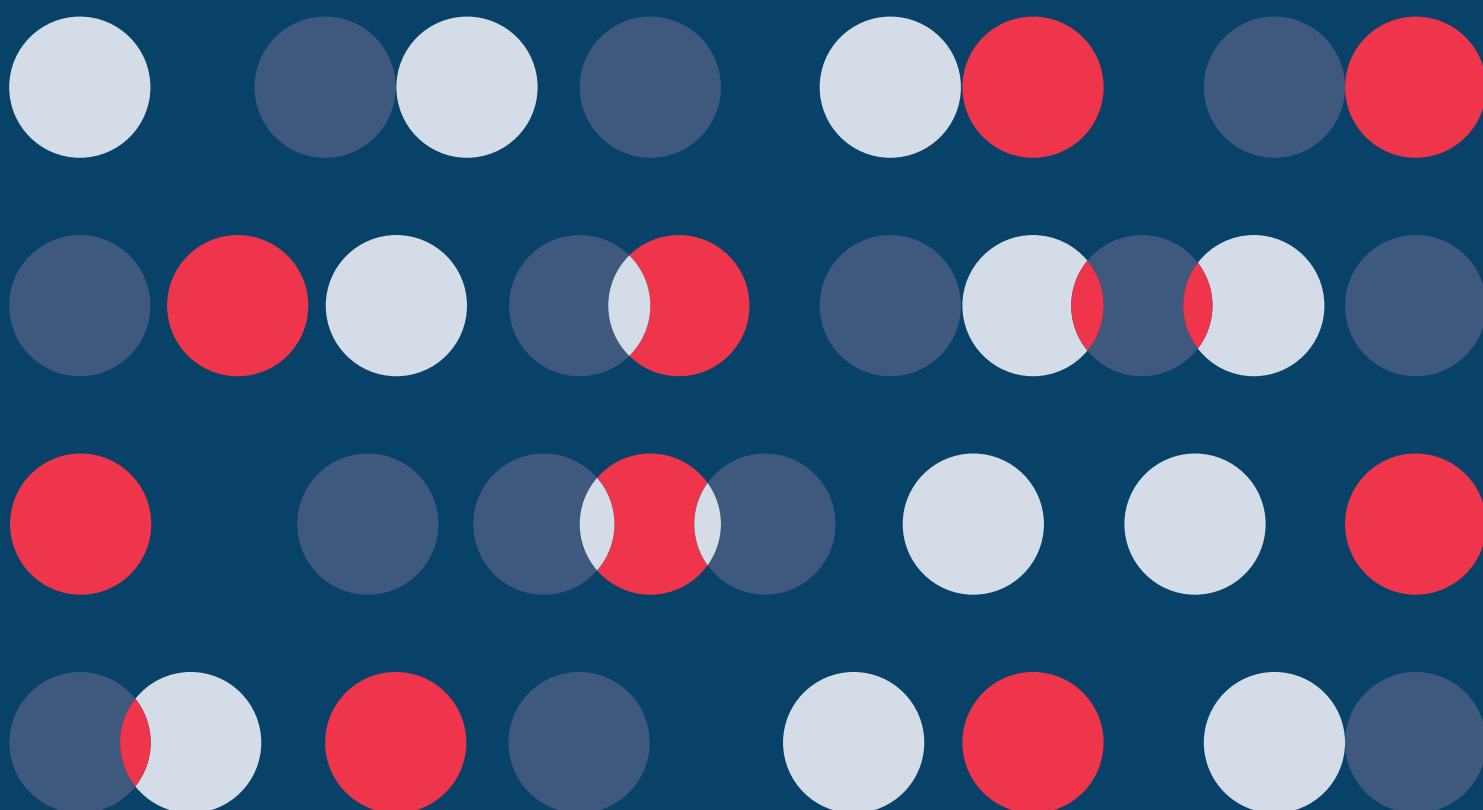


May 2020

RESEARCH REPORT

AN OVERVIEW OF THE GLOBAL COMMODITY  
DERIVATIVES MARKET



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## SUMMARY

Commodities are physical assets that are tradable and supplied without substantial differentiation by the general public. Major categories are precious metals, base metals (or non-precious metals), agriculture and energy products. Commodity trading refers to the trading of commodities in the physical (spot) market as well as the trading of commodity derivatives, which include the standardised products of futures and options on exchange markets and unstandardised products like swaps in the over-the-counter market.

A growing trend is observed over the past decade in the trading of on-exchange commodity derivatives, along with the growing market share of Asian exchanges. This can be attributed to: (1) the global economic growth which has increased the demand for hedging for commodity trades; (2) the increased use of commodity derivatives in portfolio investment for hedging against risks of investment in financial products like equities and bonds or for pure investment purposes; and (3) the rise of the Mainland economy which further boosted global trading in commodities and related hedging demand and of the Mainland commodity exchanges which have an increased significance in the world.

More than half of the derivatives exchanges in the world offer commodity derivatives in their product suites, the majority of which are futures. While the developed markets in the US and Europe may have taken the lead in terms of number of commodity products offered, the Mainland commodity derivatives exchanges have assumed a leading role in terms of trading volume. At least one of the three Mainland exchanges were among the top three in terms of trading volume in 2019 for three of the four commodity categories — precious metals, non-precious metals and agriculture. They fell behind only for energy products, these products however constituted the majority of global commodity derivatives trading volume (mainly from crude oil futures). Moreover, foreign participation in the Mainland commodity derivatives market is highly restricted — only a few designated products have been opened to foreign participants. In other words, the high trading volume on the Mainland exchanges are basically contributed by domestic participants only. Commodity contracts on the Mainland exchanges are typically of a smaller contract size and are traded in relatively high turnover ratios than their counterparts in the western developed markets.

With the further development and opening-up of the Mainland exchanges, the global landscape of commodity derivatives market will continue to evolve.

## 1. WHAT ARE COMMODITIES AND COMMODITY DERIVATIVES?

A basic economic definition of a commodity is that it is a physical good attributable to a natural resource that is tradable and supplied without substantial differentiation by the general public<sup>1</sup>. Commodities comprise a diverse set of asset classes, covering various sectors including precious metals, industrial or base metals, energy, livestock and grains and other agricultural products (often known as “soft commodities” which are grown rather than extracted or mined from nature).

Commodities are physical assets as opposed to the financial assets of equities and bonds. While the valuation of a financial asset is based on the discounted value of expected future cash flows from the asset, the valuation of a commodity is based on the discounted forecast of future possible prices of the physical asset based on such factors as the supply and demand of the physical asset<sup>2</sup>.

A derivative is a security which has the value derived from an underlying asset or a group of assets (a benchmark). The common forms of derivatives include futures, forwards, options and swaps<sup>3</sup>. A commodity derivative is a derivative with a commodity or a commodity benchmark as the underlying asset. Commodity derivatives are often used by commodity producers and consumers to hedge against future price changes in the underlying commodities. Other traders of commodity derivatives include speculators who speculate on price changes in the underlying commodity and arbitrageurs who seek profits from market inefficiencies such as price inefficiencies between markets.

Commodity trading refers to the trading of commodities in the physical (spot) market as well as the trading of commodity derivatives on exchange markets or over-the-counter (OTC). Derivatives exchanges offer standardised futures and options contracts on commodities while unstandardised forwards, options and swaps are traded in the OTC market. Investors in commodities may also choose to invest in structured products on commodities available on securities exchanges. These include exchange-traded commodities (ETCs) which are exchange-traded funds (ETFs) that track the performance of an underlying commodity index based on a single commodity or a group of commodities, and commodity contracts for difference (CFDs) which mirror the price movements of the underlying commodity or commodity index.

OTC trading of commodity derivatives had been very active. However, in contrast to the steady growth in the trading of commodity derivatives on exchanges, OTC trading in commodity derivatives has declined significantly since mid-2008 upon the outbreak of the Global Financial Crisis which revealed the severe problems in the unregulated, non-transparent OTC market in derivatives. The trend of global trading of commodity derivatives are discussed in the following sub-sections.

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<sup>1</sup> Source: The CFA Institute's website (<https://www.cfainstitute.org>).

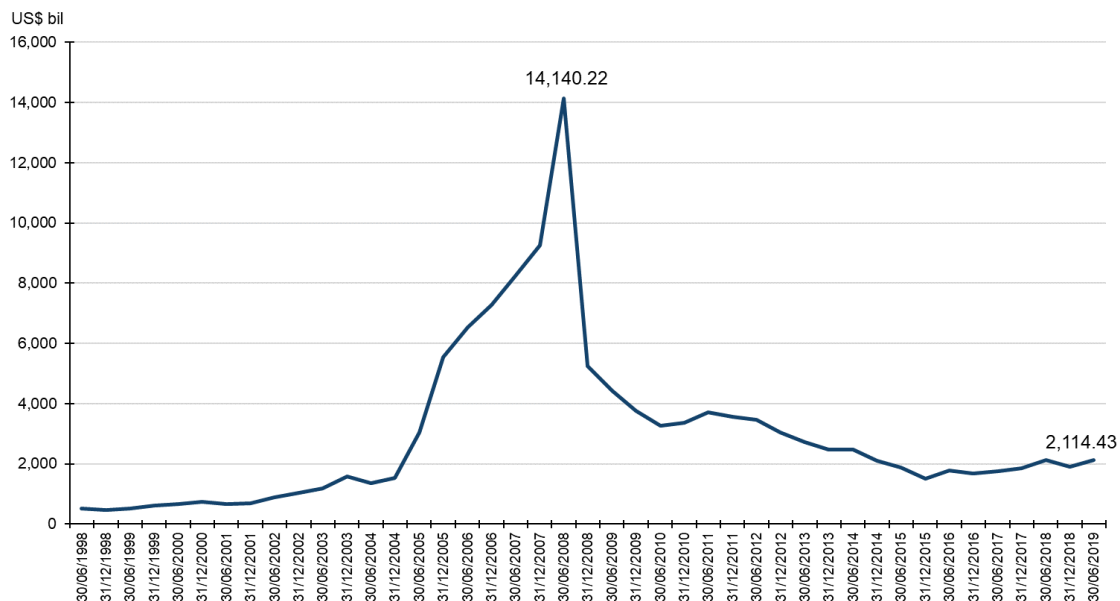
<sup>2</sup> Source: Ditto.

<sup>3</sup> A futures contract is an agreement between two parties for the purchase and delivery of the underlying asset at an agreed price at a future date. Futures contract have standardised terms and are traded on exchanges. A forward contract is similar to a futures contract but has customised terms negotiated between the buyer and the seller and are traded over-the-counter instead of on exchanges. An option contract is an agreement between two parties to buy or to sell an asset at a predetermined future date for a specific price but the option buyer is not obliged to exercise its right to buy or sell the asset at that future date. A swap contract is an agreement to exchange one kind of cash flows with another. A commodity swap is a swap where the cash flows are dependent on the price of an underlying commodity. Swaps are often traded over-the-counter.

### 1.1 OTC commodity derivatives trading

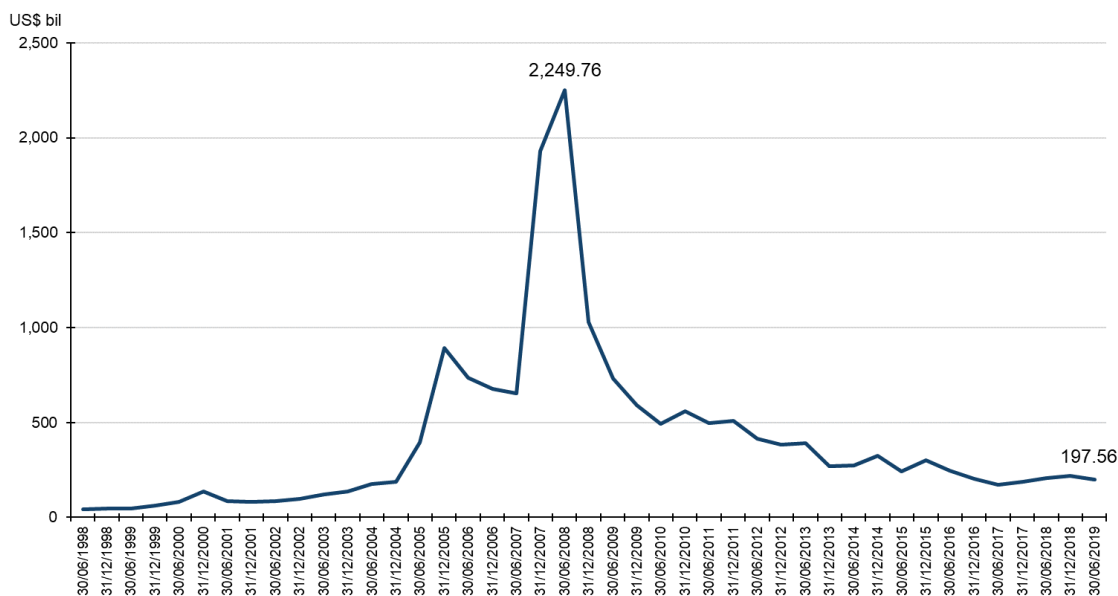
Figures 1 and 2 show the total notional amount and the total gross market value<sup>4</sup> of outstanding OTC commodity derivatives over the 21-year period from the end of June 1998 to the end of June 2019, based on the semi-annual OTC derivatives statistics compiled by the Bank for International Settlements (BIS). The notional amount and the gross market value of OTC commodity derivatives rose rapidly after the end of 2004 and reached their peaks by June 2008. They then dropped significantly in a couple of years following the 2008 Global Financial Crisis.

**Figure 1. Total notional amount of OTC commodity derivatives (Jun 1998 – Jun 2019)**



Source: BIS OTC derivatives statistics on the BIS website.

**Figure 2. Total gross market value of OTC commodity derivatives (Jun 1998 – Jun 2019)**



Source: BIS OTC derivatives statistics on the BIS website.

<sup>4</sup> According to the definition in BIS statistics, the gross market value of outstanding contracts represent the maximum loss that market participants would incur if all counterparties failed to meet their contractual payments and the contracts were replaced at market prices on the reporting date.

The surge in OTC commodity derivatives activities came along with rapid increases in a number of commodity prices, such as oil prices, that followed the collapse of the housing bubble in the United States (US) upon the outbreak of its subprime mortgage market crisis in 2007. This might be attributed to the speculative flow of money from housing and other investments into commodities, and/or the increasing sentiment of raw materials scarcity in a fast-growing world that led to long positions in those markets. The 2008 Global Financial Crisis then exposed the flaws in the OTC market due to its non-transparency. In the aftermath of regulatory reforms after the crisis, there has been further standardisation in the OTC commodity derivatives market and greater inclination towards central clearing of OTC commodity contracts<sup>5</sup>.

According to the International Swaps and Derivatives Association (ISDA), there is already a high degree of standardisation within the OTC commodity derivatives market. Almost all OTC commodity derivative trades are executed under standard legal terms, typically those contained in the ISDA Master Agreement between the parties, or in a limited number of cases in the national equivalent. The vast majority of all contracts are confirmed electronically via confirmation matching platforms. Transactions are effectively standardised through product templates and market practice standards for the majority of non-economic fields. The industry framework enables customisation of transactions without foregoing the benefits delivered by a standardised infrastructure.

The OTC commodity derivatives market has developed a very high level of straight-through processing (STP), from the use of electronic trade booking and trade confirmation through confirmation matching platforms, to central clearing counterparty (CCP) processing. For non-centrally cleared transactions, there is widespread use of bilateral collateral arrangements. A significant percentage of commodity futures, options and forwards are executed on exchanges and settled via CCPs. A number of exchanges provide CCP service for non-exchange-traded transactions. Exchange clearing houses that offer such OTC clearing services for commodity derivatives transactions include ICE Clear (gas and oil products, crude oil, coal, emissions, etc.), CME Clearport (gas, base metals, precious metals, oil products, crude oil, agriculture, etc.) and LCH.Clearnet (base metals, precious metals, plastics products, freight, iron ore, etc.). A relatively high degree of pre-trade and post-trade transparency is provided by market agencies like brokers, price reporting agencies, electronic trading platforms or confirmation services as well as clearing venues.

## 1.2 On-exchange commodity derivatives trading

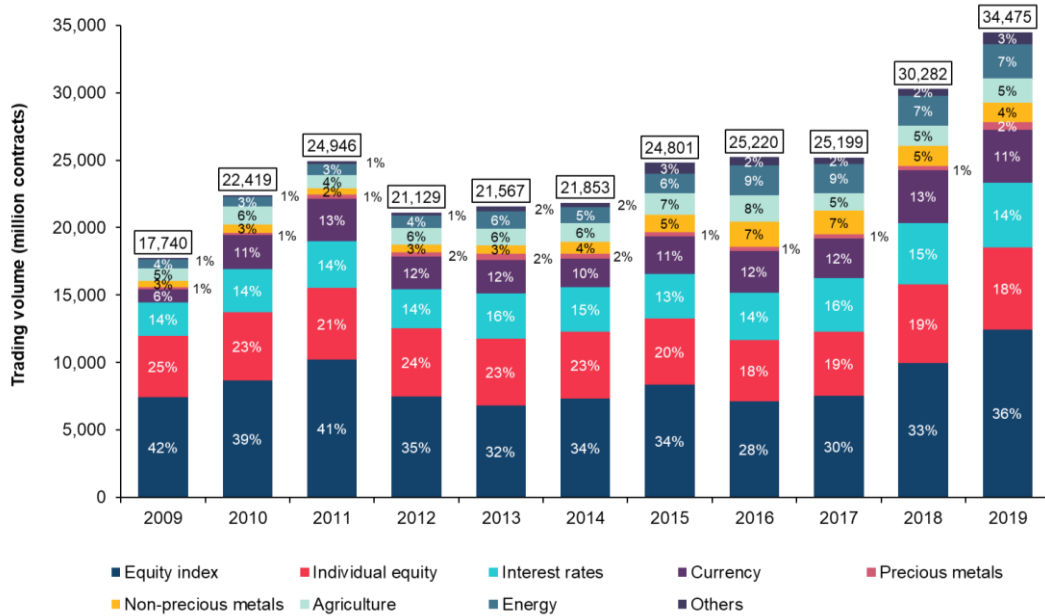
Commodities traded on global exchanges are in the form of derivatives, typically futures and options. According to classification by the Futures Industry Association (FIA), commodity asset classes underlying exchange-traded futures and options are divided into four categories — precious metals, non-precious metals (i.e. base metals), agriculture and energy. These are derivatives with physical goods as the underlying assets, in contrast to asset categories underlying financial derivatives which include equities (indices and individual equities), interest rates and currencies.

Figures 3 and 4 show the growing trends in the annual trading volume and year-end open interest of exchange-traded derivatives in the world by asset class during the period from 2009 to 2019. In terms of both trading volume and open interest, equity derivatives have been the majority contributor. Nevertheless, the percentage share of commodity derivatives rose from 12% in 2009 to 18% in 2019 in terms of trading volume and from 8% to 11% in terms of open interest (see Figure 5). Notably, as a result of such differential percentage shares in turnover volume and open interest, the turnover ratio (ratio of turnover volume in a period to period-end

<sup>5</sup> Source: *OTC Commodity Derivatives Trade Processing Lifecycle Events*, an ISDA Whitepaper, April 2012. This paper is also the source of information on OTC commodity derivatives market operations presented in this section.

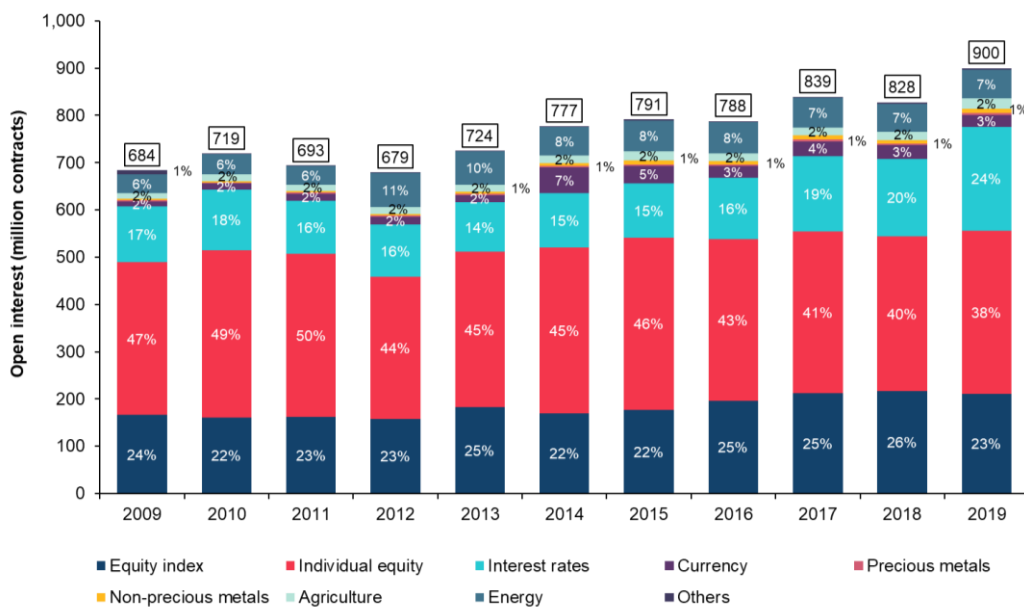
open interest) of commodity derivatives had been higher than that of financial derivatives and had been rising from 38% in 2009 to 66% in 2019 (see Figure 6).

**Figure 3. Annual trading volume of all derivatives on global exchanges by asset class (2009 – 2019)**



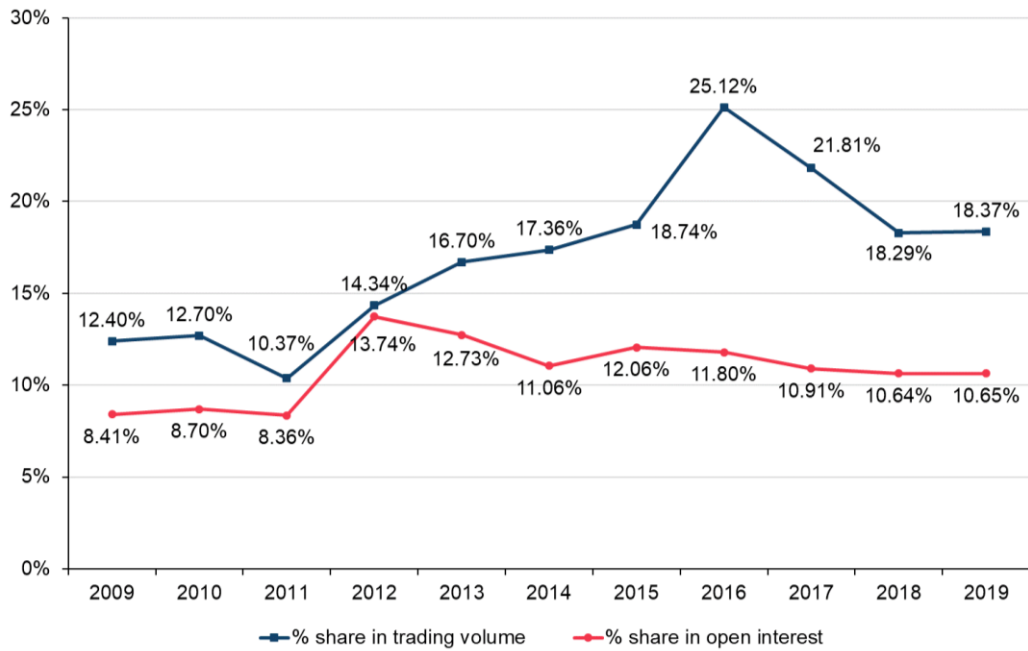
Source: FIA monthly statistics (December report of each year).

**Figure 4. Year-end open interest of all derivatives on global exchanges by asset class (2009 – 2019)**



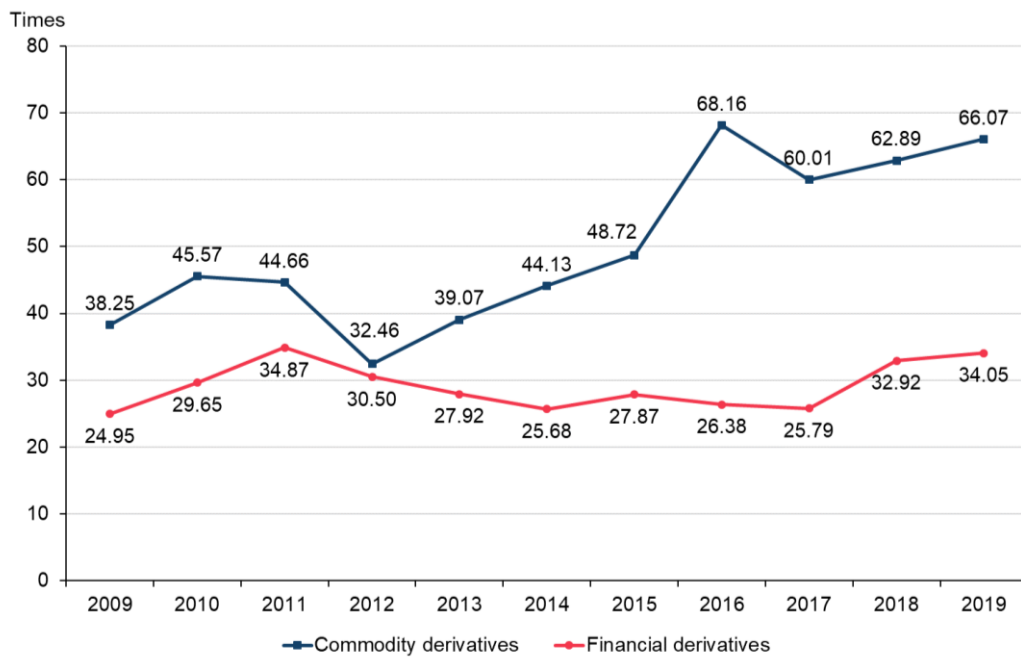
Source: FIA monthly statistics (December report of each year).

**Figure 5. Percentage share of commodity derivatives in global derivatives trading volume and open interest (2009 – 2019)**



Source: Calculated based on FIA monthly statistics (December report of each year).

**Figure 6. Turnover ratios of commodity and financial derivatives (2009 – 2019)**

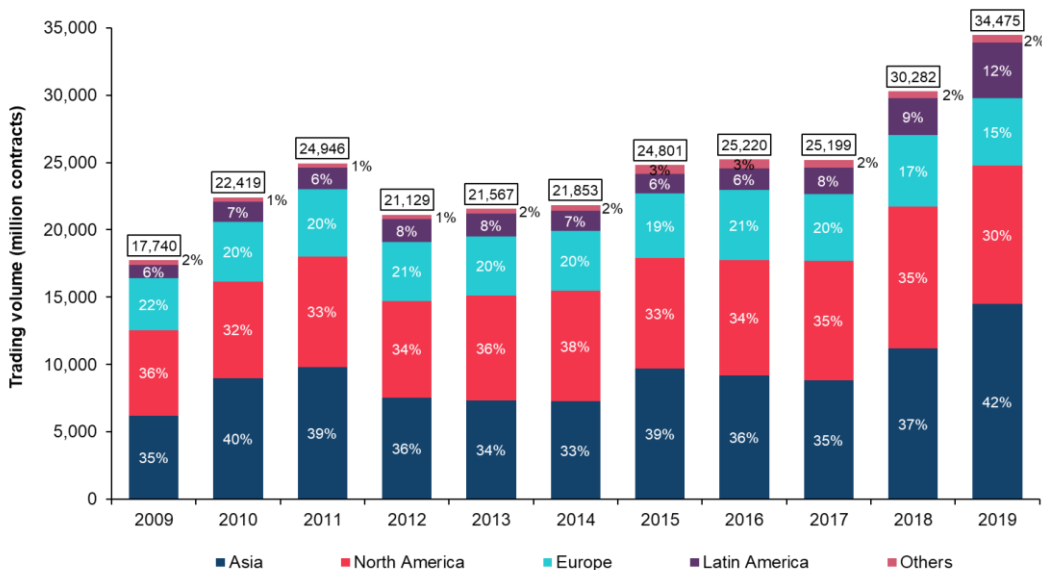


Source: Calculated based on FIA monthly statistics (December report of each year).

Along with the growing percentage share and turnover ratio of commodity derivatives was the growing contribution of Asian exchanges to the trading volume and open interest of global derivatives — from 35% in 2009 to 42% in 2019 in terms of trading volume; and from 4% in 2009 to 9% in 2019 in terms of open interest (see Figures 7 and 8).

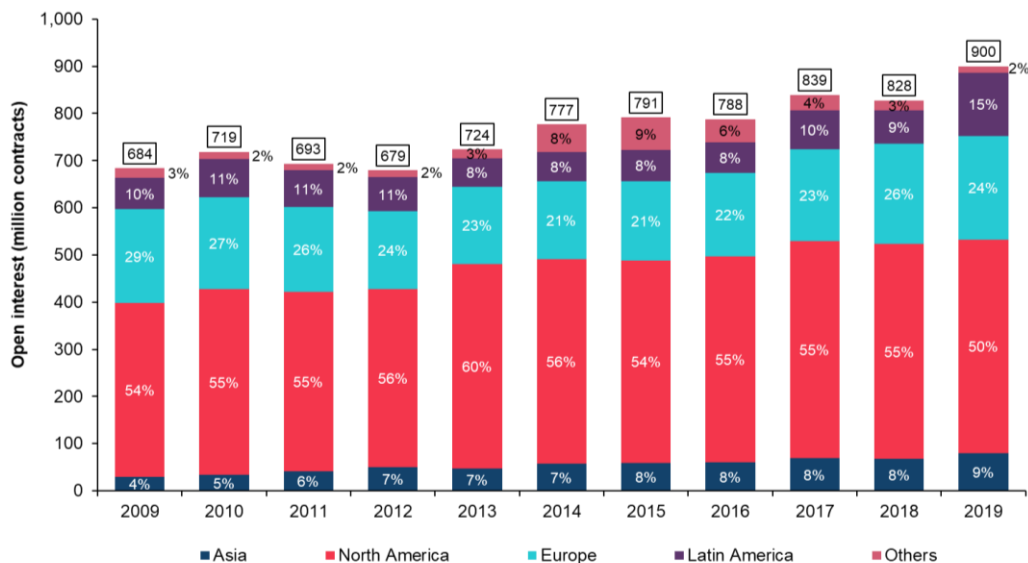


**Figure 7. Annual trading volume of all derivatives on global exchanges by region (2009 – 2019)**



Source: FIA monthly statistics (December report of each year).

**Figure 8. Year-end open interest of all derivatives on global exchanges by region (2009 – 2019)**

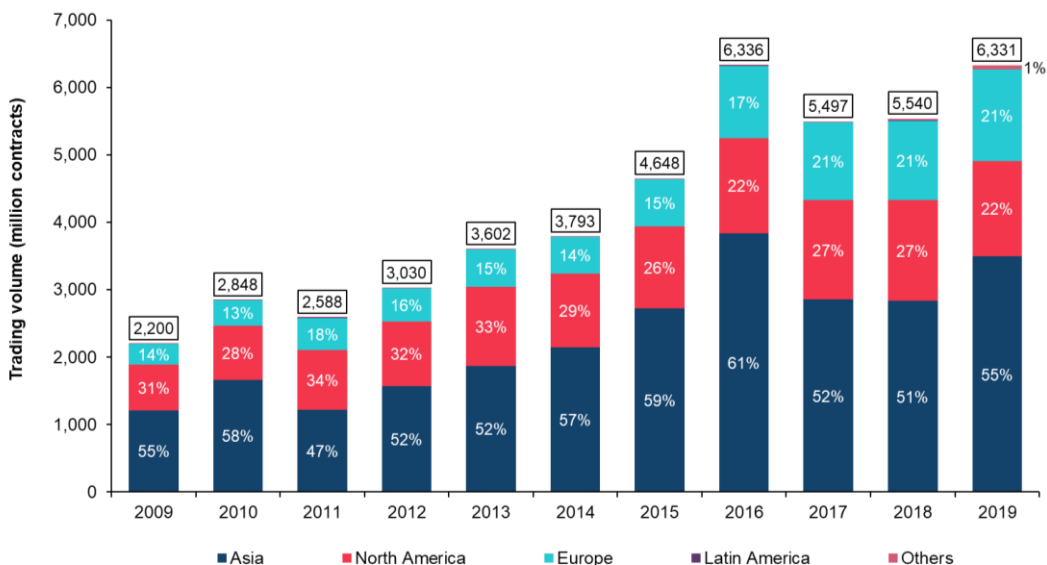


Source: FIA monthly statistics (December report of each year).

Further analysis of activities by region revealed that the percentage contribution of Asian exchanges in global commodity derivatives fluctuated somewhat around 55% in terms of trading volume during the period from 2009 to 2019 (with the highest of 61% reached in 2016) but increased significantly from 9% to 20% in terms of open interest (see Figures 9 and 10). During the period, commodity derivatives on Asian exchanges achieved a compound annual growth rate (CAGR) of 111% in trading volume and 114% in open interest, surpassing those of exchanges in America and more or less in par as European exchanges<sup>6</sup>.

<sup>6</sup> The corresponding CAGR in trading volume and open interest during the period were 108% and 101% respectively for exchanges in North America, 104% and 103% respectively for exchanges in Latin America, and 116% and 115% respectively for exchanges in Europe. Source: Calculations based on FIA statistics.

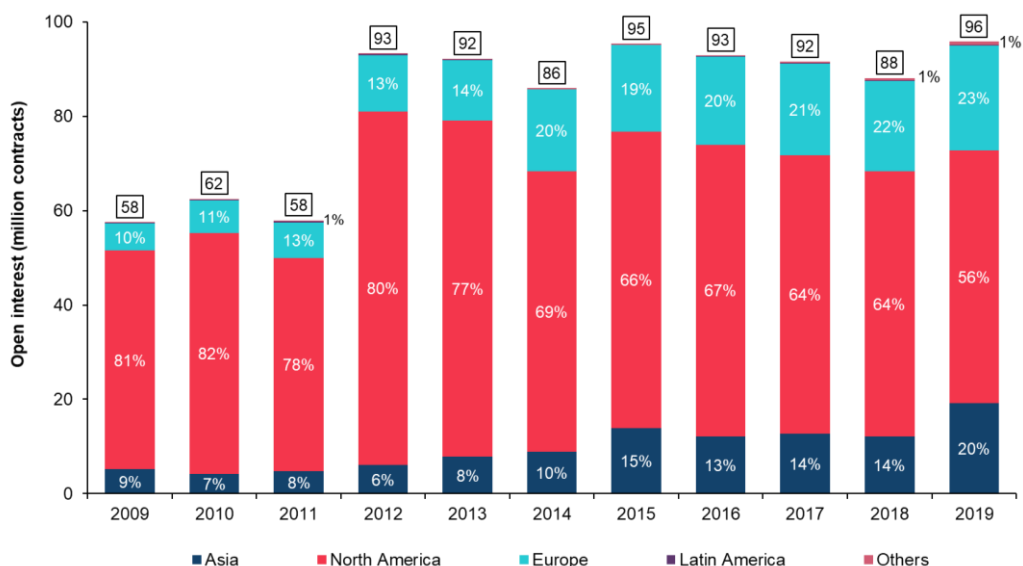
**Figure 9. Annual trading volume of commodity derivatives on global exchanges by region (2009 – 2019)**



Note: Excluding products classified as “Other” in FIA statistics, which include both commodity and non-commodity asset classes.

Source: FIA monthly statistics (December report of each year).

**Figure 10. Year-end open interest of commodity derivatives on global exchanges by region (2009 – 2019)**



Note: Excluding products classified as “Other” in FIA statistics, which include both commodity and non-commodity asset classes.

Source: FIA monthly statistics (December report of each year).

The growing trading activities in commodity derivatives and the growing share of Asian exchanges in these can be attributed to three main factors:

- (1) **Global economic growth** — The growth in global economy is naturally accompanied by the growth in commodity production, consumption and trade. As a result, there will be increasing needs from commodity producers and consumers to use commodity derivatives to hedge against their positions in the physical commodities. Trading in commodity derivatives will therefore increase due to increased hedging activities.

- (2) **The increased use of commodity derivatives in portfolio investment**<sup>7</sup> — Global investors may use commodity derivatives to hedge against investment risk in equities or bonds risk or in search for higher yields in a low interest environment. Moreover, there is increasing supply of commodity investment tools such as commodity futures index funds, which could form part of investors' global investment portfolios for exposure to the different asset classes.
- (3) **The rise of the Mainland economy and Mainland commodity exchanges** — Mainland China has been the engine of global economic growth. It achieved a remarkable average annual real growth rates of 12.7% in its gross domestic products (GDP) during the decade up to 2018, compared to the 3.5% for the world's economy<sup>8</sup>, and surpassed Japan in 2010 to become the second largest economy in the world<sup>9</sup>. Along with the economic growth is the rising significance of the commodity derivatives exchanges in the Mainland to serve the increasing hedging needs of the Mainland commodity sectors.

The three futures exchanges in the Mainland that offer trading in commodity derivatives — the Shanghai Futures Exchange (SHFE), the Zhengzhou Commodity Exchange (ZCE) and the Dalian Commodity Exchange (DCE) — fell short of the top ten exchanges in the world by derivatives trading volume and even fell short of the top 20 by open interest back in 2009<sup>10</sup>. After a decade's time, the three exchanges had become the top three exchanges in the world by derivatives trading volume and among the top 10 by open interest. (See more in Section 3 below.)

## 2. GLOBAL EXCHANGES OFFERING COMMODITY DERIVATIVES

Out of the 83 exchanges in the world that reported derivatives statistics to the FIA as of end-2019, 45 offered a total number of 1,463 commodity derivative products<sup>11</sup> (see Table 1). Most of these products were futures (1,162 in number or 79% of the total), with options being the minority. Among the four commodity asset classes, energy products constituted the most in number — 876 in number or 60% of the total (63% of futures and 46% of options). Agricultural products ranked the second — 308 in number or 21% of the total (18% of futures and 34% of options). More exchanges (44 in number) offered commodity futures than commodity options (28 in number). Non-precious metals had the least number of products (24 futures and options) and offered by the least number of exchanges (17 exchanges).

<sup>7</sup> See Parantap Basu and William T. Gavin (2011), "What explains the growth in commodity derivatives?", *Federal Reserve Bank of St. Louis Review*, January/February 2011.

<sup>8</sup> Source: Wind.

<sup>9</sup> Source: "China overtakes Japan as world's second-biggest economy", *BBC News* on the BBC website, 14 February 2011.

<sup>10</sup> Source: The rankings were produced based on FIA monthly statistics (December 2009).

<sup>11</sup> In the detailed analysis of commodity products and trading activities in 2019 in this paper, unless otherwise specified, products classified as "Other" in FIA statistics are judgementally re-classified into commodity products and non-commodity products according to their underlying assets. Those classified as commodity products are included as a commodity class in the analysis as "Others". The underlying assets of these include chemical products and commodity indices.

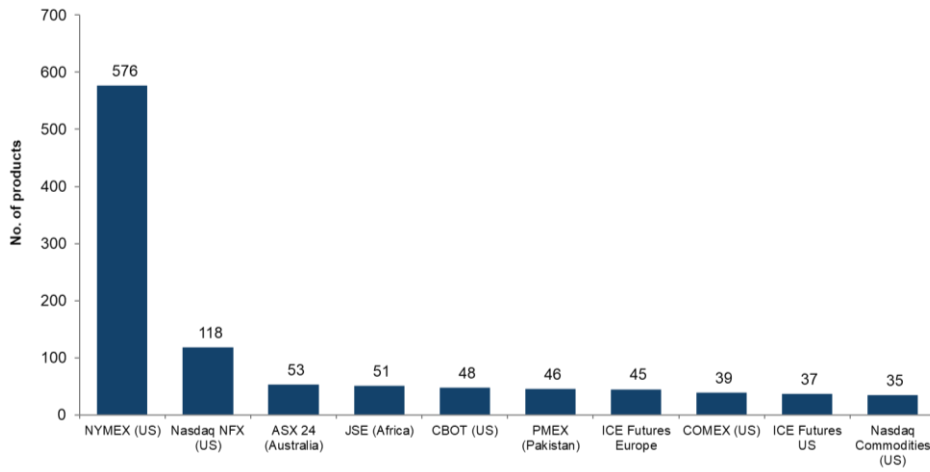
Table 1. Commodity product offerings by global exchanges (end-2019)				
Product type	Asset class	No. of exchanges offering products	No. of products	% share in no. of products by asset class
Futures	Precious metals	22	106	9.1%
	Non-precious metals	16	85	7.3%
	Agriculture	33	206	17.7%
	Energy	27	737	63.4%
	Others	6	28	2.4%
<b>Total</b>		<b>44</b>	<b>1,162</b>	<b>100%</b>
Options	Precious metals	11	28	9.3%
	Non-precious metals	8	29	9.6%
	Agriculture	19	102	33.9%
	Energy	11	139	46.2%
	Others	2	3	1.0%
<b>Total</b>		<b>28</b>	<b>301</b>	<b>100%</b>
Futures and/or options	Precious metals	24	134	9.4%
	Non-precious metals	17	114	7.8%
	Agriculture	34	308	21.1%
	Energy	28	876	59.9%
	Others	6	31	2.1%
<b>Total</b>		<b>45</b>	<b>1,463</b>	<b>100%</b>
Note: Percentages may not add up to 100% due to rounding. Source: FIA monthly statistics (December 2019 report).				

(See Appendix for the full list of exchanges offering commodity derivatives as of end-2019.)

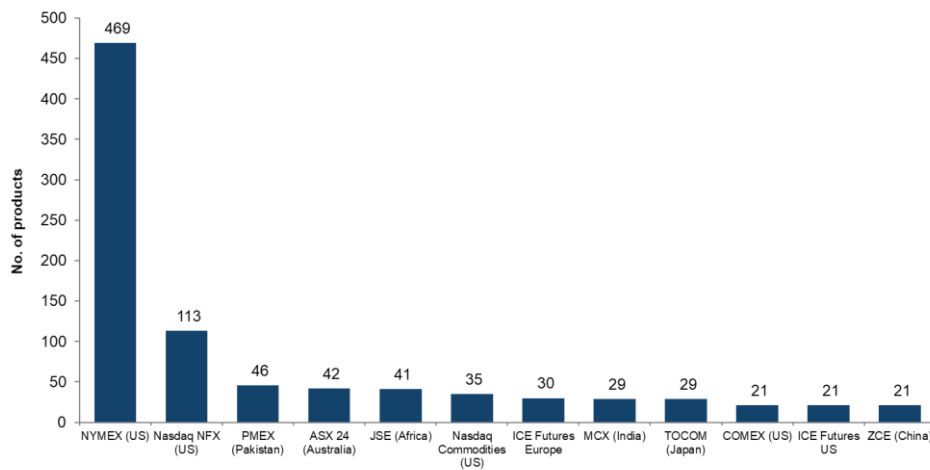
Among the exchanges, the New York Mercantile Exchange (NYMEX) in the US offered the most number of commodity products (576, 39% of the global total as of end-2019), the vast majority of which are energy products (561 in number, 64% of the global energy products total). Nasdaq NFX, also in the US, took the second place, but its number of commodity products (118 or 8% of the global total) fell much short of NYMEX. In fact, six out of the top 10 exchanges by number of commodity products are in the US. Viewing futures and options separately, five out of the top ten exchanges by number of products as of end-2019 are in the US for both futures and options and notably, US exchanges assumed the top 4 places for commodity options products. (See Figure 11.)

**Figure 11. Top 10 exchanges by number of commodity derivative products (end-2019)**

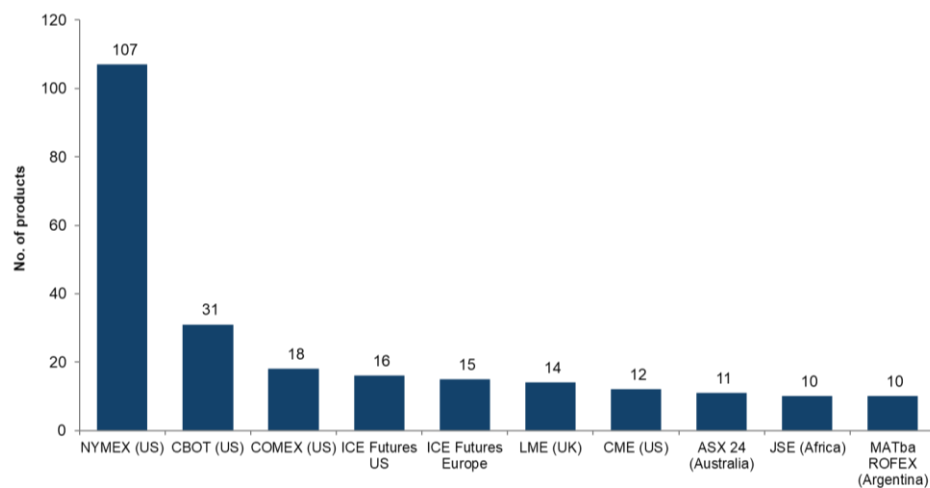
**(a) Futures and options**



**(b) Futures**



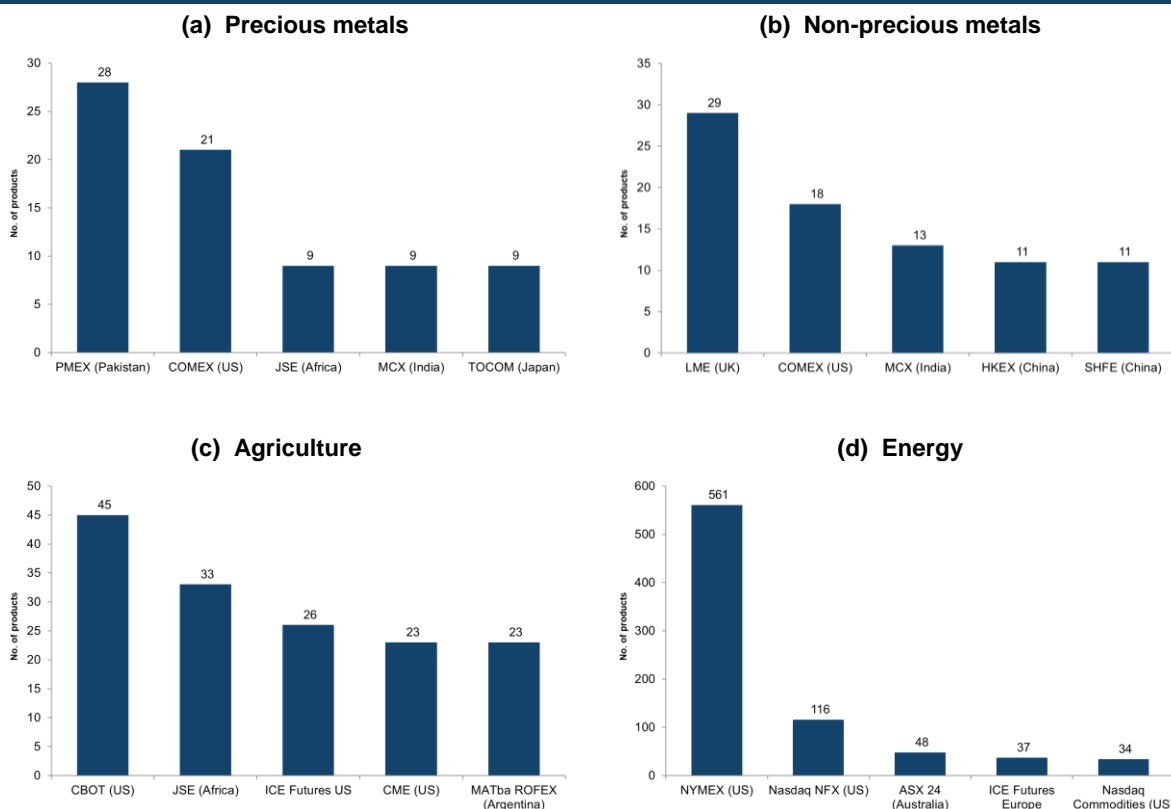
**(c) Options**



Source: FIA monthly statistics (December 2019 report).

The top 5 exchanges offering the most number of products by commodity asset class as of end of 2019 are given in Figure 12. Pakistan Mercantile Exchange (PMEX) took the lead in precious metal products; the London Metal Exchange (LME) took the lead in non-precious metal products; the Chicago Board of Trade (CBOT) took the lead in agricultural products; and NYMEX took the lead in energy products.

**Figure 12. Top 5 exchanges by number of commodity derivative products for each asset class (end-2019)**



Source: FIA monthly statistics (December 2019 report).

In terms of trading volume, futures constituted over 90% for each of the commodity asset classes, while options constituted only a minority in 2019 (see Table 2). Futures products also dominated in terms of open interest of commodity derivatives as of end-2019, though to a lesser extent than that in terms of trading volume (see Table 3). This reflects the genuine characteristic of commodity futures being the natural hedging tool for the commodity industry. (See Section 3 for more detailed analysis of the trading activities.)

**Table 2. Global commodity derivatives trading volume on exchanges by product type (2019)**

Asset class	Trading volume (mil contracts)		% share	
	Futures	Options	Futures	Options
Precious metals	562.53	19.77	96.60%	3.40%
Non-precious metals	1,423.91	15.85	98.90%	1.10%
Agriculture	1,650.58	117.14	93.37%	6.63%
Energy	2,403.36	138.23	94.56%	5.44%
Others	886.48	0.39	99.96%	0.04%
<b>Overall</b>	<b>6,926.87</b>	<b>291.38</b>	<b>95.96%</b>	<b>4.04%</b>

Source: FIA monthly statistics (December 2019 report).

**Table 3. Global commodity derivatives open interest on exchanges by product type (end-2019)**

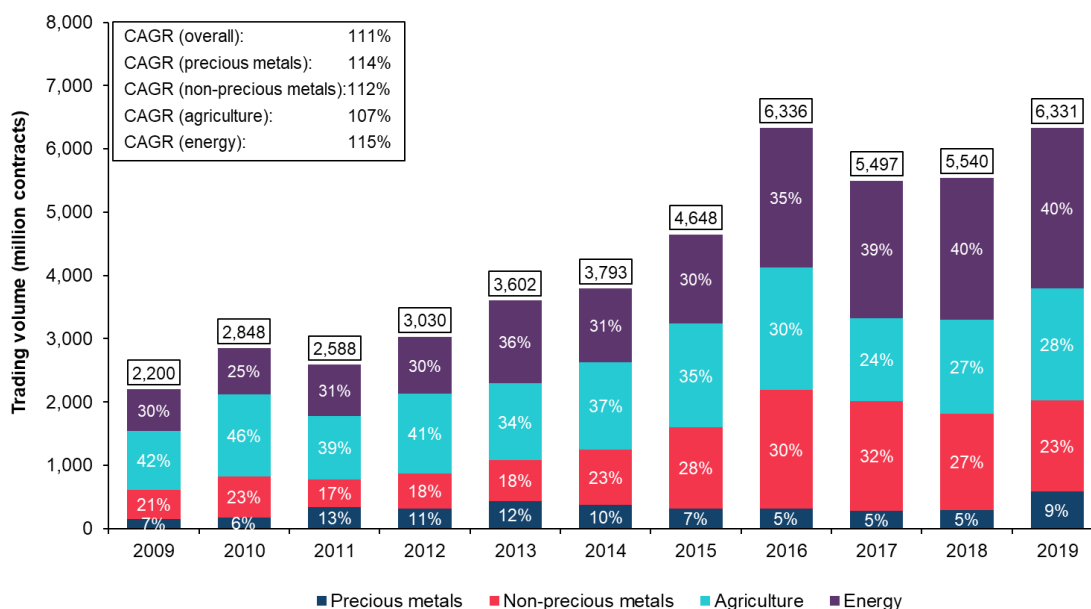
Asset class	Open interest (mil contracts)		% share	
	Futures	Options	Futures	Options
Precious metals	3.44	1.46	70.16%	29.84%
Non-precious metals	7.50	1.22	86.03%	13.97%
Agriculture	17.04	5.36	76.08%	23.92%
Energy	45.39	14.43	75.88%	24.12%
Others	3.53	0.08	97.85%	2.15%
<b>Overall</b>	<b>76.89</b>	<b>22.54</b>	<b>77.33%</b>	<b>22.67%</b>

Source: FIA monthly statistics (December 2019 report).

### 3. GLOBAL ON-EXCHANGE COMMODITY DERIVATIVES TRADING ACTIVITIES

#### 3.1 The growing trend in commodity derivatives trading

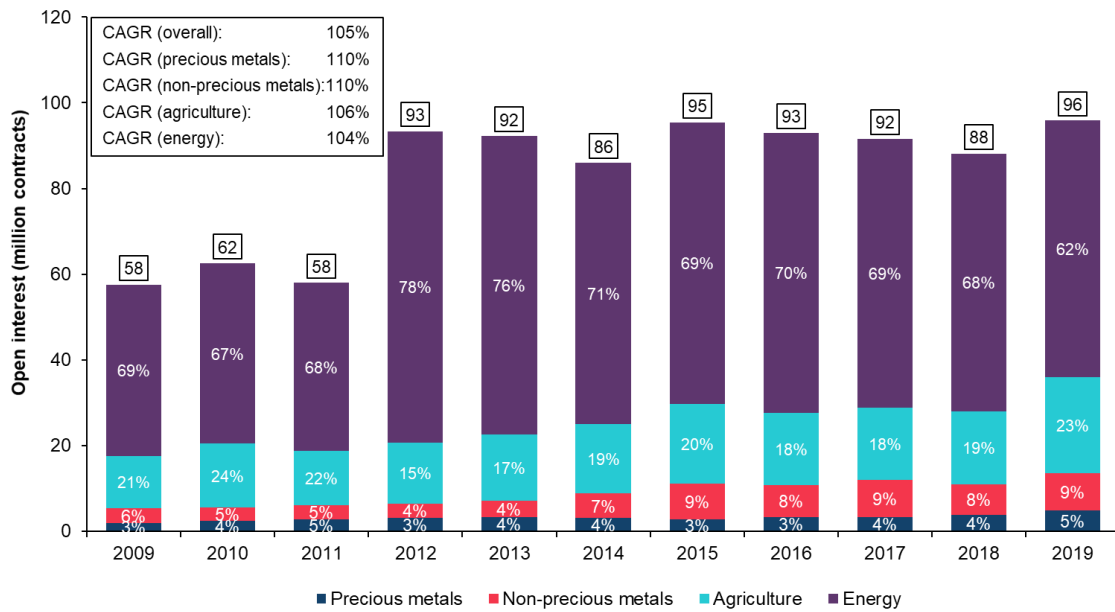
Over the past decade, commodity derivatives trading on global exchanges has had a remarkable growth, achieving an overall CAGR of 111% in trading volume and 105% in open interest. The CAGRs in both trading volume and open interest reached over 100% for each asset class. Energy products have become the major contributing asset class in terms of trading volume for four consecutive years since 2016, superseding agricultural products; which had been the majority asset class by open interest during 2009 to 2019. (See Figures 13 and 14.)

**Figure 13. Annual trading volume of commodity derivatives by asset class (2009 – 2019)**

Note: Excluding products classified as "Other" in FIA statistics, which include both commodity and non-commodity asset classes.

Source: FIA monthly statistics (December report of each year).

**Figure 14. Year-end open interest of commodity derivatives by asset class (2009 – 2019)**



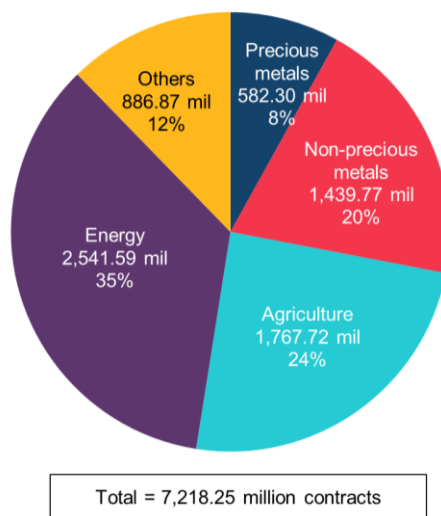
Note: Excluding products classified as “Other” in FIA statistics, which include both commodity and non-commodity asset classes.

Source: FIA monthly statistics (December report of each year).

Taking a closer look into the composition of on-exchange commodity activities in 2019, energy products constituted 35% of the trading volume for futures and 47% for options; agricultural products constituted 24% and 40% respectively. As futures constituted 96% (and options the remaining 4%) of total trading volume of commodity derivatives, energy products constituted 35% of total commodity derivatives trading volume on global exchanges, followed by agricultural products (24%). (See Figure 15.)

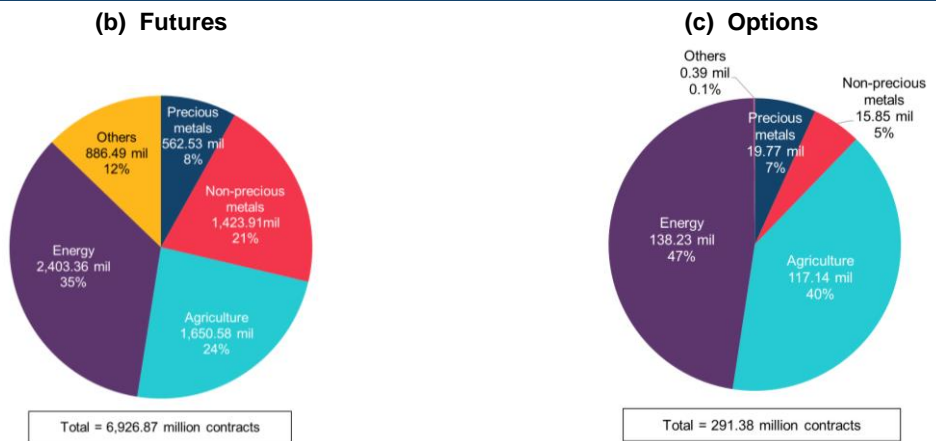
**Figure 15. Global commodity derivatives trading volume by asset class (2019)**

(a) Futures and options





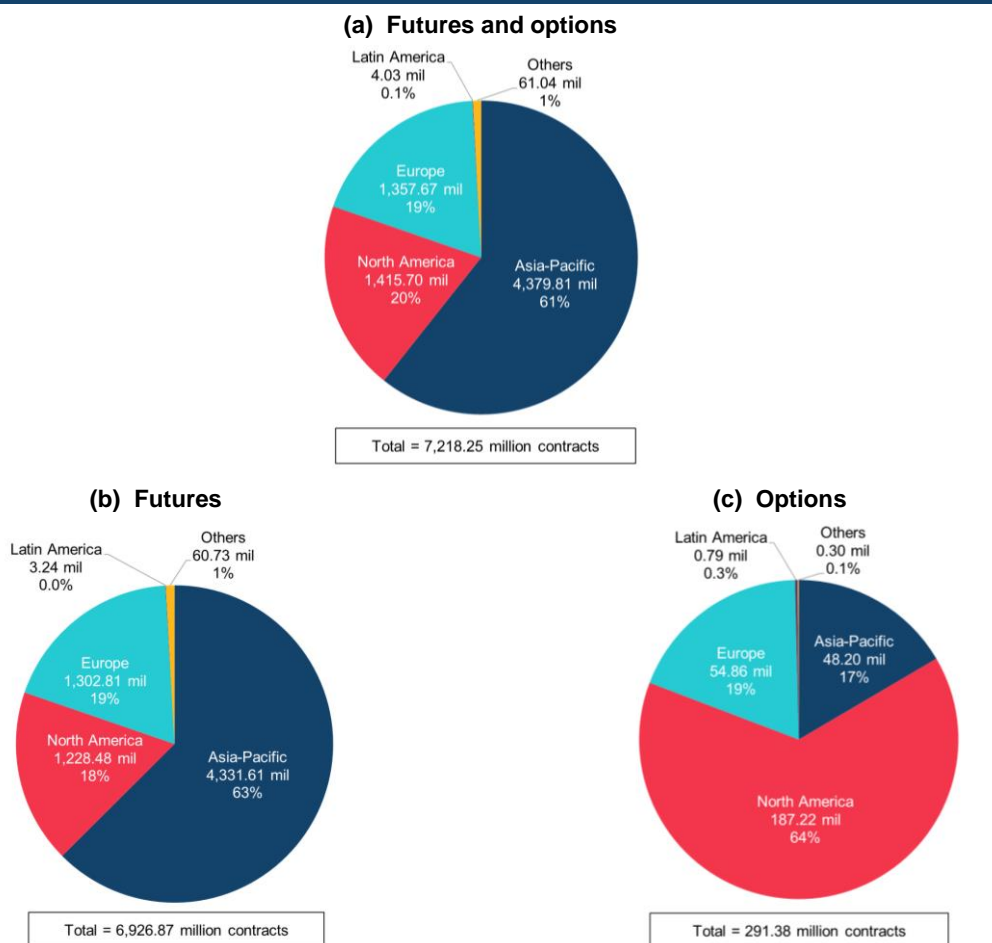
**Figure 15. Global commodity derivatives trading volume by asset class (2019) (cont'd)**



Note: Percentage may not add up to 100% due to rounding.  
 Source: FIA monthly statistics (December 2019 report).

In respect of geographical distribution of commodity trading activities, most of the commodity futures trading took place on Asia-Pacific exchanges — 63% of the total commodity futures volume in 2019; and the majority of the commodity options trading took place in North American exchanges — 64% of the total commodity options volume in 2019. As commodity futures dominated the total commodity derivatives trading, Asia-Pacific exchanges constituted the majority (61%) of total commodity derivatives trading volume in the world in 2019. (See Figure 16.)

**Figure 16. Global commodity derivatives trading volume by region (2019)**

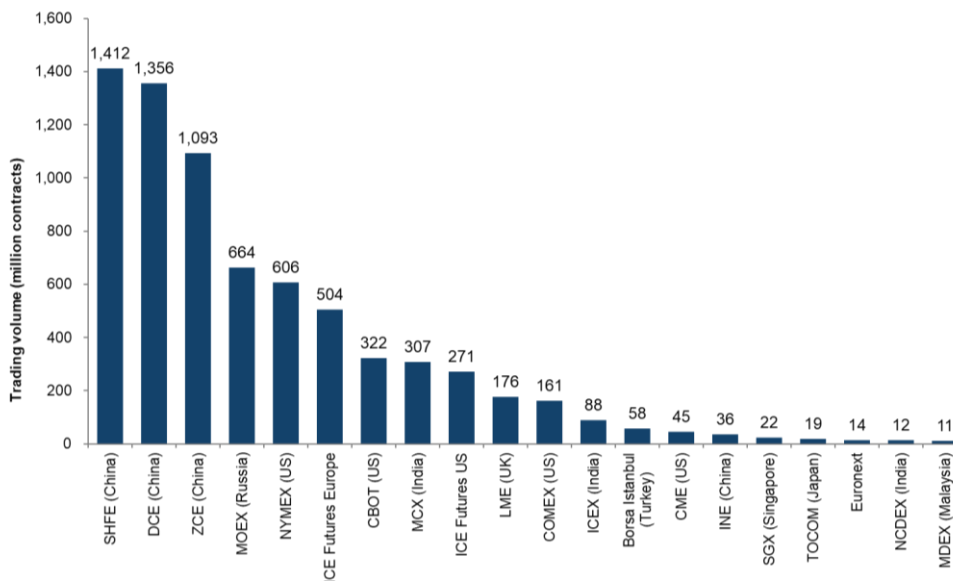


Note: Percentage may not add up to 100% due to rounding.  
 Source: FIA monthly statistics (December 2019 report).

### 3.2 Key commodity exchanges

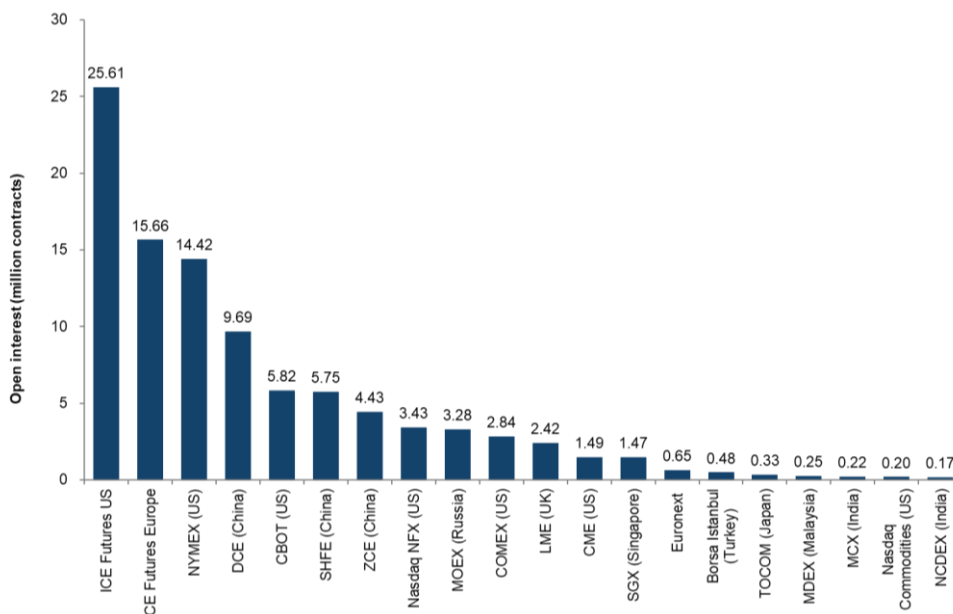
Figures 17 and 18 show the top 20 exchanges by commodity derivatives trading volume and year-end open interest in 2019. The three Mainland exchanges — SHFE, DCE and ZCE — ranked top three by trading volume but ranked below the exchanges in the US and Europe by open interest. It has to be noted that in contrast to free market entry in the western developed markets, foreign participation in the Mainland derivatives market is currently highly restricted<sup>12</sup>. In other words, the high trading volume on their exchanges are basically contributed by domestic participants only.

**Figure 17. Top 20 exchanges by commodity derivatives trading volume (2019)**



Source: FIA monthly statistics (December 2019 report).

**Figure 18. Top 20 exchanges by commodity derivatives open interest (end-2019)**

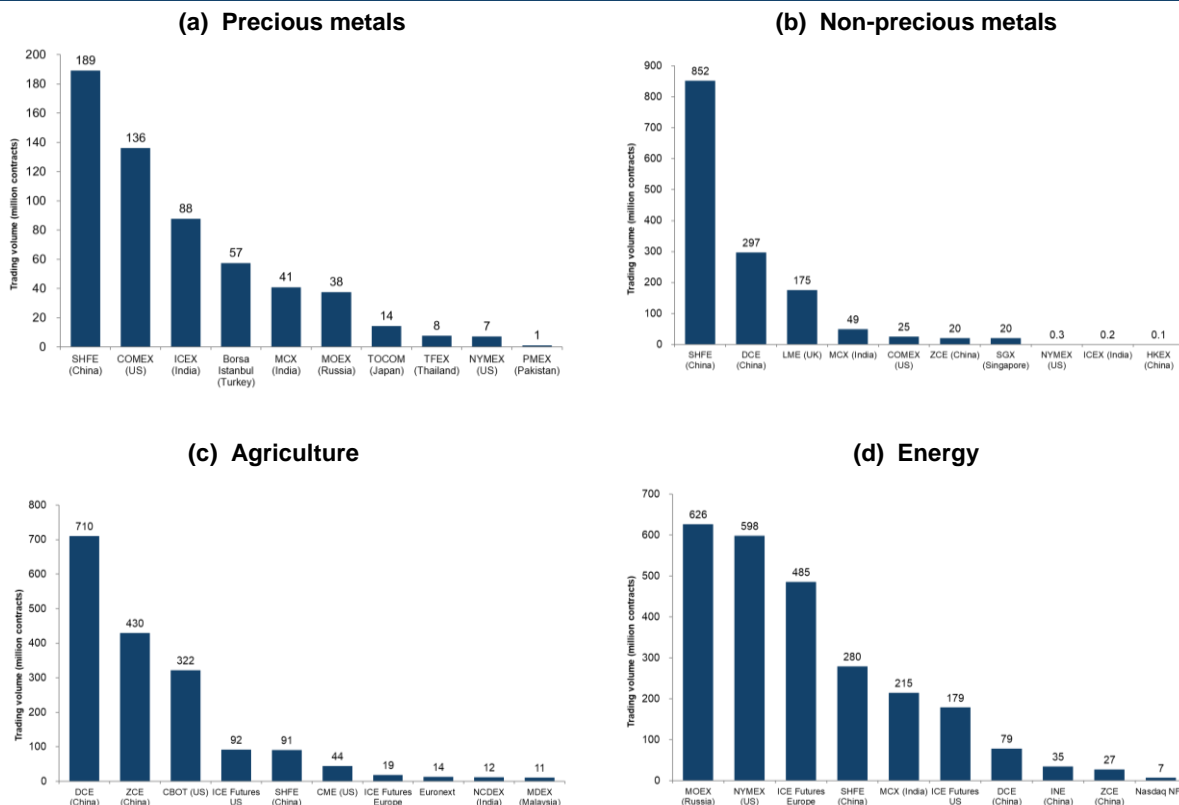


Source: FIA monthly statistics (December 2019 report).

<sup>12</sup> Foreign participation is only allowed for a few designated products (see the speech of the Chairman of the China Securities Regulatory Commission at the 11<sup>th</sup> Lujiazui Forum on 13 June 2019, on the Lujiazui Forum website).

When looking at different asset classes, in 2019, the SHFE took the lead in the trading of precious metals and non-precious metals, followed by COMEX in the US and the Indian Commodity Exchange (ICEX) for precious metals and the DCE and the LME for non-precious metals; the DCE took the lead in the trading of agricultural products, followed by ZCE and CBOT; and Moscow Exchange (MOEX) in Russia took the lead in the trading of energy products, followed by NYMEX and ICE Futures Europe. (See Figure 19.)

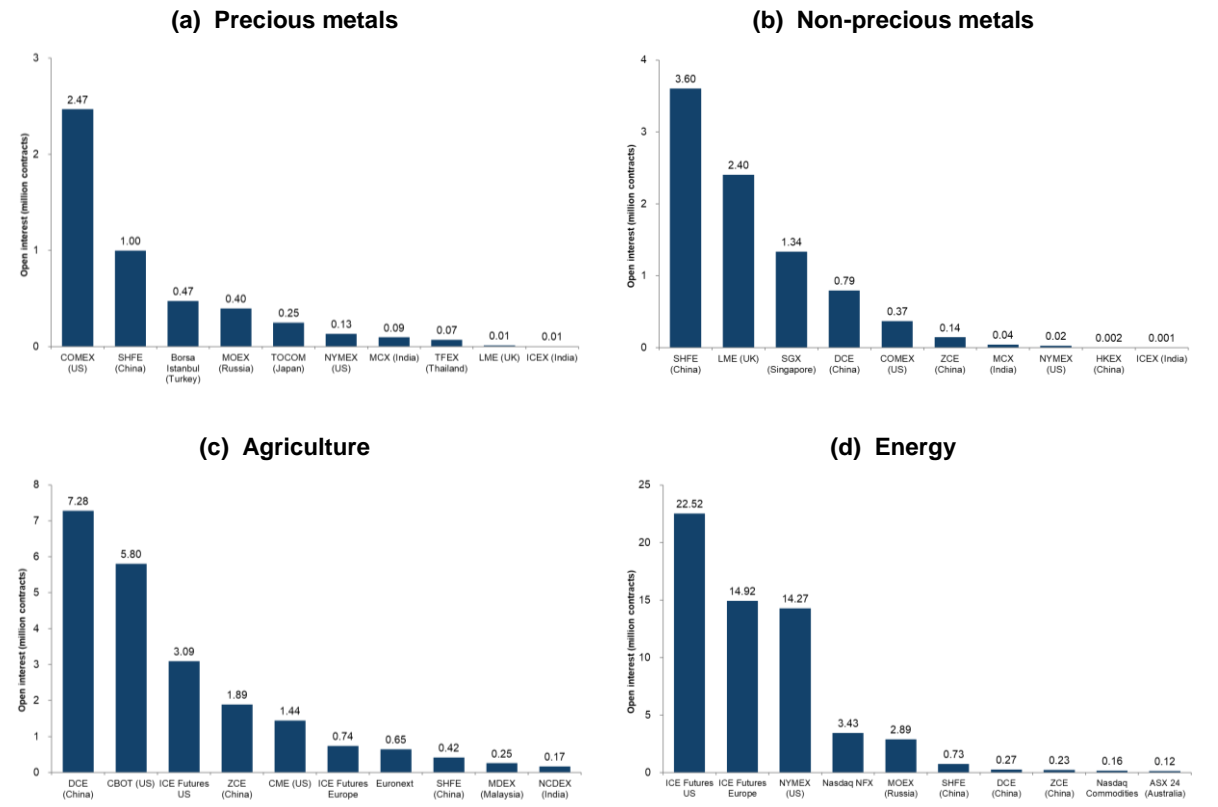
**Figure 19. Top 10 exchanges by trading volume of commodity derivative products for each asset class (2019)**



Source: FIA monthly statistics (December 2019 report).

In terms of open interest, COMEX attracted the largest open positions as at the end of 2019 for precious metals, followed by the SHFE and Borsa Istanbul in Turkey; the SHFE took the first place for non-precious metals, followed by the LME and the Singapore Exchange (SGX); the DCE ranked top for agricultural products, followed by CBOT and ICE Futures US; ICE Futures US ranked top for energy products, followed by ICE Futures Europe and NYMEX. (See Figure 20.)

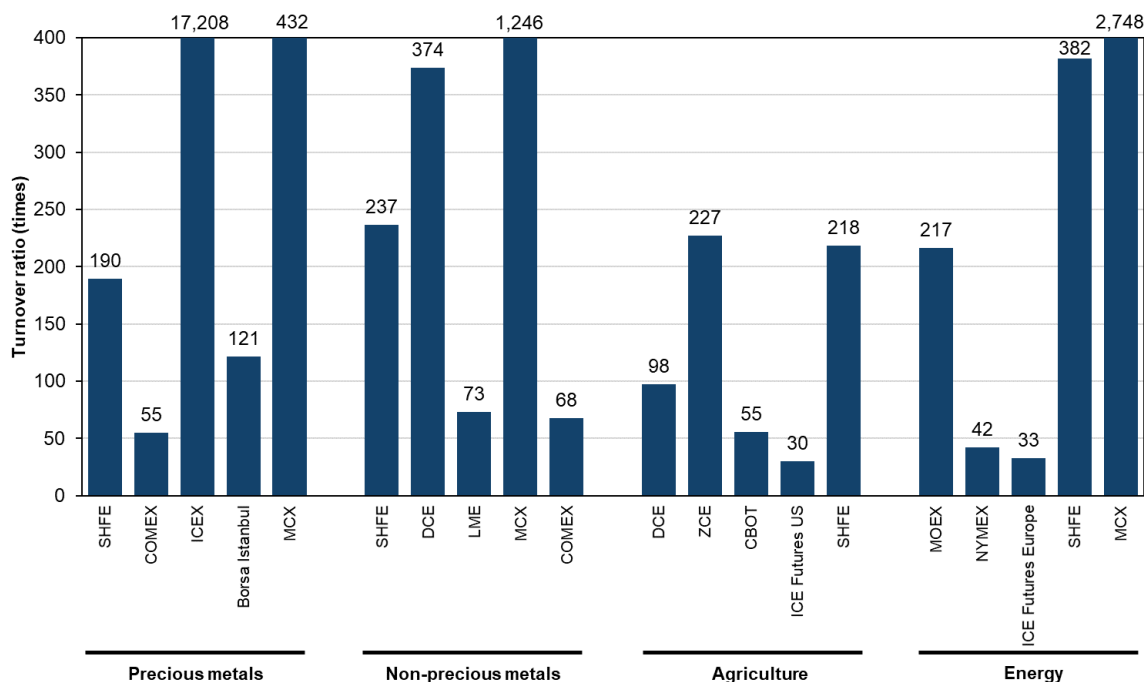
**Figure 20. Top 10 exchanges by open interest of commodity derivative products for each asset class (end-2019)**



Source: FIA monthly statistics (December 2019 report).

Among the top 5 leading exchanges by trading volume for each asset class in 2019, the turnover ratio of commodity derivatives on the Asian exchanges were notably much higher than their US and European counterparts (see Figure 21). At the extreme, the Indian exchanges had turnover ratios of over 17,000 times (ICEX) and over 400 times (Multi Commodity Exchange of India or MCX) for precious metals, and over 1,000 times (MCX) for non-precious metals and over 2,000 times (MCX) for energy products. The Mainland exchanges had turnover ratios of 190 times (SHFE) compared to the 55 times of COMEX for precious metals; 237 times (SHFE) and 374 times (DCE) compared to 73 times of the LME for non-precious metals; 98 times (DCE) and 227 times (ZCE) compared to 55 times (CBOT) and 30 times (ICE Futures US) for Agriculture; and 382 times (SHFE) compared to 42 times (NYMEX) and 33 times (ICE Futures Europe) for energy products.

**Figure 21. Turnover ratio of top 5 exchanges by commodity derivatives trading volume (2019)**



Note: Bars with turnover ratio exceeding 300 times are not shown in full.

Source: FIA monthly statistics (December 2019 report).

In summary, the Mainland futures exchanges are among global leading exchanges in the trading of commodity derivatives for three out of the four major commodity asset classes, namely precious metals, non-precious metals and agricultural products, but relatively not as strong in energy products. Asian exchanges, including Mainland exchanges, typically have much higher turnover ratios for commodity derivatives than their US and European counterparts.

### 3.3 Key products

#### 3.3.1 Precious metals

The most heavily traded precious metal products on exchanges have been silver and gold. The leading exchange in this asset class by trading volume in 2019, the SHFE, offered only three products — silver futures and gold futures and options. The second ranking exchange, COMEX, offered 21 futures and options in precious metals. Nevertheless, the trading on COMEX was dominated by only a few products on gold and silver as well — gold futures (64% of its precious metal products’ total trading volume), silver futures (18%) and gold options (11%). Comparably, the gold contracts of the SHFE have a smaller contract size than those of COMEX. The third ranking exchange, ICEX, offered diamond futures. (See Table 4.)

Table 4. Top 3 products on the top 3 exchanges by trading volume (2019) — Precious metals						
Exchange	% share of exchange in global volume of the asset class	Product	Contract size	2019 Trading volume (contracts)	% share in all precious metal products on the exchange <sup>(1)</sup>	Cumulative % share in global volume <sup>(2)</sup>
SHFE	32.5%	Silver futures	15 kg	142,823,743	75.5%	32.5%
		Gold futures	1 kg	46,208,567	24.4%	
		Gold options on futures	1 kg	40,926	0.0%	
COMEX	23.4%	Gold futures	100 troy ounces (~3.11kg)	86,508,741	63.6%	21.6%
		Silver futures	5,000 troy ounces (~155.68 kg)	24,149,148	17.7%	
		Gold options	100 troy ounces (~3.11kg)	15,043,949	11.1%	
ICEX	15.1%	Diamond 1CT futures	1 carat	86,164,857	98.2%	15.1%
		Diamond 0.5CT futures	0.5 carat	1,544,910	1.8%	
		Diamond 0.3CT futures	0.3 carat	463	0.0%	

Notes:  
(1) Trading volume of the product as percentage of all precious metal products' trading volume on the exchange.  
(2) Total trading volume of the top 3 products as percentage of all precious metal products' global trading volume.

Source: FIA monthly statistics (December 2019 report).

### 3.3.2 Non-precious metals

In 2019, the top three non-precious metal products by trading volume on the top-ranked exchange, the SHFE, were steel rebar futures, nickel futures and zinc futures. The second-ranked exchange, the DCE, offered only iron ore products. Products on this single metal asset of DCE already constituted 21% of the global trading volume in non-precious metals. The third-ranked exchange, the LME, had the highest volumes in aluminium, copper and zinc products. In respect of zinc futures, the SHFE product again has a much smaller contract size than the LME product. (See Table 5.)

Table 5. Top 3 products on the top 3 exchanges by trading volume (2019) — Non-precious metals						
Exchange	% share of exchange in global volume of the asset class	Product	Contract size	2019 Trading volume (contracts)	% share in all non-precious metal products on the exchange <sup>(1)</sup>	Cumulative % share in global volume <sup>(2)</sup>
SHFE	59.2%	Steel rebar futures	10 tons	465,171,782	54.6%	48.4%
		Nickel futures	1 ton	160,444,120	18.8%	
		Zinc futures	5 tons	71,066,468	8.3%	

Table 5. Top 3 products on the top 3 exchanges by trading volume (2019) — Non-precious metals						
Exchange	% share of exchange in global volume of the asset class	Product	Contract size	2019 Trading volume (contracts)	% share in all non-precious metal products on the exchange <sup>(1)</sup>	Cumulative % share in global volume <sup>(2)</sup>
DCE	20.6%	Iron ore futures	100 metric tonnes	296,538,011	99.9%	20.6%
		Iron ore options on futures	100 metric tonnes	363,865	0.1%	
LME	12.2%	Aluminium futures	25 metric tonnes	66,046,920	37.6%	9.2%
		LME copper futures (Grade A copper)	25 metric tonnes	37,047,230	21.1%	
		LME zinc futures (special high-grade zinc)	25 metric tonnes	29,648,051	16.9%	

Notes:  
(1) Trading volume of the product as percentage of all non-precious metal products' trading volume on the exchange.  
(2) Total trading volume of the top 3 products as percentage of all non-precious metal products' global trading volume.

Source: FIA monthly statistics (December 2019 report).

### 3.3.3 Agriculture

Agricultural products have a great variety traded on global exchanges. Key products include soybean meal futures, RBD palm olein futures and corn futures on the DCE; rapeseed meal futures, white sugar futures and cotton futures on the ZCE; and corn futures, soybean futures and wheat futures on the CBOT (see Table 6).

Table 6. Top 3 products on the top 3 exchanges by trading volume (2019) — Agriculture						
Exchange	% share of exchange in global volume of the asset class	Product	Contract size	2019 Trading volume (contracts)	% share in all agricultural products on the exchange <sup>(1)</sup>	Cumulative % share in global volume <sup>(2)</sup>
DCE	40.2%	Soybean meal futures	10 metric tonnes	272,869,691	38.4%	28.7%
		RBD palm olein futures	10 metric tonnes	135,504,196	19.1%	
		Corn futures	10 metric tonnes	99,119,054	14.0%	
ZCE	24.3%	Rapeseed meal futures	10 metric tonnes	138,085,360	32.1%	18.2%
		White sugar futures	10 metric tonnes	119,288,327	27.8%	
		Cotton no.1 futures	5 metric tonnes	63,971,129	14.9%	

**Table 6. Top 3 products on the top 3 exchanges by trading volume (2019) — Agriculture**

Exchange	% share of exchange in global volume of the asset class	Product	Contract size	2019 Trading volume (contracts)	% share in all agricultural products on the exchange <sup>(1)</sup>	Cumulative % share in global volume <sup>(2)</sup>
CBOT	18.2%	Corn futures	5,000 bushels (~136 metric tonnes)	134,508,582	41.8%	13.5%
		Soybean futures	5,000 bushels (~136 metric tonnes)	66,841,024	20.8%	
		Chicago soft red winter wheat futures	5,000 bushels (~136 metric tonnes)	37,753,766	11.7%	
Notes:						
(1) Trading volume of the product as percentage of all agricultural products' trading volume on the exchange.						
(2) Total trading volume of the top 3 products as percentage of all agricultural products' global trading volume.						

Source: FIA monthly statistics (December 2019 report).

### 3.3.4 Energy

Among the different asset classes, energy products have the largest number on exchanges (see Section 2 above). Of the 876 energy products as at the end of 2019, NYMEX alone offered a total number of 561 (64%). However, the top ten most traded energy products on NYMEX already constituted 96% of total energy product volume on the exchange<sup>13</sup>.

Crude oil products were the dominant type by trading volume. The most actively traded energy product on the top three exchanges (MOEX, NYMEX and ICE Futures Europe) by trading volume in 2019 were on crude oil. (See Table 7.)

**Table 7. Top 3 products on the top 3 exchanges by trading volume (2019) — Energy**

Exchange	% share of exchange in global volume of the asset class	Product	Contract size	2019 Trading volume (contracts)	% share in all energy products on the exchange <sup>(1)</sup>	Cumulative % share in global volume <sup>(2)</sup>
MOEX	24.6%	Brent oil futures	10 barrels	625,284,893	99.9%	24.6%
		Light sweet crude oil futures	10 barrels	769,032	0.1%	
NYMEX	23.5%	WTI light sweet crude oil futures	1,000 barrels	291,465,320	48.7%	17.5%
		Henry hub natural gas futures	10,000m British thermal units (MMBtu)	103,394,504	17.3%	
		RBOB gasoline physical futures	42,000 gallons	49,851,807	8.3%	

<sup>13</sup> Source: FIA monthly statistics (December 2019 report).



**Table 7. Top 3 products on the top 3 exchanges by trading volume (2019) — Energy**

Exchange	% share of exchange in global volume of the asset class	Product	Contract size	2019 Trading volume (contracts)	% share in all energy products on the exchange <sup>(1)</sup>	Cumulative % share in global volume <sup>(2)</sup>
ICE Future Europe	19.1%	Brent crude oil futures	1,000 barrels	246,921,939	50.9%	15.1%
		Low sulphur gas oil futures	100 metric tonnes	80,210,173	16.5%	
		WTI light sweet crude oil futures	1,000 barrels	57,292,213	11.8%	

Notes:  
(1) Trading volume of the product as percentage of all energy products' trading volume on the exchange.  
(2) Total trading volume of the top 3 products as percentage of all energy products' global trading volume.

Source: FIA monthly statistics (December 2019 report).

#### 4. CONCLUSION

Commodity derivatives are traded both on-exchange and in the OTC market. While OTC trading had declined after the 2008 Global Financial Crisis, a growing trend is observed in the trading of on-exchange commodity derivatives, mainly futures, along with the growing market share of Asian exchanges. This can be attributed to the global economic growth, the increased use of commodity derivatives in portfolio investment and the rise of the Mainland economy and Mainland commodity exchanges in the world.

While the developed markets in the US and Europe may have taken the lead in terms of number of commodity products offered, the Mainland commodity derivatives exchanges have assumed a leading role in terms of trading volume. At least one of the three Mainland exchanges were among the top three in terms of trading volume in 2019 for three of the four commodity categories — precious metals, non-precious metals and agriculture. They fell behind only for energy products, which however constituted the majority of global commodity derivatives trading volume (mainly from crude oil futures).

Commodity contracts on the Mainland exchanges are typically of a smaller contract size and are traded in relatively high turnover ratios compared with their counterparts in the western developed markets. Compared to overseas counterparts, the Mainland commodity derivatives exchanges are currently highly restricted to foreign participation. With the further development and opening-up of the Mainland exchanges, the landscape of the global commodity derivatives market will continue to evolve.

## ABBREVIATIONS OF EXCHANGES

Note: Country/Region is put in brackets.

ASX 24	ASX Trade24 (Australia)
CBOT	Chicago Board of Trade (US)
CME	Chicago Mercantile Exchange (US)
DCE	Dalian Commodity Exchange (China)
Euronext	Euronext Derivatives Market (Europe)
HKEX	Hong Kong Exchanges and Clearing Limited (China)
ICEX	Indian Commodity Exchange (India)
JSE	Johannesburg Stock Exchange (South Africa)
LME	London Metal Exchange (UK)
MDEX	Malaysia Derivatives Exchange (Malaysia)
MOEX	Moscow Exchange (Russia)
MCX	Multi Commodity Exchange of India (India)
Nasdaq Commodities	The commodities platform of Nasdaq Inc. (US)
Nasdaq NFX	Nasdaq Futures, Inc. (US)
NCDEX	National Commodity & Derivatives Exchange Limited (India)
NYMEX	New York Mercantile Exchange (US)
PMEX	Pakistan Mercantile Exchange (Pakistan)
SHFE	Shanghai Futures Exchange (China)
INE	Shanghai International Energy Exchange (China)
SGX	Singapore Exchange (Singapore)
TFEX	Thailand Futures Exchange (Thailand)
TOCOM	Tokyo Commodity Exchange (Japan)
ZCE	Zhengzhou Commodity Exchange (China)

## APPENDIX. LIST OF EXCHANGES OFFERING COMMODITY DERIVATIVE PRODUCTS (END-2019)

No.	Exchange name	No. of commodity derivative products
1	Asia Pacific Exchange	5
2	ASX 24	53
3	B3	17
4	Borsa Istanbul	5
5	Borsa Italiana — IDEM	1
6	Budapest Stock Exchange	1
7	Chicago Board of Trade	48
8	Chicago Mercantile Exchange	28
9	Commodity Exchange (COMEX)	39
10	Dalian Commodity Exchange	22
11	Dubai Gold & Commodities Exchange	11
12	Dubai Mercantile Exchange	3
13	Eurex	12
14	Euronext Derivatives Market	7
15	Hong Kong Exchanges and Clearing	13
16	ICE Futures Canada	3
17	ICE Futures Europe	45
18	ICE Futures Singapore	3
19	ICE Futures U.S.	37
20	India International Exchange	3
21	Indian Commodity Exchange	12
22	Indonesia Commodity & Derivatives Exchange	6
23	JSE Securities Exchange	51
24	Korea Exchange	2
25	London Metal Exchange	31
26	Malaysia Derivatives Exchange	4
27	MATba ROFEX	27
28	Minneapolis Grain Exchange	2
29	Moscow Exchange	16
30	Multi Commodity Exchange of India	34
31	Nasdaq Commodities	35
32	Nasdaq NFX	118
33	National Commodity & Derivatives Exchange in India	22
34	New York Mercantile Exchange	576
35	New Zealand Futures Exchange	8
36	North American Derivative Exchange	7

## APPENDIX. LIST OF EXCHANGES OFFERING COMMODITY DERIVATIVE PRODUCTS (END-2019) (Continued)

No.	Exchange name	No. of commodity derivative products
37	Osaka Dojima Commodity Exchange	10
38	Pakistan Mercantile Exchange	46
39	Shanghai Futures Exchange	19
40	Shanghai International Energy Exchange	2
41	Singapore Exchange	16
42	Taiwan Futures Exchange	4
43	Thailand Futures Exchange	5
44	Tokyo Commodity Exchange	29
45	Zhengzhou Commodity Exchange	25
<b>Total number of derivative products</b>		<b>1,463</b>

Note: The names of the exchanges follow those given in the source.

Source: FIA monthly statistics (December 2019 report).

### Disclaimer

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