

BofA FAQs: Five Answered Questions

Issue #7: How developments in the Middle East may move markets

Investment Strategy

The aim of this report is to look at market reactions to rising geopolitical tensions. It is not intended to be a prediction on how events unfold. We discuss various possible scenarios but do not consider the particular likelihood of them.

How vulnerable is the US economy to an oil price shock?

Given the US is now energy independent, this means it is a net exporter of petroleum products, so the headwind to US consumers from higher prices should be offset by profits for domestic producers. In an extreme scenario, if crude oil were to spike to \$150/bbl, this might tip the US economy into recession, but it is not a given.

Could this lead to oil prices above \$150/bbl?

The key question for energy according to Francisco Blanch is whether the conflict broadens regionally, and whether physical energy supplies are lost due to economic sanctions and/or military action. Scenarios range from the conflict being contained to Israel and Gaza with oil prices in the \$90 to \$95/bbl range, and LNG trading at around \$15/MMBtu, to an extreme scenario where a regional conflict expands to target Middle East energy infrastructure, with the spike in prices reaching \$130 or above. Supply losses of 2mn b/d or 2% of global supplies would likely push oil past \$150/bbl.

What historically happens to USD when geopolitics rise?

If an escalation of the war in the Middle East leads to higher oil prices, this could lead to a stronger USD. If oil reaches \$150, the USD could easily test and likely exceed its highs against several major currencies according to our FX Strategy team.

How do rising tensions overseas impact rates?

Mark Cabana's base case remains that US 10Y Treasury yields will peak in the 5% range and will be lower by the end of 2024. If oil does spike to \$150, our view on the 10Y yield would be more limited. We would expect concerns about recession and geopolitics to lead to a flight to quality that would likely see UST rates fall amidst elevated macro uncertainty and risk of a consumption hit with higher oil prices.

How has the market reacted to spikes in energy prices?

S&P 500 peak-to-trough declines have been 7-8% on average during major macro shocks/geopolitical events, according to our US Strategy team, but more than fully recovered after 3 months. Energy is the most direct beneficiary of higher oil prices, while consumer sectors are negatively impacted. Labor is the big cost in most industries, while energy is 3% of costs.

Bonus Q: Should we expect more defense spending?

The US deficit is a real concern for defense spending, but national security has historically trumped absolute debt levels. We see the CAGR of global defense spending increasing from 1-3% and US defense spending increasing from 3-5% to 5-8%.

Trading ideas and investment strategies discussed herein may give rise to significant risk and are not suitable for all investors. Investors should have experience in relevant markets and the financial resources to absorb any losses arising from applying these ideas or strategies.

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Refer to important disclosures on page 16 to 18.

12615882

Timestamp: 25 October 2023 05:00AM EDT

25 October 2023

Equity
Global

Thomas (T.J.) Thornton
Head of Research Marketing
BofAS
+1 646 855 2449
thomas.thornton2@bofa.com

Global Economics
Aditya Bhave
US Economist
BofAS
aditya.bhave@bofa.com

Jean-Michel Saliba
MENA Economist/Strategist
MLI (UK)
jean-michel.saliba@bofa.com

Strategy
Francisco Blanch
Commodity & Deriv Strategist
BofA Europe (Madrid)
francisco.blanch@bofa.com

Derek Harris
Portfolio Strategist
BofAS
derek.harris@bofa.com

Savita Subramanian
Equity & Quant Strategist
BofAS
savita.subramanian@bofa.com

Athanasios Vamvakidis
FX Strategist
MLI (UK)
athanasios.vamvakidis@bofa.com

Justin Devery
Portfolio Strategist
BofAS
justin.devery@bofa.com

Global Equity Research
Ronald J. Epstein
Research Analyst
BofAS
r.epstein@bofa.com

[See Team Page for List of Analysts](#)

LNG = Liquefied natural gas

Did you know?

- Saudi Arabia has \$2mm b/d of spare oil capacity and could offset possible supply losses but probably not until prices exceed \$100/bbl. (Blanch)
- The US is now energy independent so the headwind to US consumers from higher prices should be partly offset by profits for domestic producers. (Bhave)
- The extent to which US consumer spend would be impacted by an oil shock depends to what degree the consumer can reduce savings, with a longer oil shock more problematic. (Bhave)
- US defense spending relative to GDP is at an all-time low. (Bhave)
- An oil spike won't necessarily boost 10Y Treasury rates given what would likely be a flight to quality. (Cabana)
- Oil represents just ~3% of S&P 500 costs. (Subramanian)
- The S&P has been negatively correlated to oil prices when prices have risen on lower supply, but positively correlated when demand is driving oil prices higher. (Subramanian)
- History suggests that geopolitical dips should be bought, not sold. (Subramanian)

1. How vulnerable is the US economy to an oil price shock? What are the channels through which an oil shock would affect the economy?

Aditya Bhave

US Economist

BofAS

+1 646 855 9929

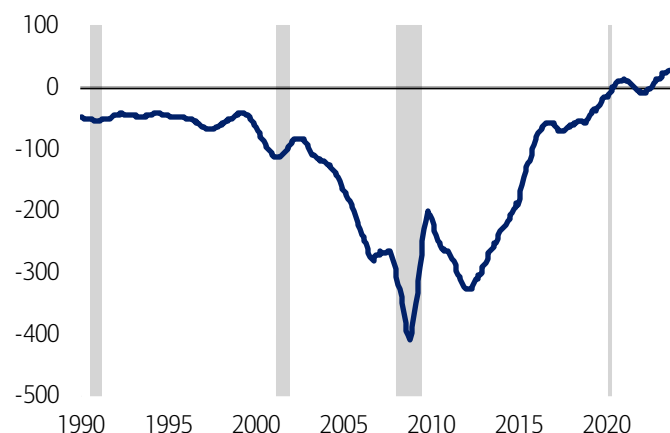
aditya.bhave@bofa.com

The US economy is a lot less vulnerable to an oil price shock than it was in the 70s, in 1990 or even in 2008. The US is now energy independent. It is a net exporter of petroleum products, so the headwind to US consumers from higher prices should be offset by profits for domestic producers (Exhibit 1).

Still, a large shock to oil prices is likely to be a net negative for the economy, at least in the short term. This is because producers probably will not deploy their windfall gains unless prices are expected to remain elevated for an extended period. Note that rig counts in the US were not very responsive to the increase in oil prices last year, possibly due to a shift in policy in favor of renewable energy (Exhibit 2).

Exhibit 1: US trade balance in petroleum products (12-month rolling total, \$bn)

The US has become a net exporter of petroleum products

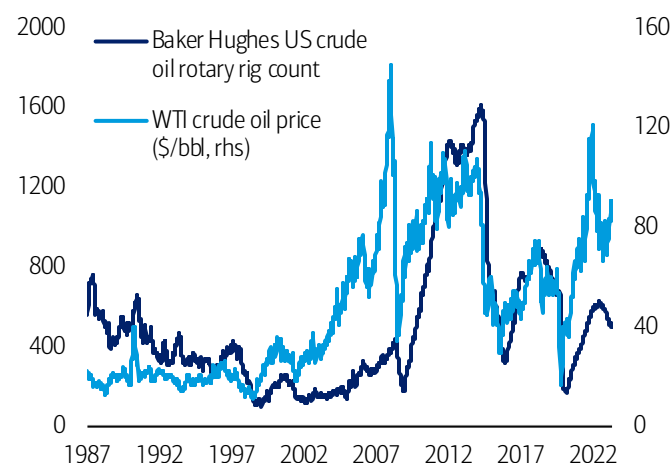


Source: Census Bureau, Haver Analytics

BofA GLOBAL RESEARCH

Exhibit 2: US rig count vs. oil prices

US production did not respond strongly to last year's surge in oil prices



Source: Bloomberg, Baker Hughes, American Automobile Association

BofA GLOBAL RESEARCH

Meanwhile, real consumer spending should be quickly impacted by an energy price spike. But even on this front we would note that i) the share of energy goods and services in the consumer wallet is very low by historical standards (Exhibit 3), and ii) the strength in household balance sheets means that consumers can, to a degree, respond an energy shock by saving less instead of spending less on other items.

In an extreme scenario, what if crude oil were to spike to \$150/bbl? Briefly, this might tip the US economy into recession, but it is not a given. Based on historical patterns, we estimate that energy prices would spike 25-40%, which would amount to 1.0-1.5% of consumer spending. We think consumers could probably offset around 50bp of the shock by lowering savings in the near term. That might not be sustainable if the shock turns out to be persistent, but the prospects for a long-lasting increase in oil prices of this magnitude seem limited given its expected deleterious impact on global demand.

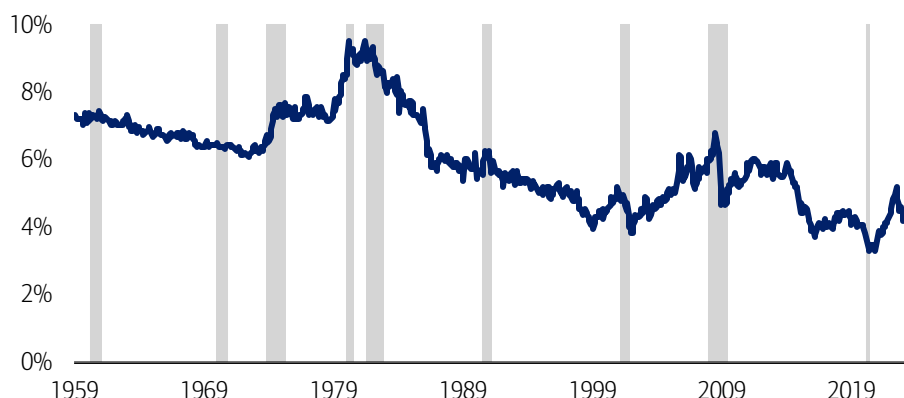


So, we would likely be looking at a 0.5-1.0% shock to consumer spending, which would translate to a 1.4-2.8pp headwind to q/q annualized GDP growth, in case the full impact of the shock is felt in one quarter. This headwind would be partially offset by the gains for energy producers. Still, if the pass-through from oil to energy prices is at the higher end of our estimates, or if consumers are less willing to dis-save than we assume, there is risk of a quarterly contraction in GDP.

Whether that would turn into a recession would depend partly on the Fed response. In our view, the Fed prefers not to lean against an exogenous energy shock if the other components of inflation are moving in the right direction. But if higher energy prices lead to a de-anchoring in inflation expectations, the Fed might be forced to hike further or at least stay on hold indefinitely. The knock-on effects of even higher rates for even longer could trigger a recession.

Exhibit 3: Energy goods and services as a share of consumer spending

The share of energy in consumer spending is low by historical standards



Source: BEA, Haver Analytics

BofA GLOBAL RESEARCH

1a) What are the scenarios around the direction of oil and LNG prices if tensions escalate?

Francisco Blanch

Commodity & Deriv Strategist

BofA Europe (Madrid)

+34 91 514 3070

francisco.blanch@bofa.com

The ongoing turmoil in the Middle East quickly brings to mind the concept of energy fragility. However, Israeli-Palestinian conflicts post 1973 have had a limited impact on energy prices because they were mostly contained. So, the key question for energy is whether the conflict might broaden regionally, and whether physical energy supplies could be lost if economic sanctions were imposed and/or military action were taken.

We break this out into 4 simplified potential outcomes for energy markets:

1. Under a scenario where war is contained to Israel and Gaza and eventually eases, we would expect oil prices to trade in a \$90 to \$95/bbl range over the coming months and LNG to trade at around \$15/MMBtu.
2. If the conflict does not broaden substantially and if the US were to enforce Iranian oil sanctions and global oil supply is curbed by 1-1.5mn b/d in 2024, Brent prices would likely jump above \$100/bbl and LNG above \$20/MMBtu.

3. Should the conflict expand beyond Gaza to engulf Iran, we believe crude prices could quickly climb above \$120-\$130/bbl to account for the potential risk of a Persian Gulf shutdown. Note that a spike of this move would likely occur without any actual production losses.
4. If an unfolding regional war expands to target Middle East energy infrastructure, the spike in prices could range between \$130 to \$250+/bbl. Supply losses of 2mn b/d or 2% of global supplies (equivalent to the production of Qatar or half of the UAE output) would likely push oil past \$150/bbl. At the extreme end, if shipments through Hormuz, a choke point for nearly 20% of the world's oil and LNG, were to shut down for a meaningful period, oil could spike above \$250/bbl and LNG could surpass \$50/MMBtu.

1b) Are there any automatic price stabilizers?

Francisco Blanch

Commodity & Deriv Strategist
BofA Europe (Madrid)
+34 91 514 3070
francisco.blanch@bofa.com

Jean-Michel Saliba

MENA Economist/Strategist
MLI (UK)
+44 20 7995 8568
jean-michel.saliba@bofa.com

While Saudi Arabia has >2mn b/d of spare capacity and could make up for lost Iranian barrels, recent signaling suggests Saudi is unlikely to do so unless oil exceeds \$100/bbl. Middle East-North Africa economist Jean-Michel Saliba's analysis of Saudi fiscal breakeven oil price suggests general government funding requirements are met around US\$95/bbl (see the report [Emerging Insight: Saudi Arabia – eyeing US\\$100/bbl oil 28 September 2023](#))

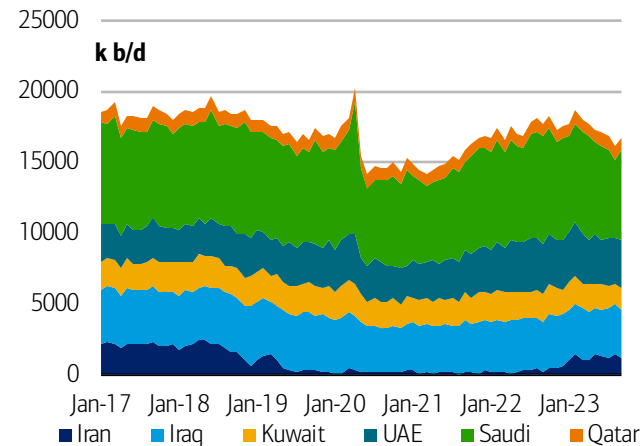
Saudi energy policy decisions are likely to finely balance OPEC (Organization of the Petroleum Exporting Countries) members' funding needs, the impact on oil demand, internal group cohesion considerations, reliability as a major oil supplier, and public perceptions (both domestically and internationally).

Large OPEC spare capacity could allow for an offsetting increase in its market share in response to a potential drop in Iranian oil exports, but likely gradually and in a controlled fashion. (Press reports suggest potential tightening of enforcement of US secondary sanctions on Iran.)

In terms of potential impact of higher energy prices globally, we note resource-poor Europe and Japan would likely suffer most. US energy independence means America is less sensitive to an external energy price shock, although the US SPR has been greatly depleted during the Ukraine war. Higher oil prices would stoke US inflation too. As the world's biggest energy importer, China may also be hurt, but their growing strategic oil stockpiles likely could help them temporarily cope with minor Middle East supply disruptions. In contrast, Russia would likely improve its geopolitical leverage as the world's largest net energy exporter in the case of an expanding regional conflict.

Exhibit 4: Middle East crude oil exports

Middle East crude oil exports have been averaging ~16.5mn b/d in recent months and represent about 17% of world supplies

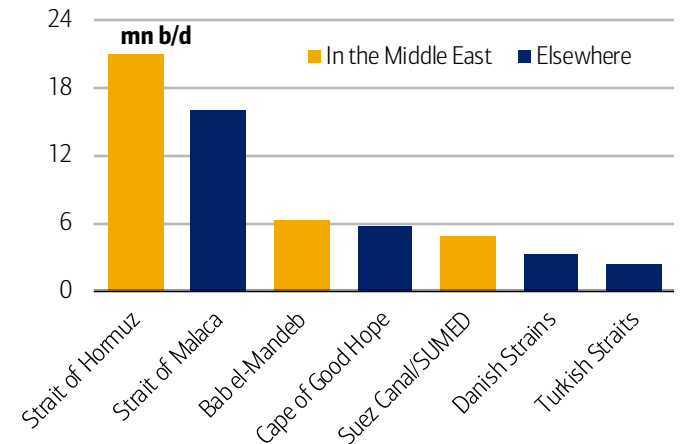


Source: Bloomberg

BofA GLOBAL RESEARCH

Exhibit 5: EIA chokepoints

There are multiple energy chokepoints across the Middle East, including Hormuz, Suez, Abqaiq, or the Ceyhan pipeline plus plenty of countries at risk

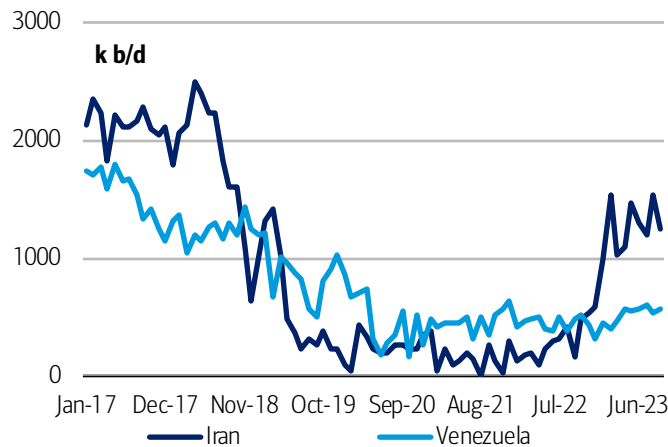


Source: EIA (estimates as of 2019), BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 6: Crude oil exports from Iran and Venezuela

Iranian crude oil exports have increased during the past few months as the US government reduced pressure on sanctions

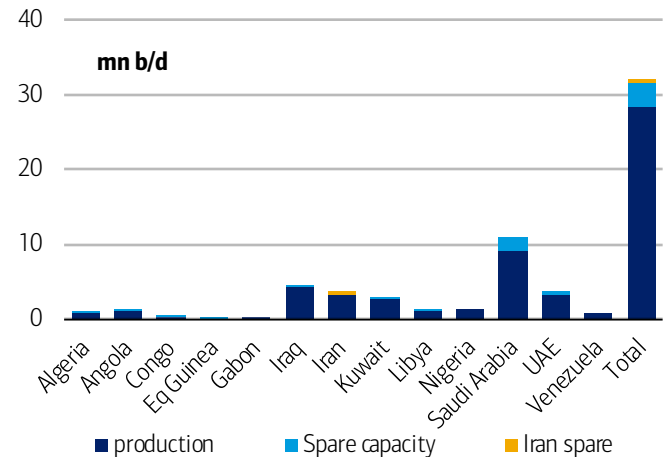


Source: Bloomberg

BofA GLOBAL RESEARCH

Exhibit 7: OPEC production capacity

Still, armed with 3.3mn b/d of spare production capacity outside Iran, there is a lot of room to put a lid on oil prices if other volumes are lost elsewhere



Source: IEA, BofA Global Research estimates

BofA GLOBAL RESEARCH

1c) If the US were to get directly involved in the conflict in the Middle East, should we expect a major drag on the US economy?

Aditya Bhawe

US Economist

BofAS

+1 646 855 9929

aditya.bhave@bofa.com

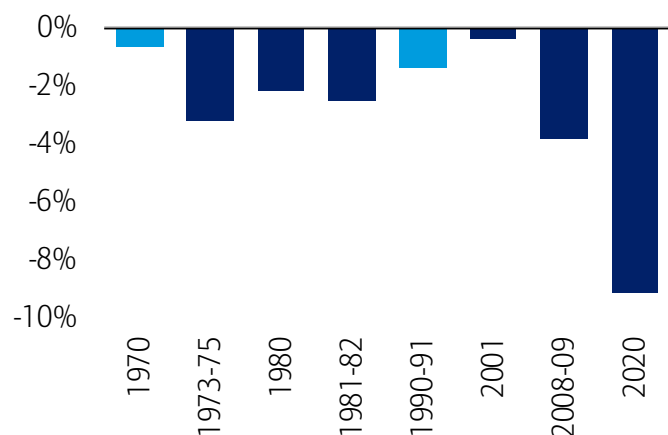
There are only a handful of examples of direct US involvement in military conflicts (“boots on the ground”) since WWII. US involvement in Vietnam spanned multiple business cycles. The shallow 1970 recession happened in the aftermath of the peak of the conflict (late 60s). The recession was driven by both Fed tightening to combat a growing inflation problem, and fiscal consolidation after a few years of deficit expansion to fund defense spending.

The Gulf War happened towards the end of the short 1990-91 recession. The recession was triggered by the oil price shock due to Iraq’s occupation of Kuwait, rather than the US military response. Tight Fed policy also played a part. It is worth noting that the 1970 and 1990-91 recessions were mild by historical standards (Exhibit 8).

Finally, US involvement in Iraq and Afghanistan also spanned multiple business cycles. The peak of the conflict, in the mid-2000s, corresponded with the housing boom. Again, there is little indication that the economy was negatively impacted. So, in conclusion, history suggests that, should it occur, direct military involvement in the Middle East would be unlikely to weigh meaningfully on the domestic economy.

Exhibit 8: GDP contraction during US recessions, peak to trough

The 1970 and 1990-91 recessions were mild by historical standards



Source: Bureau of Economic Analysis (BEA)

BofA GLOBAL RESEARCH

2. What typically happens to the USD when geopolitical tensions rise, especially during energy shocks?

Athanasios Vamvakidis

FX Strategist

MLI (UK)

+44 20 7995 0279

athanasios.vamvakidis@bofa.com

To the extent that an escalation of the war in the Middle East were to lead to higher oil prices, we expect this would lead to a stronger USD. The USD should do well against high beta currencies because of risk-off. The USD should also do well against EUR and JPY, as the US is energy independent, while the Eurozone and Japan import the most energy in G10 as a share of their consumption. High oil prices should also be a stagflation shock, forcing the Fed to keep rates high or even higher for longer, despite weaker growth, in turn supporting the USD.

This is consistent with the FX price action in the months after the war started in Ukraine. Oil prices increased sharply, and the USD appreciated to a 20 year high, with EURUSD well below parity.

Where would the USD trade in case oil rallies to \$150?

We would think the USD could easily test and likely exceed its highs against several major currencies. As seen in Exhibit 12, the relationship between the USD and oil has changed over the years, with the sign of the correlation with EURUSD having flipped from + to -. This has to do in large part with US energy independence and the terms-of-trade shock that a supply driven oil price rise of that level would have on the European economy.

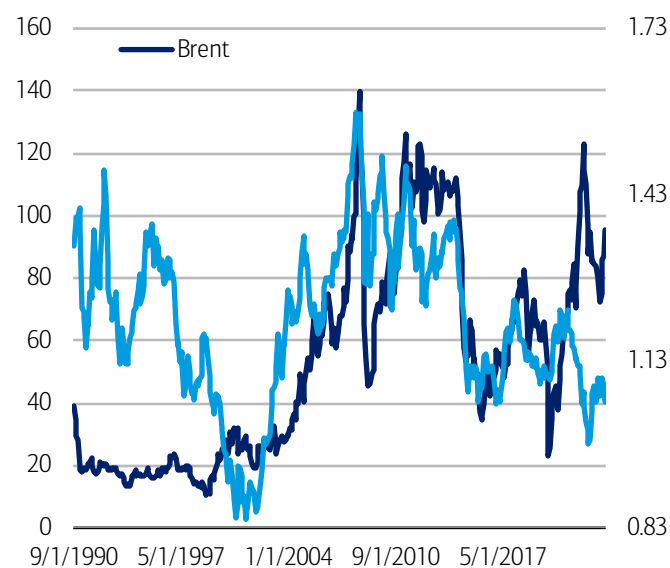
The start of the Russia/Ukraine war saw Brent almost touch ~\$140/bbl. EURUSD traded to ~\$.98 /EUR and USDJPY also eventually traded around Y150/USD, and was likely held back to an extent because of FX intervention in Japan.

If Brent crude traded back to the \$140-\$150 level, we could envision EURUSD in the mid/low-.90s, and USDJPY maybe getting above Y160 (though would likely again be smoothed out via VX intervention). This would likely be the initial move, but these extreme levels would likely moderate to an extent at some point.

Our FX team recently wrote ([Liquid Insight: Oil supply shock and FX 03 October 2023](#)) on the relationship between crude oil and the USD a few weeks ago. Among the findings, it shows USD tends to be supported on supply-driven oil price shock (+24% USD NEER correlation to oil Supply shock, highest across all major currencies)

Exhibit 9: Brent vs. EURUSD

The relationship between the USD and oil has changed over the years, with the sign of the correlation with EURUSD having flipped from + to -.

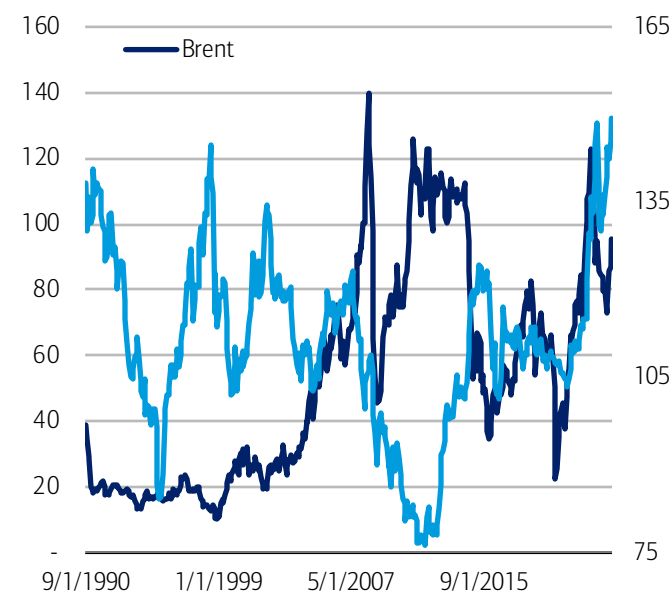


Source: Bloomberg

BofA GLOBAL RESEARCH

Exhibit 10: Brent vs. USDJPY

USDJPY maybe getting above Y160



Source: Bloomberg

BofA GLOBAL RESEARCH

3. How much could US interest rates be impacted by geopolitical tensions? What is your forecast for US rates if tensions escalate and energy prices rise?

Mark Cabana, CFA

Rates Strategist

BofAS

+1 646 855 9591

mark.cabana@bofa.com

Geopolitical risk and higher oil prices likely would mean at least two things for the UST market: (1) wider front end breakeven inflation rates with higher oil (2) a flight to quality bid at UST back end (see the report: [Global Rates Weekly: Real spooky rates 13 October 2023](#)). Our prior analysis suggests 10Y rates have historically declined 5-10bps in the week after previous geopolitical conflicts (Exhibit 14). We think this is a reasonable estimate for the potential impact at the UST back end.

Exhibit 14: Price changes around select geopolitical events in the past

Typical response to geopolitical events consists of lower rates, steeper curve & higher oil prices

Event	Date	10y UST (bp)		5s30s curve (bp)		Crude oil (%)	
		Day After	Week After	Day After	Week After	Day After	Week After
First Iraq War	1/17/91	-18.2	-6.9	--	--	-33.0	1.3
NATO bombing during Bosnian War	8/30/95	-2.6	-14.6	4.5	-10.3	-0.2	3.2
NATO bombing Kosovo War	3/24/99	0.0	8.6	-7.1	-0.3	-1.0	9.3
9/11 attack	9/11/01	-2.6	-10.2	33.4	21.7	0.5	-0.3
Afghanistan War	10/8/01	0.2	9.3	-1.4	9.1	0.3	-0.7
Second Iraq War	3/20/03	-3.1	-3.1	6.1	5.8	-4.3	6.2
Russia Invasion of Ukraine	2/25/22	-0.2	-23.1	-0.8	11.0	-1.3	26.3
Average		-3.8	-5.7	5.8	6.2	-5.6	6.5
Median		-2.6	-6.9	1.9	7.5	-1.0	3.2

Source: Bloomberg

BofA GLOBAL RESEARCH

We believe that any flight to quality on the UST curve would initially result in a bull flattening, or a bigger decline in long end rates than in short rates, given the possibility of further Fed rates hikes. However, should the conflict broaden and oil move into the \$150 range, we think the curve would eventually bull steepen due to the possibility of easier monetary policy. History suggests geopolitical risks typically see UST 5s30s bull steepening. The risk for higher oil prices also supports our 2s5s real curve steepener due to a widening of near-dated breakevens (see the report: [US Rates Watch: The “real” case for steepeners 24 October 2023](#)).

Our base case remains that US 10Y Treasury yields will peak in the 5% range and will be lower by the end of 2024. If oil does spike to \$150, our view on the 10Y yield would be more limited. We would expect concerns about recession and geopolitics to lead to a flight to quality that would see UST rates fall amidst elevated macro uncertainty and risk of a consumption hit with higher oil prices.

4. What if oil hits \$150?

Savita Subramanian

Equity & Quant Strategist

BofAS

+1 646 855 3878

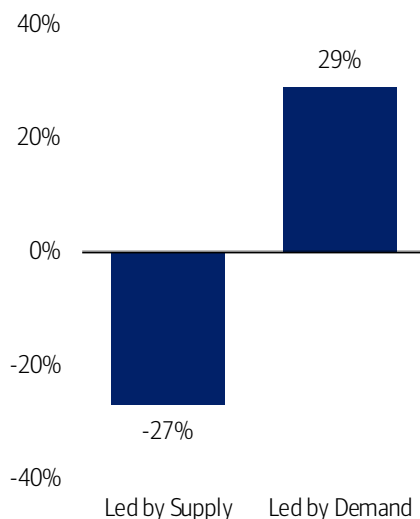
savita.subramanian@bofa.com



The risk of oil spiking to \$150 or beyond is a tail risk worth considering if geopolitical conflicts escalate further, creating a supply shock superspike. Higher oil prices mainly driven by supply (as proxied by narrowing crack spread) have had negative impacts on the S&P 500 (-27% correlation), whereas high oil prices driven by demand (as proxied by widening crack spreads) have had positive impacts on the S&P 500 (+29% correlation).

Exhibit 12: Supply-driven oil spike = headwind for S&P 500

Correlation between S&P 500 QoQ return and WTI QoQ price change when higher oil prices are led by supply (narrowing crack spread) vs. demand (widening crack spread), 3/1986-9/2021

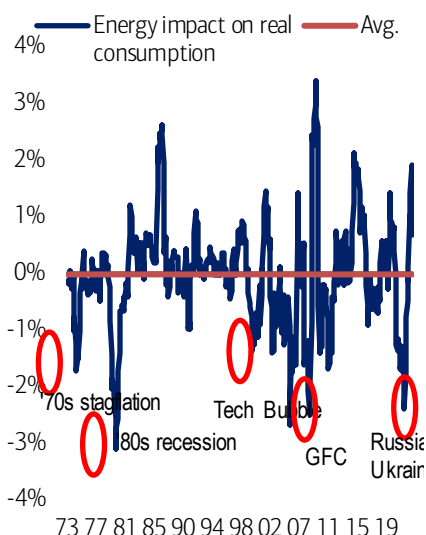


Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 13: Lower oil added ~70bps to real consumption, higher oil could take it away

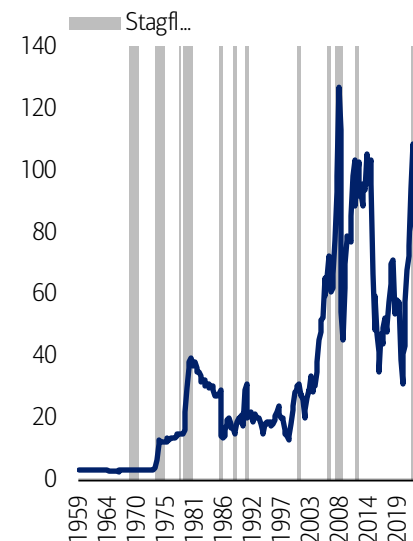
Spread between CPI ex. Energy and CPI YoY (1973-8/23)



Source: BofA US Equity & Quant Strategy, Haver Analytics
BofA GLOBAL RESEARCH

Exhibit 14: Key risk: stagflation

WTI oil prices vs stagflation (below-trend GDP growth, high & rising inflation; 1959-3Q23)



Source: BofA US Equity & Quant Strategy, Bloomberg, Global Financial Data which cites: Data from 1860 through 1897 are from The Derrick's Hand-Book of Petroleum, Oil City, PA: Derrick Publishing Co., 1898, Vol. 1. Daily data for oil prices was published in the same book in Vol. 1 (1897), 3 (1915), and 4 (1919). Prices are for quotations in Oil City, PA. through 1919. Prices from 1920 to June 1941 are the price per barrel for oil in Pennsylvania based upon data from the National Bureau of Economic Research. From 1941 through 1968, the cost of a barrel of oil (equal to 42 US gallons) as collected by Platt's is used. From 1969 through December 1982, data from the Bureau of Labor Statistics is used, with the exception of the period from October 1973 through December 1982 when the US price of oil was fixed. During this period the landed costs of imports from the US Department of Energy is used. From January 1983 to present the price for West Texas Intermediate Crude Oil is used at 40 degree API, f.o.b. Cushing, Oklahoma.

BofA GLOBAL RESEARCH

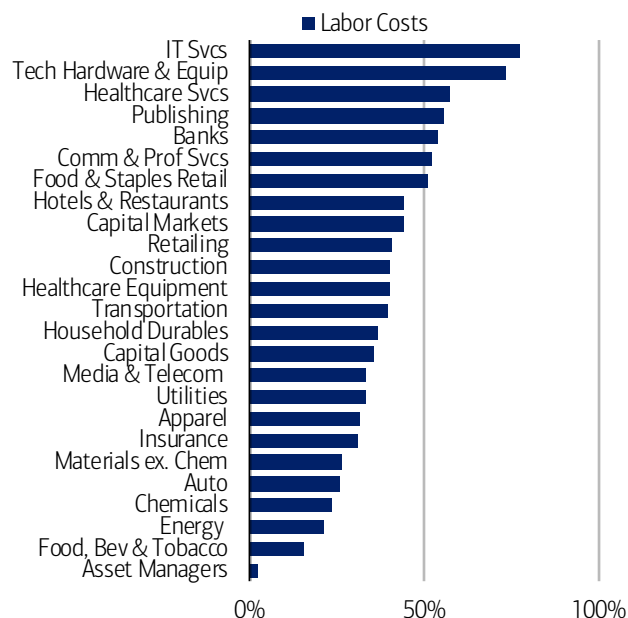
Manageable cost pressure from rising oil and gas

From a cost pressure perspective, the impact is manageable: the S&P 500 is more tethered to energy producers than to feedstock beneficiaries. Oil represents just ~3% of S&P 500 costs. Easing wage pressures (40% of total costs) should more than offset the impacts of higher oil. Even transports and airline companies have higher gearing to wages than fuel costs. Wages represent \$5-6tn of S&P 500 costs, and with wage inflation proxied by average hourly earnings having decelerated by almost 2ppts since Q1 of 2022.

Fuel costs would need to increase by 20-30% to offset easing labor costs since Q1 2022, all else being equal.

Exhibit 15: Labor Costs are biggest cost in most industries

Labor Costs as % of Total Operating Costs by Industry (the use of commodities by industries; as of 2020)

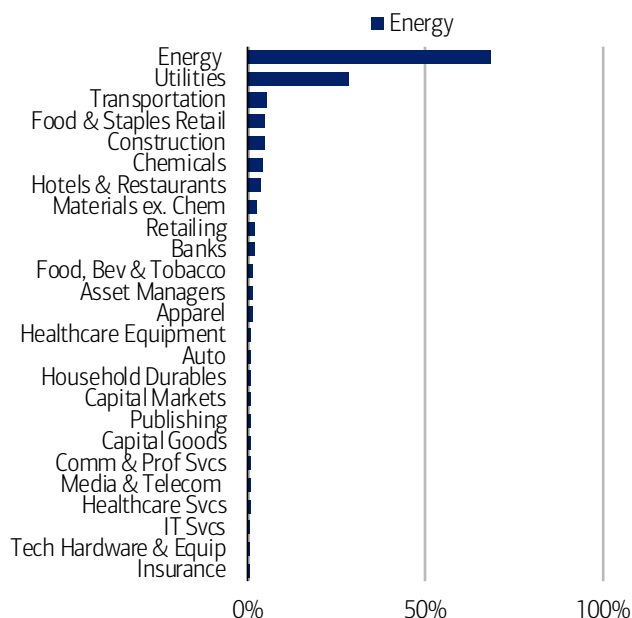


Source: BEA, BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 16: ... Energy costs are insignificant in most industries

Energy Costs as % of Total Operating Costs by Industry (the use of commodities by industries; as of 2020)



Source: BEA, BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

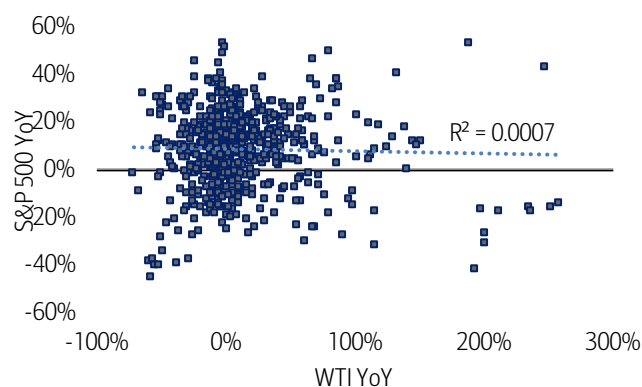
t represents over 100bn in alleviating cost pressure.

Regressive tax of higher oil impacts lower price point retailers

The consumption tax represented by higher oil and gas prices impacts the lower income consumer most given that these costs represent a bigger share of the wallet. The impact to total US consumption is more manageable given the smaller contribution of lower income consumers to aggregate numbers. Moreover, the sales impact is most acute at lower price point retailers like grocers and drug stores, big parts of the S&P 500 Consumer Staples sector. We are underweight Consumer Staples in part because of the regressive tax from higher oil and gas.

Exhibit 17: No correlation between stocks and oil

S&P 500 YoY vs. WTI YoY (1973-9/23)

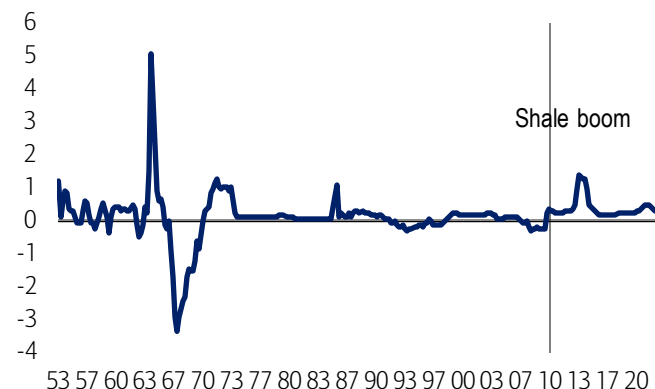


Source: Bloomberg, BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 18: Higher oil has been a tailwind to earnings, especially after US shale revolution

WTI 5-yr rolling beta to S&P 500 earnings based on a multivariate regression using WTI and GDP vs. S&P EPS (1953-2Q23)



Source: Haver, FactSet, BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

4a) How does the equity market react to rapidly rising oil prices?**Savita Subramanian**

Equity & Quant Strategist

BofAS

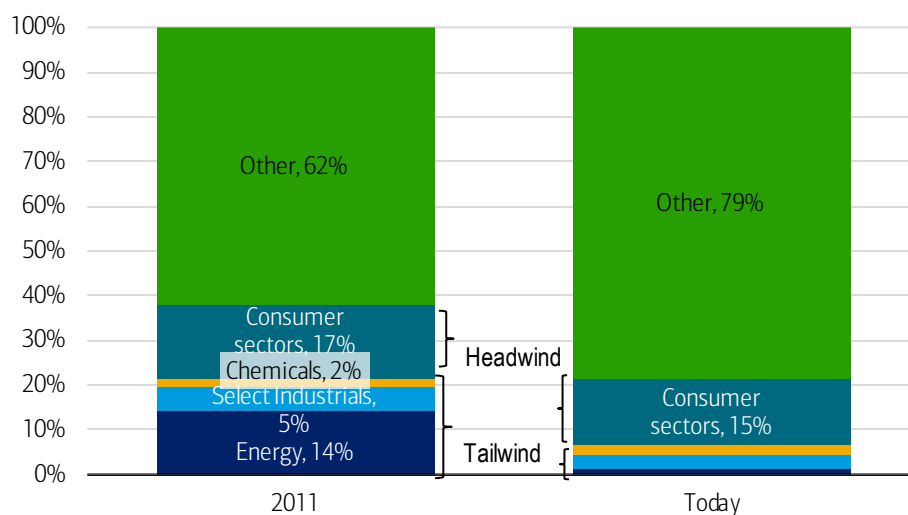
+1 646 855 3878

savita.subramanian@bofa.com

Higher oil prices have historically been a tailwind to S&P earnings, although it may be less of a positive today given the smaller contribution from earning of energy and energy beneficiaries.

Exhibit 15: Sectors that benefit from higher oil prices are much smaller now

% of S&P 500 earnings by sector



Source: FactSet, BofA US Equity & Quant Strategy

Note: Industrials with oil exposure includes Machinery, Industrial Conglomerates, Electrical Equipment, Construction & Engineering, and Trading Companies & Distributors

BofA GLOBAL RESEARCH

4b) What are implications if the conflict does not broaden?

Savita Subramanian

Equity & Quant Strategist

BofAS

+1 646 855 3878

savita.subramanian@bofa.com

A larger regional conflict in the Middle East is a key risk to equities, but prior geopolitical shocks with no fundamental, long-term implications generally represented buying opportunities. Equities saw short, sharp sell-offs on the headlines, but enjoyed full recoveries within three months or less. I.e., history suggests that geopolitical dips should be bought, not sold (Exhibit 20).

Exhibit 20: S&P 500 peak-to-trough declines have been 7-8% on average during major macro shocks/geopolitical events, but more than fully recovered after three months

S&P 500 price changes around historical macro shocks and geopolitical events since 2010

Events	-1 month	-1 day	+1 day	+1 month	+3 month	Peak to trough	Trough to +3m after event	Trough days after (before) event
S&P downgrades Greek Sovereign Debt to junk/1st Greek Bailout	3.9%	-0.4%	-2.3%	-9.0%	-8.1%	-16.0%	9.0%	66
Arab Spring: 'Beginning', Tunisian Revolution begins	3.9%	0.1%	0.3%	4.1%	2.8%	-1.6%	13.8%	-18
Arab Spring: Syrian/Libyan civil war begins	-2.4%	-0.6%	-1.1%	1.8%	-2.4%	-6.4%	8.5%	1
S&P downgrades US debt	-10.3%	-4.8%	-0.1%	-2.2%	4.4%	-18.8%	16.9%	59
US government shuts down	3.0%	-0.6%	0.8%	4.8%	9.9%	-5.4%	13.2%	7
Scotland passes referendum to vote on independence (voting date was 9/18/14)	3.6%	-0.4%	0.3%	2.8%	1.5%	-2.3%	11.7%	-24
Russia annexes Crimea	1.0%	1.0%	0.7%	0.3%	5.3%	-4.0%	7.8%	24
Swiss abandons cap on Franc vs. Euro FX rate	1.1%	-0.6%	-0.9%	4.3%	4.7%	-0.8%	7.3%	-30
Greece: misses debt payment to IMF	-2.3%	0.3%	0.7%	2.0%	-6.8%	-12.2%	6.8%	55
China: Devalues yuan	1.3%	1.3%	-1.0%	-6.8%	-1.4%	-12.2%	13.0%	14
S&P downgrades Japan credit rating	-5.4%	1.3%	0.9%	2.8%	4.8%	-11.2%	13.0%	-22
Turkey shoots down Russian plane for violating Turkish airspace	0.6%	-0.1%	0.1%	-1.2%	-7.5%	-13.3%	6.4%	79
Fed - 1st rate hike - increase interest rate 25bps	-0.5%	1.1%	1.5%	-8.0%	-0.8%	-13.0%	10.8%	57
Brazil: House votes to begin President impeachment trial	1.5%	-0.1%	0.7%	-1.6%	4.1%	-5.6%	8.3%	70
Brexit: UK votes to leave the EU	3.2%	1.3%	-3.6%	2.9%	2.4%	-5.6%	9.5%	4
Trump orders 59 Tomahawk cruise missiles to be fired at the Shayrat airbase in Syria	-0.9%	-0.3%	0.2%	2.0%	2.4%	-2.4%	5.3%	7
Trump fires FBI director James Comey	1.9%	0.0%	-0.1%	1.3%	3.1%	-1.2%	6.5%	-26
North Korea detonates a hydrogen bomb -its most powerful nuclear test ever	0.0%	0.2%	0.0%	2.1%	6.7%	-2.2%	9.2%	-15
Catalonia votes for independence from Spain	1.7%	0.4%	0.4%	2.4%	6.1%	-0.8%	9.5%	-26
The US announces imports of steel and aluminum threaten national security Under Section 232	-1.6%	1.2%	0.0%	0.8%	-0.3%	-10.2%	8.0%	-8
Trump administration releases initial list of Chinese products worth \$50bn that are under consideration for tariffs	-4.1%	-2.2%	1.3%	1.9%	5.1%	-7.3%	7.9%	-1
Italian bond yields spike on budget concerns	0.6%	0.4%	-0.1%	2.1%	4.7%	-2.9%	8.7%	-14
Collapse in Argentina and Turkey's currency ignites concerns of emerging market currency crisis	1.6%	-0.3%	0.7%	1.4%	5.5%	-1.5%	8.9%	-18
US releases list of \$200bn Chinese goods subject to tariffs	0.2%	0.9%	0.3%	1.8%	0.1%	-3.1%	8.6%	-13
Powell says we're 'a long way' from neutral on interest rates	0.8%	0.0%	0.1%	-6.9%	-16.3%	-19.8%	6.8%	82
US government shuts down	-8.8%	-2.1%	-2.7%	8.9%	15.9%	-15.7%	21.4%	2
US Treasury designates China as a currency manipulator	-2.0%	-0.7%	-3.0%	1.5%	4.9%	-6.1%	8.4%	9
Drones were used to attack the state-owned Saudi Aramco oil processing facilities	4.1%	-0.1%	-0.3%	-0.6%	6.1%	-2.6%	12.1%	-24
Top Iranian military official killed by US airstrike	3.8%	0.0%	0.8%	-0.2%	-21.8%	-1.0%	17.6%	81
China puts Wuhan City, the center of the COVID-19 outbreak, on lockdown	3.0%	0.0%	0.1%	0.5%	-15.8%	-33.9%	28.5%	60
Russia/Ukraine conflict begins	-4.2%	-1.8%	1.5%	7.0%	-6.7%	-15.8%	1.9%	84
Average	-0.1%	-0.2%	-0.1%	0.7%	0.4%	-8.2%	10.5%	17
Median	0.8%	0.0%	0.1%	1.8%	2.8%	-5.6%	8.9%	4
Min	-10.3%	-4.8%	-3.6%	-9.0%	-21.8%	-33.9%	1.9%	
Max	4.1%	1.3%	1.5%	8.9%	15.9%	-0.8%	28.5%	
Average non-US	0.9%	0.1%	-0.1%	0.9%	-0.6%	-7.4%	10.3%	
% positive	61%	45%	61%	71%	65%			

Source: BofA US Equity & Quant Strategy, FactSet, S&P

BofA GLOBAL RESEARCH

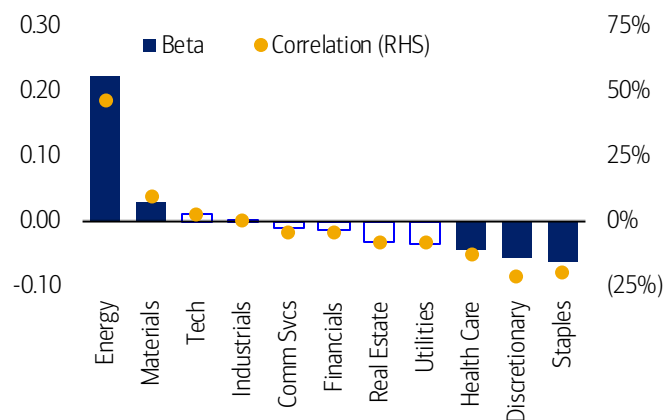


Top sectors & Bottom sectors for higher oil

Energy is the most direct beneficiary of higher oil prices. Materials has also historically benefitted from higher oil prices, which typically boost pricing power for Chemicals and commodities overall. On the other hand, Consumer sectors have historically been the worst performers. The low income consumer disproportionately spends more on oil as % of total spend, and discount retailers are typically hurt more by rising oil prices.

Exhibit 21: Higher oil: commodities benefit, consumers lose

S&P 500 sectors' relative performance (vs. S&P 500) vs. WTI oil (1972-present)

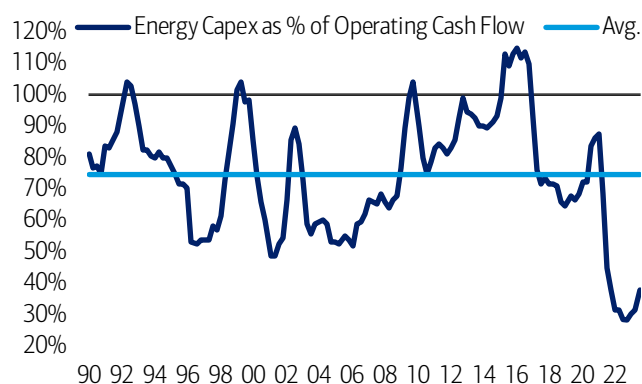


Source: BofA US Equity & Quant Strategy, Bloomberg, Global Financial Data

BofA GLOBAL RESEARCH

Exhibit 22: Supply discipline = higher oil prices

S&P 500 Energy capex as % of operating cash flow (1990-2023)



Source: BofA US Equity & Quant Strategy, FactSet

BofA GLOBAL RESEARCH

5. Are we likely to see a boost to US defense spending even in light of already high deficits? What about the rest of the world?

Ronald J. Epstein

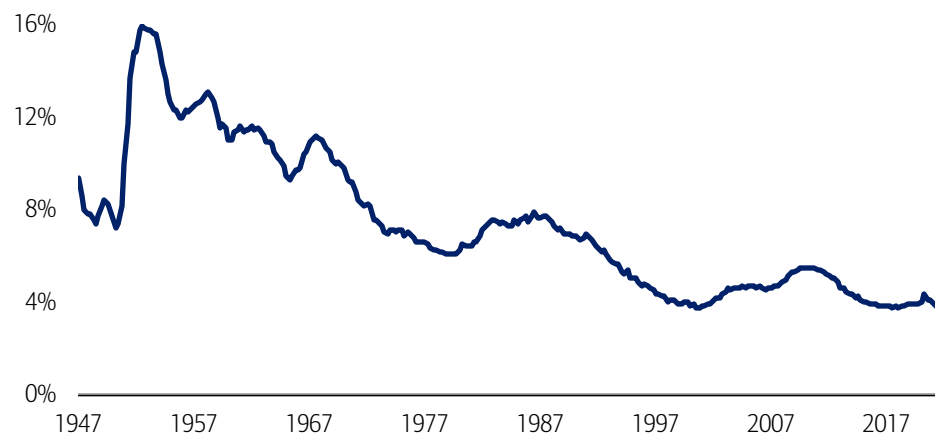
BofAS

r.epstein@bofa.com

Defense spending is around an all-time low as a share of GDP (Exhibit 23). Given the ongoing conflicts in Ukraine and the Middle East, there is room for an increase in defense outlays. However, it remains to be seen whether there is appetite for further deficit expansion given growing concerns about the unsustainable trajectory of government spending.

Exhibit 23: Defense spending as a share of GDP

Defense spending is close to an all-time low as a share of GDP



Source: BEA

BofA GLOBAL RESEARCH

While the deficit is a real concern for defense spending, our experience for the past 40 years has been that national security trumps absolute debt levels, so even though the current debt level is high, given increasing tensions in the world we do not think this will impact future spending in any way. We also view that Defense is not discretionary unless the US were to change its superpower status in the world. Countries in Europe have slowly been increasing defense spending.

We believe tensions in Asia, Europe and the Middle East will likely lead to defense spending globally going up. We think the CAGR of global defense spending is set to increase from 1% to 3% nominal globally but in the US we see it increasing from 3%–5% to 5%–8% nominal.

Disclosures

Important Disclosures

FUNDAMENTAL EQUITY OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. **VOLATILITY RISK RATINGS**, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. **INVESTMENT RATINGS** reflect the analyst's assessment of both a stock's absolute total return potential as well as its attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). Our investment ratings are: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. An investment rating of 6 (No Rating) indicates that a stock is no longer trading on the basis of fundamentals. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster ^{R1}
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

^{R1} Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

INCOME RATINGS, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. *Coverage Cluster* is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Global Research report referencing the stock.

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

Other Important Disclosures

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

This report may refer to fixed income securities or other financial instruments that may not be offered or sold in one or more states or jurisdictions, or to certain categories of investors, including retail investors. Readers of this report are advised that any discussion, recommendation or other mention of such instruments is not a solicitation or offer to transact in such instruments. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor for information relating to such instruments.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.

Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

Refer to [BofA Global Research policies relating to conflicts of interest](#).

"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.

Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:

BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no. 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofam.com/BofASEdisclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSF); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Investment Industry Regulatory Organization of Canada; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSF; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS

India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the [Electronic Communications Disclaimers](#) for further information.

This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities.

This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

Copyright and General Information:

Copyright 2023 Bank of America Corporation. All rights reserved. iQDatabase® is a registered service mark of Bank of America Corporation. This information is prepared for the use of BofA Securities clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Securities. BofA Global Research information is distributed simultaneously to internal and client websites and other portals by BofA Securities and is not publicly-available material. Any unauthorized use or disclosure is prohibited. Receipt and review of this information constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained herein (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Securities.

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content



contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.

Research Analysts

Thomas (T.J.) Thornton
Head of Research Marketing
BofAS
thomas.thornton2@bofa.com

Global Economics

Aditya Bhawe
US Economist
BofAS
aditya.bhawe@bofa.com

Jean-Michel Saliba
MENA Economist/Strategist
MLI (UK)
jean-michel.saliba@bofa.com

Strategy

Francisco Blanch
Commodity & Deriv Strategist
BofA Europe (Madrid)
francisco.blanch@bofa.com

Derek Harris
Portfolio Strategist
BofAS
derek.harris@bofa.com

Savita Subramanian
Equity & Quant Strategist
BofAS
savita.subramanian@bofa.com

Athanasios Vamvakidis
FX Strategist
MLI (UK)
athanasios.vamvakidis@bofa.com

Justin Devery
Portfolio Strategist
BofAS
justin.devery@bofa.com

Global Equity Research

Ronald J. Epstein
Research Analyst
BofAS
r.epstein@bofa.com

Trading ideas and investment strategies discussed herein may give rise to significant risk and are not suitable for all investors. Investors should have experience in relevant markets and the financial resources to absorb any losses arising from applying these ideas or strategies.

