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Global Equity Index and ETF Research

ETF Investment Considerations
for Asian Investors

Highlights:

- The global ETF/ETP market has grown at an extremely fast pace over the past five years. In December 2009, Assets Under Management (AUM) of US and European ETPs crossed the one trillion US dollar mark.
- While the Asian ETF market is still in its infancy, we believe that a number of forces are building to bring it to a tipping point that will result in accelerated growth rates. Increased coordination among regulators in Asia, a larger range of ETF products and increased use of beta index products are some of the factors which will propel Asia's ETF market growth in the next year.
- Physical replication and synthetic replication are two of the most common structures used in the construction of ETFs. Physically replicated ETFs buy all or a representative portion of the underlying securities in the index that they track. In contrast, ETFs employing synthetic replication use a basket of collateral securities, which bear no resemblance to a fund's index's constituents, and a total return swap, as part of their investment holdings. The total return swap holding will ensure that the fund replicates the performance of the underlying index.
- Most of the US ETFs utilize physical replication, while European ETFs use both physical and synthetic replication. Each structure has a number of relevant considerations that need to be understood.
- We conducted a study comparing the performance of both US and European domiciled ETFs tracking Asian benchmarks. We found that synthetic ETFs tracked their benchmark better than physically replicated ETFs for all of the indices examined.
- The tracking difference is especially apparent for physical replication of broad indices, such as the MSCI Emerging Markets, for which optimized baskets are used. Optimization entails sampling techniques to physically replicate an index, often leading to a basket that might include significantly fewer constituents, thus introducing a major source of tracking error. Unlike physically replicated ETFs which face such practical replication challenges, the performance of synthetic ETFs is not impacted by the sampling issue.
- In addition to tracking difference we have observed that European and US ETFs have different tax implications when it comes to dividend treatment. European domiciled ETFs are generally more tax efficient for Asian investors as dividends of US domiciled ETFs are taxable in the US.
- As the US ETF market is larger, and often more competitive, than the European market, we have observed that ETF bid/ask spreads tend to be tighter in the US. Therefore, in the short term holding US domiciled ETFs is more cost effective. In the long term however, for those ETFs that have larger tracking errors associated to them, European domiciled ETFs might prove to be more effective, since US ETFs utilize physical replication which we have observed to have higher levels of tracking error associated with its holding. US dividend tax treatment also reinforces this conclusion.

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Introduction

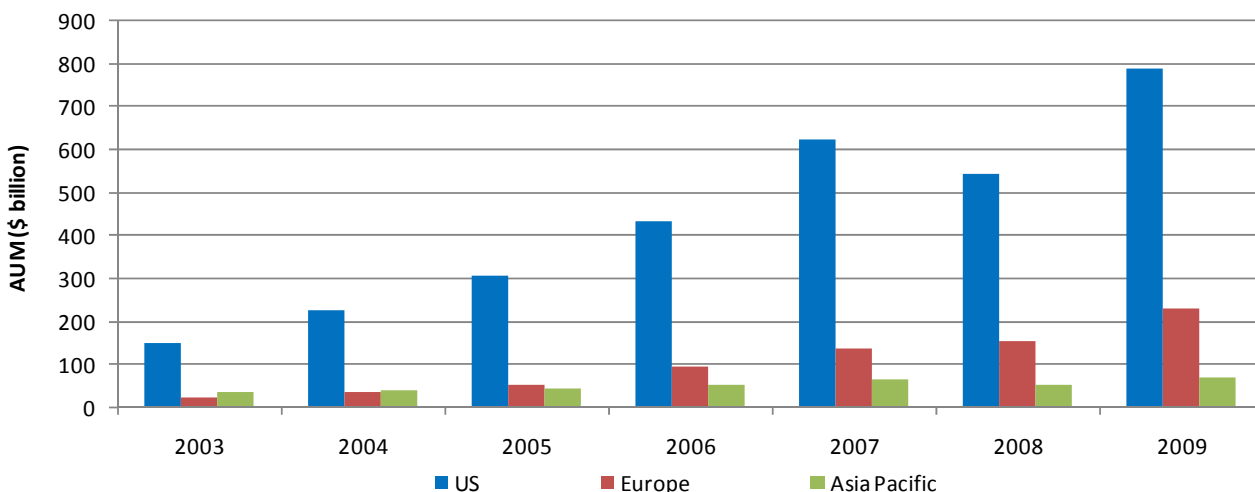
The fast-growing global Exchange-Traded Products (ETP¹) market

The global ETP market has grown at an extremely fast pace over the past five years. In December 2009, Assets Under Management (AUM) of US and European ETPs crossed the one trillion US dollar mark. The first ETF was created and listed in the US in the mid-nineties, marking the ascent of the traditional asset management industry to exchanges which up to that point carried single physical and derivative equity and fixed income instruments. Listing on an exchange facilitated continuous intra-day trading price quotation, contributed to bringing more transparency to trading activity and ultimately helped the industry become more competitive.

The exchange-traded product concept also gained broad popularity in the European Union in 2000. With the introduction of the Euro in 1999, the exchange-traded product mechanism came at an opportune time, and facilitated cross listing of funds across European exchanges. This made available a wider range of investment products to investors across the Euro-zone.

The two ETP markets, US and Europe, while very similar in some ways, are also very different in others. As of December 2009, the US ETP market is estimated to be US\$790 billion, while the European market is at US\$229 billion (See Figure 1). In addition to size, the type of investors using ETPs is also different between the two regions. In the US, they are used by both retail and institutional investors while the European market is almost entirely institutional. The regulatory environment in the two regions has also contributed to differentials, primarily in the construction and listing mechanism that governs these products.

Figure 1: Exchange Traded Products Assets Growth per Region



¹ Please refer to Appendix A for a definition of an exchange-traded product

Figure 1 (Continuation): Exchange Traded Products Assets Growth per Region

AUM	2003	2004	2005	2006	2007	2008	2009
US (\$)	149.9	225.9	306.0	431.4	625.9	544.6	790.1
		51%	35%	41%	45%	-13%	45%
Number of ETPs	134	169	220	380	673	845	925
Europe (\$)	20.5	33.0	51.3	92.3	134.5	153.0	229.4
		61%	56%	80%	46%	14%	50%
Number of ETPs	101	116	169	307	488	771	1,049
Asia Pacific (\$)	34.8	39.9	42.8	52.6	62.7	52.5	67.0
		15%	7%	23%	19%	-16%	28%
Number of ETPs	35	40	47	65	100	188	232
US, Europe & Asia Pacific (\$)	205.3	298.8	400.1	576.3	823.1	750.1	1,086.6
		46%	34%	44%	43%	-9%	45%
Number of ETPs	270	325	436	752	1,261	1,804	2,206

Source: Deutsche Bank, Bloomberg, Reuters.

While differences exist, the popularity of ETP products has been uniform and undisputed in both the US and Europe, thus propelling ETP assets to grow five-fold between 2003 and 2009. As assets grew, the variety and type of products also grew significantly. The first ETPs in the mid-nineties targeted equity benchmarks, with fixed income ETPs making their appearance in 2002. Three years later, in 2005, commodity ETPs started to become popular. Over 2009 a fourth ETP asset class, alternatives (covering hedge funds, real estate, private equity and currency) also started to gain popularity. As of today, the overall US and European markets are comprised of approximately 70% equity, 15% fixed income, 10% commodities and 5% alternatives and other asset classes (such as multi-asset).

Compared to the US and European markets, the Asian ETF market is still in its infancy (less than 10% of the global AUM, about 10% of the total number of ETPs). However, we believe that, besides the fast economic growth, a number of forces are building to bring the Asian ETP market to a tipping point which will mark growth acceleration:

- Recent market events, including equity market declines and increased volatility, have contributed to investors seeking shelter in beta (rather than alpha) products. ETFs are index tracking beta products and have greatly benefited from this trend both in the US and Europe.
- Growing and more diverse ETF products targeting a wider variety of benchmarks. The number of ETFs has more than doubled in the past two years, and now investors have access to larger variety of risk profiles, including those that have been difficult to access through more traditional channels.
- Increasing coordination among local Asia based regulators, which will make the market less fragmented. One recent example is the coordination between Taiwan and Hong Kong regulators to allow ETFs to be cross-listed in these two markets. Fragmentation is one of the major impediments to the growth of the ETF market in Asia. The European market has historically experienced similar integration issues, however, the UCITS III regime contributed to creating one market with more harmonised rules. This made it possible for ETFs in Europe to be cross-listed on several exchanges.

The US and European ETP Markets

Figure 2: AUM Global Market Overview

Summary	All Exchange-Traded Products (All figures in million)						Exchange-Traded Funds Only (All figures in million)					
	Q408	Q109	Q209	Q309	Q409	2009 growth	Q408	Q109	Q209	Q309	Q409	2009 growth
US & Europe (\$)	697,601	632,127	773,964	913,603	1,019,559	321,958	650,490	566,582	698,662	829,245	920,434	269,944
		-9.4%	22.4%	18.0%	11.6%	46.2%		-12.9%	23.3%	18.7%	11.0%	41.5%
Europe (\$)	152,998	140,566	170,572	206,847	229,421	76,424	146,150	130,632	159,160	192,729	213,691	67,540
		-8.1%	21.3%	21.3%	10.9%	50.0%		-10.6%	21.8%	21.1%	10.9%	46.2%
US (\$)	544,603	491,561	603,391	706,756	790,138	245,534	504,340	435,949	539,502	636,516	706,744	202,404
		-9.7%	22.8%	17.1%	11.8%	45.1%		-13.6%	23.8%	18.0%	11.0%	40.1%
Regions												
Europe (€)	109,976	105,814	121,536	141,424	160,030	50,054	105,050	98,333	113,400	131,765	149,065	44,015
		-3.8%	14.9%	16.4%	13.2%	46%		-6.4%	15.3%	16.2%	13.1%	42%
US (\$)	544,603	491,561	603,391	706,756	790,138	245,534	504,340	435,949	539,502	636,516	706,744	202,404
		-9.7%	22.8%	17.1%	11.8%	45%		-13.6%	23.8%	18.0%	11.0%	40%
Equity												
Europe (€)	73,909	62,504	76,580	93,749	105,938	32,029	73,909	62,504	76,580	93,749	105,937	32,029
		-15%	23%	22%	13%	43%		-15%	23%	22%	13%	43%
US (\$)	445,844	366,062	456,866	541,469	601,427	155,583	445,394	365,565	455,735	539,235	598,592	153,198
		-18%	25%	19%	11%	35%		-18%	25%	18%	11%	34%
Fixed Income												
Europe (€)	27,353	29,883	29,526	29,331	32,050	4,697	27,353	29,883	29,526	29,331	32,050	4,697
		9%	-1%	-1%	9%	17%		9%	-1%	-1%	9%	17%
US (\$)	58,535	70,024	83,212	96,552	106,926	48,391	58,535	70,024	83,212	96,552	106,926	48,391
		20%	19%	16%	11%	83%		20%	19%	16%	11%	83%
Commodity												
Europe (€)	8,618	13,343	15,165	17,805	21,117	12,499	3,692	5,861	7,028	8,146	10,175	6,483
		55%	14%	17%	19%	145%		59%	20%	16%	25%	176%
US (\$)	36,473	51,792	59,012	63,823	73,566	37,093	0	0	0	0	0	0
		42%	14%	8%	15%	102%		n.a.	n.a.	n.a.	n.a.	n.a.
Currency												
Europe (€)	57	51	68	144	192	134	57	51	68	144	170	112
		-11%	34%	112%	33%	234%		-11%	34%	112%	18%	196%
US (\$)	3,546	3,505	4,042	4,560	7,772	4,226	208	184	300	380	783	575
		-1%	15%	13%	70%	119%		-11%	63%	27%	106%	277%
Alternatives												
Europe (€)	0	5	163	349	684	684	0	5	163	349	684	684
		n.a.	3280%	114%	96%	n.a.		n.a.	3280%	114%	96%	n.a.
US (\$)	0	0	31	63	99	99	0	0	31	63	99	99
		n.a.	n.a.	103%	56%	n.a.		n.a.	n.a.	103%	56%	n.a.
Multi-Asset												
Europe (€)	38	29	35	46	49	11	38	29	35	46	49	11
		-24%	22%	31%	7%	29%		-24%	22%	31%	7%	29%
US (\$)	205	178	227	290	347	142	203	176	224	287	343	141
		-13%	27%	28%	20%	69%		-13%	27%	28%	20%	69%

Source: Deutsche Bank, Bloomberg, Reuters.

Figure 3: US Providers AUM League Table

Rank	09-Q4 AUM (USD million)	Equity	Fixed Income	Commodities	Other	Total	08- Q4 Total	09- Q1 Total	09-Q2 Total	09-Q3 Total
1	BlackRock	287,082	75,851	9,735	189	372,857	257,671	232,767	292,150	345,929
2	State Street GA	138,444	9,746	40,223	0	188,414	160,390	129,843	143,329	162,810
3	Vanguard	79,613	11,733	0	0	91,346	45,551	44,155	59,111	77,103
4	PowerShares	30,408	3,278	0	0	33,686	21,816	20,936	25,589	31,127
5	ProShares	18,022	5,354	864	180	24,420	20,496	22,103	27,532	24,602
6	Deutsche Bank AG	16	0	9,598	3,977	13,591	4,444	6,084	8,778	9,072
7	Van Eck Funds	12,111	361	0	76	12,548	4,582	6,442	7,928	9,762
8	Bank of New York	8,178	0	0	0	8,178	6,742	5,319	6,359	7,932
9	United States Commodity Funds LLC	0	0	7,404	0	7,404	3,211	3,896	6,222	6,725
10	WisdomTree AM	5,544	16	0	783	6,343	3,226	2,790	4,038	5,379
11	Barclays Capital	2,065	0	3,819	61	5,946	2,602	2,338	3,373	4,849
12	Rydex Invest.	3,031	0	0	2,694	5,726	4,241	3,832	4,755	5,604
13	Merrill Lynch	5,186	0	0	0	5,186	4,782	5,531	4,931	5,176
14	Direxionshares	4,876	142	0	0	5,019	2,429	2,966	5,126	4,446
15	Claymore Ad.	2,896	20	0	3	2,920	914	859	1,644	2,190
16	First Trust Ad.	1,976	0	0	0	1,976	745	692	957	1,472
17	Swedish Export CC	1	0	893	0	894	253	409	565	664
18	JPMorgan Chase & Co	731	0	0	0	731	2	2	178	441
19	ETF Securities Ltd - NE	0	0	492	0	492	0	0	0	227
20	PIMCO - NE	45	417	0	0	462	0	0	40	128
21	Charles Schwab IM - NE	345	0	0	0	345	0	0	0	0
22	Revenue Shares	314	0	0	0	314	67	66	133	244
23	GreenHaven Commodity Sers.	0	0	229	0	229	18	87	144	200
24	Xshares	0	0	0	169	169	133	122	146	164
25	UBS Securities	0	0	161	0	161	45	61	63	67
26	Fidelity Invest.	134	0	0	0	134	81	72	108	126
27	ALPS Fund Services Inc	106	0	0	0	106	5	4	5	29
28	IndexIQ Advisors LLC - NE	10	9	0	84	103	0	0	31	63
29	Global X Management Co LLC - NE	88	0	0	0	88	0	2	2	8
30	HSBC USA Inc	0	0	82	0	82	34	52	61	80
31	Goldman Sachs	0	0	65	0	65	53	51	60	60
32	Old Mutual Global Shares Trust - NE	62	0	0	0	62	0	0	0	0
33	Emerging Global Shares - NE	48	0	0	0	48	0	0	10	26
34	AdvisorShares Trust - NE	22	0	0	0	22	0	0	0	16
35	MacroMarkets LLC	20	0	0	0	20	21	19	20	24
36	Javelin Investment Management LLC - NE	15	0	0	0	15	0	0	0	5
37	Graal Advisors LLC - NE	14	0	0	0	14	0	0	3	3
38	FaithShares Advisors LLC - NE	13	0	0	0	13	0	0	0	0
39	OOK Advisors LLC - NE	7	0	0	0	7	0	0	0	0
40	Credit Suisse Group	3	0	0	0	3	2	2	2	3
41	Bear Stearns AM - EXT	0	0	0	0	0	0	59	0	0
42	Northern Trust Glob Inv - EXT	0	0	0	0	0	33	0	0	0
43	SPA ETFs Inc - EXT	0	0	0	0	0	12	0	0	0
44	Putnam Investment Man - EXT	0	0	0	0	0	0	0	0	0
	Total	601,427	106,926	73,566	8,217	790,138	544,603	491,561	603,391	706,756

* Other includes Currency, alternative and multi-asset

Light grey-highlighted indicate new entrants (- NE), dark grey-highlighted indicate leavers (- EXT)

Source: Deutsche Bank, Bloomberg, Reuters.

Figure 4: European Providers AUM League Table

Rank	09-Q4 AUM (€ million)	Equity	Fixed Income	Commodities	Other	Total	08-Q4 Total	09-Q1 Total	09-Q2 Total	09-Q3 Total
1	BlackRock	62,088	18,454	375	0	80,917	56,688	49,885	61,648	75,704
2	Lyxor	29,657	10,251	955	0	40,864	37,048	29,037	32,830	38,310
3	db x-trackers	23,538	11,310	1,538	1,292	37,679	24,350	25,422	30,268	33,923
4	ETF Securities Ltd	326	0	15,316	32	15,673	6,882	9,984	11,471	14,243
5	Credit Suisse AM	7,303	963	1,327	0	9,593	6,321	5,460	6,314	7,576
6	Zuercher Kantonalbank	0	0	6,669	0	6,669	3,306	4,876	5,327	6,142
7	ETFlab Investment GmbH	5,665	940	0	0	6,605	2,947	1,709	4,793	5,223
8	ComStage	4,137	1,817	161	0	6,116	2,681	2,028	2,805	3,623
9	BNP Paribas	4,309	578	850	0	5,737	4,276	3,858	4,096	5,646
10	CASAM	3,524	1,263	0	0	4,786	2,101	1,767	2,356	3,475
11	UBS	3,319	0	0	0	3,319	1,777	1,527	1,977	2,768
12	Source - NE	2,800	0	383	0	3,183	0	0	336	2,215
13	Xact Fonder AB	2,181	0	0	0	2,181	1,839	1,627	1,803	2,158
14	Julius Baer Inv	0	0	2,132	0	2,132	256	935	1,579	2,096
15	State Street GA	1,463	0	0	0	1,463	1,120	934	1,125	1,403
16	PowerShares	839	143	0	0	982	474	592	757	905
17	ABN Amro Bank NV	161	0	499	0	660	255	313	407	592
18	Seligson & Co Fund Man	257	0	0	0	257	132	123	138	213
19	JP Morgan	0	189	0	0	189	253	220	211	221
20	Alpha Asset Man.	97	0	0	0	97	76	66	91	123
21	HSBC - NE	80	0	0	0	80	0	0	0	0
22	Merrill Lynch Invest SAS	0	0	63	0	63	46	47	56	55
23	NCB Stockbrokers	31	0	0	0	31	32	30	32	39
24	BBVA Gestion SA SGIIC	0	0	0	0	0	0	0	0	0
25	DnB NOR Kapitalforvaltning	147	0	0	0	147	56	76	100	127
26	Deutsche Borse Commodities GmbH	0	0	0	0	0	0	0	0	0
27	Erste Sparinvest KAG	0	0	0	0	0	0	0	0	0
28	NBG Asset Management MFMC - NE	0	0	0	0	0	0	0	0	0
29	ThinkCapital ETFs N.V. - NE	0	0	0	0	0	0	0	0	0
30	Barclays Capital - NE	0	0	0	0	0	0	0	0	0
31	Nextra IM SGR SpA - EXT	0	0	0	0	0	82	50	53	66
32	ABG Sundal Collier AM - EXT	0	0	0	0	0	0	0	0	0
33	HQ Fonder Sverige AB - EXT	0	0	0	0	0	0	0	0	0
34	SPA ETF Europe Ltd - EXT	0	0	0	0	0	0	0	0	0
Total		151,921	45,908	30,268	1,324	229,421	152,998	140,566	170,572	206,847

* Other includes Currency, alternative and multi-asset

Light grey-highlighted indicate new entrants (- NE), dark grey-highlighted indicate leavers (- EXT)

Source: Deutsche Bank, Bloomberg, Reuters.

Asian ETF Market

Figure 5: AUM Asia Pacific Market

Exchange-Traded Funds Only (All figures in million)						
Summary	Q408	Q109	Q209	Q309	Q409	2009 growth
Asia Pacific (\$)	52,540	48,645	57,617	63,091	66,989	14,450
		-7.4%	18.4%	9.5%	6.2%	27.5%
Equity	Q408	Q109	Q209	Q309	Q409	2009 growth
Asia Pacific (\$)	49,156	45,486	54,322	58,836	62,465	13,309
		-7.5%	19.4%	8.3%	6.2%	27.1%
Fixed Income						
Asia Pacific (\$)	2,427	2,130	2,261	3,130	3,347	920
		-12.2%	6.1%	38.4%	6.9%	37.9%
Commodity						
Asia Pacific (\$)	867	937	976	1,065	1,163	296
		8.0%	4.2%	9.1%	9.3%	34.2%
Currency						
Asia Pacific (\$)	62	65	32	33	14	-48
		4.9%	-50.6%	4.0%	-59.1%	-78.0%

Source: Deutsche Bank, Bloomberg, Reuters.

Figure 6: Asia Pacific Providers AUM League Table

Rank	09-Q4 AUM (USD million)	Equity	Fixed Income	Commodities	Other*	Total	08- Q4 Total	09- Q1 Total	09-Q2 Total	09-Q3 Total
1	Nomura Asset Management	13,542	-	233	14	13,789	15,056	14,037	14,680	14,436
2	State Street GA	8,089	2,110	-	-	10,199	7,223	6,488	8,300	9,664
3	BlackRock	7,937	-	-	-	7,937	4,329	4,504	6,357	7,011
4	Nikko Asset Management	5,791	11	-	-	5,802	6,401	5,450	6,033	5,693
5	Hang Seng Investment Management	5,507	-	-	-	5,507	2,818	2,868	4,203	5,026
6	Daiwa Asset Management	5,000	-	-	-	5,000	6,158	4,627	5,351	4,739
7	China Asset Management	4,287	-	-	-	4,287	2,548	1,670	2,318	3,228
8	Polaris Int Sec	2,168	-	-	-	2,168	1,400	1,359	1,738	2,353
9	Samsung Investment Trust Mg	1,592	27	-	-	1,619	1,086	1,128	1,055	1,597
10	Benchmark Asset Management	1,552	-	50	-	1,601	441	715	1,295	1,444
11	E Fund Management	1,313	-	-	-	1,313	354	755	636	871
12	BOCI - Prudential Asset Man Ltd	983	-	-	-	983	660	697	937	811
13	Lyxor	534	-	130	-	664	501	532	686	652
14	AIG-Huatai Fund Management	594	-	-	-	594	472	493	502	483
15	Fubon Securities Investment Trust Co	593	-	-	-	593	57	74	93	528
16	ETF Securities Ltd	-	-	566	-	566	325	419	425	471
17	Mitsubishi UFJ Asset Mg	541	-	-	-	541	180	444	686	606
18	Woori Asset Management	148	353	-	-	502	718	208	70	539
19	MAPS Investment Man Co	378	-	-	-	378	233	506	245	401
20	Korea Investment Trust Mg	225	98	-	-	323	120	198	248	267
21	HSBC Inv Funds Ltd/Hong Kong	-	307	-	-	307	300	281	284	284
22	KB Asset Management	59	215	-	-	274	31	40	48	310
23	AMP	262	-	-	-	262	108	116	206	247
24	i-VCAP Management	196	-	-	-	196	132	141	170	185
25	Huaan Fund Management	187	-	-	-	187	121	83	173	159
26	CIMB-GK Securities Pte Ltd	162	-	-	-	162	100	94	132	155
27	Smartshares Ltd	160	-	-	-	160	97	138	115	145
28	AmInvestment Services Berhad/Malaysi	1	152	-	-	153	156	143	147	147
29	Yurie Asset Management	104	-	-	-	104	101	108	65	85
30	Vanguard - NE	86	-	-	-	86	-	-	3	44
31	One Asset Management	82	-	-	-	82	49	47	62	74
32	Passive Funds Management Ltd	79	-	-	-	79	47	45	54	71
33	Bahana TCW Investment Management	-	74	-	-	74	58	60	67	71
34	ICBC Credit Suisse Asset Management - NE	73	-	-	-	73	-	-	-	-
35	UTI Asset Management	3	-	55	-	59	49	47	49	53
36	UOB Asset Management Ltd - NE	57	-	-	-	57	-	-	-	-
37	Reliance Capital Asset Management	-	-	50	-	50	43	41	42	45
38	Simplex Asset Management Co Ltd - NE	11	-	34	-	45	-	-	-	30
39	Sensible Asset Management Hong Kong - NE	44	-	-	-	44	-	-	-	-
40	Kotak Mahindra Asset Man	21	-	20	-	41	26	26	33	37
41	DBS Asset Management	32	-	-	-	32	15	28	38	44
42	Tong Yang Investment Trust Mg	27	-	-	-	27	13	22	25	32
43	Daishin Investment Trust Mg	20	-	-	-	20	8	9	11	17
44	SBI Funds Management - NE	-	-	14	-	14	-	-	24	25
45	KTB Asset Management Co Ltd/Korea - NE	14	-	-	-	14	-	-	-	-
46	Hyundai Investments - NE	-	-	10	-	10	-	-	-	-
47	TMB Asset Management	6	-	-	-	6	5	4	6	7
48	Quantum Asset Management	0	-	1	-	1	1	1	1	1
49	Indo Premier Securities	1	-	-	-	1	0	0	1	0
50	Prudential ICICI Asset Man	0	-	-	-	0	0	0	0	0
51	BOCOM Schroders - NE	-	-	-	-	-	-	-	-	-
52	China Southern Fund Management Co Ltd - NE	-	-	-	-	-	-	-	-	-
	Total	62,465	3,347	1,163	14	66,989	52,540	48,645	57,617	63,091

* Other includes Currency, alternative and multi-asset

Light grey-highlighted indicate new entrants (- NE)

Source: Deutsche Bank, Bloomberg, Reuters.

ETF Mechanics

What is an ETF?

ETFs are listed products that combine the benefits of traditional index funds with benefits of exchange-tradable securities. The objective of an ETF is no different than any other index fund and that is to track the performance of its underlying index. In addition to characteristics of traditional index funds, ETFs also enjoy continued intra-day trading, convenience in accessing a market, trading transparency, as well as competitive pricing.

Background to current replication techniques employed by ETF providers

The creation of the first exchange-traded funds in the mid-nineties, while limited in depth and scope as measured by their benchmark coverage and investor type, was nevertheless revolutionary because it managed to put the exchange-traded fund concept on the map and contributed to proliferation of the concept primarily with early adopters in the indexing space. Investors, attracted by the unique – mostly - functional features begun to warm up to the idea of a fund that could be traded like any other security on an exchange, and began to channel assets into ETFs. While investors' interest was not initially very strong, it was sufficient to keep the concept alive and that in turn propelled fund providers across the globe to begin exploring and creating a wider variety of vehicles, starting with enhancing the continuum of index tracker equity and fixed income funds. While in the US the product began to experience strong growth in the late 1990s, it wasn't until the early part of the current decade that ETFs began to gain increased global recognition as a unique investment instrument.

It was during this time, and with concurrent innovations in global capital markets, such as the vast increase in the liquidity and variety of derivative instruments, that fund providers significantly increased ETF product portfolios. From 2005 to 2006, the number of ETFs in the US and Europe almost doubled, with assets in the US and Europe growing by 47% for the same period. These developments marked an inflection point in how the global investor viewed the ETF product.

With the ETF product becoming more mainstream with both retail and institutional investors came the need to create vehicles that efficiently tracked a wider variety of benchmarks in order to satisfy investor demand. The strong investor pull brought to the market non-traditional asset managers, such as investment banks and exchange-traded products specialists, and, by combining structuring capabilities long successfully deployed in capital markets in the past, began to use not only physical securities but a plethora of other financial instruments, such as exchange traded and OTC derivatives, to construct ETF vehicles.

Increased popularity of the ETF product together with increased competition, also transformed the economics of the industry. ETF providers, utilizing not only their expertise but exploiting their competitive advantages and respective cost structures, began to design products recognizing that the most optimal path to product creation, maximizing impact, and unlocking value, crossed a very fine line between exploiting the business models of traditional asset management and investment banking and the inherent cost structures of both sectors.

Traditional asset managers, capitalizing on their indexing skills created the first exchange-traded fund vehicles fully replicating their respective indices. These funds exist today and they employ physical replication primarily in equity and fixed income vehicles. Investment banks and other capital markets maestros, having more direct access to hedging instruments via their existing operations/books, took the physical replication concept and created a new generation of vehicles utilizing both in-kind replication as well as derivatives to achieve an exchange-traded vehicle's investment objectives. The fusion of decades of fund structuring asset management and capital markets experience enabled the ETF market to experience a geometric expansion and replicate benchmark profiles that go far beyond the relatively plain equity and fixed income benchmarks targeted by the first ETFs.

The replication techniques

Physical replication (vehicle issuing shares): A manager utilizing physical replication, will seek to create a fund whose holdings very closely resemble those of its benchmark index. For example, a manager replicating the FTSE/XINHUA China 25 ETF will purchase all 25 constituent stocks or as close to it as possible. The fund manager will manage the underlying pool of assets and ensure, on an ongoing basis, that they remain very similar to the constituents of the benchmark index. Creation of fund units can be done by an investor approaching a market intermediary that will in turn assemble an underlying slice of a benchmark index's constituents and exchange those with units created by the ETF fund manager. The investor will hold the unit and the fund manager will manage the underlying pool of securities which should mirror those of its benchmark index close to 100%. The investor can liquidate units by handing them back to a market intermediary and receiving back securities, or alternatively the investor can sell the unit for cash on exchange.

Variants of the physical replication method include, on certain occasions, fund managers choosing to employ physical replication but without engaging a complete index replication of a target reference index's constituents in order to create a unit. Instead, they employ statistical sampling techniques, primarily stratified sampling, which enable them to replicate an index's return as close as possible, by only purchasing a proportion of the reference index constituents. Such physical replication technique variants are especially common in Asia as indices can contain hundreds of constituents (for example Nikkei, MSCI World Index). In addition, when indices contain illiquid constituents, a decision can be made by the fund manager to exclude those when replicating. Constructing a fund that has constituents that differ from those of its benchmark, while often necessary, will result in tracking error.

Synthetic replication (vehicle issuing shares): A manager utilizing synthetic replication, will seek to create a fund whose holdings are a combination of physical securities and, either exchange-traded or over-the-counter (OTC), derivatives, most commonly in the form of total return swaps (TRS). This replication method will ensure that a vehicle meets its stated objectives via holding a basket of securities which could bear no resemblance to those of its index but will simultaneously engage in a derivative contract and swaps the return of its holdings pool to those of its target reference index. Creation of fund units can be done by handing cash to the fund manager that will in turn purchase securities and adjust the exposure of the fund's derivative position to reflect subscriptions. Similar to the physical replication an investor may elect to purchase 'ready' units of the ETF trading on an exchange. Units can be liquidated by the investor, either by selling them on an exchange, or by surrendering them to the vehicle manager and receiving cash in return.

Variants of the synthetic index replication method include variations in the comparability of the underlying pool of an ETF's assets to that of its benchmark index as well as by variations in the type of derivatives and/or number of OTC counterparties contracted, if applicable. Exchange Traded Funds (ETFs) in the US are classed as fund structures that issue shares that are traded on an exchange much the same way as equities. ETFs indexed to equity and fixed income benchmarks are registered under the investment company act of 1940. In the US, equity and fixed income ETFs employ physical index replication techniques. Use of OTC derivatives, such as total return swaps, is common with some leveraged products. Unlike Europe, no equity or fixed income ETF in the US can employ synthetic replication. In the European Union ETFs are classed as fund structures that issue units or shares that are traded on an exchange much the same way as equities. The vast majority of European ETFs are UCITS compliant and are primarily domiciled in Dublin and Luxembourg. Both physical and synthetic replication is routinely used by ETFs in Europe. Both methods have relevant considerations that should be understood prior to making an investment decision. We discuss those considerations in the next section.

ETF Investment Considerations

Measuring Index Tracking

The success of an index product such as an ETF is more commonly measured by how well it tracks its reference benchmark index. The ability of an ETF to track its benchmark can be assessed by looking at three different measures:

- a) **Tracking Error:** Tracking error is the most common statistic used to analyze how well an ETF tracks its benchmark. It is defined as the volatility of the excess returns of an investment portfolio over its benchmark. Mathematically, tracking error is calculated as the annualized standard deviation of the daily performance difference. A high tracking error means a higher probability that a fund might deviate from the return stream of its stated benchmark index. Conversely, a low tracking error translates into a higher probability of achieving very close tracking.
- b) **Relative Performance:** The performance of the ETF as compared to its stated benchmark. A good tracker should have a relative performance equal (or very close) to its All-in² fee.
- c) **Absolute Performance Difference:** The difference between the absolute performance of the ETF and the absolute performance of the stated benchmark. The best tracker would have the lowest absolute difference.

Tracking Error

Many sources of tracking error exist. We list some major ones below:

ETF Structure

As discussed earlier in this research report, ETFs employ two distinctly different replication methods to facilitate generation of their benchmark's index return: physical and synthetic. The tracking error implications are different under these two replication methods. As a result of the swap contract, there is no inherent tracking difference between a synthetically replicated ETF and its underlying index before costs. In contrast, a physically replicated ETP can be subject to higher tracking difference especially when it tracks a broad index.

Physical replication has worked well for narrowly focused indices, such as the Euro Stoxx 50, FTSE 100, etc. However they are not always efficient at tracking broad benchmarks such as the MSCI Developed World Index with around 1700 stocks or the MSCI Emerging Markets Index with about 750 stocks. When the index is broad, it becomes difficult for the ETF to own all the underlying shares due to the transaction and maintenance costs that would incur. For these broad indices, funds often use an optimized sampling approach to represent the broad index and thereby introduce tracking error into the performance. For example, the largest US ETF tracking the MSCI Emerging Markets index uses physical replication in which the ETF was invested in 429 of the 767 underlyings of the index at the end of December 2009. The 338 securities that the ETF was not invested in account for 25% of the capitalization of the index. The fund underperformed the index by more than 6% during 2009.

Index Rebalancing

Events such as an index rebalancing can exacerbate deviations of the ETF from its benchmark if the fund is not able to adjust its holdings in time. Index turnover caused by rebalancing

²The All-in fee or TER is equal to all the expenses an investor has to bear for a 1-year holding of the shares of the ETP.

could be very significant. In 2009, the MSCI Developed World Index had a two-way turnover of over 5%, while the MSCI Emerging Markets Index had a two-way turnover of over 10%. Physical ETFs are more vulnerable to the market impact of events such as index turnover. Synthetic ETFs pass along tracking and rebalancing risks to the swap counterparty, which for investors, generally translates to smaller tracking difference.

Timing of Dividends

The timing of dividends is another factor impacting the performance of ETFs. ETFs can either pay dividends at fixed time intervals to shareholders or immediately reinvest those dividends in the case where they track total return indices. Many total return indices assume that dividends are paid on the ex-dividend date and immediately reinvested in the index. However, there is often a lag between the ex-dividend date and the payment date, which can be longer than one month in some countries. This discrepancy can cause tracking difference between the ETF and the index. Alternatively, the accumulation of dividend payments in the fund can lead to cash drag. Cash drag causes physically replicated ETFs to underperform the index when the market is up, and outperform the index when the market is down. For synthetic ETFs, the risks associated with managing dividend flows are removed through the swap making them able to track total return indices.

Cash Drag

ETPs may have cash holdings, for various reasons such as dividend payment, cash reserve to buy securities, etc. Cash holdings will cause the difference between the ETF return and the index return. Significant cash holdings often cause ETFs to underperform the underlying index when the market is up, and outperform the index when the market is down.

Return Enhancement Mechanisms (Common in both US and European domiciled ETFs utilizing physical replication)

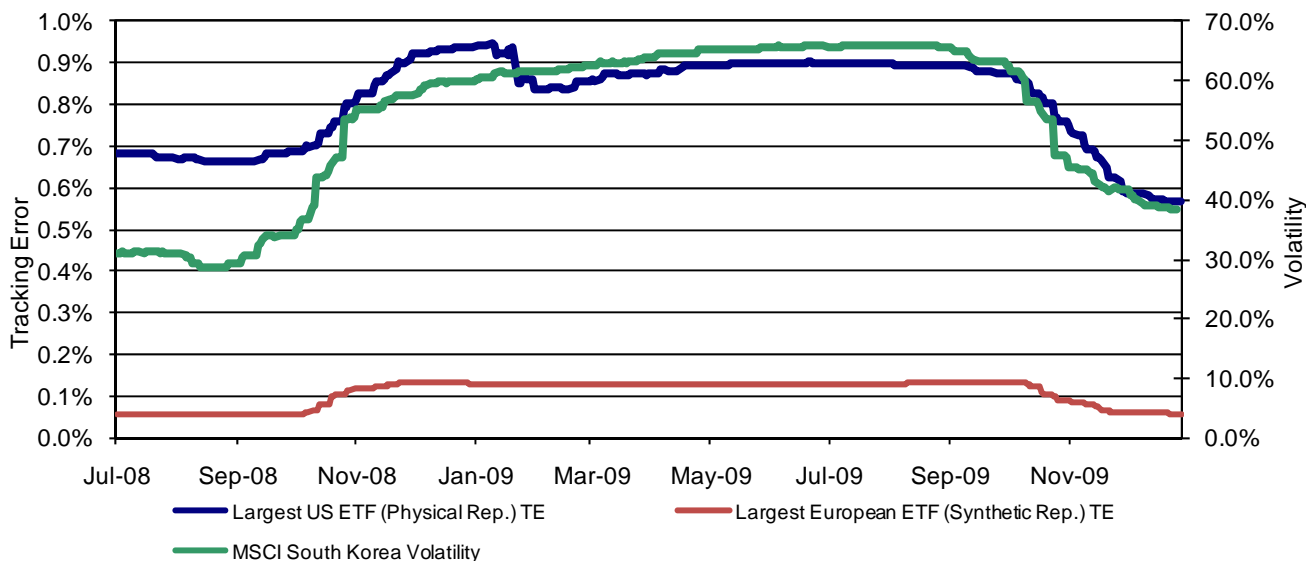
Investment managers may engage in transactions with third parties that can generate additional revenue. One such practice that can generate income to offset management fees is securities lending. It is a practice prevalent amongst many ETFs which utilize physical replication and therefore hold an underlying basket of securities very closely resembling the composition of their respective benchmark index. Security lending mandates aim to lend a fund's assets in order to generate additional income and thus reduce tracking error. Due to the nature of the securities lending market, the percentage of an ETF's physical securities that could be out on loan may vary according to market conditions. The tenor of such transactions may also vary and can range from overnight to up to a month on certain occasions. Such transactions, while generating income that is partly used to improve a fund's performance, may at times introduce additional counterparty risk. It is estimated that 50% of securities lending income accrues back to the fund, while the remaining 50% is split between the fund advisor and the fund's administrator.

Tracking Error Risk and Volatility

The ability of ETPs to closely replicate a benchmark is directly related to the market volatility. Thus, during periods of high market volatility, ETFs have a hard time trying to replicate the returns of its benchmark, which translates into a higher tracking error.

Although the above statement is true for all ETFs, physically replicated ETFs will experience a major impact in performance tracking as compared to synthetically replicated ETFs. Figure 7 depicts the market volatility for the MSCI South Korea Index, and the tracking error for one ETF employing physical replication and another one using synthetic replication in the 2008-2009 period. Both funds aim to track the MSCI South Korea Index.

Figure 7: Annual Tracking Error & Volatility of the MSCI South Korea Index*



Source: Deutsche Bank, Bloomberg. *Tracking Error and Volatility are calculated using a 1 Year rolling approach.

For indices which constituents are more liquid and sampling techniques are not employed when physically replicating, such as the S&P 500, tracking error is much lower and can range between 5 and 15 bps.

Absolute Performance Difference

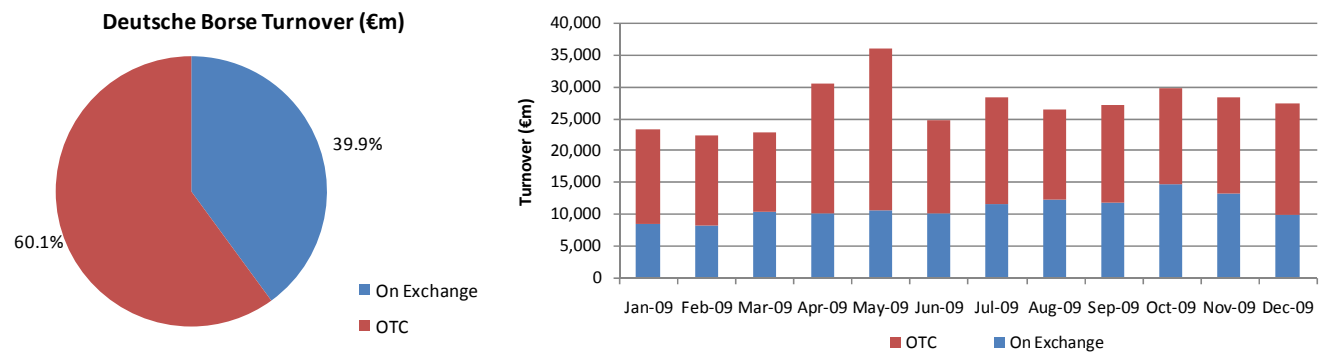
Different ETFs tracking the same benchmark may have slightly different returns compared with the underlying index, due to the reasons explained above. Generally speaking, synthetic ETFs track the benchmark closely, so the performance difference compared with the underlying index is very small. In contrast, physically replicated ETFs may have relatively large deviations from the index returns, which often underperform the index when the market is up, and outperform the index when the market is down, partly due to the cash drag.

Liquidity

As ETFs are constructed by using other securities as building blocks, the liquidity characteristics of those building blocks, relative to those of an ETF’s benchmark constituents, need to be understood before drawing any ETF liquidity conclusions. Often, ETF turnover statistics (such as volume of ETF shares traded) is used as a proxy to its liquidity. We believe that it is not appropriate to only use turnover statistics to evaluate an ETF’s liquidity, as those only capture part of the story. ETF shares can be bought on an exchange but they may also be created or dissolved by directly accessing the market. We should also note that in Europe, it is estimated that between 50-70% of ETF turnover occurs in the Over the Counter (OTC) Market, and thus it is not captured by exchange reported turnover numbers.

For example on Deutsche Borse, the largest trading venue in Europe with around 40% of market share, 60.1% of all of 2009 annual turnover came from OTC trades (See Figure 8). In addition, stock markets in Europe and in Asia mandate the presence of market makers to impose minimum size and maximum spread limits. These market makers are constantly present, even when no trades for the ETF are reported in the exchange, to ensure that there is continuous liquidity for investors.

Figure 8: Deutsche Borse On Exchange and OTC 2009 Annual and Monthly Turnover



Source: Deutsche Borse

For ETF shares trading on an exchange, turnover gives meaningful information about a vehicle’s popularity with investors. However, shares may also be created/purchased, or dissolved/sold, by utilizing the ETF’s structure to directly access the market. For example, in a physically replicated ETF, units can be created by purchasing a slice of the benchmark’s underlying constituents and exchanging them for the ETF’s shares. For ETFs that utilize a synthetic replication, shares can be created by approaching the provider, that will in turn adjust the ETF’s collateral asset pool and the vehicle’s return generating mechanism (total return swap typically) in order to create new shares. For both cases, there might be very little or no units of an ETF trading, but units can be very quickly created or dissolved, if the general market can absorb the demand/supply. At best turnover can give information about an ETF’s trading patterns and its popularity but not about the depth (or lack) of an ETF’s liquidity. It is for this reason that turnover observations should be differentiated from ETF liquidity analysis.

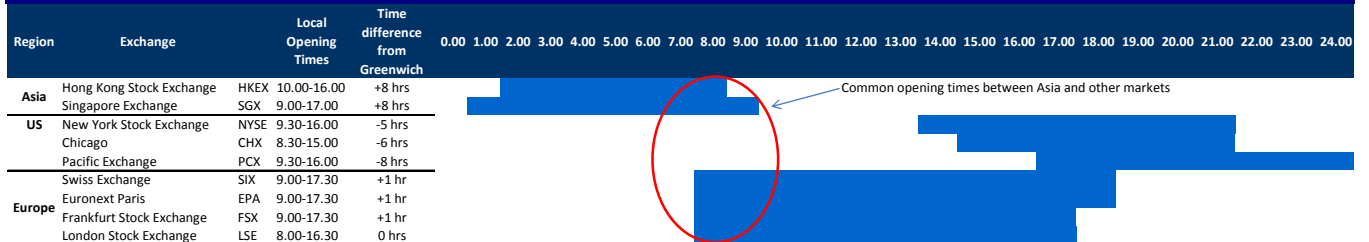
Additionally, like every other kind of index product, an ETF liquidity assessment should always be performed relative to the benchmark’s constituents. The benchmark underlying the ETF does not by itself automatically mean or guarantee that the ETF is very liquid. In fact, if the ETF’s benchmark is comprised of illiquid constituents, such is often the case for emerging market benchmark indices, a physically replicated ETF’s shares might also be illiquid because that is the ETF’s ultimate liquidity source

All the relevant liquidity considerations discussed in this section are reflected in an ETF’s bid/ask price spread. Therefore this is a very important piece of information to consider when making a liquidity evaluation as it envelopes all relevant liquidity assessment variables. The level of the spread quoted by a market maker is a function of all relevant liquidity considerations in the marketplace, including an ETF’s structure (physical or synthetic), its underlying holdings and the liquidity of its benchmark constituents and will therefore give the best view about an ETF’s liquidity characteristics.

Listing Conventions

ETFs available to Asia-based investors can be listed on a number of international exchanges. Figure 9 summarizes a few of the popular ETF exchanges together with the respective opening times.

Figure 9: International Exchanges Trading Hours



Source: Deutsche Bank

Because of time zone differences, European exchanges tend to have opening hours which overlap with business hours in Asia. In addition to convenience, this is an important consideration as it translates to direct access to ETF price discovery as well as access to a wider range of possible investments.

Tax Treatment of Dividends

In addition to the difference in index replication techniques, US and European ETFs differ with regards to their tax treatment. Each ETF is tax domicile in a single jurisdiction but can track an index with constituents from multiple countries, each with its own tax on dividends. The ETF receives dividends from foreign stocks net of tax. Some tax refunds may be claimed if the parent of the ETF, for example an investment bank, has businesses incorporated in those countries.

Depending on where they are domiciled, ETFs will distribute dividends to investors with or without an additional withholding tax on dividends. European ETFs are generally domiciled in Luxemburg or Ireland – two countries which typically offer more favorable tax regimes for non-US investors compared to US ETFs. The differentiation between ETFs domiciled in the US vs. Europe is especially relevant for Asian investors who are generally subject to a withholding tax of up to 30%³ on dividends paid by the ETF. Asian investors in European ETFs are not subject to the withholding tax. Investors should consult their tax advisors for details.

A more detailed explanation of the dividend withholding tax for Asian investors of US ETFs is provided in the section, "Tax Considerations for Asian Investors of US-listed ETFs". We encourage investors to consult their tax advisors where necessary.

Counterparty Risk

Counterparty risk is present in most ETFs and it arises from two sources. Firstly, it may come from instruments that the ETF is holding in order to facilitate its return objective. These can range from fixed income instruments, such as bonds, to OTC derivatives instruments, such as total return swaps, used to ensure that an ETF achieves its investment objective. Secondly, some ETF return enhancement techniques, such as securities lending, may contribute to increasing counterparty risk.

Total Return Swaps – TRS (most common in European domiciled ETFs utilizing synthetic replication)

TRS are OTC derivative instruments and in most cases the counterparty exposure is directly to another market participant. This participant could be a highly rated financial institution or another investor in the market. Though OTC instruments, TRS are governed by standard ISDA (International Swaps and Derivatives Association) agreements, which are largely standardized and governed by English Law. Synthetic replication is permissible by UCITS III, the legislation which governs passporting of funds across the European Union, when constructing exchange-traded funds. However, UCITS III also restricts the maximum single counterparty exposure to 10% of a fund's total value, with the remainder of the fund's assets (at least 90%) acting as collateral to the OTC instrument.

Securities Lending (Common in both US and European domiciled ETFs utilizing physical replication)

Securities lending, a practice prevalent amongst many ETFs which utilize physical replication, can also give rise to counterparty risk. Security lending mandates aim to lend a fund's assets in order to generate additional income and thus reduce tracking error. Due to the nature of

³ Currently, non-sovereign investors in Taiwan, Hong Kong, Singapore, and Malaysia are generally subject to US dividend withholding tax of 30%. The tax is 25% in the case of India, 15% in the cases of Thailand and Korea, and 10% in the case of Japan and China.

the securities lending market, the percentage of an ETF's physical securities that could be on loan may vary according to market conditions. The tenor of such transactions may also vary and can range from overnight to up to a month on certain occasions. Such transactions, while generating income that is partly used to improve a fund's performance, may at times introduce additional counterparty risk. It is estimated that 50% of securities lending income accrues back to the fund, while the remaining 50% is split between the fund advisor and the fund's administrator.

Case Study: Largest ETFs Tracking Major Asian Benchmarks

In order to demonstrate the points discussed above for Asian investors, we have looked at five indices tracking four Asian countries and the emerging markets region. These five indices are the most utilized benchmarks for ETFs used by Asia-based investors. We used the AUM as a gauge to identify the most popular Asian ETFs. Those details can be found in Figure 10 below. The selected ETFs represent both European and US domiciled funds. While all US domiciled funds utilize physical replication, European ETFs utilize both physical as well as synthetic replication techniques to track their respective benchmarks (See Figure 11 for details). We have looked at three variables in our analysis: tracking difference before tax, ETF liquidity in terms of turnover and spread, and tax considerations relevant to Asian investors.

Figure 10: Benchmark Indices Tracking an Asia Pacific Region or Country

Benchmark Index	AUM (USD)	Turnover (USD)	No. of Funds	Combined Rank
MSCI Emerging Markets	68,009,517,143	3,495,926,488	13	1
FTSE / Xinhua China 25	12,056,922,790	844,542,200	6	2
MSCI Japan	7,548,253,428	263,838,691	12	3
MSCI Taiwan	4,081,979,975	153,130,296	6	4
MSCI South Korea	3,471,841,021	160,437,727	4	5

Source: Deutsche Bank, Reuters, Bloomberg. Data as of the close of Dec 31st, 2009.

Figure 11: Benchmark Indices Tracking an Asia Pacific Region or Country

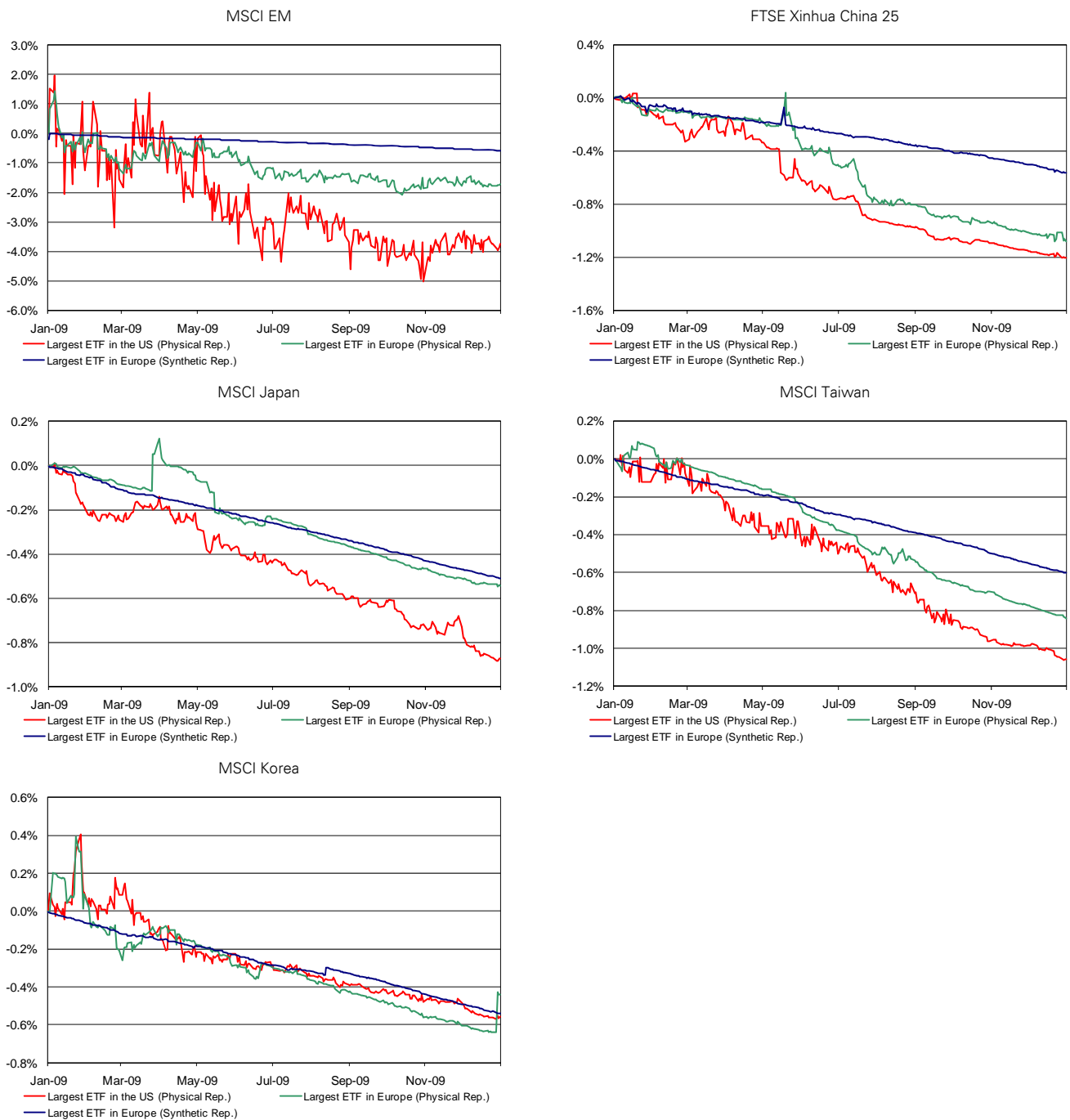
Underlying	ETF	TER	Fund Domicile
MSCI Emerging Markets	Largest US (Physical Replication)	0.72%	US
MSCI Emerging Markets	Largest EU (Synthetic Replication)	0.65%	Luxemburg
MSCI Emerging Markets	Largest EU (Physical Replication)	0.75%	Ireland
FTSE/Xinhua China 25	Largest US (Physical Replication)	0.73%	US
FTSE/Xinhua China 25	Largest EU (Synthetic Replication)	0.60%	Luxemburg
FTSE/Xinhua China 25	Largest EU (Physical Replication)	0.74%	Ireland
MSCI Japan	Largest US (Physical Replication)	0.56%	US
MSCI Japan	Largest EU (Synthetic Replication)	0.50%	Luxemburg
MSCI Japan	Largest EU (Physical Replication)	0.59%	Ireland
MSCI Taiwan	Largest US (Physical Replication)	0.82%	US
MSCI Taiwan	Largest EU (Synthetic Replication)	0.65%	Luxemburg
MSCI Taiwan	Largest EU (Physical Replication)	0.74%	Ireland
MSCI Korea	Largest US (Physical Replication)	0.65%	US
MSCI Korea	Largest EU (Synthetic Replication)	0.65%	Luxemburg
MSCI Korea	Largest EU (Physical Replication)	0.74%	Ireland

Source: Deutsche Bank, Reuters, Bloomberg. Data as of the close of Dec 31st, 2009.

Benchmark Tracking

Figure 12 depicts the performance of each ETF relative to their benchmarks during 2009. Theoretically, the difference between the returns of the ETF and its underlying index should equal the annual all-in fee without interference from other sources of tracking error.

Figure 12: Relative Performance (net of fees) to Benchmark During 2009



Source: Deutsche Bank, Bloomberg and Issuers website

Figure 13 summarizes the tracking error of the ETFs over a 2 year period and during 2009. The best tracking ETF for each index is highlighted in yellow.

Figure 13: Annualized Tracking Error in the 2008-2009 Period and During 2009						
Benchmark Index	2008-2009			2009		
	Largest US (Ph. Rep.)	Largest EU (Ph. Rep.)	Largest EU (Synth. Rep.)	Largest US (Ph. Rep.)	Largest EU (Ph. Rep.)	Largest EU Synth. Rep.)
MSCI Emerging Markets	17.09%	4.79%	0.25%	11.41%	2.87%	0.31%
FTSE / Xinhua China 25	0.75%	0.73%	0.32%	0.43%	0.42%	0.22%
MSCI Japan	0.38%	0.30%	0.21%	0.27%	0.23%	0.03%
MSCI Taiwan	0.69%	0.35%	0.04%	0.65%	0.19%	0.03%
MSCI South Korea	0.77%	0.61%	0.21%	0.57%	0.58%	0.06%

Source: Deutsche Bank, Bloomberg and Issuers websites.

Based on the results, synthetic ETFs tracked their respective benchmarks better than ETFs utilizing physical replication for all of the indices examined. Tracking errors for synthetic ETFs were much lower than those of physically replicated ETFs as a result of the factors mentioned in the previous section. The difference is especially apparent for broad indices such as the MSCI Emerging Markets for which ETFs utilizing physical replication have to rely on optimized security baskets to track the index. These baskets often include significantly fewer constituents thus causing physical ETF portfolios to differ significantly from those of their respective benchmarks and introducing a major source of tracking error. A physical ETF may elect to hold securities that are different from those of an ETF's benchmark for a few reasons. For emerging market indices, constituents are not often sufficiently liquid, therefore replicating an emerging market index can sometimes involve making decisions of which constituents must be over or underweighted in order to achieve a portfolio composition that can be reasonably and practically achieved. In addition to illiquid constituents, a manager might elect to hold a basket that can differ from an ETF's benchmark composition due to the number of constituents an index might have. For broad Asian benchmarks comprising of hundreds of securities, it is not always practicable to replicate these indices by holding all constituents.

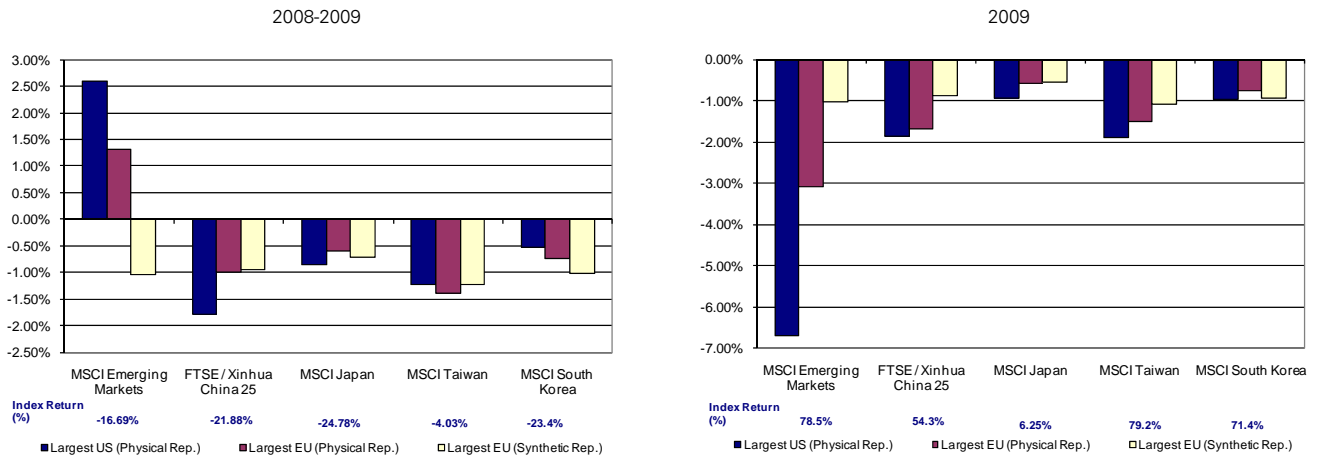
The mechanics of a synthetically replicated ETF are not impacted by the practical replication issues relating to illiquid index constituents and large indices. The performance of a synthetically replicated ETF is more often dependant on a total return swap. The synthetically constructed ETF will receive the exact target benchmark return, from its counterparty, thus eliminating potential practical sources of mistracking. Figure 14 demonstrates the number of constituents relating to benchmarks utilized by US domiciled (physically replicated) ETFs and their respective index benchmarks.

Figure 14: Number of Securities in the Largest US Physically Replicated ETF per Benchmark					
	MSCI Emerging Markets	MSCI Japan	MSCI South Korea	MSCI Taiwan	FTSE/XINHUA China 25
Securities in Underlying Index	767	347	98	117	25
Securities held by US ETF	429	329	101	119	26
Capitalization of Index Captured by US ETF	75%	99%	100%	100%	100%
Overweight Securities	224	178	40	46	11
Sum of Overweightings	36.3%	4.2%	0.3%	1.4%	0.4%
Underweight Securities	193	149	56	70	13
Sum of Underweightings	-12.5%	-2.9%	-1.5%	-1.4%	-0.3%
% of ETF Invested in non-Index Assets	1.01%	<1%	1.26%	<1%	<1%

Source: Deutsche Bank, MSCI, Issuers website as of December end 2009

Figure 15 shows the absolute difference in the performance of each of the ETFs versus their underlying index for two different periods. The period of the past two years can generally be classified as very volatile with a steep downward trend during 2008 and a market recovery in 2009. Four out of the five synthetic ETFs examined outperformed their physical counterparts in 2009, when the markets were performing upwards.

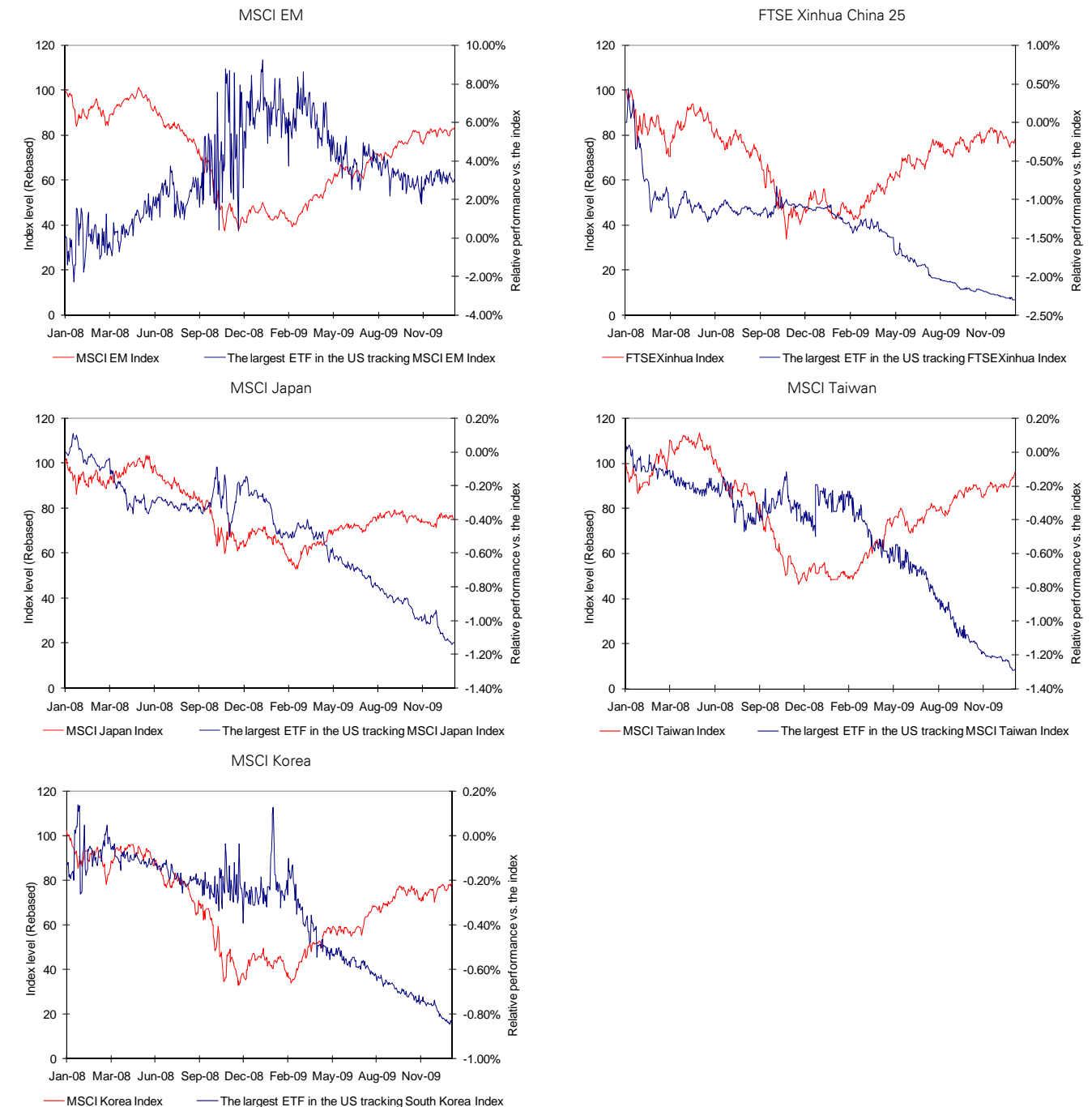
Figure 15: Absolute Performance* Difference of ETF vs. Benchmark: 2008-2009 Period and 2009



Source: Deutsche Bank, Bloomberg and Issuers website
 *Absolute performance based on NAV.

Figure 16 is a closer examination of the relative performance of the largest US ETFs in the context of the performance of their benchmark index. The charts show that physically replicated ETFs underperformed the index when the market was up, and outperform the index when the market was down. This is partly because physically replicated ETFs are subject to cash drag. Cash is a safe investment in time of market turmoil but an ETF holding cash is at risk to underperform its benchmark over time.

Figure 16: Relative Performance (net of fees) of US Physical Replication ETFs in the Past Two Years



Source: Deutsche Bank, Bloomberg and Issuers Website.

Turnover and Spreads

Because of its longer history, the US is the most active market for ETFs. For instance, at the end of 2009 the average daily turnover for all the US ETFs tracking the five benchmarks examined in this study was around USD 4.25 bn while the turnover for the European counterparties was around USD 23.6 mm. On average tighter spreads on US exchanges also suggest that US-listed ETFs are better short-term trading instruments than European-listed ETFs.

Figure 17 shows the average spreads for US and European ETFs listed and traded on NYSE Euronext as of December 2009. For investors in Asia, it is important to highlight that some of the ETFs mentioned in this research are also listed in the Hong Kong and Singapore stock exchanges with a better bid-offer than what is quoted on NYSE Euronext. This is because market makers in Asia can hedge the underlying risk of ETFs that track Asian stocks more efficiently during Asian market hours. The bid-offer improvement ranges from 0.10% to 0.20% depending on the ETF. In addition to tighter spreads, it is also more transparent for Asian investors to buy ETFs through Asian stock exchanges because it allows for real time comparisons of the price of the ETF with the value of the underlying index.

Due to time zone differences between regions, investors trading US-listed ETFs tracking European and Asian indices trade during hours when those underlying markets are closed. When the underlying market is closed, market makers will usually use correlations between that market and other markets that are open to estimate the fair value of the ETFs. These valuations contain risk and investors should make sure that a fair price is being quoted by the market markers.

ETFs listed in Europe can, however, hedge Asian underlying risk when markets in Asia are open. In order to achieve the fairest price, investors should trade an ETF when the underlying markets of the stocks that the ETF tracks are open.

Figure 17: US and European Spreads by Underlying Index

Underlying	ETF	US & European Exchanges Spread (bps)
MSCI Emerging Markets	Largest US (Physical Replication)	<10
MSCI Emerging Markets	Largest EU (Synthetic Replication)	26.24
FTSE/Xinhua China 25	Largest US (Physical Replication)	<10
FTSE/Xinhua China 25	Largest EU (Synthetic Replication)	37.68
MSCI Japan	Largest US (Physical Replication)	10
MSCI Japan	Largest EU (Synthetic Replication)	27.26
MSCI Taiwan	Largest US (Physical Replication)	10
MSCI Taiwan	Largest EU (Synthetic Replication)	56.59 / 30.00*
MSCI Korea	Largest US (Physical Replication)	<10
MSCI Korea	Largest EU (Synthetic Replication)	50.21 / 30.00*

Source: NYSE Euronext, NYSE Arca, Deutsche Bank. * these ETFs have a spread around 30 bps in Asian exchanges.

Tax Considerations for Asian Investors of US-listed ETFs

For U.S. federal income tax purposes, U.S. equity and fixed income ETFs are generally structured as RICs (Regulated Investment Companies). For foreign shareholders, RIC distributions of net investment income and net short-term capital gains are subject to a 30% U.S. withholding tax, unless a lower treaty rate applies. Net investment income includes dividends and interest, and net short-term capital gains include net gains from the disposition of assets held for one year or less.

A number of exemptions to the general withholding tax rule apply, however.

Distributions designated as capital gain dividends or exempt-interest dividends are generally not subject to the 30% U.S. withholding tax. Capital gain dividend distributions are gains from

the sale or exchange of a capital asset held for more than one year that is realized in the year in which the distribution is received. Exempt-interest dividends are distributions from RICs with majority holdings of tax-exempt municipal bonds.

Properly designated RIC dividends are generally exempt from U.S. federal withholding tax. These dividends include qualified net interest income and qualified short term capital gains. To qualify for the withholding exemption for interest-related dividends, a foreign shareholder needs to provide the appropriate documentation certifying its non-U.S. status (IRS Form W-8BEN or substitute).

A RIC that withheld qualified net interest income or short-term capital gain dividends would be credited back by the withholding agent (broker) when the RIC has properly designated the distributions.

Finally, foreign sovereign portfolio investors and international organizations are generally exempt from the U.S. withholding tax on RIC distributions.

Again, we encourage investors to consult their tax advisors where necessary.

Scenario Analysis

In this section, we use a hypothetical investment scenario to demonstrate how the factors discussed above impact an ETF investment. Please note that this scenario is for illustration purpose and includes assumptions about future performance.

The example presented on Figure 18 assumes that the US provider of the physically replicated ETF will be able to improve its absolute performance difference significantly by 50% in 2010 from 2009 and that the European provider of the synthetically replicated ETF will repeat the same absolute performance difference. Please note that it is possible that the actual performance of the physically replicated ETFs may even outperform the underlying index as illustrated in Figure 15. This is likely to happen when the market goes down.

Figure 18: Scenario Analysis

Index		Scenario #3: 12 Months, Jun '10 & Dec '10 Dividends									
		Scenario #1: 1 Month, No Dividends					Scenario #2: 6 Months, June '10 Dividends				
		Annual All-in Fees	Trading Costs	Annualized Abs. Perf. Difference (2009)	Est. Abs. Perf. Difference in 2010 (50% Improvement)	Perf. # 1	June '10 Dividend Withholding Tax (30%)	Perf. # 2	June & Dec '10 Dividend Withholding Tax(30%)	Perf. # 3	
MSCI Emerging Markets	EU Synthetic	-0.65%	-0.26%	-1.04%	-1.04%	-0.35%		-0.78%		-1.30%	
	US Physical	-0.72%	-0.10%	-6.70%	-3.35%	-0.38%	-0.30%	-2.08%	-0.57%	-4.02%	
		Out/Under-performance of EU Synthetic ETF					0.03%	1.29%		2.71%	
FTSE/XINHUA China 25	EU Synthetic	-0.60%	-0.38%	-0.87%	-0.87%	-0.45%		-0.81%		-1.25%	
	US Physical	-0.73%	-0.10%	-1.86%	-0.93%	-0.18%	-0.52%	-1.08%	-0.69%	-1.72%	
		Out/Under-performance of EU Synthetic ETF					-0.27%	0.27%		0.47%	
MSCI Japan	EU Synthetic	-0.50%	-0.27%	-0.54%	-0.54%	-0.32%		-0.54%		-0.81%	
	US Physical	-0.56%	-0.10%	-0.93%	-0.47%	-0.14%	-0.29%	-0.63%	-0.53%	-1.10%	
		Out/Under-performance of EU Synthetic ETF					-0.18%	0.08%		0.29%	
MSCI Taiwan	EU Synthetic	-0.65%	-0.30%	-1.08%	-1.08%	-0.39%		-0.84%		-1.38%	
	US Physical	-0.82%	-0.10%	-1.90%	-0.95%	-0.18%	-0.02%	-0.59%	-0.78%	-1.83%	
		Out/Under-performance of EU Synthetic ETF					-0.21%	-0.25%		0.45%	
MSCI Korea	EU Synthetic	-0.65%	-0.30%	-0.93%	-0.93%	-0.38%		-0.77%		-1.23%	
	US Physical	-0.65%	-0.10%	-0.95%	-0.48%	-0.14%	-0.02%	-0.36%	-0.35%	-0.93%	
		Out/Under-performance of EU Synthetic ETF					-0.24%	-0.41%		-0.30%	

Sources: Deutsche Bank, Bloomberg, US ETF provider's website
*Absolute Performance based on NAV.

The example showed that US physically replicated ETFs may be better as short-term investment vehicles, because of lower trading costs. However, for reasons explained previously, spread for European ETFs listed in the Hong Kong and Singapore stock exchange may be tighter by 10 to 20 bps comparing with those listed in Europe.

Mid to long term exposure to target benchmarks whose physical (ETF) replication can result in median to high tracking error can more efficiently be gained via ETFs that employ synthetic replication. This is the case because they offer superior tracking of their benchmarks. In particular, Asian investors stand to gain from investing in European ETFs which are not subject to the US withholding tax on dividends. In conclusion, European domiciled ETFs, especially those listed in Asia, offer better expected returns for Asian investors for non short-term exposure.

The authors of this report wish to acknowledge the contribution made by Sebastian Campusano, a third-party provider of offshore research support services to Deutsche Bank.

Appendix A

A large number of exchange-traded products have come to the market over the past year. These products utilize a variety of forms (funds, notes, commodities to mention a few) across various global jurisdictions, in addition to tracking a large universe of benchmark indices ranging from equity to alternative asset classes. In order to ensure clarity in our analysis we have employed a three-layer approach in defining ETPs.

Layer 1: ETP definition and characteristics

We define an exchange-traded product (ETP) as a delta-one exchange-traded equity or debt instrument with no embedded optionality and market-wide appeal to investors.

- a. **Delta one exchange-traded products:** Exchange registered and traded products that must have as a sole investment objective to track a clearly (pre)defined reference benchmark, most often in the form of an index or a specific commodity.
- b. **No embedded optionality features:** Products should exhibit no optionality characteristics, either from the part of the investor or the issuer. For example, while index options and index warrants can be freely traded on an exchange, their relatively short life, as well as their speculative nature, expressed through embedded optionality characteristics make those instruments not directly comparable to our definition of ETPs.
- c. **Equity and debt instruments:** ETPs may be structured as vehicles that issue shares, without any fixed maturity, and can therefore be classed as equity instruments. Alternatively, they can be issued as debt instruments, such as exchange-traded notes, where meeting an ETP's return objective is directly also linked to the ability of a credit counterparty to honor a promise. Debt ETPs are also commonly issued with a set term maturity date.
- d. **Market-wide appeal:** Instruments must have market-wide appeal and should not be targeted to a certain narrow class of investors. While their risk/return characteristics might be more suitable for a certain investor, market-wide appeal here is used in the context of the permissibility of offering the product to a specific set of investors. For examples, certificates are specifically designed and targeted for retail investors and are therefore excluded. A leveraged ETP on the other hand, while it requires a certain degree of sophistication for its inclusion in a portfolio, it remains a product which could be appropriate to a wider range of investors.

Layer 2: ETP asset class benchmark profiles

In most cases, the risk/return reference profile of an exchange-traded product is one of the most important variables in an investor's decision making process. We have recognized this and have thus divided the ETPs universe into six asset class specific sub-categories as follows:

- a. Equity: aiming at replicating the return of an index comprising of equity securities.
- b. Fixed income: Aiming at replicating the return of a variety of fixed income duration and credit benchmarks, ranging from short term money market target rates such as EONIA, SONIA and Fed Funds, to a wider range of variable duration sovereign and credit oriented profiles.
- c. Commodity: Aiming at replicating the return of a single commodity or a basket of commodities
- d. Other: Includes vehicles that target the return of a currency, a multi-asset strategy or an alternative, more often a hedge fund index, strategy.

Layer 3: Structural and jurisdictional characteristics

We also recognize that, depending on the regulatory regime and the structuring characteristic, a fund can be classed, among others, as an exchange-traded fund (ETF), an exchange-traded commodity (ETC) or an exchange-traded note (ETN). We are listing below some of the major and currently available structures. This list is by no means complete and it is offered to enable investors to gain familiarity with the major legal structures in each jurisdiction.

United States

Exchange Traded Funds (ETFs) in the US are classed as fund structures that issue shares that are traded on an exchange much the same way as equities. ETFs indexed to equity and fixed income benchmarks are registered under the investment company act of 1940. In the US, equity and fixed income ETFs employ physical index replication techniques. Use of OTC derivatives, such as total return swaps, is common with some leveraged products. Unlike Europe, no equity or fixed income ETF in the US can employ synthetic replication.

Primary asset classes covered: (a) Physical replication: Equity, fixed income, (b) Synthetic replication: alternative, multi-asset.

Issuers utilizing ETFs: Most common structure employed by almost all issuing participants in the US market.

Exchange Traded Notes (ETNs): Exchange-traded notes are zero coupon senior unsecured, unsubordinated debt securities issued by an underwriting institution, such as a financial institution or an asset manager. As with other debt instruments, ETNs have a, typically long (30 years), maturity date and are backed by the creditworthiness of their issuer. The debt instrument's coupon payments will mirror those of its underlying risk reference index.

Primary asset classes covered: Equity, commodities, currency

Issuers utilizing ETNs: Barclays Capital, Claymore, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, Swedish Exports, Van Eck Funds, UBS Securities.

Exchange-traded vehicles (ETVs): This terminology typically refers to grantor trusts in the US investing in commodities or currency. They differ from ETFs in that they are registered under the Securities Act of 1933 and not the investment Company Act of 1940. Vehicles that replicate commodity benchmarks, more often known as pools, and funds targeting alternative index returns are formed under the Commodities Exchange Act and are listed under the 33 Securities Act, and report under 34 Corporates Act.

Primary asset classes covered: Commodity, Currency, Alternative.

Issuers utilizing ETNs: MacroMarkets, Deutsche Bank, United States Commodity Fund, State Street, ETF Securities, ProShares, Rydex invest, BlackRock.

European Union

Exchange-traded funds (ETFs) are classed as fund structures that issue units or shares that are traded on an exchange much the same way as equities. The vast majority of European ETFs are UCITS compliant and are primarily domiciled in Dublin and Luxemburg. Both physical and synthetic replication is routinely used by ETFs in Europe.

Primary asset classes covered: Equity, fixed income, commodities, multi-asset, alternative

Issuers utilizing ETFs: Most common structure employed by major industry participants in Europe

Exchange-traded notes (ETNs) are zero coupon senior unsecured, unsubordinated debt securities issued by an underwriting institution, such as a financial institution or an asset manager. As with other debt instruments, ETNs have a maturity date and are backed by the credit of their issuer. They are issued as Commodity/Currency/Certificates and are undated, zero coupon notes or secured long term securities with long maturities (50 years) certificates.

Primary asset classes covered: Commodities

Issuers utilizing ETNs: Lyxor, Barclays Capital.

Exchange-Traded Commodities (ETCs) in Europe are issued under the EU Prospectus Directive in two forms: physically backed or through bankruptcy remote special purpose vehicles (SPVs). Both forms utilize offshore domiciles, such as Jersey, and are classed as debt instruments. Physically-backed ETCs are fully collateralized with underlying physical securities that directly mirror the composition of their reference index. SPV structures are collateralized by assets which could bear no resemblance to those of their respective risk reference index and ensure replication of their index return through a total return swap structure.

Primary asset classes covered: Commodities, currencies

Issuers utilizing ETCs: ETF Securities, Source

Appendix 1

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Equity rating key Equity rating dispersion and banking relationships

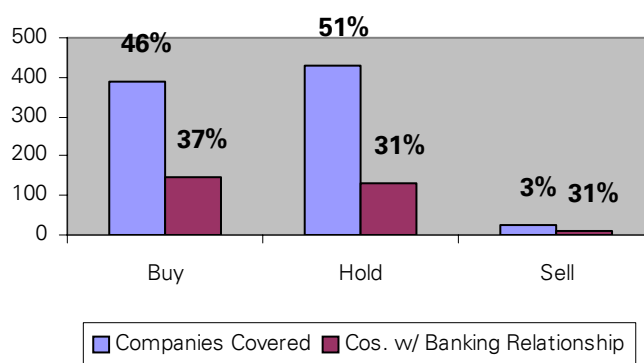
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North American Universe

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