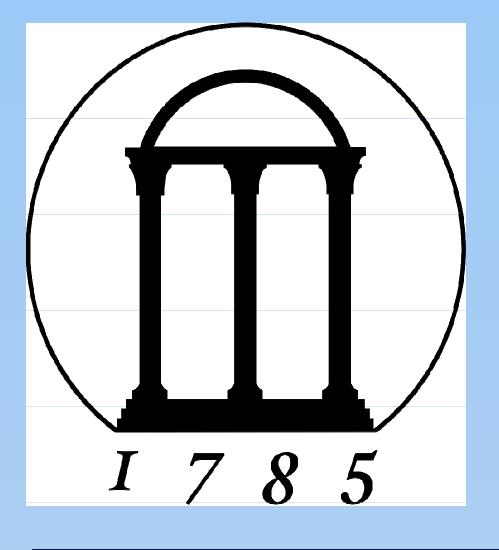
Is Commodity Price Volatility Persistent? Another Look Using Improved, Full-Sample Estimates

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BACKGROUND AND MOTIVATION

- Understanding the volatility of futures prices matters for risk management, forecasting and options pricing
- How persistent is the effect of random shocks of price volatility?
- o Practitioners need to know, if markets are currently volatile, will they remain so?
- o Traditionally, shocks are assumed to be:
 - Transitory: geometric rate of decay, or
- Permanent: no decay
- o Empirical evidence suggests that in many economic and financial time series, shocks display long memory
- Slow, hyperbolic rate of decay
- Easily confused with permanent shock
- o Previous literature has found long memory in commodity futures price volatility (Jin and Frechette; Sephton)
- o Futures prices, however, are partially overlappin time series and "splicing" futures contracts introduces nontrivial bias (Smith)

RESEARCH QUESTIONS

- o How do the findings of long memory in futures price volatility change, if at all, when the future "splicing" bias is corrected for?
- o Are there differences across commodities and particularly between storable/nonstorable?



IS COMMODITY PRICE VOLATILITY PERSISTENT? ANOTHER LOOK USING IMPROVED, FULL-SAMPLE ESTIMATES

Berna Karali and Gabriel J. Power

	-	
		METHODOLOGY
on		 To address the overlapping nature of future step is to use the GLS method of Karali and contemporaneous correlations among future from the same day Regress absolute futures price log-returns significant variables Stocks-to-use ratio (if applicable)
		 Contract time-to-delivery Time trend Consistent with the literature, volatility is d squared demeaned residuals (instead of d o Estimate degree of long memory as the fraparameter -1<d<1 (non-stationarity="" (st="" and="" apply="" cases="" d="1" developed="" feasily<="" li="" limit="" memory)="" o="" per="" recently="" shimotsu's="" with=""> </d<1>
ng		 estimator, preferable to alternatives, based Also apply alternative estimators to evaluate Futures price data are for agricultural, energy and are obtained from the Commodity Rest Inventory and stocks-to-use data are obtained Agricultural Statistics Service, Energy Infort the American Bureau of Metal Statistics
		RESULTS

2	5	

Estimates of fractional difference parameter d representing long memory Note: 0<d<1 with a higher d implying greater persistence of volatility

Variable	Corn	Live cattle	Lean hogs	Soybeans	Wheat	
Residuals	0.019	-0.045	-0.006	-0.024	0.023	
Absolute	0.242	0.030	-0.138	0.268	0.008	
Squared	0.242	0.192	-0.019	0.301	0.117	
Variable	Crude oil	Gold	Copper	Heating oil	Natural gas	Silver
Residuals	-0.067	-0.037	0.030	-0.049	0.062	-0.077
Absolute	0.124	0.163	0.172	0.153	0.074	0.145
Squared	0.312	0.274	0.202	0.296	0.206	0.226

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over economically

defined as absolute or demeaned log-returns) actional difference stationarity and no long ermanence of shocks) ible exact local Whittle ed on simulation ate robustness of results ergy and metal commodities

- search Bureau
- ined from the National
- rmation Administration and

RESULTS AND CONCLUSION

- 0
- hogs and Chicago wheat

- 0

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- Ο
- - 0.3<d<0.6 (Sephton)
- 0.1<*d*<0.3 (Elder & Jin)

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Consistent with previous findings, there is no significant long memory in residuals If volatility is defined as absolute residuals, there is long memory in all futures except for live cattle, lean Lean hogs volatility is anti-persistent E.g., high volatility is followed by low volatility If volatility is defined as squared residuals, there is long memory in all futures except lean hogs Absolute residuals are the preferred specification when price log-returns are leptokurtic Comparison with findings of previous literature Our results confirm the presence of long memory in the volatility of most commodity futures price series However the value of d is generally very small Preferred estimate *d*<0.2 for most commodities Our estimates are lower than what most previous studies have found for agricultural commodities: 0.4<*d*<0.65 (Jin & Frechette) 0.3<*d*<0.4 (Baillie et al.) Implications for researchers and practitioners Volatility in commodity futures prices is weakly but significantly persistent for most commodities No volatility persistence for the only two nonstorable

commodities considered in this research paper