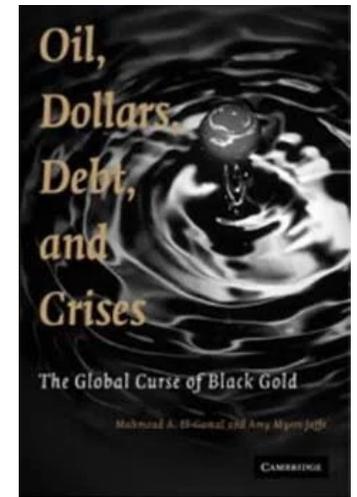
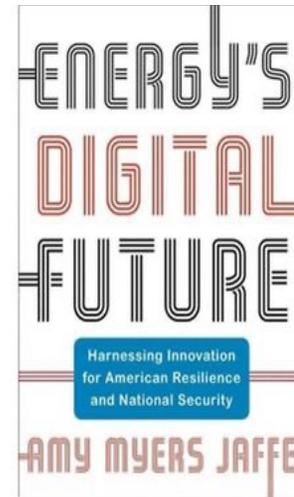




Oil Price Cycles and Geopolitical Turmoil

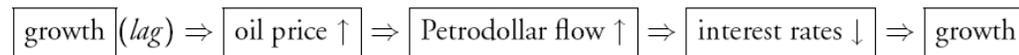
Presentation to Energy and the Economy: Reshuffling the Energy Deck – Federal Reserve Bank of Dallas and Kansas City –Nov.2023

Amy Myers Jaffe
NYU School of Professional Studies

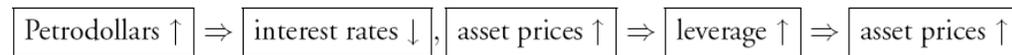


Cyclical Oil Shocks and Financial Crises: Asset and oil price bubbles hamper economy through multiple channels – current concerns should be core inflation pass through and deterioration of consumer confidence

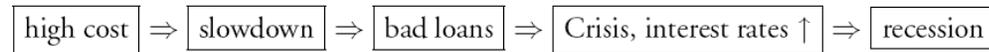
- Feedback mechanism during booms



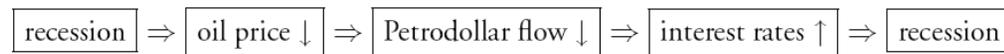
- Hubris (80's: *countries don't go bankrupt*; 00's: *house prices don't fall!*)



- Eventually (Minsky moment; Ponzi finance)



- Feedback mechanism during busts

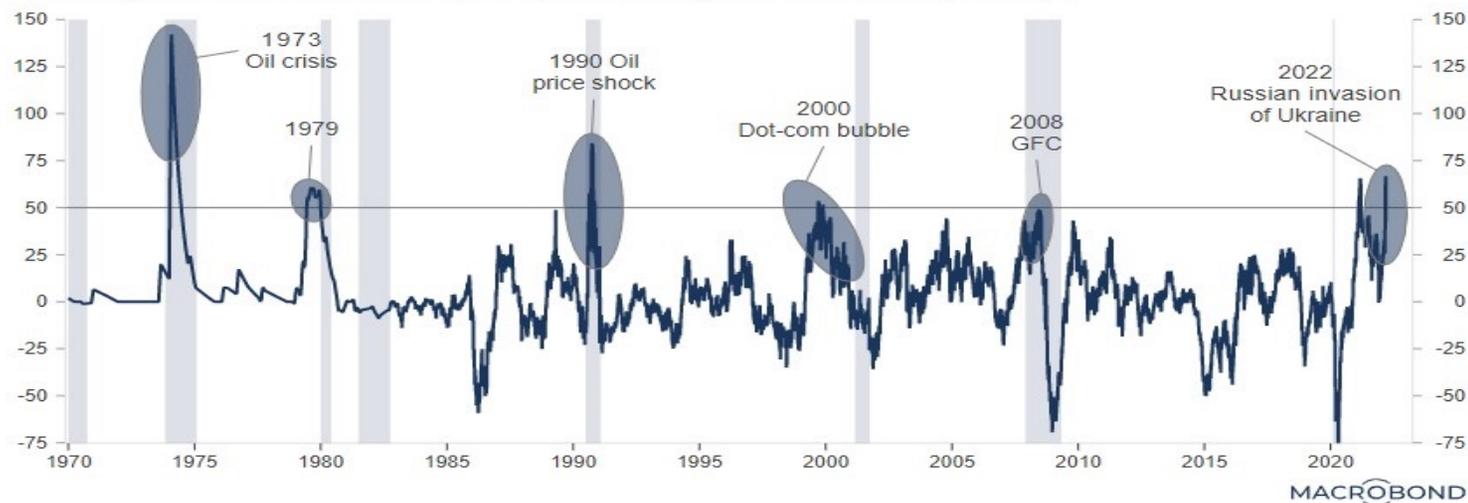


- Low cost of production + monetary and fiscal policies (lag) ⇒ economic growth + geopolitical strife (lag) ⇒ $\boxed{\text{oil price } \uparrow}$. . .

Russian invasion should be viewed as continuum in historical oil and financial crisis cycle context

Recessions typically precede or coincide with an oil price shock

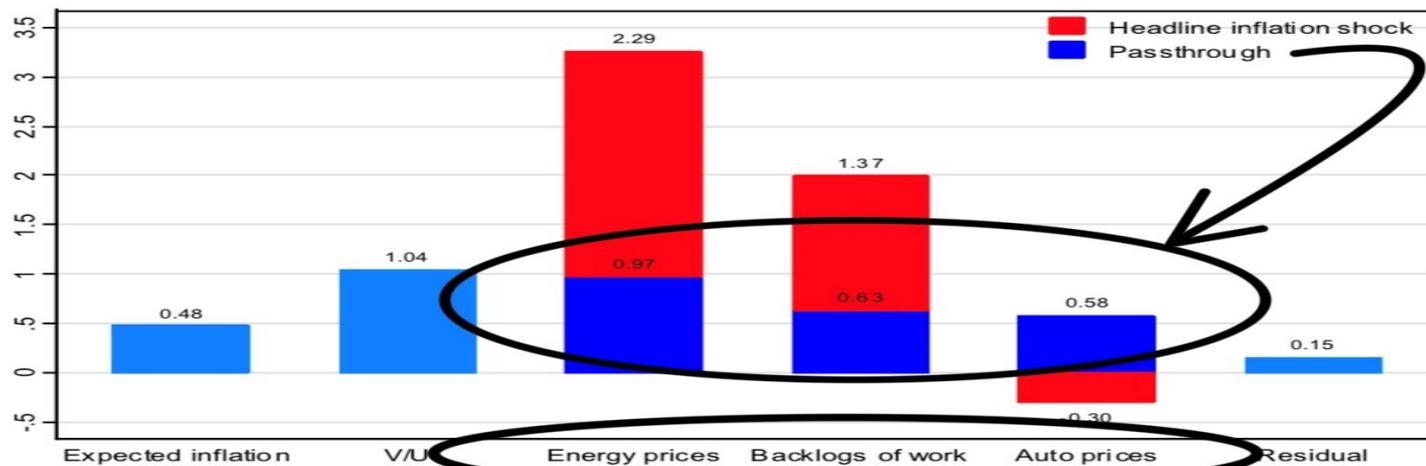
Percentage difference between current oil price and long-term trend (moving average)



Historical Legacy of 1973 Lingers - US consumers associate rising gasoline prices with uncertainty, recession and economic crises, significant correlation to unhappiness and drop in consumer confidence https://www.brookings.edu/wp-content/uploads/2016/06/09_gas_prices_happiness_graham.pdf

But for Putin, would headline inflation really have needed intervention of 75 basis points 4 times?

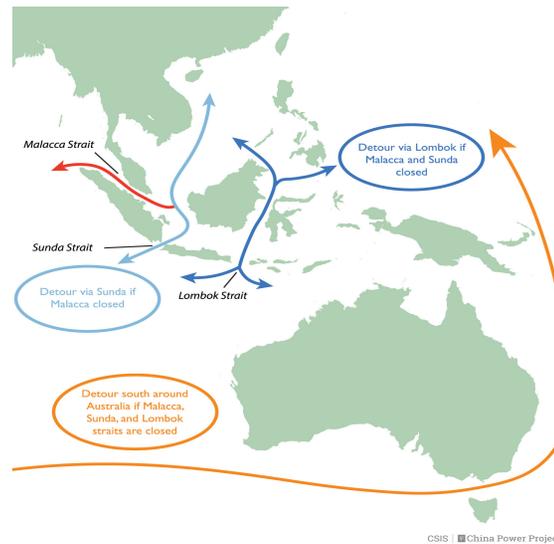
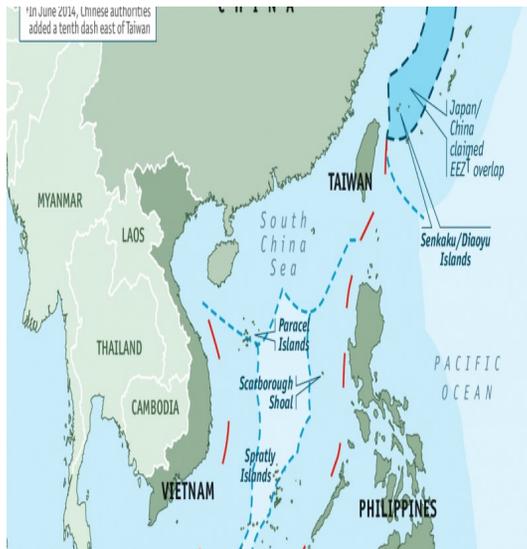
Figure 12. Accounting for the Rise in Headline Inflation
(Decomposition of change in 12-month headline CPI inflation from December 2020 to July 2022; percentage points)



Laurence Ball et al, Understanding inflation during the Covid Era <https://www.brookings.edu/wp-content/uploads/2022/09/Ball-et-al-Conference-Draft-BPEA-FA22.pdf>

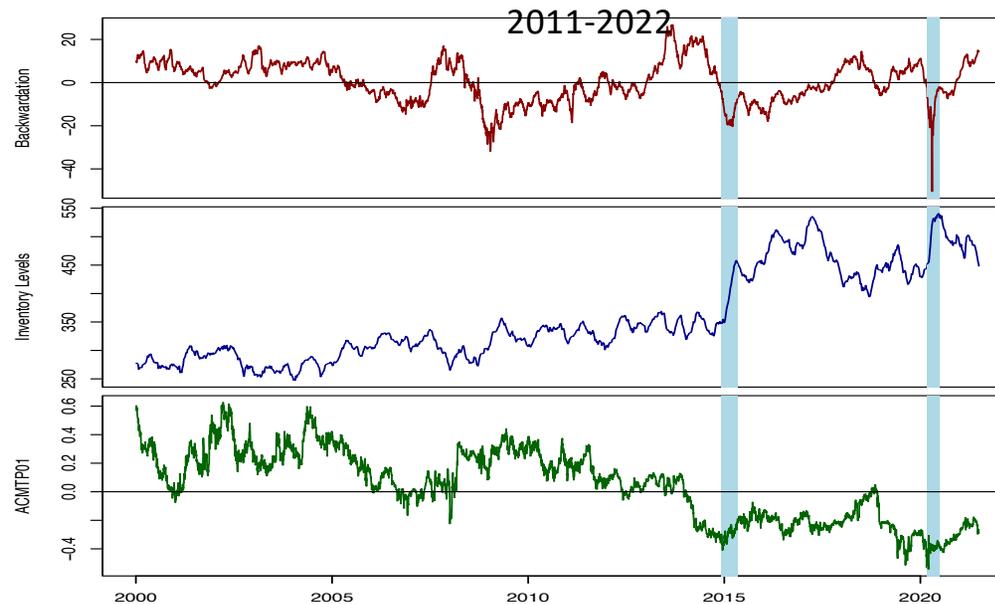
Ferriani and Gazzani, 2022. Significant negative correlation between firms financial performance and energy intensity in Europe (includes study of rising solvency risk in credit default swaps markets. <https://cepr.org/voxeu/columns/impact-war-ukraine-energy-prices-consequences-firms-financial-performance>

Broad Range of Geopolitical Flashpoints At Play: Asian Economies Perceive High Risk _{plus} Global Contagion



Global Trade Via South China Sea
Total: \$3.73 trillion (2016)
Top Exporters
 China
 South Korea
 Singapore
 Thailand
 Vietnam
 Japan (42% of Japanese trade flows)
 Indonesia

Shape of WTI curve in periods of high geopolitical risk and rising open interest from financial players exhibits more backwardation than is justified based on fundamentals for the cost of storage and interest rates. Policy makers need to further address rising risk per oil commodity funds and ETFs.

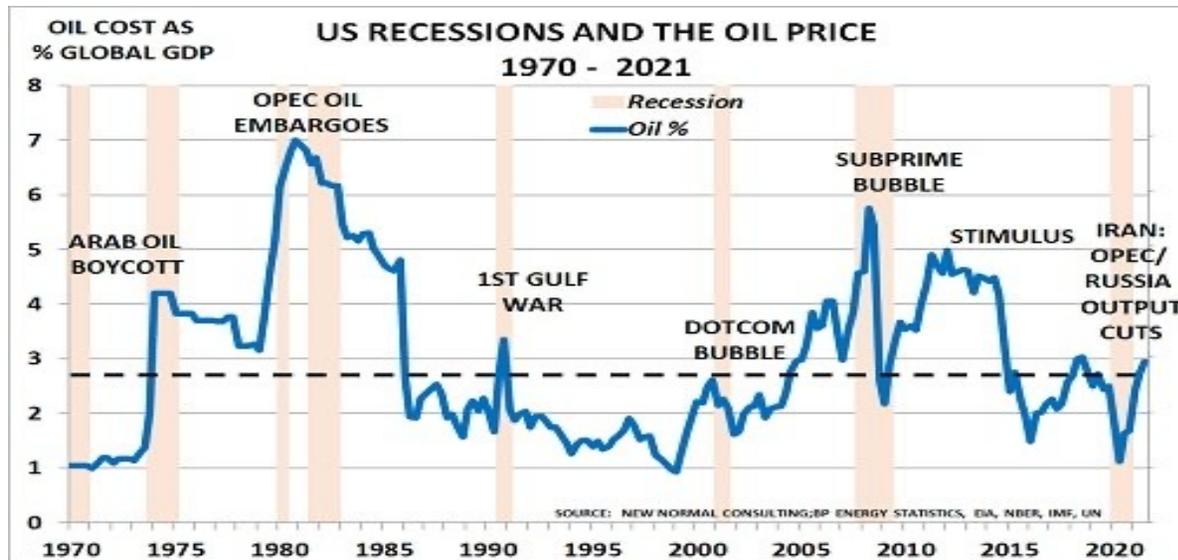


Backwardation (DNS Slope term), US Inventories Excluding SPR, and ACM Treasury One Year Term Premium – Blue is Contango Collapse

Source: El-Gamal, Jaffe, Medlock, EEP 2022

Q: Given OPEC's rising market influence and willingness to make necessary cuts, could the price of oil go below \$40 ever again?

A: History tells us that the answer to that question depends on how deep a recession is possible now or in the future



Oil Price Lows

1986 - \$10

1992 - \$17.87

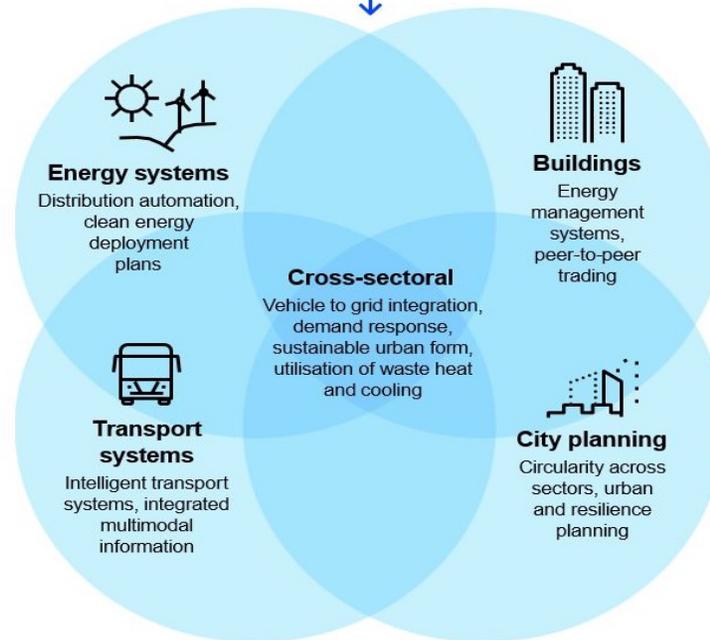
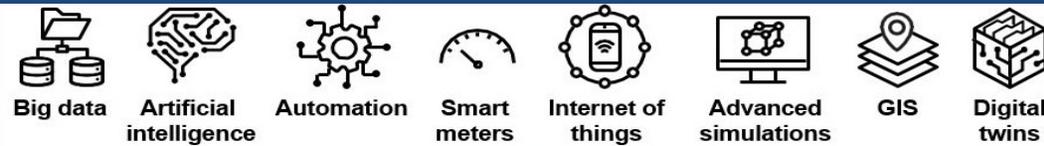
1998 - \$10.65

2001 - \$17.50

2009 - \$39.09

2020 - below 0

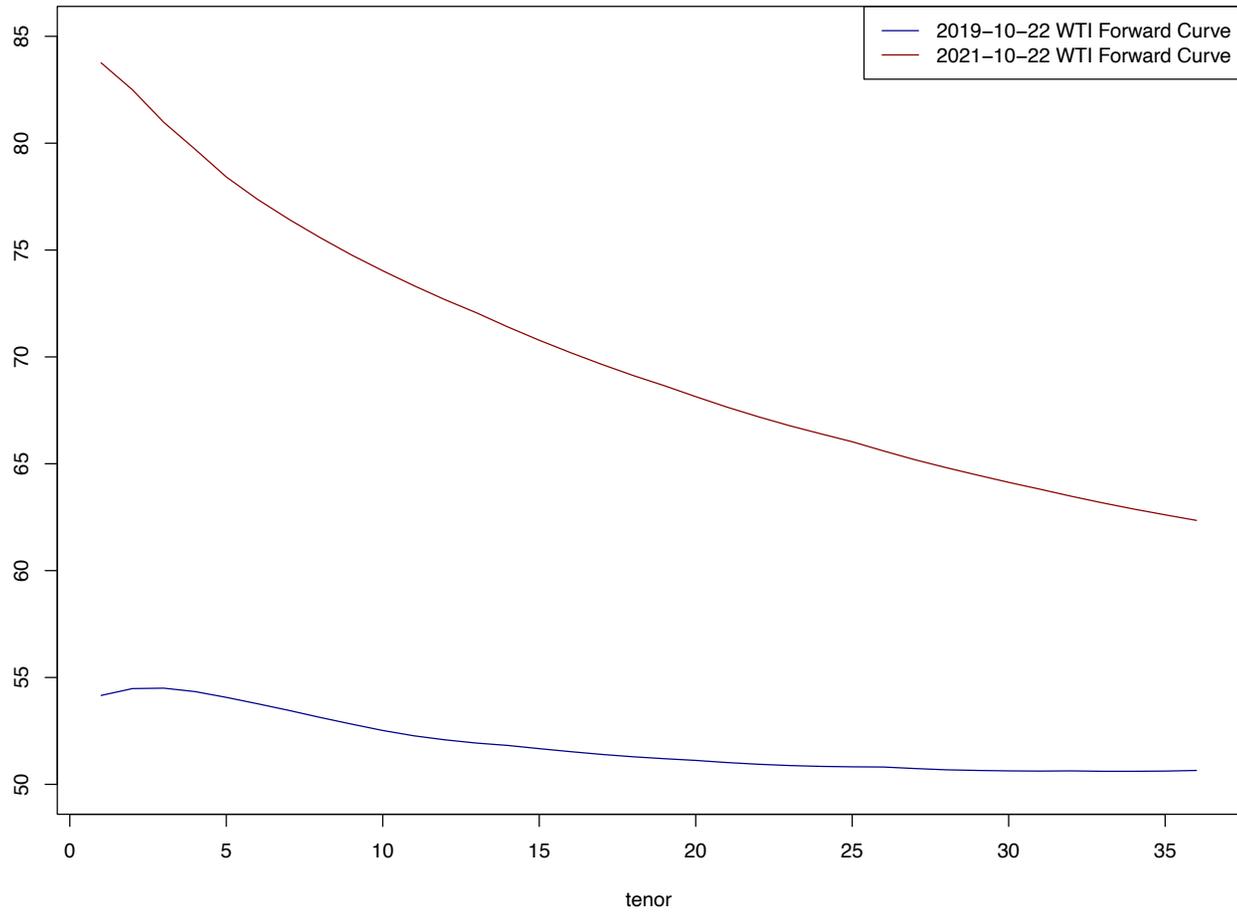
Digital Technology will be transformative for energy efficiency and further decoupling economy from oil



Appendix

Data and Definitions

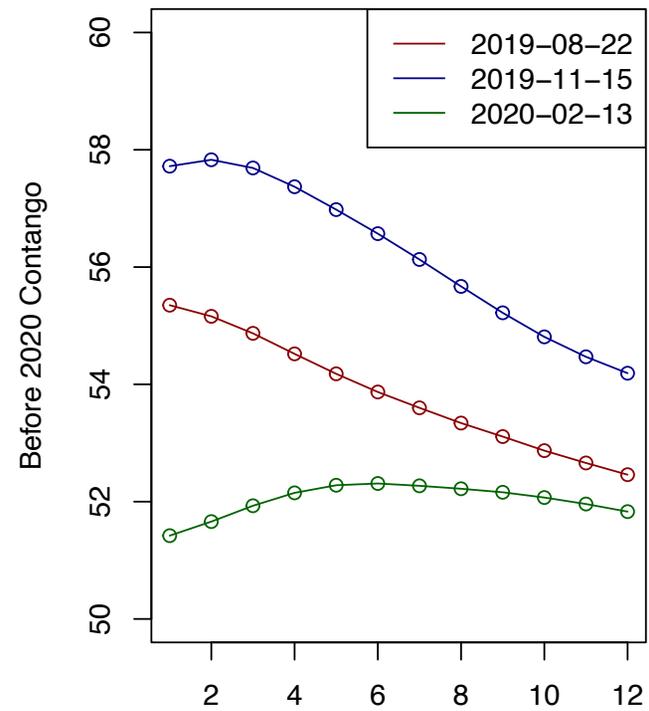
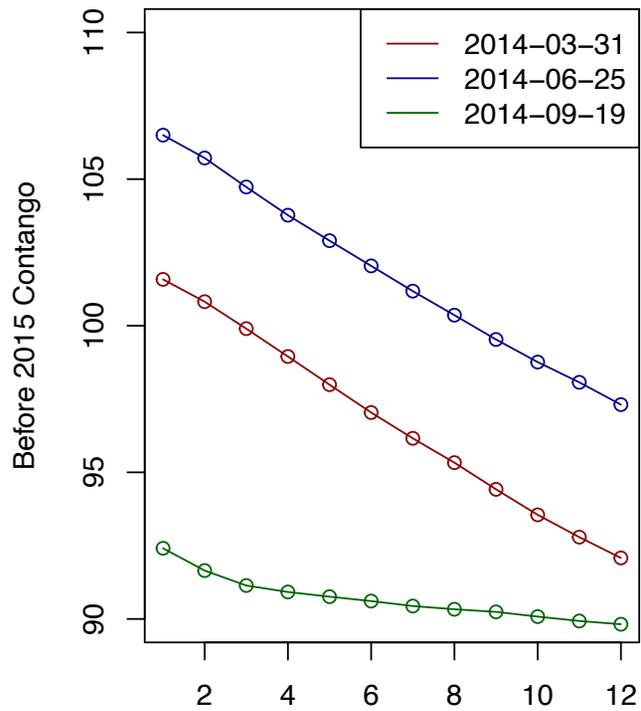
WTI Backwardation Rose to Historical Levels in 2021



We sought to answer how much of deep backwardation is speculative?

- Late 2000s- early 2010s literature on financialization and speculation
 - CFTC (2006), Einloth (2009), Singleton (2010), Vansteenkiste (2011), Juvenal and Petrella (2015) – speculation played a role, but mostly demand driven
 - El-Gamal and Jaffe (2008, 2013), Abdel-Latif and El-Gamal (2020) had emphasized the roles of financial liquidity and geopolitical risk
- In this paper: Focus on “Supernormal Backwardation”
 - “Normal backwardation” = current price is higher than discounted expected later futures price
 - Keynes (1930), Kolb (1992), may occur with upward or downward sloping forward curves
 - We estimate parsimonious model of term structure of WTI futures, as in Spenser and Bredin (2019) and Bredin et al. (2020) – level, slope and curvature; “slope” is our measure of backwardation
 - We conduct regressions with this measure, and include it in factor augmented Vector Autoregression analysis as in Bernanke et al. (2005) and Juvenal and Petrella (2015)

Supernormal Backwardation Periods



- Our Hypothesis: Speculative behavior is more likely in more liquid contracts (First, Second Month Futures)
 - Cheap money and geopolitical risk contribute positively to supernormal backwardation
 - Need to condition on various real economy variables and see if this is true
- **Our Finding: Traders tend to buy the geopolitical risk threat and sell the actual event**

Table 2: Backwardation IV Regressions vs. Fundamentals, GPR, and Financial Variables (Interpolated Commitments of Traders to Daily Data)

	<i>Dependent variable:</i>			
	Backwardation			
	(1)	(2)	(3)	(4)
GPR.THREAT				0.031*** (0.004)
GPR.ACT				-0.047*** (0.006)
MMnetlong			0.014*** (0.004)	0.005 (0.004)
SDnetlong			-0.032*** (0.003)	-0.038*** (0.003)
Physnetlong			0.031*** (0.004)	0.023*** (0.004)
ACMTP01		1.173 (1.308)	-1.717* (1.026)	-3.212*** (1.165)
ACMRNY01		-0.192 (0.242)	-2.169*** (0.223)	-3.447*** (0.270)
SP500ret		5.765 (12.180)	-3.480 (9.495)	-2.937 (9.441)
VIX		-0.133*** (0.032)	-0.132*** (0.025)	-0.119*** (0.025)
CreditSpreadCorporate		-8.381*** (0.609)	0.544 (0.535)	-0.021 (0.537)
Hurricane.Threat	-0.076*** (0.015)	-0.068*** (0.014)	-0.011 (0.011)	-0.012 (0.011)
Hurricane.Event	-0.063*** (0.022)	-0.053*** (0.020)	-0.016 (0.016)	-0.020 (0.016)
IGREA	0.110*** (0.005)	0.085*** (0.005)	0.060*** (0.004)	0.049*** (0.004)
logUSStorageSlack	5.398*** (0.364)	5.554*** (0.364)	-5.721*** (0.481)	-7.037*** (0.499)
logGlobalInv	-6.861*** (1.732)	-20.390*** (3.308)	-40.538*** (2.986)	-54.084*** (3.463)
IndustrialProdGr	3.949 (10.805)	-30.847*** (10.117)	39.795*** (8.106)	51.906*** (8.164)
USDistillateSupply	0.001** (0.0005)	0.0005 (0.0005)	-0.00003 (0.0004)	0.0003 (0.0004)
USRefinUtilRate	0.022 (0.031)	-0.061* (0.034)	0.019 (0.028)	0.003 (0.027)
USEconPolUnc	-0.028*** (0.002)	-0.007*** (0.002)	-0.016*** (0.002)	-0.014*** (0.002)
Constant	73.928*** (15.476)	213.958*** (30.457)	342.038*** (27.088)	458.221*** (31.135)
Observations	2,599	2,599	2,599	2,599
R ²	0.445	0.541	0.722	0.726
Adjusted R ²	0.443	0.538	0.720	0.723

Note:

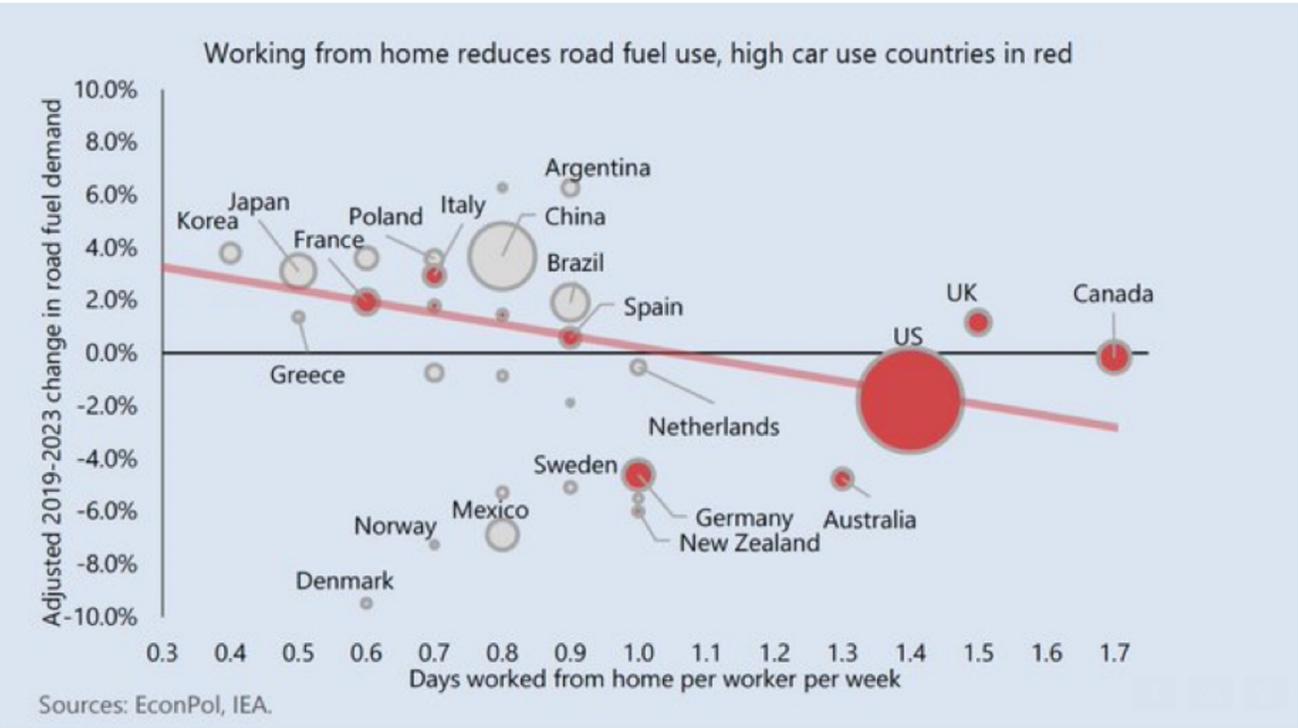
*p<0.1; **p<0.05; ***p<0.01

Factors that could alter oil cyclicity



- Pace that new production can be brought online from first investment to first production in US shale is months, not years
- Digital and other energy efficient technologies potentially eliminate demand more rapidly than previous technologies. Software solutions are typically faster and cheaper than hardware and new infrastructure.
- Increased number of commercial alternatives to oil makes it a more elastic commodity.
- Population peaking in some regions of the world counterweighs per capita drivers of growth.
- Oil intensity of major economies is declining. As oil use and GDP growth decouples oil prices could have less macro impacts.
- As Saudi economy and other petro-dollar economies are able to spend higher percentage of revenues in domestic economy, petrodollar recycling smaller financial market feature.

Digital Adoption and Lifestyle: Using Less Oil





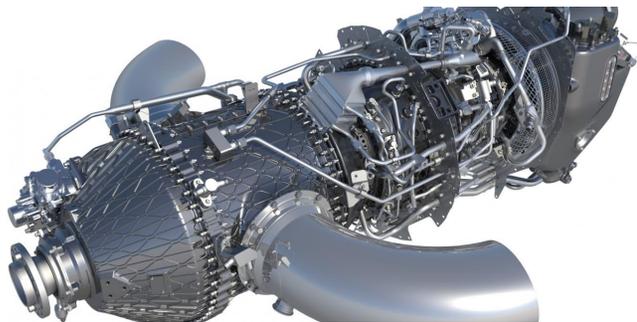
What do we mean by 'digital' *Next Generation Tech*

- Artificial Intelligence
- Industrial Internet (IoT)
- Automation
- EV charging
- Electricity Storage

Global Competition in Tech – Implications:

Digitalization promotes exponential gains in productivity, via transportational logistics, automation, big data, and 3-D printing.

Different style of green revolution to dramatically change the way we produce, sell and use energy.



What is artificial intelligence?

- Artificial intelligence is the science of making machines that can process large amounts of data to recognize patterns, make decisions, and achieve specific programable goals. For example, Siri on your smart phone is AI. Other examples are facial recognition software, autocorrect in word processing, and ChatGPT.
- Chat GPT stands for Chat Generative Pre-trained Transformer. It is a large language model “chatbot” which enables users to have the computer steer a conversation to answer questions, write an essay, draft emails, or explain how to code software.
- The Internet of Things – a collection of connected devices that can communicate between devices and cloud computing allowing exchange of data and coordination of automation or operation software. For example, a smart home thermostat that connects to a smart phone or electronic toll collections systems.