Global Economic Prospects

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COMMODITY MARKETS OUTLOOK

The World Bank

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Authors

John Baffes
Development Prospects Group
The World Bank
1818 H St, NW
Washington DC 20433
Tel: +1(202) 458-1880
jbaffes@worldbank.org

Damir Ćosić
Development Prospects Group
The World Bank
1818 H St, NW
Washington DC 20433
Tel: +1(202) 473-3867
dcosic@worldbank.org

Overview

After strengthening in early 2013 due to an improved economic outlook, most industrial commodity prices have now retreated below their end-2012 levels (figure 1). Food prices have been weakening as well, mainly a reflection of improved supply conditions (figure 2). The price of crude oil (World Bank average) dropped to less than $100/bbl during 2013Q2, down from $105/bbl during 2013 Q1. The metal price index is down 32 percent since its February 2013 peak. Precious metals are down as well, 23 percent since February and 30 percent since the all-time high reached in August 2011.

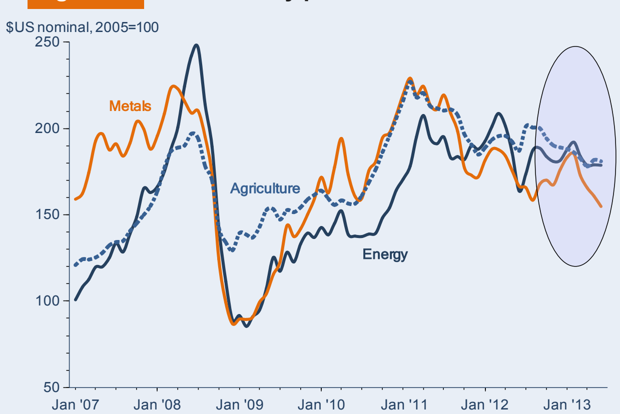
In the baseline scenario of this outlook, which assumes no major macroeconomic shocks or supply disruptions, oil prices are expected to average $101/bbl in 2013, down from $105/bbl in 2012 (table 1). Agricultural prices are projected to decline 6 percent in 2013 under the assumption of a normal crop, while the prices of food, beverages, and raw materials are expected to drop by 4.7, 11.7, and 7.1 percent, respectively. Metal prices will fall more than 8 percent due to abundant supplies and weakening demand conditions. Fertilizer prices are expected to decline 10 percent, mainly reflecting low natural gas prices in the United States. Precious metals prices are expected to drop almost 20 percent as institutional investors increasingly consider them less attractive "safe haven" alternatives, which come on top of weak physical demand.

There are a number of risks to the baseline forecasts. Downside risks include weak oil demand if growth prospects deteriorate sharply, especially in emerging economies where most of the demand growth is taking place. Over the long term, oil demand could be dampened further if substitution between crude oil and other types of energy accelerates. On the upside, a major oil supply disruption due to political turmoil in the Middle East could result in prices spiking by $50 or more. The severity of the outcome depends on numerous factors, including the severity and duration of the cutoff, policy actions regarding emergency oil reserves, demand curtailment, and OPEC's response.

A key source of uncertainty in the outlook is how OPEC (notably, Saudi Arabia) reacts to changing global demand and non-OPEC supply conditions. Since 2004, when crude oil prices started rising, OPEC has responded to subsequent price weakness by cutting supply, but it has not been as willing to intervene when prices increase. However, as non-OPEC supplies continue to come on stream and demand moderates in response to higher prices, the sustainability of this approach may come under pressure.

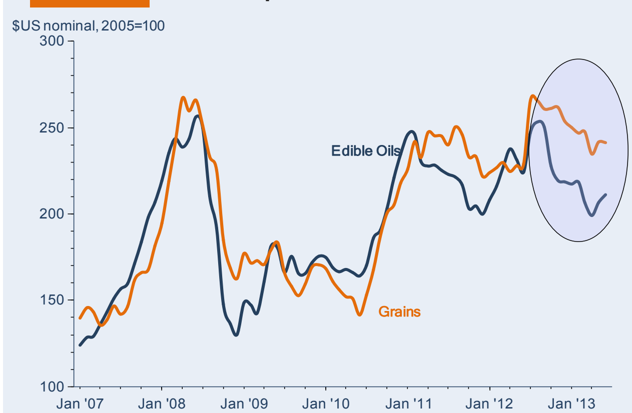
OPEC's spare capacity averaged 4.5 mb/d in the first half of 2013, some 30 percent higher than the same period one year before year but only marginally higher than the average of the past decade—it had dropped below 2 mb/d in the middle of 2008, when oil prices reached $140/bbl. OECD inventories averaged 2.7 mb/d during the first five months of 2013, remarkably similar to the corresponding period in 2012.

Figure 1 **Commodity price indexes**



Source: World Bank.

Figure 2 **Food price indexes**



Source: World Bank.

Table 1 Nominal price indexes, actual and forecasts (2005 = 100)

	ACTUAL					FORECAST		CHANGE (%)		
	2008	2009	2010	2011	2012	2013	2014	2011/12	2012/13	2013/14
Energy	182	114	145	188	187	181	179	-0.4	-3.5	-1.0
Non-Energy	182	142	174	210	190	177	176	-9.5	-6.9	-0.3
Metals	180	120	180	205	174	159	166	-15.3	-8.5	4.1
Agriculture	171	149	170	209	194	182	179	-7.2	-6.0	-2.0
Food	186	156	170	210	212	202	192	0.7	-4.7	-4.7
Grains	223	169	172	239	244	241	226	2.4	-1.4	-6.0
Fats and oils	209	165	184	223	230	210	201	3.3	-8.9	-4.1
Other food	124	131	148	168	158	156	150	-5.9	-1.4	-3.8
Beverages	152	157	182	208	166	147	151	-20.2	-11.7	2.6
Raw Materials	143	129	166	207	165	154	160	-20.0	-7.1	4.3
Fertilizers	399	204	187	267	259	233	227	-2.9	-10.2	-2.7
Precious metals	197	212	272	372	378	304	301	1.7	-19.7	-0.8
Memorandum items										
Crude oil ($/bbl)	97	62	79	104	105	101	100	1.0	-4.1	-1.0
Gold ($/toz)	872	973	1,225	1,569	1,670	1,380	1,360	6.4	-17.3	-1.4

Source: World Bank.

Price risks on raw materials, especially metals, depend both on the speed at which new supply comes on stream and on the pace of growth of China's economy. Metal prices have declined 30 percent since their early 2011 highs, and by 12 percent between February and June 2013. The price weakness reflects both moderate demand growth and strong supply response, in turn a result of increased investments of the past few years, induced by high prices. For some metals, stocks have increased considerably as well. For example, combined copper stocks at the major metals exchanges are up 106 percent during past 12 months. Aluminum stocks, which have been rising since end-2008, increased 9 during the past year.

The prospects for the metal market depend importantly on Chinese demand, as the country accounts for almost 45 percent of global metal consumption. However, if robust supply trends continue and weaker-than-anticipated demand growth materializes, metal prices could follow a path considerably lower than the baseline presented in this outlook, with significant consequences for metal exporters.

In agricultural commodity markets, the key risk is weather. According the global crop outlook assessment released by the U.S. Department of Agriculture in July 2013, the global maize market will be better supplied in the upcoming 2013/14, season. However, because stocks are still low by historical standards, any adverse weather event could induce sharp increases in maize prices—as it did in the summer of 2012 when maize prices rallied almost 40 percent in less than two months. The wheat market, which is currently better supplied than maize, could also come under pressure, either from poor crop yields or in conjunction with higher maize prices, as the two crops are competing for the same land. In contrast, price risks for rice are on the downside, especially in view of the large public stocks held by Thailand. Edible oil and oilseed markets also have limited upside price risks, due to well supplied oilseed (mostly soybeans in South America) and edible oil (primarily palm oil in East Asia) markets. Global supplies of the eight major edible oils are expected to reach a record 155 million tons this season, up from last season's 152 million tons. Global oilseed supplies will experience similar growth.

The risk of trade policy changes impacting commodity prices appears to be low, similar to the situation in 2008 and 2010, as evidenced by the virtual absence of export restrictions since the summer of 2012, despite sharp increases in grain prices. Finally, growth in the production of biofuels is slowing as policy makers increasingly realize that the environmental and energy independence benefits from biofuels are not as large as initially believed.

Crude oil

Oil prices have fluctuated within a remarkably tight band around $105/bbl (figure 3) over the past 18 months. Fluctuations have been driven mainly by the geopolitical concerns in the Middle East on the supply side and European debt issues, along with changing developing-country growth prospects, on the demand side. Price increases in early 2013 reflected geopolitical tensions in the Middle East and improving global outlook prospects. However, as supply conditions improved and concerns about market conditions in the Euro Area eased once again, prices began weakening. Crude prices are now 5 percent lower than at the beginning of 2013.

Recent Developments

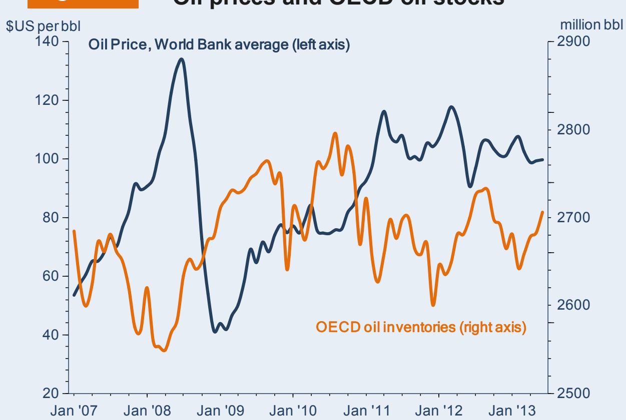
Large supplies of Canadian crude oil (especially from tar sands) to the United States, combined with rapidly rising U.S. shale liquids production, have contributed to a build-up of stocks at a time when U.S. oil consumption is dropping and natural gas supplies are increasing rapidly.

Although the price of Brent crude (the international marker) topped $117/bbl in February, West Texas Intermediate (WTI, the U.S. mid-continent price) averaged $21/bbl less due to the large built up of stocks at Cushing, Oklahoma, the delivery point of WTI. The Brent-WTI price differential declined to 7 percent in July, eight percentage points lower compared to the January 2011-June 2013 average of 15 percent and the lowest since January 2011 (figure 4).

Downward pressure on WTI prices now appear to be easing, however, partly in response to some 760,000 barrels a day in rail shipments in 2013Q1 from oil-producing regions to refineries—an eight-fold increase from 90,000 barrels per day in 2011Q1— according to a June 2013 assessment by the Association of American Railroads. Downward pressure on WTI crude will abate further when new pipelines to the Gulf of Mexico become operational and reversal of existing pipelines carrying oil from the East Coast to the mid-continental United States are completed—currently expected in late 2014 or early 2015.

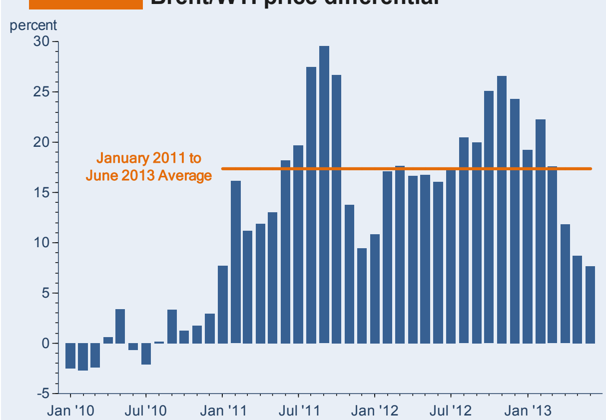
The decline in non-OPEC oil output growth evident in 2011 appears to have reversed. Non-OPEC producers added 0.7 mb/d to global supplies in 2012 and an additional 0.6 mb/d in 2013H1, mainly reflecting earlier large-scale investments. In the United States horizontal drilling and hydraulic fracturing have contributed almost 1.5 mb/d of crude oil production during the two years since 2011Q1 (figure 5). Currently, the U.S. states of Texas and North Dakota, where most of shale oil production takes place, account for almost 45 percent of total U.S. crude oil supplies, up from 33 percent a year earlier. Indeed, the IEA projects that the global crude oil supply will increase by 8.4 mb/d by 2018, up 9 percent from 90 mb/d in 2012. The increase mainly reflects surging North American crude output (2.3 mb/d from U.S. "light, tight oil," which includes production from shale, and 1.3 mb/d from Canada's oil sands).

Figure 3 Oil prices and OECD oil stocks



Source: World Bank; International Energy Agency (IEA).

Figure 4 Brent/WTI price differential



Source: World Bank.

Although shale liquid (also referred to as tight oil) and shale gas techniques have great potential to be applied worldwide, there are public concerns regarding the ecological impacts of such technologies. In addition, several countries that are believed to have similar reserves to those in the United States may be slow to utilize that potential due to difficulties in accessing drilling rights, poor regulatory frameworks, and limited "know-how" in exploring and developing the resources.

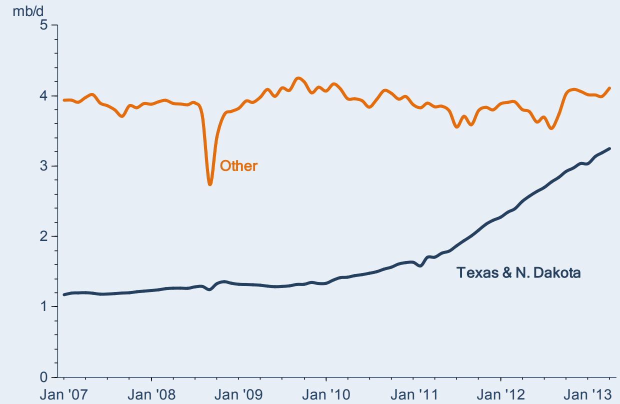
Oil production among OPEC member countries averaged 37.2 mb/d in 2013Q2, up from 36.9 mb/d in the previous quarter. The lower figure is still 10 mb/d higher than in 2002Q2, OPEC's lowest-producing quarter in recent history, and well above the official 30 mb/d quota. Iraq—still not included in OPEC's quota system—has reached pre-war levels of production, currently at slightly over 3 mb/d. Libya's oil output is about 80 percent of pre-war levels of 1.4 mb/d. Iran's oil exports were 0.8 mb/d in April, a decline of 60 percent since June 2011, when new sanctions took effect, and may tumble even further as additional sanctions start being enforced in July 2013.

The post-2010 net growth in OPEC oil production reduced spare capacity among its member countries in half, from 6.3 mb/d in 2009Q4 to 3.2 mb/d in 2012Q2 (figure 6). The downward trend in OPEC's is now reversing, though, and spare capacity averaged 4.5 mb/d during the first half of 2013, of which Saudi Arabia accounts for nearly two-thirds. The Saudi government has promised to keep the global market well supplied—and has the ability to do so—but also deems $100/bbl to be a fair price.

According to the IEA, spare capacity in the global oil market is expected to rise to more than 7 mb/d in 2014, almost three times higher than the 1.5-3.0 mb/d range observed between 2004 and 2008. Spare capacity should then begin to decline by 2016 as production in the United States slows while demand growth remains firm.

World oil demand increased modestly in 2012, a little more than 1 percent, or 0.95 mb/d (figure 7). Japan is the only OECD economy for which crude oil consumption increased (by 0.25 mb/d) in 2012. Most of that increase was to fill the loss of nuclear power generation capacity resulting from the Tohoku earthquake. Oil consumption among

Figure 5 U.S. crude oil production

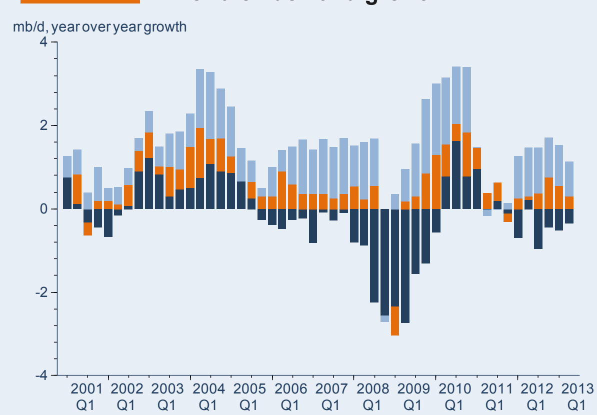


Source: U.S. Energy Information Administration.

Figure 6 OPEC spare capacity

Source: IEA.

Figure 7 World oil demand growth



Source: World Bank; IEA.

OECD countries has fallen by almost 5 mb/d, or 8 percent, from its 2005 peak. Non-OECD demand remains robust. In fact, for the first time in history, non-OECD economies are expected to consume more oil than OECD economies during 2014Q2 (44.6 mb/d for the former, versus 46.4 mb/d for the latter). IEA expects non-OECD demand to reach 54 percent of global demand by 2018.

Outlook and Risks in the Oil Market

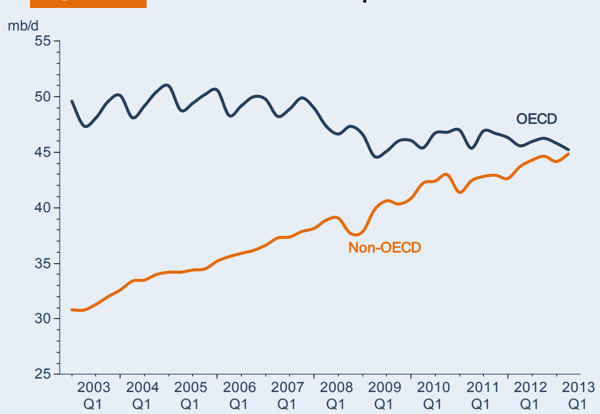
Nominal oil prices are expected to average $101/bbl during 2013 and decline to slightly below $100/bbl in 2014. Over the longer term, prices in real terms are also expected to fall, due to several reasons, including growing supplies of conventional and (especially) unconventional oil, efficiency gains, and substitution away from oil (box 1 discusses the substitution possibilities between oil and other types of energy). The assumptions underpinning these projections reflect the upper-end cost of developing additional oil capacity, notably from oil sands in Canada, which is currently estimated by the industry to be approximately $80/bbl in constant 2013 dollars. While it is expected that OPEC will continue to limit production to keep prices relatively high, the organization is also sensitive to allowing prices to rise too high, for fear of inducing innovations that would fundamentally alter the long-term path of oil prices.

World demand for crude oil is expected to grow at less than 1.5 percent annually over the projection period, with all the growth coming from non-OECD countries, as has been the case in recent years (figure 8). Growth in oil consumption among OECD countries is expected to continue to be subdued by slow economic growth and efficiency improvements in vehicle transport induced by high prices—including a gradual switch to hybrid, natural gas, and electrically powered transport. Pressure to reduce emissions due to environmental concerns is expected to further dampen oil demand growth at the global level.

Growth in oil consumption in developing countries, on the other hand, is expected to remain relatively strong in the near and medium term. In the longer-term, however, it is expected to moderate as the share of low-energy using services in these economies grow, subsidies are phased out, and (as noted above) other fuels become incorporated into the energy mix.

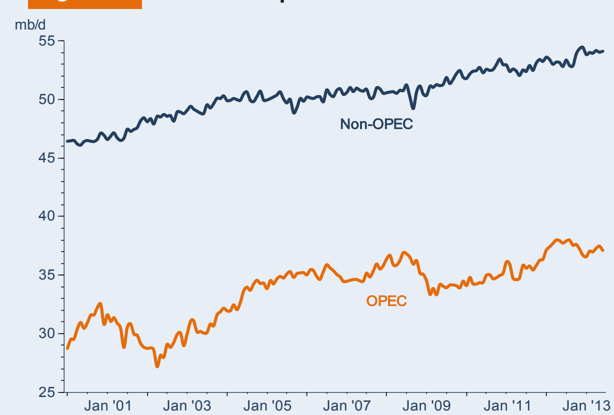
On the supply side, non-OPEC oil production is expected to continue its upward climb, as high prices have prompted increased use of innovative exploration techniques (including deepwater offshore drilling and extraction of shale liquids) and the implementation of new extractive technologies to increase the output from existing wells (figure 9). Significant production increases are expected in Brazil, the Caspian Sea, and West Africa, which together with the United States and Canada are likely to more than offset declines in mature oil-producing areas such as the North Sea.

Figure 8 Crude oil consumption



Source: IEA.

Figure 9 Crude oil production



Source: IEA.

Box 1 **A global energy market?**

Until the mid-2000s, the price of natural gas in the world's key markets (United States, Europe, and Japan) was tied to oil prices. In addition to their prices moving in a synchronous manner, natural gas and oil were priced at similar levels in terms of energy content. In other words, natural gas and crude oil markets were integrated—though administered pricing mechanisms, not market forces. Coal, which was priced independently, traded at about one- third the price of oil in energy equivalent terms (box figure 1.1).

The energy price boom of the early 2000s changed all of this. First, it delinked U.S. natural gas prices from oil prices and from European and Japanese natural gas prices. Second, it generated a gap between WTI (the mid-continent U.S. price) and Brent (the international marker). Third, it linked U.S. natural gas and coal prices.

These trends now appear to be shifting once again. The WTI-Brent gap will close soon, perhaps as early as 2014, or 2015 at the latest. The coupling of U.S. natural gas and coal prices is likely to remain (and perhaps strengthen). Natural gas price convergence will depend on various investment and policy factors, thus it may take some time before it materializes. Analyzing the future relationship between natural gas and oil prices is more complex, and depends on whether induced innovation takes place—something that cannot be evaluated or projected.

Induced innovation in the extraction of natural gas through fracking and horizontal drilling techniques (often referred to as "unconventional" gas), primarily in the United States, was followed by supply increases in turn lowering U.S. natural gas prices. Low prices made gas an attractive alternative for some energy intensive U.S. industries, especially electricity generation, which are gradually switching from coal to natural gas. Indeed, the United States experienced a marked reduction in coal use—10.5 percent—from 2006-08 to 2009-11, while global consumption increased 9 percent. As a result, beginning in 2009, U.S. natural gas and coal have been traded at similar price levels in energy equivalent terms while diverging from European natural gas and Japanese liquefied natural gas (LNG) prices (box figure 1.2).

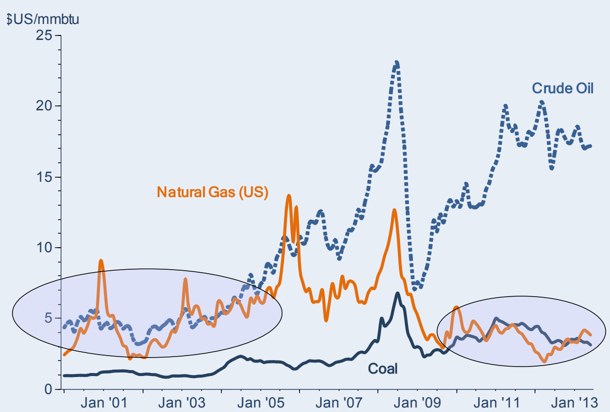
Will natural gas prices converge? There are numerous market (both demand and supply) and policy constraints, the removal of which is likely to induce coupling of natural gas prices in the longer term:

- **Supply—Increased unconventional gas supplies outside the United States.** Unconventional gas production has taken place almost exclusively in the United States. Yet unconventional natural gas reserves are plentiful in many regions, including South America, elsewhere in North America, and most importantly Asia Pacific. Industry estimates show that more than 40 percent of known global natural gas reserves recoverable at current prices and technology are unconventional. Reasons for the slow technology adoption include poor property rights, limited know-how, and environmental concerns.

- **Trade—construction of LNG facilities and gas pipelines**. Currently, 31 percent of natural gas crosses international borders—21 percent through pipelines and 10 percent in LNG form (by comparison, nearly two thirds of crude oil is traded internationally, 46 percent as oil and 20 percent as products). As more LNG facilities come on board and new gas pipelines are constructed, trade of natural gas will increase, thus exerting upward (downward) price pressure in producing (consuming) regions. Nevertheless, it should be noted that regardless of how much natural gas trade increases, LNG will be traded at much higher prices than gas through pipelines because of the high costs of liquefying and transporting.

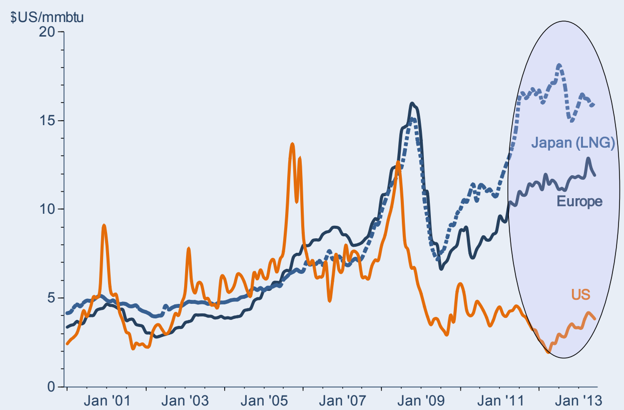
- **Demand—relocation of energy-intensive industries**. In addition to the substitution from coal to natural gas by energy-intensive industries in the United States, there is evidence that industries are moving to the United States to take advantage of the "natural gas dividend," in a way reversing the long-standing trend of American industries moving to Asia (and elsewhere) in response to the "labor cost dividend." Four energy-intensive industries that are taking (or will take) advantage of lower energy prices in

Box figure 1.1 Energy prices



Source: World Bank.

Box figure 1.2 Natural gas prices



Source: World Bank.

the United States are paper, aluminum, steel, and chemicals, whose energy costs as a share of total material costs range between 5 and 9 percent (the share for the U.S. manufacturing industry as a whole is 3 percent, four to five times higher than for agriculture; see box 3).

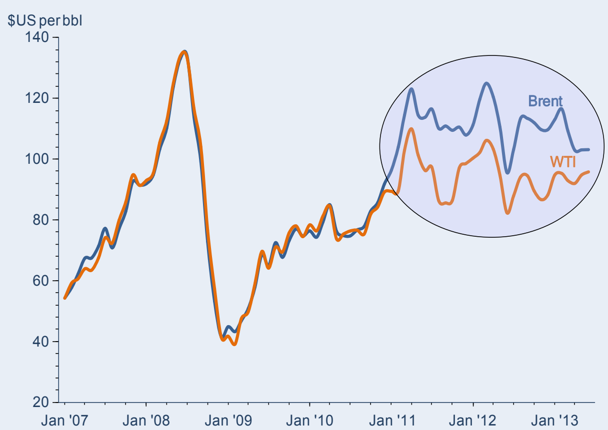
- **Substitute product—coal**. More trade in coal is likely to take place, thus further facilitating convergence of natural gas prices and also strengthening the convergence of coal and natural gas prices already underway. Indeed, between 2005 and 2012, global coal exports almost tripled (from 258 to 758 million tons), pushing coal traded as a share of production to almost 15 percent. Furthermore, anecdotal evidence points to even further increases. For example, a recent article (Bloomberg 2013) notes that Tata Power, India's second-largest electricity producer, is seeking coal supplies from the United States, Colombia, and Canada (which account for 13.9, 1.5, and 0.9 percent of global coal production, respectively; China's share is 50 percent).

- **Policies—U.S. energy exports, nuclear energy, property rights**. Three types of policies are expected to increase trade in natural gas and, consequently, price convergence. First, the United States is gradually **removing restrictions on energy exports**, most of which were introduced after the oil crisis of the 1970s in response to energy security concerns. Second, several countries are **reconsidering nuclear energy policies**, especially after the Tohoku accident in Japan; some plan to not replace aging nuclear power units, while others contemplate early decommissioning. The diminishing contribution of nuclear power to global energy consumption—already, there has been a decline from a peak of 6.4 percent in 2001 to 4.9 percent in 2011—will be replaced by coal, natural gas, and to a lesser extent renewables (see box table 1.1 for historical and current energy consumption shares). Third, countries with large unconventional reserves are likely to introduce policies to **strengthen property rights**, a key reason for not developing them.

Subsequent to the natural gas boom, fracking and horizontal drilling were applied to the U.S. oil sector, which, as expected, induced similar supply response. This increase in oil supplies, along with increasing crude inflows from Canadian oil sands, led to a decoupling of WTI from Brent, with the latter trading 18 percent above the former after January 2011 (box figure 1.3). Historically (1983-2005), WTI traded with a 6 percent premium over Brent, because the mid-continent U.S. was a "deficit" region. Following increased imports from Canadian oil sands during 2006-10, WTI and Brent traded on par. After January 2011, however, Brent has been traded with a premium over WTI following increased domestic shale oil supplies—it averaged 18 percent between January 2011 and May 2013. Although the premium declined recently, it may persist for another two years, until a new pipeline begins transferring surplus oil from Cushing, Oklahoma to the U.S. Gulf (some oil is currently moving by truck and rail). The WTI discount is likely to stabilize around 5 percent, (a mirror image of the pre-2006 premium) when the market reaches equilibrium—oil supply in the mid-Continent U.S. exceeds demand and the surplus moves to the Gulf at the lowest possible cost.

What about convergence of natural gas and oil prices? Because more than half of global crude oil supplies go to the transportation industry, the prospects of substitutability between crude oil and other types of energy will depend on the degree to which vehicles can switch from crude oil-base fuels to natural gas or electricity. As discussed in the previous edition of this outlook (World Bank 2013), contrary to the situation for natural gas, crude oil products have convenient distribution networks and refueling stations that can be reached by cars virtually everywhere in the world. Thus, in order for the transport industry to utilize natural gas at a scale large enough to make a dent in the crude oil market, innovations must take place such that the distribution and refueling costs of natural gas become comparable to those of crude oil. The second alternative, electricity, has its own drawbacks, namely, storage capacity and refueling time. Consider that if a truck with a net weight capacity of 40,000 pounds were to be powered by lithium-sulphur batteries for a 500-mile range, the batteries would occupy almost 85 percent of the truck's net capacity, leaving only 6,000 pounds of commercial space. Hence, as is the case for natural gas, for large-scale electricity use by vehicles, innovation in battery technology must take place.

Box figure 1.3 Brent and WTI prices



Source: World Bank.

Box table 1.1 Shares of global primary energy consumption (percent)

	Oil	Gas	Coal	Nuclear	Hydro	Other
1965-69	42.6	16.8	34.7	0.2	5.6	0.0
1970-74	47.3	18.6	27.7	0.9	5.4	0.1
1975-79	46.5	18.9	27.0	2.1	5.5	0.1
1980-84	41.4	20.3	28.3	3.7	6.2	0.1
1985-89	39.0	21.2	28.2	5.3	6.1	0.2
1990-94	38.7	22.3	26.3	6.0	6.3	0.4
1995-99	38.4	22.9	25.5	6.2	6.5	0.5
2000-04	37.3	23.4	26.4	6.1	6.1	0.7
2005-09	34.7	23.4	29.0	5.4	6.3	1.1
2010-11	33.1	23.7	30.3	4.9	6.4	1.6

Source: BP Statistical Review.
Note (1): "Other" includes biofuels, solar, wind, geothermal, and biomass
Note (2): The shares were calculated in oil equivalent terms

Metals

Following the collapse in metal prices that followed the 2008-09 global financial crisis, prices regained strength and increased almost continuously. The World Bank metals price index reached a new high of 229 (2005 = 100) in February 2011, up 164 percent since its December 2008 low (figure 10). This increase, together with the sustained increases prior to the financial crisis, generated large new investments inducing a strong supply response.

Most of the additional metal supply went to meet demand from China, whose consumption share of world refined metals reached 44.2 percent at the end of 2012, up from 42 percent in the previous year (figure 11). Metal prices, however, have weakened since 2011. This decline, along with the drop in energy prices and an even sharper decline in precious metal prices, has prompted economists and analysts to argue that that the so-called commodity super cycle may be coming to an end (box 2 discusses the super cycle and how it relates to global metals reserves).

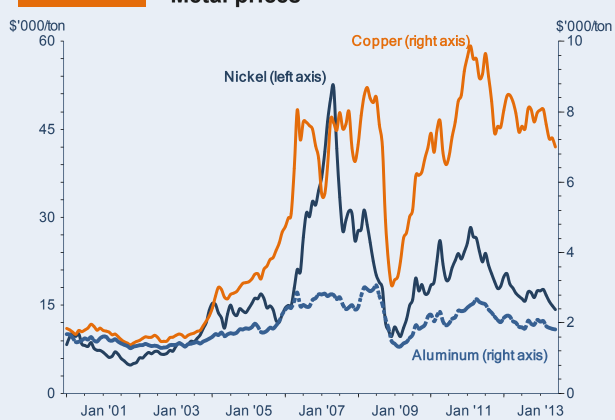
Recent Developments

Aluminum demand increased by 6.8 percent in 2012 according to World Bureau of Metal Statistics (WBMS), led for the second year by double-digit demand growth in China (15 percent) and a 7.5 percent increase in demand by India. Offsetting these increases was a contraction in consumption in the European Union (7.7 percent) and Brazil (5.2 percent) on the back of continued economic weakness. Aluminum consumption continues to benefit from substitution away from copper, mainly in the wiring and cable sectors (copper prices are now more than four times higher than aluminum prices, whereas the two were similar prior to the 2005 boom). Substitution is expected to continue for as long as the aluminum prices remain at least twice as high as copper prices, according to industry analysts.

Aluminum supply rose marginally in 2012, by 3.2 percent, down from 7.5 percent growth in 2011. Output was constrained by high energy costs, which account for nearly 40 percent of total production costs. Aluminum supply growth is coming from countries with abundant (in many cases, subsidized) energy, including China (up 12 percent), United States (up 4.4 percent), and the United Arab Emirates (up 6.2 percent). Nevertheless, aluminum production declined sharply in the European Union (19 percent) on environmental policy pressures and adverse economic developments, and in Canada (6.9 percent) due to labor disputes. Brazil and Russia have experienced marginal declines as well. Inventories of aluminum at major exchanges rose a combined 9.4 percent during the 12 months ending June 2013. Indeed, physical stocks have been rising for some time, and as of June 2013 were 45 percent higher than their end-2008 levels when the stockpiling started. However, a significant portion of these inventories is tied up in warehouse financing deals and unavailable to the market.

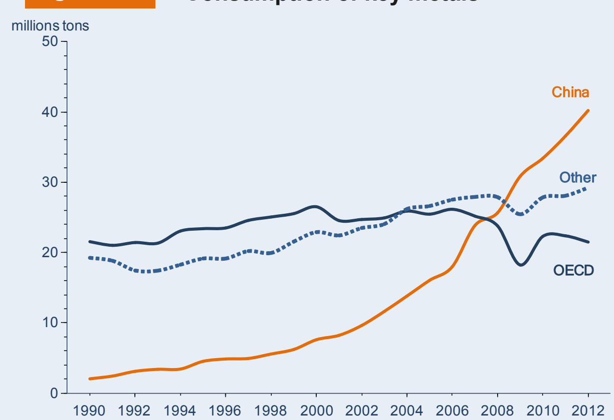
Copper demand expanded by 4.7 percent in 2012, up from 1.4 percent the year before, accord-

Figure 10 Metal prices



Source: World Bank.

Figure 11 Consumption of key metals



Source: World Bureau of Metal Statistics.

ing to WMBS data, with China's demand increasing 11.7 percent, versus 7.2 percent in 2011. It is unclear, though, how much of this demand increase was due to stock build-up and how much was actually consumed. Estimates of stock build-up in bonded warehouses in China indicate an increase of 96 percent in 2012, to some 775,000 tons. Elsewhere, demand for copper has recovered, including Brazil (up 8.6 percent following a decline the previous year), Mexico (up 20 percent), and the United States (up 3.3 percent). Demand was especially weak in the European Union (down 7.7 percent) and Japan (down 1.3 percent).

Supply of refined copper expanded at a modest 2.9 percent pace in 2012, down from 3.2 percent increase in 2011. However, output of mined copper rose 4.4 percent in 2012, up from 1.2 percent during 2009-2011. High copper prices have induced a wave of new mines and expansions of existing ones that are expected to come on stream soon. In Chile, for example, Escondida, the world's largest copper mine, is on track to increase its production by 20 percent in 2013. Mined copper output rose 7.1 percent in Africa in 2012, with several mines coming on stream in Zambia and the Democratic Republic of Congo. The Oyu Tolgoi mine in Mongolia began production in 2013 and is expected to become one of the top five copper-producing mines by 2020 in the world and to increase the country's production capacity four-fold. Physical inventories of copper on major exchanges were up 106 percent in June 2013 versus one year prior.

Nickel demand expanded 6.1 percent in 2012, down from a rapid 17 percent growth in 2011. The sharpest decline was in China, where apparent demand rose 17.4 percent, versus 46 percent in 2011. China now accounts for 40 percent of global stainless steel production (a major source of nickel demand), up from 4 percent a decade ago. Demand contracted in most high-income countries, including the European Union (down 8 percent), Japan (down 8.3 percent), and the United States (down 6.2 percent).

Global nickel supply grew by 13 percent in 2012, a second year of double digit growth, slightly down from 16 percent growth in 2011. A wave of new nickel mine capacity is likely to keep nickel prices close to marginal production costs. New projects in diverse locations will soon ramp up production, including Australia, Brazil, Madagascar, New Caledonia, and Papua New Guinea. Another major global source of nickel is nickel pig iron (NPI) produced in China, which contains low-grade nickel ore from Indonesia and the Philippines. China's production capacity may soon be constrained, though, given that Indonesia has announced that it will develop its own NPI industry and has introduced export quotas and may ban nickel ore exports by the end of 2013. Nickel stocks were built up during 2012 as supplies exceeded consumption, with stocks at LME 82 percent higher in June 2013 compared to a year before.

Outlook and Risks in Metals Markets

Metal prices are expected to continue their declines in 2013, on top of the 15 percent decline observed in 2012. Aluminum prices are expected to decline 6 percent in 2013 and to follow an upward trend thereafter in response to rising power costs and the fact that current prices have pushed some producers down to or below production costs. Copper prices are expected to decline more, by 11 percent in 2013, with more declines in subsequent years, mostly due to substitution pressures and slowing demand. Nickel prices are expected to decline 15 percent in 2013 and to follow a slightly upward trend thereafter. Over the medium term, stainless steel demand is expected to remain robust, growing by more than 6 percent annually, mainly driven by high-grade consumer applications, as emerging economies increasingly mimic consumption patterns of high-income countries. Although there are no physical constraints in metal markets, there are a number of factors that could push prices higher than predicted over the forecast period, including declining ore grades, environmental policy changes, and rising energy costs.

Metal prices face more downside than upside risks—most notably, the weakening of demand in China. Though a sharp decline in metal prices (say, 20 percent over the course of next year, relative to the baseline) will not have much of an effect on global GDP, the decline will impact metal exporting countries, especially those in Sub-Saharan African, whose GDP and fiscal balance may decline as much as 0.7 and 1 percent, respectively, compared to the baseline projections.

Box 2 **Global reserves, demand growth, and the "super cycle" hypothesis**

In 1990, the world consumed less than 43 million tons of metals. By 2012, this had increased to 91 million tons. All of the growth was driven by China—in 1990, China accounted for a mere 4 percent of global consumption; today it accounts for almost 45 percent. In 1990, the world consumed 66 million barrels of oil per day (mb/d), 37 percent of which was consumed by OECD economies. In 2012, it exceeded 90 mb/d, half of which is consumed by non-OECD economies. Despite these strong consumption growth patterns, the assumed resource depletion that has occupied headlines often is less of an issue now than it used to be. Nevertheless, problems exist, including environmental concerns, concentration of resources, and the high cost of extracting such resources.

Metal consumption by China during the past decade has been so strong that it reversed the downward trend of global metal intensity (that is, metal consumption per unit of GDP), a turnaround that continues today. Thus, metal intensity now is the same as it was the early 1970s—on the contrary, food and energy intensities have continued their long term downward trend. On the other hand, despite the strong demand growth of oil by non-OECD economies, they still consume 2.6 barrels per year on a per capita basis, as opposed to 13.7 by OECD economies.

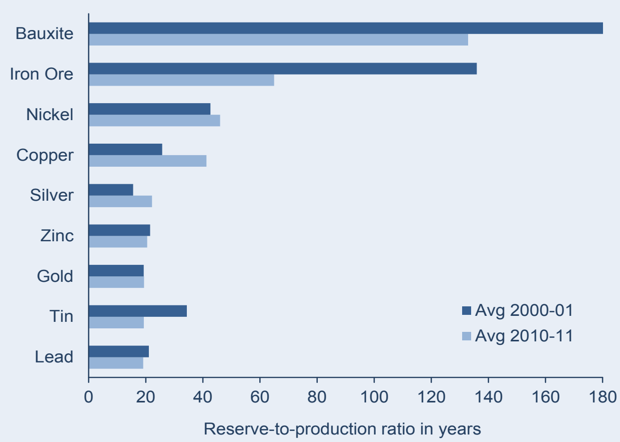
The strong growth in consumption of industrial commodities by emerging countries, along with the likelihood that these countries will experience sustained high growth rates, inevitably raises the issue of resource depletion. The issue of non-adequacy of resources to sustain projected population and income growth rates has been debated frequently, especially in periods of high prices. Examples include the peak oil hypothesis for crude oil reserves and the Club of Rome arguments regarding food supplies (Meadows and others 1972).

Based on U.S. Geological Survey data, box figure 2.1 reports global reserves for two ores (bauxite and iron ore), five base metals (nickel, copper, zinc, lead, and tin), and two precious metals (gold and silver). The reserves are expressed in terms of years of current production (the so-called reserves-to-production ratio, R/P), evaluated at two 2-year periods (2000-01 and 2010-11) spanning the recent price and consumption boom. (According to the U.S. Geological Survey, reserves refer to the part of the reserve base which could be economically extracted or produced at the time of determination but do not imply that extraction facilities are in place and operative).

Numerous stylized facts emerge from the analysis. First, the R/P ratios for various metals paint a mixed picture regarding resource scarcity. Specifically, the ratio increased in three of the nine cases: nickel (from 43 to 46 years), copper (from 26 to 41), and silver (from 16 to 22). It did not experience any appreciable change for gold and zinc but declined marginally for lead (from 21 to 19 years). Yet, three metals exhibited significant declines: Tin (from 34 to 19 years), iron ore (from 136 to 65 years), and bauxite (from 180 to 133). Second, the declines in the R/P ratios reflect increased production, not declining reserves. In fact, with the single exception of tin (for which reserves declined nearly 40 percent during the 10-year period under consideration) and gold (for which reserves increased only 4 percent), reserves increased between 16 percent (bauxite) and 94 percent (copper). Third, the two largest declines in the R/P ratio—iron ore, down by 71 years, and bauxite, down by 47 years—took place in markets where the respective metals are relatively abundant, hence less of a need to invest in exploration and development activities. Thus, of the nine metals examined here, tin appears to be the only reserve-constrained commodity.

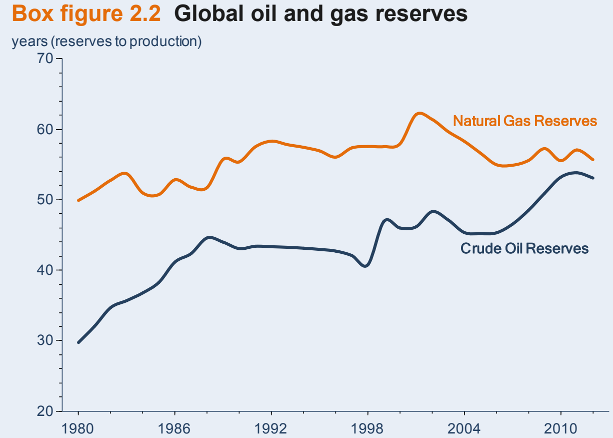
What about energy? Box figure 2.2 depicts R/P ratios for natural gas and crude oil between 1980 and 2011. In both markets the ratios have been increasing, a significant 3.0 percent per annum for crude oil and a marginal 0.3 percent for natural gas. In fact, the R/P ratio for crude oil exceeded 54 years in 2011 for the first time. (According to BP, "[reserves] are generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from

Box figure 2.1 **Global metal reserves**



Source: U.S. Geological Survey.

Box figure 2.2 **Global oil and gas reserves**



Source: BP Statistical Review.

known reservoirs under existing economic and operating conditions.")

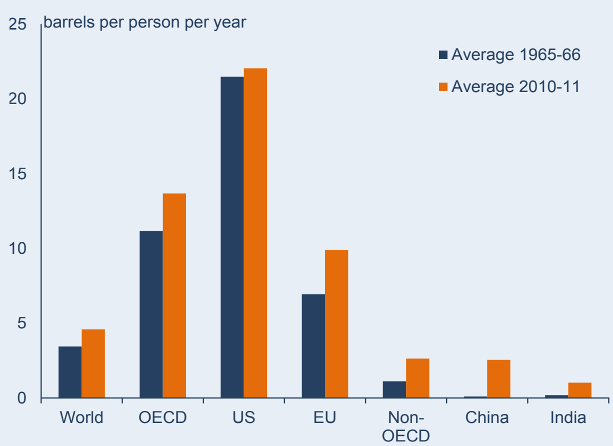
The increase in global crude oil reserves during the 1980s is due to additions by OPEC members. The 1999 uptick reflects the addition of 120 billion barrels from Canada's oil sands (equivalent to four years of current global consumption), while the increase in the mid-2000s was due to Venezuela's Orinoco Belt oil, currently estimated at 220 billion barrels (seven years of global consumption). The R/P ratios for both crude oil and natural gas are likely to increase substantially when the unconventional reserves are added in the economically recoverable resource pool. Indeed, industry experts have noted that when all global recoverable reserves are considered, the world may have as much as two centuries' worth of natural gas, evaluated at current consumption rates, prices, and technology.

While adequacy of reserves per se does not seem to be a problem, at least in the foreseeable future, there are several issues of concern, including environmental problems, concentration of ownership, further demand strengthening, and increasing extractions costs. First, by their very nature, extraction of these resources may be associated with environmental issues, such as contamination of ground water resources or concerns that excessive fracking may be linked to increasing frequency of earthquake activity.

Second, reserves are becoming concentrated. For example, currently OPEC accounts for more than 72 percent of oil reserves, nearly half of which are located in Saudi Arabia and Venezuela. Natural gas reserves are concentrated as well, with the Russian Federation and Turkmenistan accounting for more than one-third and Iran and Qatar accounting for nearly 28 percent. (The Herfindahl concentration indexes for crude oil and natural gas reserves were 9.8 and 10.7 percent, respectively, in 2011.)

Third, extracting natural resources is becoming increasingly costly. The marginal cost of oil production, for example, is currently estimated at $80/bbl for Canadian oil sands (this cost forms the basis for the World Bank's long-term oil price assumptions).

Box figure 2.3 Per capita oil consumption



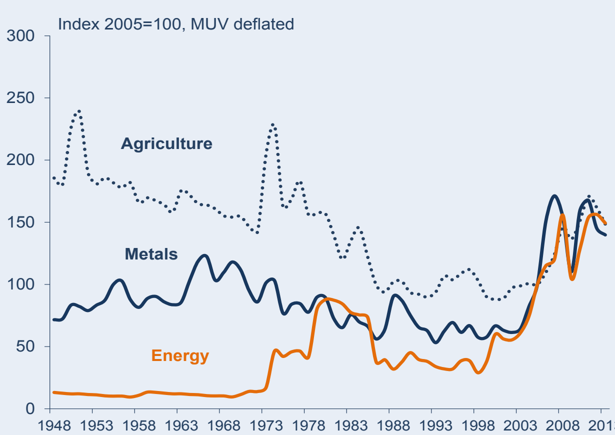
Source: BP Statistical Review; UN; OECD; Eurostat.

Finally, a key issue on resource adequacy and prices will be the strength of demand. Future fluctuations in metal markets will depend heavily on the metal intensity of the Chinese economy. Oil consumption will depend on demand by emerging economies and whether their energy intensities emulate that of high-income countries. Consider, for example, that in per capita terms, OECD countries consume five times more crude oil than non-OECD countries—or, more strikingly, that the United States consumes 23 times as much oil as India (box figure 2.3).

Many observers (see, for example, Heap 2005) have argued that, because of the extremely robust demand for metals and rapidly rising metals intensity of the Chinese economy, along with strong oil demand by emerging economies, these commodities go through a super cycle where prices are likely to stay high for an extended period of time. The so-called "super cycle hypothesis" has been empirically verified for a number of metals (Jerrett and Cuddington 2008). Super-cycles of this nature, have taken place in the past rather infrequently (for example, during the industrial revolution in the United Kingdom, and the westward expansion of the late 1800s/early 1900s in the United States). Erten and Ocampo (2012) identified four such super cycles in real prices of agriculture, metals, and crude oil during 1865-2009; the length of the cycles ranged between 30-40 years with amplitudes 20-40 percent higher or lower than the long-run trend (similar estimates have been given by Cuddington and Zellou (2013) for metals.) Furthermore, the mean of each super cycle was lower than for the previous cycle, thus supporting the view that nominal prices of primary commodities grow at a slower rate than nominal prices of manufacturing commodities (the Prebisch-Singer hypothesis).

Indeed, energy and metal prices (expressed as ratio to manufacturing prices) experienced the largest and longest boom since (box figure 2.4). Though most of the conditions behind the post-2004 price boom are still in place, there are signs that conditions may be easing. The 2008 and 2011 commodity price peaks may have marked the beginning of the end of the current super cycle. In that case, the current super cycle will be much shorter than previous ones. But, it is too early to tell.

Box figure 2.4 Commodity prices, MUV-deflated



Source: World Bank.

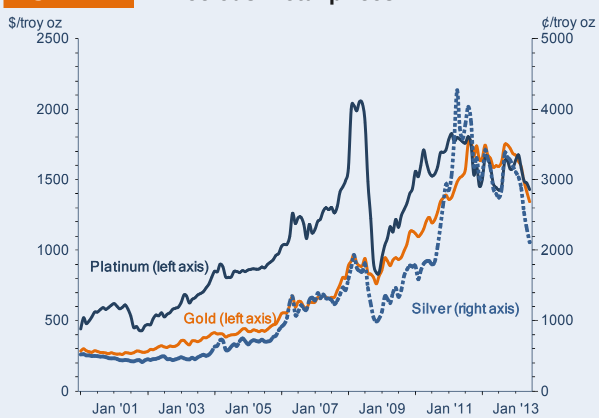
Precious Metals

Following 18 months of relative stability, precious metal prices declined sharply during 2013Q2, and the World Bank metal price index declined 23 percent in the past six months (figure 12). The decline marked a reversal of 11 straight years of increasing precious metal prices and reflects changing perceptions of global risk, given gold's status as a "safe-haven" investment asset. Holdings of gold by exchange-traded funds are down more than 15 percent for the year. In contrast, holdings of silver and platinum were up by 5 and 53 percent, respectively, by end-June 2013.

High gold prices have attracted considerable investment in the gold mining industry, for both existing and new mines. China has announced a new production target of 450 tons per year by 2015, up from 400 tons in 2012, when output grew 12 percent. Production in South Africa declined 13 percent in 2012—the fourth consecutive annual decline—in what might signal a long-term decline, although the 2012 performance also reflects very serious labor disputes in late 2012 that disrupted the production.

The precious metal index is expected to decline almost 20 percent in 2013 (with gold, silver, and platinum down by 17, 29, and 5 percent, respectively). Most risks are on the downside due to supply improvements, even as the pace of global recovery improves, including easing of financial tensions in Europe.

Figure 12 Precious metal prices



Source: World Bank.

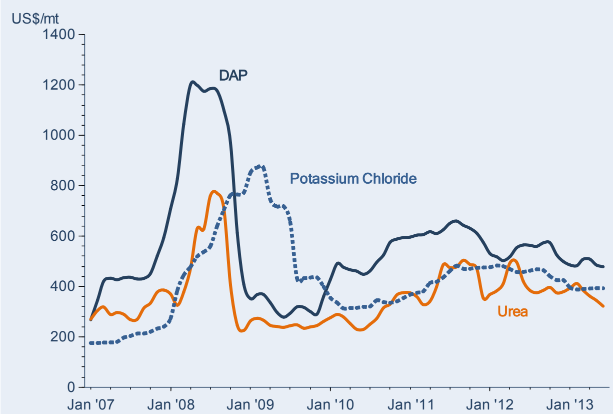
Fertilizers

Fertilizer prices, a key input to the production of most agricultural commodities especially grains and oilseeds, experienced a five-fold increase between 2003 and 2008, the largest increase among all key commodity groups (figure 13). In addition to strong demand, the price hikes reflect increases in energy prices, especially natural gas—some fertilizers are made directly out of natural gas. Indeed, fertilizer prices are now three times higher than a decade ago, remarkably similar to the three-fold increase in energy prices.

Recently, the upswing in fertilizer prices has been easing. The World Bank's fertilizer index declined 10 percent by 2013Q2 after declining 3 percent in 2012. The declines were more pronounced for urea and phosphate, each over 10 percent down. The prices of other types of fertilizers changed marginally. Weak demand, especially by India and China, has been the key factor behind the weakness (demand by the United States and South America has been strong).

Fertilizer prices are expected to ease considerably in the medium term—more than 10 percent in 2013 and another 5 percent in the two years thereafter—reflecting primarily lower production costs due to the projected moderation of natural gas prices but also the coming on stream of a number of projects, most significantly in the United Arab Emirates and the former Soviet Union, both important natural gas producers.

Figure 13 Fertilizer prices



Source: World Bank.

Agriculture

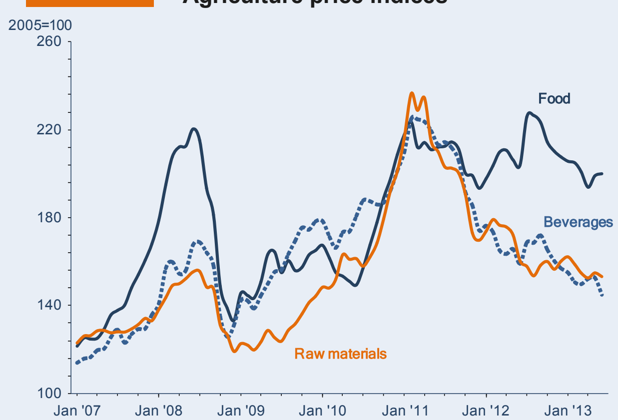
With the exception of grains, the prices of most agricultural commodities have been declining almost continuously since their early 2011 peaks (figure 14). Beverage and raw material prices are down about 35 percent each between February 2011 and July 2013. Non-grain food commodity prices are down as well—edible oils down 14 percent and other food prices down 17 percent. Initially, grain prices followed a similar (declining) path, but they reversed course sharply after a heat wave in the summer of 2012 caused considerable damage in maize-producing areas in the Midwestern United States, while severe drought conditions in Eastern Europe and Central Asia affected wheat production. As a result, the World Bank food price index gained almost 11 percent in the one month from June to July 2012. Since then, supply conditions for most food commodities have improved considerably. For example, both the edible oil and oilseed markets are well supplied, with global edible oil production expected to reach a new record. Grain supplies are improving as well. In its July 2013 assessment, the U.S. Department of Agriculture largely maintained the marked improvement in maize conditions for 2013/14, a comfortable wheat crop, and a well-supplied rice market. In response to this outlook, most food prices have receded, and the food price index has lost its 2012 gains. Yet upside risks exist, especially for maize and wheat, as any adverse weather event could upset global markets.

Recent developments in agricultural markets

Grain prices have been declining steadily since the spike in the summer of 2012 as supply expectations for the 2013/14 season have gradually improved (figure 15). Between July 2012 and June 2013, ***maize*** and ***wheat*** prices declined about 10 percent each, partly eliminating the increases during July and August of 2012. In its July 2013 update, the U.S. Department of Agriculture placed its global maize production estimate at 960 million tons, up from 855 million tons in the 2012/13 season, in turn increasing the stock-to-use ratio from 14.3 percent to 16.2 percent. Similarly, the global wheat production estimate for 2013/14 stands at 698 million tons, up from current season's 655 million tons; yet, the stock-to-use ratio for wheat may decline marginally as global consumption is expected to increase by almost 10 million tons.

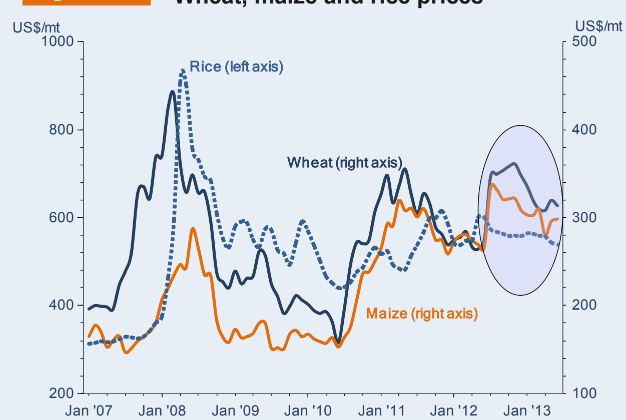
After dropping below the $600/ton mark in July 2012, ***rice*** prices have fluctuated within a very tight band around $560/ton. Prices exceeded $600/ton only twice: Near the end of 2011, when there were reports of flood damage to the Thai crop, and last year, when the Thai government introduced its purchase program—a public stock-holding mechanism. The U.S. Department of Agriculture's July 2013 assessment puts global rice production at almost 480 million tons in the 2013/14 season, 10 million tons above the 2012/13 record. The stock-to-use ratio is expected to reach almost 23 percent, remarkably similar to that of 2012/13 and well within historical norms. Trade in rice has improved

Figure 14 Agriculture price indices



Source: World Bank.

Figure 15 Wheat, maize and rice prices



Source: World Bank.

as well, reaching a new record of 38.6 million tons in 2012, aided in part by a surge in Chinese imports (2.9 million tons, up from 0.5 million tons a year earlier). Early reports indicate that this year may be another record for the volume of rice trade, perhaps as high as 40 million tons.

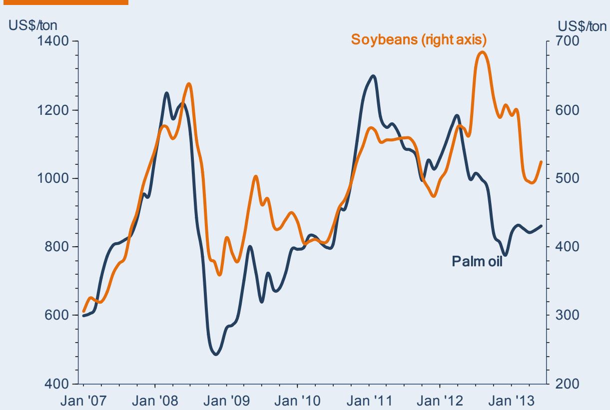
Edible oil prices have declined 17 percent since their summer 2012 peak, as measured by the World Bank's edible oil price index, effectively eliminating all price gains during the first half of last year. The decline reflects an improved South American ***soybean*** crop as well as improved assessment of the U.S. soybean crop, for which yields turned out to be higher than originally thought. ***Palm oil*** supplies from Indonesia and Malaysia, which together account for 80 percent of the global supply, have improved as well. Soybean prices have weakened as well during the past nine months and are down almost 23 percent from their August 2012 highs (figure 16). The extended soybean price spike during 2012 also reflects overall tightness in the animal feed industry. Soybean meal and white maize (the latter produced primarily in the United States) are close substitutes as they both are key inputs to the animal industry.

Edible oils experienced the fastest production and consumption growth rates of all agricultural commodities during recent decades, and this is likely to continue in the future. Table 2 reports production growth rates for eight commodities and shows that in all four sub-periods since 1960, palm oil and soybeans exhibited growth rates two to three times higher than those for food commodities, cotton (a key raw material), and coffee (for which growth is roughly aligned with population growth). The main exception is maize, which experienced a 3.7 average annual growth rate between 2004 and 2012, a reflection of biofuel demand. The four periods shown in table 2 capture different price regimes, namely, increasing commodity prices in the years leading up to the first oil crisis (1960-73), declining prices (1974-85), stable and low prices (1986-2003), and high prices during the recent boom (2004-12).

Edible oils are, perhaps, the only commodity group whose income elasticity is high not only for low and middle income countries but also for high income countries. This reflects the fact that as income increases, people tend to eat more in professional establishments and consume more prepackaged food items, both of which are utilizing more edible oil than otherwise.

Beverage prices have declined as well. The World Bank's beverage price index (comprised of coffee, cocoa, and tea) is down 36 percent since its February 2011 record high. The earlier surge (and recent decline) in beverages reflects mostly ***coffee*** prices—specifically, arabica—which reached $6/kg in 2011, the highest nominal level ever (figure 17). The increase in arabica reflected a shortfall in production in Colombia, the world's second-largest arabica supplier after Brazil. However, as Colombian production recovered partially, and coffee companies began using more robusta in their blends, arabica prices declined and are now hovering at half their early 2011 highs. Global coffee output reached 145 million bags in 2012, up from 137 million bags in 2011. Furthermore, Brazil, the world's top coffee supplier, is expected to have a bumper

Figure 16 Edible oil prices



Source: World Bank.

Table 2 Production growth of major agricultural commodities (annual growth rate)

	1960-73	1974-85	1986-2003	2004-12
Maize	4.1%	3.9%	1.8%	3.7%
Rice	3.3%	2.9%	1.2%	2.0%
Wheat	3.9%	2.8%	0.8%	2.1%
Coffee	3.4%	2.2%	2.5%	1.8%
Cotton	2.7%	2.8%	1.4%	2.9%
Sugar	2.2%	2.6%	2.3%	1.9%
Palm oil	8.6%	10.1%	7.8%	6.8%
Soybeans	7.5%	6.8%	4.0%	4.7%

Source: U.S. Department of Agriculture.

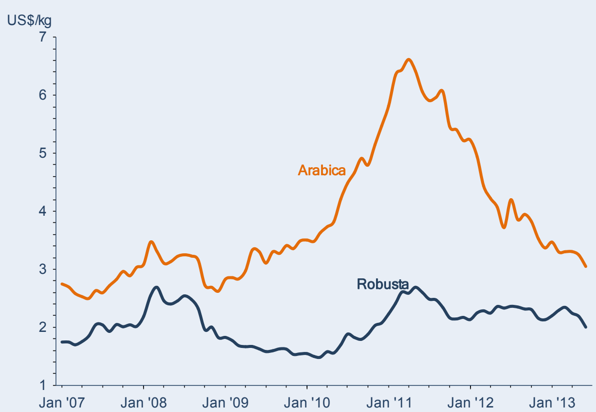
crop in 2013/14 (April-March), currently estimated at almost 47 million bags. Coffee supplies from Vietnam (the world's largest robusta supplier), Colombia, and Indonesia are also expected to be large. After declining nearly 35 percent during 2011, ***cocoa*** has been traded at around \$2.30/kg. The weakness of cocoa prices reflects partly weak demand in Europe, traditionally a key consumer of cocoa for chocolate manufacturing. Global cocoa production is expected to reach 3.96 million tons in 2012/13, down from last season's 4.06 million tons. Declined by Central and South America will offset increases by West Africa.

Sugar prices (not part of World Bank's beverage price index) have been weakening as well and are down 16 percent since a year ago and nearly 40 percent below their 2011 peak. The sugar market now faces a large surplus. Global sugar production exceeded 182 million tons in 2012, up from 173 million tons in 2011 while consumption in both years averaged 163 million tons. Good crops in South America (especially Brazil) and Asia have contributed to the surplus. Brazil, world's top sugar supplier, in an attempt to boost prices, announced a tax credit to ethanol producers; the announcement failed to support prices, though.

Raw material prices have been relatively stable during the past two quarters after declining sharply from their early 2011 peaks—down 35 percent between February 2011 and August 2012 (figure 18). ***Cotton*** prices have found some strength recently, gaining almost 9 percent since January 2013. The cotton market is well supplied by historical standards; global production is expected to be 25.1 million tons in 2013/14, and consumption at 24.3 million tons. An estimated 1 million tons will be added to global stocks, pushing the stock-to-use ratio to 77 percent, the highest since the end of World War II. Approximately 9 million tons of cotton have gone to the state reserves of China during the past two seasons, explaining the relative strength of cotton prices (International Cotton Advisory Committee 2013). Nevertheless, cotton prices increased the least among agricultural commodities during the post-2004 price boom—up 37 percent over 1997-2004 and 2005-12, as opposed to a 75 percent increase of the overall agricultural price index—primarily because of the increase in yields by China and India following the adoption of biotech crops (Baffes 2011).

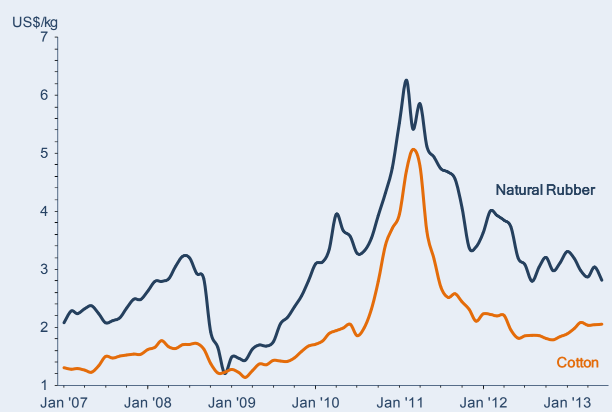
Natural rubber prices have been remarkably stable during the past two quarters, following a sharp decline from their early 2011 peak (similar to cotton). The decline in rubber prices reflected both increased supplies and fears of demand deterioration, especially from China—most natural rubber goes towards tire production, and China is the fastest-growing market for tires. Crude oil prices play a key role in the price of natural rubber as well, because synthetic rubber, a close substitute for natural rubber, is a crude oil by-product. Global natural rubber production reached 11.3 million tons during the 12-month period ending May 2013, 60 percent of which is supplied by Thailand and Indonesia. China, meanwhile, accounts for 40 percent of global rubber consumption, a level that has been growing at more than 5 percent per annum during the past few years. That makes the longer term pro-

Figure 17 Coffee prices



Source: World Bank.

Figure 18 Raw material prices



Source: World Bank.

spects of the rubber market sensitive to China's growth outlook, as is the case with most metals and mineral commodities. ***Timber*** prices have been remarkably stable as well during the past two quarters. Initial expectation of a boom in timber demand (and prices) as a result of the post-Tohoku earthquake reconstruction did not materialize, while global demand for timber products has weakened considerably.

Outlook and risks for agricultural commodities

Agricultural commodity prices are projected to decline 5.9 percent in 2013, with most of the decline to attributable to beverages (-11.7 percent), followed by raw material (-7.1 percent) and food commodities (-4.7 percent). Within the group of food commodities, edible oils are expected to decline the most (-8.9 percent), followed by other food and grains (down 5 percent each). The largest declines among important food commodities are expected to be for soybeans (-10.4 percent) and palm oil (-13.9 percent), followed by other edible oils. Grains are likely to change marginally, with maize down 1.1 percent, rice down by 3.2 percent and wheat up a bit. The decline in beverage prices will be led by arabica coffee (-23.4 percent), and less so by robusta (-7.4 percent), and cocoa (-5.9 percent), while Malaysian logs and rubber will account for most of the weakening in raw materials (about -14 percent each). A number of assumptions (along with associated risks) underpin the outlook for agricultural commodities—namely, crop conditions, energy prices, biofuels, macroeconomic environment, and trade policies. A detailed assessment of these risks is given below.

Crop conditions

It is assumed that crop production in the Southern Hemisphere will not experience any adverse weather conditions, and that next season's outlook will return to normal trends. In its July 2013 outlook assessment, the U.S. Department of Agriculture estimated the 2013/14 crop season's global grain supplies (production plus starting stocks) at 2.53 billion tons, up 5 percent from 2012/13, a level that would replenish most of the losses due to the 2012 summer heat wave. If history is any guide, when markets experience negative supply shocks similar to the 2012 drought, production comes

Figure 19a Global maize supplies

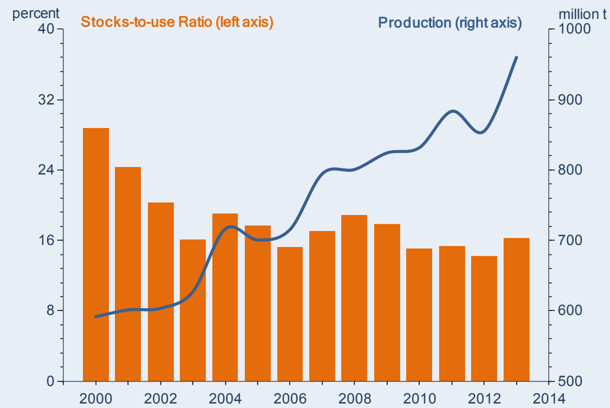


Figure 19b Global wheat supplies

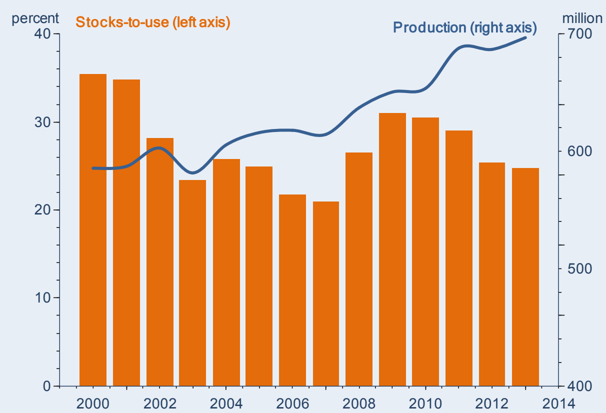
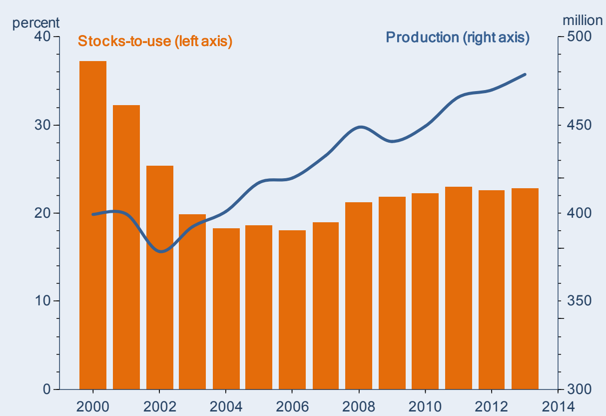


Figure 19c Global rice supplies



Source: U.S. Department of Agriculture, July 2013 update.

back within one (perhaps two) seasons through resource shifting, as has been the case in previous episodes (for example, maize in 2004/05, wheat in 2002/03, and rice in 2001/02, as shown in figure 19). However, it may take up to three seasons before stocks are fully replenished—subjecting the maize and (less so) wheat prices to upside risks. As discussed earlier, the rice market is well supplied, also reflected in the remarkable stability of rice prices.

Oil prices

The baseline forecast underlying this outlook assumes that crude oil prices will ease marginally in 2013 and that fertilizer prices will experience a 10 percent decline. (Fertilizer and crude oil are both key inputs for the agriculture sector, especially grains and oilseeds.) However, because of the energy intensive nature of agriculture—the industry has been estimated to be four to five times more energy intensive than manufacturing—an energy price spike could trigger proportional food price increases. The energy price cross-price elasticity of agricultural goods and energy ranges from 0.2 to 0.3 (depending on the commodity), implying that a 10 percent increase in energy prices will induce a 2-3 percent increase in agricultural prices.

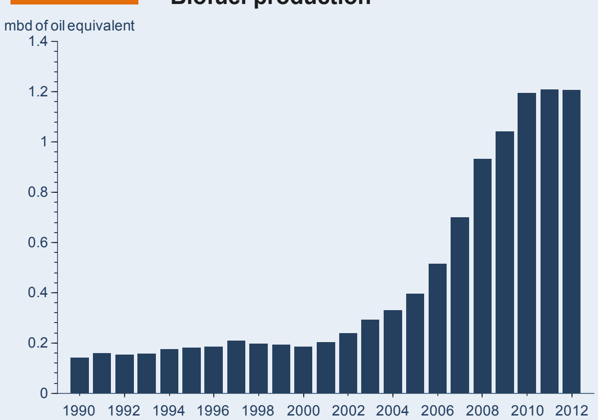
Biofuels

Despite the fact that global biofuel production remained flat during 2010-12, the outlook assumes biofuels will continue to play a key role in the behavior of agricultural commodity markets. Currently, global biofuels production corresponds to 1.3 mb/d of crude oil production in energy-equivalent terms and is projected to grow moderately over the projection period.

In the longer term, there is much uncertainty about biofuel production. If biofuel production increases at the rates suggested by some forecasts (more than 5 percent annually), as much as 10 percent of global land area allocated to grains and oilseeds could be producing biofuel crops (evaluated at world average yields) within the next two decades. Such assumptions are supported by the baselines of the joint *OECD/FAO Agricultural Outlook* as well as the *IEA Energy Outlook*, published in May 2013. However, policy makers are increasingly realizing that the environmental and energy security benefits of biofuels may not outweigh their costs, thus biofuels policies are likely to ease. Indeed, biofuel production grew very little during the past two years (figure 20).

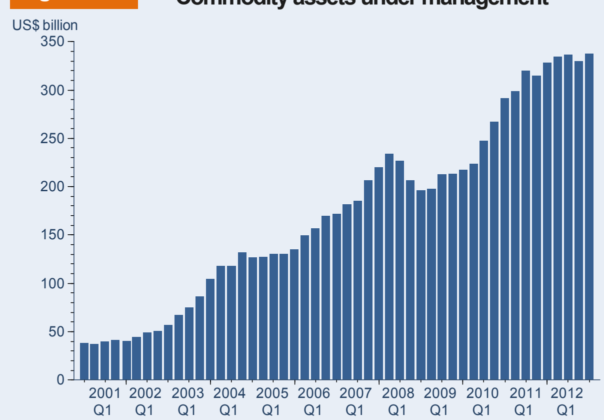
The likely long-term impact of biofuels on food prices is complex, however, as it goes far beyond land diversion, subsidies, and mandates. The impact is likely to depend more on two other factors: (i) the level at which crude oil prices make biofuels profitable, and (ii) whether technological developments of biofuel crops (or even new crops) could increase the energy content of the respective plants, thus making them more attractive sources of energy. As a result, high crude oil prices, together with likely technological innovations, could pose large upside risks for agricultural prices in the long term (box 3 elaborates on the profitability and induced innovation issues).

Figure 20 **Biofuel production**



Source: BP statistical Review of World Energy; OECD.

Figure 21 **Commodity assets under management**



Source: BarclayHedge.

Macroeconomic environment

A final risk facing the market for agricultural commodities is a sharp reversal of the loose global macroeconomic environment, including low policy rates and quantitative easing. There are two channels through which interest rates affect commodity prices—all commodities, not just agricultural commodities. The first operates through physical demand and supply: Low interest rates affect stockholding behavior, they reduce borrowing, (which in turn increases investment and hence a rightward shift of future supply), and they expand current consumption. Thus, the effect of interest rates can be positive or negative, or even zero, depending on relative elasticities. The interest rate elasticity for food commodities appears to be near zero (see Baffes and Dennis (2013) for elasticity estimates and a literature review). Other research currently underway by the World Bank shows that the interest rate elasticity for metal prices may be positive, implying that the shift in supply due to a lower cost of capital overwhelms the shift in demand (the impact through stockholding is not as important for metals and minerals).

The second channel through which interest rates impact commodity prices operates through investment fund activity—the so-called financialization of commodities, a controversial and hotly-debated topic. Investment fund activity has increased over the past decade, exceeding $330 billion in 2013Q1, according to BarclayHedge, which tracks developments in the hedge fund industry (figure 21). Most of the funds have been invested in energy and agricultural commodity markets. Some have argued that these funds have sufficiently large weight to unbalance the market, thus impairing the price discovery mechanism. Others, meanwhile, have praised these investment vehicles, claiming that they inject liquidity in commodity markets. Despite some contrasting views, the empirical evidence is, at best, weak. While it is unlikely that these investments affect long-term price trends, they have most likely affected price variability.

Trade policies

Given the experience of recent years, the outlook assumes that policy responses will not upset agricultural markets, an assumption that relies on markets remaining well-supplied. If the baseline outlook materializes, policy actions are unlikely and, if they take place, will be isolated with only limited impact. For example, when the market conditions for rice (in 2008) and cotton (in 2010) were tight, export bans induced price spikes. However, last year's Thai rice purchase program and India's export ban on cotton did not have any discernible impact on the respective prices. Interestingly, cotton prices declined more the day after India's export ban on cotton was announced (in March 2012) than they did the day of the announcement. In fact, there may be a downside price risk for rice if Thailand releases some (or all) of the stocks it accumulated through the purchase program, not an unlikely scenario given that the costs of the program account for as much as 1 percent of the country's total GDP (World Bank 2012).

Recent trends in domestic food prices

The discussion thus far has focused on price movements in U.S. dollar terms. However, what matters most to consumers is the price they pay for food in their home countries. It is not uncommon for prices paid by consumers in an individual country to differ considerably from international prices, at least in the short run. Reasons for this include exchange rate movements, trade policies intended to insulate domestic markets, the distance of domestic trading centers from domestic markets (which can add considerably to marketing costs), quality differences, and differences in the composition of food baskets across countries.

Table 3 reports changes in domestic wholesale prices of three commodities (maize, wheat, and rice) for a set of low- and middle-income countries—the selection of countries was driven, in part, by data availability. These changes are compared to the corresponding world price changes (reported in the top row of each panel). The periods chosen are 2013Q1 against 2012Q4 (capturing short run responses) and 2013Q1 against 2012Q1 (intended to capture longer term effects). The table also reports price changes between 2006-07 and 2011-12, effectively capturing the entire food price boom period.

World prices of all three grains changed little between 2012Q4 and 2013Q1 (maize and wheat down 3.8 and 9.6 percent, respectively and rice up 0.7 percent); the U.S. dollar did not change much either. The corresponding median domestic price changes were –0.6, 5.8, and 0.2 percent. Focusing on the variability of price changes, however, a different picture emerges. The relative calm in world prices is reflected in the domestic prices of rice, and somewhat less so in wheat prices, but not at all in maize prices; five countries experienced a double-digit increase in maize prices despite the moderate decline in world price. A mixed picture emerges as well when 2013Q1 is compared to 2012Q1.

Though median domestic price increases show a pattern similar to those of world prices, there is high variability around these medians for maize and wheat (but not for rice). For example, the world and the domestic median price of maize increased 9.8 and 2.5 percent, respectively. Yet, six of the 17 countries in the sample experienced price declines, while seven countries experienced increases exceeding 20 percent.

The last column of table 3 reports price changes between 2006-07 and 2011-12, periods long enough to be not affected by the presence of lags in any significant way. During these two 2-year periods, the world price of maize, wheat, and rice increased by 107, 41, and 75 percent, respectively. Not surprisingly, all countries experienced large domestic price increases in all three commodities, with corresponding median increases at 74, 66, and 48 percent. As was the case with the shorter periods, there is considerable variation across countries. For example, rice prices increased by 130 percent in East Africa (calculated as the average of prices in Tanzania and Uganda) but only 44 percent in West Africa (calculated as the average of Burkina Faso, Mali, and Niger).

The tentative conclusion from this brief analysis is that in the short term, domestic prices move, for the most part, independently of world prices. A stronger link is present in the longer term but large differences across countries are also present, implying that domestic factors play a dominant and persistent role in the food price determination process of local markets.

Table 3 **Wholesale grain prices (percent change, calculated in nominal local currencies)**

	2013Q1/ 2012Q4	2013Q1/ 2012Q1	2006-07/ 2011-12
	Maize (17 countries)		
World (US$)	**-3.8**	**9.8**	**106.7**
Uganda	20.9	31.4	153.3
Nicaragua	18.6	20.6	73.8
Tanzania	17.7	46.6	130.9
Honduras	11.0	24.3	26.8
Mozambique	10.7	23.5	77.4
Dominican Republic	8.4	0.9	70.0
Bolivia	7.6	-6.9	49.3
Ukraine	4.7	23.1	131.9
Costa Rica	-0.6	4.4	109.3
Thailand	-0.8	1.2	42.6
Rwanda	-1.3	10.4	68.4
El Salvador	-3.7	-23.8	48.4
Panama	-3.8	-9.5	94.4
Peru	-4.0	-7.5	40.9
Guatemala	-4.2	-8.1	51.9
Ethiopia	-6.6	2.5	196.7
Kenya	-15.4	-2.2	128.2
Median	***-0.6***	***2.5***	***73.8***
	Wheat (8 countries)		
World (US$)	**-9.6**	**15.3**	**40.8**
Bolivia	9.9	-4.9	88.5
Sudan	8.9	31.5	132.1
India	7.8	38.3	34.3
Ukraine	5.8	30.9	124.4
Peru	2.6	2.6	25.3
El Salvador	2.5	70.5	43.6
Ethiopia	-1.3	6.0	154.3
Bangladesh	n/a	20.1	20.7
Median	***5.8***	***25.5***	***66.0***
	Rice (19 countries)		
World (US$)	**0.7**	**3.6**	**75.2**
Bangladesh	11.8	4.2	50.1
Tanzania	11.2	-1.1	120.9
Dominican Republic	7.2	1.5	19.5
Niger	6.7	-1.5	40.4
India	4.6	14.9	67.1
Guatemala	2.2	5.2	47.8
Panama	1.4	2.7	51.1
Uganda	1.2	-4.7	140.6
Mali	0.5	-5.8	35.2
Honduras	0.2	9.2	21.4
Burkina Faso	0.0	2.7	57.0
Nicaragua	-0.3	6.7	68.7
Philippines	-0.6	-2.6	39.5
Peru	-0.7	-6.4	32.8
Thailand	-1.8	4.9	47.4
Cambodia	-1.9	0.0	74.1
El Salvador	-3.6	-8.0	33.5
Bolivia	-4.8	0.9	28.6
Rwanda	-12.4	0.1	60.9
Median	***0.2***	***0.9***	***47.8***

Source: World Bank; FAO (http://www.fao.org/giews/pricetool/).

Box 3 **The complex interplay among food, fuels, and biofuels**

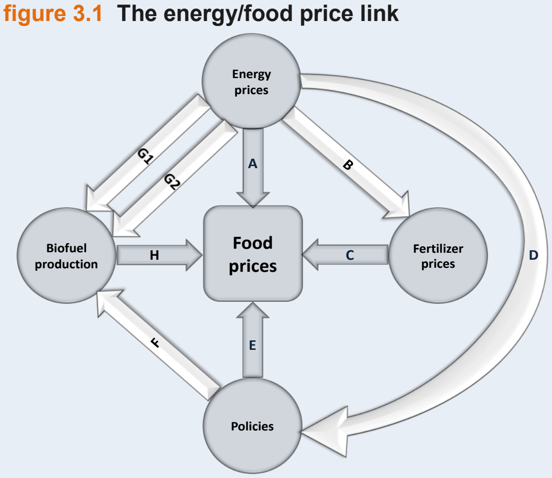
The interaction between food and energy commodities is an important, complex (see box figure 3.1), sometimes misunderstood, and hotly debated subject. High energy prices may affect food prices through four channels: higher cost of producing food, biofuel policies, profitable biofuels, and increasing biofuel profitability through induced innovation. In the long term, energy could play an even more important role in the determination of food prices.

The cost link (A and B/C in box figure 3.1). The strong relationship between energy and non-energy prices was established long before the post-2004 price boom. Gilbert (1989) estimated transmission elasticity from energy to non-energy commodities of 0.12 and from energy to food commodities of 0.25. Hanson, Robinson, and Schluter (1993) based on a general equilibrium model found a significant effect of oil price changes to agricultural producer prices in the United States. Borensztein and Reinhart (1994) estimated transmission elasticity to non-energy commodities of 0.11. A strong relationship between energy and non-energy prices was found by Chaudhuri (2001) as well. Baffes (2007) estimated transmission elasticities of 0.16 and 0.18 for non-energy and food commodities, respectively. Moss, Livanis, and Schmitz (2010) found that U.S. agriculture's energy demand is more sensitive to price changes than any other input. Pindyck and Rotemberg (1990) concluded that various unrelated primary commodity prices not only co-move, but also co-move in excess of what macroeconomic fundamentals can explain. The strong energy/food price link is also evidenced by input-output values of the GTAP database, which show that the direct energy component of the agriculture sector is four to five times higher than that of the manufacturing sector (box figure 3.2).

The policy-driven biofuel link (D/F): In addition to being a key cost component, energy plays an important role on the demand side through the diversion of some food commodities to the production of biofuels. The role of biofuels is not new. Kovarick (2012) identified four periods of biofuel use. The first went up to the mid-19th century, when the chief uses of biofuels were cooking and lighting. The second period, the early 20th century, saw the expanded use of biofuels in the internal combustion engines. The third, covering the mid- to late 20th century, includes mainly the oil crises of the 1970s. The fourth period, the 21st century, reflects environmental and energy independence concerns. Indeed, biofuels constituted the largest demand growth component of grains and oilseeds during the past decade. Currently, biofuels account for about 2-3 percent of the area allocated to grains and oilseeds and represent the equivalent of 1.2 million barrels of crude oil per day. The largest share of biofuel production (48 percent) comes from maize-based ethanol in the United States, followed by sugarcane-based ethanol from Brazil (22 percent) and edible oil-based biodiesel in Europe (17 percent). Numerous studies have examined the impact of biofuels on food prices, finding a wide range of estimates. Mitchell (2008) found that the expansion of biofuels and the policy reactions that higher prices induced were responsible for almost three-quarters of food price increases during 2000-08. Gilbert (2010) finds that at most one-quarter to one-third of the rise in food prices over 2006–08 can be directly attributed to biofuels. Roberts and Schlenker (2010) conclude that U.S. biofuel mandates increase maize prices roughly 20 percent.

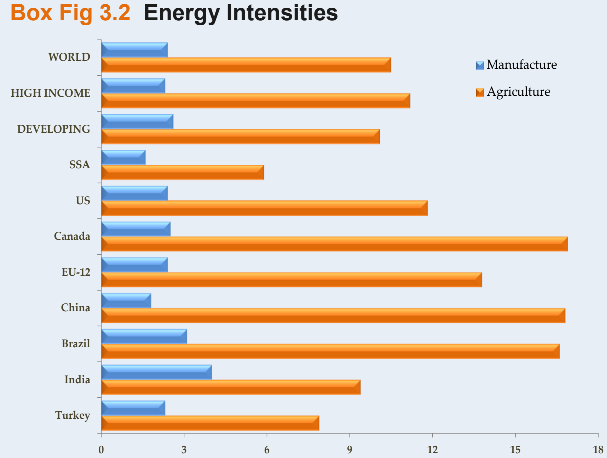
More recently, the impact of biofuels on food prices has been studied through the link between energy and non-energy prices. Serra (2011) found not only a long-run linkage between ethanol and sugarcane prices in Brazil but also that crude oil and sugarcane prices lead ethanol prices—not vice versa. Saghaian (2010) established strong correlation among oil and other commodity prices (including food) but the evidence for a causal link from oil to other commodities was mixed. Gilbert (2010) found correlation between the oil and food prices both in terms of levels and changes, but also noted that it is the result of common causation rather than a direct causal link. Zhang and others (2010) found no direct long-run relationship between fuel and agricultural commodity prices and only a limited short-run relationship. Reboredo (2012) concluded that the prices of maize, wheat, and soybeans are not driven by oil price fluctuations.

Box figure 3.1 **The energy/food price link**



Source: Baffes (2013).

Box Fig 3.2 **Energy Intensities**



Source: World Bank; GTAP database.

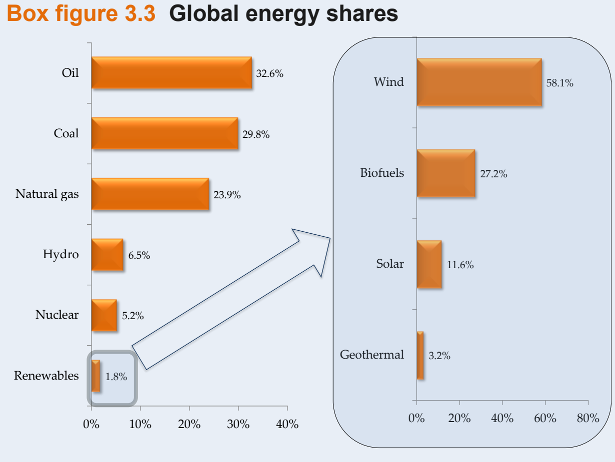
Overall, despite a nearly six-fold increase in biofuel production during the 2000s, the price link between energy and food commodities is not as clear-cut as some would have expected. This may partly be explained by the non-market influence of mandates, which caused biofuel production to rise (and perhaps influence food prices) independently of movements in oil prices. Consider an exogenous shock that pushes up crude oil prices and, in turn, lowers fuel consumption. With a mandated ethanol/gasoline mixture in place, both ethanol and maize prices will decline, *ceteris paribus*, leading to a negative food-oil price relationship (de Gorter and Just 2009).

Link through profitable biofuels (G1): A more important issue is the level at which energy prices provide a floor to food prices. If biofuels are profitable at current energy prices, the income elasticity of food will rise toward the higher elasticity of the larger (box figure 3.3) energy market, a point highlighted by numerous authors, including Lustig (2008), Heady and Fan (2010), and Baffes and Dennis (2013). Various rules of thumb to determine when biofuel production becomes profitable have been posited. One such rule suggests profitability is reached when the US$ barrel price of crude oil is 50 percent or more than the US$ price per ton of maize. Another places it at $3/gallon of gasoline at the pump (in the United States). A World Bank (2009) report argued that because of the strong correlation between the maize and crude oil prices above $50/barrel, crude oil dictate maize prices. The U.S. Government Accountability Office (2009) noted that oil above the $80-$120/barrel range may make biofuels profitable (depending on the circumstances). Babcock (2011) noted that high crude oil prices would have created market-driven investment incentives in the U.S. ethanol industry even in the absence of policies.

Induced innovation link (G2): Profitable biofuels may induce innovations by increasing the energy content of biofuel crops, hence increasing food prices even further. Consider the following illustrative example: one hectare of land produces 10 tons of maize, which generates $2,500 in farmgate revenue either by supplying maize to the food and feed industry at $250/ton or by selling it to the ethanol industry at $0.63/liter (assuming 4,000 liters maize-to-ethanol conversion). If an improved maize variety were to increase the ethanol content by 10 percent, it would generate $2,750/hectare in farmgate revenue, raising the cost of maize to the food and feed industries to $275/ton, since this is how much the ethanol industry would pay. Furthermore, the innovation in the energy content of maize would induce proportional price increases in all crops that could be grown on that land. While the above example is hypothetical, it does illustrate how innovations in the energy content (or in the efficiency of extracting ethanol) of existing or new crops could trigger food price increases, even in the absence of changes in energy prices or demand and supply conditions of food commodities.

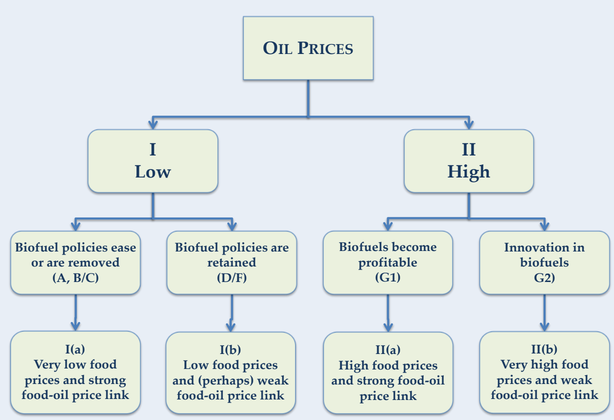
The food-fuel-biofuel link can be summarized in two oil price scenarios (box figure 3.4). The less likely of the two, the "low" oil price scenario, could materialize if a sharp slowdown in emerging economy growth takes place. It could also materialize in response to innovation in battery technology and/or large-scale utilization of natural gas, both of which could lead to substitution away from crude oil to electricity and natural gas by the transportation industry. With low oil prices, the energy costs to agriculture would decline, leading to lower food prices—scenario I(b). Low oil prices may ease biofuel policies, lowering food prices even further—scenario I(a). Interestingly, while scenario I(a) is consistent with a strong link between oil and food prices (through production costs), scenario I(b) implies a weakening of the link (because of the mandated nature of biofuels). Now consider the "high" oil price scenario. As noted above, high oil prices are likely to make biofuels profitable, in which case food and oil prices will move in a synchronous manner—scenario II(a). Moreover, profitable biofuels may induce innovation in the energy content of crops, in which case food prices could increase even further—scenario II(b). Under scenario II(b), the oil-food price link may weaken since food prices may increase even if demand and supply conditions for food and energy markets do not change.

Box figure 3.3 Global energy shares



Source: World Bank; BP Statistical Review.

Box figure 3.4 Oil and food price scenarios



Source: World Bank

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Table A1: Commodity Price Data

		Annual averages			Quarterly averages					Monthly averages		
		Jan-Dec	Jan-Dec	Jan-Dec	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Apr	May	Jun
Commodity	**Unit**	2010	2011	2012	2012Q2	2012Q3	2012Q4	2013Q1	2013Q2	2013M04	2013M05	2013M06
Energy												
Coal, Australia	a/ $/mt	99.0	121.4	96.4	95.5	89.4	86.9	92.9	86.1	87.8	87.7	82.8
Coal, Colombia	$/mt	78.0	111.5	84.0	82.2	82.7	79.3	79.3	71.8	75.1	73.4	66.9
Coal, South Africa	$/mt	91.6	116.3	92.9	93.5	87.4	85.8	84.7	80.4	82.0	81.8	77.3
Crude oil, average	a/ $/bbl	79.0	104.0	105.0	102.8	102.8	101.9	105.1	99.3	98.9	99.4	99.7
Crude oil, Brent	a/ $/bbl	79.6	110.9	112.0	108.9	110.0	110.5	112.9	103.0	102.9	103.0	103.1
Crude oil, Dubai	a/ $/bbl	78.1	106.0	108.9	106.2	106.2	107.2	108.0	100.8	101.7	100.3	100.3
Crude oil, West Texas Int.	a/ $/bbl	79.4	95.1	94.2	93.4	92.2	88.1	94.3	94.2	92.0	94.8	95.8
Natural gas Index	a/ 2005=100	91.1	107.3	108.2	106.3	108.0	112.1	114.5	120.6	125.0	120.2	116.8
Natural gas, Europe	a/ $/mmbtu	8.3	10.5	11.5	11.5	11.1	11.7	11.8	12.4	12.9	12.3	11.9
Natural gas, US	a/ $/mmbtu	4.4	4.0	2.8	2.3	2.9	3.4	3.5	4.0	4.2	4.0	3.8
Natural gas LNG	a/ $/mmbtu	10.8	14.7	16.6	17.1	17.6	15.2	16.2	16.0	16.2	15.9	16.1
Non Energy												
Agriculture												
Beverages												
Cocoa	b/ ¢/kg	313.3	298.0	239.2	228.2	249.4	245.1	220.9	230.7	229.4	234.3	228.4
Coffee, arabica	b/ ¢/kg	432.0	597.6	411.1	400.4	400.0	357.1	335.5	319.9	330.3	324.5	304.8
Coffee, robusta	b/ ¢/kg	173.6	240.8	226.7	231.0	234.1	219.5	227.8	214.3	224.2	218.6	200.1
Tea, auctions (3) avg.	b/ ¢/kg	288.5	292.1	289.8	292.2	308.4	303.6	294.6	287.3	288.9	295.4	277.5
Tea, Colombo auctions	b/ ¢/kg	329.0	326.4	306.3	304.7	308.1	319.5	338.4	328.5	339.1	329.2	317.3
Tea, Kolkata auctions	b/ ¢/kg	280.5	277.9	275.0	289.9	313.4	291.4	258.1	297.9	290.9	318.4	284.4
Tea, Mombasa auctions	b/ ¢/kg	256.0	271.9	288.1	282.0	303.5	300.0	287.3	235.4	236.8	238.8	230.8
Food												
Fats and Oils												
Coconut oil	b/ $/mt	1,123.6	1,730.1	1,110.8	1,187.0	1,012.7	843.7	836.7	839.0	793.0	828.0	896.0
Copra	$/mt	749.6	1,157.3	740.6	793.3	671.7	564.7	553.3	560.0	523.0	556.0	601.0
Groundnuts	$/mt	1,283.9	2,086.2	2,174.5	2,616.7	1,858.3	1,423.0	1,360.3	1,400.0	1,400.0	1,400.0	1,400.0
Groundnut oil	b/ $/mt	1,403.9	1,988.2	2,435.7	2,548.3	2,476.3	2,298.0	2,002.0	1,859.7	1,899.0	1,867.0	1,813.0
Palm oil	b/ $/mt	900.8	1,125.4	999.3	1,088.3	993.0	809.3	852.7	850.7	842.0	849.0	861.0
Palmkernel oil	$/mt	1,184.2	1,648.3	1,110.3	1,242.3	1,019.7	813.0	824.3	836.7	828.0	827.0	855.0
Soybean meal	b/ $/mt	378.4	398.0	524.1	487.7	630.3	586.7	531.0	528.3	484.0	543.0	558.0
Soybean oil	b/ $/mt	1,004.6	1,299.3	1,226.3	1,236.0	1,258.0	1,157.7	1,160.3	1,070.3	1,095.0	1,073.0	1,043.0
Soybeans	b/ $/mt	449.8	540.7	591.4	571.7	672.0	604.3	566.3	505.3	495.0	497.0	524.0
Grains												
Barley	b/ $/mt	158.4	207.2	240.3	237.8	258.4	249.3	239.5	229.7	229.5	229.8	229.9
Maize	b/ $/mt	185.9	291.7	298.4	270.2	328.6	317.2	305.0	291.3	279.9	295.5	298.4
Rice, Thailand, 5%	b/ $/mt	488.9	543.0	563.0	582.8	568.3	558.4	562.1	546.4	557.0	543.5	538.8
Rice, Thailand, 25%	$/mt	441.5	506.0	..	..	547.9	530.8	537.9	509.4	535.6	508.8	483.8
Rice,Thai, A.1	$/mt	383.7	458.6	525.1	545.4	513.3	521.2	532.5	511.1	530.6	510.8	492.0
Rice, Vietnam 5%	$/mt	429.2	513.6	434.4	428.7	433.6	438.6	401.5	387.8	390.8	386.8	385.9
Sorghum	$/mt	165.4	268.7	271.9	259.4	273.4	285.4	292.0	259.9	269.2	273.6	236.8
Wheat, Canada	$/mt	312.4	439.6	..	..	..	..	..	..	..	..	..
Wheat, US, HRW	b/ $/mt	223.6	316.3	313.2	269.0	349.5	355.7	321.4	313.8	308.3	319.7	313.4
Wheat, US, SRW	$/mt	229.7	285.9	295.4	251.8	333.4	337.3	297.6	275.2	278.1	279.3	268.2
Other Food												
Bananas, Europe	$/mt	1,002.2	1,124.7	1,099.7	1,171.2	982.3	1,102.8	1,095.7	1,072.4	1,103.3	1,054.0	1,060.0
Bananas, US	b/ $/mt	868.3	968.0	984.0	979.2	959.9	944.5	929.6	907.2	902.5	909.4	909.8
Fishmeal	$/mt	1,687.5	1,537.4	1,558.3	1,481.3	1,676.7	1,775.7	1,868.7	1,821.7	1,847.0	1,816.0	1,802.0
Meat, beef	b/ ¢/kg	335.1	404.2	414.2	413.0	400.1	419.1	427.1	410.8	426.2	419.8	386.5
Meat, chicken	b/ ¢/kg	189.2	192.6	207.9	207.1	209.7	213.2	221.0	229.4	226.1	229.5	232.7
Meat, sheep	¢/kg	531.4	663.1	609.1	618.3	587.5	586.2	553.2	545.5	543.5	542.7	550.2
Oranges	b/ $/mt	1,033.2	891.1	868.0	843.8	995.5	861.9	825.9	1,062.0	980.5	1,057.0	1,148.5
Shrimp	¢/kg	1,004.5	1,193.1	1,006.5	977.4	970.0	1,023.9	1,126.2	1,146.4	1,146.4	1,146.4	1,146.4
Sugar, EU	b/ ¢/kg	44.2	45.5	42.0	41.9	40.9	42.4	43.1	42.7	42.5	42.4	43.1
Sugar, US	b/ ¢/kg	79.2	83.9	63.6	66.6	61.5	50.5	46.4	43.4	44.8	43.0	42.3
Sugar, world	b/ ¢/kg	46.9	57.3	47.5	47.1	46.8	43.3	40.9	38.6	39.3	38.9	37.7
Raw Materials												
Timber												
Logs, Cameroon	$/cum	428.6	484.8	451.4	452.6	436.2	453.2	456.2	457.4	455.9	454.2	462.0
Logs, Malaysia	b/ $/cum	278.2	390.5	360.5	361.0	355.1	352.7	322.5	301.8	304.5	294.8	306.0
Plywood	¢/sheets	569.1	607.5	610.3	609.9	607.1	611.5	591.6	553.5	558.6	540.7	561.3
Sawnwood, Cameroon	$/cum	812.7	825.8	759.3	760.7	755.2	765.9	740.7	736.2	733.6	732.5	742.6
Sawnwood, Malaysia	b/ $/cum	848.3	939.4	876.3	883.8	864.3	874.4	845.2	837.4	834.4	833.2	844.6
Woodpulp	$/mt	866.8	899.6	762.8	786.8	735.2	748.2	784.0	818.7	807.0	817.0	832.0

Table A1: Commodity Price Data

		Annual averages			Quarterly averages					Monthly averages		
		Jan-Dec	Jan-Dec	Jan-Dec	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Apr	May	Jun
Commodity	**Unit**	2010	2011	2012	2012Q2	2012Q3	2012Q4	2013Q1	2013Q2	2013M04	2013M05	2013M06
Raw Materials												
Timber												
Logs, Cameroon	$/cum	428.6	484.8	451.4	452.6	436.2	453.2	456.2	457.4	455.9	454.2	462.0
Logs, Malaysia	b/ $/cum	278.2	390.5	360.5	361.0	355.1	352.7	322.5	301.8	304.5	294.8	306.0
Plywood	¢/sheets	569.1	607.5	610.3	609.9	607.1	611.5	591.6	553.5	558.6	540.7	561.3
Sawnwood, Cameroon	$/cum	812.7	825.8	759.3	760.7	755.2	765.9	740.7	736.2	733.6	732.5	742.6
Sawnwood, Malaysia	b/ $/cum	848.3	939.4	876.3	883.8	864.3	874.4	845.2	837.4	834.4	833.2	844.6
Woodpulp	$/mt	866.8	899.6	762.8	786.8	735.2	748.2	784.0	818.7	807.0	817.0	832.0
Other Raw Materials												
Cotton	b/ ¢/kg	228.3	332.9	196.7	198.9	185.6	180.9	198.2	204.3	203.4	204.3	205.2
Rubber, RSS3	b/ ¢/kg	365.4	482.3	337.7	359.1	297.0	309.6	315.6	290.5	286.7	303.8	281.0
Rubber, TSR20	¢/kg	338.1	451.9	315.6	330.1	275.0	288.3	296.3	244.6	249.9	251.3	232.6
Fertilizers												
DAP	b/ $/mt	500.7	618.9	539.8	545.2	565.0	532.3	491.6	490.5	508.3	485.1	478.3
Phosphate rock	b/ $/mt	123.0	184.9	185.9	179.4	183.3	185.0	173.0	166.3	168.8	165.0	165.0
Potassium chloride	b/ $/mt	331.9	435.3	459.0	461.3	464.8	430.1	390.8	392.3	391.5	393.0	392.5
TSP	b/ $/mt	381.9	538.3	462.0	470.4	485.0	452.2	435.0	426.0	435.0	423.0	420.0
Urea	b/ $/mt	288.6	421.0	405.4	470.0	381.3	383.0	396.6	342.4	361.5	344.4	321.4
Metals and Minerals												
Aluminum	b/ $/mt	2,173.1	2,401.4	2,023.3	1,982.5	1,928.6	2,003.3	2,000.3	1,836.1	1,861.7	1,832.0	1,814.5
Copper	b/ $/mt	7,534.8	8,828.2	7,962.3	7,889.4	7,729.2	7,913.2	7,918.0	7,161.3	7,234.3	7,249.4	7,000.2
Iron ore	$/dmt	145.9	167.8	128.5	139.6	111.6	120.9	148.5	125.5	137.4	124.4	114.8
Lead	b/ ¢/kg	214.8	240.1	206.5	197.9	198.7	220.1	229.0	205.3	202.7	203.3	210.0
Nickel	b/ $/mt	21,808.9	22,910.4	17,547.5	17,185.7	16,383.9	16,984.2	17,295.8	14,967.1	15,673.0	14,948.0	14,280.3
Tin	b/ ¢/kg	2,040.6	2,605.4	2,112.6	2,062.6	1,936.3	2,160.9	2,401.8	2,090.2	2,166.2	2,077.6	2,026.7
Zinc	b/ ¢/kg	216.1	219.4	195.0	193.2	189.2	195.2	202.9	184.2	185.6	183.2	183.9
Precious Metals												
Gold	$/toz	1,224.7	1,569.2	1,669.5	1,612.3	1,656.5	1,717.7	1,630.8	1,415.1	1,487.9	1,414.0	1,343.4
Platinum	$/toz	1,609.8	1,719.5	1,550.8	1,500.1	1,500.9	1,598.1	1,632.1	1,466.2	1,493.1	1,475.2	1,430.2
Silver	¢/toz	2,015.3	3,522.4	3,113.7	2,941.0	2,994.7	3,261.2	3,006.0	2,316.7	2,535.5	2,303.8	2,110.9
World Bank commodity price indices (2005 =100)												
Energy		144.7	188.2	187.4	183.7	183.2	182.0	187.9	178.7	178.6	178.9	178.7
Non Energy		173.9	209.9	190.0	189.3	191.0	186.9	185.9	175.6	176.0	176.8	174.2
Agriculture		170.4	209.0	194.0	191.7	200.6	191.1	185.6	180.2	178.0	181.8	181.0
Beverages		182.1	208.2	166.2	162.7	169.7	160.8	151.8	149.9	152.1	152.7	144.9
Food		169.6	210.1	211.6	206.9	225.2	210.7	203.8	197.6	193.8	199.0	200.0
Fats and Oils		184.5	222.7	230.0	231.1	250.2	221.9	214.0	205.6	199.1	206.5	211.1
Grains		171.8	238.5	244.2	227.2	264.0	258.9	248.1	239.2	234.7	241.6	241.3
Other Food		148.2	167.8	157.9	156.8	157.1	152.4	150.1	149.4	150.0	150.5	147.9
Raw Materials		166.3	206.7	165.3	169.3	156.6	158.9	158.5	153.5	152.6	154.8	153.2
Timber		130.5	153.5	142.7	143.7	140.7	141.7	134.9	131.8	131.7	130.5	133.1
Other Raw Materials		205.4	264.8	190.0	197.4	173.9	177.7	184.3	177.3	175.4	181.4	175.1
Fertilizers		187.2	267.0	259.2	270.0	256.9	249.9	240.8	227.1	232.6	226.7	222.0
Metals and Minerals c/		179.6	205.5	174.0	175.4	163.9	171.1	180.4	160.4	165.5	160.8	154.8
Base Metals d/		169.2	193.2	168.6	166.2	162.1	167.7	169.2	152.8	154.9	153.7	149.7
Precious Metals		272.2	371.9	378.3	363.6	372.7	390.7	369.0	312.8	331.3	312.3	294.8

a/ Included in the energy index (2005=100), b/ Included in the non-energy index (2005=100), c/ base metals plus iron ore, d/ Includes aluminum, copper, lead, nickel, tin and zinc

$ = US dollar ¢ = US cent bbl = barrel cum = cubic meter dmt = dry metric ton dmtu = dry metric ton unit kg = kilogram
mmbtu = million British thermal units mt = metric ton toz = troy oz n.a. = not available n.q. = no quotation

Sources include: Africa Tea Brokers Ltd Weekly Market Report, Bloomberg, Canadian Grain Commission, Canadian Wheat Board, Cotton Outlook, Coal Week International, Fertilizer International, Fertilizer Week, FRuiTROP, IHS McCloskey Coal Report, INFOFISH, INTERFEL Fel Actualités hebdo, International Cocoa Organization, International Coffee Organization, International Rubber Study Group, International Tea Committee, International Tropical Timber Organization, Internatonal Sugar Organization, ISTA Mielke GmbH Oil World, Japan Lumber Journal, Japan Metal Bulletin, Meat Trades Journal, MLA Meat & Livestock Weekly, Platts International Coal Report, Platts Metals Week, The Silver Institute, Singapore

Table A2: Commodity Prices and Price Forecast in Nominal US Dollars

		Actual						Forecast								
Commodity	**Unit**	**1980**	**1990**	**2000**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2025**
Energy																
Coal, Australian	$/mt	40.1	39.7	26.3	99.0	121.4	96.4	90.0	91.0	90.0	91.0	91.9	92.9	93.9	94.9	100.0
Crude oil, avg, spot	$/bbl	36.9	22.9	28.2	79.0	104.0	105.0	100.7	99.6	98.9	98.0	97.2	96.6	96.2	95.8	96.1
Natural gas, European	$/mmbtu	4.2	2.8	3.9	8.3	10.5	11.5	12.0	11.5	11.0	10.9	10.8	10.7	10.6	10.5	10.0
Natural gas, US	$/mmbtu	1.6	1.7	4.3	4.4	4.0	2.8	3.8	4.0	4.5	4.7	4.9	5.1	5.4	5.6	7.0
LNG, Japanese	$/mmbtu	5.7	3.6	4.7	10.8	14.7	16.6	15.5	15.2	15.0	14.7	14.5	14.2	13.9	13.7	12.5
Non Energy Commodities																
Agriculture																
Beverages																
Cocoa	¢/kg	260	127	91	313	298	239	225	232	230	229	228	227	226	225	220
Coffee, Arabica	¢/kg	347	197	192	432	598	411	315	330	340	341	342	343	344	345	350
Coffee, robusta	¢/kg	324	118	91	174	241	227	210	200	185	183	182	180	179	177	170
Tea, auctions (3) ave	¢/kg	166	206	188	288	292	290	280	288	291	295	298	301	305	308	325
Food																
Fats and Oils																
Coconut oil	$/mt	674	337	450	1,124	1,730	1,111	850	900	920	918	916	914	912	910	900
Groundnut oil	$/mt	859	964	714	1,404	1,988	2,436	1,900	1,925	1,900	1,895	1,890	1,885	1,880	1,875	1,850
Palm oil	$/mt	584	290	310	901	1,125	999	860	870	880	872	863	855	847	839	800
Soybean meal	$/mt	262	200	189	378	398	524	530	460	420	416	412	408	404	399	380
Soybean oil	$/mt	598	447	338	1,005	1,299	1,226	1,100	1,075	1,050	1,045	1,040	1,035	1,030	1,025	1,000
Soybeans	$/mt	296	247	212	450	541	591	530	525	520	519	518	517	516	515	510
Grains																
Barley	$/mt	78	80	77	158	207	240	230	215	200	198	197	195	194	192	185
Maize	$/mt	125	109	89	186	292	298	295	270	250	248	246	244	242	240	230
Rice, Thai, 5%	$/mt	411	271	202	489	543	563	545	520	500	498	496	494	492	490	480
Wheat, US, HRW	$/mt	173	136	114	224	316	313	315	310	300	297	295	292	290	287	275
Other Food																
Bananas US	$/mt	377	541	424	868	968	984	930	945	940	938	936	934	932	930	920
Meat, beef	¢/kg	276	256	193	335	404	414	450	425	400	399	398	397	396	395	390
Meat, chicken	¢/kg	76	108	131	189	193	208	220	201	201	202	203	203	204	204	205
Oranges	$/mt	400	531	363	1,033	891	868	1,100	1,050	1,000	993	986	978	971	964	930
Shrimp	¢/kg	1,152	1,069	1,513	1,004	1,193	1,006	1,150	1,035	1,100	1,110	1,120	1,130	1,140	1,150	1,200
Sugar, world	¢/kg	63.2	27.7	18.0	46.9	57.3	47.5	41.0	39.5	38.0	37.7	37.4	37.1	36.8	36.5	35.0
Agricultural Raw Materials																
Timber																
Logs, Cameroonian	$/cum	252	343	275	429	485	451	460	460	465	473	481	489	497	505	535
Logs, Malaysian	$/cum	196	177	190	278	391	361	310	345	368	374	381	387	393	400	425
Sawnwood, Malaysian	$/cum	396	533	595	848	939	876	840	885	902	919	937	955	974	1,000	1,080
Other Raw Materials																
Cotton A Index	¢/kg	206	182	130	228	333	197	200	203	205	209	213	218	222	226	250
Rubber, Malaysian	¢/kg	142	86	67	365	482	338	290	305	310	309	308	307	306	305	300
Tobacco	$/mt	2,276	3,392	2,976	4,333	4,485	4,302	4,350	4,200	4,150	4,140	4,130	4,120	4,110	4,100	4,050
Fertilizers																
DAP	$/mt	222	171	154	501	619	540	490	485	480	478	476	474	472	470	460
Phosphate rock	$/mt	47	41	44	123	185	186	170	160	150	145	140	135	130	125	105
Pottasium chloride	$/mt	116	98	123	332	435	459	400	390	380	375	369	364	359	354	330
TSP	$/mt	180	132	138	382	538	462	425	425	420	415	409	404	399	394	370
Urea	$/mt	192	119	101	289	421	405	360	355	350	345	339	334	329	324	300
Metals and Minerals																
Aluminum	$/mt	1,775	1,639	1,549	2,173	2,401	2,023	1,900	2,100	2,200	2,246	2,292	2,339	2,388	2,437	2,700
Copper	$/mt	2,182	2,661	1,813	7,535	8,828	7,962	7,100	7,050	7,000	6,980	6,960	6,939	6,919	6,899	6,800
Iron ore	¢/dmtu	28	33	29	146	168	128	120	125	130	131	133	134	136	137	145
Lead	¢/kg	91	81	45	215	240	206	210	215	220	220	221	221	222	222	225
Nickel	$/mt	6,519	8,864	8,638	21,809	22,910	17,548	15,000	18,200	18,500	18,645	18,791	18,938	19,086	19,235	20,000
Tin	¢/kg	1,677	609	544	2,041	2,605	2,113	2,100	2,200	2,300	2,319	2,339	2,358	2,378	2,398	2,500
Zinc	¢/kg	76	151	113	216	219	195	190	215	230	232	234	236	238	240	250
Precious Metals																
Gold	$/toz	608	383	279	1,225	1,569	1,670	1,380	1,360	1,350	1,345	1,340	1,335	1,330	1,325	1,300
Silver	c/toz	2,080	483	495	2,015	3,522	3,114	2,200	2,250	2,280	2,282	2,284	2,286	2,288	2,290	2,300
Platinum	$/toz	679	472	545	1,610	1,719	1,551	1,480	1,450	1,400	1,384	1,369	1,353	1,338	1,323	1,250

a/ iron ore unit for years 1980 to 2005 is cents/ dmtu, thereafter is $/dmt.

Source: World Bank

Table A3: Commodity Prices and Price Forecast in Real 2005 US Dollars

		Actual						Forecast								
Commodity	**Unit**	**1980**	**1990**	**2000**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2025**
Energy																
Coal, Australian	$/mt	52.7	41.1	29.4	87.6	99.1	80.3	75.7	75.1	73.4	73.4	73.3	73.1	72.8	72.4	70.0
Crude oil, avg, spot	$/bbl	48.4	23.7	31.6	70.0	84.9	87.6	84.7	82.3	80.7	79.1	77.6	76.1	74.6	73.1	67.3
Natural gas, European	$/mmbtu	5.5	2.9	4.3	7.3	8.6	9.6	10.1	9.5	9.0	8.8	8.6	8.4	8.2	8.0	7.0
Natural gas, US	$/mmbtu	2.1	1.8	4.8	3.9	3.3	2.3	3.2	3.3	3.7	3.8	3.9	4.0	4.2	4.3	4.9
LNG, Japanese	$/mmbtu	7.5	3.8	5.3	9.6	12.0	13.8	13.0	12.5	12.2	11.9	11.5	11.2	10.8	10.5	8.8
Non Energy Commodities																
Agriculture																
Beverages																
Cocoa	¢/kg	342	131	101	277	243	199	189	192	188	185	182	179	175	172	154
Coffee, Arabica	¢/kg	455	204	215	382	488	343	265	272	277	275	273	270	267	263	245
Coffee, robusta	¢/kg	426	122	102	154	197	189	177	165	151	148	145	142	139	135	119
Tea, auctions (3) ave	¢/kg	218	213	210	255	238	242	236	238	238	238	238	237	236	235	228
Food																
Fats and Oils																
Coconut oil	$/mt	884	348	504	995	1,412	926	715	743	751	741	731	719	707	695	630
Groundnut oil	$/mt	1,127	998	799	1,243	1,623	2,031	1,599	1,589	1,550	1,529	1,507	1,483	1,458	1,431	1,296
Palm oil	$/mt	766	300	347	798	919	833	724	718	718	703	689	673	657	640	560
Soybean meal	$/mt	344	207	212	335	325	437	446	380	343	336	328	321	313	305	266
Soybean oil	$/mt	784	463	378	889	1,060	1,022	926	887	857	843	829	814	799	782	700
Soybeans	$/mt	389	255	237	398	441	493	446	433	424	419	413	407	400	393	357
Grains																
Barley	$/mt	103	83	86	140	169	200	194	177	163	160	157	154	150	147	130
Maize	$/mt	164	113	99	165	238	249	248	223	204	200	196	192	188	183	161
Rice, Thai, 5%	$/mt	539	280	227	433	443	469	459	429	408	402	396	389	381	374	336
Wheat, US, HRW	$/mt	227	140	128	198	258	261	265	256	245	240	235	230	225	219	193
Other Food																
Bananas US	$/mt	495	560	475	769	790	820	783	780	767	757	746	735	723	710	644
Meat, beef	¢/kg	362	265	216	297	330	345	379	351	326	322	317	312	307	301	273
Meat, chicken	¢/kg	99	112	147	168	157	173	185	166	164	163	162	160	158	156	143
Oranges	$/mt	525	550	407	915	727	724	926	867	816	801	786	770	753	736	651
Shrimp	¢/kg	1,511	1,107	1,693	889	974	839	968	855	898	896	893	889	884	878	841
Sugar, world	¢/kg	82.9	28.6	20.2	41.6	46.8	39.6	34.5	32.6	31.0	30.4	29.8	29.2	28.5	27.8	24.5
Agricultural Raw Materials																
Timber																
Logs, Cameroonian	$/cum	330	356	308	379	396	376	387	380	379	382	383	385	385	385	375
Logs, Malaysian	$/cum	257	183	213	246	319	301	261	285	300	302	303	304	305	305	298
Sawnwood, Malaysian	$/cum	520	552	666	751	767	731	707	731	736	742	747	752	755	763	757
Other Raw Materials																
Cotton A Index	¢/kg	271	188	146	202	272	164	168	168	167	169	170	171	172	173	175
Rubber, Malaysian	¢/kg	187	90	75	324	394	282	244	252	253	249	246	242	237	233	210
Tobacco	$/mt	2,986	3,511	3,332	3,836	3,661	3,587	3,661	3,467	3,386	3,341	3,294	3,242	3,187	3,129	2,837
Fertilizers																
DAP	$/mt	292	177	173	443	505	450	412	400	392	386	380	373	366	359	322
Phosphate rock	$/mt	61	42	49	109	151	155	143	132	122	117	111	106	101	96	74
Pottasium chloride	$/mt	152	102	137	294	355	383	337	322	310	302	295	287	279	270	231
TSP	$/mt	237	136	154	338	439	385	358	351	343	335	327	318	310	301	259
Urea	$/mt	252	123	113	256	344	338	303	293	286	278	271	263	255	247	210
Metals and Minerals																
Aluminum	$/mt	2,329	1,697	1,734	1,924	1,960	1,687	1,599	1,734	1,795	1,812	1,828	1,841	1,852	1,860	1,891
Copper	$/mt	2,863	2,755	2,030	6,671	7,205	6,639	5,976	5,820	5,712	5,633	5,551	5,461	5,366	5,266	4,763
Iron ore	¢/dmtu	37	34	32	129	137	107	101	103	106	106	106	106	105	105	102
Lead	¢/kg	119	84	51	190	196	172	177	177	180	178	176	174	172	170	158
Nickel	$/mt	8,553	9,176	9,669	19,309	18,699	14,631	12,625	15,024	15,095	15,048	14,987	14,904	14,801	14,682	14,010
Tin	¢/kg	2,201	630	608	1,807	2,126	1,761	1,767	1,816	1,877	1,872	1,865	1,856	1,844	1,830	1,751
Zinc	¢/kg	100	157	126	191	179	163	160	177	188	187	187	186	184	183	175
Metals and Minerals																
Gold	$/toz	798	397	312	1,084	1,281	1,392	1,161	1,123	1,102	1,085	1,069	1,051	1,031	1,011	911
Silver	c/toz	2,730	500	554	1,784	2,875	2,596	1,852	1,857	1,860	1,842	1,822	1,799	1,774	1,748	1,611
Platinum	$/toz	891	488	610	1,425	1,403	1,293	1,246	1,197	1,142	1,117	1,092	1,065	1,038	1,010	876

a/ iron ore unit for years 1980 to 2005 is cents/ dmtu, thereafter is $/dmt.

Source: World Bank

Table A4: Weighted Indices of Commodity Prices and Inflation, 2005=100

	Actual						Projection								
	1980	1990	2000	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025
Price indices in nominal US dollars															
Energy	66.9	43.6	53.3	144.7	188.2	187.4	180.8	179.0	177.6	176.4	175.3	174.5	173.9	173.5	174.9
Non-energy commodities	102.2	84.0	72.2	173.9	209.9	190.0	176.9	176.4	174.9	174.8	174.9	174.9	174.9	175.1	175.4
Agriculture	119.6	90.5	78.7	170.4	209.0	194.0	182.3	178.7	175.1	174.8	174.6	174.3	174.1	174.0	172.6
Beverages	157.7	90.5	76.8	182.1	208.2	166.2	146.7	150.5	150.5	150.5	150.7	150.8	150.9	151.0	151.7
Food	124.6	90.6	76.6	169.6	210.1	211.6	201.6	192.2	185.1	184.0	182.9	181.7	180.6	179.5	174.0
Fats and oils	120.4	82.3	76.6	184.5	222.7	230.0	209.5	201.0	195.8	194.4	193.1	191.8	190.4	189.1	182.8
Grains	126.8	99.4	79.9	171.8	238.5	244.2	240.8	226.4	213.8	212.2	210.6	209.1	207.6	206.0	198.6
Other food	128.0	93.6	73.8	148.2	167.8	157.9	155.7	149.7	145.3	144.8	144.3	143.8	143.3	142.9	140.2
Raw materials	88.0	90.2	84.7	166.3	206.7	165.3	153.6	160.2	163.2	164.8	166.5	168.2	169.9	172.2	179.8
Timber	68.1	82.3	90.9	130.5	153.5	142.7	133.0	142.1	146.6	149.3	152.1	154.9	157.8	161.6	173.8
Other Raw Materials	109.9	98.9	77.9	205.4	264.8	190.0	176.2	180.0	181.4	181.8	182.3	182.7	183.2	183.7	186.4
Fertilizers	89.1	65.4	67.0	187.2	267.0	259.2	232.8	226.6	219.8	215.4	211.2	207.0	203.0	199.0	180.6
Metals and minerals a/	68.1	72.8	59.5	179.6	205.5	174.0	159.3	165.9	169.2	170.3	171.4	172.4	173.5	174.7	180.6
Base Metals b/	73.9	78.1	63.0	169.2	193.2	168.6	153.4	159.8	162.1	162.9	163.7	164.5	165.3	166.2	170.7
Precious Metals	162.7	81.3	63.6	272.2	371.9	378.3	303.7	301.4	300.3	299.4	298.5	297.6	296.7	295.8	291.5
Price indices in real 2005 US dollars c/															
Energy	87.8	45.1	59.6	128.1	153.6	156.2	152.2	147.8	144.9	142.4	139.8	137.3	134.9	132.4	122.5
Non-energy commodities	134.1	87.0	80.8	154.0	171.4	158.4	148.9	145.6	142.7	141.1	139.5	137.6	135.7	133.6	122.9
Agriculture	156.9	93.7	88.1	150.9	170.6	161.7	153.5	147.5	142.9	141.1	139.2	137.2	135.0	132.8	120.9
Beverages	207.0	93.7	86.0	161.3	170.0	138.6	123.5	124.2	122.8	121.5	120.2	118.7	117.0	115.3	106.3
Food	163.4	93.8	85.8	150.2	171.5	176.4	169.7	158.7	151.1	148.5	145.8	143.0	140.1	137.0	121.9
Fats and oils	158.0	85.2	85.7	163.3	181.8	191.8	176.4	165.9	159.7	156.9	154.0	150.9	147.7	144.4	128.1
Grains	166.4	102.9	89.5	152.1	194.7	203.6	202.7	186.9	174.4	171.3	168.0	164.6	161.0	157.3	139.1
Other food	167.9	96.9	82.6	131.2	136.9	131.6	131.0	123.6	118.5	116.8	115.1	113.2	111.2	109.1	98.2
Raw materials	115.5	93.4	94.8	147.2	168.7	137.8	129.3	132.2	133.2	133.0	132.8	132.4	131.8	131.4	126.0
Timber	89.3	85.1	101.8	115.5	125.2	119.0	111.9	117.3	119.6	120.5	121.3	121.9	122.4	123.4	121.8
Other Raw Materials	144.2	102.3	87.2	181.9	216.1	158.4	148.3	148.6	148.0	146.8	145.4	143.8	142.0	140.2	130.6
Fertilizers	116.9	67.7	75.1	165.7	217.9	216.1	195.9	187.0	179.4	173.9	168.4	162.9	157.4	151.9	126.5
Metals and minerals a/	89.4	75.4	66.6	159.0	167.7	145.1	134.1	137.0	138.1	137.4	136.7	135.7	134.6	133.3	126.5
Base Metals b/	97.0	80.9	70.6	149.8	157.7	140.5	129.2	131.9	132.3	131.5	130.5	129.4	128.2	126.8	119.6
Precious Metals	213.4	84.2	71.2	241.0	303.6	315.4	255.6	248.8	245.0	241.6	238.0	234.2	230.1	225.8	204.2
Inflation indices, 2005=100 d/															
MUV index e/	76.2	96.6	89.3	112.9	122.5	119.9	118.8	121.1	122.6	123.9	125.4	127.1	129.0	131.0	142.8
US GDP deflator	47.8	72.3	88.7	111.0	113.4	115.4	116.8	119.4	122.0	124.6	127.3	130.1	132.9	135.8	151.2

a/ Base metals plus iron ore.

b/ Includes aluminum, copper, lead, nickel, tin and zinc.

c/ Real price indices are computed from unrounded data and deflated by the MUV index.

d/ Inflation indices for 2011-2025 are projections. Growth rates for years 1990, 2000 and 2010 refer to compound annual rate of change between adjacent end-point years; all others are annual growth rates from the previous year.

e/ Unit value index of manufacture exports (MUV) in US dollar terms for fifteen countries (Brazil, Canada, China, Germany, France, India, Italy, Japan, Mexico, Republic of Kore South Africa, Spain, Thailand, United Kingdom, and United States).

Source: World Bank. Historical US GDP deflator: US Department of Commerce.

Description of price series

Coal (**Australia)**, thermal, f.o.b. piers, Newcastle/Port Kembla, 6,700 kcal/kg, 90 days forward delivery beginning year 2011; for period 2002-2010, 6,300 kcal/kg (11,340 btu/lb); prior to year 2002, 6,667 kcal/kg (12,000 btu/lb).

Coal (Colombia), thermal, f.o.b. Bolivar, 6,450 kcal/kg, (11,200 btu/lb) ; during years 2002-July 2005 11,600 btu/lb, less than .8% sulfur, 9% ash , 90 days forward delivery

Coal (South Africa), thermal, f.o.b. Richards Bay, 90 days forward delivery; 6,000 kcal/kg, during 2002-2005, 6,200 kcal/kg (11,200 btu/lb); during 1990-2001 6390 kcal/kg (11,500 btu/lb)

Crude oil, average price of Brent, Dubai and West Texas Intermediate, equally weighed.

Crude oil, U.K. Brent 38` API.

Crude oil, Dubai Fateh 32` API.

Crude oil, West Texas Intermediate (WTI) 40` API.

Natural Gas Index (Laspeyres), weights based on 5-year consumption volumes for Europe, US and Japan (LNG), updated every 5 years, except the 11-year period 1960-70.

Natural Gas (Europe), average import border price, including UK. As of April 2010 includes a spot price component. Between June 2000 - March 2010 excludes UK.

Natural Gas (U.S.), spot price at Henry Hub, Louisiana.

Natural gas LNG (Japan), import price, cif, recent two months' averages are estimates.

Cocoa (ICCO), International Cocoa Organization daily price, average of the first three positions on the terminal markets of New York and London, nearest three future trading months.

Coffee (ICO), International Coffee Organization indicator price, other mild Arabicas, average New York and Bremen/Hamburg markets, ex-dock.

Coffee (ICO), International Coffee Organization indicator price, Robustas, average New York and Le Havre/Marseilles markets, ex-dock.

Tea, average three auctions, arithmetic average of quotations at Kolkata, Colombo and Mombasa/Nairobi.

Tea (Colombo auctions), Sri Lankan origin, all tea, arithmetic average of weekly quotes.

Tea (Kolkata auctions), leaf, include excise duty, arithmetic average of weekly quotes.

Tea (Mombasa/Nairobi auctions), African origin, all tea, arithmetic average of weekly quotes.

Coconut oil (Philippines/Indonesia), bulk, c.i.f. Rotterdam.

Copra (Philippines/Indonesia), bulk, c.i.f. N.W. Europe.

Groundnuts (US), Runners 40/50, shelled basis, c.i.f. Rotterdam

Groundnut oil (any origin), c.i.f. Rotterdam.

Palm oil (Malaysia), 5% bulk, c.i.f. N. W. Europe.

Palmkernel Oil (Malaysia), c.I.f. Rotterdam.

Soybean meal (any origin), Argentine 45/46% extraction, c.i.f. Rotterdam beginning 1990; previously US 44%.

Soybean oil (Any origin), crude, f.o.b. ex-mill Netherlands.

Soybeans (US), c.i.f. Rotterdam.

Barley (US) feed, No. 2, spot, 20 days To-Arrive, delivered Minneapolis from May 2012 onwards; during 1980 - 2012 April Canadian, feed, Western No. 1, Winnipeg Commodity Exchange, spot, wholesale farmers' price

Maize (US), no. 2, yellow, f.o.b. US Gulf ports.

Rice (Thailand), 5% broken, white rice (WR), milled, indicative price based on weekly surveys of export transactions, government standard, f.o.b. Bangkok.

Rice (Thailand), 25% broken, WR, milled indicative survey price, government standard, f.o.b. Bangkok.

Rice (Thailand), 100% broken, A.1 Super from 2006 onwards, government standard, f.o.b. Bangkok; prior to 2006, A1 Special, a slightly lower grade than A1 Super.

Rice (Vietnam), 5% broken, WR, milled, weekly indicative survey price, Minimum Export Price, f.o.b. Hanoi.

Sorghum (US), no. 2 milo yellow, f.o.b. Gulf ports.

Wheat (Canada), no. 1, Western Red Spring (CWRS), in store, St. Lawrence, export price.

Wheat (US), no. 1, hard red winter, ordinary protein, export price delivered at the US Gulf port for prompt or 30 days shipment.

Wheat (US), no. 2, soft red winter, export price delivered at the US Gulf port for prompt or 30 days shipment.

Bananas (Central & South America), major brands, free on truck (f.o.t.) Southern Europe, including duties; prior to October 2006, f.o.t. Hamburg.

Bananas (Central & South America), major brands, US import price, f.o.t. US Gulf ports.

Fishmeal (any origin), 64-65%, c&f Bremen, estimates based on wholesale price, beginning 2004; previously c&f Hamburg.

Meat, beef (Australia/New Zealand), chucks and cow forequarters, frozen boneless, 85% chemical lean, c.i.f. U.S. port (East Coast), ex-dock, beginning November 2002; previously cow forequarters.

Meat, chicken (US), broiler/fryer, whole birds, 2-1/2 to 3 pounds, USDA grade "A", ice-packed, Georgia Dock preliminary weighted average, wholesale.

Meat, sheep (New Zealand), frozen whole carcasses Prime Medium (PM) wholesale, Smithfield, London beginning January 2006; previously Prime Light (PL).

Oranges (Mediterranean exporters) navel, EEC indicative import price, c.i.f. Paris.

Shrimp, (Mexico), west coast, frozen, white, No. 1, shell-on, headless, 26 to 30 count per pound, wholesale price at New York.

Sugar (EU), European Union negotiated import price for raw unpackaged sugar from African, Caribbean and Pacific (ACP) under Lome Conventions, c.I.f. European ports.

Sugar (US), nearby futures contract, c.i.f.

Sugar (world), International Sugar Agreement (ISA) daily price, raw, f.o.b. and stowed at greater Caribbean ports.