

Cheap Money, Geopolitics and Supernormal Backwardation of WTI Forward Curve

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Background: El-Gamal and Jaffe (2010)

Oil, Dollars, Debt and Crises: The Global Curse of Black Gold, Cambridge UP

- Self-perpetuating cycle: oil prices, finance and geopolitics
 1. High oil prices \Rightarrow
 - Recession, financial crises \Rightarrow low oil prices
 - Amplified by petrodollar reversal, less financial liquidity
 2. Weak Demand + Low oil prices \Rightarrow
 - Central banks infuse massive financial liquidity
 - Increased geopolitical strife (more on this in a minute)
 3. Cheap money + geopolitical supply story \Rightarrow
 - Economic recovery, petrodollars amplify financial liquidity
 - Speculative acceleration of oil price increase \Rightarrow back to 1.
- Can't stop the cycle, but try to attenuate its amplitude through financial regulation (today: oil futures market)

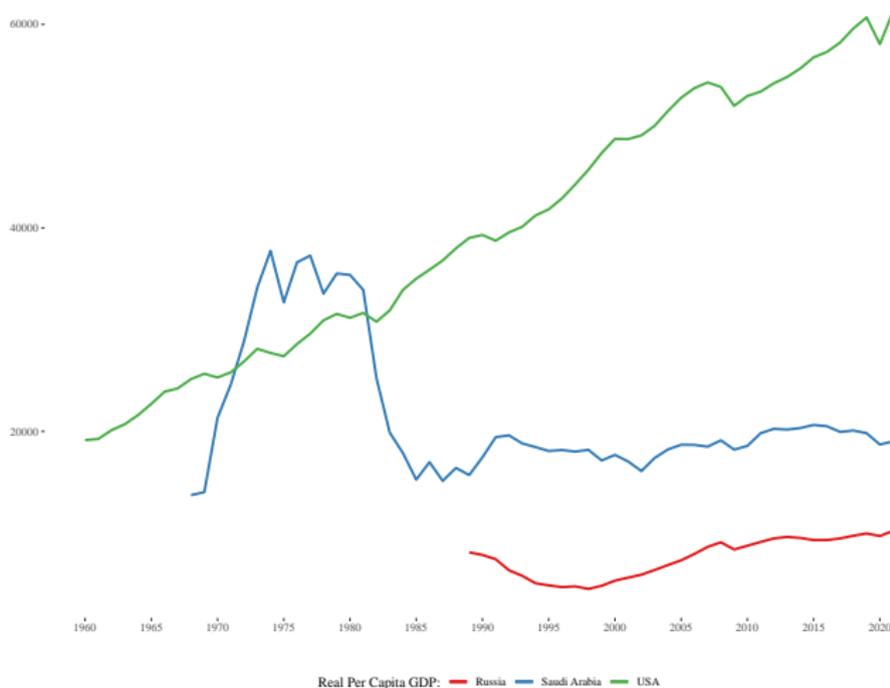
Geopolitical Strife: Economic Foundations

Heightened Expectations and Dashed Hopes

Severe Resource Curse: Rent seeking, corruption, inability to diversify economies

Petrodollars ↑: Financial resources to buy loyalty and suppress dissent

Petrodollars ↓: Frustration + limited resources for bribes and security



Perverse Economic Justifications of Geopolitical Strife

- Bin Laden's letter to King Fahd, August 1995:
 - Detrioration in education and health, foreign debts 80% of GDP
 - Servitude to U.S.: increased production in 1980s to weaken Iran
 - "Insane expenditure" on allied forces in Gulf war (\$60 billion)
 - Another \$40 billion in "fictional" military and civilian deals with U.S.
 - Squandering reserves abroad, approx. \$140 billion in seven years
 - Borrowing from usurious banks to finance debt

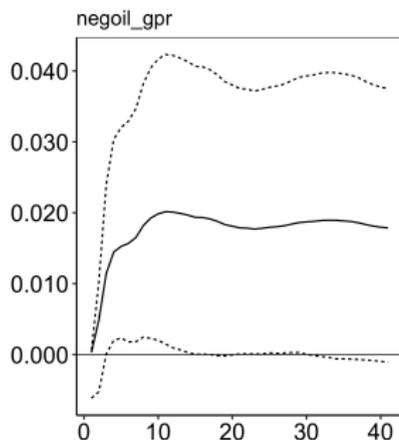
- Putin's speech before invading Ukraine, February 2022:
 - Claimed that Kyiv took advantage of Russia since 1991 and subjected it to economic "blackmail"
 - "In NATO documents, our country is officially and directly declared the main threat . . . Ukraine will serve as a forward springboard for the strike"
 - "They are trying to blackmail us again. They are threatening us again with sanctions, which, by the way, I think they will introduce anyway"

Empirical Evidence: Abdel-Latif and El-Gamal (2020)

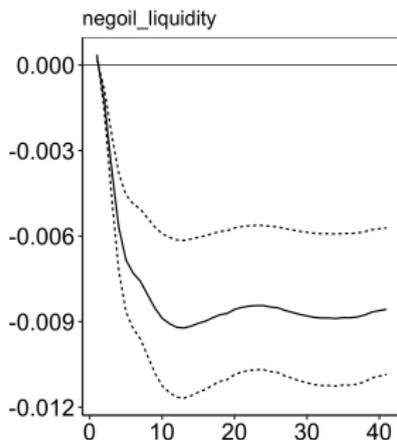
“Financial Liquidity, Geopolitics and Oil Prices,” *Energy Economics* 87

- 53 Countries 1979:1 to 2017:2 GVAR IRs to 1s.d. Negative oil Shock

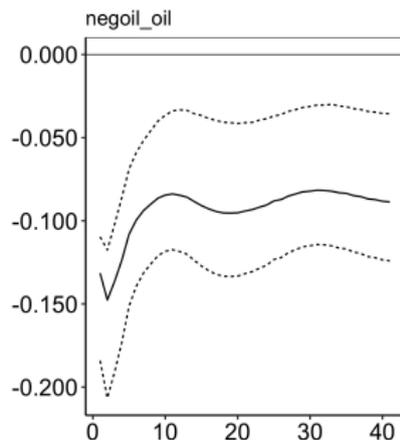
Effect on Geopolitical Risk



Effect on Global Liquidity



Effect on Oil Price



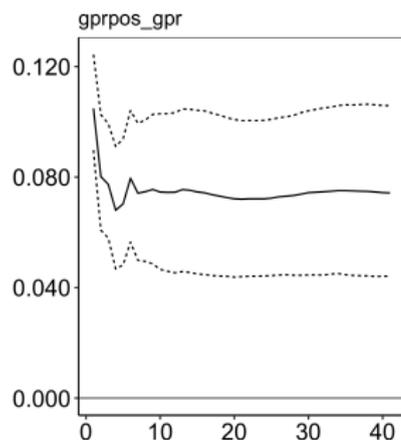
- Oil prices drop triggers persistent surge in GPR, decline in financial liquidity

Empirical Evidence: Abdel-Latif and El-Gamal (2020)

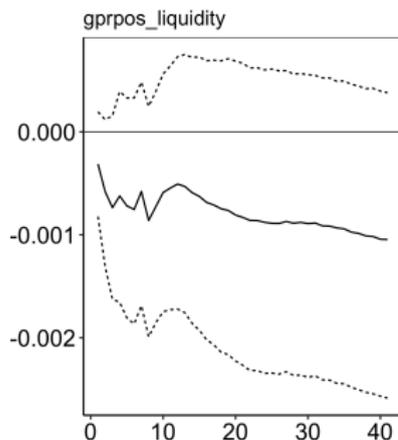
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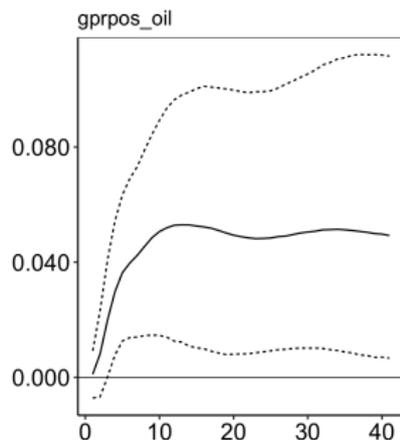
Effect on Geopolitical Risk



Effect on Global Liquidity



Effect on Oil Price



- In turn, heightened geopolitical risk triggers higher future oil prices

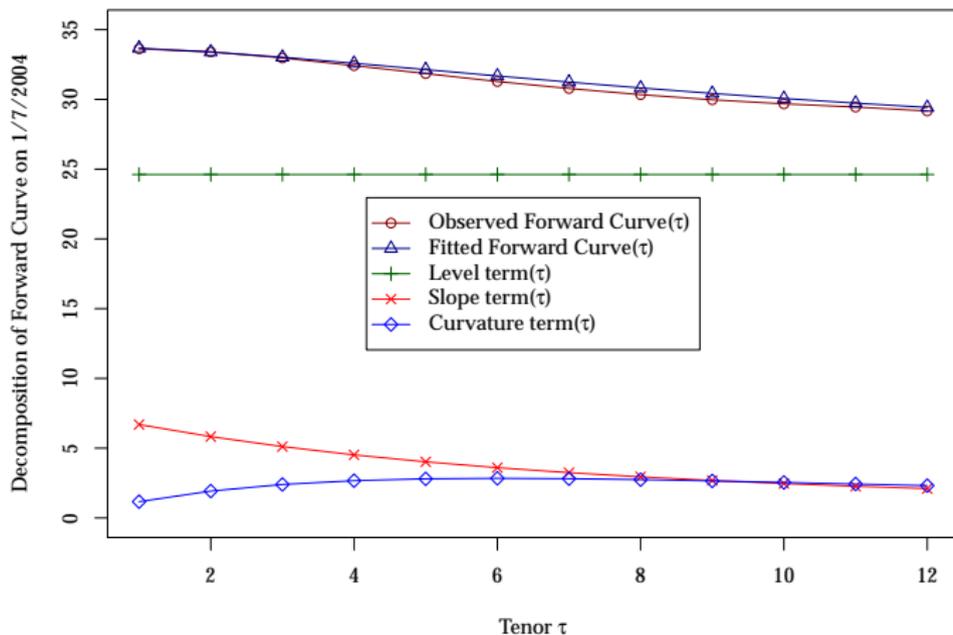
Main Insight/ Assumption: Speculation in Short-Tenor

“Cheap Money, Geopolitics and Supernormal Backwardation”, *EEEEP* 12(1), 2023

- Late 2000s-2010s on financialization and speculation:
 - CFTC (2006), Einloth (2009), Singleton (2010), Vansteenkiste (2011), Juvenal and Petrella (2015)
 - Speculation played a role, but mostly demand driven
- Normal backwardation: near-month price slightly higher than discounted expected later tenor price
 - Keynes (1930), Kolb (1992) ...speculative “supernormal backwardation”?
- In this paper:
 - Dynamic term structure of WTI forward curve, c.f. Diebold et al (2004), Spenser & Bredin (2019) and Bredin et al. (2020)
 - Assume that speculators buy most liquid short tenors
 - Regressions with slope component, FAVARs as in Bernanke et al. (2005) and Juvenal and Petrella (2015)

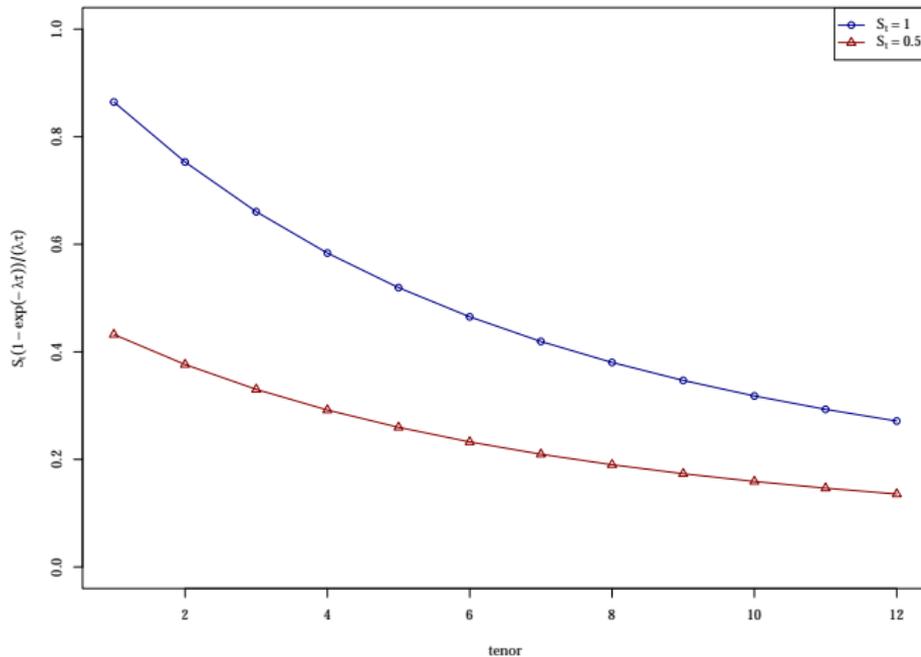
Term Structure: Level, Slope and Curvature

$$F_t(\tau) = L_t + S_t \left(\frac{1 - e^{-\tau\lambda}}{\tau\lambda} \right) + C_t \left(\frac{1 - e^{-\tau\lambda}}{\tau\lambda} - e^{-\tau\lambda} \right) + \epsilon_t(\tau)$$

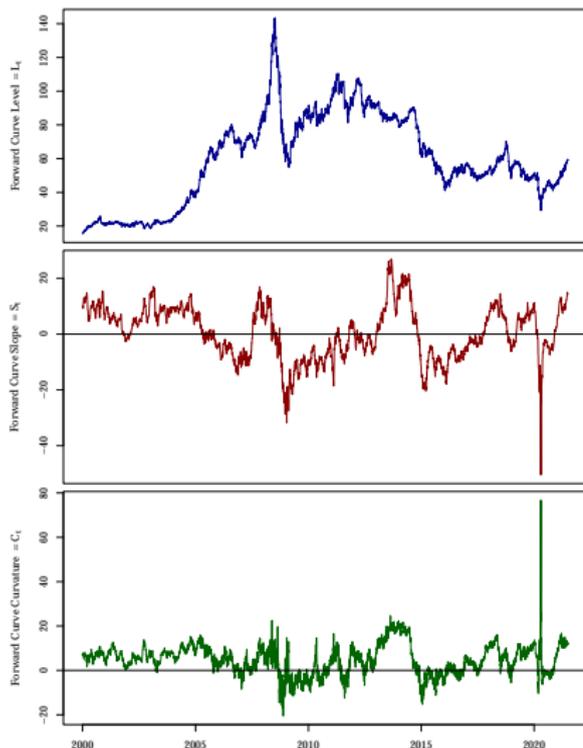


Slope Component Measures Backwardation

Illustration of the function $S_t (1 - e^{-\tau\lambda}) / (\tau\lambda)$ for $S_t \in \{0.5, 1\}$ and $\lambda = 0.2985328$



Estimated Dynamic Nelson-Siegel Components

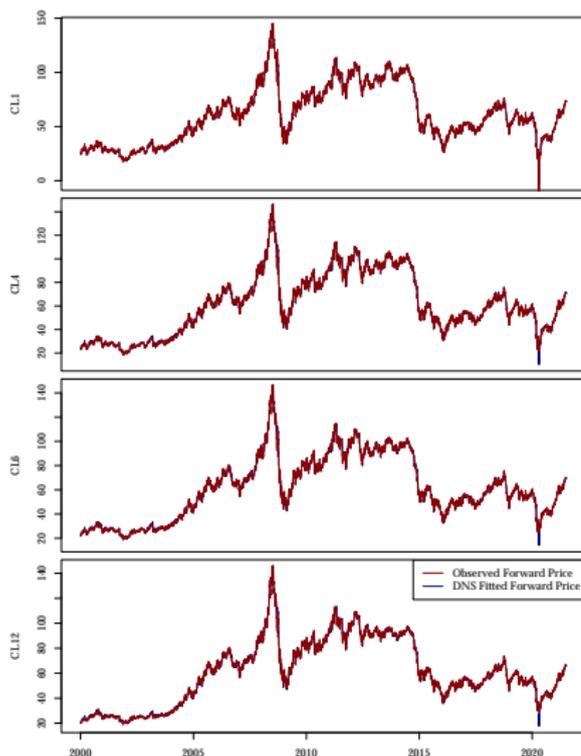


- As in Diebold et al (2004), estimate Dynamic term structure using Kalman Filter:

$$F_t(\tau) = L_t + S_t \left(\frac{1 - e^{-\tau\lambda}}{\tau\lambda} \right) + C_t \left(\frac{1 - e^{-\tau\lambda}}{\tau\lambda} - e^{-\tau\lambda} \right) + \epsilon_t(\tau)$$

$$\begin{pmatrix} L_t - \mu_L \\ S_t - \mu_S \\ C_t - \mu_C \end{pmatrix} = \begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix} \begin{pmatrix} L_{t-1} - \mu_L \\ S_{t-1} - \mu_S \\ C_{t-1} - \mu_C \end{pmatrix} + \begin{pmatrix} \eta_t(L) \\ \eta_t(S) \\ \eta_t(C) \end{pmatrix}$$

Model Fits Data Very Well

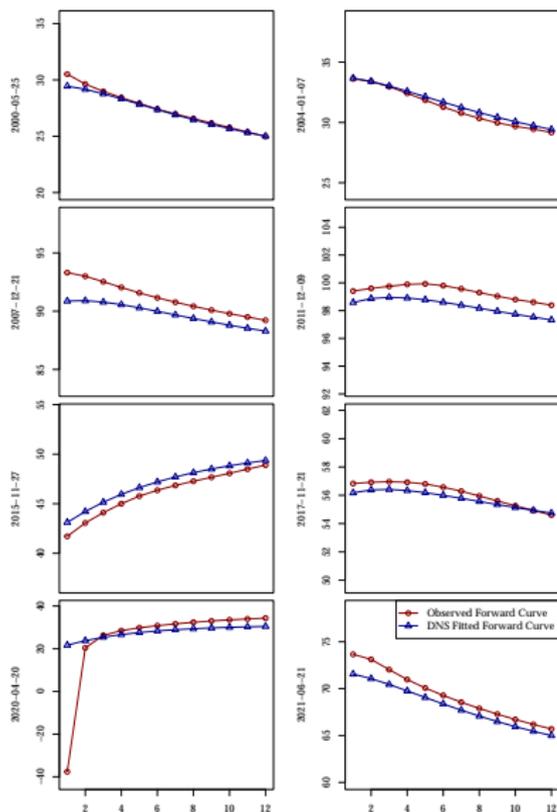


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Dynamic Model Fits Data Well



- As in Diebold et al (2004), estimate Dynamic term structure using Kalman Filter:

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Regression Results

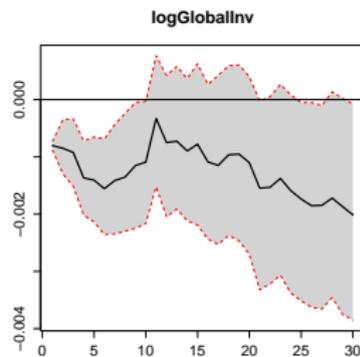
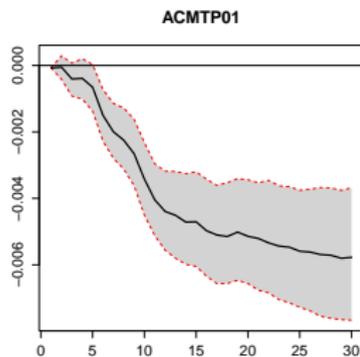
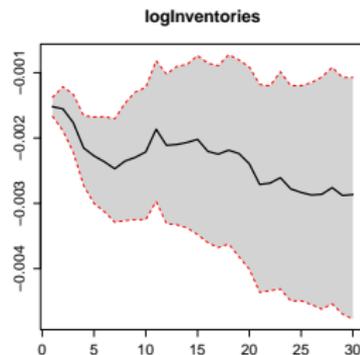
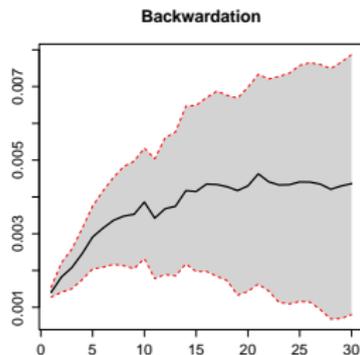
Backwardation IV Regressions vs. Fundamentals, GPR, and Financial Variables
(Commitments of Traders interpolated to Daily; Variables defined in Table 5 in Appendix)

| | Dependent variable: | | | |
|------------------------------|-----------------------|------------------------|------------------------|------------------------|
| | 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) |
| Credit Spread Corporate | | -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) |
| log(US Storage Slack) | 5.398*** (0.364) | 5.554*** (0.364) | -5.721*** (0.481) | -7.037*** (0.499) |
| log(Global Oil Inventory) | -6.861*** (1.732) | -20.390*** (3.308) | -40.538*** (2.986) | -54.084*** (3.463) |
| Industrial Prod Growth | 3.949 (10.805) | -30.847*** (10.117) | 39.795*** (8.106) | 51.906*** (8.164) |
| US Distillate Supply | 0.001** (0.0005) | 0.0005 (0.0005) | -0.00003 (0.0004) | 0.0003 (0.0004) |
| US Refining Utilization Rate | 0.022 (0.031) | -0.061* (0.034) | 0.019 (0.028) | 0.003 (0.027) |
| US Econ Policy Uncertainty | -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 |

- Similar results with $\frac{CL_1 - CL_{12}}{CL_{12}}$
- 23-day lags for instruments
- Models:
 1. Physical fundamentals
 2. ... + pure financial variables
 3. ... + positions of traders
 4. ... + GPR threat/act
- R² much higher w/ trader positions
- + trader positions makes ACMTP coeffs sig. negative (cheaper money ⇒ more backwardation)
- Adding geopolitical risk/act makes MMnetlong position insignificant
- Speculators buy risk & sell event

IRFs to GPR Threat Shock

Higher Backwardation, Depleted Inventories & Inverted Yield Curve!



Suggested Regulatory Remedies

- Make more granular CFTC commitments of traders data available to researchers
 - Also, CME group forward curve data now behind pay wall
 - Are financial speculators increasingly arbitraging the forward curve?
- Integrate analysis of forward curve dynamics in CFTC rule-making
- Implement CFTC 2016, 2021 or similar rules on limits to positions deemed speculative
- Introduce progressively higher margin requirements on positions deemed speculative