



C A M B R I D G E A S S O C I A T E S L L C

## GLOBAL MARKET COMMENTARY

# COMMODITIES: SITTING OUT THE NEXT ROUND?

February 2012

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Kyle Anderson  
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# Commodities: Sitting Out the Next Round?

Sean McLaughlin, Kyle Anderson, & Alex Jones

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**Rich spot prices, combined with unhelpful collateral and roll yields, are a recipe for disappointing commodity returns; natural resources equities are more attractive.**

With elevated spot prices, essentially no cash collateral yield, and an ongoing contango drag, returns for commodity futures in the years to come are very unlikely to match their levels of the past decade, or those of equities. While commodities should retain their propensity to perform strongly during periods of rising inflation expectations, *base-case* return expectations are poor, raising the question of whether commodities should be thought of today as an options-like investment.

We continue to believe that investors should hold assets that can support spending during inflation spikes (which tend to depress equity valuations and push up bond yields). While commodities should continue to provide strong, inflation-sensitive performance during these exceptional periods, some other assets can deliver defensive (though certainly not heroic) returns during inflation bouts, with the benefit of base-case expected returns that are superior to those of commodities. These assets include natural resources equities and bank loans. As such, investors should underweight commodities until return prospects improve, favoring natural resources equities, and perhaps bank loans (which we would not characterize as real assets, but which should be somewhat resistant to the corrosive impacts of inflation).

Conditions for commodity investors have improved moderately over the past year. Speculative investor fervor has dwindled, prices are now somewhat closer to long-term inflation-adjusted levels than they were during the frothy first few months of 2011, and the punitive imple-

mentation conditions of the past half-decade have moderated somewhat. The medium-term commodity demand story, which is being written largely in Chinese characters, appears to remain intact (near term is a question mark).

That said, the portfolio diversification benefits of commodity futures allocations appear to have waned as commodity futures have taken off as an institutional asset class. It is difficult to know if these conditions will continue, as correlation and beta to equities have risen during a period when growth expectations, rather than inflation expectations, have driven equity and commodity markets. We would expect correlations and betas to be elevated under such conditions, although the fact that these changes have transpired along with the proliferation of long-only institutional investments raises questions about the degree to which we can rely on commodities to produce the level of returns and the diversification benefits they have in the past. Regardless of the durability of such conditions, commodities (like most assets that investors find useful as hedges) are likely to offer lower returns than other risk assets, given today's elevated spot prices and poor implementation conditions, in exchange for a valuable tendency to deliver home-run returns during worrisome inflationary spikes.

Investors that desire inflation-sensitive assets, but are loathe to pay the opportunity-cost toll to own commodities today, should consider replacing a meaningful portion of their commodity allocation with natural resources equities, which share *some* of the inflation-sensitive benefits of commodities without a return penalty (at the cost

of month-to-month returns that march largely to an equity beat). Natural resources equities might well be paired with bank loans to support spending during an inflationary bout. Investors that forego commodities altogether are likely to miss out on a performance “pop” during an inflation spike, but these alternatives should hold their value during periods of moderately accelerating inflation, supporting spending.

## The Cure for High Prices...

Commodity investors in 2011 endured a volatile year (Exhibit 1). While those investors able to nimbly rebalance their commodity exposure (trimming in the spring as prices became frothy and then adding in late summer or early autumn as valuations improved) likely fared reasonably well, for many institutions, the pace of change may have been too rapid to allow interim exposure tweaks.<sup>1</sup>

Early in the year, prices for a wide variety of commodities soared, with overheating Chinese growth and inflation worries conspiring to push up prices of food-related commodities, cotton, and industrial metals. Simultaneously, “Arab Spring” turmoil in the Middle East and North Africa boosted oil prices as market participants fretted about the adequacy of sweet-crude supplies following the start of unrest in Libya, a key supplier of light sweet crude. The turmoil also fueled strong gains in gold prices—the Dow Jones-UBS Total Return Index returned 8.1% during the first four months of the year.

At the beginning of last May, however, we noted that commodities were overvalued, with elevated spot prices relative to long-term inflation-

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<sup>1</sup> In March 2011, we changed our valuation assessment of commodities from *fairly valued* to *overvalued*, then switched it back to *fairly valued* in early October. After prices rallied sharply during October, we once again shifted the valuation to *overvalued* in early November.

adjusted averages, and we advised trimming real asset positions to the lower end of investors’ target range.<sup>2</sup> In fact, spot prices had peaked on April 29 at a full standard deviation above their post-1976 average. They had been at higher levels just twice in the past 35 years: during the late 1970s, and during the first half of 2008.

Supposed new eras are common, while truly new eras are rare indeed. As summer neared in the Northern Hemisphere, commodities became a victim of their own high prices, along with slowing growth in China, Europe, and the United States. Commodity volatility shot up in May, with crude oil falling \$9/barrel (bbl) in a single day, while speculative silver traders nursed 25% declines in the first four trading days of the month. Even gold, which had gained during most of the tumultuous third quarter, dropped sharply in September as rumors flew that hedge funds were liquidating one of their few remaining profitable trades.

From its late April peak through its early October 2011 trough, the Dow-Jones UBS Spot Index fell about 20.6% before rebounding by about 8% into January 2012 (spot prices remain about 14% below peak levels). At current levels, a diversified basket of spot prices is about 0.8 standard deviation elevated relative to long-term inflation-adjusted averages<sup>3</sup> (Exhibit 2).

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<sup>2</sup> Please see our May 2011 publication *Notes on Current Valuations*. At that time, we did not feel that abandoning commodities was warranted, given their important role as an inflation-sensitive asset. However, we have said that the ideal time to build allocations to both inflation-sensitive and deflation-protecting assets is during periods when they are being cast off by others as unnecessary and irrelevant.

<sup>3</sup> This is true of spot prices compared to both their post-1976 level and their post-1900 level. A standard deviation of 0.8 implies that in a normal distribution, inflation-adjusted prices are expected to be higher about 23% of the time. A standard deviation of 1 implies that values would be higher about 16% of the time. The spot price basket is weighted to approximate the 2011 weighting scheme of the Dow Jones-UBS Index, with each commodity’s spot price compared to its own

## Fading Contango

Investors, of course, cannot eat spot returns.<sup>4</sup> Only investors that can take delivery can hope to track spot prices. With limited investor appetite for, say, storing bales of cotton, long-only commodity managers tend to buy futures contracts expiring within the next few quarters, and then periodically sell them to buy longer-dated ones. Indices do this in a predictable fashion (with index investors getting their heads handed to them in a likewise predictable fashion), while active managers can roll futures at optimal tenors, to minimize the pain of contango or even benefit from backwardation.<sup>5</sup> However, if most commodities are sharply in contango, the most an active manager can do is ease the pain of implementation. Over the past five years, the contango drag has amounted to approximately -11% annualized for both the Dow Jones-UBS Index and the S&P GSCI™ Index (Exhibit 3). Over the past several years, the toll from contango, which has not been offset by the skimpy yield from cash collateral, ensured that total returns to passive commodity investors lagged far behind the change in spot prices.<sup>6</sup> As Exhibit 4 highlights, the collateral and roll

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inflation-adjusted average, and the weighted Z-score represents the degree of overvaluation at the index level.

<sup>4</sup> The primary exception is precious metals, which can be stored relatively cheaply.

<sup>5</sup> Contango is when the near-term futures contract is priced below the next contract; thus, index investors must sell cheap and buy dear. Backwardation, which was fairly common until commodity investments became institutionalized in the past five years, is the opposite and provides a tailwind to investors.

<sup>6</sup> Active managers and a variety of niche indices attempt to systematically lessen or counteract the toll of selling cheap contracts to buy dear ones. Deutsche Bank's Optimum Yield Index, for example, weights commodities identically to the Dow Jones-UBS Index each year, but implements those weights using the portions of the futures curve that are the least contangoed or have the strongest backwardation. While the benefits of enhanced roll yield are clear, investors should be aware that contract liquidity tends to diminish as tenors increase, and that contracts farther from expiration may have a diminished response to a supply

returns accounted for the lion's share of the total returns of the S&P GSCI™ Index during the 1970s, 1980s, and 1990s. During the 2000s and from 2010 to the present, the measly collateral yield was not nearly robust enough to offset the contango drag, and index total returns from 2000 to the present were just 6.2% on an annualized basis, even as spot returns compounded at an impressive pace of 12.1%.

Today, while contango is still a headwind, it is more moderate than it has been in recent years. In 2011, the contango drag on the Dow Jones-UBS Index amounted to an annualized -5.9%, and it is currently positive or moderate across five of the six key commodities shown in Exhibit 5.<sup>7</sup> While West Texas Intermediate (WTI) crude oil remains moderately in contango, Brent crude has been in backwardation for much of this year. WTI has been the Dow Jones-UBS Index's sole crude oil component, but in January the index cut some of its hefty WTI allocation, replacing it with Brent crude exposure. Brent crude is more representative of global markets, while WTI pricing continues to be influenced by a glut of oil at the Cushing, Oklahoma, delivery point for the WTI contract.

## Demand Remains Strong for Now

Demand for commodities appears to remain robust, even as economic growth in the developed world comes under serious pressure. This is because China (together with the rest of the emerging world), not the developed world, sets the demand agenda. Even after downshifting

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shock (such as from war, weather, or other disruption), compared to near-month futures.

<sup>7</sup> The annualized roll yield from natural gas is running at -19%, but natural gas curves have significant seasonal impacts; high levels of contango help encourage the storage of gas during the summer and fall, when demand is low due to warm weather.

slightly amid policy tightness, China's 8.9% GDP growth rate remains impressive. However, that growth has been driven by very high levels of infrastructure and property investment, which has in turn been driven by rapid credit growth (see sidebar). Any setbacks in the overheated property market could be damaging to commodity prices. While China accounts for 10% of the world's GDP, it consumes one-quarter of global soybean and rice production and roughly 40% of the world's key industrial metals (Exhibit 6). China accounts for a much smaller fraction of the world's oil consumption (10%, in keeping with the country's GDP share), but Chinese oil consumption is rising much more quickly than that of the rest of the world, so even in oil, China is driving the demand bus. While China's contribution to commodity demand is clearly not a one-year phenomenon, Deutsche Bank has estimated China's contribution to 2012 demand growth for most industrial metals to be at least 40%, and upwards of 60% for corn and soybeans.

## Inventories of Many Commodities Are Tight

All things equal, tight inventories of a commodity tend to be associated with elevated spot prices and increased spot-price volatility. Unfortunately, global inventory data are not always reliable or readily available. U.S. grain and petroleum inventories are readily available, and metals inventories are tracked by the London Metal Exchange (LME), although it is likely that some unofficial storage facilities are off the LME's radar. Because of the scarcity of data, we highlight the inventory picture for selected commodities.

Key feedgrains (corn and soybeans) are in tight supply, which has supported high prices (Exhibit 7). China has recently become a net importer

## Risks to Commodity Investors From Chinese Property Boom

While the Chinese have a well-deserved reputation as savers, China's aggregate credit has skyrocketed in the past three years, from an estimated 120% of GDP to about 180% of GDP today. Much of the borrowing has funded property and infrastructure investment, while local government pools have borrowed between \$1.6 trillion and \$2.2 trillion to finance construction and infrastructure projects. Median home prices in the nine largest Chinese cities have doubled from 2006 to today, and the value of China's housing stock has roughly tripled in the past decade. Property and infrastructure development are driving Chinese economic growth, but they are also spurring inflation. The Chinese government has taken numerous steps in recent months to tighten credit to the property sector and limit speculative development, but even as it has eased reserve requirements, it has kept credit tight for the property sector. Developers are already running into a financing crunch. The main concern is that over-tightening will cause a collapse in property prices that would stress the banking system and trigger a slowdown in Chinese growth. A slowly deflating balloon (likely the goal of policymakers) would have a moderate impact on commodity demand, while a less likely, but possible, rush for the exits could crush commodity demand and prices.

of corn, and ethanol refining now consumes almost 40% of the U.S. corn crop (the fraction has more than tripled since 2005, highlighted on Exhibit 8). Net annual Chinese soy imports have increased six-fold from about 10 million tons to about 60 million tons over the past ten years, as more affluent Chinese consumers increase their pork consumption (approximately six pounds of grain-based feed are required to produce a pound of pork or beef).

Crude oil inventories in the United States are high on a seasonally adjusted basis (Exhibit 9). That said, U.S. inventories may understate the

global level of tightness, given that U.S. and Canadian oil production have been ramping up—for the first time since 1993, more U.S. rigs are now drilling for oil than gas, and Canadian oil sands production is expected to increase by 200,000 bbls/day in 2012—even as U.S. oil demand has been essentially stable over the past decade at 20 billion bbls/day. Chinese demand, on the other hand, has doubled over the past ten years, and emerging markets demand growth (including China) has increased by an estimated 44% over the past decade, even as OECD consumption has *shrunk* over the period (Exhibit 10). In fact, non-OECD economies account for *the entirety* of forecast consumption growth over the next ten years, as developed world consumption is expected to continue falling. U.S. drilling activity is near its highest level in more than two decades, although the marginal cost of production is also somewhat elevated. Horizontal drilling technology is now spreading from natural gas production to oil production, causing U.S. domestic oil production to rise for the first time in more than two decades. For the first time since 1949, the United States was a net exporter of refined petroleum products last year. At current prices, many types of global oil reserves are well above their cost of production (Exhibit 11). Concurrently, however, exploration of new or rediscovered fields in the Americas can be politically or environmentally sensitive, and some long-standing supply backbones in the Middle East and North Africa remain somewhat unstable.

Natural gas inventory is highly seasonal, with heavy inventory build in the fall, when peaking electricity demand is very light and many eastern U.S. households use their gas furnaces sparingly.<sup>8</sup> In the winter, inventories are drawn

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<sup>8</sup> In this report, we focus on U.S. rather than global natural gas economics, because the Henry Hub futures contract is the typical way for commodity managers to gain natural gas exposure. According to CME Group, the Henry Hub contract enjoys the second-highest

down rapidly as households turn up furnaces. Late fall is typically the peak storage period, but last fall set a new record, with U.S. natural gas in storage topping out at 3,852 billion cubic feet in November. Gas in storage has subsequently fallen as heating demand has increased, but remains plentiful due to strong production and a largely mild winter in much of the United States. As of early March, supplies were more than 50% greater than their five-year average levels for that time of year. The amount of natural gas that can be economically extracted has expanded sharply in recent years due to advancements in drilling techniques, and the United States is awash in shale gas,<sup>9</sup> so inventories may remain elevated relative to seasonal norms for a considerable period, depressing prices unless demand experiences a step-function increase similar to that of the supply outlook. Some in the industry expect that U.S. liquefied natural gas (LNG) exports to gas-poor countries could eventually significantly boost demand for U.S.-produced gas. Goldman Sachs reports that five U.S. and two Canadian LNG projects are in the approval process, and that exports could begin as early as 2015. However, these projects are costly and politically sensitive (because they appear to go against calls to increase U.S. “energy security”). The prospect of long-term demand for LNG is a question mark as well, since unconventional gas deposits appear to be widely dispersed globally.

Even more than for other types of commodities, Chinese demand and supply have dominated the market for industrial metals. From 2000 to 2010, Chinese consumption of aluminum, copper, nickel, and zinc grew by roughly 14% to 24% annually, even as demand in the rest of the world

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trading volume of all physically settled futures contracts globally.

<sup>9</sup> While industry participants agree that the depletion rate of unconventional gas deposits is faster than that of conventional wells, the degree is a matter of some debate. If depletion rates are faster than currently anticipated and experienced, this certainly could eventually constrain supply and support prices.

fell, and spot prices of zinc, nickel, and copper have risen by 169%, 249%, and 435%, respectively, over the past decade to ration persistent Chinese demand (Exhibit 12). Copper inventory appears relatively tight (Exhibit 13), as China's building binge continues, and it produces much less copper than it consumes. Unlike grains, the supply of copper ore is finite, and the quality of ore continues to deteriorate. Additionally, new mines can be slow and risky to develop, with financing, political, and environmental challenges to overcome. Metals equity manager T. Rowe Price reports that planned new copper supply by 2020 has shrunk by 2.5 million tons per year since June 2008, and copper ore quality has declined by about 15% over the past ten years. Copper prices are serving to ration demand and encourage substitution or salvage when possible, but they can do little to spur incremental new mine supply in the near or even medium term. Aluminum demand has also been relatively strong, but unlike copper, production levels are high as well. China's aluminum production matches its aluminum consumption, and inventory appears plentiful, so prices have been relatively stable.

## From Out-of-Step to Lockstep

We have advocated commodity allocations since about 1998, primarily as a means of providing protection against unanticipated inflation without too high an opportunity cost relative to equities when considered at the portfolio level. The S&P GSCI™ Index has exhibited a low 9% correlation with the S&P 500 Index since the commodity index's 1970 inception; however, the correlation since 2004 is 45%. The Dow Jones-UBS Index has exhibited a 46% daily correlation with equities over the trailing one-year period, down only modestly from the peak trailing-year daily correlation of 55% in 2010, and compared to just 19% for the full post-1993 period (Exhibit

14). Monthly correlations on a trailing three-year basis are higher still.

Not only are the daily and monthly returns of a commodity basket now much less independent of equity returns than they have been historically, the basket's components are now highly correlated with one another. While some commodity pairs have long been correlated, for fundamental economic (and even chemical or biological!) reasons, the typical commodity pair has demonstrated almost no correlation over the past century (Exhibit 15), averaging just 7%; now, the median commodity pair is 20% correlated. Prior to the past three years, correlations among largely unrelated commodities (think aluminum and cattle, or cotton and silver) were minimal, except for a brief spike during World War II. One likely reason for this increase is that until the second half of the past decade, the amount of investor dollars devoted to investing in diversified commodity baskets was minimal. Commercial commodity users,<sup>10</sup> speculators, and CTAs were on one side of the trade, and producers were on the other—backwardation made up for any imbalance. Now, index-benchmarked investment plays a mammoth role in the commodity markets, and investor flows into these strategies push prices of unrelated commodities up and down in sync, as well as syncing the basket's returns to those of the market (because the flows appear to result largely from risk-on or risk-off decisions). An additional reason for high correlations of individual commodities with one another may well be the structural increase in demand from China for a wide variety of commodities.

The higher internal correlation of basket components (assuming it persists), when paired with high volatility for individual commodities, has increased the volatility of the commodity basket substantially (Exhibit 16). The annualized

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<sup>10</sup> For example, the towel manufacturer that hedges against rising input prices by buying cotton futures.

standard deviation of the Dow Jones-UBS Index over the past 36 months is 18%, versus a post-1991 average of 15.0%.

The much-vaunted diversification benefits of commodities have been absent in recent years. The elevated volatility of commodities, along with their increased correlation with equities, has resulted in a much higher beta with equities relative to prior periods. Over the past 36 months, the beta was 0.69<sup>11</sup>; prior to 2005, it averaged about 0.1 and never topped 0.3 (Exhibit 17). To some degree, this would be expected given that growth expectations have been a key driver of both equities and commodities in recent years, while the longer historical record reflects periods of disinflation (which are very good for equities, but not so good for commodities) and high inflation (which are great for commodities, but poor for equities). However, we would not be surprised if they are gone for good, outside of inflationary environments, now that commodities are thought of increasingly as investments, rather than as consumables or inputs into goods and services. That said, it is possible that disappointment with low returns for futures-based commodity strategies will shake investor faith in commodities, leading index-oriented investors to drop out of the market, with potential benefits for the roll yield.

## Underweight Commodities, But What to Overweight?

While commodity futures should continue to provide a more rapid and pronounced response to inflationary spikes than some other inflation-sensitive assets, this beneficial characteristic is tempered by return prospects that strike us as

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<sup>11</sup> This implies that if equities gained 1%, commodities would experience a 0.69% gain associated with the equity price increase. Of course, this is just the *systematic* relationship with equities, and commodities continue to have *non-systematic* exposure as well.

poor relative to growth-oriented investments. The weighted-average overvaluation of our broad basket of commodities, versus each commodity's long-term inflation-adjusted average level, is 41%,<sup>12</sup> and for the basket's weighted-average premium to disappear, spot prices would need to fall approximately 30% in real terms. If that decline took five years with inflation of 2% per year, eroding the commodity spot-price premium would equate to a -5% nominal average annual compound return for spot prices.<sup>13</sup> Add to this the meager return from cash collateral and the punitive roll return (which is currently running at -5.8% and has averaged -5.2% since 1991), and it is tough to get excited about the base-case return prospects of commodity futures. A well-chosen active manager should be able to outperform the index, particularly because of the freedom to moderate the corrosive impact of contango, but turning beta lead into beta-plus-alpha gold is another matter entirely.<sup>14</sup>

Natural resources equities should provide stronger long-term returns than commodity

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<sup>12</sup> The spot prices of most agricultural commodities have lagged inflation over time, while prices of many nonrenewable commodities, including precious metals and oil, have generally paced inflation until roaring higher in recent years. This valuation metric multiplies the percentage overvaluation/undervaluation of each commodity by the commodity's weighting in our basket, and then sums the resulting values. Recall that our basket attempts to mimic the sector weights of the Dow Jones-UBS Commodities Index. While prices of most nonagricultural commodities have oscillated around their inflation-adjusted value for decades, prices can stray quite far from this theoretical "correct" value, and it is possible that prices will in fact not revert, due to technological or societal changes.

<sup>13</sup> If inflation was 4%, nominal spot prices would have to decline 3% per year to hit their long-run real average, and if inflation was 6%, nominal spot prices would still have to decline 1% to get back to average.

<sup>14</sup> Long-biased commodity hedge funds, which are free to avoid or short individual overvalued commodities in favor of those with better fundamentals, are not tethered to index-like commodity return streams. However, manager selection is paramount, and even highly skilled managers may not fully participate in all inflation-driven commodity rallies.



futures, though they will likely exhibit less sensitivity to unanticipated inflation and greater correlation to broad equities. Valuations of natural resources equities appear reasonable, although elevated commodity prices are a reason for caution when considering the level of earnings that can be sustained. As Exhibit 18 illustrates, normalized valuation multiples are moderate relative to history—the Shiller price-earnings (P/E) ratio is 16.7 versus a long-term 18.9 average, and the return on equity (ROE)—adjusted P/E is 16.4 versus 13.7 on average. However, even normalized earnings show benefits from the tailwind of elevated commodity prices, and earnings would certainly come under pressure if Chinese commodity demand moderates. Profit margins and ROEs for natural resources equities tend to rise and fall roughly in concert with the spot prices of related commodities (Exhibit 19). Additionally, mining and energy firms have raised massive amounts of equity capital in recent years, based in part on investor enthusiasm for these cyclically strong earnings. Any stretch of earnings shortfalls could depress multiples and increase credit stress for this sector, which has seen plentiful investor interest. Mining and energy firms have raised more equity capital in initial public offerings and secondary offerings in the past five years than they did in the prior *two decades* (Exhibit 20).

In September 2010, we wrote at length about the degree of inflation sensitivity for natural resources equities, and we will not reprise the text of that report here.<sup>15</sup> However, we believe that natural resources equities remain a sensible inflation-sensitive investment, with prospective long-run returns that should rival broad equities, likely coupled with a response to any outbreak of inflation that should be better than broad equities. Investors should not kid themselves, though—natural resources equities are stocks

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<sup>15</sup> Please see our September 2010 Market Commentary *The Right Time for Natural Resources Equities?*

first and commodity-related assets second. If inflation and interest rates spike, natural resources equities may still sell off as valuation multiples contract, even if prospective earnings are increasing. For this reason, maintaining some pure commodity futures exposure may be beneficial.

Bank loans<sup>16</sup> are another potential arrow in the quiver—an asset that is poised to deliver solid base-case returns<sup>17</sup>—and that should help to play defense in the event of an inflation spike. Unlike commodities and natural resources equities, however, bank loans are not inflation-sensitive; rather, we would characterize them as inflation-resistant. Their yield structurally increases alongside Libor rates, so they would not suffer a typical bond-like swoon in a rising-rate environment. Their issuers are often highly indebted firms, and inflation eats away the real value of debt; on the other hand, the floating-rate feature is a negative from the perspective of the operational health of the issuer in a rising-rate environment. Historically, bank loans have not been particularly correlated to inflation, and we would not anticipate any performance “pop” during an inflation spike; however, we expect they would hold their ground in a moderately inflationary environment to support spending. Much of the expected return from bank loans will derive from income, limiting their appeal to taxable investors.

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<sup>16</sup> Also called leveraged loans, bank loans are issued by banks to corporations without investment-grade ratings and then syndicated to mutual funds, hedge funds, and collateralized loan obligations. For a brief primer, please see our June 2009 Market Commentary *Distressed Investing*.

<sup>17</sup> With floating-rate yields around 5% and loans priced at a modest discount to par, medium-term annualized returns in the mid–single digits appears to be a reasonable expectation, allowing for default losses.

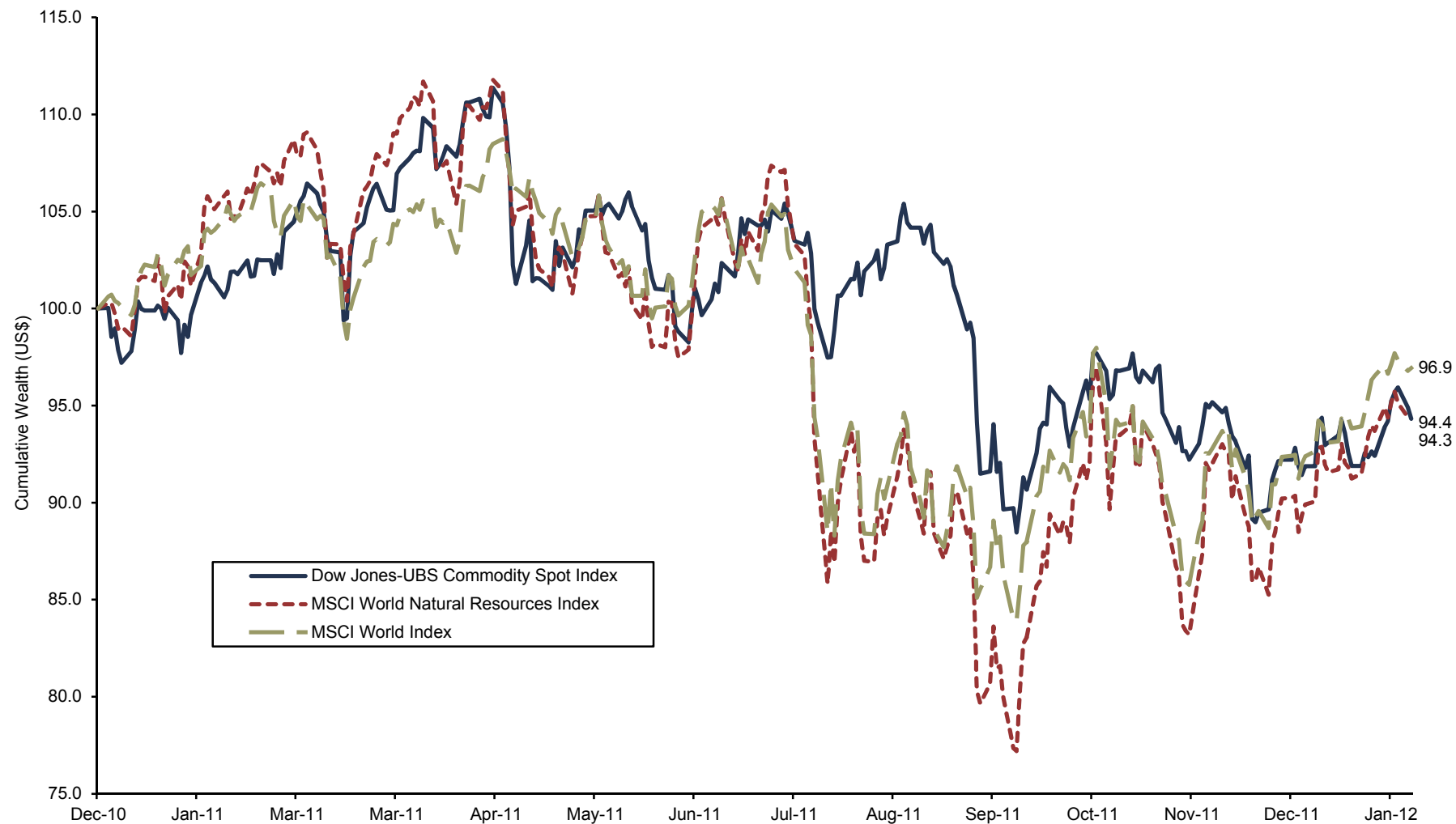
## Conclusion

The return prospects for commodities are unappealing (absent an acceleration of the already strong emerging markets demand), and given rising volatility and correlation with equities, we are now somewhat skeptical of their role as a reducer of portfolio risk. Given these concerns, investors should pare back commodity exposure from strategic target levels, in favor of natural resources equities, possibly supplemented with bank loans. Investors that underweight or eliminate commodity exposure need to realize that they are likely to forego a large performance pop in the event of an inflationary shock, and should ensure that they have sufficient inflation-resistant assets to support spending during a period of accelerating inflation until the portfolio's equities recover. ■

**Exhibit 1**

**Cumulative Wealth of Dow Jones-UBS Commodity Spot Index and MSCI World Natural Resource Index Versus MSCI World Index**

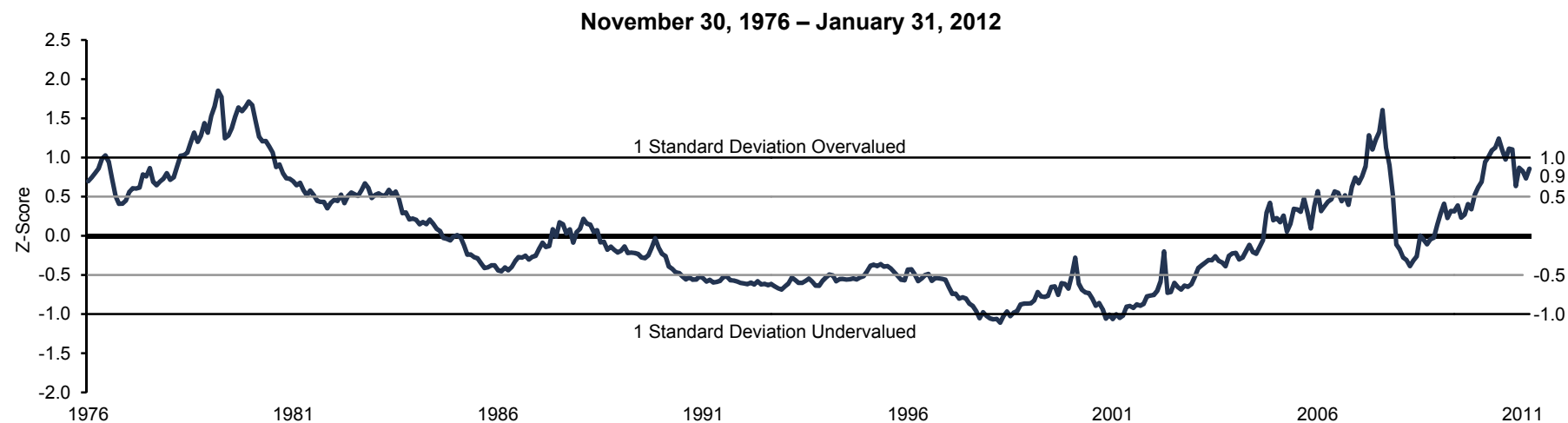
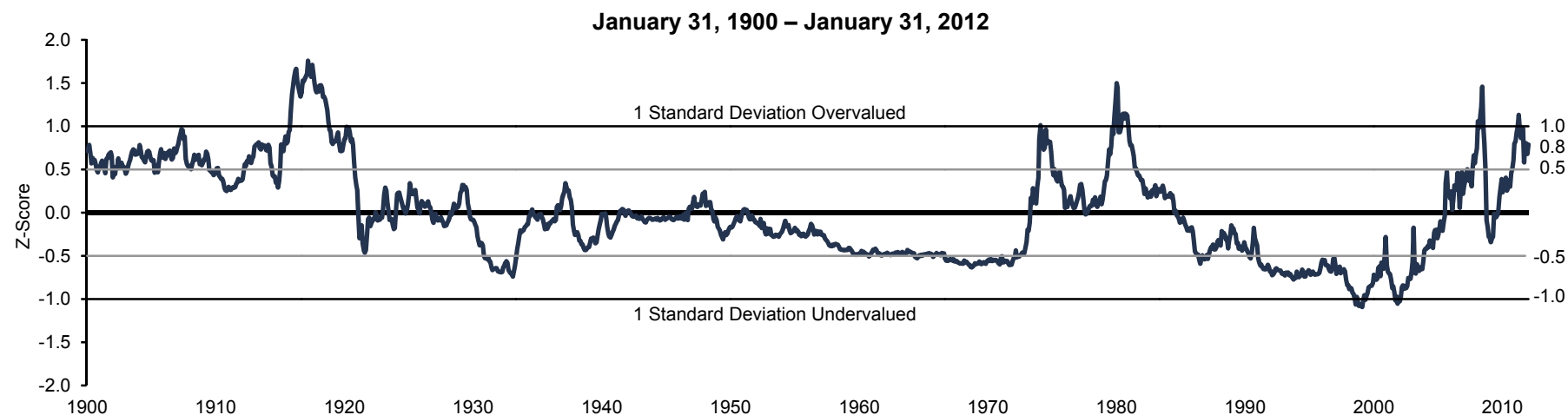
January 1, 2011 – January 31, 2012 • U.S. Dollar • December 31, 2010 = \$100



Sources: Dow Jones & Company, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without express or implied warranties.  
Note: Cumulative wealth based on daily price returns.

## Exhibit 2

### Valuation of a Basket of Commodity Spot Prices Relative to Inflation-Adjusted Averages

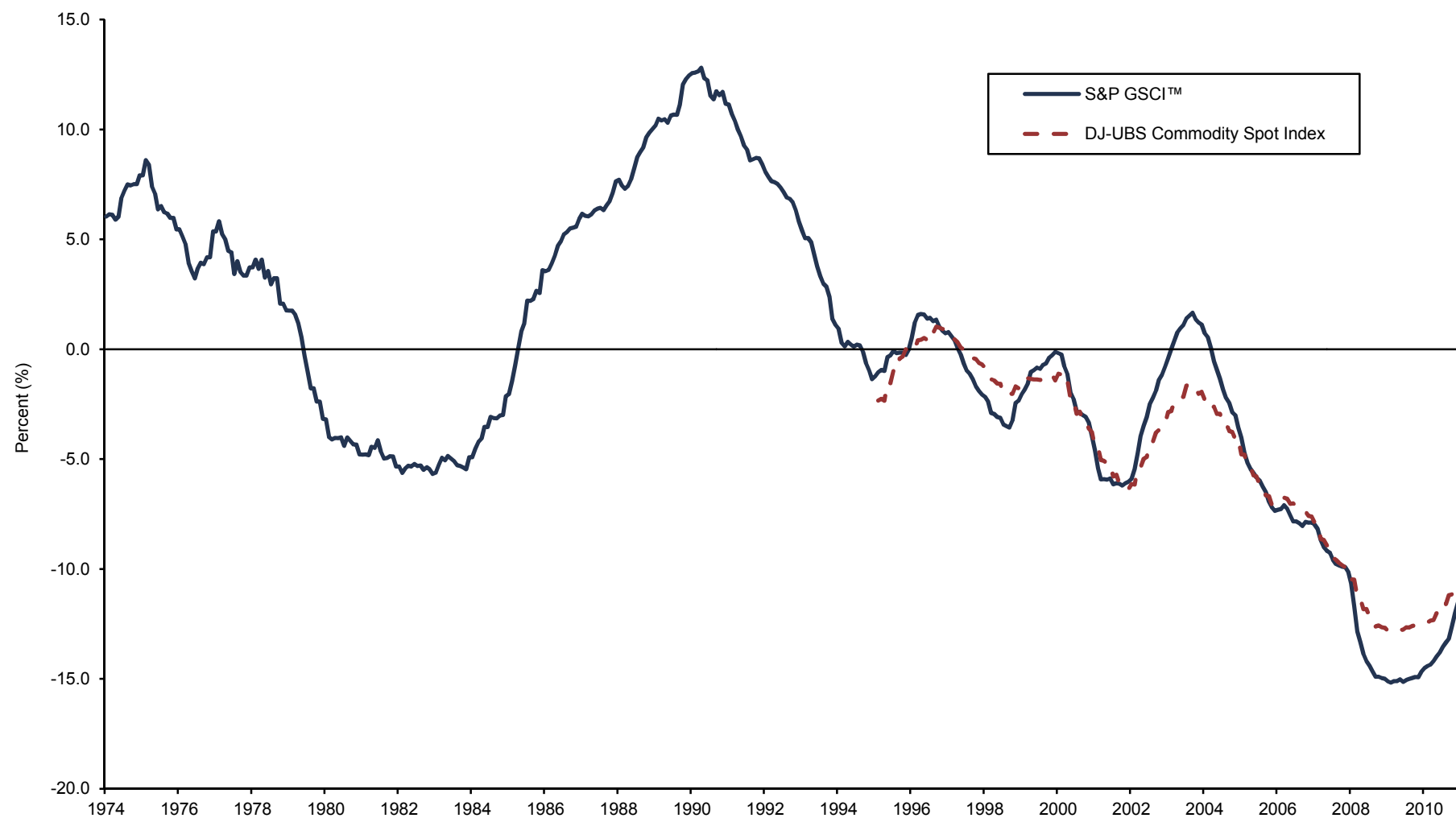


Sources: Cambridge Associates LLC, Global Financial Data, Inc. and Thomson Reuters Datastream.

Notes: Basket of 19 commodity spot prices includes cattle, coffee, copper, corn, cotton, gold, hogs, silver, sugar, wheat, WTI oil, and zinc from 1900, aluminum from 1910, soybean oil from 1911, soybeans from 1913, nickel from 1926, brent crude oil from 1957, heating oil from 1967, and natural gas from 1976. The commodity basket includes a variety of commodities that have been subject to official price controls, ownership limitations, or periodic rationing; for this reason, spot prices incorporated within the basket did not always reflect market preferences. Z-score represents the number of standard deviations above or below the historical average valuation. Prices are adjusted to January 2012 dollars.

### Exhibit 3 Five-Year Annualized Return from Rolling Commodity Futures

December 31, 1974 – January 31, 2012

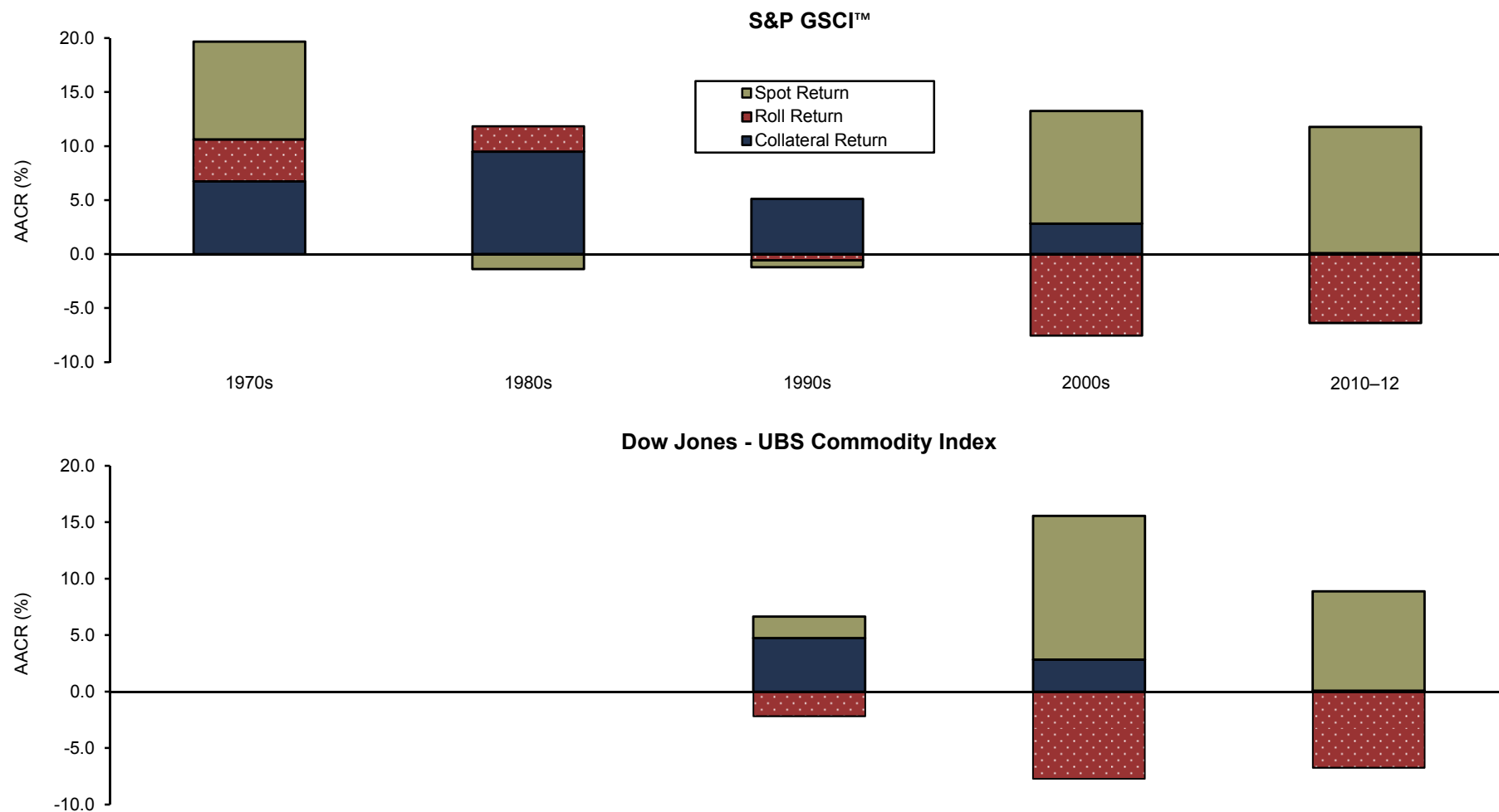


Sources: Dow Jones & Company, Inc., Standard & Poor's, and Thomson Reuters Datastream.

Notes: Graph refers to the five-year average annual compound return on the roll returns of the S&P GSCI™ and Dow Jones-UBS Commodity Spot Index. Dow Jones-UBS Commodity Spot Index data begin January 1996.

## Exhibit 4 Building Blocks of Commodity Futures Returns by Decade

January 1, 1970 – January 31, 2012

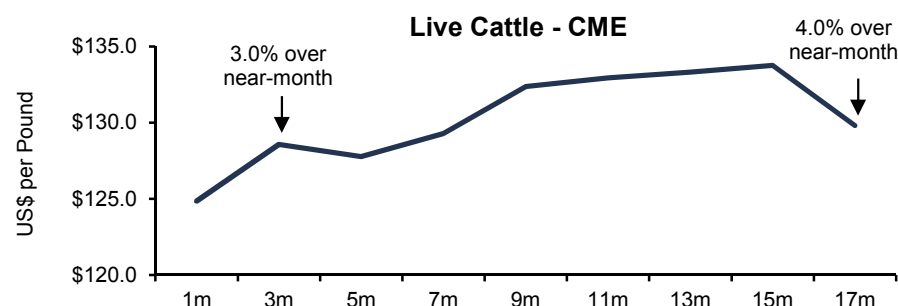
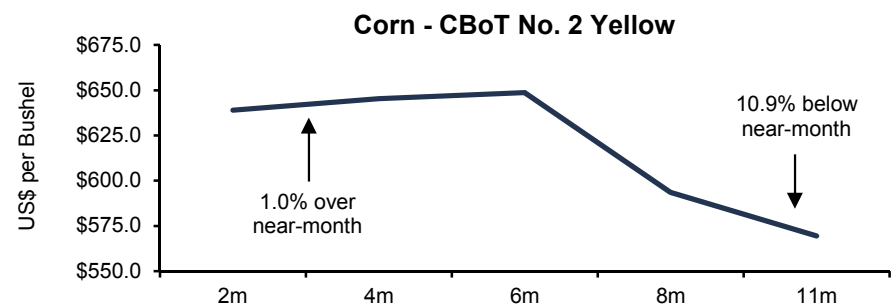
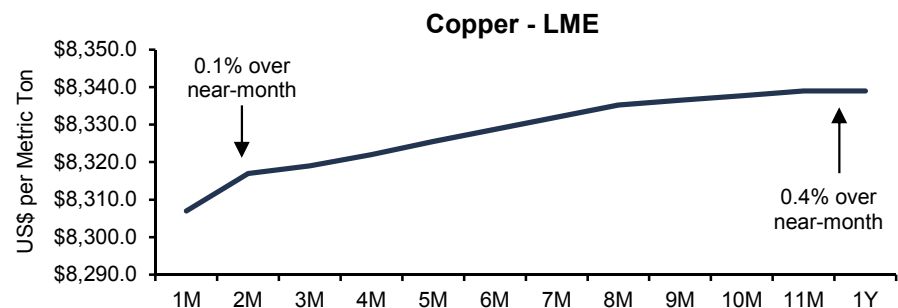
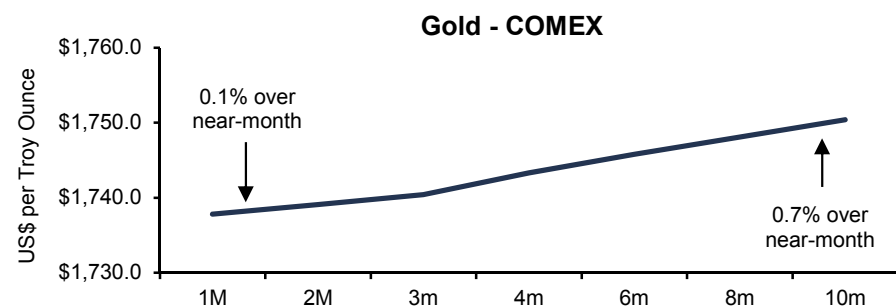
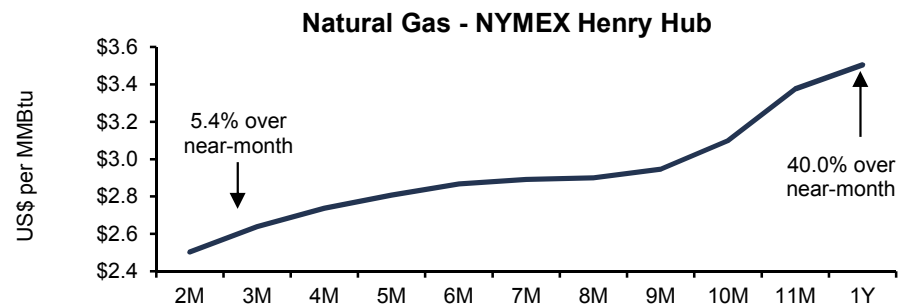
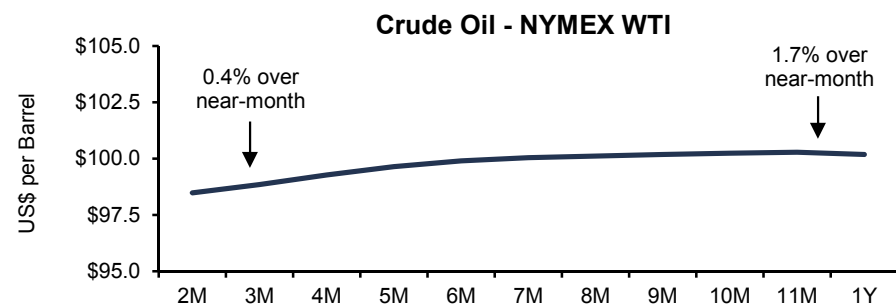


Sources: Dow Jones & Company, Inc., Standard & Poor's, and Thomson Reuters Datastream.

Notes: Represents components of the S&P GSCI™ and Dow Jones-UBS Commodity Index. Collateral return is the return from investing futures collateral in cash instruments. Roll return is the premium gained (paid) when rolling futures contracts to the next month, when a commodity is in backwardation (contango). Spot return is the nominal change in spot price of the index's commodities.

## Exhibit 5 Selected Commodity Futures Curves

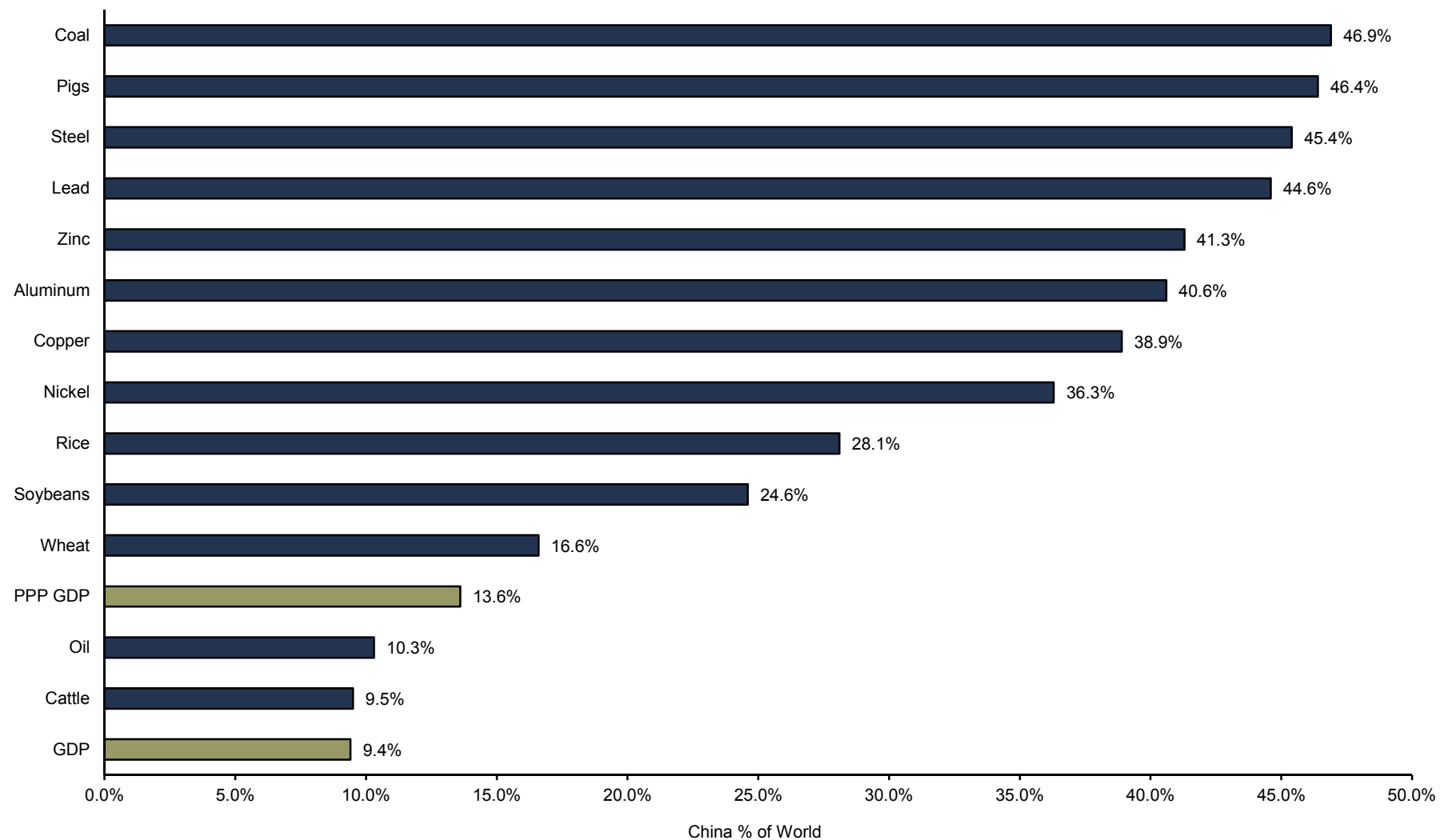
As of January 31, 2012



Source: Bloomberg L.P.  
1873m (mod)

## Exhibit 6 China's Share of World Commodity Consumption

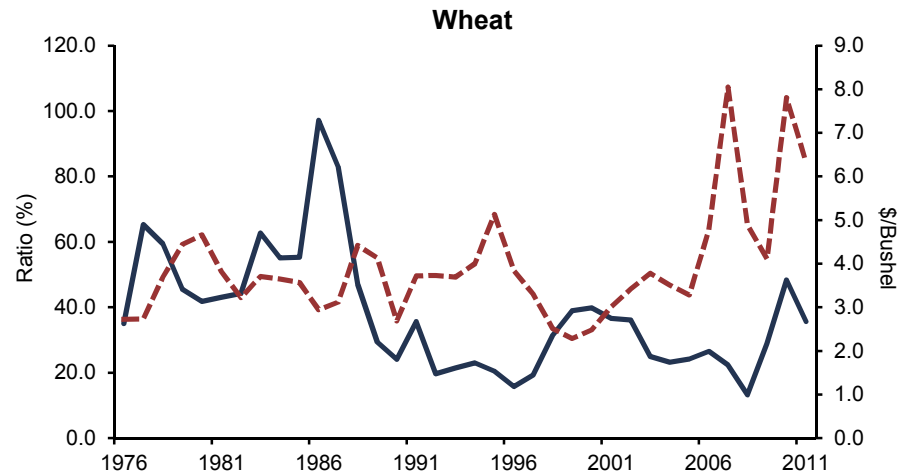
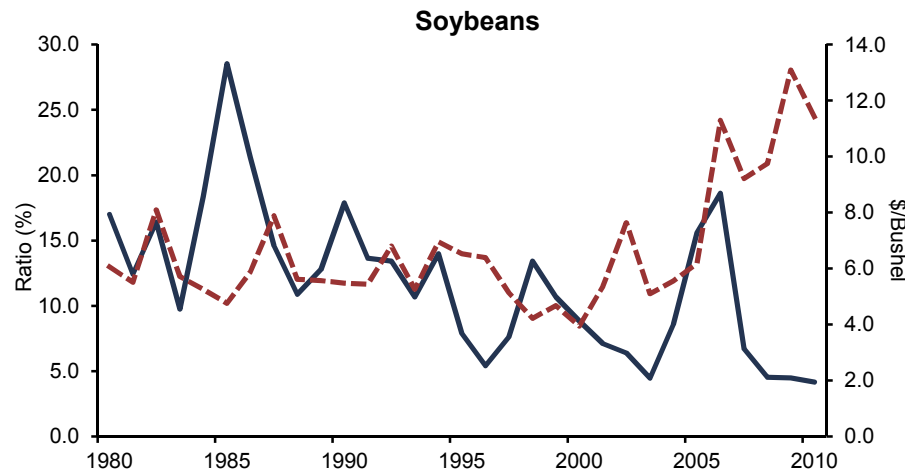
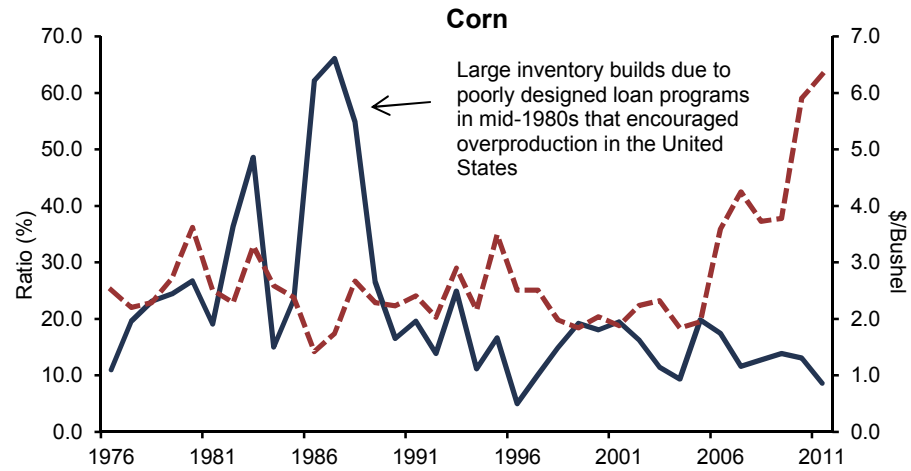
As of 2011



Source: GMO, April 2011.



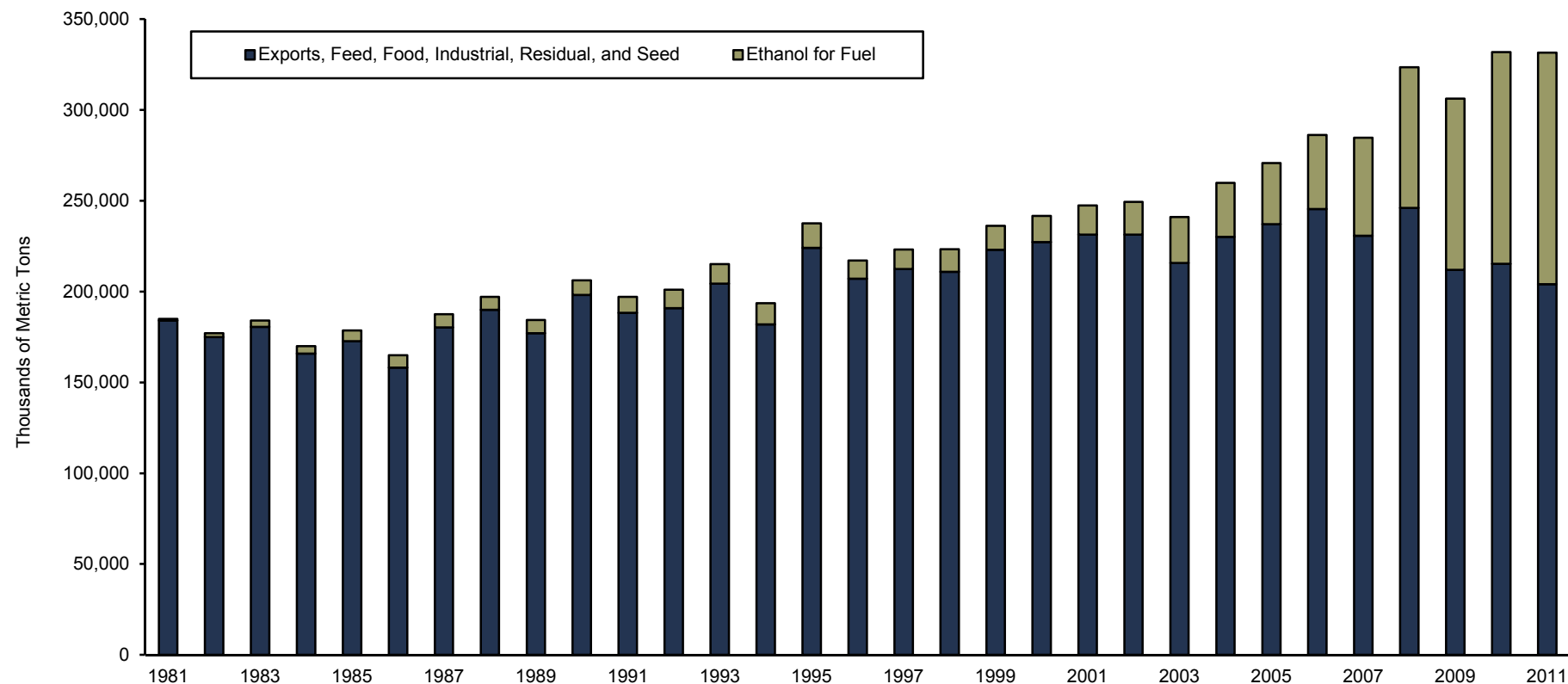
**Exhibit 7**  
**U.S. Grains Stocks-to-Use Ratio and Commodity Prices**  
 1976–2011



— Stocks-to-Use Ratio (Left Scale)    - - - Price \$ / Bushel (Right Scale)

Sources: Global Financial Data, Inc., Thomson Reuters Datastream, and U.S. Department of Agriculture - Economic Research Service.  
 Notes: Soybean data begin in 1981. Prices represent December 31 values for each year. Stocks-to-use ratios represent market year estimates for each crop.

**Exhibit 8**  
**U.S. Corn Market**  
 1981–2011



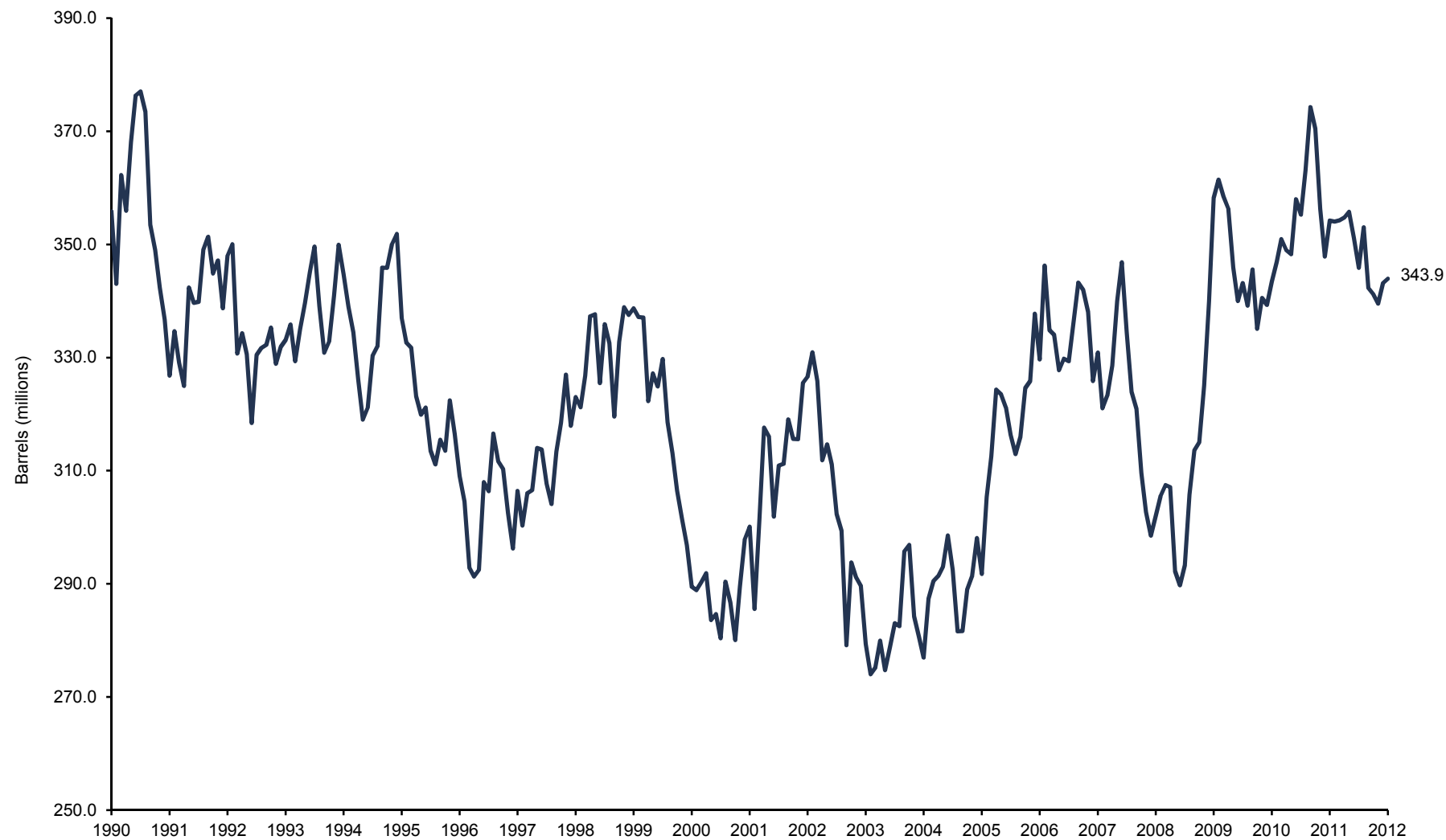
Cumulative Growth in U.S. Corn Consumption/Exports (2001–11)		Market Share of Ethanol Production Among Uses for U.S. Corn	
Ethanol-Based	697.2%	2001	6.5%
All Other Uses	-11.8%	2011	38.5%
Total	34.0%		

Source: U.S. Department of Agriculture - Economic Research Service and Foreign Agricultural Service.  
 Note: Data for 2010 and 2011 are projections.

**Exhibit 9**

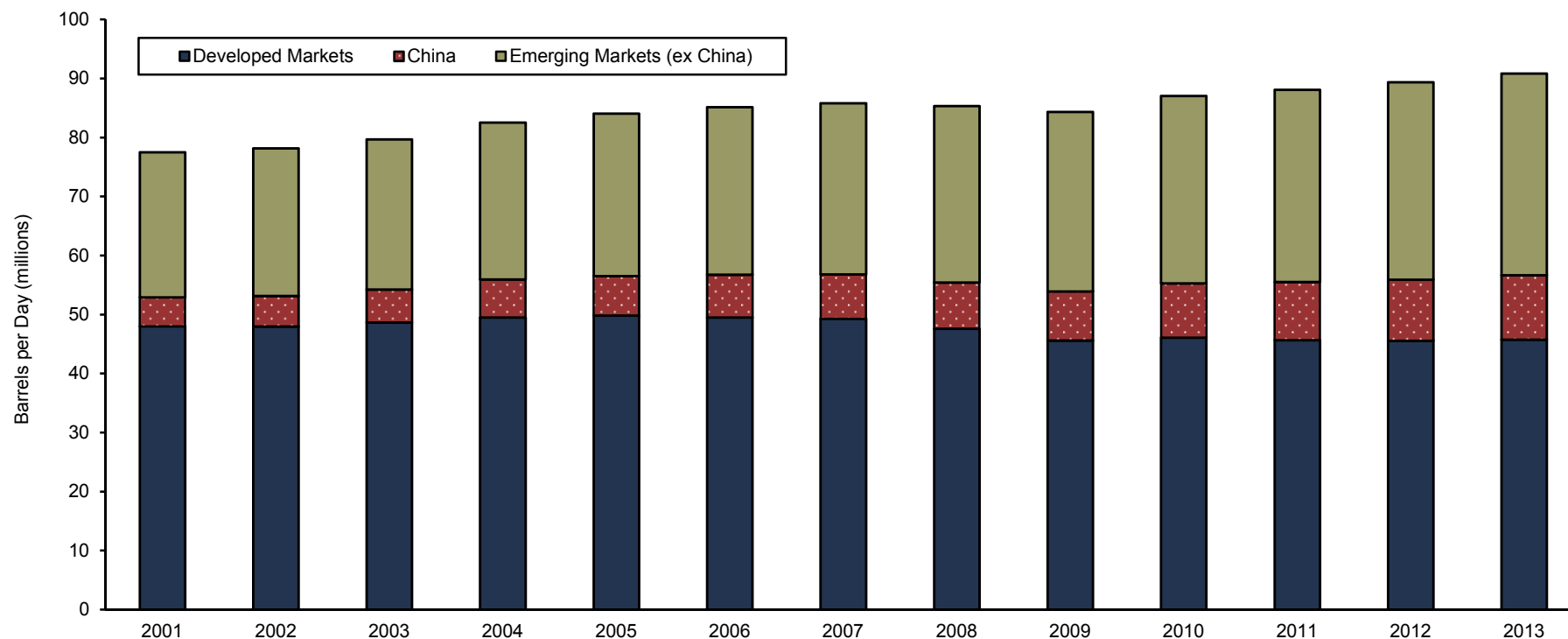
**U.S. Seasonally Adjusted Inventory of Crude Oil (Excluding Strategic Petroleum Reserves)**

January 31, 1990 – January 31, 2012



Source: Energy Information Administration.  
Note: Data are seasonally adjusted by Cambridge Associates LLC.

**Exhibit 10**  
**Sources of Global Oil Demand**  
 2001–13

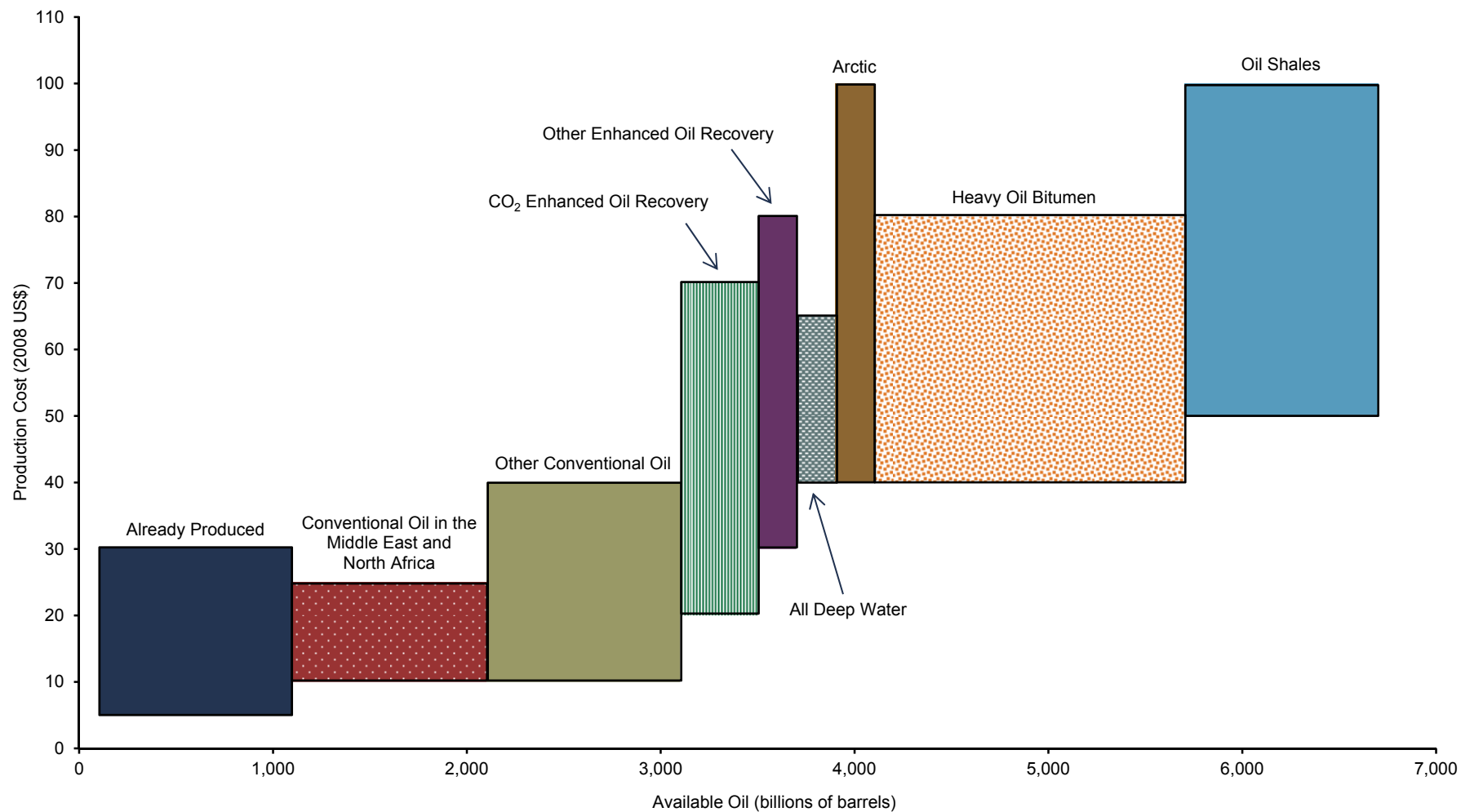


Full Period Consumption Growth		
	<u>Avg Annual % Growth</u>	<u>Million Barrels/Day</u>
Emerging Markets (ex China)	2.8	9.6
China	6.9	6.0
Developed Markets	-0.4	-2.3

Source: Energy Information Administration.

Notes: Data for 2012 and 2013 represent EIA forecasts. Developed markets are defined as the OECD membership countries for the purpose of this exhibit; however, the OECD includes some nations generally considered to be emerging markets, such as Mexico and South Korea.

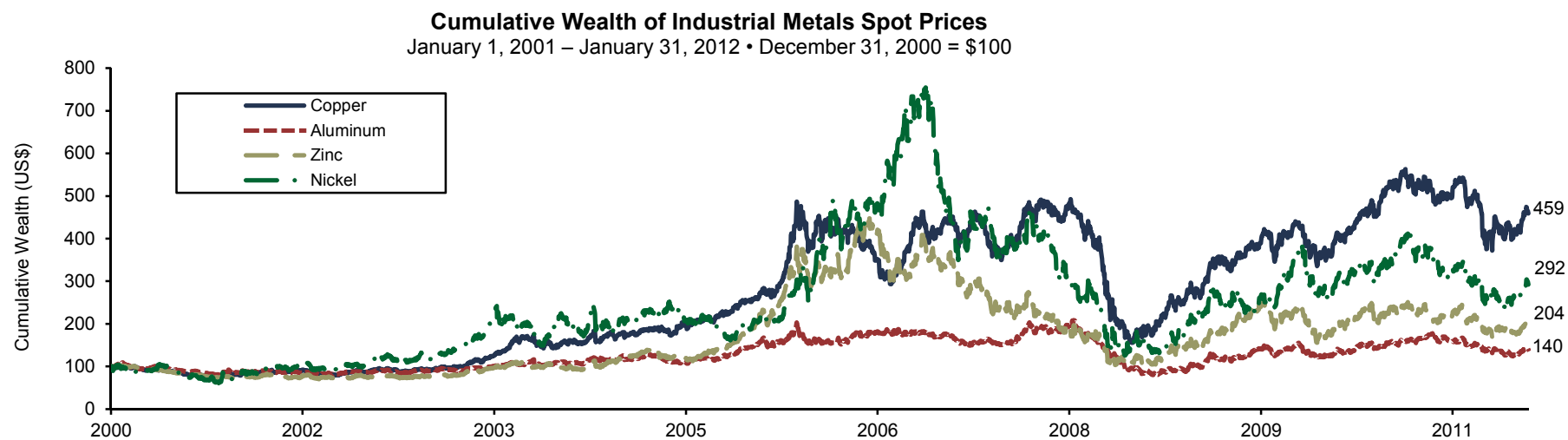
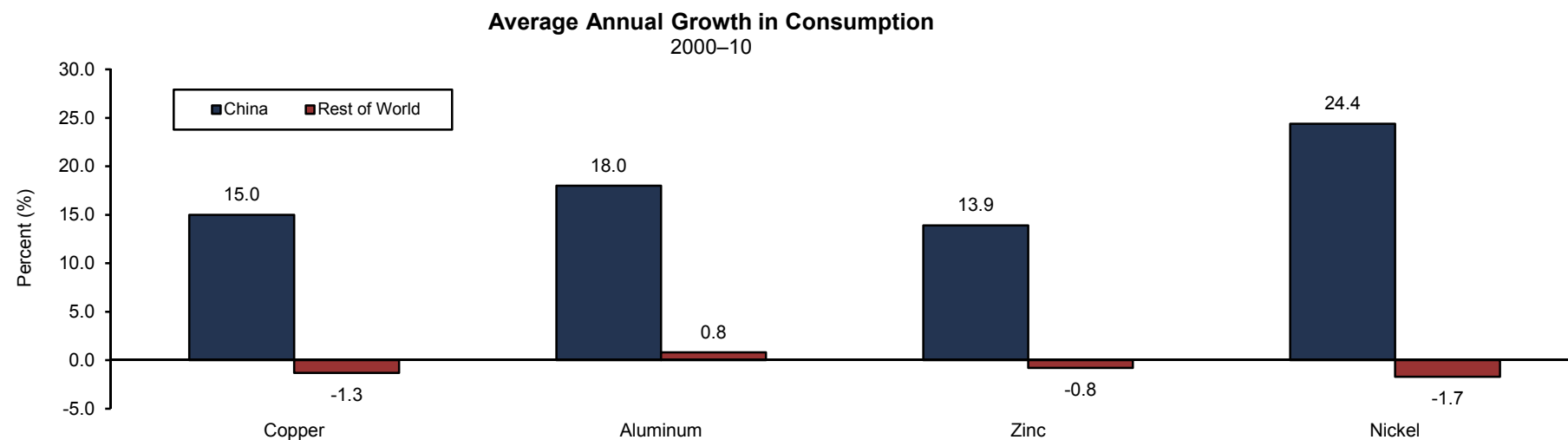
**Exhibit 11**  
**Production Cost Curve**  
 2011



Source: International Energy Agency.

Notes: CO<sub>2</sub> enhanced oil recovery is a process by which existing oil reservoirs are injected with carbon dioxide to extract volumes of conventional oil. Similarly, other enhanced oil recovery involves extracting volumes of conventional oil from existing oil reservoirs, using alternative gases such as natural gas or nitrogen, or alternative methods such as microbial or steam injections.

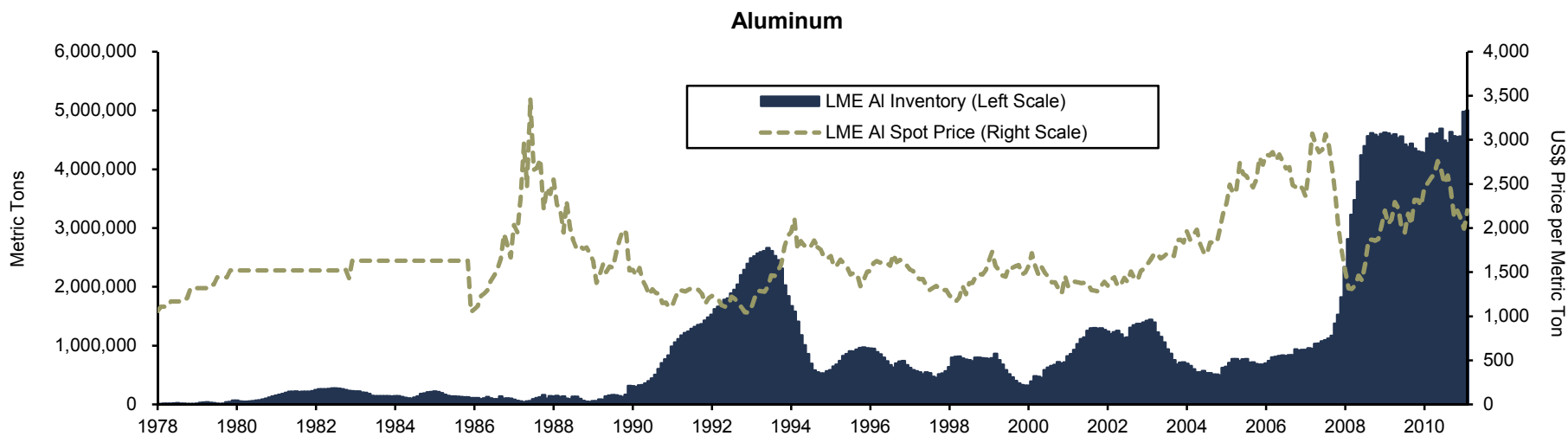
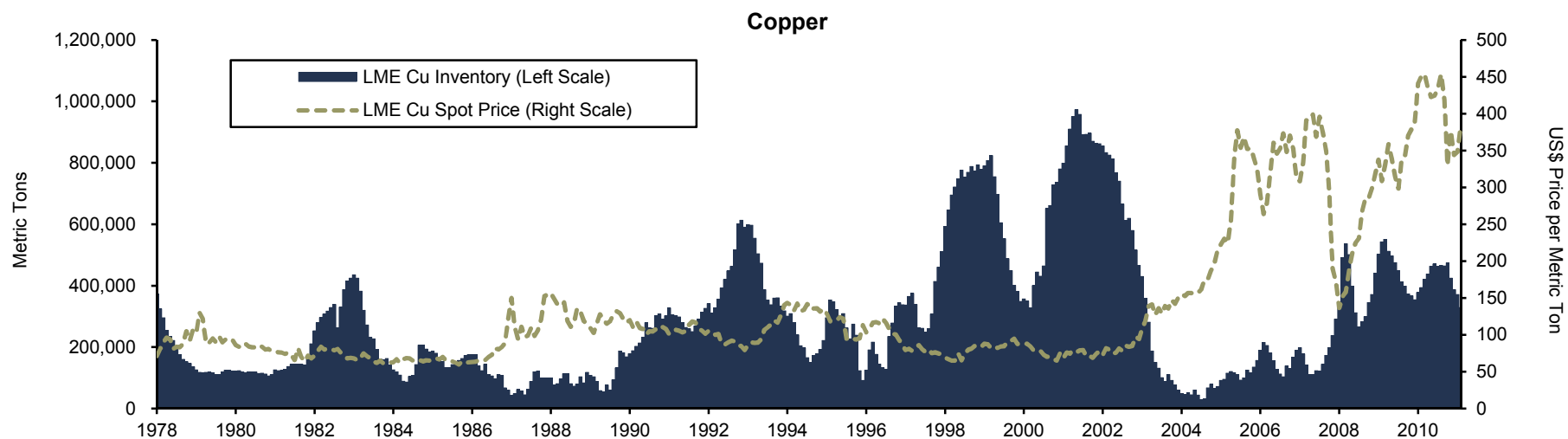
**Exhibit 12**  
**Consumption Patterns and Price Trends for Selected Industrial Metals**



Sources: Macquarie and Thomson Reuters Datastream.

**Exhibit 13**  
**Industrial Metals**

December 31, 1978 – January 31, 2012

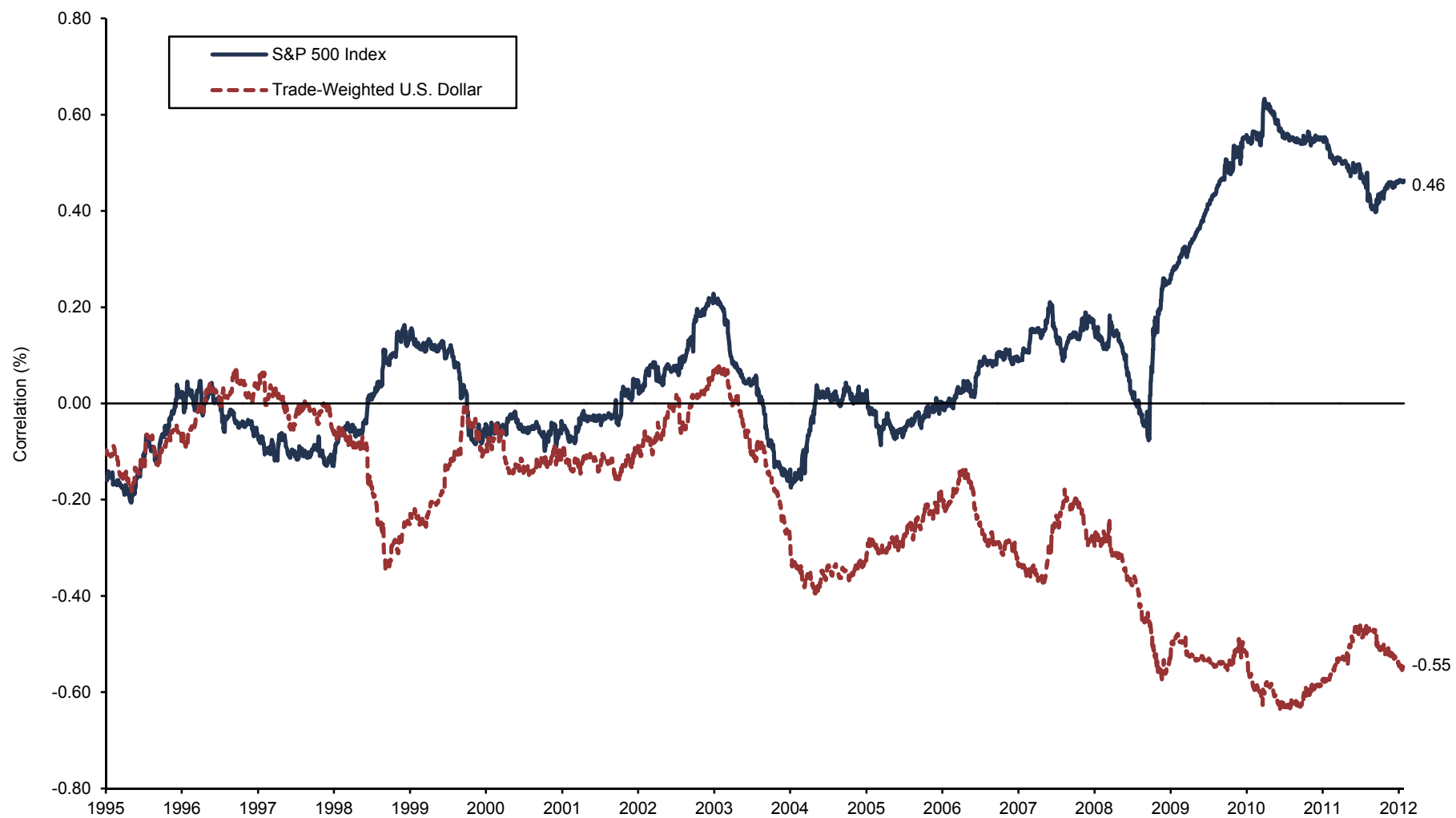


Sources: Global Financial Data, Inc., London Metal Exchange, and Thomson Reuters Datastream.

Exhibit 14

**Rolling One-Year Correlation of the Dow Jones-UBS Commodity Total Return Index to the S&P 500 Index and Trade-Weighted U.S. Dollar**

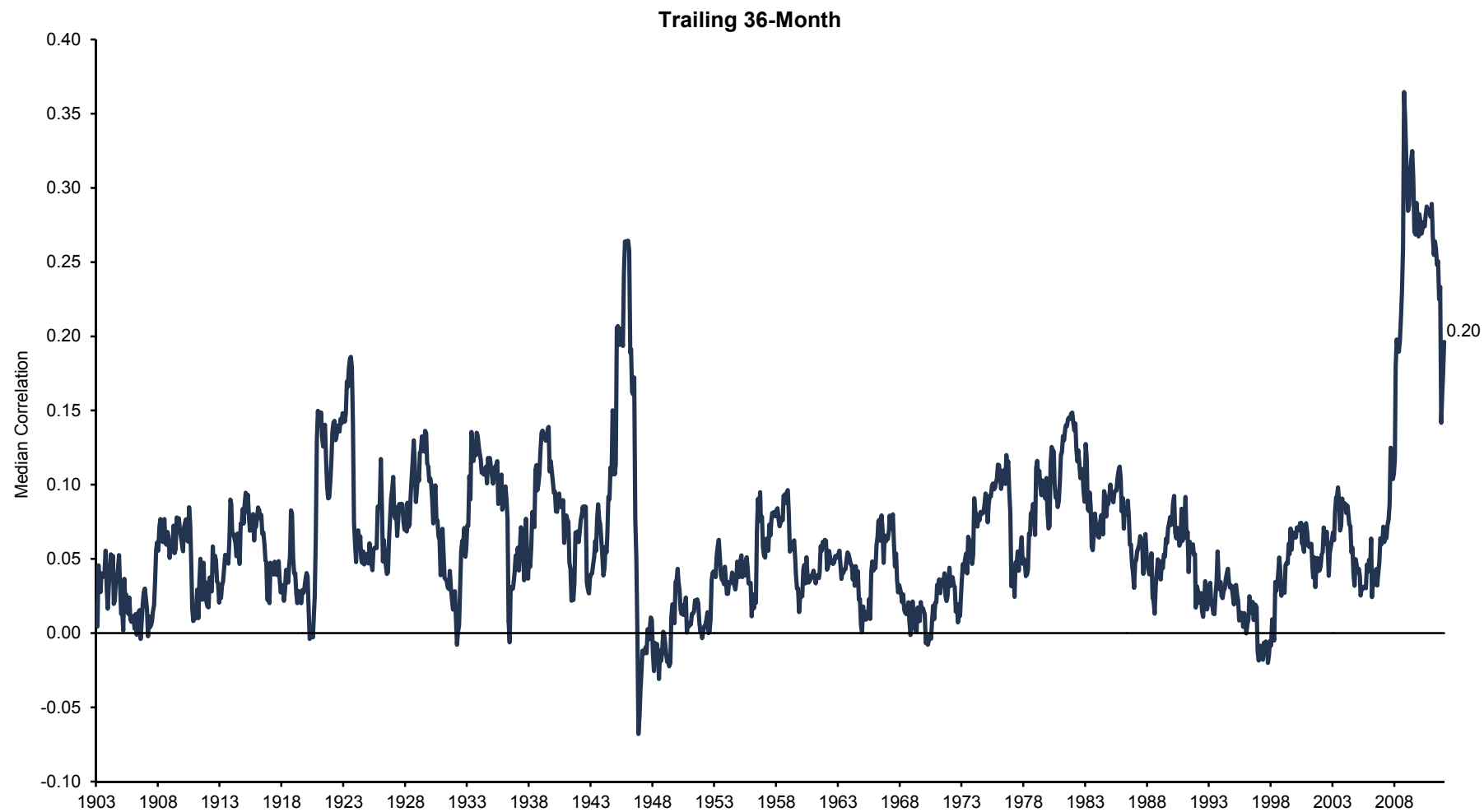
January 6, 1995 – January 31, 2012



Sources: Dow Jones & Company, Inc., Standard & Poor's, and Thomson Reuters Datastream.  
Note: Based on the rolling 265-day correlation of daily total returns.



**Exhibit 15**  
**Median Correlation of Individual Commodities to One Another**  
 January 1, 1903 – January 31, 2012



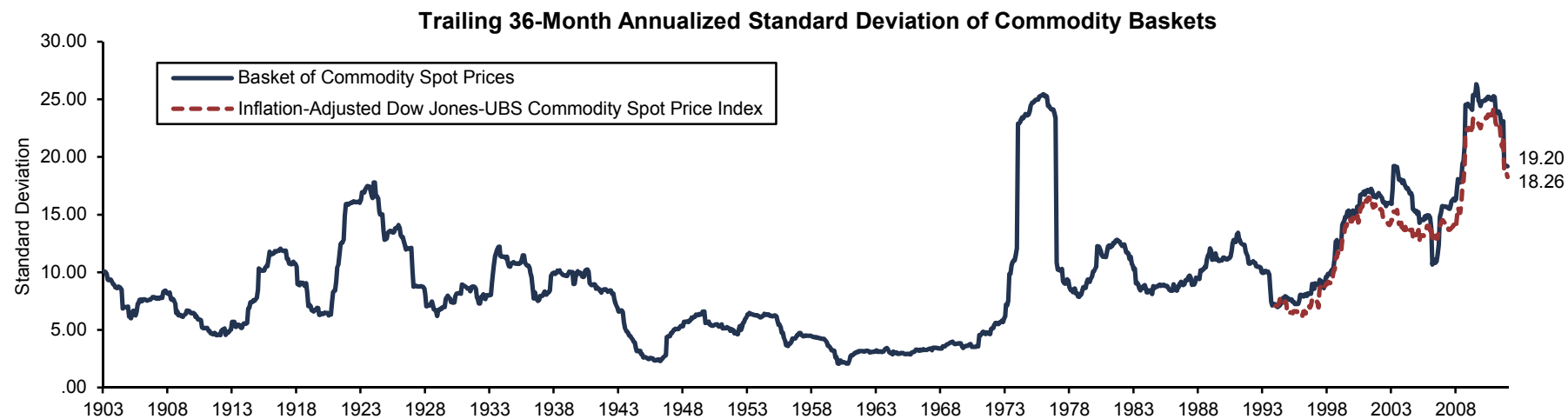
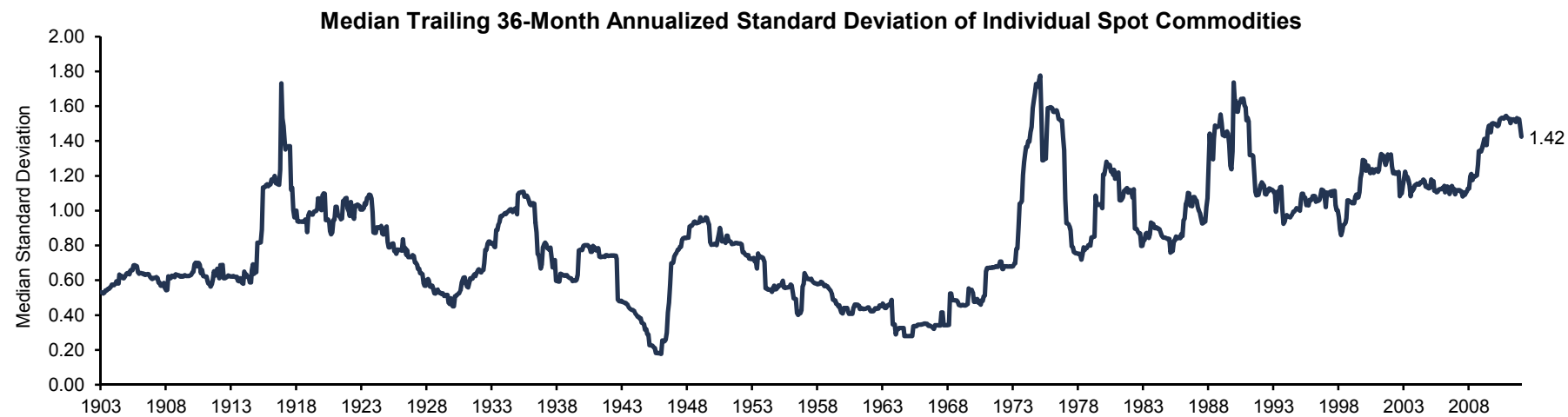
Sources: Cambridge Associates LLC, Global Financial Data, Inc., and Thomson Reuters Datastream.

Notes: Basket of 19 commodity spot prices includes cattle, coffee, copper, corn, cotton, gold, hogs, silver, sugar, wheat, WTI oil, and zinc from 1900, aluminum from 1910, soybean oil from 1911, soybeans from 1913, nickel from 1926, brent crude oil from 1957, heating oil from 1967, and natural gas from 1976. The commodity basket includes a variety of commodities that have been subject to official price controls, ownership limitations, or periodic rationing; for this reason, spot prices incorporated within the basket did not always reflect market preferences. Prices are adjusted to January 2012 dollars.

**Exhibit 16**

**Median Standard Deviation of Individual Spot Commodities and Standard Deviation of Composite Index**

January 1, 1903 – January 31, 2012



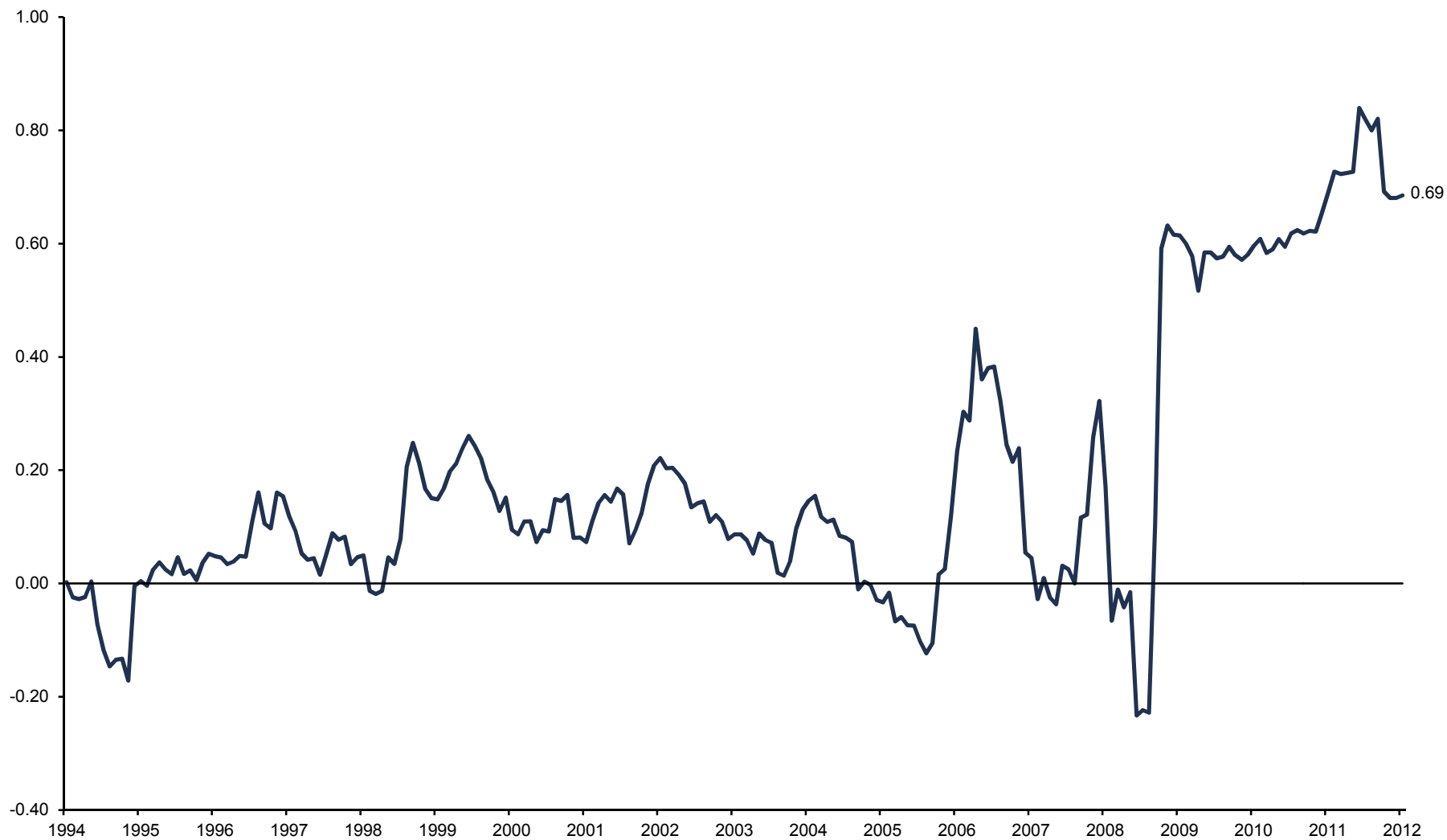
Sources: Cambridge Associates LLC, Dow Jones & Company, Inc., Global Financial Data, Inc., and Thomson Reuters Datastream.

Notes: Basket of 19 commodity spot prices includes cattle, coffee, copper, corn, cotton, gold, hogs, silver, sugar, wheat, WTI oil, and zinc from 1900, aluminum from 1910, soybean oil from 1911, soybeans from 1913, nickel from 1926, brent crude oil from 1957, heating oil from 1967, and natural gas from 1976. The commodity basket includes a variety of commodities that have been subject to official price controls, ownership limitations, or periodic rationing; for this reason, spot prices incorporated within the basket did not always reflect market preferences. Prices are adjusted to January 2012 dollars.

**Exhibit 17**

**Rolling 36-Month Beta of the Dow Jones-UBS Commodity Total Return Index to the S&P 500 Index**

January 31, 1994 – January 31, 2012

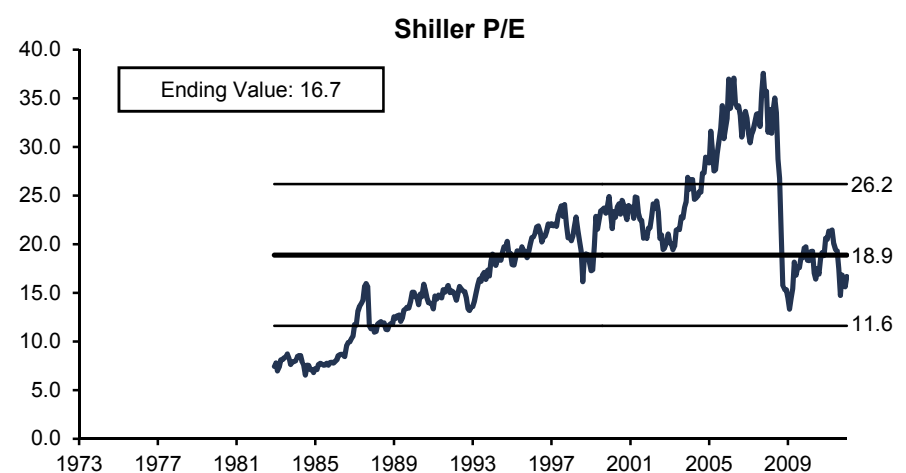
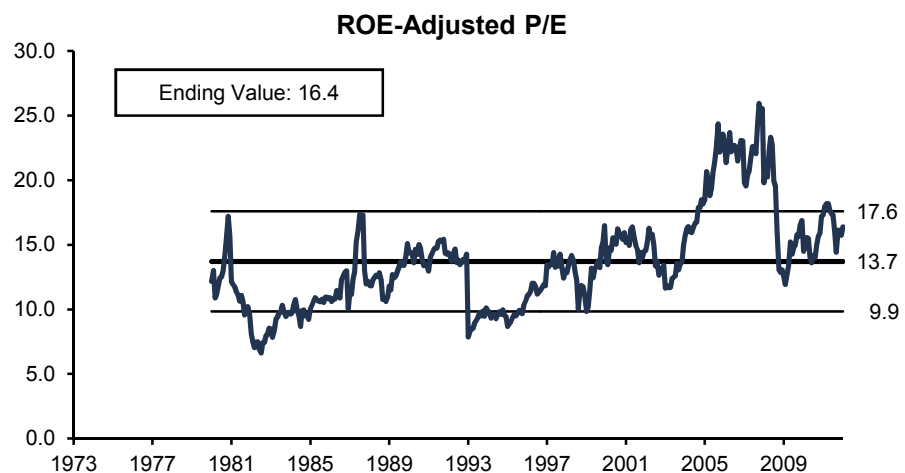
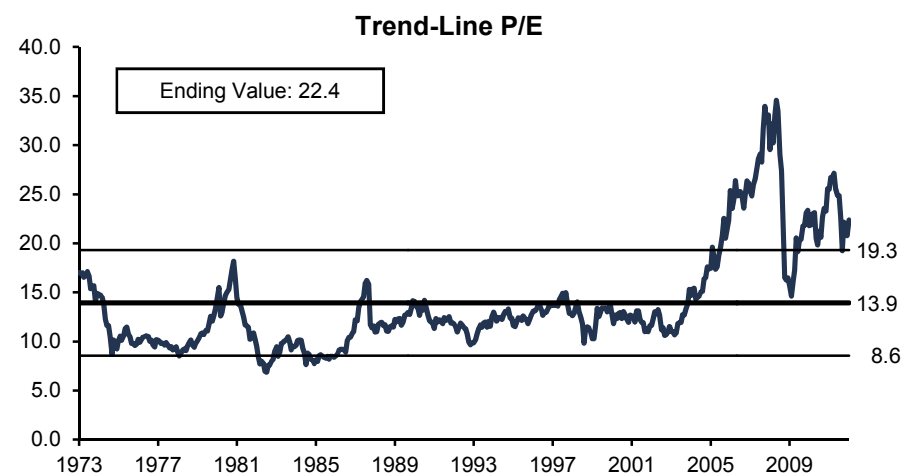
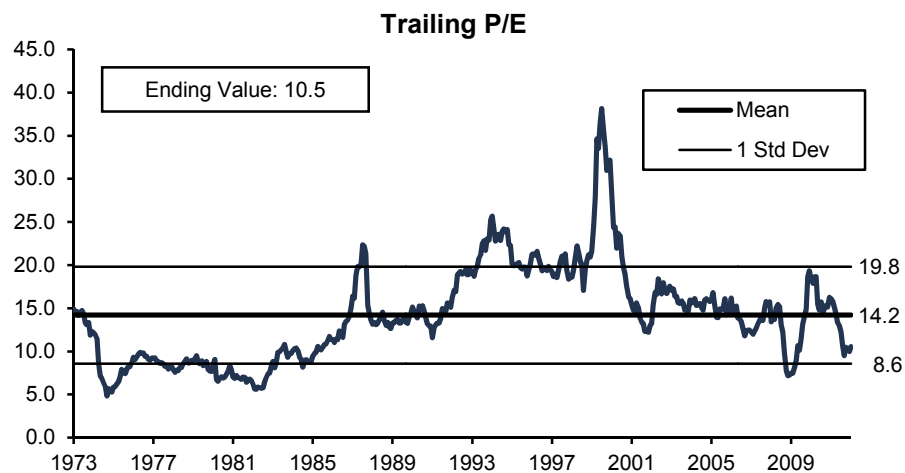


Source: Thomson Reuters Datastream.  
Note: Beta calculation based on monthly total returns.

**Exhibit 18**

**Composite Natural Resources Equities Normalized Price-Earnings Valuations**

January 31, 1973 – January 31, 2012

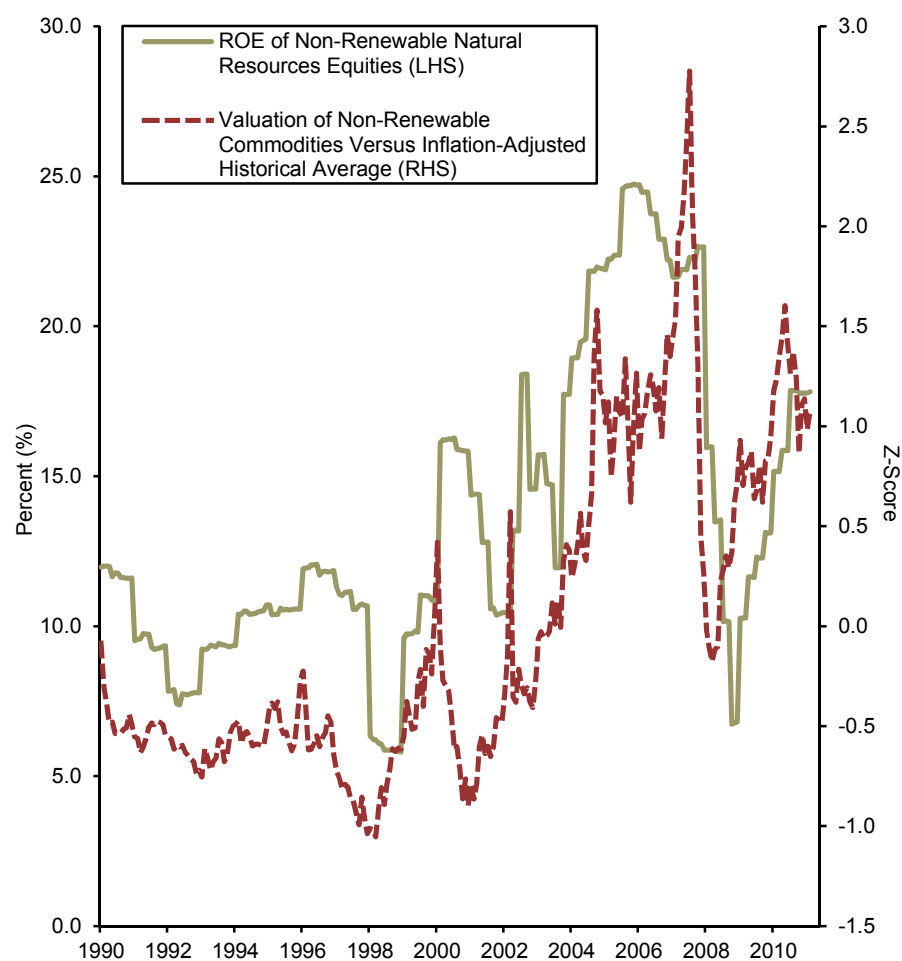
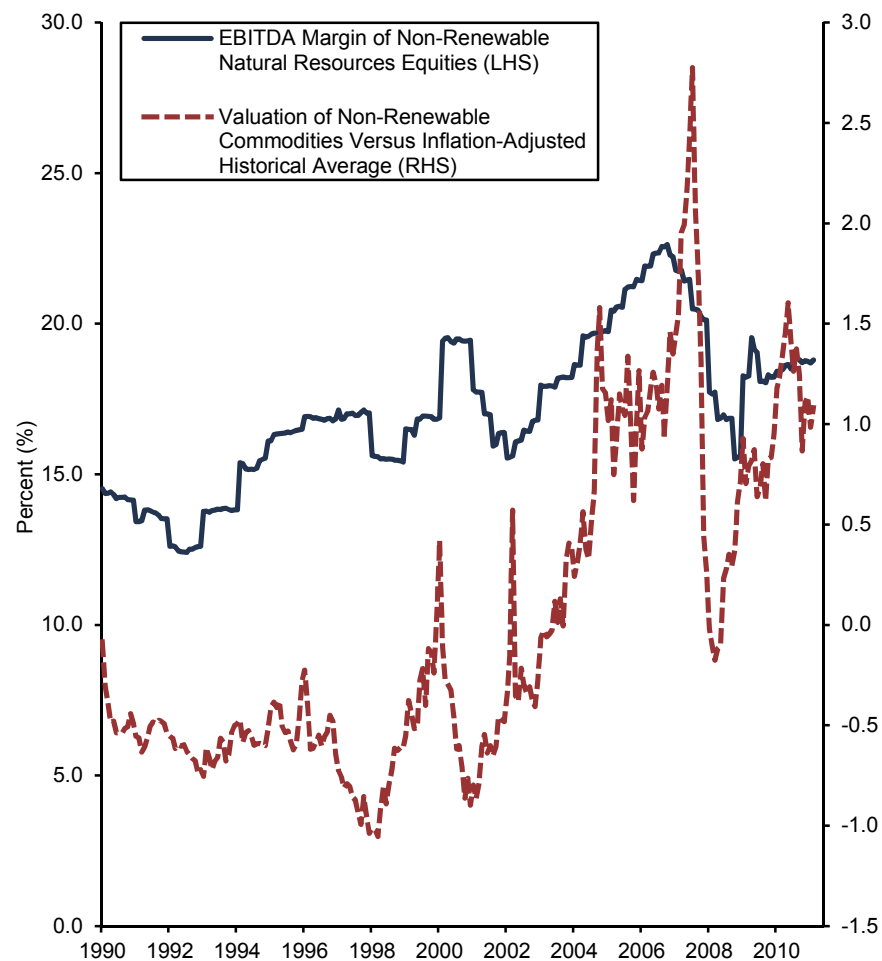


Source: Thomson Reuters Datastream.

Notes: Natural resources equities are composed of 70% Datastream World Oil & Gas Index, 20% Datastream World Metals & Mining, and 10% Datastream Gold Mining. Prices are adjusted to January 2012 dollars. Return on equity-adjusted price-earnings (P/E) ratio graph begins January 31, 1980. Shiller P/E graph begins December 31, 1982.

Exhibit 19

**Profit Margin and ROE of Non-Renewable Natural Resources Equities Versus Non-Renewable Commodities Z-Score**

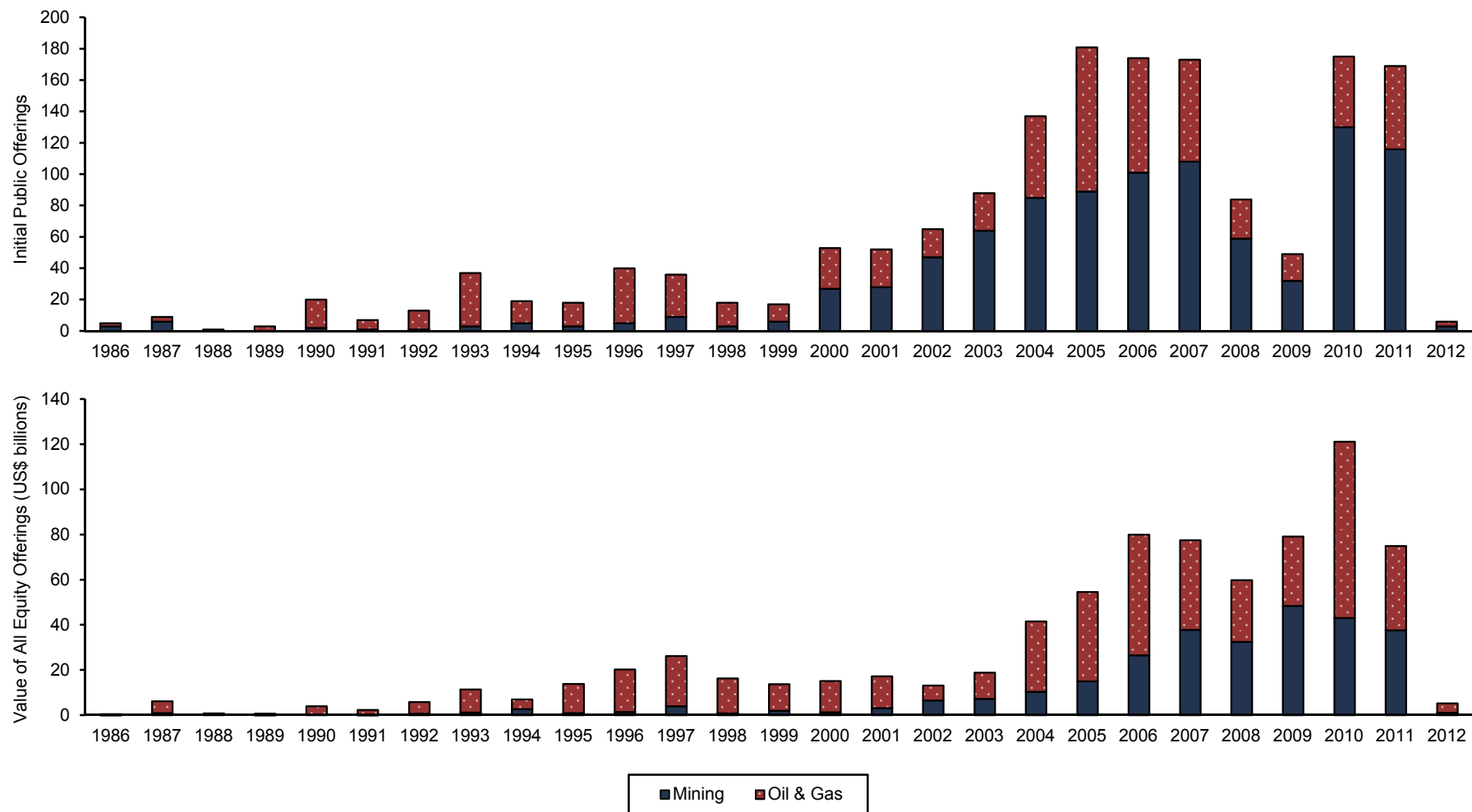


Sources: Cambridge Associates LLC, Global Financial Data, Inc., and Thomson Reuters Datastream.

Notes: Natural resources equities are composed of 70% Datastream World Oil & Gas Index, 20% Datastream World Metals & Mining, and 10% Datastream Gold Mining. Non-renewable commodity basket includes aluminum, Brent crude oil, copper, gold, heating oil, natural gas, nickel, silver, WTI oil, and zinc. The commodity basket includes a variety of commodities that have been subject to official price controls, ownership limitations, or periodic rationing; for this reason, spot prices incorporated within the basket did not always reflect market preferences. Z-score represents the number of standard deviations above or below the historical average valuation. Prices are adjusted to January 2012 dollars.

## Exhibit 20 Equity Fund Raising in Mining and Oil & Gas Industries

January 1, 1986 – January 31, 2012



Source: Dealogic.

Notes: Deal values include initial public offerings, secondary offerings, and private investment in public equity (PIPE) deals. Dealogic updates its database on a regular basis, therefore historical data may change.