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ASSET FIXITY IN U.S. AGRICULTURE:
ROBUSTNESS TO FUNCTIONAL FORM

Ni Lin and C. Richard Shumway

DEPARTMENT OF AGRICULTURAL ECONOMICS

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

WASHINGTON STATE UNIVERSITY

PULLMAN, WASHINGTON

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Ni Lin, Scoring Analyst, Chase Manhattan
ni.lin@chase.com

and

C. Richard Shumway, Agricultural Economist,
Department of Agricultural Economics,
Washington State University
PO Box 646210
Pullman, WA 99164-6210

shumway@wsu.edu

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Abstract

The sensitivity of asset fixity conclusions, input adjustment rates, and elasticities to choice of functional form is examined using a dynamic dual model of U.S. agriculture. A very general initial specification allows tests of instantaneous adjustment to be performed for every input. Test results are mixed across functional forms for all inputs except real estate, which is consistently found to be quasi-fixed. Important differences in estimated adjustment rates and elasticities are also found among the functional forms. The translog has higher likelihood support than either the generalized Leontief or normalized quadratic functional forms for this dynamic model specification and data set.

Keywords: Dynamic duality, functional form, likelihood support, sensitivity analysis

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Ni Lin is a scoring analyst at Chase Manhattan, and C. Richard Shumway is a professor and chair of the Department of Agricultural Economics at Washington State University.

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ASSET FIXITY IN U.S. AGRICULTURE:

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Asset fixity theory (Johnson 1972, Johnson and Quance 1972; Johnson and Pasour 1981, Chambers and Vasavada 1983, Bradford 1987, Nelson, Braden, and Roh 1989, Taylor and Kalaitzandonakes 1990, Hsu and Chang 1990, Chavas 1994) has sought to explain low agricultural resource returns by fixity of factors and irreversible supply. This theory is based on the difference between an asset's acquisition cost and its salvage value. When the value in use on the farm is between the acquisition cost and the salvage value, factors are considered "trapped" in their current uses. While this theory explains how factor fixity occurs in the agricultural production process, it does not identify which assets are fixed (or quasi-fixed). The development of dynamic duality (McLaren and Cooper 1980, Epstein 1981), also known as the dynamic adjustment cost model, provided the mechanism for doing that.

Vasavada and Chambers (1986) documented the linkage between asset fixity (or quasi-fixity) and the dynamic adjustment cost model. Asset fixity is implicitly defined in terms of the rate of adjustment of inputs to their long-run equilibrium levels. If the hypothesis of instantaneous adjustment to equilibrium in each period is rejected, then some degree of fixity can be concluded.[1] Dynamic duality has an advantage over other forms of asset fixity modeling in that the determination of asset fixity and the degree of asset fixity are both endogenous.

[1] The dynamic dual model has been used by several authors to examine dynamic structure and investment patterns within U.S. agriculture, e.g., Taylor and Monson (1985), Vasavada and Chambers (1986), Vasavada and Ball (1988), Howard and Shumway (1988), Weersink and Tauer (1990), Luh and Stefanou (1991), Fernandez-Cornejo et al. (1992), and Richards (1995). Capital, land and labor are commonly treated as quasi-fixed inputs or subjected to empirical testing for variable inputs in dynamic adjustment cost models of agricultural production. As noted by Kuchler and Tegene (1993), the degree of variability of these inputs is important for both policy making and welfare analysis.

Although not focused on dynamic models, much empirical research attention has also been given to the choice of functional form in model specification. Second-order Taylor-series expansions have generally dominated the set of options considered in supply and demand analysis. Empirical work on functional forms, primarily focusing on static models, has documented that choice of functional form can largely predetermine economic results (Berndt, Darrough, and Diewert 1977, Shumway and Lim 1993). Very often, elasticities and implications with important economic meaning have been sensitive to choice of functional form. While considerable effort has been devoted to examining the effects of alternative functional forms in static production models, little attention has been given to this subject in dynamic investment analysis.

Three functional forms commonly used in dynamic duality analysis are the normalized quadratic (Vasavada and Chambers 1986, Vasavada and Ball 1988), generalized Leontief (Howard and Shumway 1988, Weersink and Tauer 1990, Luh and Stefanou 1991, Richards 1995), and translog (Taylor and Monson 1985). Each is a second-order Taylor-series expansion. However, to date the effects of functional form on validation of the asset fixity specification and the corresponding dynamic elasticity calculations have not been examined (Galeotti 1996).

The purpose of this paper is to investigate the sensitivity of asset fixity conclusions, speed of input adjustment, and implied elasticities to choice among these three functional forms. Dynamic adjustment cost theory will be applied to U.S. agriculture. The likelihood dominance criterion (Pollak and Wales 1991) will be used to discriminate among the functional forms. Inputs will not be prestratified into quasi-fixed and variable input categories. Rather, tests will be conducted on each of five inputs to determine which are variable and what the rate of adjustment is for those that are quasi-fixed.

The Dynamic Adjustment Model

The dynamic adjustment problem assumes that a firm or industry has two types of inputs -- variable and quasi-fixed. Variable inputs may be obtained by a competitive firm at a given price. Changing the level of quasi-fixed inputs, however, involves an internal, nonlinear adjustment cost as well as the usual cost of renting an additional unit of input. For our purposes, we will assume that, in any period, agricultural production is characterized by a single-output production function $F(X,Z,I)$, where X is a vector of perfectly variable inputs, Z is a vector of quasi-fixed inputs, and I is a vector of gross investments in quasi-fixed inputs and is included in the function as an argument to reflect internal costs of adjusting quasi-fixed inputs. It is assumed that the agricultural firm maximizes the discounted stream of net cash flow over an infinite planning horizon:

(1) $J(W, P, r, Z_0) = Max\int e^{-rt}[F(X, Z, I) - W'X - P'Z]dt$

subject to X, $Z > 0$, $\dot{Z}_t = I_t - dZ_{t-1}$, and $Z(0) = Z_0 > 0$,

where W is the price vector of variable inputs normalized by lagged output price, P is the rental price vector of the quasi-fixed inputs normalized by lagged output price, r is the real discount rate, d is the (constant) depreciation rate, Z_0 is the initial endowment of Z, and $\dot{Z}$ is the net change in Z during one time period. Lagged output price is used as a proxy for expected output price.

An additional common assumption is that price expectations are static, i.e., relative prices observed in each base period are expected to persist indefinitely (Epstein 1981). This assumption allows (1) to be reduced to the Hamilton-Jacobi equation:

(2) $rJ(W, P, Z) = Max[F(X, Z, I) - W'X - P'Z + J_Z\dot{Z}]$,

where J_Z (the derivative of J with respect to Z) is the shadow price of the quasi-fixed input. It has been shown that the properties of *F*( ) are fully manifested in the value function, given that standard regularity conditions are maintained on *F*( ), as detailed by Epstein (1981). Thus, a full duality exists between $F(X,Z,I)$ and $J(W,P,Z)$. Applying the envelope theorem directly to equation (2) and taking derivative results back to equation (2) results in the specification of output supply, variable input demands, and quasi-fixed input adjustments as the following:

(3) $F(W,P,Z) = r(J - W'J_W - P'J_P) - \dot{Z}(W'J_{ZW} + P'J_{ZP} - J_Z),$

(4) $X(W,P,Z) = -rJ_W + J_{ZW}\dot{Z},$

(5) $\dot{Z}(W,P,Z) = J_{ZP}^{-1}(rJ_P + Z).$

If $J_{ZP}(W,P,Z)$ has a form such as $(M - r)^{-1}$, where *M* is the rate of adjustment matrix and is a matrix of constant parameters, (5) then becomes a multivariate flexible accelerator model,

(6) $\dot{Z}(W,P,Z) = M(Z - Z^*(W,P)),$

where $Z^*(W,P)$ is the desired level of the *Z* vector in the long-run equilibrium.

The Empirical Model

The above methods are used to study the importance of asset fixity in U.S. agriculture and to determine the robustness of the results to different functional form specifications of the optimal value function *J*( ). Optimal value functions and their respective investment demand function specifications are presented in this section. No arbitrary classification of a subset of inputs as variable is made prior to specification of the dynamic system. Rather, all inputs are initially allowed to be quasi-fixed. Variability of factors is investigated by conducting nested hypothesis tests in which restrictions are placed on the quasi-fixed inputs. The restrictions imply instantaneous adjustment to price changes with no costs of adjustment. This is a more general dynamic specification than the alternative approach. An input initially specified as quasi-fixed can be tested and found to be variable, but no nested testing procedure allows us to determine whether an input specified as variable is actually quasi-fixed.

Data

The U.S. agricultural production data set of output and input quantities and prices (Ball 1996) consists of 46 annual observations for the period 1948-1993. These data are comprehensive in coverage of output and input items of the agricultural production sector. They reflect an intensive re-examination of basic data underlying published U.S. Department of Agriculture series and conform fully to earlier AAEA-USDA Task Force recommendations. Input price data were aggregated as Tornqvist indices into five categories -- hired labor, capital, family labor, real estate, and purchased inputs. The corresponding quantity aggregates were obtained by dividing category expenditures by the respective price index. Output prices were similarly aggregated into a single category, and the quantity index was obtained by dividing receipts by the price index. Following the empirical work of Epstein and Yatchew (1985), the rate of capital depreciation (d) was chosen to be 0.104 and the real discount rate (r) to be 0.04.

Public and private research expenditures were used to create an explicit proxy for technical change. Data for this variable are from Huffman and Evenson (1993).

Specification

Treating all inputs as potentially quasi-fixed, all three of the functional forms considered for the value function may be specified by means of the following general notation for each observation t:

(7) $J(P,Z,T) = a_0 + a'R + b'Z + .5R'AR + .5Z'BZ + P'CZ + d'PT + e'PT^2$,

where a_0, a, b, A, B, C, d, and e are parameter matrices; A and B are symmetric; $R = P$ for the normalized quadratic (NQ); $R=P^{0.5}$ for the generalized Leontief (GL); and $R=\log(P)$ for the translog (TL). Vectors P and Z are (5x1) -- 1 is hired labor, 2 is capital, 3 is family labor, 4 is real estate, and 5 is purchased inputs. T is the technical change variable. T^2 is included in the value function to allow for the possibility of nonlinear interactions of technical change and prices.

The variable T is a research innovation stock variable created as an explicit proxy for technical change. Huffman and Evenson's (1993) public and private research expenditure data for the period 1910-1990 were augmented by five-year moving averages for 1991 and 1992. Following Chavas and Cox (1992), a separate innovation stock was created from each expenditure series. A linear spline lag structure with a 30-year lag length was used for both series. Both structures had four segments and lag weights summed to 1.0. Lag weights peaked in year 23 for public research expenditures and year 15 for private research expenditures. The variable used in this study is total innovation stock which is the sum of the public and private innovation stocks.

In each functional form, J_{PZ} is specified as a matrix of constants, C, which maintains the multivariate flexible accelerator hypothesis of input adjustment. It also assures that convexity of J in P and concavity of J in Z are sufficient for concavity of the technology and promotes econometric testing of alternative nested adjustment hypotheses. For example, as C^{-1} approaches a diagonal matrix, each input adjusts toward its equilibrium level at a rate which is independent of adjustment rates of other inputs. This independence condition is also known as the univariate accelerator model. As C^{-1} approaches a diagonal matrix with the element $C_{ii}^{-1} = -(1+r)$, input i

adjusts instantaneously and consequently is appropriately classified as a variable input. The off-diagonal elements in C^{-1} are not necessarily symmetric and measure the interdependence of the quasi-fixed inputs. Aggregate data and models are frequently used for policy purposes. The necessary and sufficient condition for consistent aggregation across firms is that the value function have a form such that $J_{ZZ} = 0$ (i.e., all elements in B are zero). Interaction terms between P and both T and T^2 are included to permit examination of a wider range of technical change possibilities than typically considered. Static *ex ante* expectations of price, technology, discount rate, and depreciation rate are assumed in each model. Thus, current information is presumed to contain all relevant information about the future (Hillier and Lieberman, p. 351).

For the NQ, GL, and TL functional forms, the investment equations are:

(8) $\dot{Z} = C^{-1}[r(aR_P + 2R_P{}'AR + dT + eT^2) + Z] + rZ,$

where R_P = ¶R_t / ¶P_t . The output supply equations are:

(9) $F = r(a_0 + b'Z - .5P'AP + .5Z'BZ) - \dot{Z}'(b + BZ)$ for the NQ,

(10) $F = r(a_0 + .5a'R + b'Z + .5Z'BZ) - \dot{Z}'(b + BZ)$ for the GL, and

(11) $$F = r[a_0 + \sum_{i=1}^{5} a_i(\log P_i - 1) + \sum_{i=1}^{5} A_{ii}(.5\log^2 P_i - \log P_i) + \sum_{i=1}^{4}\sum_{j=i+1}^{5} A_{ij}(\log P_i \log P_j$$

$$- \log P_i - \log P_j) + \sum_{i=1}^{5} b_i Z_i + .5\sum_{i=1}^{5}\sum_{j=1}^{5} B_{ij} Z_i Z_j] - \sum_{i=1}^{5} \dot{Z}_i(b_i + \sum_{j=1}^{5} B_{ij} Z_j) \text{ for the TL.}$$

Equations (8) and (9) constitute the estimation system for the NQ functional form, equations (8) and (10) for the GL functional form, and equations (8) and (11) for the TL functional form. Each system of six equations (including five investment demand equations (8) and one output supply equation (9), (10), or (11)) was estimated using nonlinear least squares. The errors were assumed to be additive and normally distributed and (possibly) contemporaneously correlated across equations. The dynamic dual model requires the input adjustment matrix $M = J_{ZP}^{-1} + r$ to be stable, i.e., that all its eigenvalues have negative real parts.

Model parameters were first estimated by nonlinear three-stage least squares (N3SLS). Ten instrumental variables were considered -- population, per capita income, consumer price index, producer price index of industrial commodities, producer price index of crude materials, prime rate, implicit price deflator, total private nonagricultural average gross hourly earnings, rate of change of consumer price index, and government direct payments. The entire set, as well as several subsets, of instrumental variables were used in the initial estimation. However, the estimated input adjustment matrix M was not stable for any functional form with any group of instrumental variables.

Re-estimation by nonlinear seemingly unrelated regression (NSUR) obtained a stable adjustment matrix for all three functional forms. Because of the importance of a stable adjustment matrix for deriving economic inference, NSUR was used in the final estimations. Thus, it is possible that the parameter estimates suffer from some simultaneity bias in the input markets. Because lagged output price was used as the proxy for expected output price, the model is recursive in the output markets so simultaneity bias should not occur there. In addition, although national data are used, production agriculture accounts for a small portion of total economic activity. Consequently, it is possible that the extent of bias due to simultaneity in the input markets is small.

The Davidon-Fletcher-Powell iterative minimization algorithm was used to estimate each system of equations. After convergence was established, different parameter starting values were specified to investigate global convergence of the parameter estimates. Estimated parameter values which comprise the adjustment matrix for the maintained multivariate flexible accelerator hypothesis and for testing other hypotheses were not significantly affected by changing the starting values. Although this procedure does not guarantee global convergence, it provides sufficient evidence to suggest we are in the neighborhood of a stable convergence region.

Optimal output supply and investment demands can be derived from an estimated value function that is convex in input prices and concave in quasi-fixed input quantities. To assure consistency with optimizing behavior, all tests of the modeling hypotheses (including consistent aggregation, symmetric adjustment, univariate accelerator, and variable inputs) and calculation of elasticities were performed with curvature conditions maintained at the data means.

Empirical Results

The modeling hypotheses that were tested in this study and their implied restrictions on parameters are reported in Table 1. Consistent aggregation, symmetric adjustment, the univariate accelerator model, as well as the hypotheses that all inputs or individual inputs are variable were tested as independent hypotheses. Likelihood ratio test statistics were conducted for these hypotheses and are reported in Table 2. At a 5% level of significance, all functional specifications reject the hypotheses of consistent aggregation, the univariate accelerator, all inputs variable, and real estate variable. Rejection of the univariate accelerator and all variable inputs hypotheses is consistent with the findings of Vasavada and Chambers (1986) and Vasavada and Ball (1988). The symmetric adjustment hypothesis was rejected by both the NQ and GL functional forms, but was not rejected by the TL. Four of the five individual tests for variable inputs also give mixed results depending on which functional form is used. Both the NQ and TL find that hired labor is variable. The NQ also finds support for capital being a variable input, and the TL supports designation of family labor and purchased inputs as variable inputs. The GL provides no support for any input being variable but rather finds each to be quasi-fixed.

The conclusion that real estate adjusts to its optimal level sluggishly (i.e., is quasi-fixed) is robust to functional form and appears to be robust to data period and aggregation procedure (Vasavada and Chambers 1986, Vasavada and Ball 1988). The hypothesis of variability of capital was strongly rejected by two functional forms which was also consistent with the earlier tests by Vasavada and Chambers (1986) and Vasavada and Ball (1988). The hypothesis of variability of family labor was also rejected by two functional forms. Thus, most support was found by these hypothesis tests for instantaneous adjustment of hired labor to equilibrium levels, and least support was found for instantaneous adjustment of real estate. Little support was also found for instantaneous adjustment of capital, family labor, and purchased inputs. Only the last finding proved surprising. Since the purchased inputs category did not include capital investment items, it was expected that purchases of these inputs were for use in the same production period, that they were fully utilized in the production process in that period, and that there was little storage from one year to the next. The hypothesis tests failed to support this expectation.

The results of these hypothesis tests provide three important implications for empirical modeling of aggregate agricultural production data: (a) not unexpectedly, the theoretical foundations of firm-level production models may not apply well to aggregate models, (b) most aggregate inputs adjust sluggishly to their optimal levels, and (c) which inputs are judged to be quasi-fixed is sensitive to choice of functional form.

Choice of functional form was examined by means of the likelihood dominance criterion (Pollak and Wales 1991). Loglikelihood values are reported in the first row of Table 2 for the three functional forms without imposing any constraints for nested hypotheses. Since all three functional specifications contain the same number of parameters and are estimated using the same dependent variables, the model with the highest loglikelihood value has the highest likelihood support. Based on this criterion, the TL is the preferred functional form for the dynamic model with these data. The GL is the least preferred functional form.

Table 3 provides estimated rates of adjustment for each input to its optimal level. Differences in the estimated rate of adjustment between the three functional forms were substantial for several of the inputs. The largest differences occurred for hired labor and real estate with rates of adjustment ranging from .08 to .37 for hired labor and from .15 to .44 for real estate. In both cases, the NQ and TL gave the extremes. The TL estimate was highest for hired labor and lowest for real estate, while the NQ estimate was highest for real estate and lowest for hired labor. In addition to some large differences between functional forms in estimated adjustment rates, there was little correlation between the rates of adjustment and the test conclusions with regard to variable or quasi-fixed inputs. Despite some considerable differences among functional forms in the estimated adjustment rates, all adjustment rate estimates were quite low, even for those inputs judged to be variable by statistical test.

Based on the variable input tests, the NQ and TL models were re-specified. Hired labor and capital were treated as variable inputs for the re-specified NQ model and hired labor, family labor and purchased inputs were treated as variable inputs for the re-specified TL model. Short-run and long-run own-price elasticities were calculated and are reported in Table 4. As implied by the maintained curvature conditions, all short-run and long-run own-price input demand elasticities were negative and the output own-price elasticities were positive. Important differences in the estimated elasticities were found among the three functional forms. For example, short-run own-price elasticity for capital ranged from -.01 for the TL and -.41 for the NQ, while long-run elasticity for capital ranged from -.32 for the TL to -3.57 for the GL. The large differences are partially the result of the different re-specifications among the functional forms. The NQ treated capital as a variable input while the GL and TL treated it as a quasi-fixed input.

Nearly all long-run elasticities were larger in absolute value than the short-run elasticities. This observation is consistent with the Le Chatelier theorem. Output supply elasticity did not vary by functional form nearly as much as the inputs. In addition, for two of the functional forms there was little difference between short-run and long-run output supply elasticities.

The asset fixity theory provides an explanation why factors may become fixed in their short-run use in the production process. The concept of fixity of factors is important in agricultural research, not only because it explains the internal cost of adjustment process, but also because specification of fixed factors can largely predetermine economic implications such as elasticities. The dynamic dual model provides a means for identifying quasi-fixed assets by allowing both the determination of which inputs are quasi-fixed and the degree of their asset fixity to be endogenous. This study shows that the delineation of inputs into variable and quasi-fixed categories can be sensitive to the choice of functional form. That delineation has important impacts on both short-run and long-run elasticity estimates. Thus, appropriate selection of functional form and delineation of assets subject to fixity are important specification issues that must be addressed prior to final model design. That specification can benefit from empirical testing.

Conclusions

The asset fixity theory hypothesizes that an asset is fixed when its value is between the acquisition cost and the salvage value. This study employed a dynamic dual model to determine whether empirical evidence supported the hypothesis of asset fixity for U.S. agriculture, which inputs were primarily responsible if the hypothesis was not rejected, and whether test conclusions were sensitive to choice of functional form. It also examined the sensitivity of short-run and long-run elasticities to the choice of functional form specification. Three functional forms were considered -- translog, generalized Leontief, and normalized quadratic. Linear homogeneity in prices, convexity in prices, and concavity in quasi-fixed input quantities were maintained on the value function.

Hypotheses related to the adjustment cost matrix were tested to guide model specification. Hypotheses of consistent aggregation, univariate accelerator, and instantaneous adjustment of all inputs and of real estate were strongly rejected by all three functional forms. The test result against treating all inputs as variable factors was robust to functional form and clearly indicated the existence of some quasi-fixed inputs and asset fixity. The hypothesis of instantaneous adjustment of individual inputs was also investigated, and test results were mixed across functional forms for all inputs except for real estate. Real estate exhibited asset fixity, and the fixity of this input was robust to functional form.

Based on the likelihood dominance criterion, the translog functional form was chosen over the normalized quadratic and generalized Leontief for the dynamic dual model with these data. Test results with the translog function supported capital and real estate as quasi-fixed inputs and hired and family labor and purchased inputs as variable inputs. Short-run and long-run own-price elasticities were computed at data means. Compared to functional forms with less likelihood support, estimated translog own-price elasticities showed important differences but was neither consistently higher nor consistently lower than for either of the alternative functional forms. The important findings of this study with respect to the asset fixity hypothesis are that asset fixity applies to U.S. agriculture, this conclusion is robust to functional form, but, except for real estate, the specific inputs responsible for asset fixity are not.

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Table 1. Parameter Restrictions for Modeling Hypotheses

Hypothesis	Parameter Restrictions
1. Consistent Aggregation	$B_{ij} = 0, \forall$ all i, j
2. Symmetric Adjustment	$C_{ij}^{-1} = C_{ji}^{-1}, \forall$ all i, j
3. Univariate Accelerator	$C_{ij}^{-1} = 0, \forall\ i \neq j$
4. All Inputs Variable	$C_{ii}^{-1} = -1 - r, \forall\, i = 1 \ldots 5;\ C_{ij}^{-1} = 0, \forall\ j \neq i$
5. Hired Labor Variable	$C_{11}^{-1} = -1 - r,\ C_{1j}^{-1} = 0, C_{j1}^{-1} = 0,\ j \neq 1$
6. Capital Variable	$C_{22}^{-1} = -1 - r,\ C_{2j}^{-1} = 0, C_{j2}^{-1} = 0,\ j \neq 2$
7. Family Labor Variable	$C_{33}^{-1} = -1 - r,\ C_{3j}^{-1} = 0, C_{j3}^{-1} = 0,\ j \neq 3$
8. Real Estate Variable	$C_{44}^{-1} = -1 - r,\ C_{4j}^{-1} = 0, C_{j4}^{-1} = 0,\ j \neq 4$
9. Purchased Inputs Variable	$C_{55}^{-1} = -1 - r,\ C_{5j}^{-1} = 0, C_{j5}^{-1} = 0,\ j \neq 5$

Table 2. Modeling Hypothesis Test Statistics

Model	Normalized Quadratic	Generalized Leontief	Translog	Critical Value ($c^2_{.05}$)	Test Degrees of Freedom
Likelihood Values, Unrestricted Model	-484.55	-531.96	-449.31		
Likelihood Ratio Statistics					
1. Consistent Aggregation	154.92*	355.61*	40.47*	37.65	25
2. Symmetric Adjustment	27.13*	280.87	4.48	18.31	10
3. Univariate Accelerator	94.39*	513.78*	73.38*	31.41	20
4. All Inputs Variable	191.31*	1241.77*	400.75*	37.65	25
5. Hired Labor Variable	6.44	207.62*	7.23	16.92	9
6. Capital Variable	12.10	685.21*	41.04*	16.92	9
7. Family Labor Variable	40.92*	114.29*	13.14	16.92	9
8. Real Estate Variable	99.29*	321.10*	106.28*	16.92	9
9. Purchased Inputs Variable	66.52*	67.01*	0.46	16.92	9

* Hypotheses rejected at 5% significance level.

Table 3. Estimated Rates of Adjustment, Initial Specifications

Input	Normalized Quadratic	Generalized Leontief	Translog
Hired Labor	0.08	0.20	0.37
Capital	0.28	0.11	0.13
Family Labor	0.23	0.08	0.16
Real Estate	0.44	0.25	0.15
Purchased Inputs	0.26	0.39	0.28

Table 4. Short-Run and Long-Run Own-Price Elasticities at Data Means, Final Specification

Length of Run	Input	Normalized Quadratic	Generalized Leontief	Translog
Short-Run	Hired Labor	-0.49	-0.04	-0.04
	Capital	-0.41	-0.03	-0.01
	Family Labor	-0.02	-0.05	-0.09
	Real Estate	-0.01	-0.02	-0.08
	Purchased Inputs	-0.05	-0.05	-0.53
	Output	0.23	0.01	0.27
Long-Run	Hired Labor	-0.53	-2.45	-0.47
	Capital	-0.40	-3.57	-0.32
	Family Labor	-0.82	-2.76	-0.15
	Real Estate	-0.09	-0.68	-0.85
	Purchased Inputs	-0.74	-0.35	-2.45
	Output	0.25	0.45	0.27