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Seon-Woong Kim and B. Wade Brorsen¹

Selected Poster prepared for presentation at the 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Joint Annual Meeting, San Francisco, CA, July 26-28

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¹ Seon-Woong Kim is a graduate research associate, B. Wade Brorsen is a regents professor and A.J. and Susan Jacques Chair, Department of Agricultural Economics, Oklahoma State University, Stillwater, Oklahoma. The research was supported by the Oklahoma Agricultural Experiment Station.



planning and inventory management difficult.



Source: Fertilizer Week (2014)

allocation of resources.

Two groups of exogenous variables are:

Causal Relationships among World Fertilizer Markets Seon-Woong Kim¹ and B. Wade Brorsen¹

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Figure 2. Main Urea Trade Flows **Source: International Fertilizer Industry Associations 2012**

- Explanatory Variable

	Natural Gas	Middle East Urea	ARCH	GARCH		
	1					
		1		•		
		•	1	1		
	1		1	1		
		1	1	1		
bles in aroun1 and aroun2 respectively						

 Table 3. Mean Absolute Error
naïve 349 0.857 0.857 313 261 0.857 209 0.857 157 0.857

Table 4. Root Mean Squared Error							
W	naïve	AR	ARX1	ARX2	ARG	ARXG1	ARXG2
349	1.099	1.002	0.991	0.993	1.020	1.012	1.002
313	1.099	1.001	0.989	0.992	1.018	1.009	1.000
261	1.099	0.999	0.994	0.995	1.015	1.007	0.997
209	1.099	0.999	0.988	0.988	1.012	1.006	0.995
157	1.099	1.000	0.979	0.983	1.012	0.995	0.991

Table 5. Enc	ompa
ARGX2) and	MAE
MODEL	W
ARX1	157
ARXG2	209
Note: The t-valu	ues for
** indicate	s statis

- risk in urea market.

Diebold, F.X. Elements of Forecasting. Fourth edition. Mason, OH: Thomson South-Western, 2007. Fertilizer Week is a kind of commercial publications by CRU group USDA.2013. Fertilizer Use and Price. Economic Research Service (ERS). USDA.2013. Fertilizer Imports/Exports. Economic Research Service (ERS)

B. Wade Brorsen receives financial support from the Oklahoma Agricultural Experiment Station and USDA National Institute of Food and Agriculture, Hatch project OKL02939.



AR	ARX1	ARX2	ARG	ARXG1	ARXG2
0.748	0.732	0.733	0.767	0.754	0.736
0.749	0.732	0.735	0.765	0.751	0.735
0.749	0.738	0.742	0.761	0.747	0.732
0.748	0.738	0.732	0.758	0.745	0.727
0.752	0.739	0.730	0.757	0.734	0.728

assing Regression (Preferred Model is ARX1 to and RMSE of Combination Model

Estimated weight	MAE	RMSE		
0.604**(3.40) 0.396**(2.23)	0.725	0.977		
o tast statistics are presented in parentheses				

the test statistics are presented in parentheses. istical significance at the 1% level.

Conclusions

All four exogenous variables cause urea prices based on both in-sample and out-of-sample tests.

ARXG2 with 209 week window has lowest MAE and ARX1 with 157 week window has lowest RMSE. The composite model does not outperform them.

This research indicates a causal relationship between supply, demand, transportation factors, and leading market price and New Orleans urea price. It also suggest urea price forecasting models to reduce price

References

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