An Econometric Analysis of Dairy Market Price Transmission Processes

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This study examines the relationships between dairy product prices. With the U.S. government's declining support of the dairy industry via the Dairy Price Support Program beginning in the mid-1980s, dairy prices, particularly at the farm and wholesale levels, have exhibited increased volatility. This study examines the issue of whether or not this instability has also been associated with different relationships across market levels for monthly national average prices of five dairy products: fluid milk, processed cheese, butter, nonfat dry milk, and ice cream.

First, the causal order or connection between the market level prices is tested using the modified Sims framework and joint F-tests. Several modifications of a full-sample base case (1971–91) are also tested: (1) the influence of government support and purchase prices for supported dairy products, (2) the early announcement date for non-supported products, and (3) the sample period separated in two sub-periods, 1971–87 and 1988–91. In general, results indicate that causal order differs across products, differs across time, and exhibits multi-directional patterns. Governmental support and purchase prices do not appear to influence the causal order, with the exception of butter. The early announcement date does not alter the causal order for non-supported products.

The results from the causality test for the base period are used to formulate behavioral equations of dairy prices. The possibility of asymmetric price responses is allowed using Houck's framework to specify the equations within a distributed lag structure, and binary variable are included to allow for different price responses in the 1988–91 time period. Usually, more of a price increase is passed through in comparison to a price decrease, and asymmetry exists in both the short-and long-run. In general, asymmetry is more prevalent within the later time than for the full sample period.

Using the parameter estimates from the price transmission model, within-sample simulation tests are conducted. Due to divergence of the model under both Gauss-Seidel and grid search solution techniques, the model is simulated with the Minnesota-Wisconsin price treated as exogenous. Two applications of the revised model are demonstrated. First, two extreme two-year periods are simulated: a stable pricing period and a volatile pricing period. Across products and across market levels, the simulated prices have similar margin relationships relative to the M-W price, with the exception of the wholesale processed cheese price. Asymmetric responses result in different average wholesale and retail prices, even with the same average M-W. Second, within-sample and *ex post* forecasts for the 1992 through September 1993 period are conducted. The revised model typically predicts the within-sample period well, catching most turning points. Results vary for the *ex post* period, with both accurate and inaccurate forecasts.

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The Economics of Groundwater Pollution: The Case of the Chlorinated Solvents in the Philadelphia-Camden Area

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A dynamic optimization model is formulated for the problem of groundwater contamination by chlorinated solvents. The time paths of optimal solvent use, recycling, and groundwater remediation policies are characterized. The model is applied to the case of automotive and fabricated metal industries in the Philadelphia-Camden area. Several simulations are performed in which the costs to society of an increased stock of pollution are weighted against the production benefits of using solvents. The results of the model in which there is no regulation are compared with results from models where one or more policy options are available.

Optimal policy choices are sensitive to parameters such as bottled water costs. For instance, with low bottled water costs, the policy combination of reduced solvent use and recycling of solvent by firms yields the highest social welfare. When bottled water costs are high, the policy maker chooses a combination of reduced solvent use, recycling and groundwater remediation. The sensitivity of the results to changes in some of the other parameters is also examined. For instance, in the case where bottled water costs are high, a lower rate of interest causes the groundwater remediation option to be delayed, while a decrease in the parameter which represents the recycling potential of the solvent leads to earlier installation of the groundwater remediation option. The value of the shadow cost of contamination provides a basis for calculating the tax on solvent use that would induce firms to behave optimally. The time path of this optimal tax is computed for specific cases.