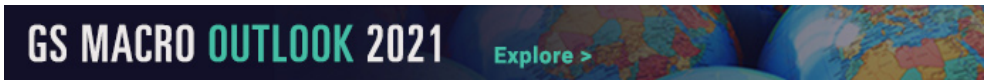
2021 Commodity Outlook

REVing up a structural bull market



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While the vaccine presents tactical upside, the pandemic itself represents a structural shift. Over the past decade the GSCI is down c.60%, erasing 3 decades of gains. We believe this streak of poor returns has reached an end in the aftermath of the Covid crisis. Of course, negative oil prices are hard to top, and it's easy – and largely accurate – to present the 2021 commodity outlook as a V-shaped vaccine trade. What we think is key, however, is that this recovery in commodity prices will actually be the beginning of a much longer structural bull market for commodities driven by three key themes.

1. **Revenge of the old economy.** Structural under-investment in the old economy due to a decade of poor returns, particularly in energy where ESG issues have further reduced investment, was accelerated during 2020 in response to Covid, leaving inadequate production capacity to meet a V-shaped vaccine driven demand recovery. Investment decisions are at a historical trough, taking 7.9 mn bld of oil out of 2025 expected supply. In our view, this will spell the end of non-OPEC growth in 2021.
2. **REV'ing demand through social need.** Covid is already ushering in a new era of policies aimed at social need instead of financial stability. This will likely create cyclically stronger, more commodity-intensive economic growth that should create the elusive cyclical upswing in demand. Three global initiatives have the potential to REV the global demand for commodities: **R**edistributional policies, **E**nvironmental policies and **V**ersatile supply chain initiatives. From China's new 5YP to Europe's Green Deal or Biden's stimulus plan, policymakers are looking to REV demand after a decade of policies aimed at financial stability.
3. **Revaluation and reflation.** Covid has led to a massive rise in government spending, particularly in the US where the dollar was already facing headwinds. Although the dollar got a boost from a flight to safety at the beginning of the crisis, this support is likely to fade in 2021 and beyond, creating a positive feedback loop similar to what it did during the 1970s and 2000s when oil and gold reached historical highs. In addition, inflation tails risks are greater than at any other time since the 1970s due to the REV policies above.

The mid-cycle trap, not supply, created the lost decade. It is tempting to blame supply for the poor performance of commodities over the past decade, particularly given the technological innovations in shale, NPI and smart farming, to name a few. However, there is little evidence for it. In oil, OPEC+ in the spirit of 'market stability' offset shale increases, or in metals Chinese 'supply-side reforms' did the same. In our view, it was the inevitable consequence of global policy focused on financial-stability following the financial crisis. Such policies, by definition, took risk out of the system, and along with it many of the drivers of strong demand growth that would potentially have created inflation, a commodity bull market and, more importantly, the rising tide of wages and income that lifts all boats. This left the global economy stuck in a mid-cycle holding pattern with asset price inflation that benefited high-income households that are far fewer in number and don't volumetrically consume many goods.

Social need policies help escape the mid-cycle trap. The financial crisis was a crisis of financial instability whereas the Covid pandemic is a crisis of social need, the need to deal with political issues that can no longer be ignored such as inequality, climate change and structural unemployment in key sectors and demographics. Policies aimed at social need benefit lower-income households that are larger in number and volumetrically consume more goods. Stimulus aimed at social need creates far more growth than stimulus aimed at fixing a financial crisis. And more importantly, it can create a cyclical upswing in demand to finally reach escape velocity to solidly enter a period of above capacity growth, helping commodities and the old economy out of the mid-cycle trap they have been in for the past decade which lies at the core of the poor performance. Even the US Fed in announcing its new framework, acknowledges a cyclically strong economy helps solve many of these social issues.

A structural bull market on par with the 2000s. Looking at the 2020s, we believe that similar structural forces to those which drove commodities in the 2000s could be at play. Not only can the green capex increase be as big as BRIC's investment 20 years ago, but the redistributative push in DMs, and in China this time, is likely to lead to a large boost to consumer spending, comparable to the lending-fuelled consumption increase in the 2000s. Finally, similar to 2000s, there is structural under-investment in supply of almost all commodities, against a weak dollar backdrop.

But inflation risks like the late 1960s. In the 1960s, the last time social need was escalated to the top of the policy agenda, the focus was the need to project power during the Cold War (today's policy challenges are against Covid, and the effects of US trade war with China) and the need to fight the War on Poverty to calm social unrest (today's is against minority unemployment and income inequality). The US government embarked on an unprecedented spending program and did not raise taxes accordingly, the central bank kept rates low, as inflation had been near 1.5% and unemployment below 5%, and the bond market kept borrowing rates low, driven by well-anchored inflation expectations, setting the stage for the 1970s.

Commodities are the best inflation hedge. While our economists are forecasting 1.7% inflation in the US next year, using oil forwards at $48/bbl (as per the ECB and Fed), should our $65/bbl forecast materialize, this inflation number jumps to 2.5%. This is significant in the context of an average IG bond portfolio yielding less than 1.95%. This

also illustrates an important point about levels, that it is the level of inflation that matters as opposed to the change in inflation. Macroeconomists typically care about the change in inflation, and how far from target the economy is. Portfolio managers typically care about the level of inflation and whether that target could change. History shows there is a longer-term super cycle to the inflation target, just as there is for commodity prices, and that politics dictates when that target can change. Macro inflation is a political dynamic, as opposed to an economic dynamic, which underscores the political risks to asset managers.

Late-cycle markets in ags, gas and metals while oil lags. In the near term, the longer the current crisis drags on, the larger the social need and policy response; however, once the normalization begins (whether that is in 2H21 as our economists are forecasting, or later, should vaccines disappoint), a V-shaped recovery in demand will almost certainly face tight supply across all markets. As we have emphasized over the past month, nearly every commodity is in a deficit, including oil today, despite lockdowns. Such broad-based deficits are usually only seen late in the business cycle.

Winter lockdowns appear only a speed bump for oil. Any tactical downside in crude will likely be temporary, in our view, pushing back our $65/bbl Brent target into late 2021. We expect the winter Covid wave to delay, but not derail, the oil market rebalancing, with normalized OECD stocks, OPEC+ spare capacity returning to 1Q20 levels, and finally, shale production growth all occurring by 4Q21.

Base metals and agriculture have more near-term upside than oil. Indeed, China has destocked the West just as its demand recovery begins. This year China's base and bulk imports have surged, underpinned by robust onshore end-user demand from infra and construction, shortages in scrap and strategic stockpiling. Across aluminium, copper and iron ore China has substantially offset Western Covid surpluses, generating deficits from Q3, copper in particular. Moreover China's domestic markets show no signs of gluts developing. In agriculture, 20/21 has been a record-breaking year of US corn, soy and pork exports, largely driven by increased Chinese buying to combat rising domestic food prices and low state reserves of all three commodities.

Reflation and renewables will pull precious metals higher. Similar to after the GFC, gold markets will likely be pulled higher as reflation concerns grow with the recovery and investors look to buy the currency of last resort. Our economists believe near-term breakeven inflation has further room to run, supporting our $2300 gold forecast. Silver's demand will also rise as policymakers REV the economy with a 9% increase in solar installation demand alone.

Watch out for the weather amid a secular demand boom. As La Nina strengthens over the East Pacific, near-term risks to agricultural commodity supply is growing, from US winter wheat to Argentinean corn and Colombian coffee. As a result of La Nina we see additional price volatility in soybeans, corn, coffee and coking coal going in to 2021. More importantly, however, this near-term supply risk comes at the start of a boom in grains demand, as renewable diesel, China's strategic restocking and the growth of its hog herd tighten the outlook for US balances going forward.

GS Commodity Views

Exhibit 1: Bloomberg Commodity Index Forecasts

BCOM Index	Dollar Weight	Historical Performance			Forecast		
		2018	2019	2020 YTD„	3m	6m	12m
BCOM	**100.0**	**-11.2**	**7.7**	**-8.4**	**4.7**	**7.8**	**9.3**
Energy	23.6	-12.7	11.8	-45.3	4.2	14.1	19.7
Industrial Metals	18.9	-19.5	7.0	10.7	-0.4	0.3	1.4
Precious Metals	20.5	-4.6	17.0	23.8	20.6	20.1	19.2
Grains	24.8	-5.5	-1.1	7.0	0.8	1.5	-0.6
Softs	7.2	-22.3	4.3	-1.7	-6.3	-4.8	1.3
Livestock	5.1	-1.7	-6.0	-27.1	-2.9	5.1	10.5

„ YTD returns through Nov 16, 2020

Source: Goldman Sachs Global Investment Research.

Exhibit 2: S&P GSCI Forecasts

GSCI Commodity Index	Dollar Weight	Historical Performance			GS Forecast		
		2018	2019	2020 YTD„	3m	6m	12m
S&P GSCI	**100.0**	**-12.9**	**17.4**	**-27.9**	**3.4**	**9.4**	**26.8**
Energy	62.6	-13.9	28.5	-45.7	4.6	12.7	40.1
Industrial Metals	11.2	-18.0	2.8	9.4	-0.1	1.5	3.0
Precious Metals	4.1	-3.6	17.7	22.6	20.7	20.2	19.2
Agriculture	15.4	-7.0	-1.6	3.8	-0.7	0.3	-1.0
Livestock	6.7	-2.2	-5.4	-26.0	-2.9	5.4	10.6

„ YTD returns through Nov 16, 2020

Source: Goldman Sachs Global Investment Research.

Exhibit 3: Key Commodity Price Forecasts

		4Q20E	1Q21E	2Q21E	3Q21E	4Q21E	2020E	2021E	3m	6m	12m
Energy											
WTI	$/bbl	40.0	45.0	49.0	56.5	60.5	38.7	52.8	45.0	49.0	60.5
Brent	$/bbl	42.0	47.0	51.0	59.0	63.0	42.4	55.0	47.0	51.0	63.0
Nat Gas	$/mmBtu	3.00	3.50	3.25	3.25	2.92	2.17	3.23	3.00	3.50	3.25
Industrial											
Aluminum	$/mt	1,950	2,000	2,050	2,100	2,100	1,712	2,063	2,000	2,050	2,100
Copper	$/mt	6,750	7,000	7,250	7,500	7,500	6,067	7,313	7,000	7,250	7,500
Nickel	$/mt	16,000	16,500	16,000	16,000	16,000	13,797	16,125	16,500	16,000	16,000
Zinc	$/mt	2,500	2,550	2,475	2,450	2,400	2,233	2,469	2,550	2,475	2,400
Precious											
Gold	$/t oz	2,300	2,300	2,300	2,300	2,300	1,977	1,977	2,300	2,300	2,300
Silver	$/t oz	30	30	30	30	30	23	30	30	30	30

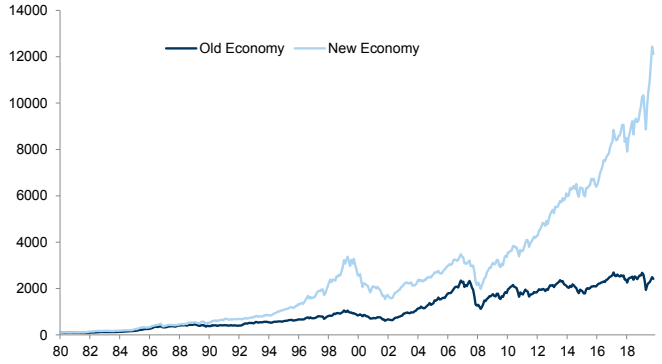
Source: Goldman Sachs Global Investment Research.

Focus: Vaccine presents tactical upside; the pandemic itself represents a structural shift in 2021

Commodity performance, along with other parts of the old economy, has been unprecedentedly weak over the past decade with the GSCI down 61%, erasing nearly three decades of gains. We believe this streak of poor returns has reached an end in the aftermath of the Covid crisis. Of course, negative oil prices are hard to top, and it's easy – and largely accurate – to present the 2021 commodity outlook as a V-shaped vaccine trade. What we think is key, however, is that this recovery in commodity prices will actually be the beginning of a much longer structural bull market for commodities driven by three key themes.

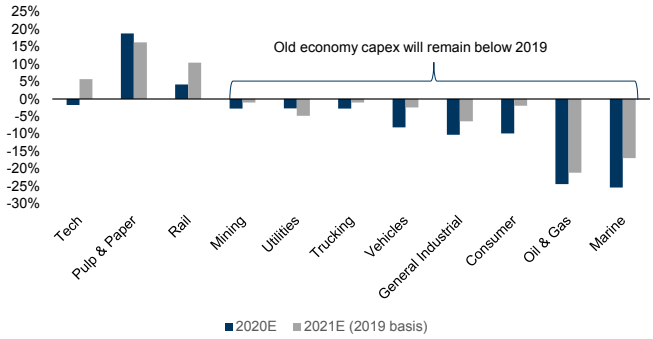
1. **Revenge of the old economy.** Structural under-investment in the old economy due to a decade of poor returns, particularly in energy where ESG issues have further reduced investment, was accelerated during 2020 in response to covid, leaving inadequate production capacity to meet a V-shaped vaccine driven demand recovery. Investment decisions are at a historical trough, taking 7.9 mn bld of oil out of 2025 expected supply. In our view, this will spell the end of non-OPEC growth in 2021.
2. **REVing commodity demand growth.** Covid is already ushering in a new era of policies aimed at social need instead of financial stability. This will likely create cyclically stronger, more commodity-intensive economic growth that should create a cyclical upswing in demand, helping commodities and the old economy to finally reach escape velocity, pushing these sectors out of the mid-cycle trap they have been in for the past decade. Three global policy initiatives have the potential to REV the global demand for commodities: **R**edistributional policies, **E**nvironmental policies and **V**ersatile supply chain initiatives. Moreover, redistributional policies have a long-lasting tail effect, as growing wages drive a consumption-wage growth multiplier across the economy, creating a secular upward trend in demand over the coming decade.
3. **Revaluation and reflation.** Covid has led to a massive rise in government spending, particularly in the US where the dollar was already facing headwinds. Although the dollar got a boost from a flight to safety at the beginning of the crisis, this support is likely to fade in 2021 and beyond, creating a positive feedback loop similar to what it did during the 1970s and 2000s when oil and gold reached historical highs. In addition, inflation tails risks are greater than at any other time since the 1970s due to the REV policies laid out above.

Exhibit 4: New economy outperformance attracts capital away from the old economy...
Equity return index, 1980 = 100



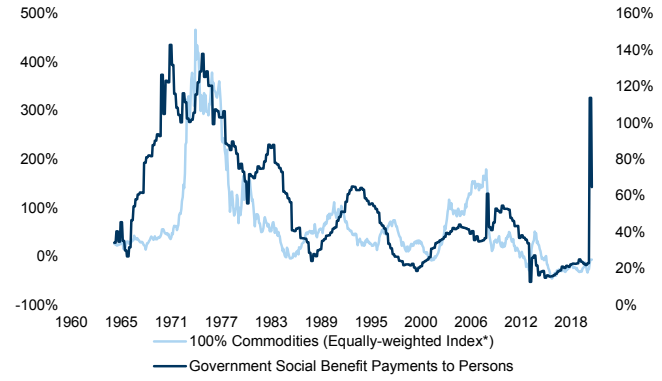
Source: Reuters, Goldman Sachs Global Investment Research

Exhibit 5: ...creating sustained declines in old economy capex in 2021



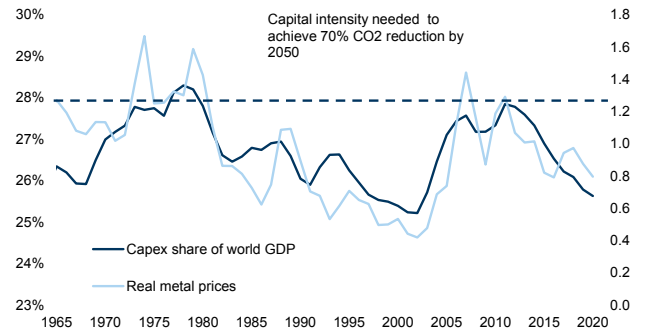
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 6: Redistributional policies are associated with commodity price inflation...
100% Commodity equal weighted index, 5-year rolling return, % an, Growth in Government Social Benefits to Persons, % an (rhs)



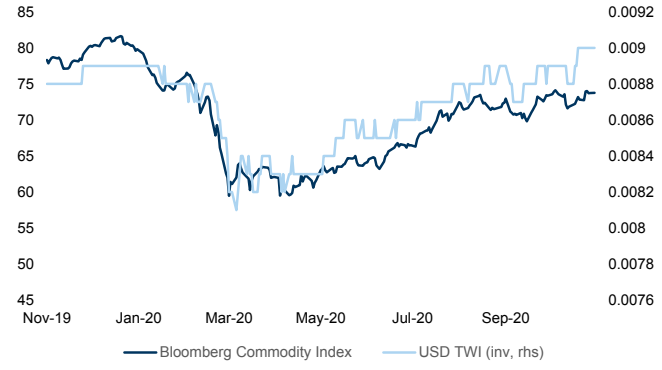
Source: AQR, Goldman Sachs Global Investment Research, Bloomberg.

Exhibit 7: ...while environmental policies will drive a capex boom on par with the 2000s



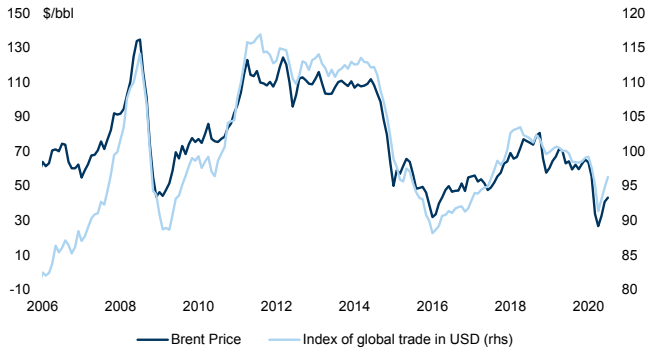
Source: Goldman Sachs Global Investment Research, Maddison Project.

Exhibit 8: Weaker US dollar helps push commodity prices higher in 2020



Source: Bloomberg, Goldman Sachs Global Investment Research

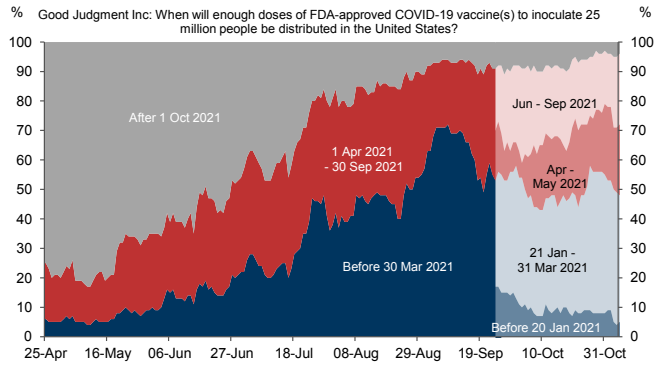
Exhibit 9: ...while higher prices help drive up the $-value of global trade, weakening the dollar



Source: CPB, Goldman Sachs Global Investment Research, Bloomberg

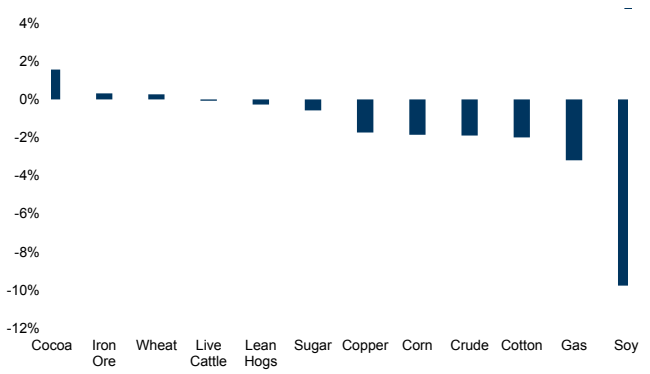
In the near term, the longer the current crisis drags on, the larger the social need and policy response; however, once the normalization begins (whether that is in 2H21 as our economists are forecasting, or later, should vaccines disappoint), a V-shaped recovery in demand will almost certainly face tight supply across all markets. As we have emphasized over the past month, nearly every commodity is in a deficit, including oil today, despite lockdowns. Such broad-based deficits are usually only seen late in the business cycle, underscoring the peculiar environment markets are in.

Exhibit 10: A vaccine will likely create a V-shaped recovery...



Source: Good Judgment Project, Goldman Sachs Global Investment Research.

Exhibit 11: ...this will occur against tight commodity supply, with nearly all commodity markets are already drawing inventory
Yoy change in inventories as a % of US/global demand



Sugar, Copper, Cocoa, Gas, Crude, Iron Ore use global demand, Cotton, Corn, Soy, Live Cattle, Lean Hogs use US demand

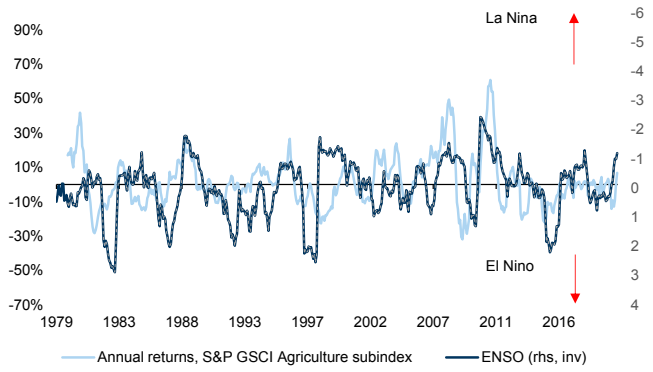
Source: Goldman Sachs Global Investment Research

As global demand remains tepid for consumer-related commodities like oil, the deficits further underscore how significant the drop in supply has been and how the supply response function has changed. For oil, the sharp drop in capex is now having an impact on non-OPEC decline rates, with capital markets refusing to fund shale drilling, only debt rollovers. In metals, we have seen a sharp drop in maintenance capex and supply disruptions dragging into 2021. This suggests that, even if demand falters in coming weeks as winter exacerbates Covid, markets will likely continue to rebalance, barring an outright collapse in demand.

In our view, base metals and agriculture have more near-term upside than oil, with smaller inventories to move through before prices begin to rise. In fact, China has destocked the West just as its demand recovery begins. This year China's base and bulk imports have surged, underpinned by robust onshore end-user demand from infra and construction, shortages in scrap and strategic stockpiling. Across aluminium, copper and iron ore China has substantially offset Western Covid surpluses, generating deficits from Q3, copper in particular. Moreover China's domestic markets show no signs of gluts developing. In agriculture, 20/21 has been a record-breaking year of US corn, soy and pork exports, largely driven by increased Chinese buying to combat rising domestic food prices and low state reserves of all three commodities. With only modest mine supply improvements anticipated next year in base and bulks, and with dry weather threatening South American yields, we see all the ingredients for continued fundamental tightness in 2021. This pull from China is also evident in oil, with China absorbing a quarter of the entire spring oil surplus and with its increased refinery capacity requiring structurally

higher inventory coverage going forward.

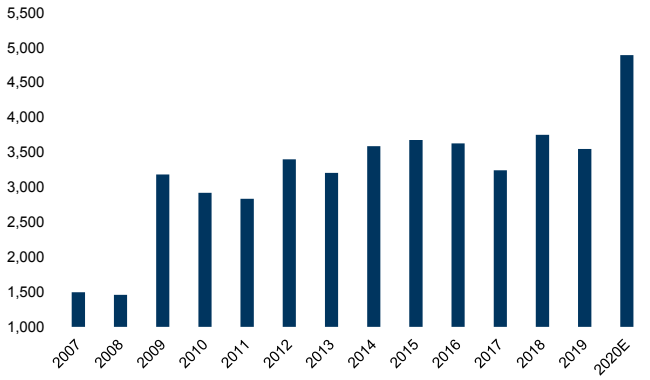
Exhibit 12: Previous La Nina events have been associated with rising agricultural prices



Source: NOAA, Bloomberg, Goldman Sachs Global Investment Research

Exhibit 13: Chinese copper imports have surged this year, destocking Western markets

Chinese copper imports, kmt



Source: Wind, Goldman Sachs Global Investment Research

Indeed, as demand could bounce back rapidly with the roll-out of rapid Covid testing alone, upside risks to tightening balances across all markets remain. In oil, winter lockdowns are only a speed bump: any tactical downside in crude will likely be temporary, in our view, pushing back our $65/bbl Brent target into late 2021. We expect the winter Covid wave to delay, but not derail, the oil market rebalancing, with normalized OECD stocks, OPEC+ spare capacity returning to 1Q20 levels, and finally, shale production growth all occurring by 4Q21.

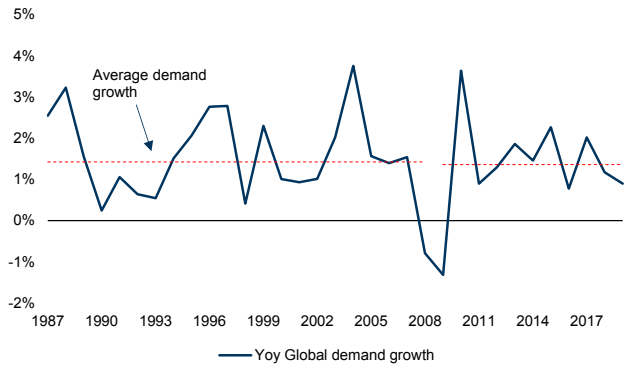
Unique among all recent recessions, Covid has automatically synchronised the global business cycle, creating co-ordination of policy along the same decarbonisation channel. We believe this will spur a specifically commodity-intensive recovery, one that is broadly resistant to near-term lockdown risk. Such a sharp V-shaped recovery has created concern around our bullish gold call of $2300/toz; however, we remain convicted as gold prices off near-term real rates which are expected to remain under pressure, not longer-dated real rates which are likely to be cyclically stronger as the V-shape recovery takes hold. All of this suggests an inflection in the prices of commodities in 2021. As a result, we maintain our Overweight recommendations for commodities in 2021 and forecast a return of 30%.

Commodities 2010 to 2019: Caught in a mid-cycle trap

It is tempting to blame supply for the poor performance of commodities over the past decade, particularly given the technological innovations in shale, pig iron nickel and smart farming, to name a few. However, in our view, it was the inevitable consequence of global policy focused on market- and financial-stability. The resulting lack of cyclicality in the global economy stranded commodity markets and the old economy in a mid-cycle trap that never had the ability to reach escape velocity and enter the expansion phase of the business cycle, helping commodities and the old economy out of the mid-cycle trap they have been in for the past decade that lies at the core of the poor performance. We believe that the pandemic will be the catalyst to usher in a new era in which the global policy focus is shifted from financial stability (following the financial crisis) to one of

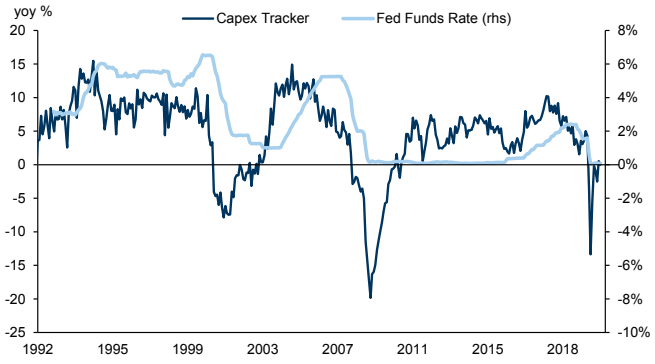
social need, the need to deal with political issues that can no longer be ignored such as inequality, climate change and structural unemployment in key sectors and demographics. As we argue below and as recently acknowledged by the US Federal Reserve in announcing its new framework, a cyclically strong economy solves many of these problems. *Accordingly, this new era will be characterised by more cyclical and commodity-intensive economic growth, increased green investment and a greater focus of governments on providing for lower-income households who have a higher propensity to consume on real assets.*

Exhibit 14: Trend oil demand has been similar to prior decades, but without the cyclicality...
Yoy global crude demand growth, % an



Source: IEA, Goldman Sachs Global Investment Research

Exhibit 15: ...as central bankers raised rates as soon as cyclicality materialised
Department of Commerce US Capex Tracker, yoy growth, Fed Funds Rate (rhs)



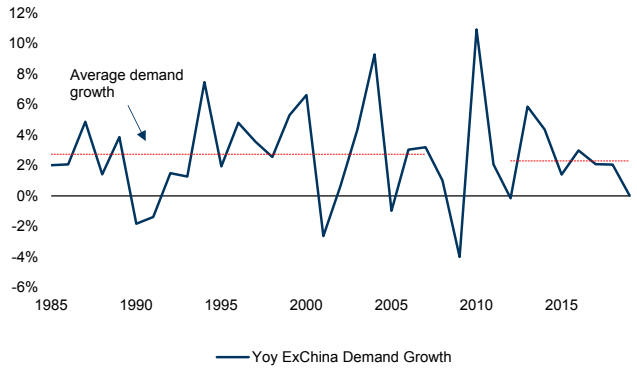
Source: Haver Analytics, Goldman Sachs Global Investment Research, Department of Commerce

After the financial crisis, the stimulus in the West simply could not create strong, late-cycle commodity demand, focussed as it was on debt sustainability, fiscal rules and austerity. Even in China, the previous five-year plan (2016 to 2020) was focused on deleveraging, supply-side reform and anti-pollution efforts, all of which all of which reduced the cyclicality global commodity demand. As a result, the global economy never got above capacity, with the exception of about 12 months starting in late 2017. However, for those 12 months commodities performed as expected with oil topping $88/bbl and the GSCI up c.30% at a time when equities had started to wane with the rapid rise in rates (Exhibit 15). However, with policy focused on macro stability, the overheating economy was immediately shut down in late 2018 and early 2019, alongside an escalating trade war. Then the Covid crisis struck, leaving concerns around an overheating economy in the distant past.

Even OPEC abandoning market stability in favour of market share again. Take oil: the sharp increases in shale output over the past decade were constantly accommodated by OPEC+, in the name of 'market stability', leaving global supply growth mostly in line with the benign demand environment. This benign demand and price environment, which mimicked the broader economy, incentivized central banks to pursue more QE in an attempt to reach escape velocity from the mid-cycle trap. This in turn lowered the cost of capital, allowing producers to pursue capex programs that reached levels near 130% of cash flow, reinforcing a stable environment that never had a chance of reaching escape velocity. Like the US Federal Reserve in its recent revamp, OPEC+ abandoned market stability (Exhibit 17) in March, which has created a likely

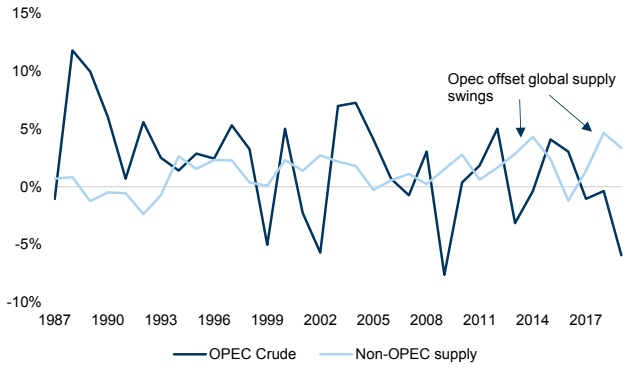
lasting shift towards fiscal discipline among shale producer out of fear of another price collapse (as explicitly stated in recent earnings releases). This in turn has allowed OPEC+ to focus on better compliance near-term to lower inventories, which reinforces backwardation and reduces the ability for shale producers to hedge large capex programs.

Exhibit 16: Stabilisation policies were global...even reducing copper demand cyclicality
Yoy growth in ExChina copper demand, % an



Source: Goldman Sachs Global Investment Research, Wood Mackenzie

Exhibit 17: Even OPEC pursued a market stability strategy reducing supply cyclicality
Global oil supply growth yoy, OPEC and non-OPEC



Source: IEA, Goldman Sachs Global Investment Research

Cycles are important to both innovation and profitability. Remember that it was the super cycle in demand from the 2000s that led to the high prices that stimulated those technological innovations (and equally the low prices that led to the collapse of the less-efficient and unprofitable producers in the early part of the decade, that dragged down industry-wide returns in the 2010s). However, the last decade removed the cyclicality from demand and prices. When demand waned, policy stimulated, and when demand surged, policy delevered. While there is a view among many that demand growth for commodities was tepid over the past decade, in reality, it was on the same trend as the previous 30 years, just without cycles. 1.66% through 1987-2007, and 1.63% through 2010-2019. And surprisingly, this was mostly true for global copper demand as well (Exhibit 14 and Exhibit 16). And the global mix of policy was not too different as China leaned on fiscal policy while the West leaned on monetary policy. The problem for commodities was that the global policy approach was risk-averse. Today, we believe policy will be the opposite – after a decade of ascendant populism, politicians the world-over know they cannot repeat the mistakes of the past when coming out of this recession.

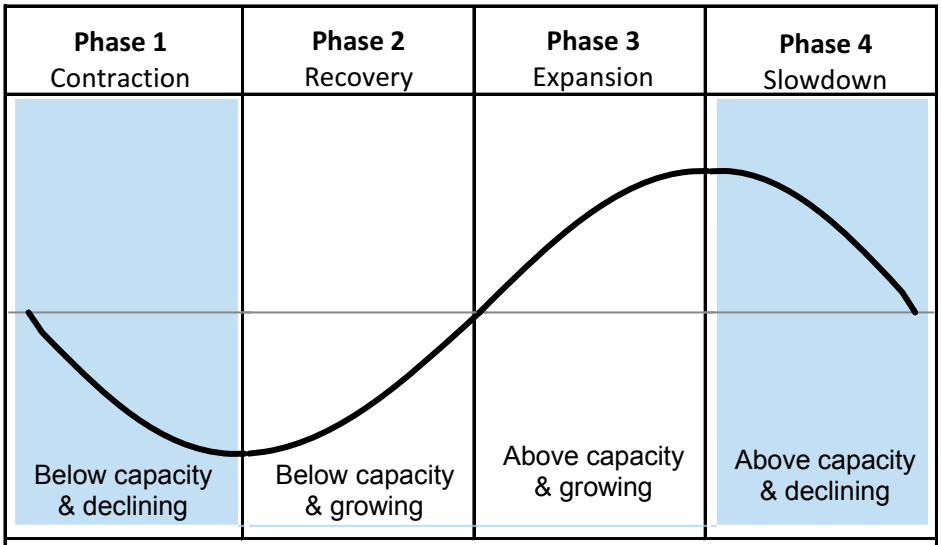
Commodities beyond 2020: REVing demand to reach escape velocity

The financial crisis was a crisis of financial instability; the Covid crisis is a crisis of social need, driven by healthcare and severe unemployment in the hardest-hit sectors. While social need was paramount after the financial crisis, the more pressing concern was the stability of the financial system itself – accordingly, policy efforts were directed toward macro stability, leaving social issues unresolved. Today, the more salient concerns are social issues, such as income inequality, minority unemployment and structural weakness in sectors severely hit by Covid. Accordingly, we expect the policy response

today to focus more on the need to reduce social need, rather than maintaining macro stability at the expense of jobs, wages and health outcomes.

Policies aimed at financial stability, by definition, took risk out of the system, and along with it many of the drivers of strong demand growth that would potentially have created inflation, a commodity bull market and, more importantly, the rising tide of wages and income that lifts all boats (Exhibit 18). The Covid crisis has not only pushed aside efforts towards austerity, by forcing record fiscal spending, it has also exposed many of the problems these policies exacerbated, such as income inequality, minority unemployment, and the fragility of just-in-time inventory management. In contrast, policies aimed at social need will likely create cyclically stronger, more commodity-intensive economic growth that should create a cyclical upswing in demand to finally reach escape velocity, helping commodities and the old economy out of the mid-cycle trap they have been in for the past decade.

Exhibit 18: Commodities and wages both grow fastest during late cycle expansions



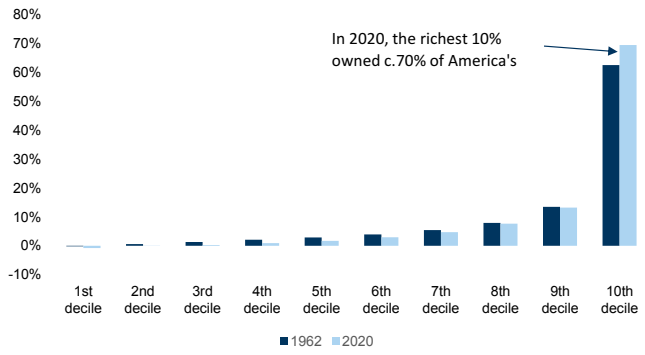
Relative Ranking of Assets (average return by phase, annualized)							
Bonds	12.2%	Equities	19.1%	Commodities	29.7%	Bonds	14.3%
Equities	10.6%	Bonds	4.4%	Equities	15.5%	Cash	5.6%
Cash	2.9%	Commodities	4.0%	Bonds	5.8%	Commodities	3.4%
Commodities	0.0%	Cash	3.0%	Cash	5.1%	Equities	-12.4%
Quintile Income Growth							
Lowest Income	3.0%	Poorest Quintile	1.6%	Poorest Quintile	3.1%	Poorest Quintile	5.6%
2nd	1.7%	2nd	1.6%	2nd	1.9%	2nd	4.4%
3rd	2.4%	3rd	1.9%	3rd	1.7%	3rd	4.2%
4th	2.9%	4th	2.4%	4th	1.6%	4th	4.6%
Highest Income	3.1%	Highest Income	3.6%	Highest Income	4.2%	Highest Income	1.6%
Core CPI	2.7%	Core CPI	2.3%	Core CPI	2.8%	Core CPI	3.4%

Source: Goldman Sachs Global Investment Research.

Reducing social need will help boost demand. In short, we believe a stimulus aimed at social need creates far more growth than a stimulus aimed at fixing a financial crisis. Since the financial crisis, markets have not been faced with an overheating global economy, something at the core of a strong commodity and cyclical backdrop, and something which only above-capacity demand growth can create. Certainly, we believe this type of demand growth was never possible with fiscal policy focused on austerity, and monetary policy focused on financial market stability, with regulations aimed at restricting credit to lower income groups. As the stimulus, ultimately, was restricted to the banking system, it was only able to create asset price inflation, mostly benefiting higher-income groups where the marginal propensity to consume out of wealth is a meager 3%. In contrast, the average propensity to consume out of permanent income (wages) among low income households has ranged from 95-105% – that is, households have dissaved to continue consuming (see Exhibit 23).

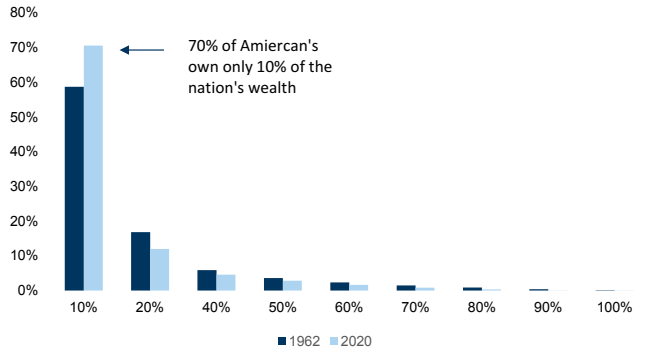
This is important: the majority of wealth is held among only a few, very rich individuals, with the majority of people having very little wealth (Exhibit 19). As a result, the lower-wealth groups substantially outnumber the higher wealth groups (Exhibit 20) and hence, volumetrically, consume more commodities and other real assets. Using data from Piketty, Zucman and Saez's (2018) MicroData files, Exhibit 19 and Exhibit 20 show this clearly – the first shows the percentage of total wealth held by each decile of the income distribution, while the second shows the proportion of the population that holds each 10% of the US's net wealth. As 50% of the nation's wealth is held by a few multi-millionaires who are unconstrained in their consumption, any marginal increase in overall wealth translates to little additional demand in the economy.

Exhibit 19: As the very wealthiest own most of the wealth...
% of total wealth owned by wealth decile



Source: Picketty, Zucman, Saez, Goldman Sachs Global Investment Research.

Exhibit 20: ...the number of people who own most of the wealth is small, lowering the effectiveness of a wealth-based stimulus
x-axis; deciles of national wealth, y-axis; % of the population who own that decile of wealth



Source: Picketty, Seaz, Zucman (2018), Goldman Sachs Global Investment Research.

A REV'ed up economy will help drive a structural bull market in commodities. Today's Covid crisis has changed many people's perception of the role of the state, creating a situation similar to that of the 1960s, the last time social need was escalated to the top of the policy agenda. In the 1960s, the focus was the need to project power in the Cold War (today's fight is against Covid, and the effects of decoupling from China) and the need to fight the War on Poverty to calm social unrest (today's is against minority unemployment and income inequality). The US government embarked on an

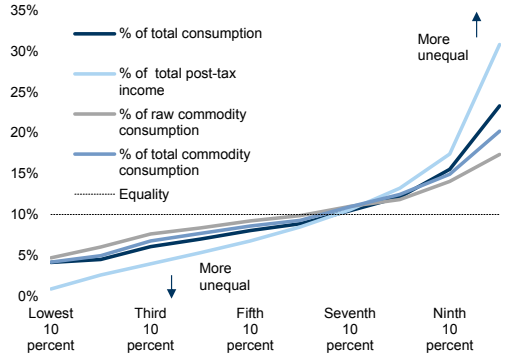
unprecedented spending program and did not raise taxes accordingly, the central bank kept rates low, as inflation had been near 1.5% and unemployment below 5%, and the bond market kept borrowing rates low, driven by well-anchored inflation expectations.

We view today's current policy mix, and more importantly, the strength of today's consensus for greater macro-level spending to address specific social inequities, as far more likely to generate a commodity bull market than the policy mix following the financial crisis. While the exact policy program for the US remains heavily contingent upon cooperation between branches of government, without substantial changes, the demands to address social inequities will likely continue to rise. These trends demand increasing amounts of attention and money from government, while potentially complacent markets continue to offer cheap funding, seemingly ignoring inflation or default risks. The potential for shifting policy preferences as a result of the current political situation can already be seen in Federal Reserve statements about income distribution and inflation targeting. We believe this shift will be represented by three global policy initiatives that have the potential to REV the global demand for commodities: Redistributional policy, Environmental policy and Versatility of global supply chains (caught out twice by a trade war and the global pandemic).

1. **Redistributional policy**. While Covid-19 began as a health crisis, it quickly morphed into an economic and social crisis, which escalated the spending requirements of governments around the world, from healthcare to unemployment benefits. Total additional government spending commitments in the first two months alone rose to c.$10 trn, the highest since the 1970s. To deal with the social issues of income inequality and minority unemployment, an overheated economy is historically required: this is when the wages of the lowest incomes accelerate the most, closing the gap. While most economists (based on consensus) see these redistributional polices fading a year or two after this current crisis, history shows that it takes a new crisis to end them, just as it took the current crisis to end macro stability and austerity policies. While LBJ started similar policies in the mid-1960s, it was not until the early 1980s that they were ended for good, and it took painful inflation to create the political will to do so. Indeed, redistributive policy is becoming a centerpiece of policy-makers' long-run agendas, from Biden's fiscal strategy and Johnson's 'leveling up' agenda in the UK, to the European multi-year funding framework and China's 5-year plan. While COVID pressures should eventually fade, we believe redistributional policy will continue well into the 2020s.
2. **Environmental policy**. Weather events over the past two years have pushed climate change close to the top of the policy agenda. It has become a convenient need to accommodate potentially large infrastructure spending programs in policy, particularly as many investors and voters are pressing for rapid decarbonisation. Our equity research colleagues estimate that a 70% reduction in global CO2 emissions by 2050 will require a US$2 trn investment per annum. With global GDP in 2019 roughly US$87 trn, US$2 trn could boost global capital formation from 25.8% currently to 28.1%. This represents an increase in the capital intensity of the global economy comparable to the effect of the BRICs boom of the 2000s, and one which would be global, rather the constrained to the emerging markets.

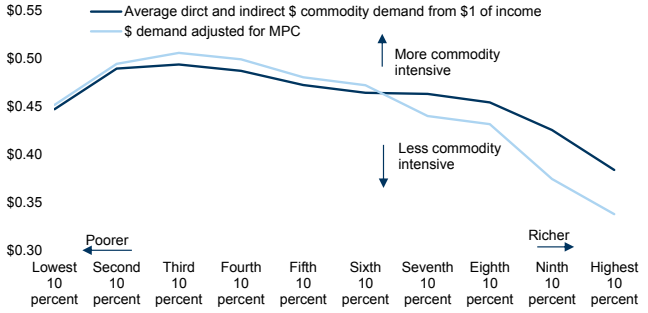
3. **Versatile supply chain initiatives**. After two years of trade war, and one year into a global pandemic, the need for supply chain resilience is paramount. This includes strategic reserves and supply chain security for the new, green and old economies, such as duplicate 5G networks (the new economy), domestic initiatives for electric and hydrogen fuel cell vehicles (green economy) and domestic manufacturing supply security such as steel production capacity (old economy). We believe this will significantly impact oil (crude), copper, corn/soybeans and palladium (CCCP), where Chinese strategic stock building has already had a substantial impact, tightening these key commodity markets in 2020.

Exhibit 21: Redistributional policy raises commodity demand as it is more equally distributed than income...
% of the total of each variable, by income decile. A steep angle is more unequal than a flat line (uniform consumption)



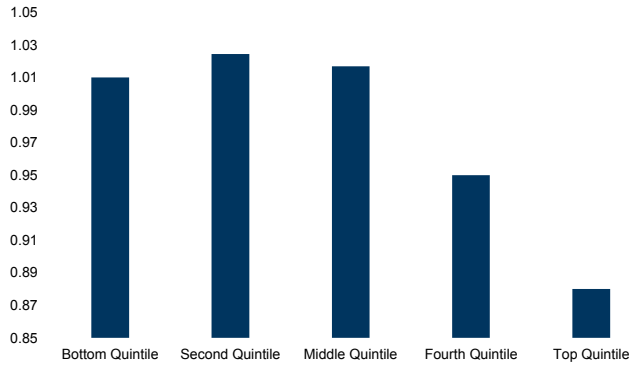
Source: Goldman Sachs Global Investment Research., BLS, BEA

Exhibit 22: ...while lower income households have a higher commodity consumption intensity than rich households
Total direct and indirect commodity demand from a $1 increase in standard consumption bundle, by decile on income



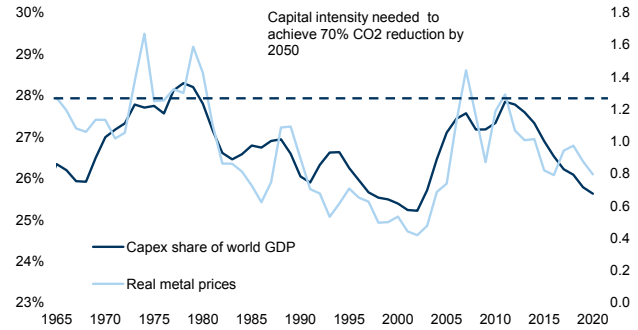
Source: Goldman Sachs Global Investment Research., BLS, BEA

Exhibit 23: ...as the wealthy spend less of their income, acting as a drag on consumption
Average consumption intensity by quintile, % of income consumed each period (>1 implies net borrowing)



Source: Goldman Sachs Global Investment Research., FED

Exhibit 24: In addition, environmental policy will spark a capex boom similar to that of the 2000s



Source: Goldman Sachs Global Investment Research, Haver Analytics

The REV economy is global, not local. It is important to emphasize that these policy initiatives are global phenomena – from China's new five-year plan to Europe's Green Deal or Biden's stimulus plan, policymakers are looking to REV their economies after a decade of policies aimed at financial stability. Specifically, the new Chinese five-year plan has three major points that capture these three themes: (1) technology standards

and investment to create domestic technologies; (2) a domestic green movement; and (3) dual circulation, which requires building out a middle class consumer to create domestic consumption of excess production. To achieve the latter, China has explicitly noted potential redistributive policies to the lower-income rural communities. It is important to note that these structural drivers outlast the government efforts to cyclically stimulate the economy. Beyond our economists estimate of an initial $1trn US stimulus, Biden's climate plan targets additional $1.7trn of spending over the next 10 years. Even if a split Congress leads to a more gradual ramp up from $500bn, this remains a substantial tailwind to green capex. The same is true in Europe, where the Green Deal maps out a sequence of investment, regulation and energy market changes out until 2030.

As we believe that commodity markets are entering a structural bull market, we argue that worrying about this week's oil or copper inventory report is far less important than understanding where we are in the broader super cycle. Over the past 10 years, global growth has had three, short-lived mini boom and bust cycles. However, it has never expanded at a fast pace for a considerable period. These mini cycles were all driven by policy stimuluses, specifically Chinese fiscal policy and US monetary policy. Every time policy support weakened, global growth slowed materially, as it did in 2010-2011, 2014-2015 and 2018-2019. Each slowdown forced the governments to add back stimulus, and led to a short-lived mini boom. Such short-term, mean-reverting cycles come in sharp contrast with the 2000s, which saw the biggest bull market in commodities since the 1970s. The difference between the 2000s and 2010s was that global growth in the 2000s was driven by long-term structural factors, such as a massive, savings-financed investment boom in China and a consumer-lending boom in the DM economies. Structural forces underpinning the 2000s commodities super cycle meant it remained uninterrupted by Chinese tightening in 2004, or US rate hikes in 2005, and was only derailed by a full-scale global crisis in 2008.

As we have emphasized in the past, the outlook for commodities prices and returns depends upon activity levels and not growth rates, as commodity market outperformance requires the level of demand to exceed the level of supply. In particular, if supply levels cannot reach demand levels, shortages persist, which keeps prices high and volatile even should growth slows (and weigh on the performance of financial anticipatory assets like equities).

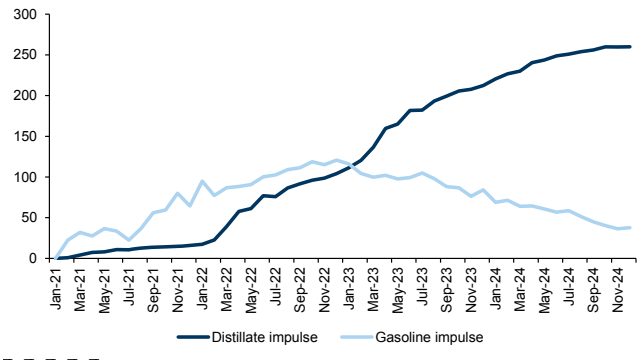
Looking at the 2020s, we believe that similar structural forces to those which drove commodities in the 2000s could be at play. Huge environmental investment requirements suggest that the green capex increase could be as big as the BRICs investment 20 years ago. Additionally, the redistributative push in DMs, and in China this time, is likely to lead to large boost to consumer spending, comparable to the lending-fuelled consumption increase in the US and Europe in the 2000s (Exhibit 21 and Exhibit 22). We derive the total indirect and direct commodity demand for each decile's consumption basket (for the exact methodology please see the Appendix). Although each rich household consumes more commodities in absolute terms (Exhibit 21), lower-income households' consumption is inherently more commodity intensive, making wage growth in low-income households growth more bullish commodity

demand than the equivalent growth in high-income households. Finally, similar to 2000s, there is structural under-investment in supply of almost all commodities. By contrast, the 2010s saw large supply growth of all key commodities, owing to technological innovation and a capex boom after years of strong prices. All in all, we believe the key drivers are in place for another long-term bull market in commodities.

We see green capex and broader environmental policies as bullish for energy prices, not just metals. In the case of gas, because most policies currently being proposed would increase the cost of shale supply, and potentially reduce associated gas production (if an Iran deal keeps oil prices below our constructive forecast). For oil, because we believe low deferred prices already embed a full return of Iran in 2021, and sustained weak demand – both too pessimistic in our view – with the shale supply headwinds set to offset a return of Iran production longer term. Headwinds to US oil and gas production could rise further under a Biden Administration, even if the President-Elect has struck a centrist tone, reiterating his climate plan instead of the more ambitious Green New Deal. Statements to date suggest his administration would likely introduce regulations that would: (1) increase the cost of shale production (with methane restriction and taxes potentially increasing costs by up to $5/bbl); as well as (2) reduce shale's recoverable resources (via limitations on federal land drilling and pipeline approvals).

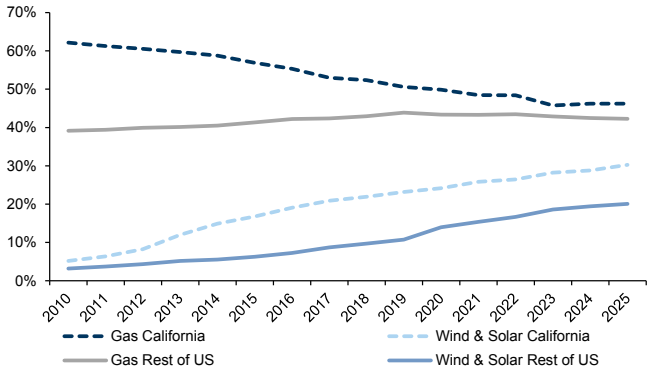
On the demand side, Biden's climate priorities point to a faster deployment of renewable sources of energy than currently expected (Exhibit 25). While negative for US hydrocarbon demand over the long run, such an agenda would require new infrastructure, which alongside a likely large initial fiscal stimulus would in our view lead to higher oil demand in coming years than currently expected (with a $2 trn stimulus over 2021-22 boosting US demand by c.200 kb/d, for example). The targeted increase in renewable power generation, likely enabled through an extension of the associated tax credits, could in turn support gas burn, initially to compensate for greater intermittency in power generation as electricity demand rises, especially in the context of declining coal-fired generation capacity, until sufficient utility storage capacity is installed (Exhibit 26).

Exhibit 25: The impulse via consumer incomes and industrial activity should boost US gasoline and diesel consumption
Estimated impact of proposed Biden-Harris Agenda on gasoline and distillate demand (kb/d, vs. baseline of split congress)



Source: Goldman Sachs Global Investment Research, Haver Analytics, IEA, EIA.

Exhibit 26: Rising renewable capacity can support gas burn in coming years due to declining coal capacity and rising share of intermittent generation, as visible in California this year
Share of generation capacity by fuel type

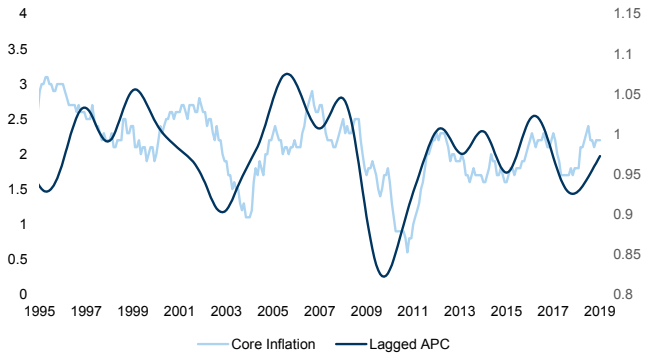


Source: VelocitySuite, California ISO, Goldman Sachs Global Investment Research

Hedging tail risk of inflation with commodities

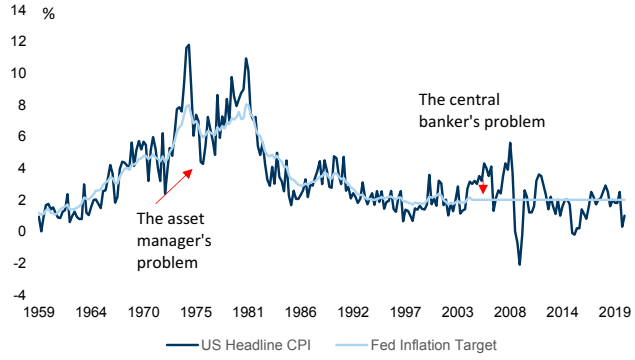
Even inflationary risks are to the upside, in our view. While our economists are forecasting 1.7% inflation in the US next year, using oil forwards at $48/bbl (as per the ECB and Fed), should our $65/bbl forecast materialize, this inflation number jumps to 2.5%, while core inflation rises from 1.6% to 1.75%. This is significant in the context of an average bond portfolio yielding less than 1.95%. This also illustrates an important point about levels, that it is the level of inflation that matters as opposed to the change in inflation (Exhibit 28). Macroeconomists and central bankers typically care about the change in inflation, and how far from target the economy is. Portfolio managers typically care about the level of inflation and whether that target could change. History shows there is a longer-term super cycle to the inflation target, just as there is for commodity prices, and that politics dictates when that target can change. As we have argued in the past, macro inflation is a political dynamic, as opposed to an economic dynamic such as relative price moves (which is what commodities are all about). Policy makers can always shut down or create macro inflation (by using the fiscal channel as opposed to the monetary channel). Today, with policy-makers facing a political crisis, as opposed to a financial crisis, they have little choice but to use the fiscal channel.

Exhibit 27: Redistribution mechanically raises consumption intensity – a driver of core inflation
APC – household consumption as a % of disposable income (>1 is equivalent to dissaving)



Source: Haver, Goldman Sachs Global Investment Research.

Exhibit 28: The asset manager and central banker are looking at two different things
Fed Implied Inflation Target

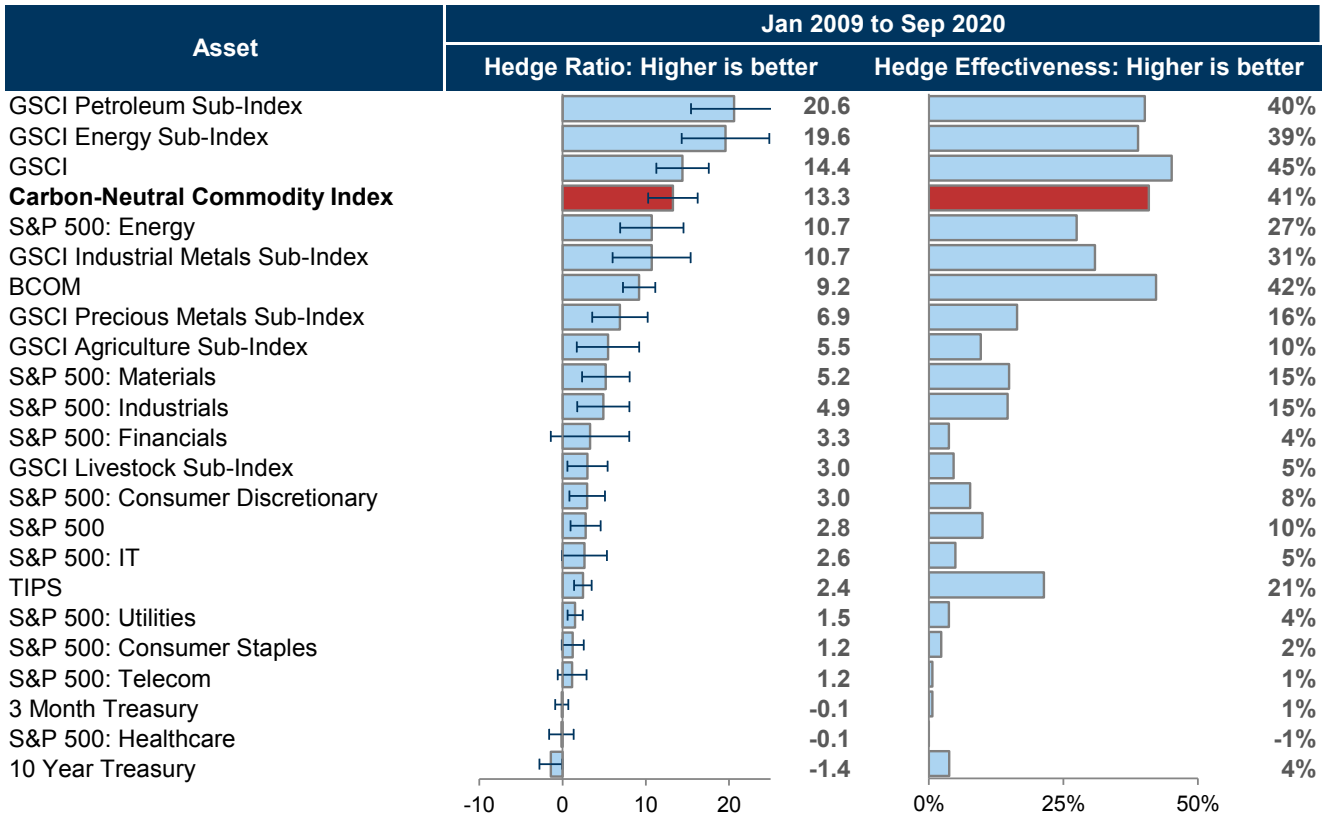


Source: Haver Analytics, Goldman Sachs Global Investment Research.

The key point from a hedging perspective is that asset managers care about the level of inflation, not the change in inflation, and from a level perspective, inflation hedges such as commodities and equities are likely far cheaper today than in the future, when inflation could arrive. When discussing the drivers of investment demand for gold and commodities, it is important to distinguish between debasement and inflation. The key is that current debasement and debt accumulation sow the seeds of future inflationary risk despite inflationary risks remaining low today. While debasement in many cases leads to inflation, it is not always the case, as witnessed over the past decade. Debasement can occur either against a consumption basket (e.g. CPI) or a financial asset basket (equities or bonds) — gold hedges in both case. Equally, the best debasement hedge (gold) is not always the best hedge against inflation (oil). Indeed, the word debasement comes from adding base metals such as tin or copper to the precious metals that acted as hard currency; therefore, owning the pure precious metal is the

best hedge against debasement. However, this does not mean gold is the best hedge against inflation, a common misconception of many investors, we believe. Gold does not appear significantly in any CPI anywhere in the world. As a result, oil and other commodities that drive the items found in different CPIs are the best hedges against inflation (Exhibit 29). However, at present we see the risk as from debasement of fiat currencies, which sows the risk of inflation, and gold is the best hedge against debasement. Further out, as inflation risks rise, oil and equities hedge unexpected and expected inflation better than gold (respectively). Given the size of bond portfolios built over the past decade that will need to be hedged against inflation risks, the sheer size of investment demand for commodities is likely to be massive, in our view, underscoring the need to act today.

Exhibit 29: Energy commodities make up the largest component of a consumer's basket, making them the best hedge against inflation
Year-on-year regression beta (with +/- 1 standard error)



Source: Goldman Sachs Global Investment Research.

Go long our "Back to the USSR" basket – crude, grains, copper and PGMs. With policymakers caught between Covid-19, a growing China-US technology rift, tightening grain markets and growing social unrest, we see the backdrop as increasingly similar to that of the early 1970s. To capture the inflection we forecast in 2021, we are recommending our "Back to the USSR" basket, each component with equal weighting. These commodities present the greatest strategic upside over the course of 2021, reflecting exposure to increasing focus on redistribution, ESG policy and versatility of supply chains. We include the following contracts. **Long Copper GSCI Subindex ER** – Inclusion in the basket on the basis of a projected large deficit in 21', very low inventory

ex-China after record China imports, continued China strategic stockpiling and finally, peak mine supply approaching on the horizon in 23/24'. **Long Grains: 50% S&P GSCI Corn Subindex TR, 50% S&P GSCI Soy Subindex TR** – a tightening LatAm corn outlook in 20/21 will coincide with a maintained Chinese restocking cycle based on limited upside to domestic acreage and yields. Further growing soy oil demand will require higher 2022 acreage and imports, forcing up long-dated prices to incentivise planting and trade. **Long S&P GSCI Brent Subindex TR** – vaccine-led recovery and continued OPEC supply discipline will help maintain a market deficit and draw down inventories to pull Brent toward our year-end target of $65/bbl. **Long PGMS: 50% S&P GSCI Platinum Subindex TR, 50% S&P GSCI Palladium Subindex TR** – PGMs will stand to benefit from continued recovery in global auto sales, tightening standards and continued strong Chinese imports.

Exhibit 30: We are opening our "Back to the USSR" trading recommendation

Commodity	Contract	Opening Price	Current Price	% Return
Copper	S&P GSCI Subindex ER	4241	4241	0%
Brent Crude	S&P GSCI Subindex ER	176	176	0%
Corn/Soybeans	S&P GSCI Subindex ER	2147	2147	0%
Palladium/Platinum	S&P GSCI Subindex ER	1736	1736	0%
Total Return				**0%**

*Corn/Soy and Platnium/Palldium are pair, each taking a 12.5% weighting in the basket

Source: Goldman Sachs Global Investment Research

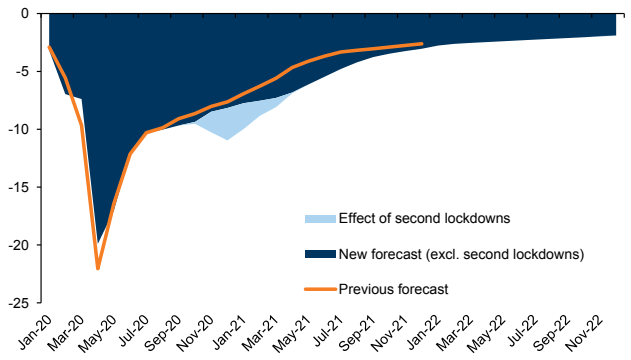
Global Commodity Outlooks

Oil - Winter lockdowns simply a speed bump in the oil market rebalancing

We expect a second wave of lockdowns in Europe and the US to bring the oil market's rebalancing to a halt in the coming months. The increase in inventories that we anticipate is likely to remain modest, however, as we expect OPEC to delay its planned January ramp up by three months. Importantly, this is only a speed bump in our forecast of a sharp tightening of oil fundamentals through 2021, driven by a recovery in demand, boosted by vaccines and rapid testing, and by the collapse in upstream investment and change in the shale reaction function. Accounting for this winter Covid delay, we now expect the oil market rebalancing to occur next year, with normalized OECD stocks, OPEC+ spare capacity returning to 1Q20 levels, and shale production growth all occurring by 4Q21. Our 2022 balances point to a balanced oil market, even while now assuming a near-full return of Iranian production.

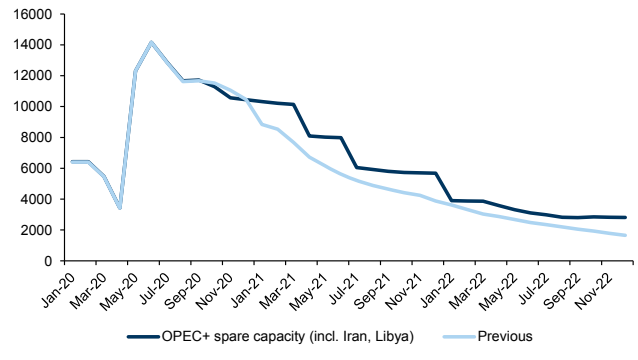
In the coming weeks, we expect the market to remain caught between vaccine issues, lockdown and US election headlines, leaving scope for further price volatility and downside risks. Thereafter, we expect Brent prices to resume their rally in 1Q21, when we forecast a Brent price average of $47/bbl, with the winter speed bump simply delaying the return to $65/bbl from the fall of 2021E to late 2021. For petroleum products, our constructive demand forecasts, along with a surprisingly quick shuttering of refining capacity, leave us bullish on 2022 margins, even though the next few months will likely prove challenging. We are most constructive on distillates that are most levered to the vaccine roll-out, given their positive impact on jet demand.

Exhibit 31: The second wave should see demand sequentially decline over the winter
Demand impact of Covid-19 vs. counterfactural expected level (mb/d)



Source: Google Covid-19 Community Mobility Reports https://www.google.com/covid19/mobility/ Accessed: 11/13/2020, Goldman Sachs Global Investment Research.

Exhibit 32: OPEC spare capacity should normalise to pre-Covid levels by 4Q21
OPEC+ spare capacity excluding Venezuela (kb/d)



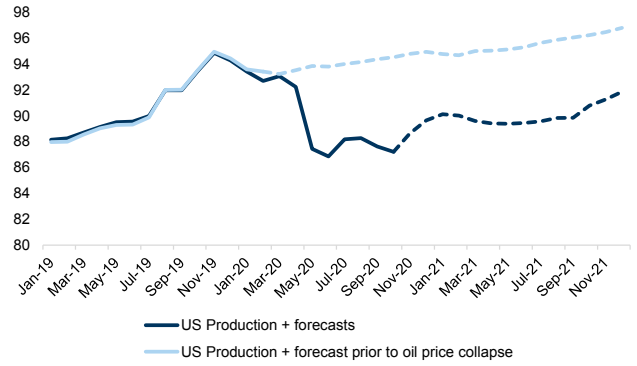
Source: IEA, OPEC, Goldman Sachs Global Investment Research.

Natural Gas - A tighter forward outlook

We maintain our view that US markets are transitioning into a significantly tighter 2021 balance driven by low associated gas production growth given the collapse in US oil production capex. Despite a very warm start of winter, which has weighed on

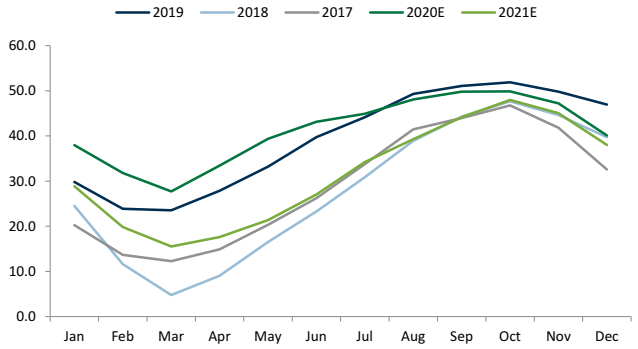
heating-related gas demand, we believe this has not been near enough to rectify this forward tightness. This is because it's been accompanied by a sharp sell-off in the US gas curve, which we believe supports implied forward coal-to-gas (C2G) substitution by more than enough to completely offset the reduction in heating demand this month. Hence, we maintain our constructive NYMEX natural gas price view with a $3.23/mmBtu forecast for 2021, 14% above current forwards. Our US views assume forward US LNG exports normalize from the low levels observed this summer. Specifically, we expect steeper inventory draws in Europe this winter vs last to create room in storage to accommodate higher US LNG exports as well as higher Russian pipeline flows. This allows TTF to balance in 2021 by pricing against coal at our $4.70/mmBtu forecast through next summer, as opposed to pricing supply out at sub-$4 levels. Consistent with this view, we have seen the JKM and TTF forward curves move in line with our forecast over the past three months, with winter prices even moving a little above our forecasts. Accordingly, we are now more neutral relative to current JKM and TTF prices, in contrast with our still bullish US gas view.

Exhibit 33: The oil collapse earlier this year has significantly lowered our expectations of US associated gas production growth
GS US gas production outlook; Bcf/d



Source: Goldman Sachs Global Investment Research, Wood Mackenzie

Exhibit 34: We expect lower LNG imports in Europe this winter to help normalize storage levels through 2021
NW European gas storage, Bcm

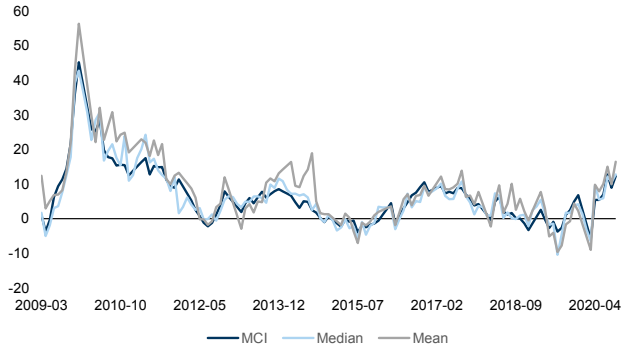


Source: Bloomberg, Goldman Sachs Global Investment Research

Base Metals - Synchronised global demand surge, lean supply chain inventories set to support industrial metal higher

We expect a broad tightening trend in industrial metals fundamentals through 2021, which should generate a positive bias to price dynamics. First and foremost, we believe this will be supported by a firm recovery in Western demand conditions, supported by a combination of vaccine deployment from early in the year, and continued dovish policy setting. Evidence of this has already started to emerge in the US, and particularly for aluminium-related use in autos and construction. Moreover, there is limited evidence so far that the second wave of lockdowns in Europe is denting the positive momentum in manufacturing activity. Second, there still remains strong positive momentum in China's demand conditions, and although more policy restraint is likely ahead, only a modest sequential deceleration is anticipated by our economists. We also believe that any stimulus-restraining moves by Beijing will be tied to evidence of a sustained Western recovery, which suggests any policy adjustments will be weighted towards at least 2Q20 with an actual activity impact unlikely until well into the second half of the year.

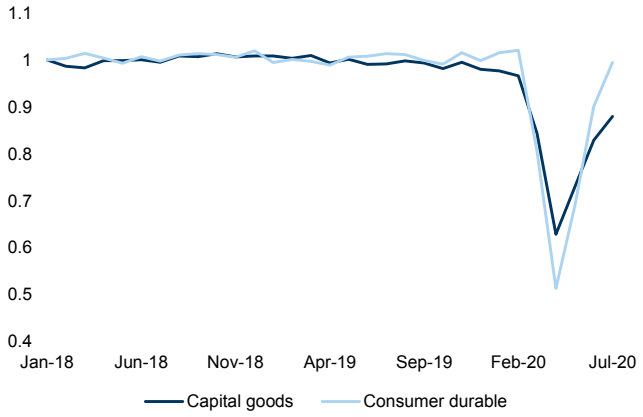
Exhibit 35: The China Metals Consumption Index is at its highest level since 2011



Source: Goldman Sachs Global Investment Research.

Exhibit 36: Recovery in Western metals demand fuelled by a resurgence in Industrial Production

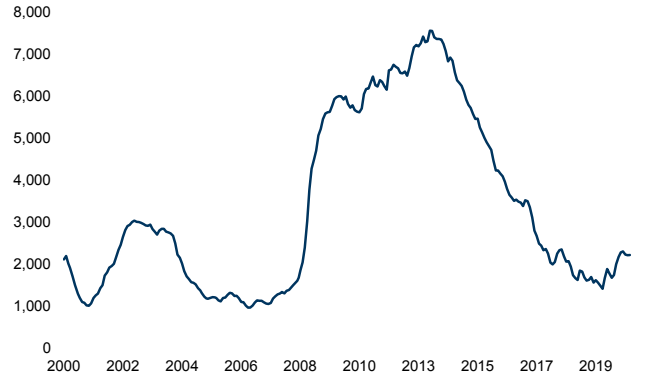
Capital Goods and Consumer Durables Industrial Production, US, index Jan18 = 1



Source: Haver Analytics, Goldman Sachs Global Investment Research

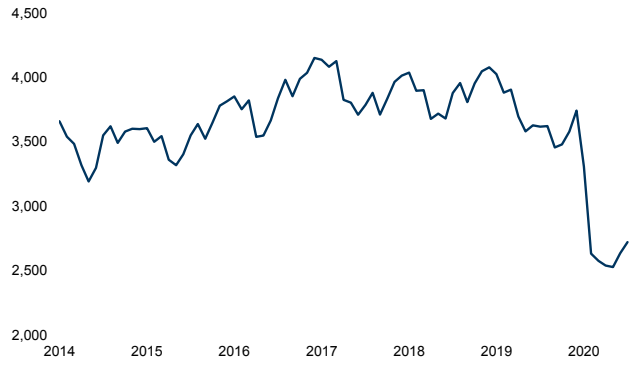
Adjoining this positive demand setting is a very tight inventory environment across the metals space. The Western industrial supply chain has been heavily destocked over the course of this year, with now very-low raw material and finished good stocks. This points to raw material restocking bursts as a necessary additional demand component. At the same time, in China strategic stockpiling remains in play beyond the current year, given elevated concerns over security of supply. However, and importantly, onshore visible inventories remain only at modest levels. This should limit the extent of any seasonal destocking phases around the Chinese New Year. Finally, we expect supply conditions to be more varied across the metals, with short-cycle scrap upswings likely for most metals on higher activity and price. However, we expect a reflationary cost setting (fuelled particularly by US dollar weakness) to ultimately restrain investment responses from an already fiscally conservative mining sector. Given our respective base-case forecast peaks in global supply for zinc, aluminium and copper over the 2023-24 period, the ability to defer those supply inflections is extremely challenged. On a differing timeframe, with copper having the most bullish prospects on a near-term basis, we believe, higher prices will need to eventuate across the complex, to prevent scarcity conditions developing.

Exhibit 37: LME inventories across the base metals are back to levels last seen in the early 2000s
LME, all base metals inventories, kmt



Source: Wind, Goldman Sachs Global Investment Research.

Exhibit 38: Low US auto inventories demonstrates well the lean state of Western supply chains



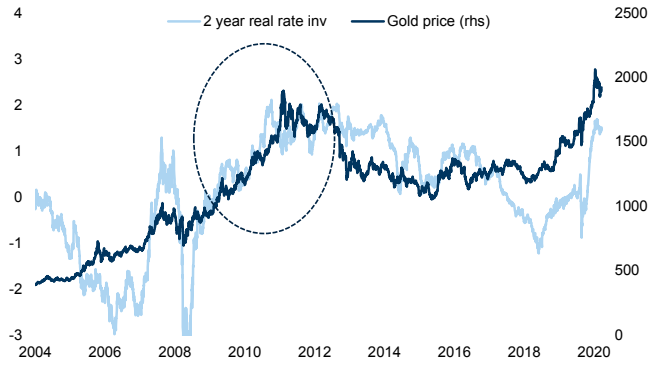
Source: BEA, Wards, Motor Intelligence.

Precious Metals: Global reflation at the zero lower bound to drive precious higher

Gold and silver also stand to benefit from the reflation theme. This year, the focus in precious markets has been on fiscal and monetary stimulus, and participants have largely ignored the inflation numbers (which were heavily impacted by the pandemic.) Next year, as the economy reopens, we expect the focus to shift to whether policy stimulus and aggregated savings will lead to real inflation. With our economists expecting the Fed to remain on hold until 2025, any increase in inflation expectations will likely translate into lower real rates at near- to medium-term maturities. Our rates team notes that under our economists' inflation forecasts and our oil view, near-term real rates are expected to average -2.1% over the next five years. Currently, 5-year tips are only -1.2%, which suggests material room to fall. There will likely be less downside pressure on 10-year real rates, but we believe that the gold and silver markets will focus on shorter maturity rates. The reason for this is that gold is currently viewed primarily as a hedge against currency debasement, rather than equity market risk.

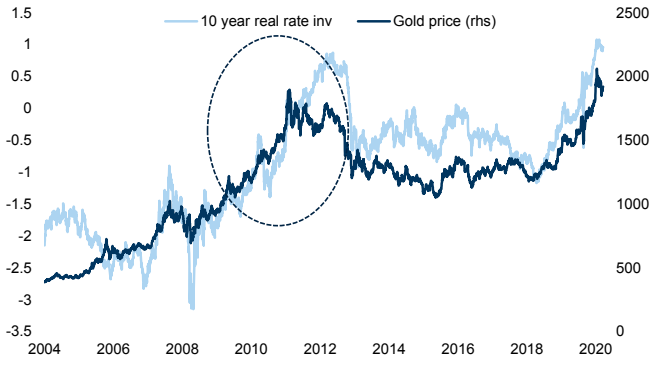
While equities tend to be driven more by longer-term real rates, currencies are more focused on nearer-term real rates. The bulk of gold purchases this year were made, in our view, because investors were concerned about the real purchasing power of the dollar vs. losses in their equity portfolios. Nearer-term real rates were also more important post the GFC, when gold was better correlated with 2- and 5-year real rates than 10-year rates. In late-2011, while longer-term real rates continued to move higher, gold did not. Instead, it was correlated with the dollar and front-end rates. For silver, we see an additional tailwind in the form of a strong rebound in industrial demand, spearheaded by a boost to global solar investment. We keep our 3/6/12m targets for gold and silver unchanged at $2,300/2,300/2,300/t oz and $30/30/30/t oz respectively.

Exhibit 39: Gold is driven more by near-term real rates...



Source: Haver, Goldman Sachs Global Investment Research.

Exhibit 40: ...than by long-term real rates



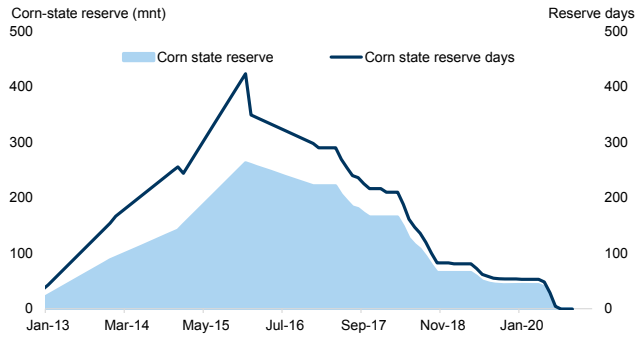
Source: Haver, Goldman Sachs Global Investment Research.

Agriculture: Focus on renewable diesel and versatility of Chinese commodity supply are creating a structural bull market in grains

Agricultural markets have posted a remarkable turnaround this year, following adverse weather and a record import pull from China in recent months. While benign weather conditions and trade wars have weighed on prices in recent years, we believe this year's reversal reflects the beginning of a multi-year structural repricing higher for crops. First, weather: recent years have posted low weather variability, as observed in the 1960s, and a reversion to long-run weather swings would add to price volatility and upside, with La Nina already a threat to South American production. Second, China is starting a multi-year import surge. The US-China trade war led to large destocking of Chinese corn and soybean inventories, now requiring a multi-year restocking cycle (this fits within its next five-year plan targets and should occur alongside the expansion of the Chinese hog herd). Third, we expect a return of a US-led biofuel demand pull in coming years, this time led by renewable diesel, which our agribusiness analysts estimate could represent an additional 1.5 bn bu of soybean use.

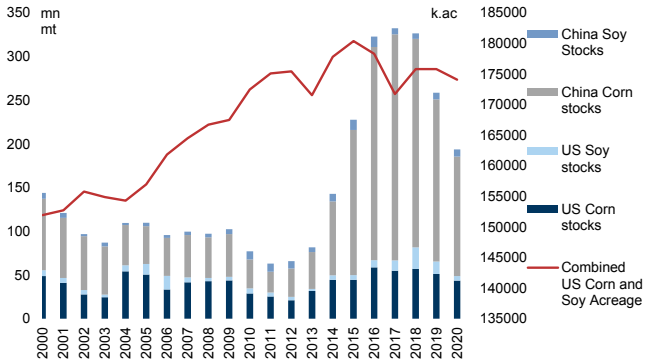
To meet this growing pull on US and Latin American crops US corn and soybean planting will need to rise in the coming years. These will, however, be marginal acres in terms of productivity, with farmers' input costs set to rise with higher oil and derivative prices. This pull should not just be on US acreage, as domestic soybean oil production capacity will likely remain short of the expected renewable diesel demand pull, requiring additional imports from Argentina where acreage expansion faces the vagaries of domestic policies. As a result, we believe there will be a structural repricing higher of agriculture products in coming years, with deferred forward prices for corn, and especially soybeans, needing to rally further.

Exhibit 41: Chinese state corn reserves have now depleted, driving the start of a restocking cycle



Source: Wind, Goldman Sachs Global Investment Research.

Exhibit 42: China restocking, hog herd expansion and a US renewable diesel pull should all require US acreage expansion and higher crop prices



Source: USDA, Wind, Goldman Sachs Global Investment Research.

Commodity Trade Recommendations

Exhibit 43: Commodity Trade Recommendations

Open trades	Open		Latest		Change	Profit/Loss	Unit
Cross-Commodity	**Date**	**Value**	**Date**	**Value at last close**			
Long Carbon Neutral Commodity Index*	2020-10-20	264.23	2020-11-18	261.39	-2.84	-2.84	%
Back to the USSR Trade Basket	2020-11-17	1.02	2020-11-18	1.02	0.00	0.00	%
Relative Recovery Basket	**Date**	**Value**	**Date**	**Value**			
Long GSCI Copper ER Subindex	09-Jul-20	532.10	2020-11-18	602.93	70.83	13.31%	%
Energy	**Date**	**Value**	**Date**	**Value**			
Long 3Q21 Nymex Gas	2020-10-05	2.82	2020-11-18	2.83	0.01	0.01	$/mmbtu
Long 2Q2021 JKM-TTF spread	2020-10-19	0.26	2020-11-18	0.37	0.11	0.11	$/mmBtu
Long Jet Regrade	2020-09-23	8.44	2020-11-18	18.43	9.99	9.99	$/bbl
Long Brent Dec21	2020-08-30	48.99	2020-11-18	45.33	-3.66	-3.66	$/bbl
Long Brent Jun21-Jun22 timespreads (rolled from Dec20-Dec21)	2020-08-30	-1.75	2020-11-18	-1.10	0.65	3.47	$/bbl
Short cal21 VLSFO Brent cracks	2019-09-04	11.15	2020-11-18	5.36	-5.79	5.79	$/bbl
Short cal21 VLSFO vs. NW Eur 0.1% GO	2019-09-04	-5.76	2020-11-18	0.03	5.79	-5.79	$/bbl
Metals							
Long copper and short Zinc	2019-04-25	2.38	2020-11-18	2.69	0.31	0.31	%
Long Silver	2020-10-08	23.96	2020-11-18	24.63	0.67	2.80%	%
Long December 2020 Gold	2020-03-23	1581.40	2020-11-18	1887.80	306.40	306.40	$/toz

CNCI:*87% weight in the S&P enhanced GSCI, 13% weight in the Dec 12 EUA

Source: Goldman Sachs Global Investment Research.

Exhibit 44: Individual Commodity Return Forecasts

Commodity	Dollar Weight*		GS Forecast Return								
			Spot			Roll			Total		
	GSCI	BCOM	3m	6m	12m	3m	6m	12m	3m	6m	12m
WTI	20.8%	5.1%	8.3	17.9	45.5	-2.4	-3.3	-1.7	5.7	14.1	43.3
Brent	14.1%	4.3%	7.3	16.4	43.8	-2.3	-2.6	-0.5	4.9	13.5	43.3
Gasoline	3.5%	1.4%	9.2	28.8	41.7	-12.0	-13.9	-5.2	-3.8	11.0	34.6
Heating Oil	3.1%	1.2%	7.8	18.7	47.4	-2.8	-4.2	-4.2	4.9	13.8	41.5
Natural Gas	3.7%	10.0%	4.7	22.2	13.5	0.0	-4.5	-12.7	4.8	16.8	-0.7
Aluminum	4.5%	4.5%	2.7	5.2	7.8	-0.5	-1.3	-3.0	2.2	3.9	4.8
Copper	5.8%	7.6%	-1.5	2.0	5.6	0.0	0.0	0.3	-1.5	2.2	6.1
Nickel	1.1%	3.0%	3.9	0.8	0.8	-0.4	-0.7	-1.5	3.6	0.1	-0.5
Zinc	1.3%	3.7%	-4.7	-7.5	-10.3	-0.2	-0.5	-1.0	-4.8	-7.8	-10.9
Gold	6.7%	15.6%	21.4	21.4	21.4	-0.6	-1.1	-2.1	20.8	20.2	19.1
Silver	0.8%	4.9%	20.4	20.4	20.4	-0.3	-0.6	-1.1	20.1	19.8	19.3
Wheat	4.0%	3.2%	-1.6	-3.3	-9.1	-0.3	-0.6	-1.5	-1.9	-3.8	-10.2
Corn	6.3%	6.2%	2.5	6.1	2.5	-0.6	-1.4	-1.4	2.0	4.7	1.3
Soybeans	4.7%	6.7%	2.3	1.9	-0.3	-0.4	1.0	1.3	1.9	3.0	1.3
Cotton	1.4%	1.5%	2.0	3.4	4.8	-0.9	-1.7	0.0	1.2	1.7	5.0
Sugar	2.2%	3.2%	-9.5	-12.7	-9.5	0.0	2.2	2.9	-9.5	-10.7	-6.6
Coffee	0.9%	2.5%	-5.7	1.1	13.7	-1.0	-2.0	-3.9	-6.5	-0.9	9.4
Cocoa	0.4%	0.0%	-3.5	-1.4	2.7	-0.2	-0.1	0.0	-3.6	-1.4	2.9
Live Cattle	4.4%	3.4%	0.0	2.7	11.6	-2.7	-0.1	-1.3	-2.6	2.7	10.4
Lean Hogs	2.2%	1.6%	1.9	25.4	9.8	-5.4	-12.1	0.8	-3.5	10.4	10.9

* dollar weights as of Nov 17, 2020

Source: Goldman Sachs Global Investment Research.

Outlook by Commodity

Energy

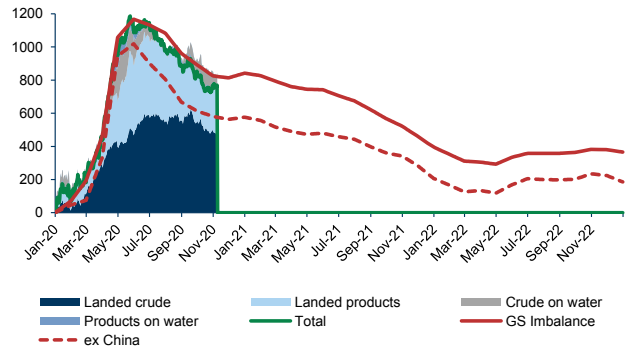
Oil: Winter lockdowns simply a speed bump in the oil market rebalancing

The wave of Covid infections sweeping Europe has surprised in its intensity, leading to renewed lockdowns, with US restrictions likely as well. Our expected peak 3.1 mb/d associated hit to oil demand, while smaller than in April 2020 given lighter restrictions, will nonetheless bring the oil market rebalancing to a halt, on our forecasts, following the surprisingly quick return of Libyan production. After a 2.2 mb/d October deficit, we now expect a 1.0 mb/d December surplus. In the coming weeks, the market will likely remain caught between vaccine, lockdown and US election headlines, leaving scope for further price volatility and downside risks as the surplus weighs on crude timespreads. The year-end surplus we forecast, and still-high demand uncertainty, lead us to expect OPEC+ to delay by three months its January production ramp-up when it meets in four weeks, helping bring the market back to a shallow 0.9 mb/d deficit in 1Q21.

Importantly, the winter lockdowns are only a speed bump in our forecast of a sharp tightening of oil's fundamentals through 2021. This is firstly driven by our above-consensus demand recovery forecast, boosted by vaccines and rapid testing. Sustained low oil prices are also reducing supply capacity, and are setting the stage for binding under-investment. Producers outside shale are keeping upstream capex low, with the majors shifting their capex to renewables, given growing investor focus on ESG. Based on a shrinking number of new projects, and higher expected decline rates, this should limit the recovery in non-OPEC and non-shale output. In addition, the shale reaction function has changed, with a focus on returning cash to shareholders. This should allow OPEC to start growing production at higher price levels next year, requiring a meaningful increase in prices to trigger the rebound in shale production needed to balance the global market from late-2021. Net, we expect the winter Covid wave to delay, but not derail, the oil market's rebalancing, with normalized OECD stocks, OPEC+ spare capacity returning to 1Q20 levels and finally shale production growth all occurring by 4Q21.

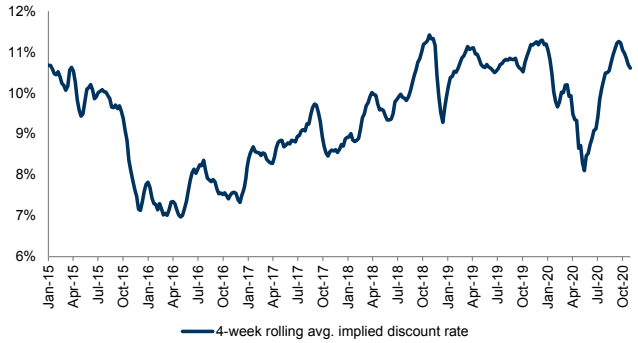
Our 2022 balances point to a balanced oil market, even after now assuming a near-full return of Iranian production. As a result, we expect Brent prices to resume their rally in 1Q21, when we forecast the Brent price averaging $47/bbl, with the winter speed bump simply delaying the return to $65/bbl by year-end 2021. We forecast a large inflection in oil prices next summer, when we expect the steady deficit, declining inventory buffer and diminishing OPEC spare capacity to become apparent, calling for higher drilling activity. As a result, while our initial recommendation to go long Dec-21 Brent proved too early, this remains our preferred macro expression of oil's rally.

Exhibit 45: Landed crude stocks are off their highs while oil on water is nearing normal levels
Global high frequency inventory tracking (mb vs Dec-19)



Source: Kpler, Goldman Sachs Global Investment Research.

Exhibit 46: Low oil prices, poor historical returns and high ESG headwinds have all significantly increased the cost of capital for oil producers
4-week rolling avg. implied discount rate for US oil producers



Source: Company data, Goldman Sachs Global Investment Research.

Products - Margin upside to be confined to distillates

As oil demand recovers, we expect refined product markets to tighten next year, once winter lockdowns ease. As with crude, this tightening should first be driven by above consensus demand growth, with vaccine availability, rapid testing, fiscal stimuli and green investment all leading to much stronger consumption from 2Q21 and through 2022. While corporate jet travel will likely face scarring effects, the ramp-up in infrastructure spending should increase the oil intensity of the economic recovery, with lasting working from home effects likely also countered by de-urbanization and lingering public-to-private commuting substitution in DMs. With oil demand back to late 2019 levels by year-end 2021 on our forecasts, we expect 2022 demand to only be 2 mb/d below our pre-Covid19 expectations.

Lingering excess refining capacity had, until now, prevented us from taking a constructive view on 2021-22 margins, even in the face of improving demand. Even before the Covid-19 hit, the global refining market was set to face over-capacity in 2020-22, with large new refineries coming online in China and the Middle East. The refining industry is, however, finally responding, and announced closures have accelerated, pointing to a rationalization of excess capacity by 2022 on our demand forecast. Specifically, over 2.5 mb/d of capacity globally is now slated to close, although we estimate the net impact will be closer to 1.5 mb/d given conversions into biofuel plants and mothballing of facilities. Nonetheless, the combination of 1.5 mb/d lower refinery capacity by 2022 than previously expected, and our current demand projections, lead us to forecast refinery utilisation recovering to levels not far below 2019 over the next two years. This should lead deferred refining margins to expire well above still depressed current forwards, especially in 2022. The difficulty in expressing this view remains, for now, the negative impact that winter lockdowns will likely have on oil demand and refining profitability in the coming months, as well as the potential delay of capacity rationalization if margins recover too quickly in 1H21.

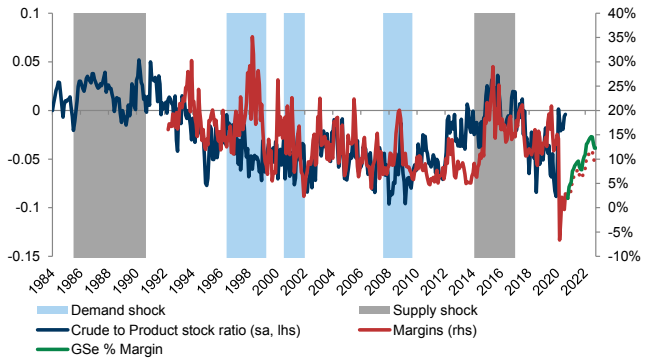
Our constructive demand and refining forecasts do not result, however, in a blanket bullish view across petroleum product cracks. The increase in runs required to keep pace

with the oil demand recovery will have diverging impacts on product markets, we expect, with distillates likely to outperform gasoline. First, distillate demand is more levered to the roll-out of vaccines, given the current depressed level of international travel, with much more modest upside to gasoline demand. This boost may in fact play out through the winter, as rapid testing, inventory restocking and heating demand all support distillate and jet demand relative to gasoline, weighed down by lockdowns (especially if they spread to the US).

There is also a supply argument, as gasoline yields will need to come off substantially when runs ramp up, in order not to overwhelm stocks. As we show in Exhibit 49, relative gasoline and distillate forward cracks would lead to a much larger deficit in distillate markets (assuming runs increase in line with demand and modelled yield switching). As a result, we view deferred European distillate cracks as the preferred expression of our constructive refining view, which further benefit in 2022 from relatively depressed pricing (vs. US markets) and being more exposed to the recovery in jet fuel demand (as EU jet demand has lagged the US recovery) and jet fuel hedging (with US airlines hedging a lot less). A longer-term EU pivot to gasoline over diesel as a motor fuel (and the resultant impact on trade flows) is insufficient to explain the magnitude of the deferred discount, in our view.

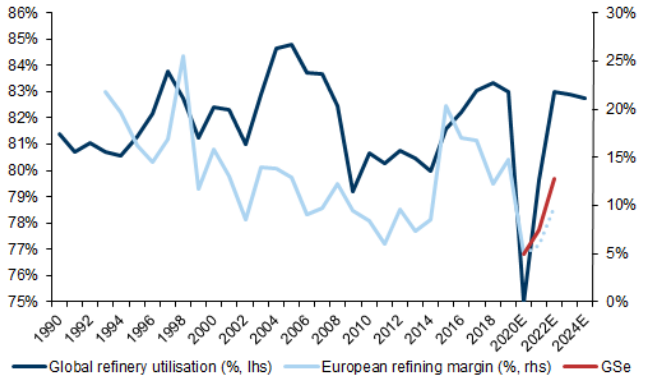
Ultimately, we still expect jet cracks to outperform the products complex, a view that we have expressed with our long 2Q21 European jet regrade (jet minus diesel) trade recommendation. This is due, in large part, to recovering demand, but additionally to regrade remaining lower than required to re-segregate jet molecules from the distillate pool (achieved due to the exceptional refinery flexibility demonstrated this year). Finally, resilient shipping and power demand will likely leave bunker fuels such as VLSFO and HSFO less leveraged to the incremental stimulus of a vaccine roll-out. Hence, we believe that they will underperform as refinery runs and their supply ramp up. This may especially be the case for VLSFO, as complex US refiners ramp up from their current low utilization. Combined with improving segregation, this implies that low-sulfur bunker markets should eventually no longer need to price against distillates to source marginal supply in an IMO world. We therefore reiterate our long-held view that VLSFO cracks will gradually become negative. We believe HSFO will also face pressure from the global crude slate becoming heavier, as OPEC+ ramps back up faster than shale, although meaningful downside should be limited by scrubber uptake and HSFO's clearing mechanism as a secondary refinery feedstock.

Exhibit 47: OECD product to crude surplus has already normalised = margins should eventually follow
Seasonally adjusted ratio of crude to product stocks (lhs) relative to refinery margins (NW Europe Brent basis, % rhs)



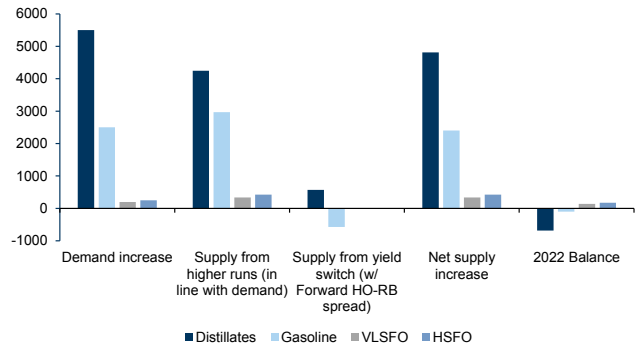
Source: IEA, Platts, ICE, Goldman Sachs Global Investment Research.

Exhibit 48: A bullish outlook on a V(accine)-shaped recovery and numerous refinery closures see utilisation rates almost normalise by 2022
Global refinery utilisation (%,lhs) vs refining margins (%, rhs)



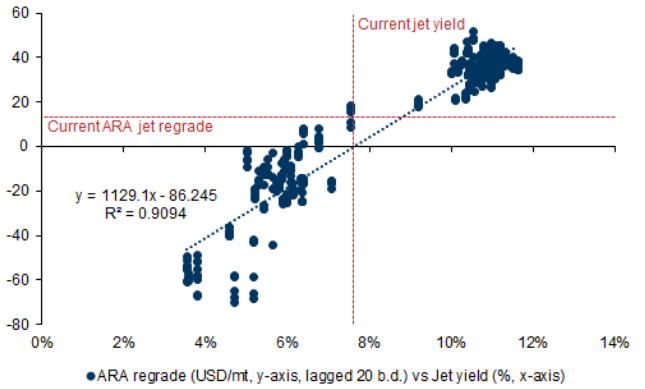
Source: IEA, IIR, Platts, ICE, Reuters, BP, Goldman Sachs Global Investment Research.

Exhibit 49: Current forward cracks do not reflect the interproduct rebalancing required
Cal22 vs. Oct-20 S&D bridges for refined products given current forward heat-gas spread



Source: IEA, Goldman Sachs Global Investment Research.

Exhibit 50:
Lagged NW Europe jet fuel-gasoil spread (regrade, y-axis, USD/mt) vs. US refinery jet fuel yields (x-axis, %)



Source: EIA, Platts, Goldman Sachs Global Investment Research.

Natural gas:

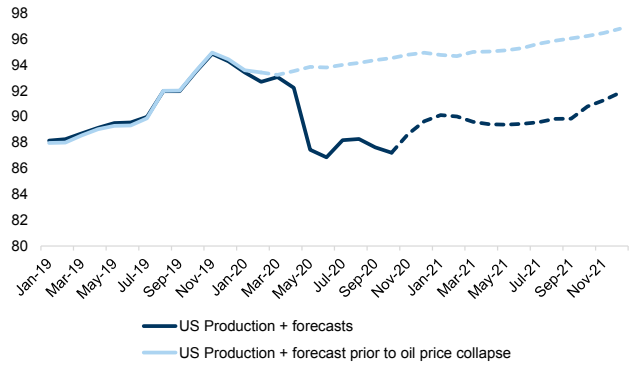
US Gas - Transition to a tighter forward outlook

This year's global gas oversupply has weighed on Henry Hub prices all summer long, as lower US LNG exports were eventually needed to solve for the global gas surplus. These headwinds have now disappeared, which we expect will remain the case in 2021 as the global gas market moves to a more balanced setting. Importantly for 2021, the catalysts for a further rally in US gas prices are domestic, owing to lower associated gas production. As a result, although weather and Covid could delay/derail the rebalancing of the global gas market, it would take an extreme set of assumptions for these to also derail a further rally in Henry Hub gas prices. As a result, we reiterate our constructive $3.23/mmBtu Cal21 Henry Hub view ($0.39 above forwards), with the market set for a sustained domestically-driven deficit, and we continue to recommend a long 3Q21 NYMEX gas trading position. We note, though, that the same strong link between global gas and US markets that softened US balances this summer can work in the other direction. For instance, should weather or lower-than-expected US gas production trigger a spike in Henry Hub prices, the US LNG export arb could shut temporarily, potentially reducing LNG supplies and tightening global gas balances as a result.

Importantly, we believe this constructive US gas outlook is robust, even with a warmer-than-average US winter. Specifically, we expect end-Oct21 storage under current forwards at nearly 780 Bcf below the bottom of the historically acceptable 3.6-3.9 Tcf range. With a one-standard-deviation warmer-than-average winter adding about 500-550 Bcf to storage, such an event would remain insufficient to balance the market ahead of the 2021/22 winter, we estimate. And although November has indeed started significantly warmer than average, we note it has been accompanied by a sharp sell-off of the US gas curve. This is important, as lower gas prices support higher implied coal-to-gas (C2G) substitution. With the scale of the recent price sell-off exacerbated by exceptionally long positioning, we would argue that, if sustained, such price levels would support C2G substitution by more than enough to compensate for this month's decline in heating demand, therefore leaving Cal21 balances as tight if not tighter than previously.

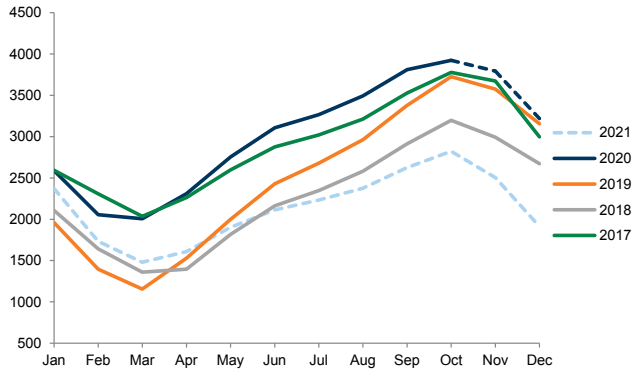
As a result, our tighter forward outlook and price views remain intact, though we see risks to our price forecast changing from an upside skew to being more balanced, as we increase our expected end-Oct21 storage under current forecasts to 2822 Bcf from 2739 Bcf previously. This revision takes into account the latest weather forecasts and price moves, as well as a modest downward revision to power and industrial demand (on expected increased Covid restrictions), and higher expected Haynesville production on stronger realized data and recent producer commentary. Importantly, we note that our recent oil update highlights a delayed recovery in oil prices, vs. our previous expectations, suggesting a delayed recovery in associated gas production growth next year. We believe this keeps risks to our current $2.75/mmBtu 2022 NYMEX natural gas forecast skewed to the upside.

Exhibit 51: The oil collapse earlier this year has significantly lowered our expectations of US associated gas production growth
GS US gas production outlook; Bcf/d



Source: Wood Mackenzie, Goldman Sachs Global Investment Research

Exhibit 52: Our 2021 storage outlook under current price forwards remains very tight
US gas storage, Bcf



Source: EIA, Wood Mackenzie, Platts, Goldman Sachs Global Investment Research

Global Gas - A more balanced 2021

We maintain our view that the 2020 summer was the peak of the current bearish cycle in global gas markets, and that forward fundamentals point to a much better-balanced outlook in both Europe and Asia. Consistent with this view, we have seen the JKM and TTF forward curves move in line with our forecast over the past three months, with winter prices even moving a little above our forecasts. Accordingly, we are now more neutral, relative to current JKM and TTF prices, with our TTF and JKM forecasts unchanged at $4.70/mmBtu and $5.80/mmBtu for the 2020/21 winter (forwards at $5.04 and $6.41) and $4.70/mmBtu and $5.50/mmBtu for the 2021 summer (forwards at $4.65 and $5.04). Importantly, we continue to see further upside to US gas prices, where current forwards still imply a very tight 2021 balance, in our view.

To be clear, there were three main drivers that led to the extreme oversupply in global gas markets this year, namely: (1) an already oversupplied LNG market owing to strong capacity additions; (2) a warm winter across the Northern hemisphere, which weighed on heating demand for gas; and (3) severe Covid-related lockdowns around the world, which weighed heavily on industrial and power demand for gas. To balance the market and prevent a breach of storage in NW Europe, the main destination for global LNG supply residuals, global gas prices collapsed this summer to incentivize demand and trigger supply cuts, most notably from the US, the marginal LNG supplier on a variable cost basis.

Going forward, we see this year's bearish drivers largely reversing, with: (1) global LNG capacity additions slowing markedly, not only next year but for the next four years; (2) an expected normalization of weather patterns this winter, especially as La Nina favors colder deviations in Japan and South Korea; and (3) an already visible strong rebound in Asian LNG imports from the weakness observed this past summer. Even taking into account renewed lockdown measures in Western Europe, we expect winter storage draws in the region to be significantly steeper than a year ago, leaving room in European gas storage to accommodate higher gas supplies next year. This should allow TTF to balance in 2021, by pricing against coal (currently pricing at $5.38/mmBtu and

$5.47/mmBtu for this winter and next summer), as opposed to pricing supply out at sub-$4 levels.

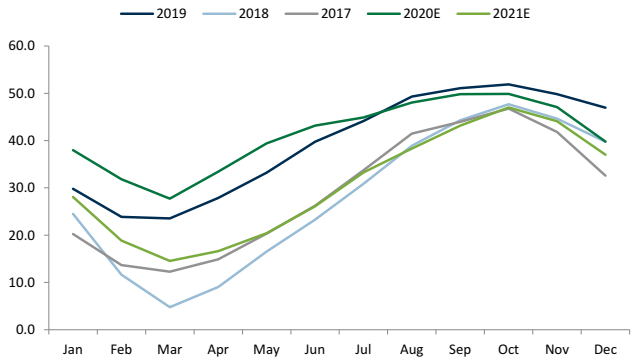
Accordingly, we maintain our winter and summer 2021 forecast at $4.70/mmBtu for TTF. We forecast JKM prices at $5.80/mmBtu and $5.50/mmBtu for next winter and summer, at a wider spread to TTF than this year, owing to a more balanced global LNG market. To express this view, we recently opened a trading recommendation to go long the 2Q21 JKM-TTF spread. We see risks to our 2021 global gas price forecasts as balanced, with winter weather as the main driver for the next several weeks.

Exhibit 53: We expect global LNG balances to tighten sequentially for the next four years

Source: Kpler, Goldman Sachs Global Investment Research.

Exhibit 54: We expect lower LNG imports in Europe this winter to help normalize storage levels through 2021

NW European gas storage, Bcm



Source: Bloomberg, Goldman Sachs Global Investment Research.

Metals - Outlook

Industrial Metals

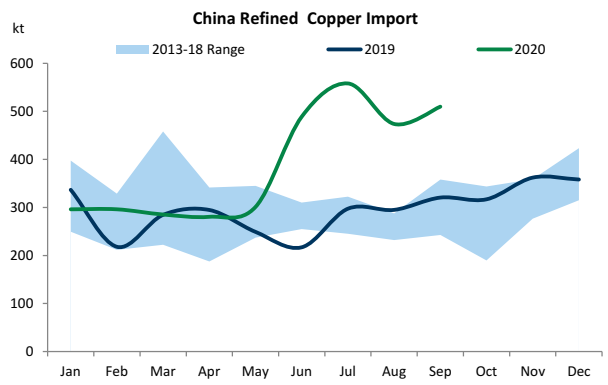
Copper: Sizeable metal deficit to fuel continued upside in 2021

Overall, we are firmly in the bullish camp on copper. After a year of significant ex-China destocking (due to record China copper imports), we expect a large global deficit in 2021, supported by recovering Western demand, solid China and mine supply tightness to take copper prices higher (GS 12M target $7,500/t). We project a 409kt refined metal deficit next year, which should be followed by close to balanced markets in 2022/23. The US election result has had little impact on our 2021 balance, although we have modestly adjusted our US consumption forecasts for 2022-24 on a slight increase in support for copper-intensive green sectors. We believe the critical trend in the copper market in 2021 will be ex-China metal tightness, as Western demand recovery builds on a low-inventory starting point. In this context, we continue to like exposure to this upside risk in flat copper prices but also expect the copper curve to tighten in an environment of multi-year low inventories.

The key development in the copper market in 2020 has been the surge in China's refined metal imports. Even with sluggish Western demand, China's record refined imports have generated a significant destock of the ex-China copper market. On year-to-date trends, we estimate that after accounting for China's net refined metal imports, the ex-China copper market will be in a very large full-year 1Mt refined deficit. Visible inventories in the ex-China market in LME and COMEX warehouses are close to flat year-to-date, which implies the reduction in inventory has largely been in non-visible stocks (trader/supply chain inventories). We believe that this has more than halved ex-China non visible copper stocks, a significant stock reduction ahead of a prospective demand recovery in the West next year.

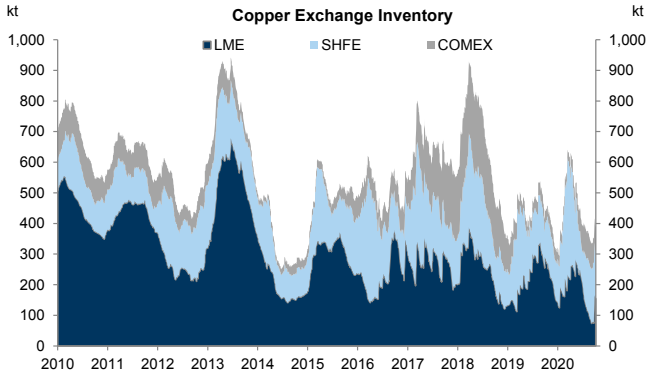
On the China side of the equation, a combination of strong end demand trends, tightness in scrap (supporting substitution to cathode) and some strategic stockpiling supported the record level of cathode imports. We think refined imports are likely to moderate next year, but not fall substantially: scrap supply will likely improve after the negative activity shock this year, but China's end-demand conditions should remain healthy next year on property, infrastructure investment and new 'green'-related demand. As such, we expect China to remain a positive influence on the copper market next year, albeit adjoined by a Western demand recovery, which together should support a material revival in global demand. Set against modest global mine supply growth, we think there will be a significant deficit in refined metal, which is not fully discounted in either flat prices or spreads currently.

Exhibit 55: Surge in China refined imports remains underpinned by end demand trends and other raw material tightness



Source: Wind, Goldman Sachs Global Investment Research.

Exhibit 56: Visible copper inventories remain near multi-year lows; China import strength has destocked the ex-China market



Source: Bloomberg, Goldman Sachs Global Investment Research.

Aluminium: Upside path supported by Western demand revival, persistent China tightness

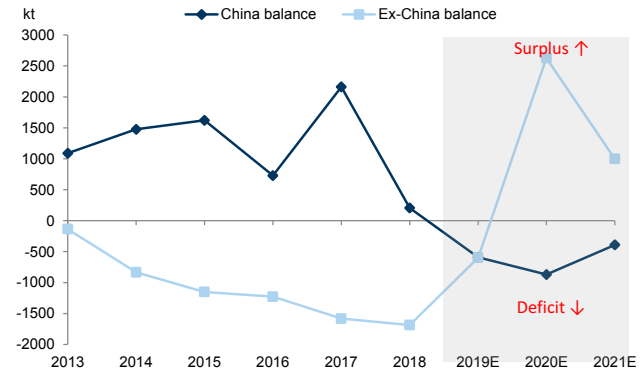
We view aluminum in bullish terms, with a projected upside path for prices through the course of 2021 (3/6/12m $2,000/2,050/2,100/t). From a fundamental perspective, this constructive view is underpinned by an expected tightening trend in the global balance from a sizeable surplus (1.8Mt) this year to a negligible surplus (606kt) in 2021. The critical shift in fundamental conditions should be driven by a strong rebound in Western demand, evidence of which is already starting to emerge in the US and Europe. We also assume that support will remain from the continuation of a tight China primary market, prone to import phases, which should help to reduce the ex-China surplus. China's aluminum supply will rise next year, on our forecasts, on new smelting capacity and higher scrap imports. However, this should be substantially offset by still healthy domestic primary demand growth and a rebound in demand related to stronger semis exports (as Western activity revives).

The most significant and in our view underappreciated trend in the aluminum market this year has been the exceptional strength of China's primary demand. We expect China's primary aluminum demand to increase 5% yoy in 2020. This has been underpinned by surging semis output, rising by 11% yoy year-to-date. Momentum remains very strong in this dynamic in 4Q and we expect only a modest deceleration in demand growth next year (+3% yoy). Set against a restrained rebound in scrap supply, and China hitting its capacity cap on the smelting side, we expect a continuation in tight onshore primary metal conditions. We believe that the highly regulated approval process for new capacity, reinforced by an increasing green policy focus onshore, will curtail the potential for extended surplus phases in the onshore market.

From an ex-China primary market perspective, we expect a broad growth recovery and heavily destocked Western supply chain to support sharp yoy growth in metal demand next year. Set against limited ex-China primary supply growth, this should sharply reduce the ex-China surplus and, in turn, the global surplus. This should be a supportive trend for the LME price, particularly in combination with anticipated broader macro trends (a weaker USD in particular). In terms of physical market trends, the periodic primary

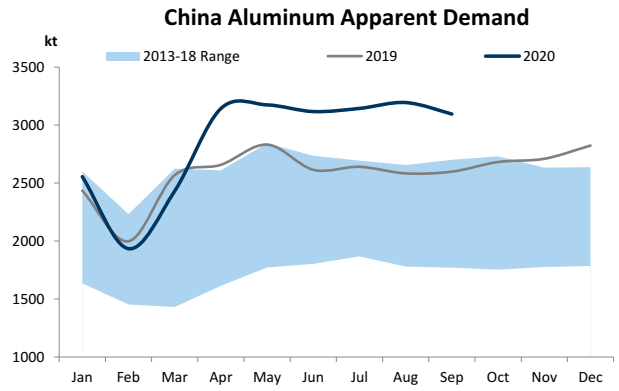
import phases into China will likely continue to support a gravitational pull of inventory to South East Asia. The remapping of ex-China primary metal flows tied to China's import opportunities is an increasingly entrenched feature of the market. These dynamics are also likely to provide support to duty unpaid physical premiums in Europe, the US and Japan, as demand improves into next year, given greater incentives needed to attract units from the Asian aluminum storage hub.

Exhibit 57: Continued China deficit and progressively smaller ex-China surplus to generate net tightening in aluminum into 2021



Source: Goldman Sachs Global Investment Research.

Exhibit 58: China's primary aluminum demand has been exceptionally strong in H2-20



Source: Wind, Goldman Sachs Global Investment Research.

Nickel: Tug of war between near-term surplus and medium-term EV demand

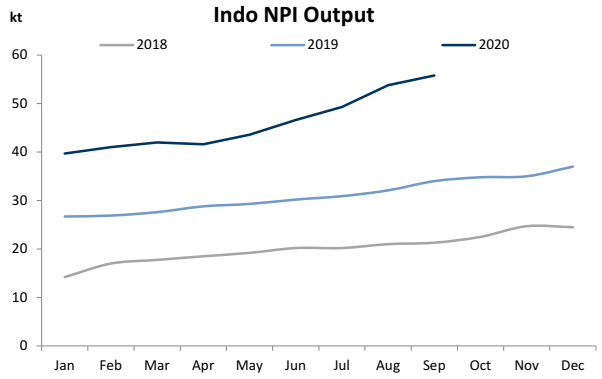
Nickel prices have rebounded strongly since March, rising 40% and leaving it second only to copper in performance among the base metals. The recovery trend has been fueled by strong investor buying, focused on the medium-term EV-related demand story. The nickel market faces a unique balance of contrasting fundamental forces, with the prospect of near-term surpluses rooted in a highly elastic Indonesian NPI supply contrasting with medium-term supply incentive price levels tied to EV demand-led tightening effects. This leaves the nickel price dynamic in an extreme balancing act, in our view. Whilst our latest price forecasts signal relative stability (3/6/12m $16,500/16,000/16,000/t), we expect EV-related policy signals and shorter-term surplus pressures to offer trading opportunities around this level. Phases of surplus visibility are likely to generate periodic headwinds, with the potential for pullbacks towards $14,000/t based on key cost curve support levels, though we believe the upside skew in EV demand outcomes will increasingly limit the price downside as the sector expands and the balance tightens.

Our ongoing analysis of EV battery-related demand continues to point towards a material medium-term tightening risk for the nickel market. We believe there is no doubt that the increasingly front-footed green policy environment skews the risks to the upside in our base case forecasts. From 2019 to 2025, we estimate nickel demand from the sector will grow by at least 260kt (base) and by up to 500kt on a faster assumed penetration rate. At the current price level, there are enough committed type 1 projects and mine restart potential to balance the market by 2025, in our base case. However, in our view the risks are skewed towards an earlier emergence of a deficit, if EV penetration rates rise ahead of our expectation. Substantive inventories would buffer

initial upside demand surprises, but a higher price environment would likely have to eventuate, given the costs of the required HPAL projects and sulphide nickel mines. Battery chemistry creates some additional risks to our demand assumptions, although our assumption remains that nickel predominates on its comparative qualities.

The softening counterweight in the nickel market relates to broader pre-existing trends. A continued surge in Indonesian NPI production has supported robust supply growth this year, just as ex-China demand has fallen sharply on the Covid-induced slowdown. Ex-China demand has been particularly impacted by a collapse in oil, gas and chemical investment, which accounts for close to 20% of end demand. Lower nickel use has been accentuated by a significant upswing in scrap availability in Western markets. Despite some offset from strong China stainless production, the global balance has swung into a very large 161kt surplus in 2020, we estimate. Into 2021/22, we expect a phase of more modest surpluses (64kt, 61Kt) as Western demand rebounds, albeit counteracted by continued Indonesian NPI supply growth. With a sizable inventory overhang and a tightening LME curve, there remains a risk of exchange deliveries, which would likely be a negative for prices, particularly with net investor positioning now clearly on the long side. Whilst we expect the nickel market fundamentals to eventually tighten towards a balanced state by mid-decade, we believe legacy surplus will remain a persistent price risk, particularly on any setbacks to the EV demand story.

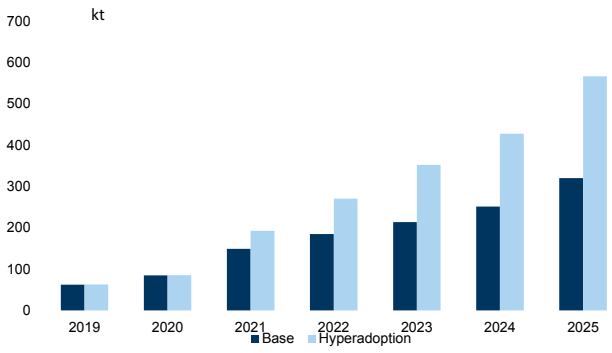
Exhibit 59: Indonesia NPI supply growth has been very strong



Source: Goldman Sachs Global Investment Research.

Exhibit 60: Under our Auto team's hyper-adoption scenario, we estimate the nickel EV demand boost could be double that of their base case projections

Nickel demand from batteries under our base case and hyperadoption sales scenarios, kt



Source: Goldman Sachs Global Investment Research.

Zinc: Continued metals surplus set to drive underperformance

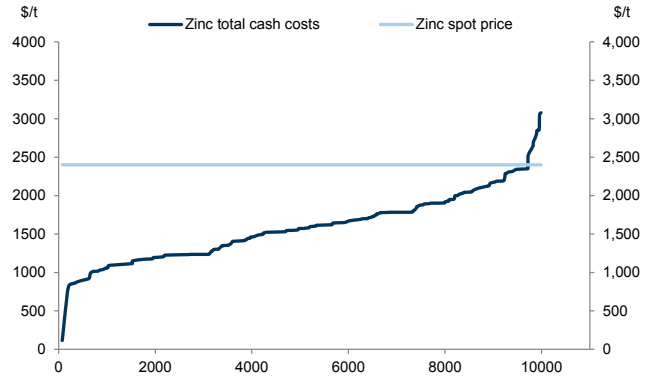
Zinc prices have recovered strongly so far in 2020, benefiting as much from the macro-led rising tide as underlying supply-demand improvements. We believe the refined zinc market has been in a large surplus this year (GSe 584kt) albeit reduced from our previous forecast (closer to 1Mt), reflecting less developed market demand contraction than previously discounted. Close to half this surplus has been visible in stock trends, with the remainder built primarily in Western off-warrant locations. We expect a more modest overall refined metal surplus in 2021 (284kt), supported primarily by a continued recovery in DM demand. Our current zinc price forecasts (3/6/12m

$2,550/2,475/2,400/t) signal that there is limited fundamental support for further upside. Whilst the broader macro climate could nonetheless offer more support, we ultimately envisage a relatively restrained price dynamic into next year for zinc, owing to continued metal surplus conditions. From this perspective, we think zinc producers should look to further near-term upside as a hedging opportunity.

The challenge to sustained zinc price upside into 2021 relates to a combination of our expected China market and mine supply trends. Regarding China, in comparison to the other base metals, zinc suffers from two channels of relative weakness. First, China's refined zinc demand continues to trend at a materially weaker level than for other base metals. We think this reflects a combination of restrained trends from both the galvanized steel and die-casting alloy sectors, with some substitution from aluminium alloy and stainless steel noted in the construction sector. Second, China's refined zinc production has remained relatively unrestrained versus other metals, reflecting strong concentrate imports and still profitable margins. In this context, China's refined import requirements have remained depressed, limiting the erosion of ex-China metal surplus via strong China imports that has played out in the aluminium and copper markets this year for example. If China's demand growth moderates next year, and onshore refined production growth remains well-supported, it is not obvious why China will play a more supportive role.

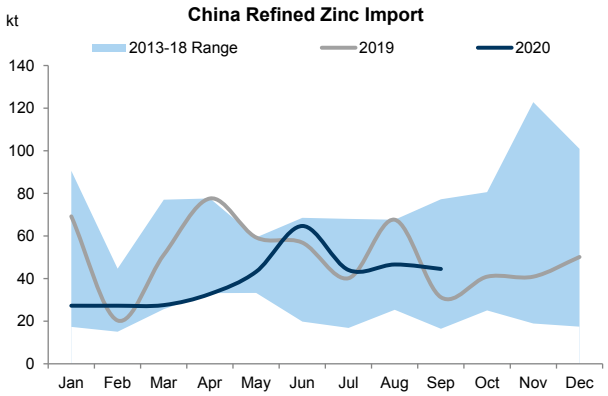
In terms of mine supply, after a heavily disrupted year due to Covid, primarily in South America, our base case points to a 7% yoy increase in global mine production in 2021. This forecast growth is supported by a number of new mine projects and expansions that have been delayed but not cancelled. The key impact should be that this mine supply significantly softens the concentrate market, taking it back into surplus after a year of destocking, in turn supporting higher spot treatment charges and incentivizing stronger refined production (particularly in China where capacity flex remains). The flip side of our mine supply outlook is that from 2022, production growth essentially depletes until new projects are approved and developed, meaning at least a 3-year period of incremental tightening. It is in this context that even after some fundamental headwinds and price moderation, we do not expect zinc prices to trade substantially into the cost curve next year.

Exhibit 61: Strongest zinc producer margins in close to 12 months



Source: Wood Mackenzie, Goldman Sachs Global Investment Research.

Exhibit 62: China refined zinc imports have remained depressed through 2020



Source: Customs, Wind, Goldman Sachs Global Investment Research.

Precious Metals

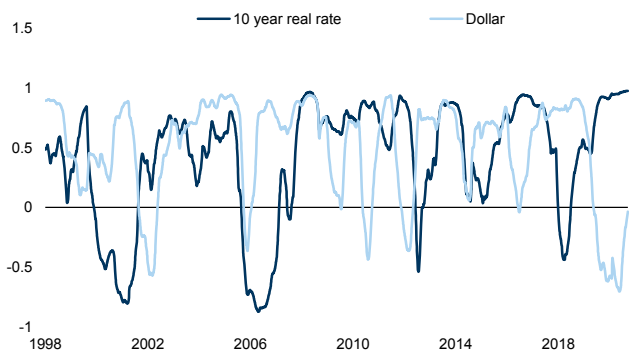
Gold

2020 has seen governments and central banks globally introduce very material fiscal and monetary stimulus to help support the economy through the Covid pandemic. US real rates fell as nominal rates were pushed close to their historical lows, while inflation expectations rebounded, supported by stimulus hopes. We believe that 2021 will likely see further compression in 5-year real rates, as actual inflation begins to emerge. Our economists expect US CPI to briefly accelerate above 3% under our oil price forecast. While part of this acceleration would be due to a supportive base effect, market expectations of breakeven inflation are still likely to move higher.

In this environment of accelerating inflation and falling real rates, we expect investment demand for gold to remain high, as investors focus on hedging against inflation tail risks and diversifying their fixed income portfolios. In this sense, the current situation resembles 2010-2012 when economic recovery coupled with strong commodity prices led to a strong inflation rebound and drove gold to its peak in late-2011. During this period of accelerating inflation, gold disconnected from 10-year real rates and became more correlated with the dollar and with real rates with a maturity of less than five years. We see a similar outlook, with the gold price moving higher with a weaker dollar and lower near-term real rates, even if 10-year real rates fail to move lower.

Finally, in 2021 we expect strong rebound in emerging market economies' dollar GDP, as these economies gradually recover from the pandemic and their currencies strengthen, supported by increasing global dollar liquidity. EM demand was a material drag on gold prices in 2021, but investment demand was strong enough to fully offset this weakness. Next year, if strong investment demand is met with rebounding consumer purchases, we believe this could lead to significant gold price rally (we see supply set to remain fixed, meaning that the market will only be able to clear through higher prices). As such we maintain our 3/6/12 month forecasts of $2,300/t oz.

Exhibit 63: The correlation between gold, the dollar, and 10 year real rates



Source: Bloomberg, Goldman Sachs Global Investment Research.

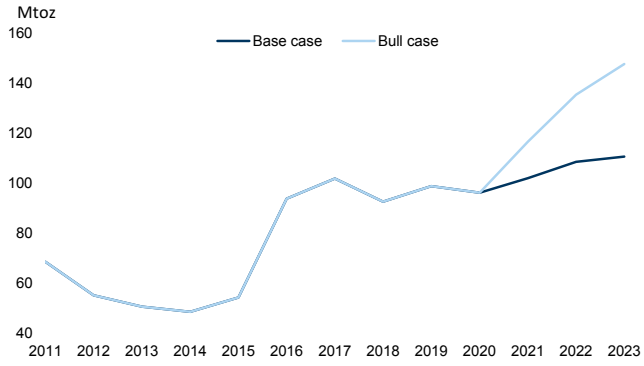
Exhibit 64: Recovery in EM gold demand should boost the gold price

Source: Bloomberg, Goldman Sachs Global Investment Research.

Silver

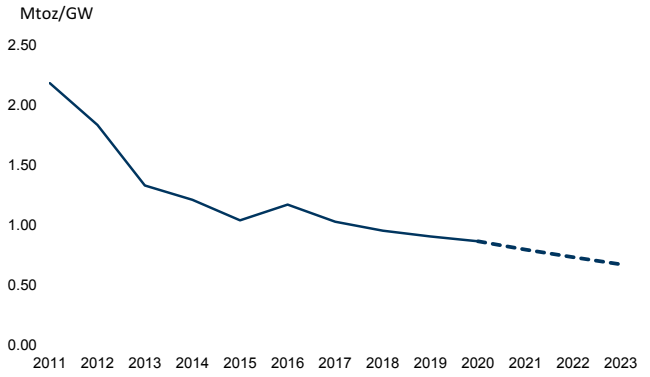
Higher investment demand for gold is likely to translate into a significant boost for silver industrial demand too. Silver sits somewhere between gold and base metals, with 55% of its demand coming from industrial uses. We are bullish on gold and base metals, given our continued concerns of dollar debasement and strong push into Green Infrastructure. As such, silver represents the best of both worlds. We find that the silver price has high correlation to both the gold price and silver industrial demand. We expect silver investment demand to remain strong into 2021, as investors aim to diversify part of their gold exposure with silver. At the same time, we see material upside to industrial demand, from an acceleration in global investment in solar. Specifically, we think that in the event that the Biden green plan is implemented, and China brings forward its renewable targets, silver's industrial demand could receive a 9% boost from solar alone. This is unlikely to lead to material tightness, owing to a high level of on-ground stocks, and price sensitive jewellery and silverware demand. Nevertheless, historically the silver price has had a sensitivity to industrial demand of 1.1. On this basis, a 9% boost to silver industrial demand would imply 10% additional upside to our price target. For now, we keep our 3/6/12 month forecasts unchanged at $30/t oz.

Exhibit 65: Increased demand for solar panels should boost silver industrial demand
Silver solar demand projections, Mtoz



Source: Goldman Sachs Global Investment Research.

Exhibit 66: Falling silver intensity in solar technology will likely attenuate this demand, however
Silver intensity of solar installations, dashed line forecast, Mtoz/GW



Source: Goldman Sachs Global Investment Research.

Bulk Commodities

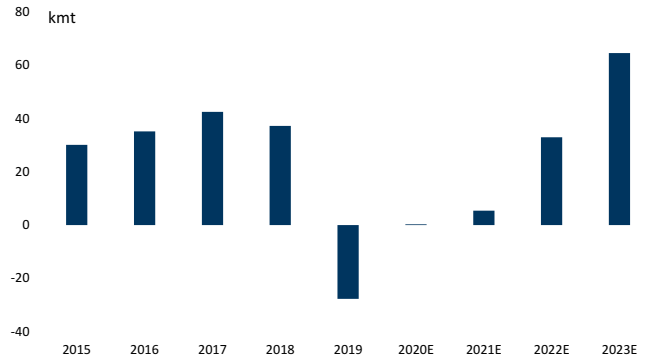
Iron Ore

The iron ore market has been tightly balanced through 2020, with prolonged deficit phases earlier in the year now offset by a surplus phase in the current quarter. The market has been characterised by very strong China steel demand growth, set against strong supply from ex-Australia/Brazil, particularly from India, Ukraine and Chile. Into 2021, we expect a balanced market, before clearer surplus trends into 2022. The softening path will be tentative in our view, and contingent in particular on Australia avoiding any weather-related disruptions in 1Q, Vale achieving the majority of volume growth for the entire supply-side, and some deceleration in China steel demand. Given these risks, we ultimately assume only a gradual move lower in price, and it is not until 2022, on our forecasts, that surplus conditions enable prices start to trade down into the top end of the cost curve.

Chinese demand conditions have been very strong through much of 2020, with a notable re-acceleration in growth so far in 4Q, particularly from construction-related consumption. We assume a deceleration in full-year China steel demand in 2021 (+2% yoy), versus close to double that in 2020. With mill margins having now improved, and with limited evidence of a fresh steel surplus, the setting remains very supportive on the steel side into year-end. The main downside risk in this context, in our view, is the property sector, and the potential for the Three Red Lines policy to restrain developer activity over the course of next year. Whilst this policy remains at a trial phase, if it results in lower land sales to developers, and in turn new property starts, this will prove a headwind to steel demand. This is more likely a headwind to steel demand in 2H21 and into 2022, in our view, reinforcing our belief that correction pressures are likely to be limited in the near term. In line with our base metal assumptions, we also expect Western steel demand to rebound in 2021, which should also be a limiting factor on softening path.

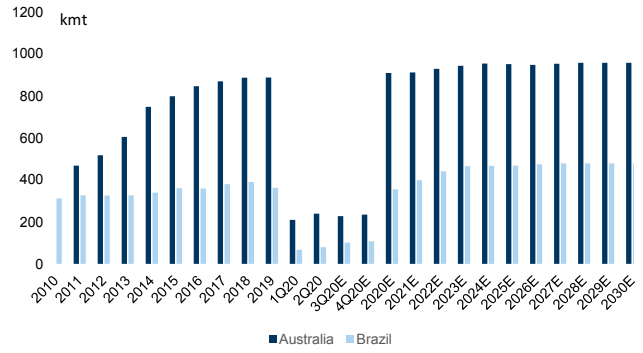
Supply dynamics are equally fragile in terms of the path to surplus. Essentially, all the seaborne supply growth we forecast for 2021 (+63Mt) comes from Brazil, and predominantly from Vale's operations. Whilst there are no obvious operational issues at this stage that might prevent Brazil from achieving this growth, risks from weather (in 1Q in particular) and fresh Covid outbreaks cannot be ruled out as a source of risk. Australian production is forecast essentially flat yoy in 2021 in our base case, but could also face some elevated weather risk in 1Q from La Nina-induced heavy rainfall. Finally, there is limited prospect for further growth in China's domestic mine supply we believe, with the main potential supply increases coming if the government opens the scrap import channel. If that were to happen, we would expect at least 10-15Mt of iron ore equivalent supply over the year. Overall, the concentration of supply growth in Brazil will be a factor limiting the ease with which the market discounts a continued improvement in volumes, in our view.

Exhibit 67: Modest softening path for the iron ore market in 2021



Source: Goldman Sachs Global Investment Research.

Exhibit 68: Reacceleration in Brazil and then Australia supply over 2021-23



Source: Goldman Sachs Global Investment Research.

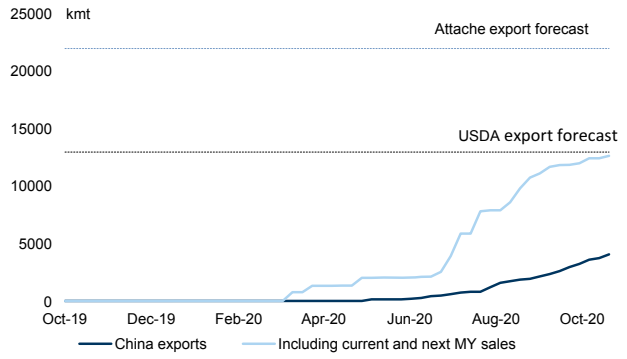
Agriculture

Corn

Expectations of a record 20/21 US corn carry-out were slashed in recent months by bad weather and a Chinese export surge, with the US corn balance facing its largest deficit (-293mn bu) since 2010/11. Potential downside to US, Argentina and Brazil corn production estimates, and upside risks to exports to China, leave risks of further tightening. Dry weather is delaying corn planting in South America with the majority of corn crops set to enter their critical filling phase one month late in April-May, when the persistence of La Nina will raise the likelihood of drought and depressed yields. Near-record domestic prices across China, Argentina and Brazil leaves US corn competitive on the international export market, with the US likely to pick up a large share of any La Nina-driven fall in trade flows from Latin America to China in 1H21. The large current third Covid-19 wave in the US represents only a partial offsetting risk as it weighs on US gasoline and ethanol grind in coming months.

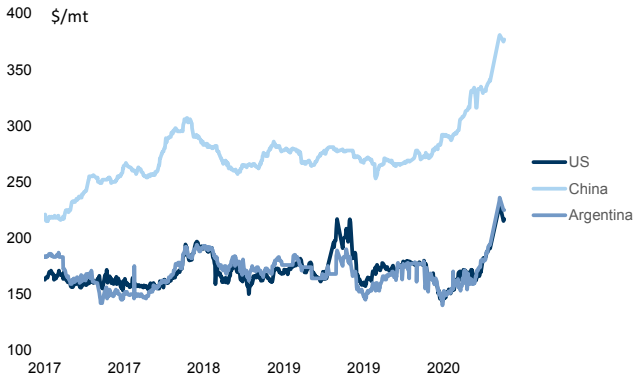
While weather risks may prove transient, the shift in the demand picture is likely to persist in coming years in our view, underscoring the shift in the agriculture cycle after six years of benign weather and lacklustre demand. In particular, the US-China trade wars and the ASF pork epidemic in China depressed both China's consumption and imports in recent years, something we believe is now set to reverse. The large government destocking that offset low imports has shifted to necessary restocking, with the hog herd on the rebound as well. We see total Chinese corn imports rising to 33mn mt (1.3bn bu) in 2021, and up to 55mn mt by 2023 as China's structural deficit in corn grows. The concurrent tightening of the US and global corn and soy balances raises the prospect of acreage competition in the US between the two crops next spring, further reinforcing the upside risks to deferred corn prices. Our once-again raised forecasts of 435/c450/c435/bu over a 3/6/12m horizon are as a result mostly above the forward curve on deferred contracts (especially as input costs are expected to rise by 2022 on our above consensus oil forecast).

Exhibit 69: Chinese corn exports are expected to grow to 22mn mt over the coming 12m



Source: USDA, Goldman Sachs Global Investment Research.

Exhibit 70: Latin American corn tightness keeps US corn competitive despite rising prices



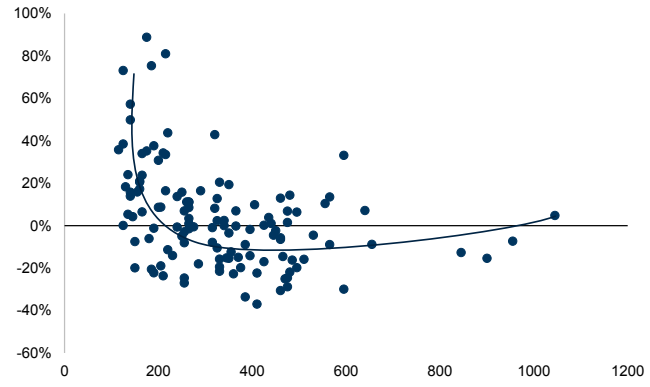
Source: Bloomberg, Goldman Sachs Global Investment Research.

Soy

The tightening of the US soybean balance has been even more dramatic than for corn after a year of surging Chinese demand and a disappointing US harvest. Together, they point to uncomfortably low inventories heading into the 2021/22 crop year, leaving soybean prices needing to outperform corn and cotton to secure additional acreage in the US next spring. Any further tightening of the 2020/21 US balance will require prices to rise enough to either lower US crush demand and Chinese imports, or incentivise increases in Argentinean soy to the US to make up the shortfall. This leaves price risk in 1H21 not only weather-dependent but also skewed to the upside in our view, with prices potentially returning to the $12-14 trading range of 2011-14 if the Latin American harvest is poor.

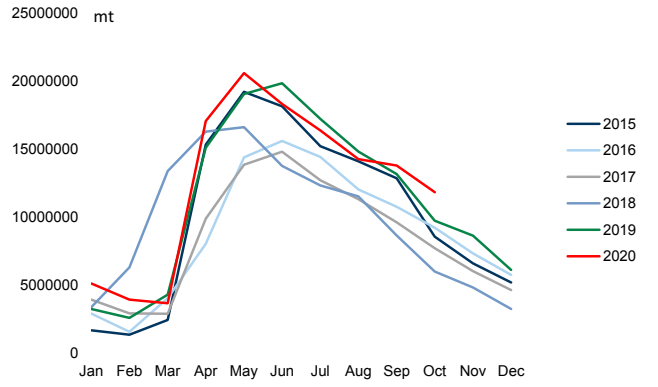
Similar to corn, we see upside risks to demand and downside risks to soy supply in the coming months, also driven by La Nina weather risks and upside to Chinese imports. On the demand side, we expect Chinese imports to grow to 99mn mt in 2021, as pork producers rebuild their hog herds. While we expect the majority of this will be supplied by Brazil, current delays in the crop cycle leave upside risks to US soy exports in 1Q21, especially as a sharp currency depreciation leads Argentinian farmer to hoard stocks. Finally, we see 2021 as the start of a structural rise in domestic crush demand, as renewable diesel (largely based on soyoil) gains an increasing share of the diesel market. Our agribusiness analysts estimate c.2.1bn gal of capacity will come online by 2024, leading to c.17bn gal of total vegoil demand (in all, equivalent to c.1.47bn bu of soybeans). The tightness in supply remains dependent on weather outcomes in Latin America, although rising Chinese and US demand will both play out over the coming years, creating non-linear upside risk to soybean prices in our view. At current inventory levels, deferred prices therefore need to remain elevated to incentivise increased acreage, offsetting this year's deficit with next year's surplus. Accordingly, we upgrade our forecasts from ¢1,080/¢1,045/¢1,030 c/bu, to ¢1,180/¢1,175/¢1,150/bu on a 3/6/12m basis.

Exhibit 71: Very low stocks require markets to create demand destruction through exponentially rising prices
Scatter plot of yoy change in soy prices (y-axis) vs. ending stocks (mn bu, x-axis)



Source: Bloomberg, Goldman Sachs Global Investment Research.

Exhibit 72: Argentinian farmers are hoarding soy stocks owing to currency weakness

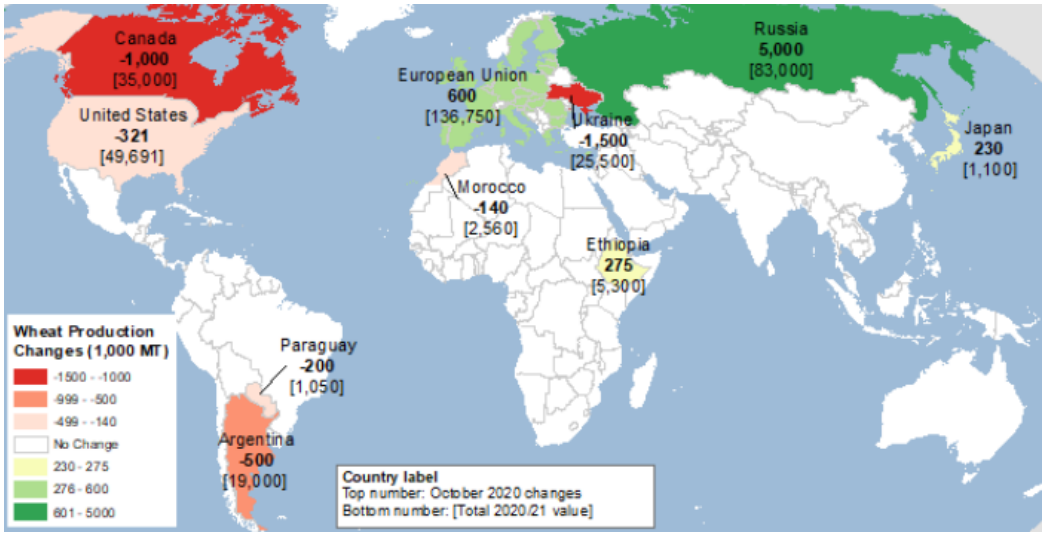


Source: Bloomberg, Goldman Sachs Global Investment Research.

Wheat

Wheat markets also face potential tightness as dry weather in the Black Sea and US creates downside risks for winter wheat production, while corn prices create a higher/rising floor. Despite the US wheat market being projected to end the year with stocks at their lowest in six years, global wheat balances are better supplied than corn, as a strong 2019/20 harvest in Russia left carry-in stocks up 30mn mt yoy. Trend yields would therefore likely be bearish for prices and our forecast of 595c/bu is below market forwards, although weather risks should support prices for now as a third of the US winter wheat crop faces drought conditions. In addition, Black Sea wheat producers are facing their driest autumn in a decade, although plentiful rainfall in October and early November should help limit this dry spell. While the supply outlook remains mixed, we see global demand remaining healthy in 2021. Chinese imports are on track to hit our projected 6.7mn mt for 2020/21, with potential upside risks to US exports given tensions with Australia. Net, apart from winter weather, the main bullish risk we see for wheat is higher corn prices, as this could increase demand for wheat in feed. Net healthy global balances drive our forecast of c595/c585/c550/bu over the 3/6/12m horizon.

Exhibit 73: Winter wheat declines due to La Nina will likely be offset by growing Russian production



Source: USDA

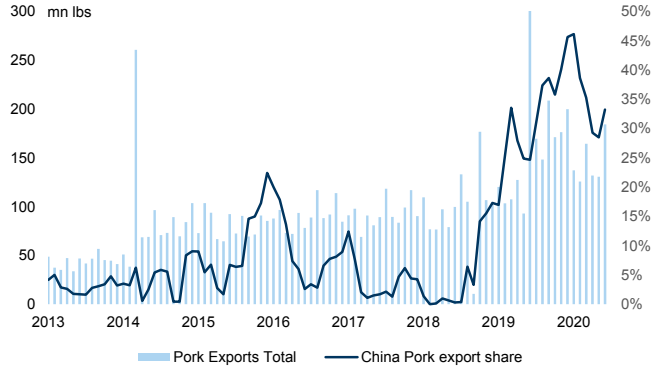
Lean Hogs

Through 2021, we believe the US hog market will likely continue on a slow path of rebalancing, after the historic disruption Covid-19 brought this year. While supply has returned to near seasonal norms, frozen storage stocks have remained low as China increased its imports of pork to help offset a large domestic deficit, pointing to volatility in prices going into 2021. With Covid case growth rising across the US MidWest, further plant shutdowns are possible, though unlikely on the same scale as April.

We see the large supply rotation that began in 2H20 continuing in 2021, as China works to rebuild its hog herds (we expect them to grow 20% yoy), while the US works to reduce them after shutdowns created a backlog in 1H20. This should lower US pork competitiveness relative to domestic Chinese supply, attenuating US exports,

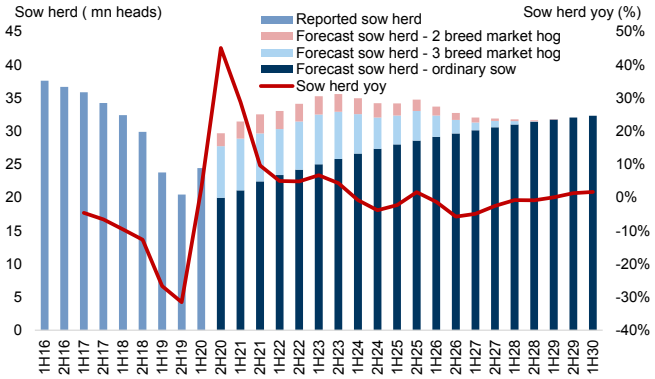
particularly in the second half of 2021. However, we expect Chinese supply (and hence export demand) to accelerate only gradually into 2021. This delay we forecast is driven by the use of aggressive non-traditional cross-breeding lowering the quality of the Chinese sow herd, lowering feed conversion efficiency and farrowing rates. Net, the continued rebalancing of the US herd we forecast should support a seasonally moderated upswing in prices throughout 2021. Accordingly, we change our forecasts to $65/$80/$70/cwt.

Exhibit 74: China's share of exports is set to diminish in 2021



Source: Bloomberg, Goldman Sachs Global Investment Research.

Exhibit 75: As China's ordinary herd recovers, this year's record export pace should soften



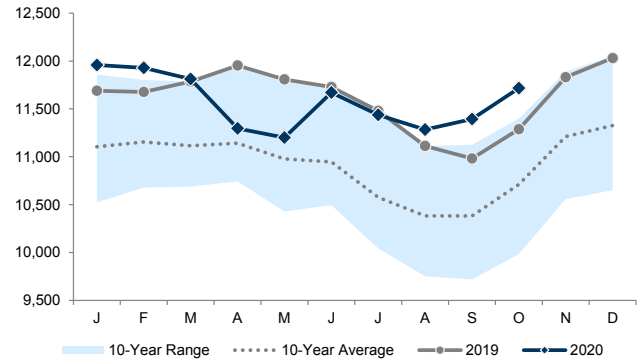
Source: Goldman Sachs Global Investment Research.

Live Cattle

We see the cattle market near a stable equilibrium at the start of 2021. With producer margins remaining within their five-year range and near-term supply ample, we expect live cattle to move back to within the seasonal range by 2Q21. However, risks of feedlot margin compression under rising grains prices point to tighter supplies in 2H21. As a result, we forecast prices of $112/$115/$125/cwt over the 3/6/12m horizon.

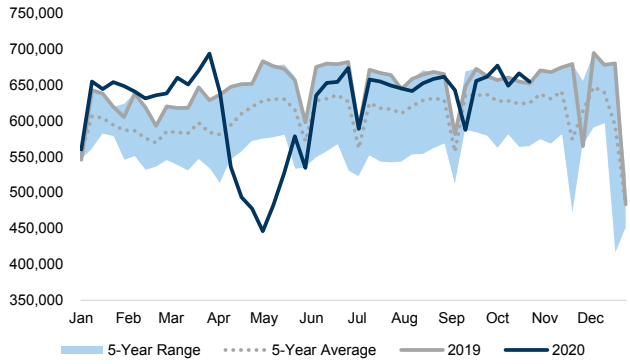
After October's Cattle on Feed Report surprised to the upside, we see a continuation of increased placements through into 1H21 as on-feed inventories are forecast to expand, leaving ample front-end supplies of market-ready cattle. At the start of 2021, we expect feeder margins to continue to compress alongside rising grains prices, slowing the supply of live cattle to feedlots and providing a mild tailwind to live cattle prices in 1H21. Further out, we see moderate drought risks to cattle supply in 2H21/1H22, with La Nina pointing to further dryness, with 44% of US cattle already in areas experiencing drought. Dry conditions reduce pasture availability, reducing heifer retention and lowering the following year's calf crop (and hence 1H22 Feeder cattle supply). From a demand perspective we see international demand continuing to normalize as major buyers (including Japan and Mexico) resume beef imports, generating an additional c.2mn mt of exports a week by end 1Q21 on our forecasts. Overall, the USDA expects total exports to increase to 11.2% of production across 2021.

Exhibit 76: Cattle on Feed remain above typical levels, up 3.8% yoy



Source: IHS Markit, USDA, Goldman Sachs Global Investment Research.

Exhibit 77: Cattle slaughter will likely remain at the upper end of production capacity to work through excess herd backlog
USDA daily cattle slaughter, smooth, head



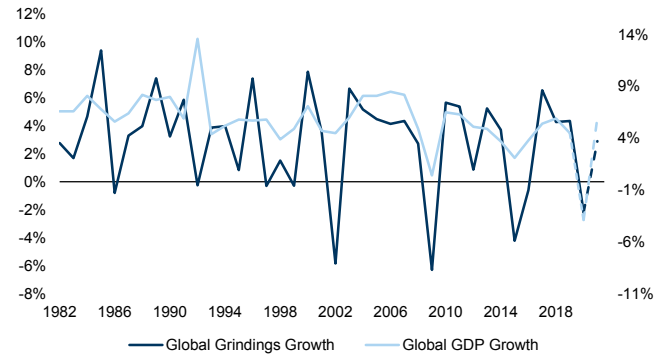
Source: USDA, Goldman Sachs Global Investment Research.

Cocoa

Cocoa demand has been largely hit by Covid-19, as a substantial portion of purchasing comes from travellers (airports, train stations and tourists). Therefore, our demand outlook for 2021 remains contingent on the widespread availability of a functional vaccine, which our global economists see as an increasingly likely prospect. We see a rebound in grindings of 3% yoy, leveraging a simple model of GDP growth, carry-in stocks and the futures curve to track year-ahead grindings (see exhibit). However, with cases rising exponentially in the US and Europe, this support will only come later in 2021, with the global supply outlook for 2021 increasingly bearish, as ample rains and sunshine aid West African crop development prior to the Dec-Mar harvest.

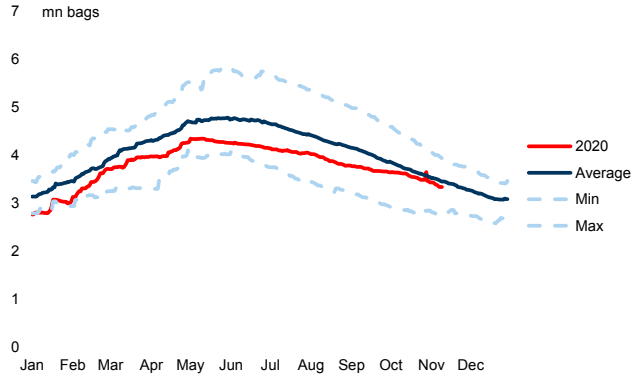
We therefore expect downside to prices in 1H21 until global travel resumes, reflected in our new forecast of $2350/2400/2500/t over the 3/6/12m horizon. Political risks remain, however. Recent elections in Cote d'Ivoire have seen civil unrest breakout across the country, blocking roads and restriction cocoa access to ports. While the situation remains volatile, our base case assumes a return to normality with minimum disruption to this winter's harvest and export. Further, while there remains political pressure on the Ivorian government to increase or guarantee the Living Income Differential (LID) for farm gate prices, we assume the status quo at this time.

Exhibit 78: We expect cocoa grindings to grow next year as global growth rebounds
Dashed lines are GS forecasts



Source: Goldman Sachs Global Investment Research, Bloomberg.

Exhibit 79: Lower demand leaves 21 carry-in stocks near average, despite a poor 19/20 harvest
ICE Cocoa inventories

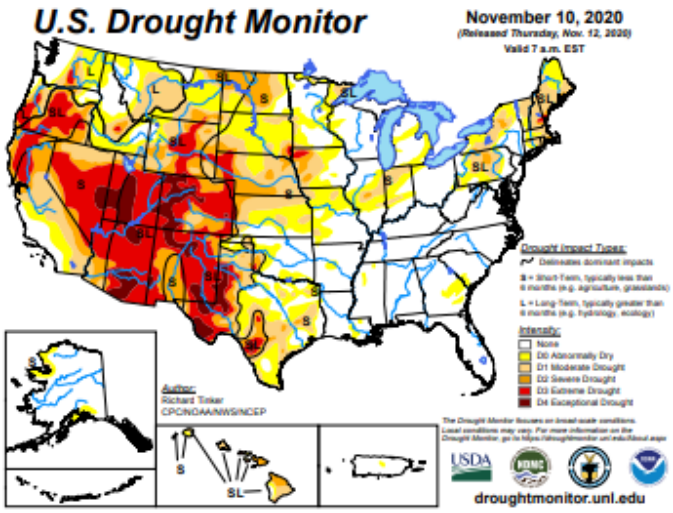


Source: Bloomberg, Goldman Sachs Global Investment Research.

Cotton

In 2020E, cotton demand fell as global apparel imports dropped across the developed world (U.S. -55% in May, the UK/EU -40%, Japan -40%). Alongside other softs, we see cotton demand growing in 2021 as global growth rebounds. Although Chinese state stockpiles are at target, our economists' above consensus growth forecast points to a strong rebound in cotton usage, with mill use for 2020/21 projected up 12%. At the same time, we see global production falling 5% yoy to 116mn mt, pushing the world into a 3mn mt deficit for 2021. Dry weather across the US south – exacerbating by the strengthening La Nina – has pulled down cotton production to 17.1mn bales, taking projected US 20/21 ending stocks down 10% from a decade high of 8mn mt to 7.2mn mt. With the global supply outlook tightening, we see world cotton stocks being run down over the next year and a cyclical rise in prices throughout 2021. As a result we forecast ¢73/¢74/¢75 /lb over the 3/6/12m horizon.

Exhibit 80: La Nina is creating drought conditions in the South West of the United States

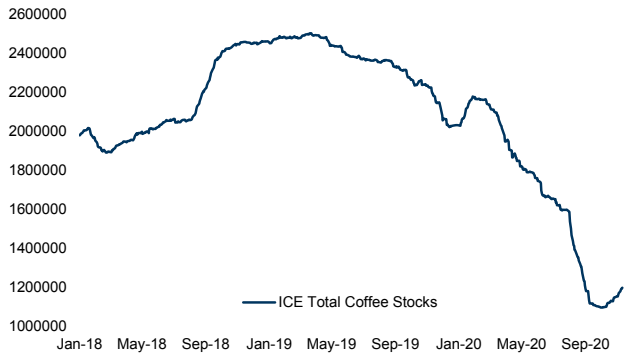


Source: NOAA

Coffee

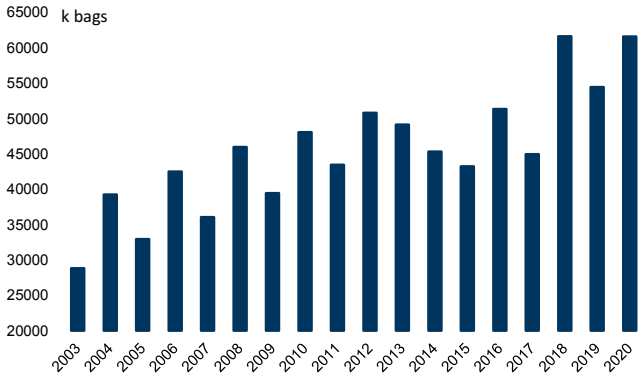
Coffee prices also remain sensitive to the development of a vaccine and a reduction in Western travel restrictions. Near-term, we expect demand weakness as European lockdowns bite and the risk of further restrictions in the US. While bearish, delays in getting the record Brazilian crop to market have left on-exchange stocks falling and provided support to prices. Despite this large crop, we expect prices to appreciate from 2H21 given an expected V-shaped recovery in coffee demand, at c.1.1% yoy for 2021 (after a 0.9% fall in 2020). The EU and US – core consumers of high-grade Arabica – are seeing imports rise with next year's Brazil's 'off year' in coffee production. In fact, La Nina presents upside risks to prices, as drier South central Brazilian weather is causing flowers to wilt across Minas Gerias – a leading indicator for falling yields. This presents material upside risks to our 3 and 6m forecasts of 135-145¢/lb that are above market forwards. In the long-run, we see potential for further upside given building supply threats due to Covid: worker-intensive harvesting processes have been stymied by lockdowns, allowing coffee borer to attack plants. Coffee rust is further damaging harvests in central America as low coffee prices ensure farmers do not have the funds to invest in the herbicides required to treat it. As a result we update our forecasts to 112/120/135¢/lb over the 3/6/12m horizon.

Exhibit 81: Covid-19 related disruption has helped drive on-exchange stocks to multi-year lows
60 kg bags



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 82: Despite near-record production in Brazil



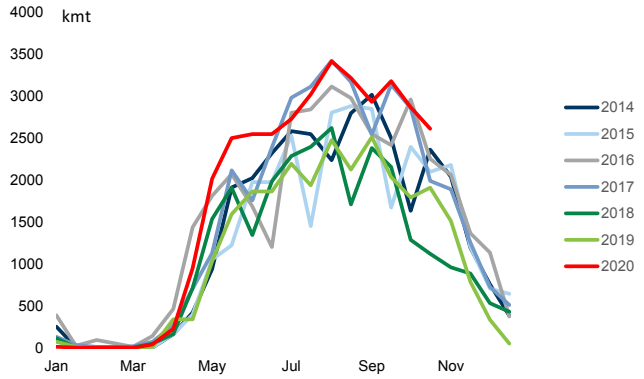
Source: Conab, Goldman Sachs Global Investment Research

Sugar

Moving into 2021, sugar prices will decline moderately as supply gains offset a moderate demand recovery. We see global production up 9% to 180mn mt despite falling Thai yields, with the market under-pricing India's large crop and rising stockpiles. We believe a large Indian sugar export subsidy and low domestic prices will drive exports to 6mn mt. Only partially absorbing this increase in production will be recovering demand and oil prices. With a second wave building across Europe and the early signs of a third appearing in the US, we see near term risks to sugar demand exactly when excess Indian supply will be hitting the world export market. After falling for the first time in forty years, we expect global demand to rise c.1.5mn mt as lockdowns are lifted – albeit at a slower pace than pre-Covid as cinema's, restaurants and tourism take time to recover as the vaccine becomes more widely available. Rising ethanol prices during

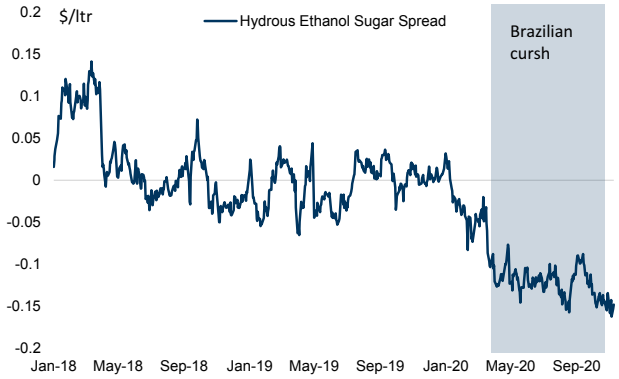
Brazil's crushing season should moderate India's supply glut but only in 2H21. As a result, we see global sugar prices moderating downward in 1H21, stabilizing at a new equilibrium of 13.5-14c/lb.

Exhibit 83: Brazilian cane crush has risen this year
South Central Brazilian sugar production



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 84: Sugar production has risen due to low ethanol prices



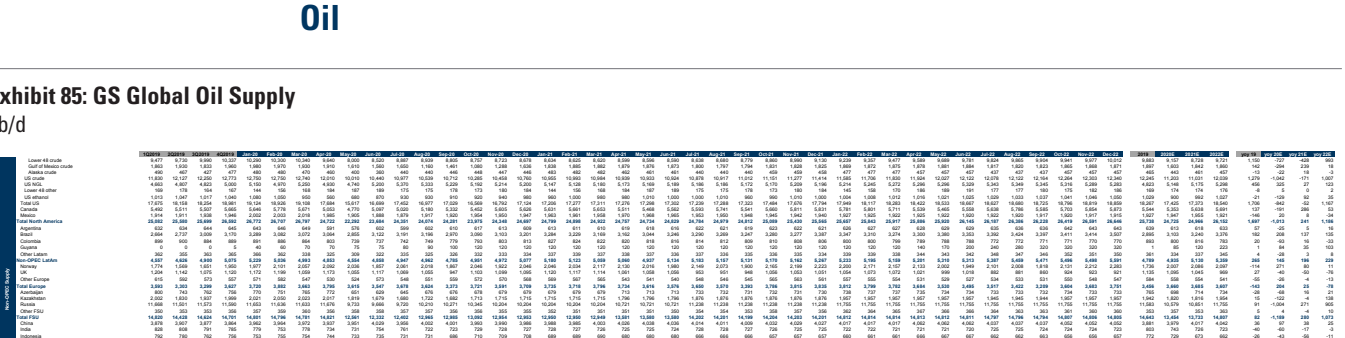
Source: Bloomberg, Goldman Sachs Global Investment Research

Commodity Supply and Demand Models

Oil

Exhibit 85: GS Global Oil Supply

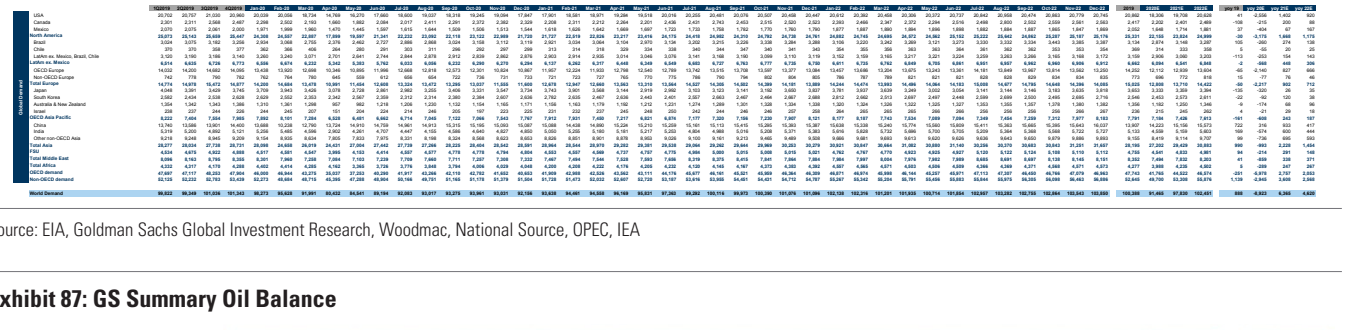
kb/d



Source: IEA, Woodmac, EIA, National sources, OPEC, Kpler, Goldman Sachs Global Investment Research

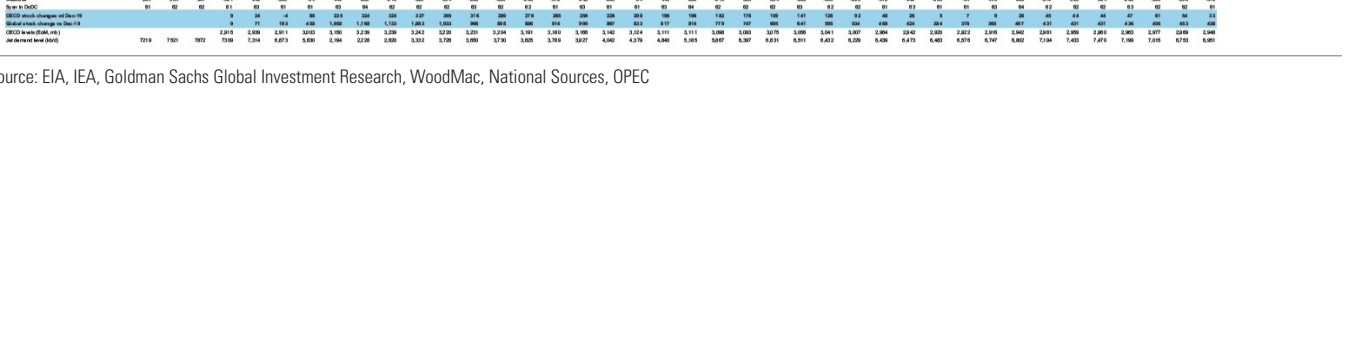
Exhibit 86: GS Global Oil Demand

kb/d



Source: EIA, Goldman Sachs Global Investment Research, Woodmac, National Source, OPEC, IEA

Exhibit 87: GS Summary Oil Balance



Source: EIA, IEA, Goldman Sachs Global Investment Research, WoodMac, National Sources, OPEC

Natural Gas

Exhibit 88: US Natural Gas Supply & Demand Under Forward Prices as of Nov 16, 2020
Bcf/d; storage, Bcf

	Production	Net Canadian imports	LNG imports	Balancing term	Total supply	Net Mexican exports	LNG exports	ResCom demand	Industrial demand	Power Demand	Vehicle fuel cons.	Lease and plant cons.	Pipeline and dist. use	Total demand	Storage
Nov-19	94.9	4.3	0.0	1.0	**100.1**	5.3	7.2	32.6	24.5	27.3	0.1	5.3	2.8	**105.1**	**3,575**
Dec-19	94.3	4.4	0.0	2.1	**100.7**	4.9	7.9	39.0	25.1	28.9	0.1	5.3	3.1	**114.3**	**3,156**
Jan-20	93.4	4.8	0.0	3.4	**101.7**	5.2	8.5	42.2	25.5	30.0	0.1	5.2	3.2	**120.0**	**2,588**
Feb-20	92.7	5.3	0.0	1.9	**99.9**	5.2	8.6	40.6	25.2	30.3	0.1	5.2	3.2	**118.3**	**2,055**
Mar-20	93.1	4.1	0.0	2.5	**99.7**	5.4	8.6	27.8	23.2	28.3	0.1	5.2	2.7	**101.3**	**2,006**
Apr-20	92.2	3.9	0.0	1.6	**97.8**	4.6	8.3	20.4	21.5	25.5	0.1	5.1	2.3	**87.7**	**2,310**
May-20	87.4	3.8	0.0	1.2	**92.5**	4.7	6.7	12.8	20.2	26.9	0.1	4.8	2.0	**78.2**	**2,754**
Jun-20	86.9	3.9	0.0	1.6	**92.4**	5.4	4.1	8.9	20.2	34.8	0.1	4.9	2.2	**80.7**	**3,108**
Jul-20	88.2	4.4	0.0	2.1	**94.7**	5.8	3.3	8.0	20.7	44.3	0.1	4.9	2.4	**89.5**	**3,266**
Aug-20	88.3	4.8	0.0	1.8	**94.9**	6.0	4.0	7.8	21.1	41.3	0.1	5.0	2.4	**87.6**	**3,493**
Sep-20	87.6	3.8	0.0	1.0	**92.4**	6.1	5.9	8.5	20.7	33.4	0.1	4.9	2.1	**81.9**	**3,810**
Oct-20	87.2	4.3	0.0	-0.3	**91.2**	5.7	8.0	14.6	21.6	30.5	0.1	4.9	2.2	**87.5**	**3,923**
Nov-20	88.8	4.8	0.0	0.1	**93.7**	5.6	10.1	26.8	22.7	25.2	0.1	5.0	2.5	**98.0**	**3,793**
Dec-20	89.6	5.8	0.3	1.2	**96.8**	5.6	10.0	40.3	24.7	26.5	0.1	5.0	3.1	**115.4**	**3,219**
Jan-21	90.1	5.8	0.3	2.0	**98.2**	5.6	10.1	47.5	26.0	27.9	0.1	5.1	3.4	**125.6**	**2,370**
Feb-21	90.0	5.3	0.2	2.4	**97.9**	5.6	10.2	43.3	25.5	27.6	0.1	5.0	3.2	**120.6**	**1,733**
Mar-21	89.6	5.1	0.0	1.8	**96.4**	5.7	10.3	30.8	23.7	26.2	0.1	5.0	2.7	**104.6**	**1,480**
Apr-21	89.4	4.8	0.0	1.2	**95.4**	5.8	9.9	18.9	22.8	26.3	0.1	5.0	2.3	**91.0**	**1,610**
May-21	89.4	4.8	0.0	0.5	**94.7**	6.0	10.0	11.4	21.7	28.8	0.1	5.0	2.1	**85.2**	**1,903**
Jun-21	89.4	4.8	0.0	1.2	**95.4**	6.6	10.0	8.6	21.4	34.4	0.1	5.0	2.2	**88.3**	**2,115**
Jul-21	89.6	4.8	0.0	1.4	**95.7**	6.6	10.0	7.4	21.3	39.0	0.1	5.0	2.3	**91.9**	**2,232**
Aug-21	89.8	4.8	0.0	1.2	**95.8**	6.6	9.7	7.4	21.7	38.3	0.1	5.0	2.3	**91.2**	**2,375**
Sep-21	89.8	4.8	0.0	1.1	**95.7**	6.4	9.7	8.2	21.7	34.2	0.1	5.0	2.1	**87.4**	**2,624**
Oct-21	90.8	4.8	0.1	-0.1	**95.6**	6.2	10.7	13.7	22.4	28.8	0.1	5.1	2.2	**89.2**	**2,822**
Nov-21	91.3	5.1	0.1	0.2	**96.6**	6.3	10.7	30.5	24.7	27.1	0.1	5.1	2.8	**107.3**	**2,503**
Dec-21	91.8	5.8	0.3	1.2	**99.0**	6.1	10.7	40.3	25.4	27.1	0.1	5.2	3.1	**118.1**	**1,912**
															Build/draw
Winter19/20	93.7	4.6	0.0	2.2	**100.4**	5.2	8.1	36.4	24.7	29.0	0.1	5.2	3.0	**111.8**	**-1,719**
Summer 2020	88.3	4.1	0.0	1.3	**93.7**	5.5	5.8	11.6	20.8	33.8	0.1	4.9	2.2	**84.7**	**1,917**
Winter 20/21	89.6	5.3	0.2	1.5	**96.6**	5.6	10.1	37.7	24.5	26.7	0.1	5.0	3.0	**112.8**	**-2,443**
Summer 2021	89.7	4.8	0.0	0.9	**95.5**	6.3	10.0	10.8	21.9	32.8	0.1	5.0	2.2	**89.2**	**1,343**
															End-Oct
Cal 19	90.8	4.7	0.1	1.7	**97.3**	5.1	5.7	23.5	23.1	30.9	0.1	5.1	2.6	**96.1**	**3726**
Cal 20	89.6	4.5	0.0	1.5	**95.6**	5.4	7.2	21.5	22.3	31.4	0.1	5.0	2.5	**95.5**	**3923**
Cal 21	90.1	5.0	0.1	1.2	**96.4**	6.1	10.2	22.3	23.2	30.5	0.1	5.1	2.5	**100.0**	**2822**
YOY															
Winter19/20	5.2	-0.3	-0.3	0.5	**5.1**	0.4	3.7	-4.1	-0.3	2.9	0.0	0.3	0.0	**2.8**	
Summer 2020	-2.5	-0.4	0.0	-0.3	**-3.3**	0.2	0.1	0.1	-0.8	0.3	0.0	-0.2	0.0	**-0.2**	
Winter 20/21	-4.0	0.7	0.2	-0.7	**-3.8**	0.5	2.0	1.3	-0.2	-2.3	0.0	-0.2	0.0	**1.1**	
Summer 2021	1.5	0.6	0.0	-0.4	**1.7**	0.8	4.2	-0.8	1.0	-1.0	0.0	0.1	0.0	**4.5**	
Cal 19	7.6	-0.7	0.0	0.8	**7.6**	0.5	2.3	0.1	0.0	2.0	0.0	0.4	0.2	**5.4**	
Cal 20	-1.2	-0.2	-0.1	-0.2	**-1.7**	0.3	1.5	-1.9	-0.8	0.5	0.0	-0.1	-0.1	**-0.6**	
Cal 21	0.5	0.5	0.1	-0.3	**0.7**	0.7	3.0	0.8	0.9	-1.0	0.0	0.1	0.0	**4.5**	

Source: EIA, Platts, Wood Mackenzie, Morningstar, Haver Analytics, VelocitySuite, Radiant Solution, Bloomberg, Goldman Sachs Global Investment Research

Exhibit 89: US Natural Gas Supply & Demand Under GS Price Forecasts
Bcf/d; Storage, Bcf

	Production	Net Canadian imports	LNG imports	Balancing term	Total supply	Net Mexican exports	LNG exports	ResComm demand	Industrial demand	Power Demand	Vehicle fuel cons.	Lease and plant cons.	Pipeline and dist. use	Total demand	Storage
Nov-19	94.9	4.3	0.0	1.0	**100.1**	5.3	7.2	32.6	24.5	27.3	0.1	5.3	2.8	**105.1**	**3,575**
Dec-19	94.3	4.4	0.0	2.1	**100.7**	4.9	7.9	39.0	25.1	28.9	0.1	5.3	3.1	**114.3**	**3,156**
Jan-20	93.4	4.8	0.0	3.4	**101.7**	5.2	8.5	42.2	25.5	30.0	0.1	5.2	3.2	**120.0**	**2,588**
Feb-20	92.7	5.3	0.0	1.9	**99.9**	5.2	8.6	40.6	25.2	30.3	0.1	5.2	3.2	**118.3**	**2,055**
Mar-20	93.1	4.1	0.0	2.5	**99.7**	5.4	8.6	27.8	23.2	28.3	0.1	5.2	2.7	**101.3**	**2,006**
Apr-20	92.2	3.9	0.0	1.6	**97.8**	4.6	8.3	20.4	21.5	25.5	0.1	5.1	2.3	**87.7**	**2,310**
May-20	87.4	3.8	0.0	1.2	**92.5**	4.7	6.7	12.8	20.2	26.9	0.1	4.8	2.0	**78.2**	**2,754**
Jun-20	86.9	3.9	0.0	1.6	**92.4**	5.4	4.1	8.9	20.2	34.8	0.1	4.9	2.2	**80.7**	**3,108**
Jul-20	88.2	4.4	0.0	2.1	**94.7**	5.8	3.3	8.0	20.7	44.3	0.1	4.9	2.4	**89.5**	**3,266**
Aug-20	88.3	4.8	0.0	1.8	**94.9**	6.0	4.0	7.8	21.1	41.3	0.1	5.0	2.4	**87.6**	**3,493**
Sep-20	87.6	3.8	0.0	1.0	**92.4**	6.1	5.9	8.5	20.7	33.4	0.1	4.9	2.1	**81.9**	**3,810**
Oct-20	87.2	4.3	0.0	-0.3	**91.2**	5.7	8.0	14.6	21.6	30.5	0.1	4.9	2.2	**87.5**	**3,923**
Nov-20	88.8	4.8	0.0	0.1	**93.7**	5.6	10.1	26.8	22.7	24.4	0.1	5.0	2.5	**97.2**	**3,819**
Dec-20	89.6	6.7	0.3	1.2	**97.7**	5.6	10.0	40.3	24.7	25.0	0.1	5.0	3.0	**113.8**	**3,321**
Jan-21	90.1	6.7	0.3	2.0	**99.1**	5.6	10.1	47.5	26.0	26.3	0.1	5.1	3.3	**124.0**	**2,550**
Feb-21	90.0	6.2	0.2	2.4	**98.8**	5.6	10.2	43.3	25.5	25.9	0.1	5.0	3.2	**118.8**	**1,988**
Mar-21	89.6	6.0	0.0	1.8	**97.3**	5.7	10.3	30.8	23.7	25.0	0.1	5.0	2.7	**103.3**	**1,803**
Apr-21	89.7	5.7	0.0	1.2	**96.5**	5.8	9.9	18.9	22.8	25.0	0.1	5.0	2.2	**89.7**	**2,005**
May-21	89.9	5.7	0.0	0.5	**96.0**	6.0	10.0	11.4	21.7	27.7	0.1	5.0	2.0	**84.0**	**2,378**
Jun-21	90.0	5.7	0.0	1.2	**96.9**	6.6	10.0	8.6	21.4	33.4	0.1	5.1	2.1	**87.3**	**2,665**
Jul-21	90.4	5.7	0.0	1.4	**97.5**	6.6	10.0	7.4	21.3	38.1	0.1	5.1	2.2	**90.9**	**2,867**
Aug-21	90.8	5.7	0.0	1.2	**97.6**	6.6	9.7	7.4	21.7	37.3	0.1	5.1	2.2	**90.1**	**3,100**
Sep-21	90.9	5.7	0.0	1.1	**97.7**	6.4	9.7	8.2	21.7	33.3	0.1	5.1	2.1	**86.5**	**3,435**
Oct-21	92.1	5.7	0.1	-0.1	**97.8**	6.2	10.7	13.7	22.4	29.3	0.1	5.2	2.2	**89.8**	**3,685**
Nov-21	92.7	5.1	0.1	0.2	**98.0**	6.3	10.7	30.5	24.7	27.9	0.1	5.2	2.8	**108.2**	**3,380**
Dec-21	93.4	5.8	0.3	1.2	**100.6**	6.1	10.7	40.3	25.4	28.1	0.1	5.2	3.1	**119.3**	**2,802**
															Build/draw
Winter19/20	93.7	4.6	0.0	2.2	**100.4**	5.2	8.1	36.4	24.7	29.0	0.1	5.2	3.0	**111.8**	**-1,719**
Summer 2020	88.3	4.1	0.0	1.3	**93.7**	5.5	5.8	11.6	20.8	33.8	0.1	4.9	2.2	**84.7**	**1,917**
Winter 20/21	89.6	6.0	0.2	1.5	**97.3**	5.6	10.1	37.7	24.5	25.3	0.1	5.0	2.9	**111.4**	**-2,120**
Summer 2021	90.5	5.7	0.0	0.9	**97.1**	6.3	10.0	10.8	21.9	32.0	0.1	5.1	2.2	**88.3**	**1,882**
															End-Oct
Cal 19	90.8	4.7	0.1	1.7	**97.3**	5.1	5.7	23.5	23.1	30.9	0.1	5.1	2.6	**96.1**	**3726**
Cal 20	89.6	4.6	0.0	1.5	**95.7**	5.4	7.2	21.5	22.3	31.2	0.1	5.0	2.5	**95.3**	**3923**
Cal 21	90.8	5.8	0.1	1.2	**97.8**	6.1	10.2	22.3	23.2	29.8	0.1	5.1	2.5	**99.3**	**3685**
YOY															
Winter19/20	5.2	-0.3	-0.3	0.5	**5.1**	0.4	3.7	-4.1	-0.3	2.9	0.0	0.3	0.0	**2.8**	
Summer 2020	-2.5	-0.4	0.0	-0.3	**-3.3**	0.2	0.1	0.1	-0.8	0.3	0.0	-0.2	0.0	**-0.2**	
Winter 20/21	-4.0	1.5	0.2	-0.7	**-3.1**	0.5	2.0	1.3	-0.2	-3.7	0.0	-0.2	-0.1	**-0.4**	
Summer 2021	2.3	1.5	0.0	-0.4	**3.4**	0.8	4.2	-0.8	1.0	-1.8	0.0	0.2	-0.1	**3.6**	
Cal 19	7.6	-0.7	0.0	0.8	**7.6**	0.5	2.3	0.1	0.0	2.0	0.0	0.4	0.2	**5.4**	
Cal 20	-1.2	-0.1	-0.1	-0.2	**-1.6**	0.3	1.5	-1.9	-0.8	0.3	0.0	-0.1	-0.1	**-0.8**	
Cal 21	1.2	1.2	0.1	-0.3	**2.1**	0.7	3.0	0.8	0.9	-1.5	0.0	0.1	0.0	**4.0**	

Source: EIA, Platts, Wood Mackenzie, Morningstar, Haver Analytics, VelocitySuite, Radiant Solution, Bloomberg, Goldman Sachs Global Investment Research

Exhibit 90: NW Europe Natural Gas Supply & Demand
mcm/d; storage, Bcm

	UK production	Netherlands production	Norwegian pipeline imports	Net Russian pipeline imports	Net LNG imports	Total Supply	LDC demand	Industrial demand	Power demand *	Pipeline exports to Southern Europe	Other exports	Total demand	Balancing item	Storage (Bcm)
Jan-19	109	137	340	224	129	**940**	713	68	365	54	2	**1202**	-58	**29.8**
Feb-19	105	114	335	211	126	**892**	586	65	324	57	3	**1034**	-70	**23.9**
Mar-19	104	114	330	197	182	**927**	487	60	279	55	3	**884**	-53	**23.5**
Apr-19	102	78	309	179	213	**881**	353	54	265	59	2	**733**	-3	**27.9**
May-19	102	70	287	160	177	**797**	268	53	260	51	2	**633**	8	**33.2**
Jun-19	87	54	285	150	115	**691**	149	50	240	54	1	**493**	20	**39.7**
Jul-19	89	48	284	103	83	**606**	122	49	260	56	1	**488**	24	**44.1**
Aug-19	84	51	237	141	68	**580**	119	44	236	44	1	**445**	32	**49.3**
Sep-19	93	58	170	172	77	**570**	173	48	263	37	4	**524**	13	**51.1**
Oct-19	100	69	272	199	127	**768**	317	51	299	58	10	**736**	-6	**51.9**
Nov-19	114	117	306	222	214	**974**	549	65	330	26	13	**983**	-60	**49.8**
Dec-19	110	122	320	222	196	**970**	604	63	295	22	12	**995**	-67	**46.9**
Jan-20	109	117	312	155	173	**865**	622	65	324	56	8	**1075**	-79	**38.0**
Feb-20	105	114	314	154	176	**863**	583	63	287	52	9	**994**	-81	**31.8**
Mar-20	100	83	321	124	195	**823**	523	58	278	44	9	**912**	-43	**27.7**
Apr-20	107	76	278	132	202	**795**	285	47	214	51	8	**606**	1	**33.4**
May-20	106	67	246	120	185	**724**	214	52	215	51	9	**541**	10	**39.4**
Jun-20	98	54	269	123	80	**624**	149	48	241	43	8	**490**	-9	**43.2**
Jul-20	97	43	280	56	76	**552**	136	51	255	44	9	**495**	0	**44.9**
Aug-20	82	41	259	111	70	**563**	119	45	255	35	7	**461**	0	**48.1**
Sep-20	79	43	265	144	68	**599**	177	50	261	27	7	**523**	-17	**49.8**
Oct-20	100	68	280	205	74	**728**	353	61	269	9	8	**699**	-28	**49.9**
Nov-20	97	62	319	217	114	**808**	484	63	302	10	8	**867**	-35	**47.5**
Dec-20	111	112	337	215	122	**897**	653	63	328	30	10	**1083**	-45	**40.3**
Jan-21	116	107	337	220	129	**910**	739	66	353	50	9	**1217**	-59	**29.0**
Feb-21	112	104	340	205	154	**914**	721	66	326	50	8	**1170**	-69	**19.9**
Mar-21	111	73	333	190	154	**861**	536	61	307	50	8	**962**	-41	**15.5**
Apr-21	109	66	270	178	160	**783**	328	54	278	50	8	**717**	2	**17.5**
May-21	109	54	248	160	133	**705**	234	56	246	50	8	**595**	12	**21.3**
Jun-21	94	42	257	150	129	**672**	151	51	234	49	8	**492**	9	**27.0**
Jul-21	96	36	301	128	109	**670**	106	53	239	48	8	**454**	16	**34.2**
Aug-21	91	39	272	140	66	**607**	120	47	242	44	8	**461**	17	**39.2**
Sep-21	97	43	274	172	101	**687**	185	51	257	36	8	**537**	12	**44.1**
Oct-21	104	60	300	198	177	**839**	310	62	283	35	9	**699**	-17	**47.9**
Nov-21	109	78	338	220	144	**889**	508	66	331	31	9	**944**	-46	**44.9**
Dec-21	111	104	339	225	100	**879**	623	65	333	34	10	**1066**	-45	**37.7**
														End of
winter 19/20	108	110	314	176	191	**899**	576	63	303	40	10	**992**	-66	**27.7**
summer 2020	96	56	268	127	108	**655**	205	51	244	37	8	**545**	-6	**49.9**
winter 20/21	110	91	333	209	135	**878**	626	64	323	38	9	**1060**	-50	**15.5**
summer 2021	100	48	275	161	125	**709**	205	53	254	44	8	**565**	7	**47.9**
yoy														
winter 19/20	3	-11	-13	-39	56	**-4**	-2	-1	-16	-7	8	**-18**	-12	**4**
summer 2020	2	-5	5	-30	-15	**-44**	-10	1	-16	-14	5	**-34**	-19	**-2**
winter 20/21	2	-19	19	34	-56	**-21**	50	1	20	-2	-2	**68**	16	**-12**
summer 2021	5	-8	6	34	17	**54**	0	3	10	7	0	**20**	14	**-2**

Footnotes
Components in mcm/d; Storage in Bcm
Balance does not include heavy Norwegian maintenance in 2020, only what's been scheduled
* Power demand includes Netherland and Germany industrial demand, as well as a portion of Belgium industrial demand

Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 91: Global LNG Supply & Demand

mtpa

		2015	2016	2017	2018	2019E	2020E	2021E	2022E	2023E	2024E	2025E	yoy 19	yoy20	yoy21	yoy 22	yoy 23	yoy 24	yoy 25		
Supply	Qatar	81	80	79	79	80	79	79	79	79	79	89	0.8	-0.5	-0.3	0.0	0.0	0.0	9.6	Qatar	Supply
	Australia	30	45	57	70	79	80	81	81	78	77	77	8.4	1.4	0.6	0.3	-3.1	-0.5	-0.3	Australia	
	United States	1	3	14	23	37	49	70	74	80	84	90	14.0	12.0	21.5	3.8	6.3	3.1	6.2	United States	
	Russia	11	11	11	19	30	30	30	31	31	36	44	10.9	0.2	-0.7	1.8	0.0	4.3	7.8	Russia	
	Malaysia	25	25	27	25	26	24	27	27	27	27	27	1.8	-2.7	2.7	0.1	0.0	0.0	0.0	Malaysia	
	Nigeria	21	18	21	20	22	22	21	21	21	21	21	1.1	0.1	-1.0	0.0	0.0	0.0	0.1	Nigeria	
	Indonesia	17	17	17	16	13	13	12	12	12	12	12	-3.3	0.2	-0.5	0.1	0.2	-0.1	-0.3	Indonesia	
	Trinidad	14	12	11	13	14	12	13	13	13	13	13	0.6	-2.0	1.4	0.0	0.0	0.0	0.0	Trinidad	
	Algeria	12	12	13	10	13	11	12	13	13	13	13	2.3	-1.7	1.0	0.5	0.0	0.0	0.0	Algeria	
	Mozambique	0	0	0	0	0	0	0	1	3	3	9	0.0	0.0	0.0	1.0	2.0	0.5	5.5	Mozambique	
	Canada	0	0	0	0	0	0	0	0	0	0	2	0.0	0.0	0.0	0.0	0.0	0.0	1.5	Canada	
	RoW Supply	41	42	46	48	52	48	49	54	55	57	60	3.8	-3.9	0.8	4.9	0.9	2.8	2.6	RoW Supply	
	World Supply	**252**	**264**	**296**	**324**	**365**	**368**	**393**	**406**	**412**	**422**	**454**	**40.3**	**3.1**	**25.4**	**12.5**	**6.2**	**10.0**	**32.6**	**Total**	
Demand	Asia	180	189	215	245	251	261	280	301	316	330	346	6.4	9.6	19.6	20.8	15.2	13.5	16.2	Asia	Demand
	Japan	87	84	86	86	79	76	78	81	77	76	78	-6.4	-3.0	1.9	2.4	-3.7	-0.7	1.4	Japan	
	South Korea	34	34	39	46	42	43	42	40	40	42	44	-3.6	0.5	-0.7	-2.1	0.4	1.8	2.4	South Korea	
	China	20	28	40	56	64	71	83	94	103	109	115	7.9	7.0	11.6	10.6	9.5	6.4	5.7	China	
	India	16	19	20	23	25	28	30	34	38	40	41	1.5	3.1	2.2	4.2	4.1	1.7	0.9	India	
	Taiwan	15	15	17	17	17	18	18	19	20	21	23	-0.4	1.5	0.1	0.5	1.0	1.0	1.7	Taiwan	
	Pak-Ban	1	3	5	8	12	12	14	15	15	15	15	4.6	-0.6	2.3	0.9	0.2	0.0	0.0	Pak-Ban	
	SE Asia	6	6	8	9	11	12	15	19	23	26	30	2.7	1.2	2.2	4.3	3.9	3.3	4.2	SE Asia	
	Middle East	10	18	16	10	7	7	7	9	11	12	13	-3.2	0.0	0.4	1.8	1.8	1.0	0.8	Middle East	
	OECD Europe	39	39	47	50	89	87	91	80	69	64	80	39.0	-2.6	4.2	-11.4	-10.7	-4.4	15.7	OECD Europe	
	South America	13	9	9	8	7	6	6	6	6	6	6	-1.7	-0.7	0.1	-0.3	0.0	-0.2	0.0	South America	
	Central & North America	10	9	9	10	10	7	8	8	7	7	7	0.1	-3.3	0.8	-0.1	-0.6	-0.2	0.0	Central & North America	
	RoW Demand	0	0	0	1	0	0	1	2	3	3	3	-0.2	-0.1	0.2	1.6	0.5	0.2	0.0	RoW Demand	
	World Demand	**252**	**264**	**296**	**324**	**365**	**368**	**393**	**406**	**412**	**422**	**454**	**40.3**	**3.1**	**25.4**	**12.5**	**6.2**	**10.0**	**32.6**	**Total**	

Footnote

1. RoW supply = Angola, Brunei, Cameroon, Egypt, Equatorial Guinea, Norway, Oman, Papua New Guinea, Peru, UAE, Yemen, Argentina, Mauritania
2. SE Asia = Malaysia, Philippines, Singapore, Thailand, Myammar, Sri Lanka, Vietnam, Hong Kong
3. Middle East = Bahrain, Egypt, Israel, Jordan, Kuwait
4. Row demand = Cyprus, Malta, Papua New Guinea, Russia, Ukraine, Ghana
5. We use a conversion factor of 0.45 from cubic meter to mt□
6. Australia, Indonesia and UAE exports□are now calculated net of imports

Source: Kpler, Goldman Sachs Global Investment Research

Base Metals

Exhibit 92: Aluminium Supply and Demand Model
kmt

('000 tonnes)	2012	2013	2014	2015	2016	2017	2018	2019	2020E	2021E	2022E	2023E
Consumption - DM												
US	4842	4928	5128	5391	5490	5547	5519	5382	4897	5264	5528	5594
% change y/y	*11.6%*	*1.8%*	*4.0%*	*5.1%*	*1.8%*	*0.5%*	*-0.5%*	*-2.5%*	*-9.0%*	*7.5%*	*5.0%*	*1.2%*
Europe	7995	8093	8234	8359	8606	8924	9102	8920	7939	8495	8919	9098
% change y/y	*0.1%*	*1.2%*	*1.7%*	*1.5%*	*3.0%*	*3.7%*	*2.0%*	*-2.0%*	*-11.0%*	*7.0%*	*5.0%*	*2.0%*
Japan	2166	1997	2108	2012	2080	2154	2180	2071	1802	1928	2005	2045
% change y/y	*1.3%*	*-7.8%*	*5.5%*	*-4.5%*	*3.4%*	*3.6%*	*1.2%*	*-5.0%*	*-13.0%*	*7.0%*	*4.0%*	*2.0%*
Other DM	2789	2794	2945	3010	3088	3167	3164	3069	2701	2917	3063	3096
% change y/y	*-0.6%*	*0.2%*	*5.4%*	*2.2%*	*2.6%*	*2.6%*	*-0.1%*	*-3.0%*	*-12.0%*	*8.0%*	*5.0%*	*1.1%*
Sub-Total DM	**17791**	**17812**	**18415**	**18772**	**19264**	**19792**	**19966**	**19442**	**17339**	**18604**	**19515**	**19833**
% change y/y	*3.0%*	*0.1%*	*3.4%*	*1.9%*	*2.6%*	*2.7%*	*0.9%*	*-2.6%*	*-10.8%*	*7.3%*	*4.9%*	*1.6%*
Consumption - EM												
China	21719	24282	27147	29373	31664	34419	35796	36154	37587	38509	39019	39698
% change y/y	*11.5%*	*11.8%*	*11.8%*	*8.2%*	*7.8%*	*8.7%*	*4.0%*	*1.0%*	*4.0%*	*2.5%*	*1.3%*	*1.7%*
Other EM	7795	8028	8236	8592	8874	9237	9422	9233	8033	8555	9069	9422
% change y/y	*3.2%*	*3.0%*	*2.6%*	*4.3%*	*3.3%*	*4.1%*	*2.0%*	*-2.0%*	*-13.0%*	*6.5%*	*6.0%*	*3.9%*
Sub-Total EM	**29514**	**32310**	**35383**	**37966**	**40538**	**43656**	**45218**	**45387**	**45620**	**47065**	**48087**	**49120**
% change y/y	*9.2%*	*9.5%*	*9.5%*	*7.3%*	*6.8%*	*7.7%*	*3.6%*	*0.4%*	*0.5%*	*3.2%*	*2.2%*	*2.1%*
Total Global Consumption	**47305**	**50122**	**53798**	**56738**	**59802**	**63449**	**65184**	**64829**	**62959**	**65668**	**67602**	**68954**
% change y/y	*6.8%*	*6.0%*	*7.3%*	*5.5%*	*5.4%*	*6.1%*	*2.7%*	*-0.5%*	*-2.9%*	*4.3%*	*2.9%*	*2.0%*
Total Global Production												
China Production	23089	25372	28623	30995	32393	36580	36002	35563	36717	38117	39017	39300
% change y/y	*15.2%*	*9.9%*	*12.8%*	*8.3%*	*4.5%*	*12.9%*	*-1.6%*	*-1.2%*	*3.2%*	*3.8%*	*2.4%*	*0.7%*
Ex-China Production	25702	25704	25816	26213	26909	27446	27701	28077	27999	28157	28495	28793
% change y/y	*-2.5%*	*0.0%*	*0.4%*	*1.5%*	*2.7%*	*2.0%*	*0.9%*	*1.4%*	*-0.3%*	*0.6%*	*1.2%*	*1.0%*
Total Production	**48791**	**51075**	**54439**	**57208**	**59302**	**64026**	**63702**	**63640**	**64717**	**66274**	**67512**	**68093**
% change y/y	*5.2%*	*4.7%*	*6.6%*	*5.1%*	*3.7%*	*8.0%*	*-0.5%*	*-0.1%*	*1.7%*	*2.4%*	*1.9%*	*0.9%*
Global Supply/Demand Balance	**1486**	**953**	**641**	**470**	**-499**	**578**	**-1481**	**-1189**	**1758**	**606**	**-90**	**-860**
Cash Prices (annual average)												
Current Dollars ($/t)	2022	1846	1868	1662	1605	1968	2111	1775	1712	2063	2100	2100
Current Dollars (c/lb)	92	84	85	75	73	89	96	81	78	94	95	95

Source: Wood Mackenzie, CRU, Goldman Sachs Global Investment Research

Exhibit 93: Nickle Supply and Demand Model
kmt

('000 tonnes)	2012	2013	2014	2015	2016	2017	2018	2019	2020E	2021E	2022E	2023E
CONSUMPTION - Developed Markets												
USA	122	121	138	127	119	136	138	144	124	134	142	147
% change y/y	*-0.5*	*-1.3*	*14.4*	*-8.3*	*-5.7*	*14.3*	*1.4*	*4.1*	*-14.0*	*8.0*	*6.0*	*4.0*
Japan	129	129	139	136	142	146	154	152	134	144	153	161
% change y/y	*-3.5*	*-0.1*	*7.5*	*-1.8*	*4.3*	*2.8*	*5.4*	*-1.1*	*-12.0*	*8.0*	*6.0*	*5.0*
Europe	345	332	331	322	330	332	339	326	284	305	320	336
% change y/y	*-2.5*	*-3.7*	*-0.1*	*-2.8*	*6.0*	*0.6*	*2.1*	*-3.8*	*-13.0*	*7.5*	*5.0*	*5.0*
Other DM	134	128	135	142	165	164	165	158	141	149	157	163
% change y/y	*-2.4*	*-4.8*	*5.4*	*5.7*	*16.0*	*-0.5*	*2.5*	*-4.0*	*-11.0*	*6.0*	*5.0*	*4.0*
Sub-Total DM	**731**	**709**	**743**	**727**	**757**	**779**	**796**	782	**682**	**733**	**772**	**808**
% change y/y	*-2.3*	*-2.9*	*4.7*	*-2.1*	*4.0*	*2.9*	*2.2*	*-1.7*	*-12.8*	*7.4*	*5.4*	*4.6*
CONSUMPTION - Emerging Markets												
China	781	929	979	1020	1155	1183	1183	1320	1380	1422	1463	1504
Indonesia	0	0	0	0	2	52	156	178	201	360	400	420
China & Indonsia	**781**	**929**	**979**	**1020**	**1157**	**1235**	**1339**	**1498**	**1581**	**1782**	**1863**	**1924**
% change y/y	*6.8*	*19.0*	*5.4*	*4.2*	*13.4*	*6.8*	*8.4*	*11.9*	*5.5*	*12.7*	*4.5*	*3.3*
Other EM	134	146	138	143	165	170	158	148	135	145	155	175
% change y/y	*6.5*	*8.9*	*-5.2*	*3.4*	*15.4*	*3.0*	*-7.1*	*-6.3*	*-8.8*	*7.4*	*6.9*	*12.7*
Sub-Total EM	**915**	**1075**	**1117**	**1163**	**1322**	**1405**	**1497**	**1646**	**1716**	**1927**	**2018**	**2099**
% change y/y	*6.8*	*17.5*	*3.9*	*4.1*	*13.6*	*6.3*	*6.5*	*10.0*	*4.3*	*12.3*	*4.7*	*4.0*
Total Global Consumption	**1645**	**1784**	**1860**	**1890**	**2078**	**2184**	**2293**	**2428**	**2398**	**2660**	**2790**	**2906**
% change y/y	*2.5*	*8.5*	*4.3*	*1.6*	*9.9*	*5.1*	*5.0*	*5.9*	*-1.2*	*10.9*	*4.9*	*4.2*
World ex-China ex-Indonesia	***865***	***855***	***881***	***870***	***922***	***949***	***954***	***930***	***817***	***878***	***927***	***982***
% change y/y	*-1.1*	*-1.1*	*3.0*	*-1.3*	*5.9*	*3.0*	*0.5*	*-2.5*	*-12.2*	*7.4*	*5.6*	*6.0*
SUPPLY												
Global Primary Production	**1708**	**2022**	**2006**	**2012**	**2048**	**2132**	***2245***	***2421***	**2559**	**2723**	**2851**	**2953**
% change	*6.4*	*18.4*	*-0.8*	*0.3*	*1.8*	*4.1*	5	8	*5.7*	*6.4*	*4.7*	*3.6*
China	**447**	**740**	**698**	**627**	**615**	**666**	***714***	***878***	**843**	**776**	**773**	**760**
% change	*11.4*	*65.7*	*-5.7*	*-10.2*	*-1.8*	*8.3*	7	23	*-4.0*	*-7.9*	*-0.4*	*-1.7*
Indonesia	**18**	**21**	**21**	**47**	**119**	**203**	**264**	**373**	**592**	**793**	**893**	**927**
% change	*-6.7*	*16.2*	*-2.3*	*127.4*	*151.6*	*69.9*	30	41	*58.7*	*34.0*	*12.7*	*3.8*
ex-China & Indonesia	**1243**	**1260**	**1287**	**1338**	**1313**	**1263**	***1267***	**1170**	***1124***	***1154***	***1185***	***1266***
% change	*5.0*	*1.4*	*2.1*	*4.0*	*-1.9*	*-3.9*	0	-8	*-3.9*	*2.7*	*2.6*	*6.9*
Forecasted market adjustment												
BALANCE	**62**	**237**	**145**	**122**	**-31**	**-52**	**-48**	**-7**	**161**	**64**	**61**	**47**
PRICES												
Cash (annual average; $/t)	**17528**	**15012**	**16889**	**11835**	**9606**	**10405**	**13200**	**13911**	**13796**	**16125**	**16000**	**16000**
Cash (annual average; c/lb)	795	681	766	537	436	472	599	631	626	731	726	726

Source: Goldman Sachs Global Investment Research

Exhibit 94: Copper Supply and Demand Model
kmt

('000 tonnes)	2012	2013	2014	2015	2016	2017	2018	2019	2020E	2021E	2022E	2023E
Consumption - DM												
US	2081	2117	2102	2104	2107	2113	2127	2155	1983	2112	2228	2339
% change y/y	*-0.3%*	*1.7%*	*-0.7%*	*0.1%*	*0.1%*	*0.3%*	*0.7%*	*1.3%*	*-8.0%*	*6.5%*	*5.5%*	*5.0%*
Europe	5130	5125	5186	5026	5040	5166	5259	5047	4542	4860	5079	5231
% change y/y	*-5.8%*	*-0.1%*	*1.2%*	*-3.1%*	*0.3%*	*2.5%*	*1.8%*	*-4.0%*	*-10.0%*	*7.0%*	*4.5%*	*3.0%*
Japan	1427	1438	1503	1433	1405	1458	1450	1392	1225	1323	1363	1404
% change y/y	*-2.7%*	*0.8%*	*4.5%*	*-4.7%*	*-2.0%*	*3.7%*	*-0.6%*	*-4.0%*	*-12.0%*	*8.0%*	*3.0%*	*3.0%*
Other DM	2339	2361	2313	2252	2279	2328	2234	2089	1839	2004	2064	2106
% change y/y	*-6.2%*	*0.9%*	*-2.0%*	*-2.6%*	*1.2%*	*2.2%*	*-4.1%*	*-6.5%*	*-12.0%*	*9.0%*	*3.0%*	*2.0%*
Sub- DM	10977	11041	11104	10815	10831	11065	11069	10683	9589	10299	10734	11079
% change y/y	*-4.5%*	*0.6%*	*0.6%*	*-2.6%*	*0.1%*	*2.2%*	*0.0%*	*-3.5%*	*-10.2%*	*7.4%*	*4.2%*	*3.2%*
Consumption - EM												
China	10650	11525	12155	12435	12816	13326	13710	13930	14209	14664	15016	15316
% change y/y	*5.8%*	*8.2%*	*5.5%*	*2.3%*	*3.1%*	*4.0%*	*2.9%*	*0.5%*	*2.0%*	*3.2%*	*2.4%*	*2.0%*
Other EM	4329	4366	4522	4620	4691	4769	4883	4963	4466	4779	4946	5144
% change y/y	*1.6%*	*0.8%*	*3.6%*	*2.2%*	*1.5%*	*1.7%*	*2.4%*	*1.6%*	*-10.0%*	*7.0%*	*3.5%*	*4.0%*
Sub- EM	14979	15891	16677	17055	17508	18095	18593	18893	18675	19443	19962	20460
% change y/y	*4.5%*	*6.1%*	*4.9%*	*2.3%*	*2.7%*	*3.4%*	*2.7%*	*1.6%*	*-1.2%*	*4.1%*	*2.7%*	*2.5%*
Global Consumption	25957	26932	27781	27870	28338	29160	29662	29576	28264	29742	30695	31539
Direct Global Scrap Use	6370	6207	6153	5940	5756	6106	6136	6047	5140	5962	6135	6286
Refined Global Consumption	19586	20725	21628	21930	22583	23054	23526	23529	23124	23779	24560	25254
% change y/y	*-0.1%*	*5.8%*	*4.4%*	*1.4%*	*3.0%*	*2.1%*	*2.0%*	*0.0%*	*-1.7%*	*2.8%*	*3.3%*	*2.8%*
Global Production												
Mine Production	16650	18028	18485	19231	20220	20118	20786	20929	20435	21039	22117	22705
% change y/y	*3.7%*	*8.3%*	*2.5%*	*4.0%*	*5.1%*	*-0.5%*	*3.3%*	*0.7%*	*-2.4%*	*3.0%*	*5.1%*	*2.7%*
Refined Copper	20146	20780	21755	22031	22742	22992	23472	23377	23119	23371	24473	25273
% change y/y	*2.0%*	*3.1%*	*4.7%*	*1.3%*	*3.2%*	*1.1%*	*2.1%*	*-0.4%*	*-0.3%*	*1.1%*	*4.7%*	*3.3%*
Global Balance	**560**	**55**	**127**	**101**	**159**	**-62**	**-54**	**-152**	**-5**	**-409**	**-87**	**20**
Cash Prices (annual average)												
Current Dollars ($/t)	7949	7322	6862	5494	4862	6166	6532	6000	6000	7300	7500	7500
Current Dollars (c/lb)	361	332	311	249	221	280	296	272	272	331	340	340

Source: Goldman Sachs Global Investment Research, Wood, Mackenzie

Exhibit 95: Zinc Supply and Demand Model
kmt

('000 tonnes)	2012	2013	2014	2015	2016	2017	2018	2019	2020E	2021E	2022E	2023E
Global Production												
Mine Supply	12901	13014	12929	13230	12372	12819	13337	13727	13042	13973	14353	14209
% change	*1.2*	*0.9*	*-0.7*	*2.3*	*-6.5*	*3.6*	*4.0*	*2.9*	*-5.0*	*7.1*	*2.7*	*-1.0*
Refined Production (incl DLA)	**13020**	**13250**	**13700**	**13820**	**13900**	**13700**	**13593**	**13947**	**14110**	**14406**	**14691**	**14700**
% change	*2.4*	*1.8*	*3.4*	*0.9*	*0.6*	*-1.4*	*-0.8*	*2.6*	*1.2*	*2.1*	*2.0*	*0.1*
DM Consumption												
US	1071	1073	1113	1064	1077	1078	1079	1088	1001	1061	1082	1101
% change y/y	*6.2*	*0.1*	*3.8*	*-4.4*	*1.2*	*0.1*	*0.1*	*0.8*	*-8.0*	*6.0*	*2.0*	*1.8*
Japan	478	475	494	461	450	452	445	439	395	427	431	435
% change y/y	*-3.8*	*-0.6*	*3.9*	*-6.7*	*-2.2*	*0.3*	*-1.5*	*-1.4*	*-10.0*	*8.0*	*1.0*	*1.0*
Western Europe	1811	1821	1871	1909	1932	1956	1920	1892	1702	1839	1879	1911
% change y/y	*-7.5*	*0.5*	*2.8*	*2.0*	*1.3*	*1.2*	*-1.8*	*-1.5*	*-10.0*	*8.0*	*2.2*	*1.7*
Other OECD	1443	1458	1499	1490	1502	1524	1493	1468	1321	1427	1453	1473
% change y/y	*0.6*	*1.0*	*2.8*	*-0.6*	*0.8*	*0.8*	*-2.0*	*-1.7*	*-10.0*	*8.0*	*1.8*	*1.4*
DM	4803	4826	4977	4923	4961	5010	4938	4886	4420	4753	4845	4921
% change y/y	***-1.9***	***0.5***	***3.1***	***-1.1***	***0.8***	***1.0***	***-1.4***	***-1.0***	***-9.6***	***7.5***	***1.9***	***1.6***
EM Consumption												
China	5457	5948	6305	6431	6624	6750	6786	6736	6891	6979	7153	7313
% change y/y	*7.0*	*9.0*	*6.0*	*2.0*	*3.0*	*1.9*	*0.5*	*-0.7*	*2.3*	*1.3*	*2.5*	*2.2*
India	612	639	649	666	691	720	720	725	652	711	757	814
% change y/y	*2.5*	*4.5*	*1.5*	*2.6*	*3.8*	*4.2*	*0.0*	*0.7*	*-10.0*	*9.0*	*6.5*	*7.5*
Russia	*226*	*220*	*206*	*185*	*185*	*186*	*187*	*189*	*185*	*191*	*194*	*196*
% change y/y	*6.9*	*-2.5*	*-6.7*	*-10.0*	*-0.3*	*0.6*	*0.8*	*1.0*	*-2.0*	*3.0*	*1.5*	*1.4*
Brazil	268	269	244	224	230	230	227	225	203	219	225	230
% change y/y	*6.2*	*0.2*	*-9.2*	*-8.0*	*2.5*	*-0.1*	*-1.3*	*-0.7*	*-10.0*	*8.0*	*2.7*	*2.2*
Other EM	1311	1345	1371	1350	1347	1345	1322	1306	1175	1269	1295	1315
% change y/y	*-1.8*	*2.6*	*1.9*	*-1.5*	*-0.2*	*-0.2*	*-1.7*	*-1.2*	*-10.0*	*8.0*	*2.0*	*1.6*
EM	7873	8422	8774	8856	9077	9230	9241	9181	9107	9369	9624	9868
% change y/y	***5.0***	***7.0***	***4.2***	***0.9***	***2.5***	***1.7***	***0.1***	***-0.7***	***-0.8***	***2.9***	***2.7***	***2.5***
Global Consumption	**12677**	**13248**	**13751**	**13780**	**14038**	**14239**	**14180**	**14067**	**13526**	**14122**	**14469**	**14789**
% change y/y	*2.3*	*4.5*	*3.8*	*0.2*	*1.9*	*1.4*	*-0.4*	*-0.8*	*-3.8*	*4.4*	*2.5*	*2.2*
Of which, ex-China	**7220**	**7300**	**7446**	**7349**	**7414**	**7489**	**7394**	**7331**	**6635**	**7143**	**7315**	**7476**
% change y/y	-1.0	1.1	2.0	-1.3	0.9	1.0	-1.3	-0.8	-9.5	7.7	2.4	2.2
DM as % of global	*37.9*	*36.4*	*36.2*	*35.7*	*35.3*	*35.2*	*34.8*	*34.7*	*32.7*	*33.7*	*33.5*	*33.3*
EM as % of global	*62.1*	*63.6*	*63.8*	*64.3*	*64.7*	*64.8*	*65.2*	*65.3*	*67.3*	*66.3*	*66.5*	*66.7*
Global Supply / Demand Balance	**343**	**2**	**-51**	**40**	**-138**	**-539**	**-587**	**-120**	**584**	**284**	**222**	**-89**
Total Inventory	1960	1605	1831	1641	1556	1166	1049	964	1548	1832	2054	1965
Reported stocks (Weeks cons.)	**56**	**44**	**49**	**43**	**40**	**30**	**27**	**25**	**42**	**47**	**52**	**49**
Prices												
Cash (annual average; US$/tonne)	**1948**	**1909**	**2163**	**1928**	**2094**	**2893**	**2921**	**2552**	**2226**	**2469**	**2400**	**2400**
Cash (annual average; USc/lb)	88	87	98	87	95	131	132	116	101	112	109	109

Source: Wood Mackenzie, Goldman Sachs Global Investment Research

Appendix

To calculate the commodity demand intensity of a by – decile consumption bundle, we use the BEA's Supply and Use Table for the US economy in 2012 and the BLS by-decile consumption of PCE goods from the Consumer Expenditure Survey.

From the BEA Industry Use Commodity by commodity table we draw a vector of commodity use in $ terms. We generate the inverse Leontief as below from the Industry by Industry Input Output matrix. We then generate a mapping from the BEA industries to the PCE consumption goods using the BLS codebook and production weighting.

The methodology is as follows:

Let $v_j = \sum_{i=1}^{C} use_{i,j}$ be the I-valued vector of I industries where $j \in \{1, \ldots . I\}$

Where $use_{i,j}$ is the commodity use table, and commodities $i \in \{1, \ldots . C\}$ is the bundle of commodities (composition below). Hence each item in v_j is the dollar value of initial use of each commodity in each industry.

Then let $M_{i,j}$ be the industry by industry input-output matrix and $L_{i,j}$ be the inverse Leontief $L_{i,j} = \left(I - M_{i,j}\right)^{-1}$.

Finally let $w_{i,j}$ be the weights each industry has input into each consumption good.

Then the total commodity use of an individual bundle, is simply the commodity input into each industry and each industries input into each final consumption good g.

$$CI_g = (v^T L) w^T$$

Exhibit 96: Commodities underlying commodity demand intensity chart

BIC Code	Process	Commodity
1111A0	Oilseed farming	Soybeans
1111B0	Grain farming	Corn and Wheat
1121A0	Beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming	Beef
211000	Oil and gas extraction	Crude and Gas
212100	Coal mining	Met Coal
212230	Copper, nickel, lead, and zinc mining	Base Metals
2122A0	Iron, gold, silver, and other metal ore mining	Bulk and Precious
331110	Iron and steel mills and ferroalloy manufacturing	Steel
331313	Alumina refining and primary aluminum production	Aluminia
33131B	Aluminum product manufacturing from purchased aluminum	Aluminium

Source: Goldman Sachs Global Investment Research

Disclosure Appendix

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We, Jeffrey Currie, Damien Courvalin, Samantha Dart, Nicholas Snowdon, Michael Hinds, Alison Li, Mikhail Sprogis, Callum Bruce, Huan Wei and Daniel Sharp, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

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