INVESTMENT RIGIDITY AND POLICY MEASURES

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Abstract

This paper assesses the impacts of decoupled government transfers on production decisions of a sample of Kansas farms observed from 1996 to 2001. Our model allows for risk, risk attitudes and the intertemporal investment decisions. We also allow for different adjustments of the decision variables depending on the predominant economic conditions. The theoretical model is estimated using the threshold regression methods proposed by Hansen (1999). Threshold effects are allowed to characterize the behavior of output supply and quasi-fixed and variable input demand.. The econometric results support the existence of three regimes characterized by different economic behavior. Our analysis suggests that in a dynamic setting with risk and non-risk neutral economic agents, decoupled transfers can have a powerful influence on decisions taken by economic agents. The dynamics of the stock of capital cause this influence to grow over time.

Key words: Investment, Decoupling, Threshold Behaviour

Topic. Agricultural and Food Policies

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Introduction

With the proliferation of decoupled instruments over the last two decades as a key element in agricultural policy formulation in developed countries, several studies seek to assess the impacts of these instruments on farmers' decisions. Published work in this area considers the three chief mechanisms through which policy measures can affect agricultural production.

The first group contains papers studying the partially decoupled area payments introduced in the European Union (EU) by the 1992 Common Agricultural Policy (CAP) reform, focusing on the static effects of policy under risk neutrality. In this scenario, policies will only impact on farmers' economic decisions as long as they alter relative market prices. Papers within this group include Guyomard, Baudry and Carpentier (1996), Moro and Sckokai (1999) and Serra et al. (2005) and have generally used a conventional theoretical framework approach that assumes perfect markets and risk neutral producers.

Price-neutral policies can also influence production in a static framework with risk averse economic agents, by means of altering price or revenue uncertainty and exogenous income. A more recent avenue of research on decoupling has explicitly allowed for risk and risk preferences (Sckokai and Moro, 2006; Serra et al., 2006). This literature generally builds upon Sandmo's (1971) seminal paper that shows that lump sum transfers, by means of altering farm household wealth, can affect individuals' risk preferences and their economic decisions.

More incipient is the literature considering the dynamic effects of policy. Farm output is a function of different inputs including the level of capital, which depends on past decisions on investments. To the extent that lump sum transfers can alter investment demand, the effects of decoupled policies on production may play a more important role in a dynamic setting. The latter constitutes a third mechanism through which agricultural policy can affect economic decisions, i.e., through the dynamic investment response, which will have long-lasting impacts on production. Our paper will focus on assessing this dynamic response.

As detailed in the investment literature, in a world with perfect capital markets, statically decoupled payments are not likely to influence a farm's capital stock. However, in the presence of capital market imperfections such as binding constraints, decoupled payments may have the effect of stimulating farm investments, which will carry their output effects into future years. The literature on this topic has been very scarce. The papers by Sckokai (2005) and Coyle (2005) constitute two notable exceptions. Following the modern theory on investment under uncertainty (Dixit and Pindyck 1994), which recognizes the importance of uncertainties related to future market conditions in the decision to invest, Sckokai (2005) not only assesses the dynamic investment effects, but also allows for some degree of uncertainty affecting production and investment decision choices. Our model builds upon the framework proposed by Sckokai (2005).

In line with the typical classical dynamic setting, the incipient literature on the effects of decoupling on investment decisions has assumed convex investment costs that allow quasi-fixed inputs to adjust smoothly over time to their optimal level, where the shadow value of capital equals its marginal adjustment costs (Lucas, 1967; Rothschild, 1971). Irregularities in the adjustment cost function however, may prevent firms from adjusting to changing market conditions. Following Abel and Eberly (1994) and extending previous literature on decoupling, we allow for these irregularities by specifying threshold-type behavior. The theoretical model, which also allows for some degree of uncertainty and risk preferences is estimated using the threshold regression procedure proposed by Hansen (1999).

Our empirical analysis focuses on assessing the impacts of the extensive reform that the US farm policy underwent in 1996. The reform was embodied in the 1996 Federal Agriculture Improvement and Reform (FAIR) Act and involved a reduction in the coupled element of income support. Price supports were cut and the negative effects of price changes on farmers' incomes were compensated by production flexibility contract (PFC) payments that did not require the production of certain crops and were not linked to actual production or prices, and by a deficiency payment that guaranteed a minimum support price for program crops. Our objective is to determine the dynamic investment effects of PFC payments using farm-level data from the Kansas Farm Management Association dataset.

The Model and Estimation Methods

We focus on the dynamic intertemporal duality theory due to McLaren and Cooper (1980) and Epstein (1981). The literature that studies agricultural investment decisions under a dynamic framework has generally imposed rather restrictive assumptions on risk and risk preferences. Some analyses have completely ignored risk and attitudes towards risk (for example, Epstein and Denny, 1983; Vasavada and Chambers, 1986). More recent developments have allowed for nonstatic price expectations and risk though assuming risk neutral economic agents (see Luh and Stefanou, 1996; and Pietola and Myers, 2000). Sckokai (2005) has allowed for risk and risk preferences. We extend the dual model of investment under uncertainty developed by Sckokai (2005) to a consideration of irregularities in the capital stock adjustment cost function.

We assume that farmers are risk averse. Specifically, we suppose constant relative risk aversion (CRRA) preferences, where the coefficient of absolute risk aversion is modelled as $R=\frac{\eta}{A}$, being A the value of a farm's expected wealth, and η a parameter representing a farmer's risk attitudes. Further we assume that a farmer's utility function can be represented as

$$u = A_0 + \bar{p}\,\bar{y} - wx - ck + S - \frac{\eta}{2\left[A_0 + \bar{p}\,\bar{y} - wx - ck + S\right]}\sigma_A^2 \qquad (1)$$

where, A_0 is a farm's initial wealth, x is the quantity used of a variable input which can be adjusted at no cost, k represents the units of capital, w is the variable input price, c is the capital rental price and S measures decoupled payments. Variable $y = f(x,k,I) + e$ represents a farm's single output production function, e is an error term with mean zero and finite variance, and I is the capital investment variable. Output supply is assumed to be a stochastic variable with mean $\bar{y}$ and variance σ_y^2 . The market output price p is also assumed to be a random variable that is independently distributed from the production disturbance with mean $\bar{p}$ and variance σ_p^2. Expression $A = A_0 + \bar{p}\,\bar{y} - wx - ck + S$ is the expected farm's wealth, being $\sigma_A^2 = \bar{y}^2\sigma_p^2 + \bar{p}^2\sigma_y^2 + \sigma_p^2\sigma_y^2$ the farm's profit variance. While we consider price and output uncertainty within a period, we do not allow for the inter-temporal dimension of risk. Static expectations are thus assumed for both price and output in the sense that they are formulated within each period given present conditions without any dynamic consideration. It is only when the period changes that new expectations can be formulated if previous ones are not optimal (Sckokai, 2005; Howard and Shumway, 1998).

Under the assumption that farmers are risk averse and take their decisions with the aim of maximizing the discounted utility over an infinite horizon, subject to the transition equation for capital, the value of the firm can be represented as:

$$J(r, A_0, \overline{p},\ w, c, S, \sigma_A^2, k) = \max_{I,x} \int_0^{\infty} e^{-rt} u(A, \sigma_A^2) \tag{2}$$

s.t.:

$$\dot{k} = (I - \delta k)$$

where $\dot{k}$ is the time derivative of the capital path and r is the interest rate. The Hamilton-Jacobi-Bellman equation corresponding to the optimization program is:

$$rJ = \max_{I,x} \left\{ u + J_k \left(I - \delta k \right) \right\} \tag{3}$$

where the subscripts denote derivatives. The first derivatives of expression (3) with respect to output and input prices will yield the system of first-order conditions

$$\begin{cases} y = \dfrac{1}{\left(\dfrac{\partial u}{\partial S}\right)} \left\{ rJ_p - J_{kp} \dot{k} \right\} \\ \dot{k} = \dfrac{1}{J_{kc}} \left\{ rJ_c + k \left(\dfrac{\partial u}{\partial S} \right) \right\} \\ x = \dfrac{1}{\left(\dfrac{\partial u}{\partial S}\right)} \left\{ -rJ_w + J_{kw} \dot{k} \right\} \end{cases} \tag{4}$$

where $\partial u/\partial S = 1+\eta\sigma_A^2 \Big/ 2\left[A_0 + \bar{p}\,\bar{y} - wx - ck + S\right]^2$ represents the change in utility levels if farm's wealth is increased by means of lump-sum transfers.

The system of equations in (4) investigates investment and disinvestment decisions in a typical classical dynamic setting. The classical theory of investment assumes that the cost of investment can be represented by a strictly convex function that allows quasi-fixed inputs to adjust smoothly over time to their optimal level (Lucas, 1967; Rothschild, 1971). Irregularities in the adjustment cost function however, may prevent firms from adapting to changing market conditions.

Considering these irregularities, Abel and Eberly (1994) propose an augmented adjustment cost function that allows for differences between the purchase and resale asset prices, asymmetries in fixed capital adjustment costs, and a kink of the conventional adjustment cost function at its origin. Within this framework, capital investment is a non-decreasing function of the asset's shadow price (J_k). However, it does follow a threshold-type behavior characterized by a lower and an upper critical values of the shadow price. Optimal gross investment is expected to be positive (negative) for shadow prices above (below) the upper (lower) threshold. For shadow prices in the range comprised between the two thresholds, capital may not adjust (or may adjust more slowly) to exogenous shocks.

Boetel, Hoffmann and Liu (2007) have used a threshold regression procedure to empirically implement Abel and Eberly (1994) theoretical proposal. More specifically, they estimate the system of first-order conditions in two steps. In a first stage the investment demand is estimated following the method proposed by Hansen (1996, 1999, 2000). The output supply and variable input demand equations are estimated in a second stage by seemingly unrelated regressions (SUR) method.

Because output supply is a function of different inputs including the capital stock, nonlinearities in capital adjustment to its long-run equilibrium may be easily translated to the output supply and variable input demand equations. For example, output supply may experience quicker adjustments in those regimes where capital adjusts at a fast path than in those regimes where capital stock is more constant. Consistent with this argument, we allow for the threshold-type behavior in all equations of the system of first order conditions. Further, we estimate the system simultaneously to avoid inefficiencies in the estimation process. In doing so, we extend and improve Boetel, Hoffman and Liu (2007) empirical approach.

From (4) one can derive an empirical counterpart for the output supply and input demand equations by assigning a mathematical specification to function J. This however will result in a nonlinear system of equations that would render the implementation of threshold regression methods too difficult. These methods generally assume that while a variable adjusts differently (nonlinearly) across regimes, it follows a linear adjustment within each regime. We thus estimate a reduced-form of the equations of the system. In this reduced-form, the optimal output supply and input demand equations are expressed as:

$$g = \beta_1' x I\left(J_k < J_k^l\right) + \beta_2' x I\left(J_k^l \le J_k \le J_k^u\right) + \beta_3' x I\left(J_k > J_k^u\right) + \varepsilon \qquad (5)$$

where g is the vector of decision variables being analyzed and x is the vector of explanatory variables. According to the theoretical model above, vector x is assumed to be composed by $x = \left(r, A_0, \overline{p}, w, c, S, \sigma_A^2, k_{-1}\right)$. $I(.)$ is an indicator function which takes the value of one if the condition inside the parenthesis is met and zero otherwise. Because the shadow value of the quasi-fixed input, i.e., J_k is not observable, we assume that there exists a mapping between the shadow value and the lagged value of the net farm income. The upper and lower thresholds are represented by J_k^u and J_k^l respectively.[1] ε is the vector of iid errors.

The econometric methods that we follow to estimate the system in (5) are described in Hansen (1996, 1999, 2000). More specifically, we use sequential conditional iterated SUR in two steps. In the first stage a grid search is carried out to estimate the threshold parameters J_k^l and J_k^u. The lower threshold is searched over the minimum and median of the lagged net farm income, while the upper threshold is searched over the range that goes from the median to the maximum value of the lagged net farm income. The search is restricted to ensure an adequate number of observations in each regime. For a given pair $\left(J_k^l, J_k^u\right)$, regression coefficients can be estimated through the OLS regression of g on x for each subsample. From this estimation the logarithm of the determinant of the variance-covariance matrix of the residuals Σ is derived: $S\left(J_k^l, J_k^u\right) = ln\left|\hat{\Sigma}\left(J_k^l, J_k^u\right)\right|$, being $\hat{\Sigma}\left(J_k^l, J_k^u\right)$ a multivariate least squares estimate of $\Sigma = var\left(\varepsilon\right)$ conditional upon J_k^l and J_k^u.

In the second stage of the estimation process, the least squares estimate of $\left(J_k^l, J_k^u\right)$ is obtained by minimizing function $S\left(J_k^l, J_k^u\right)$, which is equivalent to maximizing a likelihood function (Hansen and Seo, 2002): $\left(\hat{J}_k^l, \hat{J}_k^u\right) = \underset{J_k^l, J_k^u}{arg\,min}\, S\left(J_k^l, J_k^u\right)$. To test for the significance of the differences in parameters across regimes, we use the likelihood ratio proposed by Hansen (1999). Since this test does not follow a standard distribution, its value

[1] Other approximations to the shadow value were tried. Selecting the output price as in Chavas (1994) or Boetel, Hoffmann and Liu (2007) would produce similar results.

is compared against the critical values derived from the bootstrap procedure outlined in Hansen (1996). Confidence intervals for the threshold parameters are derived as in Hansen (1999).

Empirical Implementation

The model is estimated using farm-level data for a sample of Kansas farms observed from 1996 to 2001 corresponding to the implementation of the FAIR Act. Micro data are derived from the Kansas Farm Management Association database. Aggregate data are also used to define those variables unavailable at the farm-level. Country-level price indices and state-level output prices and quantities are taken from the National Agricultural Statistics Service (NASS). The United States Department of Agriculture (USDA) provides state-level marketing assistance loan rates and PFC payment rates. The Federal Reserve provides data on the federal funds rate.

Our analysis concentrates on those farms specialized in the production of the most relevant crops in Kansas, i.e., wheat, corn, grain sorghum and soybeans. In this regard, we only consider those farms whose sales of the four crops represent at least 80% of total sales. We define a single output category (y) that aggregates the production (in bushels) of wheat, corn, grain sorghum, and soybeans. Because our database does not explicitly contain information on market prices, we use price indices as a proxy. Specifically, we build an output Paasche price index by using state-level production data and state-level prices. The expected output price is made equal to the lagged price index.

The aggregate variable input includes the use of pesticides and insecticides, fertilizer, seed, gas-fuel-oil, and irrigation energy. The input price w is measured using a national aggregate input price index. Variable input level, x, is defined as an implicit quantity index.

Capital is aggregated into a single variable k incorporating vehicles, machinery and buildings. By using real estate and machinery price indices,[2] a quantity index of available capital is derived. The rental price for capital is computed by assuming that the current asset price can be derived as a continuously discounted sum of all future rents on the depreciated asset (see Epstein and Denny, 1983; and Pietola and Myers, 2000). According to this assumption, the rental price of capital can be computed as $c=\left(r+\delta\right)z$, where c is the rental price, r is the interest rate corresponding to the annual federal funds interest rate, δ is the capital depreciation rate which is computed at the data means, and z is the capital price index.

The Kansas database does not register PFC government payments. In its place, a single measure including all government payments received by each farm is available. We estimate farm-level PFC payments by approximating the acreage of the program crops (base acreage) and the base yield for each crop using farm-level data. The approximation uses the 1986-1988 average acreage and yield for each program crop and farm and permits construction of a balanced panel of 154 farms. PFC payments per crop are computed by multiplying 0.85 by the base acreage, yield, and the PFC payment rate. PFC payments per crop are then added to get total direct payments per farm. This estimate is compared to actual government payments received by each farm. If estimated PFC payments exceed actual payments, the first measure is replaced by the second.

Initial wealth A_0 is computed as the lagged value of a farm's total assets (excluding the lagged capital stock already measured by k). The standard deviation of wealth σ_A is approximated at the farm-level by the standard deviation of a farm's sales. The value of the

[2] These indices are weighted according to the relevance of each component in the capital variable computed at the data means.

net farm income is computed as the difference between the value of farm production and operating expenses and depreciation. Its lagged value is taken as the threshold variable. The system of first order conditions is estimated as described above.

Some details pertaining to the empirical estimation are described here. Following Boetel, Hoffmann and Liu (2007) and to conserve degrees of freedom, we allow only the parameters associated with the lagged stock of capital to vary across the three regimes. Second, all prices are normalized by the capital rental price in the interest of parsimony. Finally, the variance of wealth is normalized by the square of the difference between farm's assets and liabilities in the system in (4).

The point estimates of the two thresholds and their asymptotic 95% confidence intervals are reported in table 1. The lower threshold is 23,511 and the upper equals 55,617, thus corresponding to small and large lagged returns to unpaid labor, management and equity. These thresholds separate firms into three different groups: those receiving low returns, the ones with intermediate returns and the group benefiting from the highest net farm income. The intermediate income regime concentrates 224 observations, while the lower and upper regimes have 365 and 335 observations respectively. The null hypothesis of no threshold against the alternative of two thresholds is tested using the likelihood ratio test proposed by Hansen (1999) which allows to comfortably reject the null.[3]

The regression slope parameter estimates and their standard errors are also offered in table 1. As noted above, we allow for one regime-dependent variable, the lagged stock of capital. The regime-varying coefficients in the investment demand equation take values comprised between -1 and 0, implying that capital adjusts to its long-run equilibrium. These coefficients are all statistically significant and differ across regimes. The lowest value

[3] The null of one threshold against two thresholds was also tested and rejected (with a p-value of 0.04). Finally the null of zero versus one threshold was also rejected (p-value = 0.00).

corresponds to the central regime, while the highest is associated to the low income regime. This involves, as expected, that capital is adjusted at a higher speed when the lagged net farm income is more extreme than when it takes intermediate values.

The regime-dependent coefficients in the output supply equation are also statistically significant and suggest that increases in output as a response to an increase in capital stock are bigger in the higher income regimes where capital levels are higher. On the contrary, in the most unfavorable regime where capital levels are lower, increases in capital stock exert the smallest impact on output levels. This suggests increasing returns to capital stock. Finally, the variable input demand seems to increase faster with increasing capital levels as the economic conditions improve.

With regards to the regime-independent variables, a majority of coefficients are statistically significant and have the expected sign. The positive coefficient on the expected output price in all three equations suggests that an increase in the profitability of production causes an increase to both (variable and quasi-fixed) input demand and output supply. Our results suggest that changes in market interest rates do not exert statistically significant impacts on production decisions.

Of interest is the coefficient on decoupled payments, which is positive and statistically different from zero in all three equations. As noted above, decoupled payments can impact production levels through risk effects and also through dynamic effects. The coefficient on initial wealth, which is positive in all three equations, suggests the importance of risk effects. It is widely accepted that an agent's degree of risk aversion decreases with wealth (Sandmo, 1971; Hennessy, 1998). Hence, wealthier farmers, in being less risk averse, are likely to be more prone to expand their business size. In that decoupled payments contribute to enhance wealth, they will also lead to increasing output supply and input demand. Dynamic effects of payments should be relevant as lump sum transfers motivate capital investments. This hypothesis is confirmed below with the computation of the elasticities of output and inputs with respect to policy instruments. The coefficients on the variance of sales have the expected negative sign, but are not statistically significant.

In order to have a better gasp of the workings of the output supply/input demand system and to better assess the impacts of policy reform, we determine the sensitivity of the decision variables with respect to decoupled payments and for comparison purposes, output prices. As in Boetel, Hoffmann and Liu (2007), ours is a dynamic recursive system due to the inclusion of the lagged stock of capital as an explanatory variable. The elasticities are derived at the data means for all three regimes for different lengths of run. More specifically, to derive the base-scenario, the system of equations is solved forcing the solution to be in each regime alternatively and holding the explanatory variables at their mean levels. Once we have the regime-dependent solution, we increase decoupled payments by 5% and the solution to the system is re-computed. A comparison of the quantities in the base scenario with those derived after the shock allow to compute the elasticities for different time periods. The same operation is repeated to assess the impacts of a shock to output prices. Results are presented in tables 2 and 3.

With the exception of the output price elasticity in the long-run, empirical results show that both price and payment elasticities are inelastic both in the short and long-run. Payment elasticities are found to be small relative to price elasticities, a result which is compatible with previous research (Hennessy 1998; Sckokai, 2005; Serra et al., 2006). For example, after 10 years of a permanent 5% increase in output prices, all decision variables increase between 4.4% and 5.3%. However, a permanent 5% increase in decoupled payments is only capable of stimulating an increase in capital stock of around 1% and an increase in output supply and variable input demand between 1.9% and 3.0%. The differences between the effects of a price and a payment shock become more relevant over time, suggesting that output price dynamic effects are more powerful than payment effects.

It is also noteworthy that while payment impacts are small relative to the price impacts, they are higher than the ones reported by previous analyses that have ignored the dynamic investment response (see Serra et al., 2006; Moro and Sckokai, 1999). Both payment and price elasticities increase over time as a result of the dynamic effects. Price elasticities experience considerable increases within the ten-year period studied (investment demand elasticities increase sixfold, while output supply and variable input demand elasticities experience increases between 50-100%). Investment demand payment elasticities experience similar increases as price elasticities. Output and variable input payment elasticities experience milder but worth mentioning increases.

Capital stock elasticities suggest that adjustment is quicker for the extreme regimes than for the central one. This result is compatible with parameter estimates presented in table 1 and with findings in Boetel, Hoffmann and Liu (2007).

Concluding remarks

This paper assesses the impacts of decoupled government transfers on production decisions of a sample of Kansas farms observed from 1996 to 2001. Our model allows for risk, risk attitudes and the intertemporal investment decisions. We also allow for different adjustments of the decision variables depending on the predominant economic conditions. In each period, farmers are assumed to simultaneously choose the dynamics of the stock of capital, output levels and variable input demand. The theoretical model is estimated using the threshold regression methods proposed by Hansen (1999). Threshold effects are allowed to characterize the behavior of output supply and quasi-fixed and variable input demand.

The econometric results support the existence of three regimes characterized by different economic behavior. A first group includes firms receiving a low return to unpaid labor, management and equity, firms receiving an intermediate income belong to the second group, being the third group composed by firms receiving the highest income. Firms in the central regime have the slowest capital adjustments, while those in the more extreme ones adjust capital stock at a quicker rate.

In order to determine the impacts of decoupled payments on production decisions, we compute the elasticities of the decision variables with respect to these payments and, for comparison purposes, output prices. Our analysis suggests that in a dynamic setting with risk and non-risk neutral economic agents, decoupled transfers can have a powerful influence on decisions taken by economic agents. The dynamics of the stock of capital cause this influence to grow over time.

Compatible with previous research, the impacts of subsidies on output levels and input use are found to be considerably smaller than the effect of output prices. Interestingly, these differences are found to increase over time, suggesting that prices have stronger dynamic effects than payments. It is also noteworthy that while payment impacts are small relative to the price impacts, they are higher than the ones reported by previous analyses that have ignored the dynamic investment response (see Serra et al., 2006; Moro and Sckokai, 1999).

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Table 1. Parameter estimates for the system of first-order conditions

Variable	Investment demand			Output supply			Variable input demand		
	Reg 1 N=264	**Reg 2 N=429**	**Reg 3 N=231**	**Reg 1 N=264**	**Reg 2 N=429**	**Reg 3 N=231**	**Reg 1 N=264**	**Reg 2 N=429**	**Reg 3 N=231**
k_{-1}	-0.087** (0.014)	-0.047** (0.017)	-0.054** (0.011)	0.145** (0.015)	0.206** (0.018)	0.232** (0.012)	0.171** (0.016)	0.151** (0.020)	0.216** (0.013)
r			28,358.711 (119,211.530)			-128,899.700 (129,522.640)			-92,128.190 (142,323.920)
$\overline{p}$			3,741.107** (701.294)			6,358.136** (761.952)			5,114.701** (837.259)
S			0.088** (0.033)			0.511** (0.036)			0.354** (0.039)
w			-3,713.900** (1,272.710)			-6,049.580** (1,382.792)			-5,421.003** (1,519.459)
A_0			0.001** (5.141E-04)			7.647E-04 (5.585E-04)			0.004** (6.138E-04)
σ_A^2 / A_0^2			-131.165 (422.428)			-161.428 (458.965)			-110.172 (504.327)
R-squared			0.08			0.640			0.583
Threshold	**Estimate**					**95% confidence intervals**			
Lower					23,511				-17,989 – 33,511
Upper					55,617				39,617 – 191,117
LR test									70.579 (0.000)

Table 2. Elascities under the different investment regimes: Permanent 5% output price increase

Period	Investment demand			Output supply			Input demand		
	Reg 1	**Reg 2**	**Reg3**	**Reg 1**	**Reg 2**	**Reg3**	**Reg 1**	**Reg 2**	**Reg3**
1st	0.757	0.729	0.734	3.439	2.961	2.793	2.708	2.851	2.423
2nd	1.436	1.362	1.375	3.718	3.245	3.109	3.033	3.103	2.748
3rd	2.046	1.917	1.940	3.971	3.503	3.397	3.328	3.335	3.044
4rth	2.595	2.407	2.441	4.201	3.740	3.659	3.595	3.548	3.313
5th	3.090	2.843	2.887	4.410	3.957	3.899	3.837	3.744	3.559
10th	4.933	4.439	4.529	5.201	4.812	4.833	4.754	4.524	4.519

Table 3. Elascities under the different investment regimes: Permanent 5% decoupled payments increase

Period	Investment demand			Output supply			Input demand		
	Reg 1	**Reg 2**	**Reg3**	**Reg 1**	**Reg 2**	**Reg3**	**Reg 1**	**Reg 2**	**Reg3**
1st	0.170	0.163	0.165	2.645	2.278	2.148	1.794	1.889	1.605
2nd	0.322	0.306	0.309	2.701	2.305	2.188	1.862	1.921	1.656
3rd	0.459	0.430	0.435	2.752	2.330	2.225	1.924	1.950	1.703
4rth	0.582	0.540	0.548	2.798	2.353	2.258	1.980	1.977	1.745
5th	0.693	0.638	0.648	2.840	2.374	2.288	2.030	2.001	1.784
10th	1.107	0.996	1.016	2.998	2.457	2.406	2.222	2.100	1.935