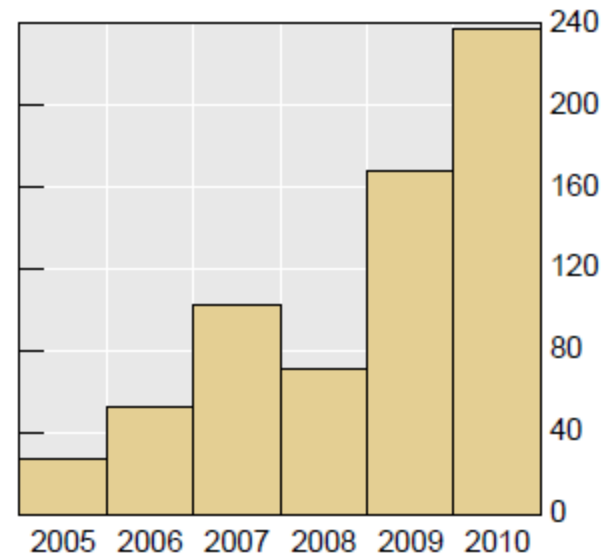
Global and commodity ETFs



ETFs in Europe and share of physical and synthetic structures



ETFs providing exposure to emerging markets



Source: BlackRock (2011).

Global ETFs by Exposure

Region of exposure	Q1-11					YTD change				
	# ETFs	# total listings	AUM (US\$ Bn)	% total	ADV (US\$ Bn)	# ETFs	# total listings	AUM (US\$ Bn)	% AUM	% total
Equity	1,965	4,544	\$1,124.3	80.3%	\$67.4	80	220	\$70.5	6.7%	0.0%
North America	609	1,065	\$573.0	40.9%	\$52.3	30	72	\$49.9	9.5%	1.1%
Emerging markets	465	1,002	\$236.2	16.9%	\$8.4	35	81	-\$1.4	-0.6%	-1.2%
Europe	489	1,516	\$135.0	9.6%	\$3.3	-1	10	\$13.6	11.2%	0.4%
Asia Pacific	189	435	\$81.7	5.8%	\$1.8	5	22	-\$0.6	-0.7%	-0.4%
Global (ex-US)	73	94	\$69.5	5.0%	\$1.3	2	4	\$5.7	9.0%	0.1%
Global	140	432	\$28.9	2.1%	\$0.3	9	31	\$3.3	12.8%	0.1%
Fixed income	412	962	\$218.4	15.6%	\$3.1	35	83	\$11.2	5.4%	-0.2%
Fixed income - all (ex-cash)	387	888	\$209.2	14.9%	\$2.9	30	68	\$9.3	4.7%	-0.3%
Fixed income - cash (money market)	25	74	\$9.3	0.7%	\$0.2	5	15	\$1.8	24.9%	0.1%
Commodities	149	304	\$51.1	3.7%	\$1.5	19	32	\$5.4	11.8%	0.2%
Alternative	21	30	\$2.4	0.2%	\$0.0	5	8	\$0.4	18.8%	0.0%
Currency	17	22	\$1.8	0.1%	\$0.0	2	2	\$0.3	21.8%	0.0%
Mixed	41	43	\$1.3	0.1%	\$0.0	4	5	\$0.3	28.3%	0.0%
Total	2,605	5,905	\$1,399.4	100.0%	\$72.0	145	350	\$88.1	6.7%	



- North America - equity 40.9%
- Emerging markets - equity 16.9%
- Fixed income - all (ex-cash) 14.9%
- Europe - equity 9.6%
- Asia Pacific - equity 5.8%
- Global (ex-US) - equity 5.0%
- Commodities 3.7%
- Global - equity 2.1%
- Fixed income - cash (money market) 0.7%
- Alternative 0.2%
- Currency 0.1%
- Mixed 0.1%

Source: Global ETF Research and Implementation Strategy Team, BlackRock, Bloomberg.

Does not include European synthetics

March 2011, 60 Largest US-based ETFs by AUM (in \$BB; highlighted: iShares MSCI Brazil)

Rank	Ticker	Description	Market Cap
1	SPY	SPDR S&P 500	90.21
2	GLD	SPDR Gold Shares	56.03
3	VWO	Vanguard MSCI Emerging Markets	43.73
4	EFA	iShares MSCI EAFE Index	38.15
5	EEM	iShares MSCI Emerging Markets	36.24
6	IVV	iShares S&P 500 Index	26.95
7	QQQQ	PowerShares QQQ	24.21
8	TIP	iShares Barclays TIPS Bond	19.89
9	VTI	Vanguard Total Stock Market	18.98
10	IWM	iShares Russell 2000 Index	15.39
11	IWF	iShares Russell 1000 Growth	13.29
12	LQD	iShares iBoxx Investment Grade	12.98
13	EWZ	iShares MSCI Brazil Index	12.54
14	SLV	iShares Silver Trust	12.38
15	IWD	iShares Russell 1000 Value	11.80
16	VEA	Vanguard MSCI EAFE ETF	11.34
17	MDY	SPDR S&P MidCap 400	11.11
18	AGG	iShares Barclays Aggregate Bond	11.06
19	BSV	Vanguard Short-Term Bond ETF	10.72
20	IJH	iShares S&P MidCap 400	10.72
21	XLE	Energy Select Sector SPDR	10.38
22	BND	Vanguard Total Bond Market	9.25
23	DIA	SPDR Dow Jones Industrial	9.21
24	VNQ	Vanguard REIT ETF	8.58
25	HYG	iShares iBoxx High Yield	8.32
26	XLF	Financial Select Sector SPDR	8.05
27	SHY	iShares Barclays 1 3	7.93
28	CSJ	iShares Barclays 40546 Year	7.82
29	IJR	iShares S&P SmallCap 600	7.38
30	FXI	iShares FTSE China 25	7.25

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31	VEU	Vanguard FTSE All-World ex-US	7.21
32	JNK	SPDR Barclays Capital High	7.06
33	IWB	iShares Russell 1000 Index	7.00
34	PFF	iShares S P U	6.79
35	XLK	Technology Select Sector SPDR	6.79
36	EWJ	iShares MSCI Japan Index	6.47
37	IWR	iShares Russell Midcap Index	6.37
38	VIG	Vanguard Dividend Appreciation ETF	6.10
39	IVW	iShares S&P 500 Growth	6.05
40	DVY	iShares Dow Jones Select	5.99
41	EWC	iShares MSCI Canada	5.97
42	TBT	Proshares UltraShort 20+tsy	5.68
43	IAU	iShares Gold Trust	5.67
44	VUG	Vanguard Growth ETF	5.42
45	SDY	SPDR S&P Dividend	5.37
46	VTV	Vanguard Value ETF	4.84
47	VB	Vanguard Small-Cap ETF	4.64
48	VV	Vanguard Large-Cap ETF	4.61
49	IWN	iShares Russell 2000	4.56
50	IVE	iShares S&P 500	4.51
51	EWY	iShares MSCI South Korea	4.38
52	SHV	iShares Barclays Short TSY	4.16
53	IWO	iShares Russell 2000	4.02
54	XLU	Utilities Select Sector	3.91
55	EPP	iShares MSCI Pacific ex-JP	3.80
56	XLI	Industrial Select Sector	3.69
57	VO	Vanguard Mid-Cap ETF	3.66
58	DBA	DB Agriculture Fund	3.59
59	IWS	iShares Russell Midcap	3.42
60	IWV	iShares Russell 3000	3.42

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The investor perspective: Main advantages of ETFs

Retail Investors

- Diversification at an affordable price
- Behave like index mutual funds but are more flexible
- Limit orders, short-selling, options
- Lower fees (?)
- Tax efficiency: lower turnover than MFs (no need to sell assets each time someone sells, less capital gains tax impact)

Professionals & Pension Funds

- Used for trading & hedging by pros (HF managers, traders)
- Proxies for market factors for explaining stock returns
- Tactical allocation (core/satellite,
- ``Equitification`` of commodities, currencies and fixed-income

Large institutional growth is expected going forward with ETFs replacing traditional MFs

Main categories of ETFs

- Trackers: industry sectors
- Trackers: country
- Currency: based on non-deliverable forwards (NDFs)
- Commodity: based on physical
- Commodity: based on rolling futures
- Actively managed
- Leveraged & inverse

Examples of Country ETFs issued in the US

TICKER	DESCRIPTION	AUM (\$B)	ADV (\$M)
EWZ	MSCI Brazil	12.5	830
EWJ	MSCI Japan	8.2	500
FXI	Xinghua 25	6.7	600
EWT	Taiwan	3.4	150
EWY	Korea	5.0	180
EWC	Canada	5.5	90
EWH	Hong Kong	2.1	80
EWS	Singapore	1.9	30
RSX	Russia	3.1	120
EWA	Australia	3.0	90
EWW	Mexico	1.7	100

ADV=Average daily volume

US ETFs providing Brazilian exposure

Index Trackers		AUM (\$ million)
EWZ	- iShares MSCI Brazil Index Fund	1250 ←
BRF	- Small Cap	900 ←
BRXX	- Infrastructure	900 ←
EWZS	- Small Cap	60
BRAQ	- Consumer	30
BRAZ	- Mid Cap	30
BRAF	- Financials	8

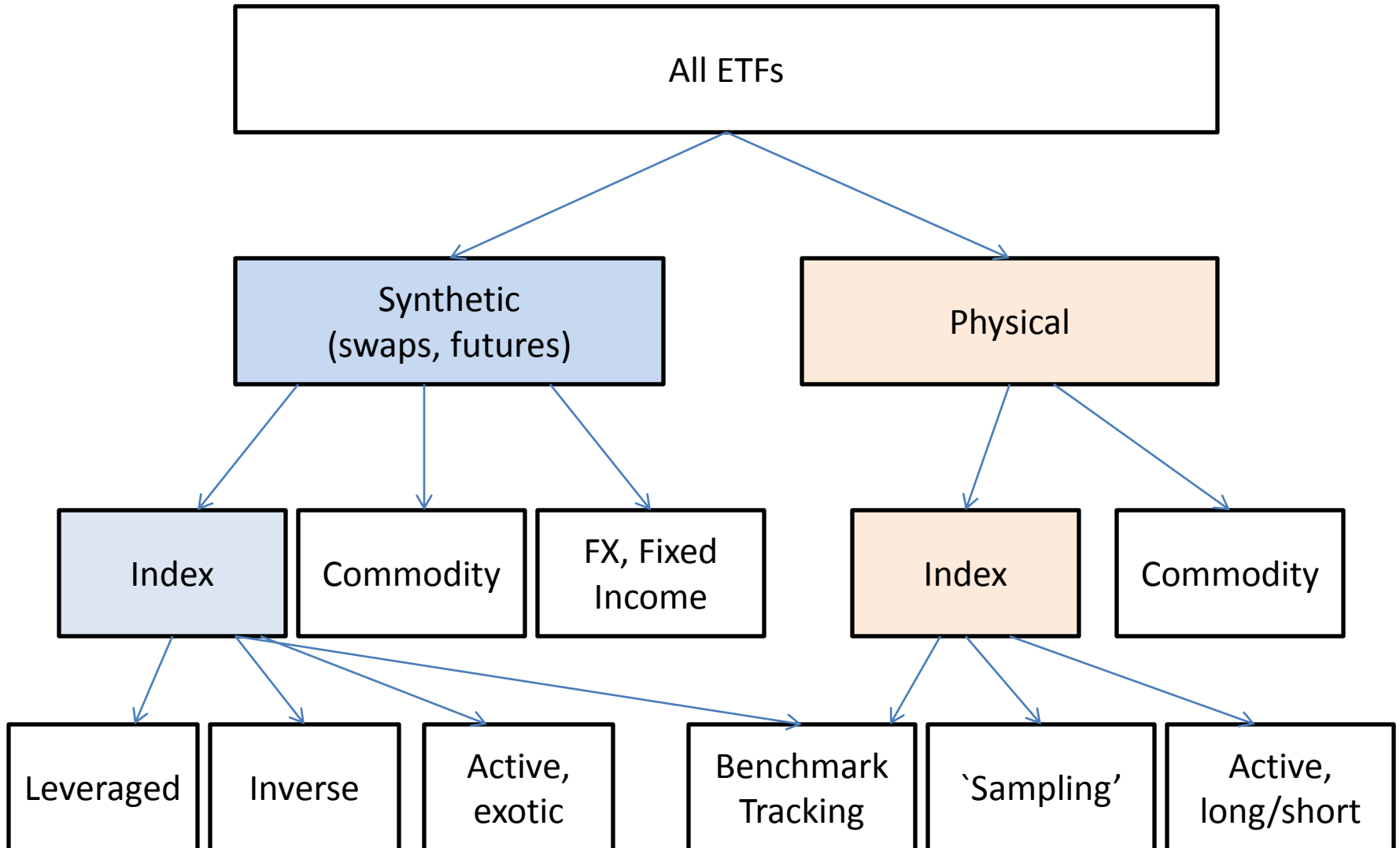
Leveraged

UBR	- (2X) MSCI Ultra-long	20
BZQ	- (-2X) MSCI Ultra-short	10

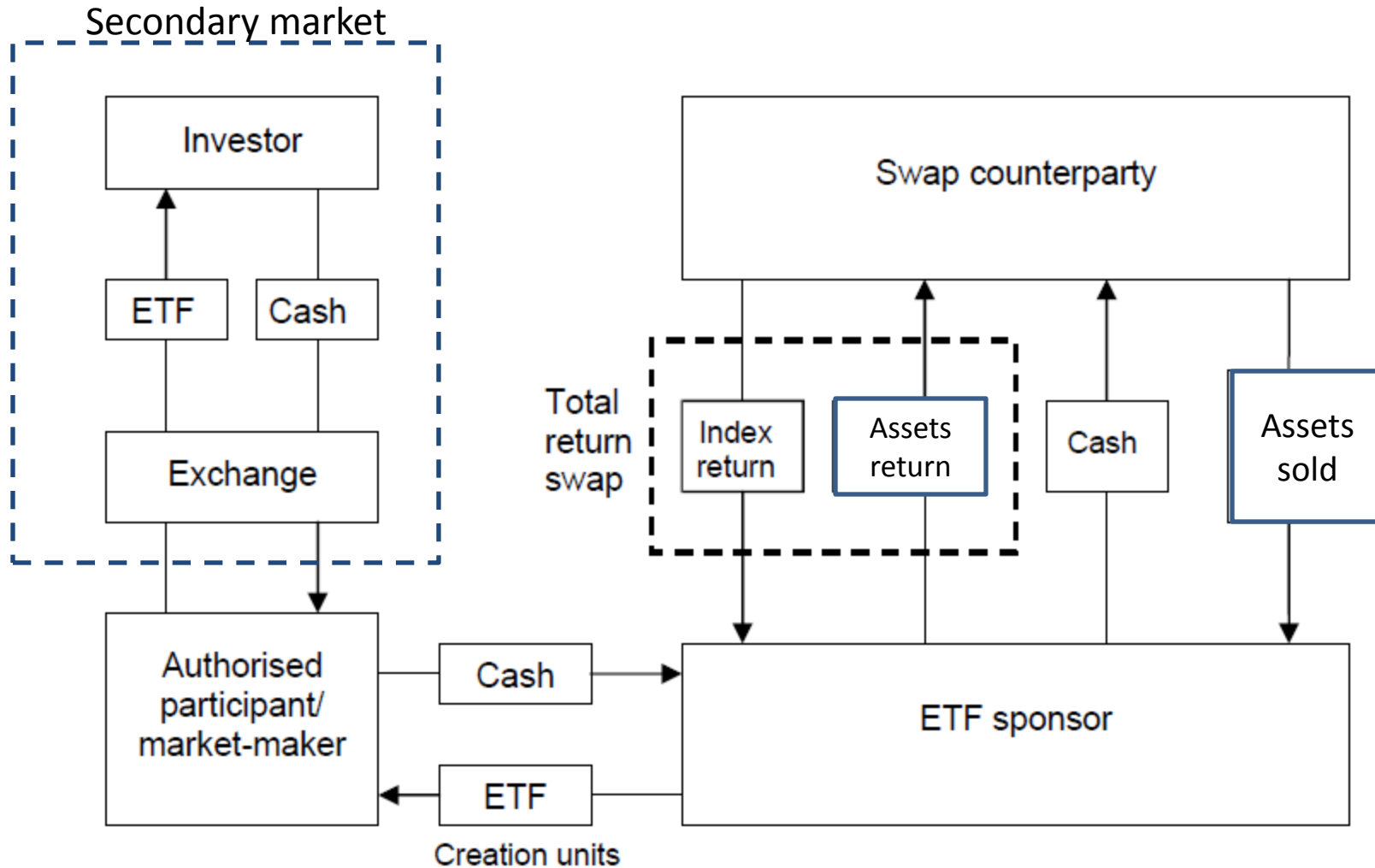
Currency

BZF	- Real Money Market Fund	500 ←
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Structuring: ETF Zoology 101

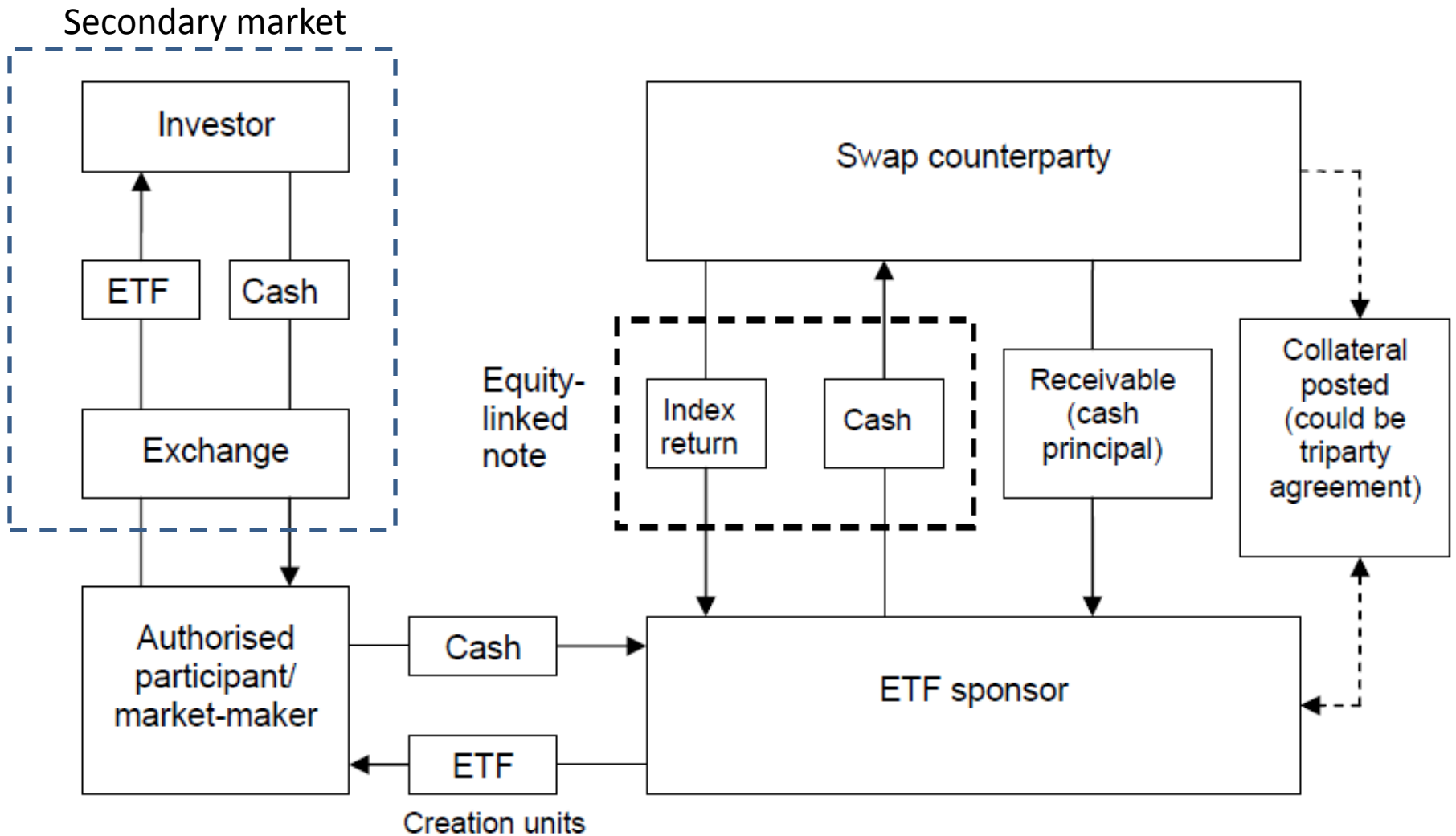


Synthetic structure (“unfunded”)



Collateral assets may or may not be related to the underlying index

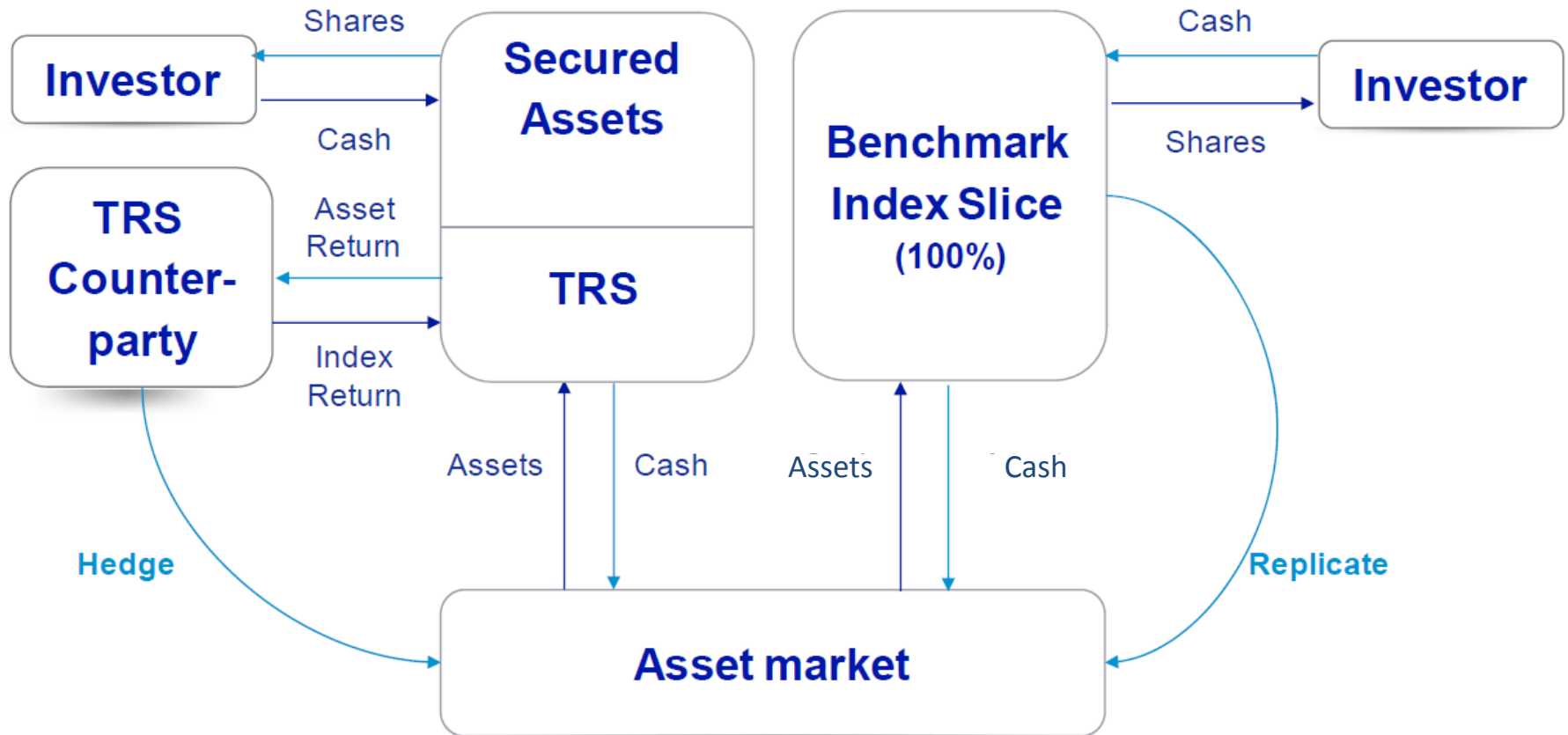
Synthetic structure (“funded”)



(source: BIS)

How does a typical Index ETF work?

(A.: a mix of assets and swaps)



Profitability of the ETF industry in Europe

Europe ETF Industry Profitability Estimate

All figures in bps

In EUR million

	All figures in bps		In EUR million			
	Physical	Synthetic	ETF Provider	AUM EUR million	Replication Method	Estimated annual profit
Profit and Loss Estimate			Blackrock	77,886	Physical	377.6
Management fees	0.45%	0.43%	Lyxor	36,448	Synthetic	260.6
Securities lending	0.26%	0.20%	Deutsche Bank	35,434	Synthetic	253.3
Other enhancements	0.05%	0.05%	Credit Suisse	12,265	Physical	59.5
Trading P&L	0.00%	0.35%	Amundi	6,745	Synthetic	48.2
Total revenues	0.75%	1.03%	Comstage	6,488	Synthetic	46.4
Management costs	0.20%	0.05%	Source	4,846	Synthetic	34.6
Collateral cost	0.00%	0.20%	UBS	6,970	Physical	33.8
Administration	0.05%	0.05%	Rest of industry**	29,658	Mixed	89.0
Other expenses	0.02%	0.02%	Total	216,740	0.55%	1,202.9
Total costs	0.27%	0.32%	* As of June 17, 2011			
Profit/(Loss)	0.48%	0.71%	** Rest of industry profitability assumed at half of the top 8 average			
Profitability	64.2%	69.1%				

Source: Deutsche Bank

Profit is estimated at EUR 1.2 B in Europe, EUR 5B globally (including US)
 Securities lending revenue is estimated at 498 mm EUR (2500 MM globally)
Indirect revenues are important!

Physical vs. Synthetic?

- Physical replication is preferred by Asset Managers (e.g. Black Rock, Vanguard) with expertise in portfolio management and index tracking
- Synthetic replication is preferred by Banks which have large swaps and structured notes business (DB, Soc Gen, Surge) and less capability in equity portfolio management
- This explains the recent surge of synthetics in Europe where banks have natural distribution channels and OTC businesses
- Energy futures-based ETFs are the province of banks, in general (e.g. DB), and some specialized commodity traders

Main issue for regulators: transparency

Physical Replication

Need better disclosure on:

- Securities lending
 - Percentage of NAV lent out
 - Collateral Agreements
 - Who receives the profits from securities lending?
- Benchmark index composition: what are we really investing in ?
- Tracking methods
 - Full replication or sampling?
 - Reports on sampling effectiveness.

Main issue for regulators: transparency

Synthetic Replication

Need better disclosure on:

- Method of synthetic replication (funded, unfunded)
- Who are the swap counterparties?
- What collateral taken on the swap?
- Collateral ownership agreements
- Legal opinion on recourse for investors in case of default

ETFs in Latin America

	Registrations	Primary Listings	Total Listings	Providers	AUM (USD B)
Brazil	9	9	9	2	1.8
Chile *	350	-	50	-	-
Mexico	348	19	348	3	8.3
Peru *	295	-	-	-	-

- (*) Chile and Peru only allow ETF investment by pension funds
- Most of Mexico's AUM are in US Index ETFs (Nasdaq, S&P, Dow Jones, Canada, Japan)
- Largest issuer: Black Rock
- Significant expansion underway in terms of registrations

(Source: Black Rock, BM&F Bovespa)

ETFs Made in Brazil

- Current legislation, **Instrucao CVM 359**, allows only for ETFs on Brazilian equity shares, with physical replication (at least 95% physical replication)
- According to informed sources, a new Instruction is under review by CVM, which will allow for ETFs on commodities, foreign shares and fixed-income

Major Fund	Symbol	AUM (\$B BRL)	ADV(`000)	ADV(\$m)
• PIBB Fundo Indice Brasil 50	PIBB11	1.2	13	1.8
• iShares Brasil Fundo de Indice	BOVA11	0.45	507	21

PIBB issued by Banco Itau was first mover

BOVA issued by BlackRock is capturing market share rapidly

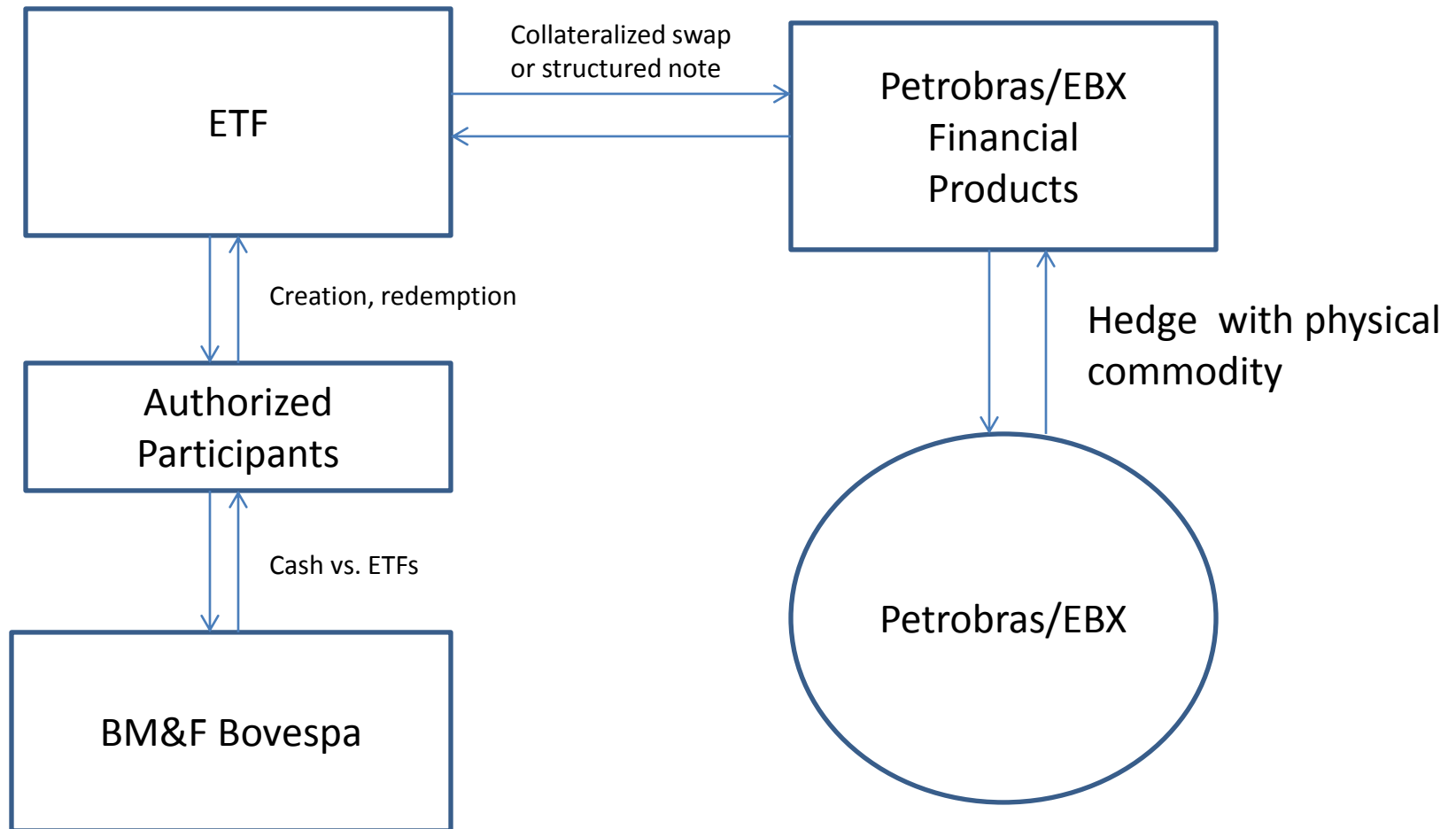
Some ideas for ETFs issues in Brazil

- **Commodity ETFs** , especially Agricultural and Mining
- BDRs not on single stocks, but on **major market indexes** !
(QQQ, SPY, Eurostoxx, Nikkei, Russell 2K)
- **Cross border ETFs based on regional stocks** (including Argentina, Chile & Brazil)
- Very interesting opportunity to introduce new assets to the Brazilian investor community

... but...

- The appropriate design of these new products is important in order to avoid well-known pitfalls . Opportunity to shine...

Brazilian petroleum or mineral commodity synthetic structure



Known pitfalls in commodity ETFs: Physical vs. Futures

Physical commodity: GLD (StreetTracks Gold Shares)
IAU (iShares Comex Gold Trust)

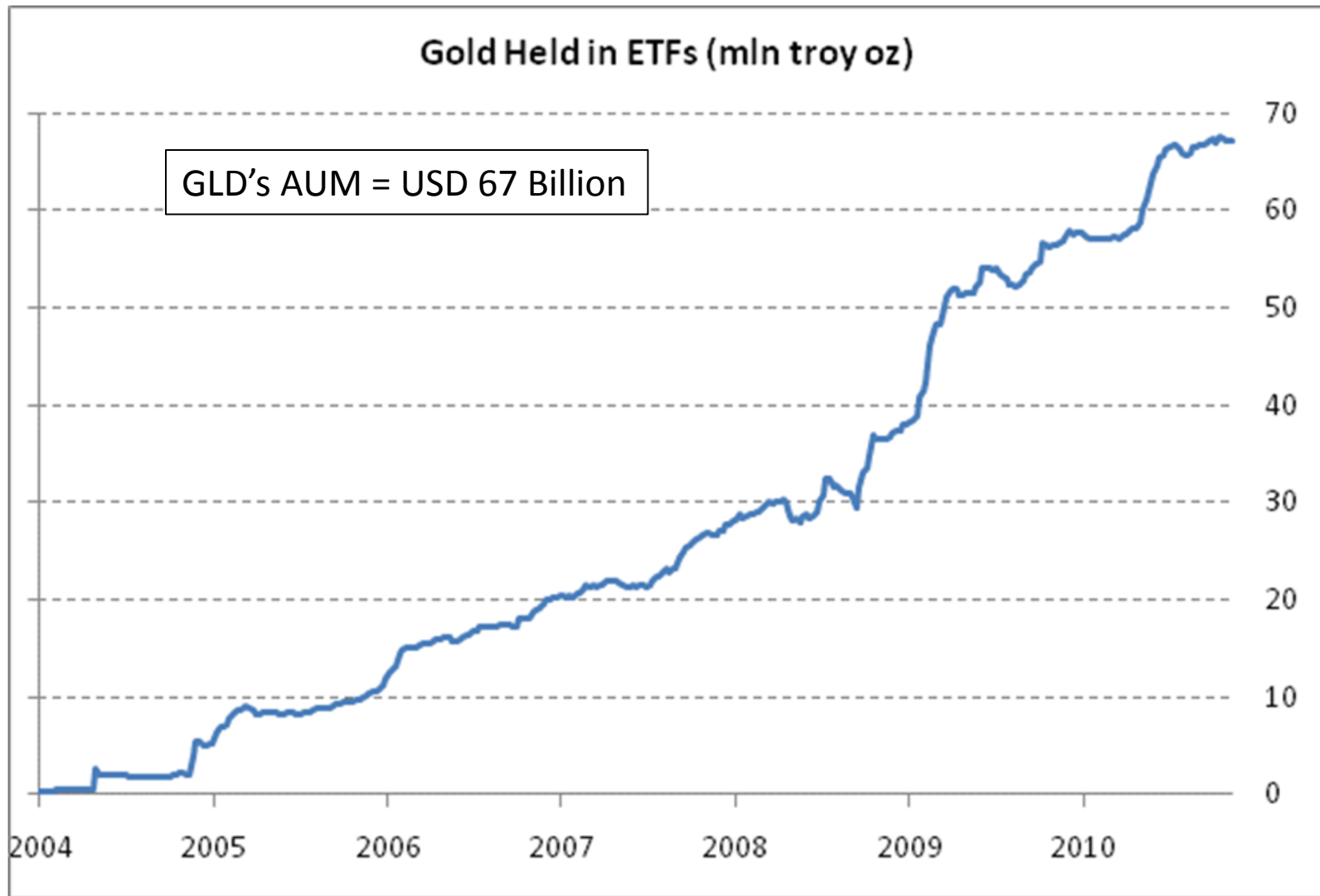
Futures-based: DGL (Powershares DB Gold Fund)

Futures-based ETFs are based on maintaining a position in a constant-maturity futures by **rolling** from one contract to the next as they reach maturity

This may result in underperformance with respect to the spot commodity for at least 3 reasons

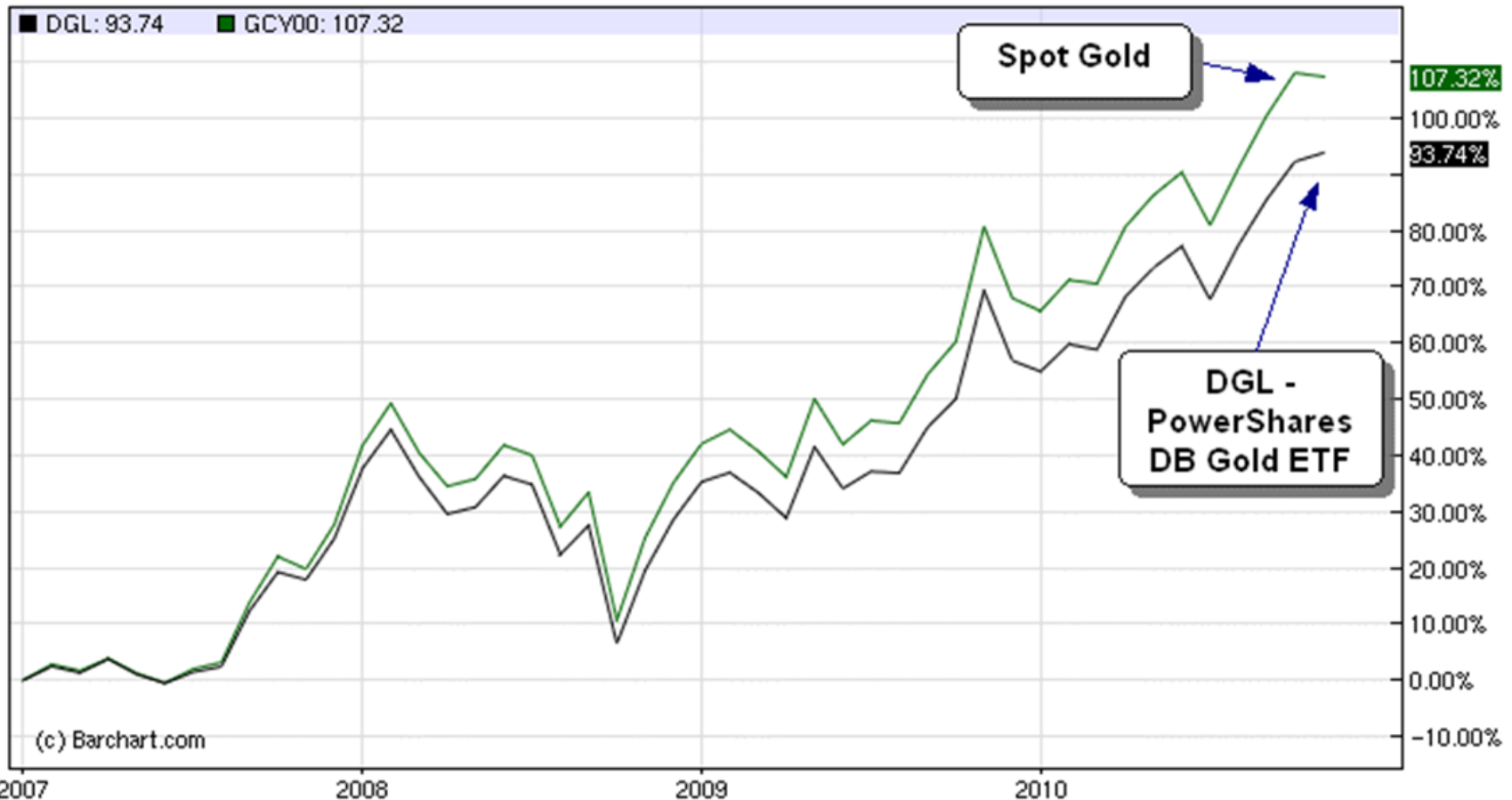
- rolling costs (including front-running)
- position limits in futures exchanges limits AUM growth and produce distortions
- contango /backwardation

Growth of Gold Bullion ETFs over the last 6 years

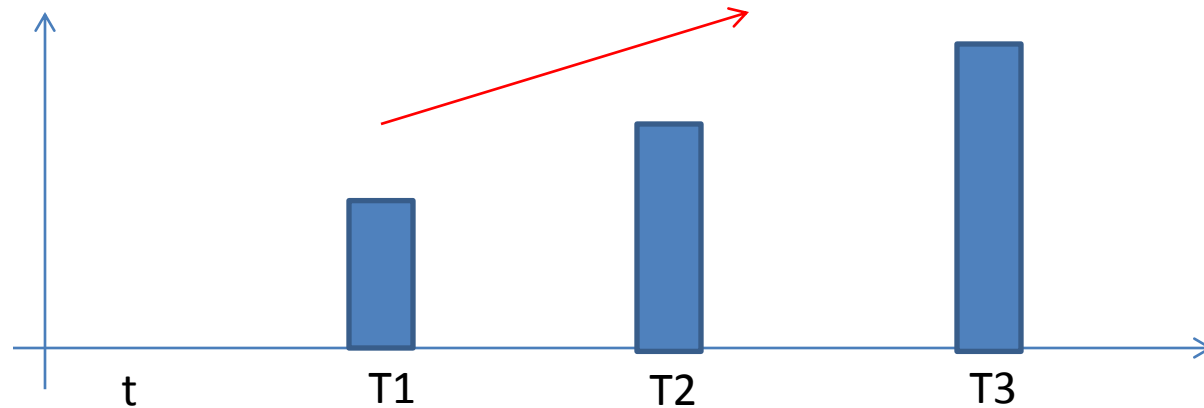


Difference Between Spot Gold and Futures-based Gold ETFs

DGL - DB Gold (AMEX) - Monthly Line Chart



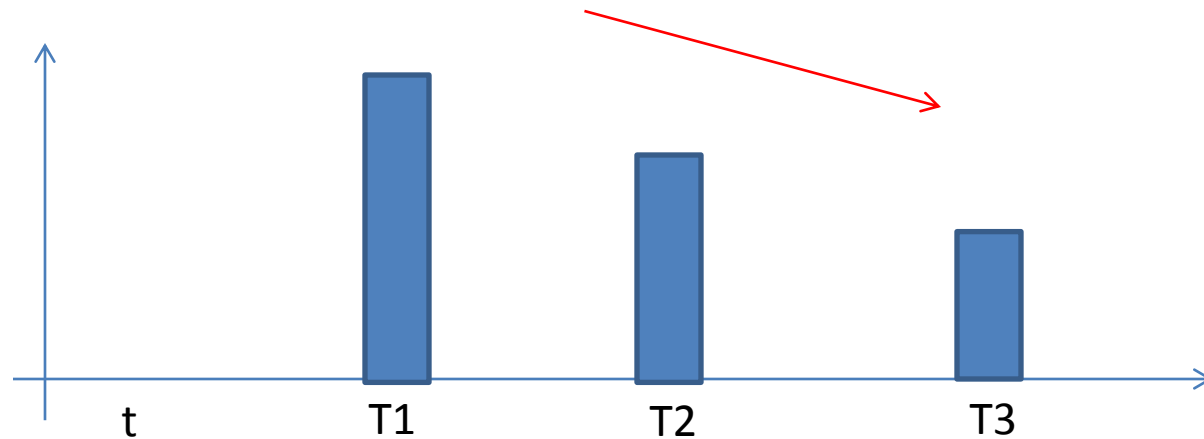
Commodity Futures: Contango



Futures are said to be in **contango** if the futures price increases with the time-to-delivery (futures is higher than spot)

If the futures are in contango, this means that the “convenience yield” is low and the cost of storing and financing make the forward delivery more expensive as time goes by

Commodity Futures: Backwardation



Futures are said to be in **backwardation** if the futures price decreases with the time-to-delivery (futures is lower than spot)

Associated with a high convenience yield. For example, rental for gold could be expensive, etc.

Futures-based ETFs: the rolling conundrum

Mandate:

- position in one or more contracts, aiming to carry a fixed-maturity
- change (roll) contracts as expiration arrives

$$\frac{dI_t}{I_t} = a(t) \frac{dF_t^{(1)}}{F_t^{(1)}} + (1 - a(t)) \frac{dF_t^{(2)}}{F_t^{(2)}} + rdt$$

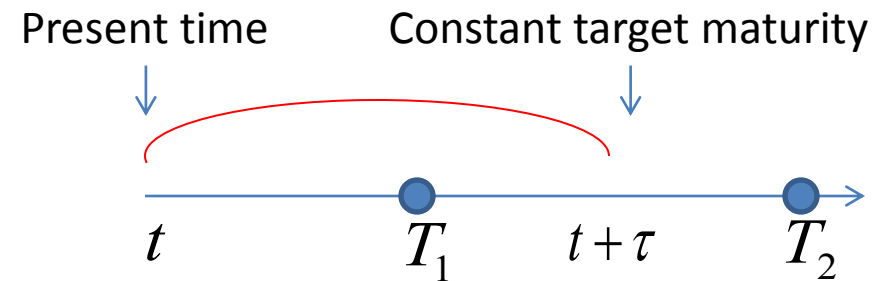
I_t = value of the index at date t

$F_t^{(i)}$ = futures with settlement date T_i

Rolling with constant maturity τ

Discrete rolling (USO, UNG)

$$a(t) = \begin{cases} 1, & \text{if } t + \tau < \frac{1}{2}(T_1 + T_2) \\ 0, & \text{if } t + \tau \geq \frac{1}{2}(T_1 + T_2) \end{cases}$$



Continuous rolling (VXX, VXZ)

$$a(t) = \frac{T_2 - (t + \tau)}{T_2 - T_1}$$

Typically, $\tau > T_2 - T_1$

Contango implies futures drop towards spot

Simple model for F

$$F_t^{(i)} = S_t e^{(r_i - d_i)(T_i - t)} \quad \text{contango} \Rightarrow r_i - d_i > 0$$

S_t = spot price

r_i = rate for expiration T_i

d_i = convenience yield - storage cost for mat. T_i

$$\frac{dF_t^{(i)}}{F_t^{(i)}} = \frac{dS_t}{S_t} - (r_i - d_i)dt,$$

In a low interest rate environment, contango means that convenience yields are negative. ($d_i < 0$)

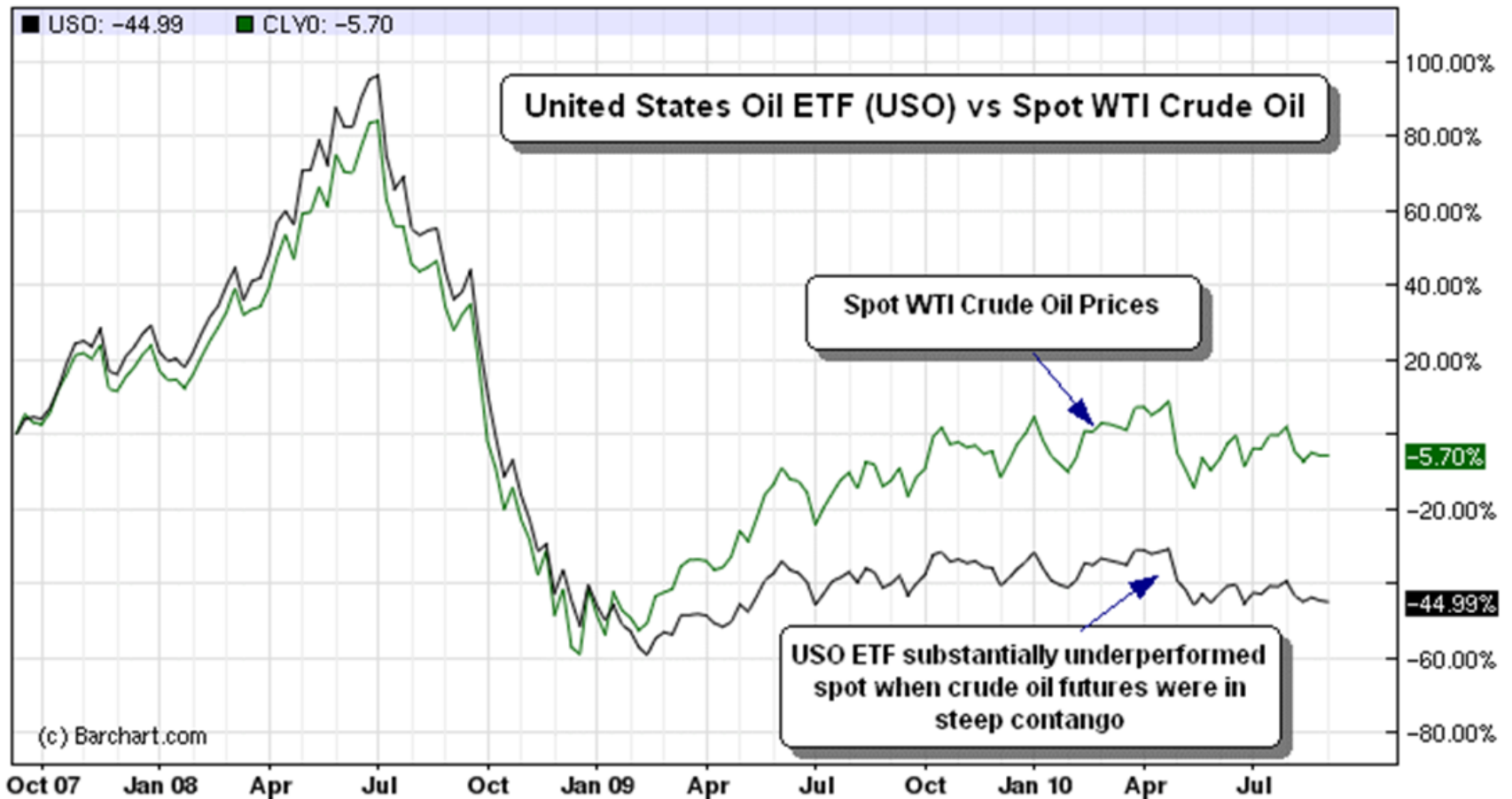
Consequence for futures-based ETFs

$$\begin{aligned}\frac{dI_t}{I_t} &= a(t) \frac{dF_t^{(1)}}{F_t^{(1)}} + (1 - a(t)) \frac{dF_t^{(2)}}{F_t^{(2)}} + r dt \\ &= \frac{dS_t}{S_t} - [a(t)(r_1 - d_1) + (1 - a(t))(r_2 - d_2)] dt + r dt \\ &= \frac{dS_t}{S_t} + [a(t)d_1 + (1 - a(t))d_2] dt\end{aligned}$$

Negative drift relative to spot px if convenience yield is negative

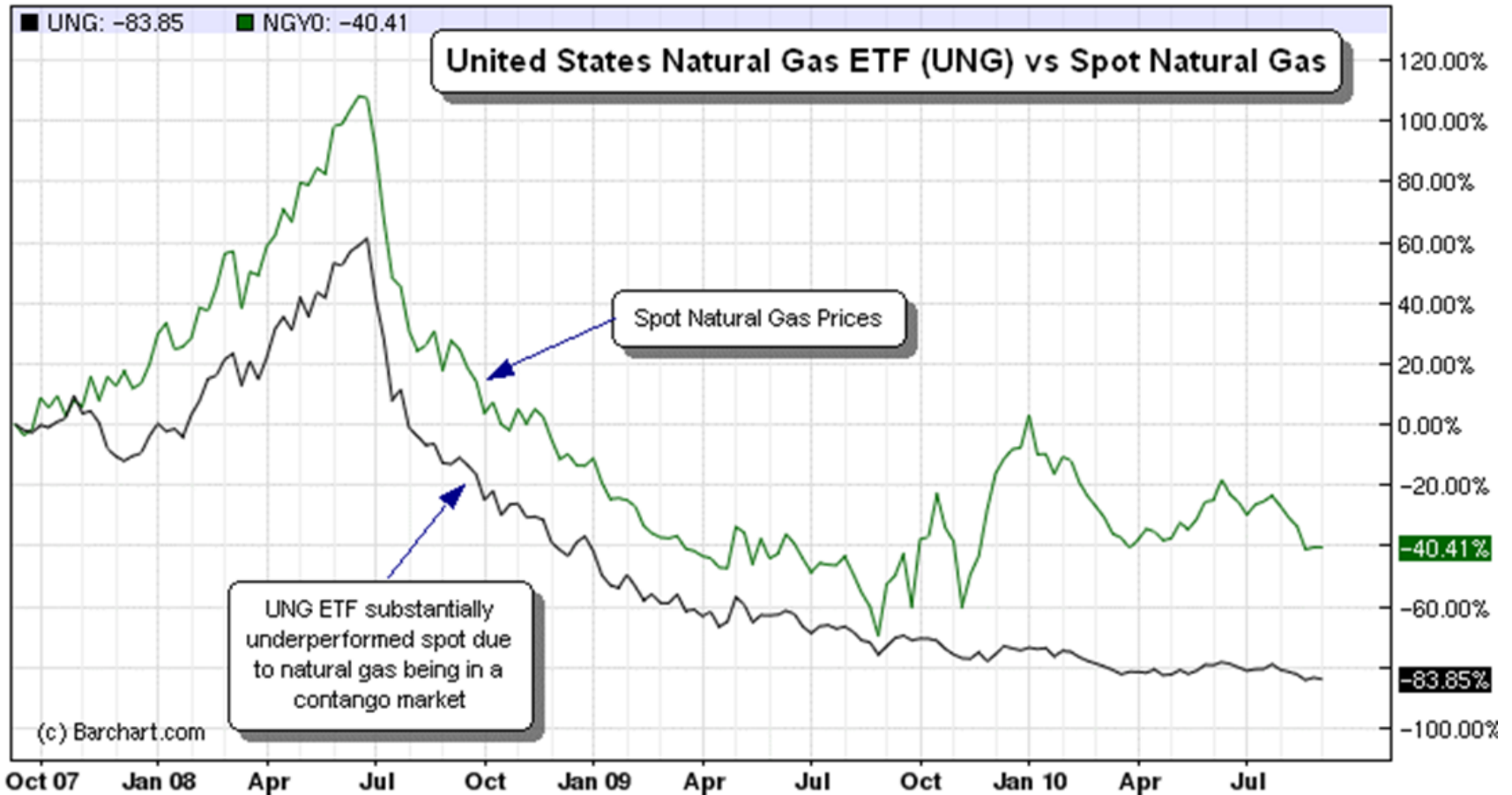
Theory meets practice: the USO oil ETF

USO - United States Oil (AMEX) - Weekly Line Chart



UNG: Natural Gas ETF

UNG - United States Natural Gas (AMEX) - Weekly Line Chart



Long-Short Physical vs. Futures ETF

Since futures-based ETFs underperform spot, we should be able to profit (theoretically, at least) from going long physical ETF and shorting the futures-based etf on the same commodity.

Case study:

Physical ETF: GLD

Futures-based: DGL

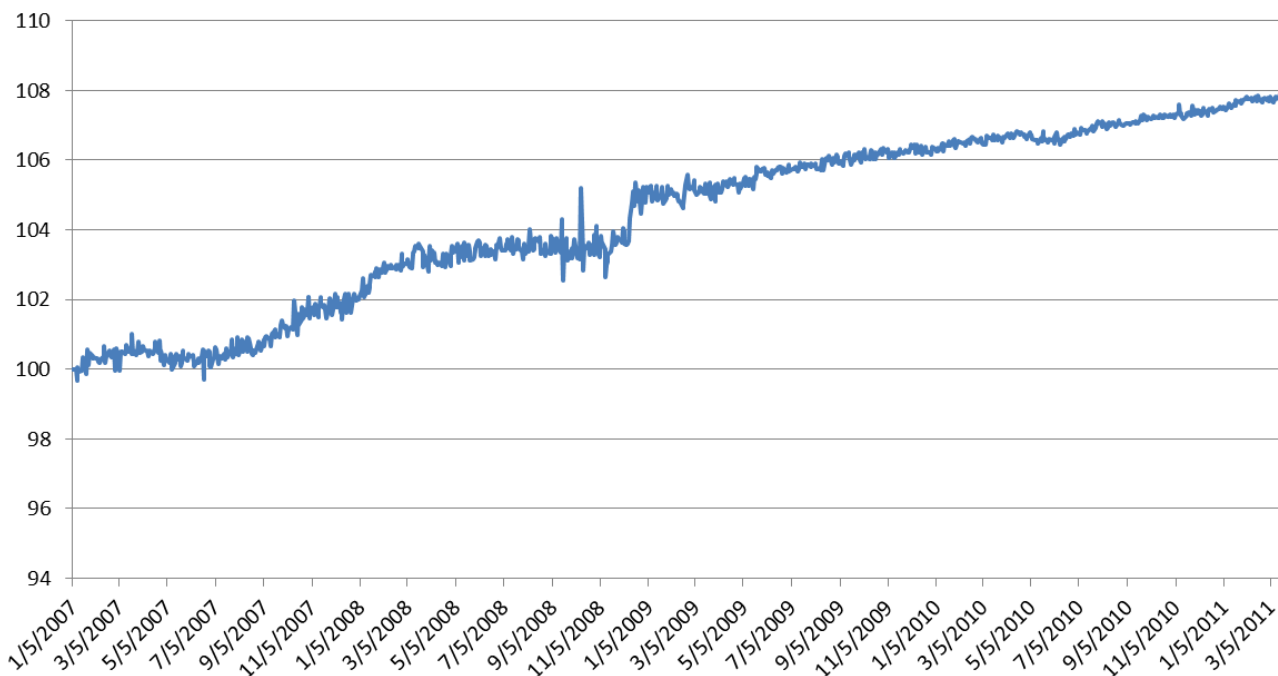
X_t = return of GLD

Y_t = return of DGL

$$\frac{\Delta P_t}{P_t} = X_t - Y_t + r_s \Delta t \quad \therefore \quad P_T = P_0 \prod_{t=1}^T (1 + X_t - Y_t + r_s \Delta t)$$

A first back-test (no borrow rates)

Long 100% DLG, short 100% GDL, daily rebalancing



Theoretical performance: 1.8% per year (daily compounding)

3.3% volatility per year

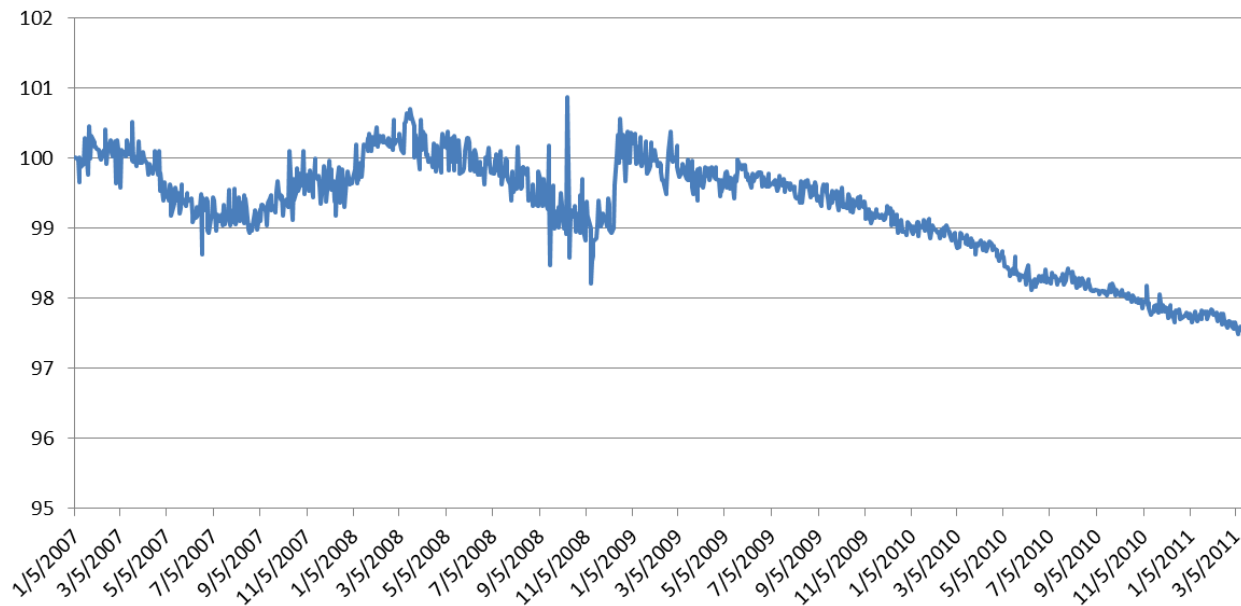
Straight line suggests that the difference should correspond to funding costs

...but borrow rates ``kill'' this arbitrage

Assume that GLD can be financed at general collateral (e.g. 0.25%), so the Issue is how much does it cost to short DGL.

DGL short rate= **-2.381%** (from large broker, March 23, 2011). **This is a negative rate: you pay on cash balances.**

Long 100% DLG, short 100% GDL, daily rebalancing, with short rate



Leveraged ETFs

Products offer a multiple of the *daily* return of a reference index

Examples:

Proshares Ultra Financials ETF (UYG)

Offers a daily exposure to 2 times the Dow Jones Financial Index
(long 200% of underlying index, via TRS)

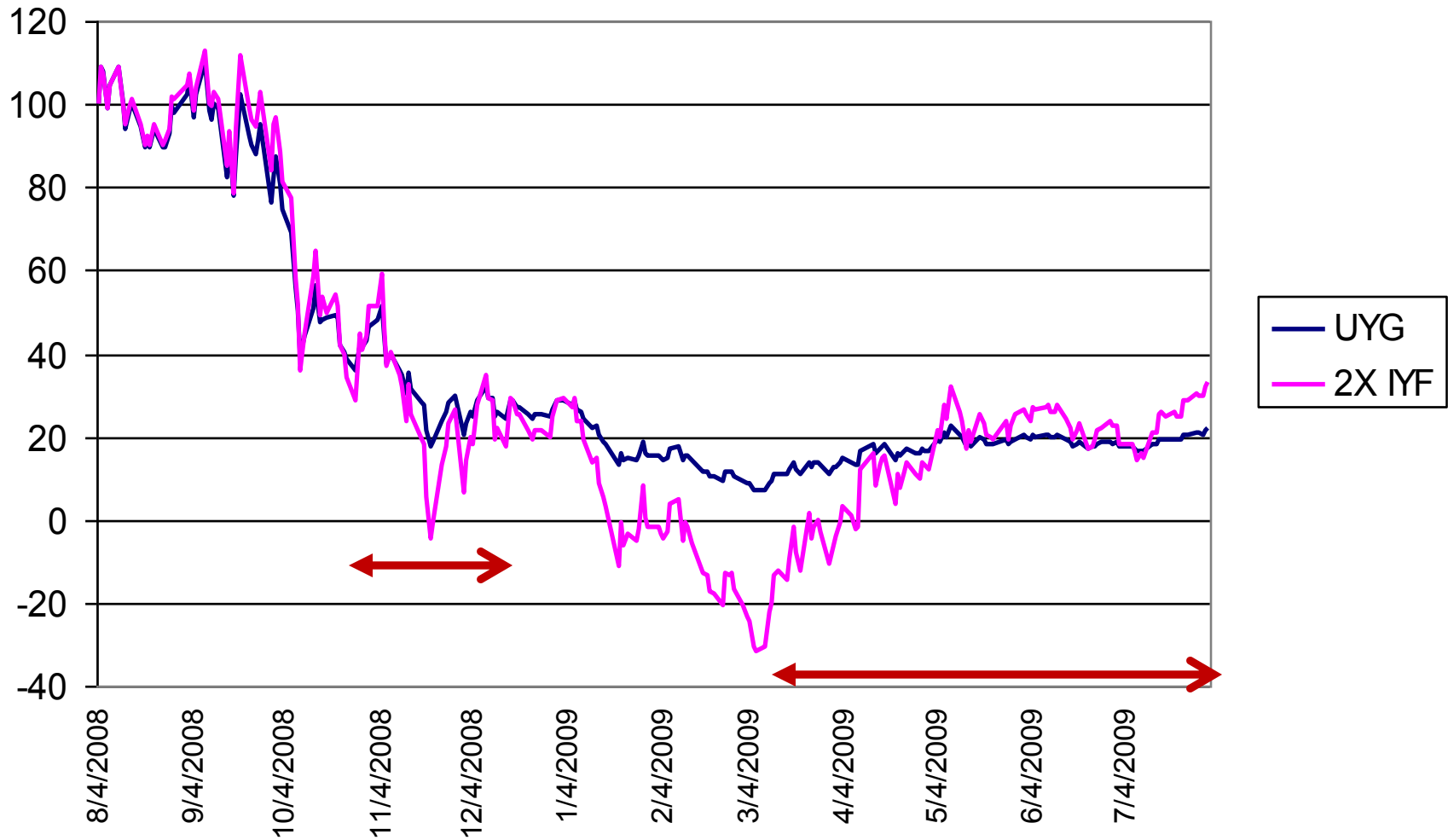
Proshares UltraShort Financials ETF (SKF)

Offers a daily exposure to -2 times the Dow Jones Financial Index
(short 200% of underlying index, via TRS)

Pitfalls of leveraged ETFs for buy-and hold investors

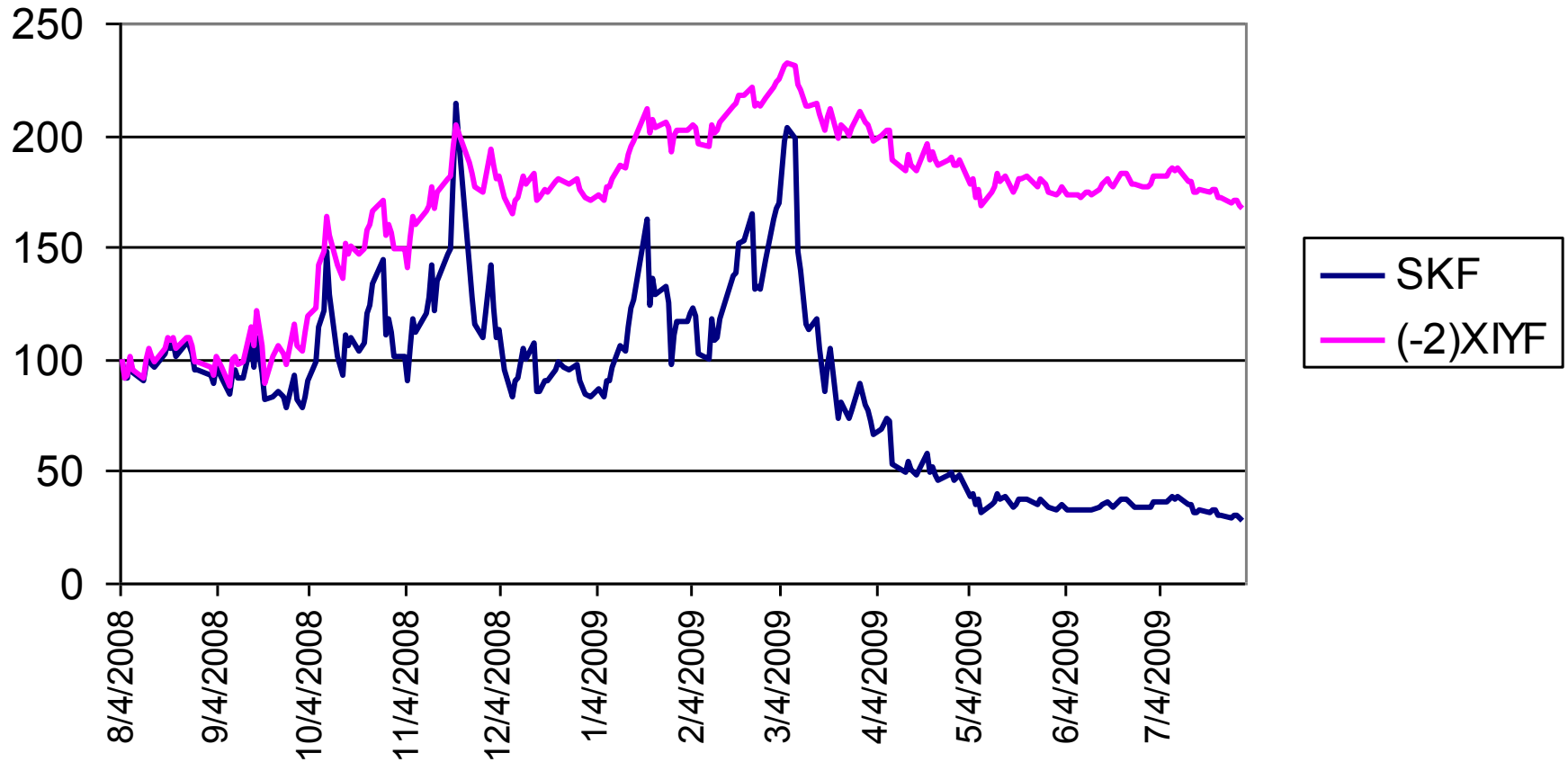
- Issues have been raised in the marketplace pertaining to the suitability of leveraged ETFs for long-term investors seeking to replicate a multiple of an index performance
- “UBS AG U.S. brokerage business stopped selling ETFs that use leverage because such products do not conform to its emphasis on long-term investing” *Bloomberg News, July 27, 2009*
- “ Due to the effects of compounding, their performance over longer periods of time can differ significantly from their stated daily objective. Therefore, inverse and leveraged ETFs that are reset daily typically are unsuitable for retail investors who plan to hold them longer than one trading session, particularly in volatile markets” *FINRA Regulatory Notice, June 31, 2009*
- SEC issued a similar warning notice in 2009

Tracking error: UYG vs. 2X IYF, 1 year



Lack of recovery in the bull mkt of Q1 09

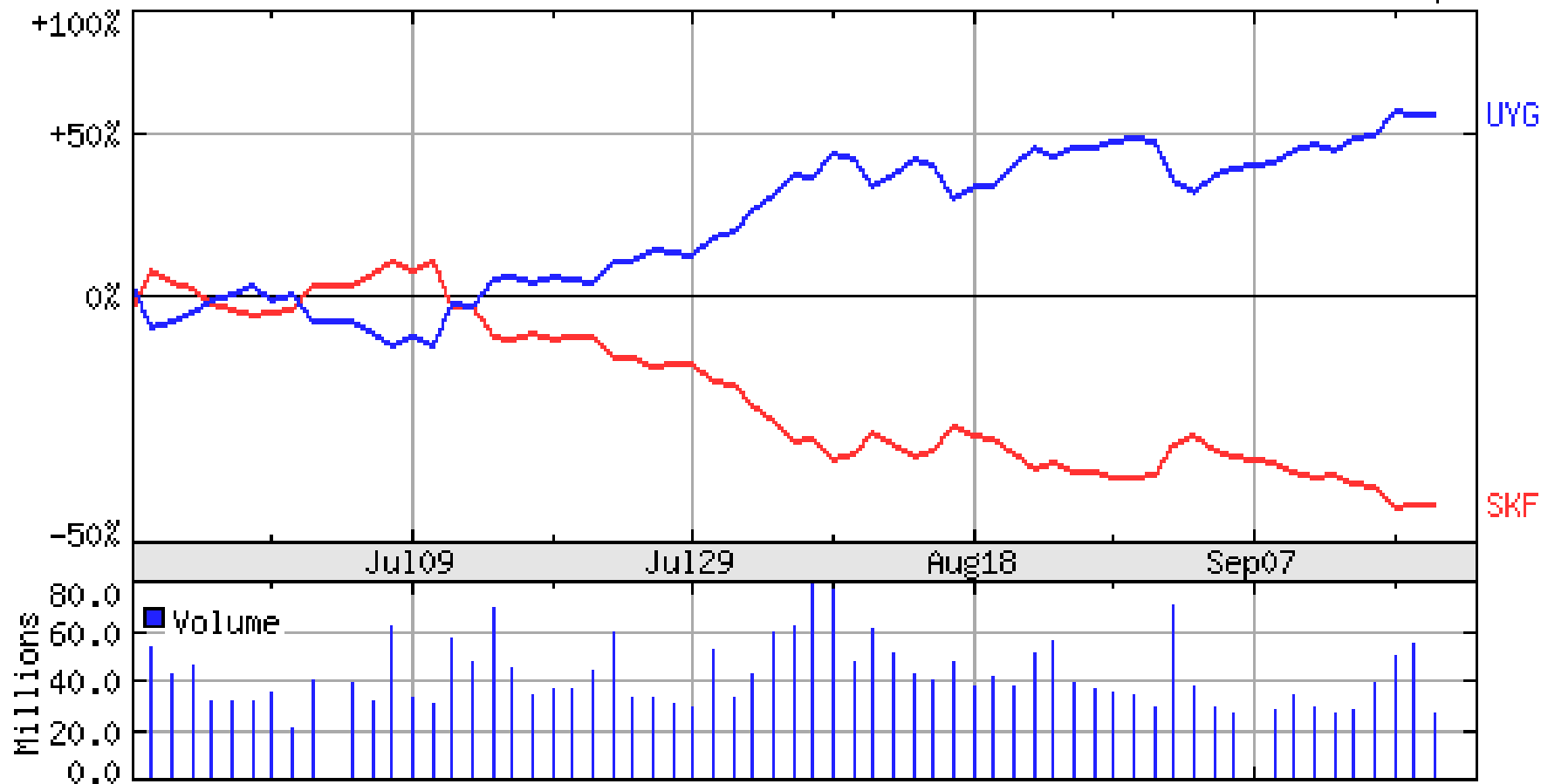
Tracking error: SKF vs. -2X IYF



SKF/UYG Past 3 months

ULTRA FINANCIALS PRO

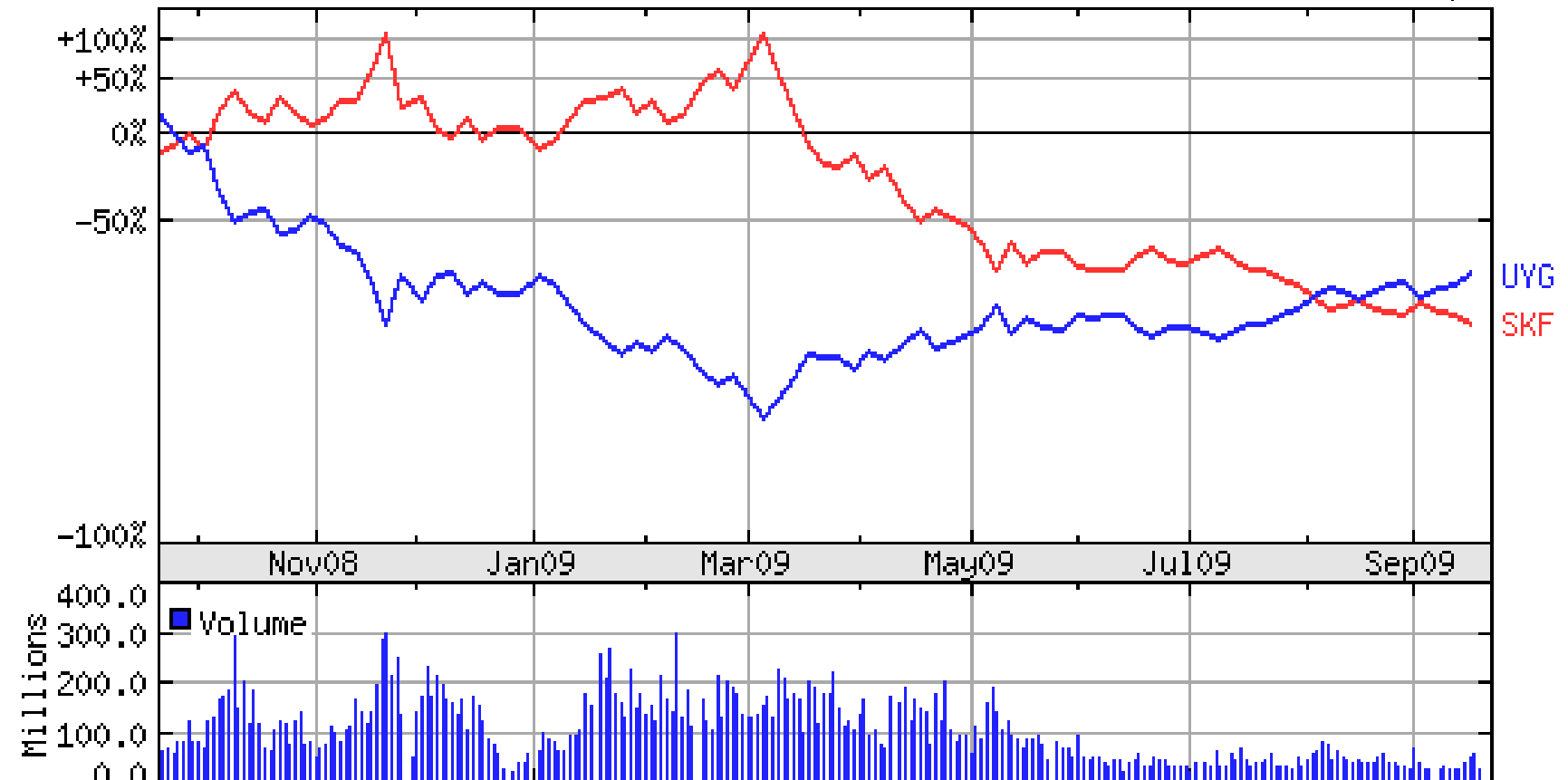
as of 18-Sep-2009



Past year

UYG

as of 18-Sep-2009

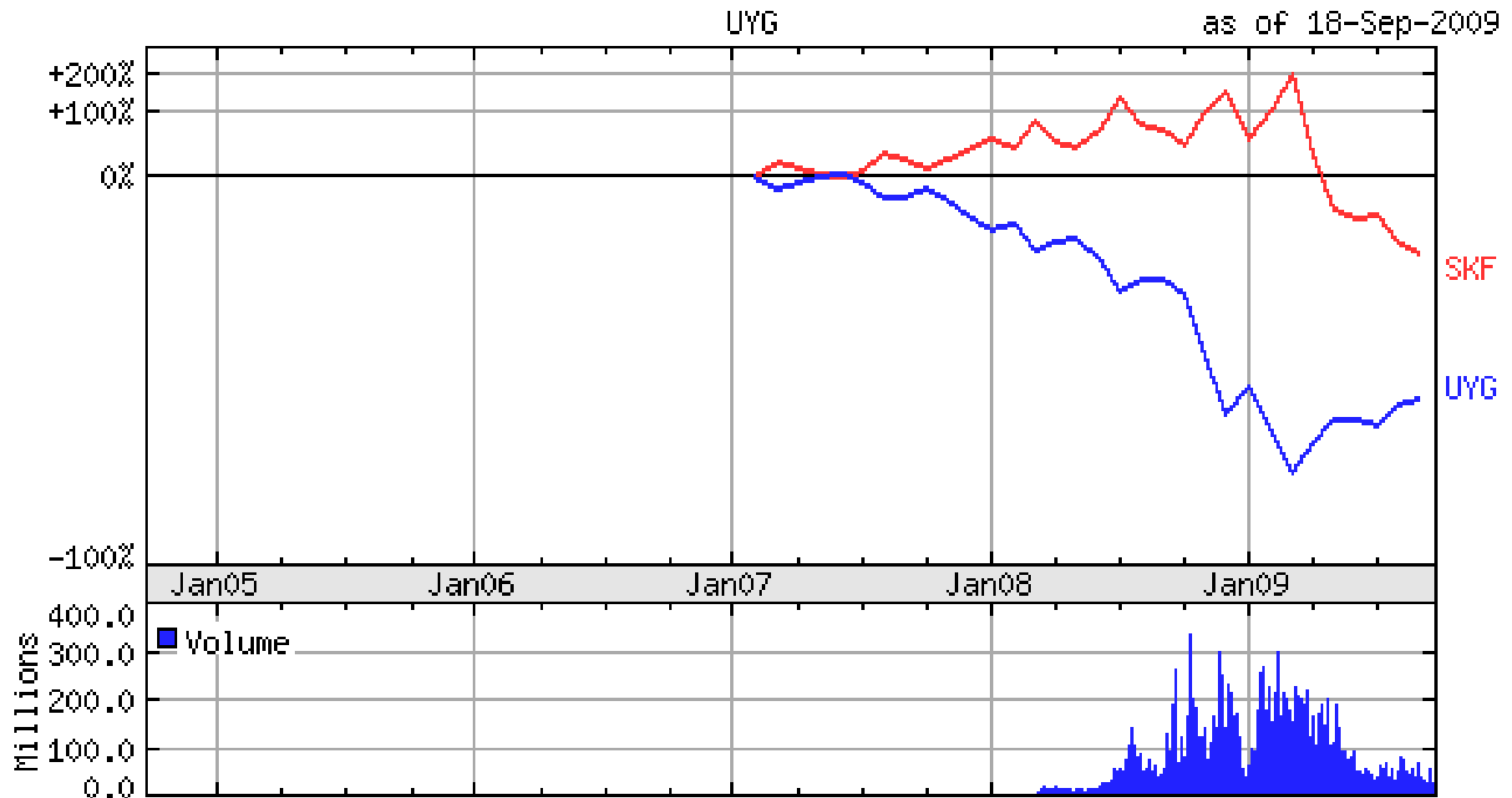


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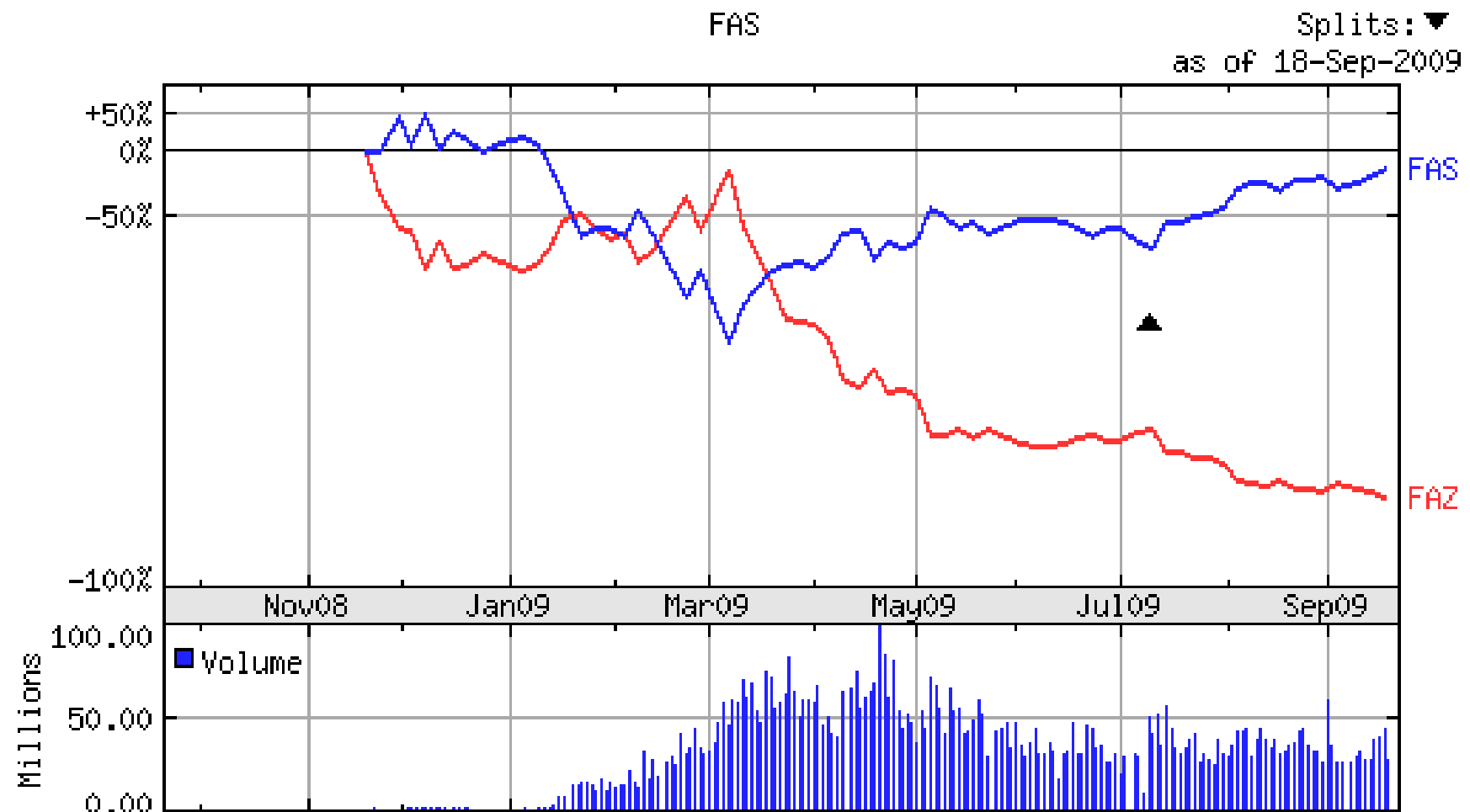
Notice that both returns are negative (big) over 1 year

Since inception

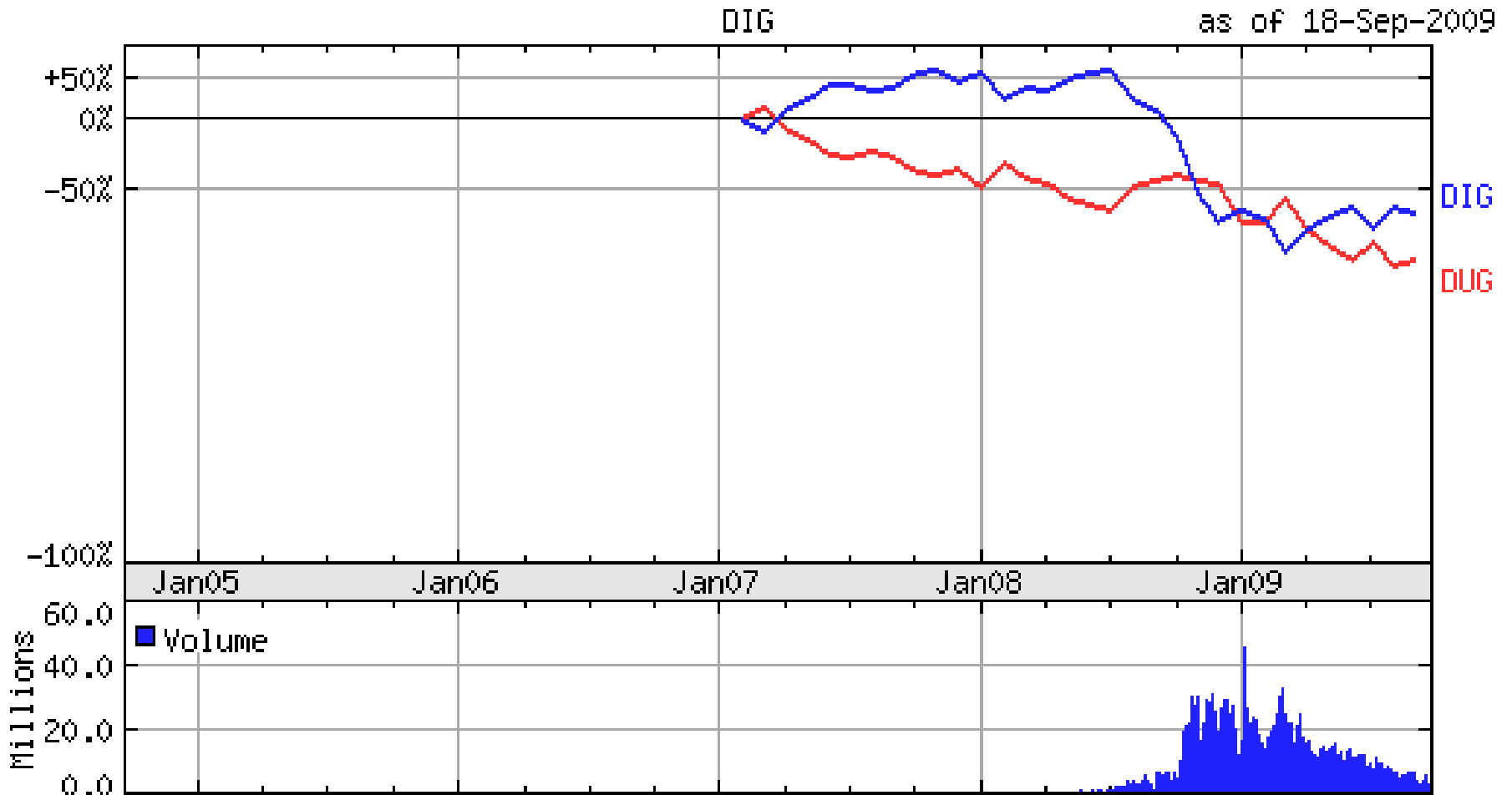


Another example: FAS/FAZ

Direxion 3X and -3X Financial ETF



Oil & Gas Proshares DIG (long) DUG (short)



LETFS: The discrete model

$R_{S,n}$ = return of the underlying index over the nth period

$R_{L,n}$ = return of the leveraged ETF over the nth period

S_t = price of the underlying index or ETF

L_t = price of the leveraged ETF

f = expense ratio for leveraged ETF

$$R_{L,n} = \beta R_{S,n} + (1 - \beta)r\Delta t - f\Delta t$$

$$\begin{aligned} L_t &= \prod_{n=1}^N (1 + R_{L,n}) \\ &= \prod_{n=1}^N (1 + \beta R_{S,n} + (1 - \beta)r\Delta t - f\Delta t) \end{aligned}$$

Relation between ETF and underlying index

$$\frac{L_t}{L_0} = \left(\frac{S_t}{S_0} \right)^\beta \exp \left[(1-\beta)rt - ft - \frac{1}{2}(\beta^2 - \beta) \int_0^t \sigma_s^2 ds \right]$$

convexity due
to daily
compounding

financing
& fees

volatility

Path-dependence of LETFs is caused by exposure to volatility

Tracking error:

$$\varepsilon_t = \frac{L_t}{L_0} - \left(\frac{S_t}{S_0} \right)^\beta \exp \left[(1 - \beta)rt - ft - \frac{1}{2} (\beta^2 - \beta) \int_0^t \sigma_s^2 ds \right]$$

Avellaneda and Zhang (2009) examined 56 LETFs since their inception and showed that the formula provides reasonable explanation for the variations of LETF prices, i.e. that the tracking error is small

Double leveraged bullish ETFs, 2/2008 to 3/2009

Double-Leveraged Bullish ETFs			
Underlying ETF	Tracking Error average,%	Standard Deviation %	Leveraged ETF
QQQQ	0.04	0.47	QLD
DIA	0	0.78	DDM
SPY	-0.06	0.4	SSO
IJH	-0.06	0.38	MVV
IJR	1.26	0.71	SAA
IWM	1.26	0.88	UWM
IWD	1	0.98	UVG
IWF	0.5	0.59	UKF
IWS	-0.33	1.2	UVU
IWP	-0.02	0.61	UKW
IWN	2.15	1.29	UVT
IWO	0.5	0.74	UKK
IYM	1.44	1.21	UYM
IYK	1.2	0.75	UGE
IYC	1.56	1.04	UCC
IYF	-0.22	0.74	UYG
IYH	0.4	0.42	RXL
IYJ	1.05	0.74	UXI
IYE	-0.73	1.71	DIG
IYR	1.64	1.86	URE
IYW	0.51	0.55	ROM
IDU	0.25	0.55	UPW

Double leveraged bearish ETFs, 2/2008 to 3/2009

Double-Leveraged Bearish ETFs			
Underlying ETF	Tracking Error average,%	Standard Deviation %	Leveraged ETF
QQQQ	0.22	0.8	QID
DIA	-2.01	3.24	DXD
SPY	-1.4	2.66	SDS
IJH	0.69	0.64	MZZ
IJR	-0.55	0.86	SDD
IWM	0.94	0.91	TWM
IWD	0.32	1.4	SJF
IWF	-0.3	1.34	SFK
IWS	-2.06	3.03	SJL
IWP	0.93	0.92	SDK
IWN	-2.21	1.8	SJH
IWO	-0.19	0.79	SKK
IYM	1.82	0.99	SMN
IYK	-0.76	1.98	SZK
IYC	0.79	0.92	SCC
IYF	3.3	3.03	SKF
IYH	1.04	0.91	RXD
IYJ	0.32	0.74	SIJ
IYE	0.43	3.09	DUG
IYR	2	2.07	SRS
IYW	0.01	0.8	REW
IDU	1.75	1.06	SDP

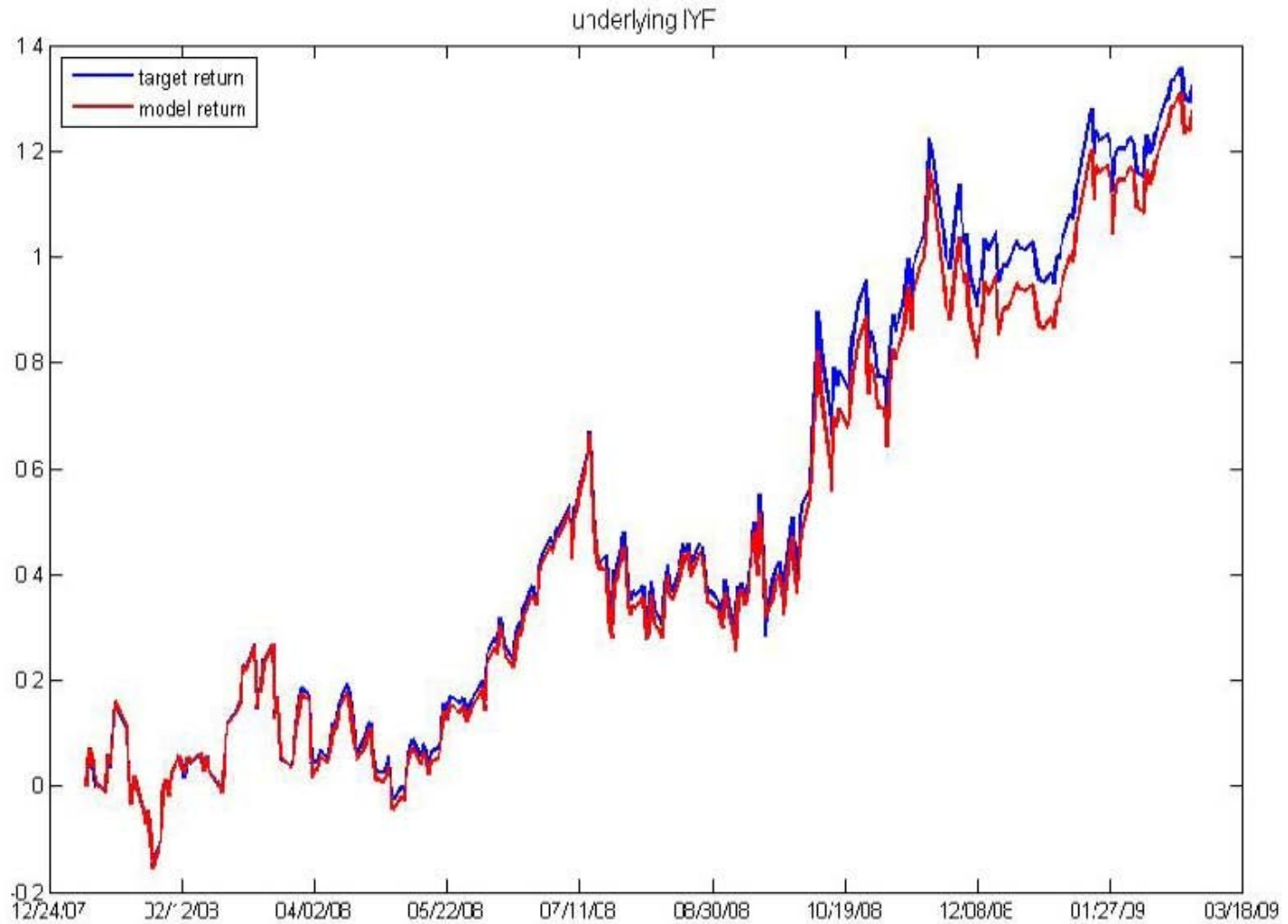
Triple leveraged ETFs, since inception (Nov 2008 – Mar 2009)

Triple-Leveraged Bullish ETFs

Underlying ETF/Index	Tracking Error average,%	Standard Deviation %	Leveraged ETF
IWB	0.44	0.55	BGU
IWM	0.81	0.75	TNA
RIFIN.X	3.67	2.08	FAS
RIENG.X	2.57	0.7	ERX
EFA	1.26	2.32	DZK
EEM	1.41	1.21	EDC

Triple-Leveraged Bearish ETFs

Underlying ETF/Index	Tracking Error average,%	Standard Deviation %	Leveraged ETF
IWB	-0.08	0.64	BGZ
IWM	0.65	0.76	TZA
RIFIN.X	-1.63	4.04	FAZ
RIENG.X	-1.41	1.01	ERY
EFA	-1.54	1.86	DPK
EEM	0.49	1.43	EDZ



Tracking SKF since December 2007 using the actual prices and the formula

Conclusions

- ETFs provide natural advantages to retail investors (access), professional investors and hedge funds (hedging, tactical allocation) and issuers (high-margin business)
- BM&F Bovespa, as a leader in regional and BRIC capital markets, is a natural habitat for expanding local & regional exchange-traded products
- Commodities: this is an area where Brazil can shine, especially in structuring physical or swap-based products on gold, agriculture and minerals
- Potential new businesses can arise as a consequence of this which are beneficial to the country's economy

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