



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

A Short-run Demand Flexibility System for U.S. Agricultural Commodities

Michael K. Adjemian
USDA Economic Research Service
355 E Street, SW 5S-65
Washington, D.C. 20472
Email: madjemian@ers.usda.gov
Ph: 202-694-5576

Aaron Smith
Department of Agricultural and Resource Economics
University of California, Davis
One Shields Avenue
Davis, CA 95616
Email: adsmith@ucdavis.edu
Ph: 530-752-2138

Poster prepared for presentation at the Agricultural & Applied Economics Association 2012

AAEA Annual Meeting, Seattle, Washington, August 12-14, 2012.

Michael K. Adjemian is an economist in the Economic Research Service (ERS) of the USDA. Aaron Smith is an Associate Professor in the Department of Agricultural and Resource Economics at the University of California, Davis. This is a preliminary work; it may not be cited without permission. The views expressed belong to the authors and do not necessarily represent those of ERS or the USDA.

A Short-run Demand Flexibility System for U.S. Agricultural Commodities

Michael K. Adjemian¹ and Aaron Smith²

¹Economic Research Service, USDA; ²Department of Agricultural and Resource Economics, University of California, Davis

Abstract

Using five monthly revisions to USDA crop forecasts (Jul, Aug, Sep, Oct, & Nov), we estimate own- and cross-commodity short-run demand flexibilities for six domestic agricultural commodities. Our findings indicate that the corn supply influences the expected harvest-time price of virtually every other major field crop. Moreover, as the share of the corn crop devoted to ethanol production grows, corn and soybean prices become more flexible, while the reverse is true for wheat and oats.

Price Flexibilities

Particularly for the short-run, demand parameters for agricultural commodities are best represented by price flexibilities, the percentage change in price for a 1% change in quantity.

Why is that?

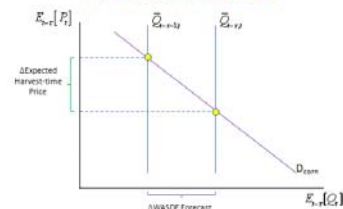
- In general, quantity variation for agricultural commodities is dominated by exogenous supply shocks, especially within a crop year.
 - For example, weather or pests can alter the expected crop size at harvest.
- Producers have little capacity to adjust their output.
- Prices bear the adjustment burden to arrive at the new market-clearing equilibrium.
- Consequently, price dependent regressions are a more accurate way to estimate demand parameters
- See Moore (1919), Houck (1966), and Huang(1988) for more about price flexibilities.

Futures & Forecast Revisions

A harvest-time commodity futures price represents the market's expectation of the price once the harvest is complete. These contracts trade near-continuously, and their prices change as traders update their own expectations based on new fundamental information, such as revisions to USDA crop forecasts (e.g., Adjemian, 2012).

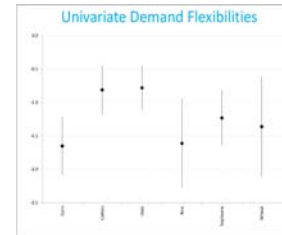
Adjemian and Smith (forthcoming) show that under minimal assumptions, a consistent estimate for the price flexibility of demand is generated by regressing log price changes for the harvest-time futures contract on contemporaneous within-crop-year monthly log USDA supply forecast revisions. These estimates have two immediate advantages over traditional parameter estimates: they can be recovered after a shorter passage of time, and they have more statistical power.

Identifying the Demand Curve With Forecast Revisions

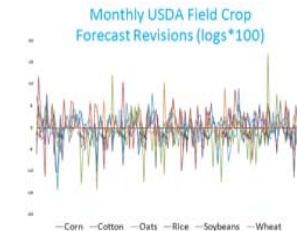


Extending their work, we identify own- and cross-commodity demand flexibilities by regressing the log futures price change for each commodity on the set of USDA forecasted supply revisions for the major domestic field crops, from 1981-2011.

Findings



USDA supply forecast revisions are more correlated for some commodities than others: corn/soybeans (0.62); cotton/oats (-.03).



A multivariate SUR model identifies the own- and cross-commodity effects of changes to supply expectations on prices.

Forecast Revision	Price Change					
	Corn	Cotton	Oats	Rice	Soybeans	Wheat
Corn	-1.97***	-0.16	-0.83***	-0.69**	-0.52*	-0.68**
Cotton	0.08	-0.83***	0.58**	-0.04	0.11	0.30
Oats	0.05	0.07	-0.27*	-0.08	0.21	0.15
Rice	0.16	-0.48*	0.14	-1.52***	0.38	-0.38
Soybeans	0.11	0.13	-0.06	0.29	-1.09***	0.19
Wheat	0.02	-0.46	-0.86**	-0.14	0.07	-1.06***
R-squared	58%	38%	45%	41%	54%	37%

Note: These regressions include monthly dummies and macro controls.

Conclusion

- All own-quantity flexibilities have the expected negative signs, and are statistically significant.
- USDA supply forecast revisions, monthly dummies, and macro controls explain a substantial portion of the variation in futures prices for field crops.
- Corn supply shocks generate a price response for every field crop except cotton. For example, poor weather that leads to a 5% reduction in the corn supply raises expected harvest-time prices for corn (10%), oats (4%), rice (3%), soybeans (3%), and wheat (3%) prices.
- For each commodity, we estimate a model that interact both own- and corn supply revisions with the share of the corn crop devoted to ethanol. We find that corn and soybean demand have become more flexible (less elastic) and own-quantity wheat and oat demand have become less flexible (more elastic) as the ethanol share has risen.

References

- Moore, H.L. 1919. "Empirical Laws of Demand and Supply and the Flexibility of Prices." *Political Science Quarterly* 34(4):546-567.
- Houck, J.P. 1966. "A Look at Flexibilities and Elasticities." *Journal of Farm Economics* 48(2):225-232.
- Huang, K.S. 1988. "An Inverse Demand System for U.S. Composite Foods." *American Journal of Agricultural Economics* 70(4):902-909.
- Adjemian, M.K. 2012. "Quantifying the WASDE Announcement Effect." *American Journal of Agricultural Economics* 94(1):238-256.
- Adjemian, M.K. and A. Smith. Forthcoming. "Using USDA Forecasts to Estimate the Price Flexibility of Demand for Agricultural Commodities." *American Journal of Agricultural Economics*.

For further information

Please contact madjemian@ers.usda.gov. More information on this and related projects can be obtained at www.ers.usda.gov. The views expressed are those of the authors and not necessarily shared by ERS or USDA.