

RESEARCH PAPER

A comparison of farmland value determinants in Chile between 1978-1998 and 1999-2008

Guillermo Donoso¹, José Cancino^{1,2}, Ricardo Olguín¹, and Daniela Schönhaut¹

¹Facultad de Ciencias Agrarias y Forestales, Pontificia Universidad Católica de Chile. Vicuña Mackenna 4860, Macul, Santiago, Chile.

²Universidad Tecnológica de Chile INACAP. Av. Vitacura 10.151, Vitacura, Santiago, Chile.

Abstract

G. Donoso, J. Cancino, R. Olguin, and D. Schönhaut. 2013. A comparison of farmland value determinants in Chile between 1978-1998 and 1999-2008. Cien. Inv. Agr. 40(1):85-96. Research on the determinants that influence the price of farmland has found renewed interest in the past decade because agricultural land values are an important source of information for tracing the distribution of benefits generated by agricultural growth. This study's objective is to identify the determinants of the value of agricultural land in Chile for the periods 1978-1998 and 1999-2008 to analyze the evolution of the factors that determined the price of agricultural land between these two periods. The explanatory power of the estimated hedonic land price model is significantly greater for the period 1978-1998 ($R^2= 67\%$). The lower explanatory power of the model for the period 1999-2008 ($R^2= 29\%$) indicates that factors not accounted for in the model have increased its importance during the past decade. Thus, a different set of factors determines farmland value for each time period. Further research is required to identify the determining factors of farmland value during the last decade. Some variables maintained their relative importance during both time periods. Such is the case of the importance of the distance between the farm and Santiago, which ranked second in both periods, and total farm surface, which ranked fifth. All other variables present changes in their relative importance. The price trend increased from the third to the first rank in the last decade. The price of the most important agricultural product increased 5 positions and was ranked third during the period 1999-2008. The distance of the farm to the regional capital increases from its previous position in 1978-1998 to the fourth position during the last decade. Other factors that increased their importance are the interaction between the distance to Santiago with the time trend and the presence of construction. The variables that reduce their relative importance are the farmland aptitude variables.

Key words: Agricultural land value, determinants of agricultural land value, hedonic agricultural land value model.

Introduction

Research on the determinants that influence the price of farmland has found renewed interest in

the past decade (Guiling *et al.*, 2009; Decimavilla *et al.*, 2008; Awokuse and Duke, 2006; Isgin and Forster, 2006; Miller, 2006; Goodwin *et al.*, 2003; Madison, 2000, and Plantinga and Miller, 2001). This interest is mainly due to agricultural land values being an important source of information

Received April 13, 2012. Accepted December 27, 2012.

Corresponding author: gdonosoh@uc.cl

for tracing the distribution of benefits generated by agricultural growth. Despite the recent general growth in agricultural production in Latin America and the Caribbean, poverty persists in the majority of the region's countries. After a series of domestic and trade policy reforms beginning over two decades ago that encouraged investment and integration into world markets, the value added of the agricultural sector saw a regional average growth during 2000-2005 of 3.2 percent (ECLAC/CEPAL, 2007).

Between 1985 and 2007, the value added of the agricultural sectors of all but a few Latin American countries (excluding the Caribbean) grew at over 2.5 percent, and in some countries it grew much faster (Valdés *et al.*, 2009). Nevertheless, development analysts who focus on the region (da Silva *et al.*, 2010) have noted that the modernization of agriculture – in some countries reaching levels of efficiency equal to the developed world – has not translated into a commensurate acceleration of rural poverty alleviation. The question for many is, “Who has benefited from this agriculture boom?”

To begin to answer the overall question of the distribution of gains associated with the agricultural growth experienced since the economic reforms, the researcher must address several issues. These issues include the evolution of the returns to farms of various sizes and product compositions, the returns to family and hired labor, and the myriad of factors determining the returns to labor, capital, and land. Despite the persistence of rural poverty, there is some evidence that agricultural labor as a whole in the region has benefited from the growth of the sector. Valdés *et al.* (2009) make use of periodic household surveys to measure the incomes of three groups in agriculture in five Latin American countries: salaried workers, self-employed workers (small farmers), and employers (medium and larger farmers). They show that in the cases of Brazil, Chile, and Mexico salaried workers in agriculture have captured an increasing proportion of incomes reported in surveys since

the early 1990s. In fact, in these three countries the average incomes of salaried workers has grown faster than for farmers (self-employed and employers). For Colombia and Paraguay, however, the proportion of total (reported) income going to small farmers has been growing, and in Colombia, the relative income of salaried workers has declined.

There are limits, however, to the use of household surveys to identify the beneficiaries of the recent agricultural “boom.” These surveys provide data on self-reported incomes, and as such, in the case of farmers large and small, they mix the returns to family labor, management, and owned assets. Incomes earned by owners of farm assets – notably land – who are not self-declared in the agricultural sector would not be included in this type of survey-based accounting. For example, urban professionals (physicians, lawyers and college professors) may be partners in a Chilean avocado plantation, hiring a farm manager who in turn hires manual laborers. Using a standard household survey, the professionals and their farm-asset-derived incomes are almost certainly counted in non-agricultural sectors, while the farm manager and his labor income would be counted in the agricultural sector. In short, agricultural land values are an important source of information for tracing the distribution of benefits generated by agricultural growth.

The methodology most commonly used to identify the determinants of land prices has been hedonic prices (Snyder *et al.*, 2007; Madison, 2000; Roka and Palmquist, 1997; Stewart and Libby, 1998; Ready *et al.*, 1997; Palmquist and Danielson, 1989; Miranowski and Hammes, 1984).

Schönhaut (1999) analyzes the prices of agricultural land in Chile with a hedonic approach for the years 1978-1998 using data from the advertisements of *El Mercurio* for the period 1978-1983 and from the *Revista del Campo* for the period 1984-1998, only considering properties larger than 30 hectares

to avoid the inclusion of suburban country plots. More recently, Odepa (2009) has addressed the question of the determinants of farmland values in Chile by employing a hedonic approach in which the geographical and temporal variations in the prices of land parcels of distinct attributes contain information regarding the marginal valuations by farmers and other potential buyers of these attributes. This study also uses data from the advertisements of *El Mercurio*, but for the period 1999-2008.

Taking advantage of these two data sets, this study's objective is to identify the determinants of the value of agricultural land in Chile for the periods 1978-1998 and 1999-2008, and to analyze the evolution of the factors that determine the price of agricultural land between these two periods. This comparison allows us to show how the relationships between farmland values and factors associated with the growth in Chilean agriculture have evolved during a period when the country has experienced economic growth.

This study analyzes the relationships between farmland values and its determinants associated with the growth in Chilean agriculture and with development, making use of advertised land prices in Chile's central valley between the Atacama and Los Lagos Regions, for the 1978-2008 period.

As a practical matter, farmland values will depend on different productive and non-productive factors. Among the productive factors affecting the value of agricultural land are intrinsic quality or potential soil use, property size, soil improvement in the form of physical works or plantations, and public infrastructure in the area, among others (Decimavilla *et al.*, 2008; Goodwin *et al.*, 2003; Madison, 2000; Just and Miranowski, 1993; Traill, 1979). There are conflicting results with respect to the influence of agricultural product prices on the value of farmland. Just and Miranowski (1993) established that prices of agricultural products significantly influence agricultural land value,

while Goodwin *et al.* (2003) concluded that this variable was not statistically significant.

With regard to productive factors and their influence on Chilean land values, Bravo-Ureta and Fuentes (2003) find that farm infrastructure, higher soil quality and a larger irrigated land area have a positive and significant impact on land value. These authors also conclude that property size and the distance between the farm and the closest city or highway present a significant negative effect on land value. Morandé and Soto (1992) conclude that attributes such as farm infrastructure and the existence of cattle do not affect land value, while the presence of fruit trees and vineyards present a positive impact on land value. Schönhaut (1999) confirms the results obtained by Morandé and Soto (1992) but argue that the lack of significant effects of farm infrastructure is due to its high heterogeneity and that this attribute was included as a binary variable in the hedonic price model, thus not reflecting this heterogeneity. Farmland size has also been found to significantly influence the per unit price of land. Hurtado *et al.* (1979) found that larger farmlands present a higher per unit price. However, Lin and Evans (2000), Troncoso *et al.* (2010), and Troncoso and Tobar (2005) concluded that the greater the extent of the property, the lower its per unit value. In addition, our model considers a land parcel's likely suitability for high-valued, export-oriented crops that have led Chile's agricultural boom to the possible impact of infrastructure development.

However, it is likely that land prices depend on non-agricultural factors, such as the demand for urban development on the urban-rural fringe. The impact of conversion pressures from rapidly expanding suburban areas, a non-productive factor, is well documented by Stewart and Libby (1998) and Guiling *et al.* (2009). Boisvert *et al.* (1997) and Goodwin *et al.* (2003) established that the population density of the closest city to the farmland is a good proxy of land conversion pressure, obtaining a positive and significant

effect of this variable on farmland value. Thus, we consider urban population growth as a proxy of the demand for urban development on the urban-rural fringe. Goodwin *et al.* (2003), to incorporate these non-agricultural factors as an explanatory variable of agricultural land prices, consider total construction permits in the municipality, population growth, and population density; due to lack of data on construction permits in the municipality and population density, we focus on municipal population growth.

Several researchers have analyzed farmland price determinants in Chile. The most recent study, conducted by Troncoso *et al.* (2010), estimates the impact of physical attributes of land as well as location and connectivity on farmland price. With this purpose, these authors analyze farm sales data from the province of Talca between 2003 and 2006. Bravo-Ureta and Fuentes (2003) analyze the factors that determine the value of agricultural land in Chile covering the period 1981-1996. On the other hand, Troncoso and Calderon (2000) and Troncoso and Tobar (2005) analyze the relationship between the profitability of agriculture and land prices for the periods 1983-1996 and 1983-2002, respectively. These authors estimated land values as a function of the ratio of prices received and paid by farmers for different products and inputs, respectively, concluding that farm profits do not significantly impact farmland values. Additionally, Hurtado *et al.* (1979) analyze the sale characteristics and conditions of 794 farmlands with areas greater than 30 hectares, offered for sale in different parts of the country during 1917-1970 and 1974-1978. The authors excluded the period 1971-1973 from the analysis, given the political instability in the country at that time.

With respect to the effect of geographic location, Troncoso and Tobar (2005) Bravo-Ureta and Fuentes (2003), and Hurtado *et al.* (1979) agree that farmland value is greater in the north of the country. Regarding the determinants of farmland prices, Troncoso *et al.* (2010) finds that the most influential

variable on the price of land is its geographic location. Farm size has a negative impact on the per hectare price, while accessibility, irrigation water availability and soil quality have a positive impact on price. Bravo-Ureta and Fuentes (2003) determined that the presence of infrastructure, soil quality and the percentage of irrigated land have a positive and significant impact on the value of the land. The same authors also conclude that the size and distance between the farm and the nearest city have a negative effect on land prices. Additionally, Morandé and Soto (1992) conclude that the presence of fruit trees and vineyards has a positive impact on the value of land. This result does not hold for other farmland attributes, such as animal production.

Thus, farmland values depend on various factors, such as geographic location, intrinsic quality or potential land use, property size, public infrastructure in the area, irrigated area, and investments in irrigation infrastructure. Moreover, because these factors change over time, so does the farmland value. However, there is no consensus on which are the most important factors influencing farmland value today and whether they have changed over time.

Materials and methods

In the short term, under the assumption of economic rationality, suppose that each farmer maximizes their net income by choosing the optimal use of variable inputs, z_t , for a given agricultural production surface; that is,

$$\pi(p_t, w_t, S_t) \equiv \underset{\{z_t\}}{\text{Max}} \{p_t y_t - w_t' z_t | f(z_t | S_t) \geq y_t\} \quad (1)$$

where $p_t \in \mathcal{R}_{++}$ denotes output price at time t ; $w_t \in \mathcal{R}_{++}^n$ is a vector of variable input prices at time t ; S_t represents the fixed available agricultural production surface; and $f(z_t | S_t)$ is a twice-differentiable, real-valued, and monotonic production function that is non-decreasing in S_t , is locally concave $\forall z_t \in N_\varepsilon(Z_t^*)$, and satisfies

weak essentiality in variable inputs. The Maximum Value Function satisfies the five properties of all profit functions. Additionally, according to the envelope theorem the profit function is non-decreasing in S_t , as

$$\frac{\partial \pi(p_t, w_t, S_t)}{\partial S_t} = \lambda_t \left(\frac{\partial f(z_t | S_t)}{\partial S_t} \right) \tag{2}$$

and λ_t is the shadow land value.

In the long term, the producer chooses the optimal production surface by maximizing the present discounted value of all future profits. More specifically, S_t^* is chosen to

$$V = \underset{\{S_t\}}{Max} \sum_{t=0}^{\infty} \pi(p_t, w_t, S_t) \delta^t \tag{3}$$

where V represents the agricultural land value. Thus, any productive variable that affects the future stream of profits will produce variations in land values; these are productive land value determinants, such as soil aptitude, irrigation, and production technology, among others.

However, as discussed previously, farmland values will depend on different productive and non-productive factors. Taking into account the importance of the variables discussed previously,

we propose the following econometric specification of the farmland hedonic price function:

$$LnV_t = \beta_0 + \alpha t + \beta_1 \ln(x_{1t}) + \sum_{i=2}^n \beta_i x_{it} + \gamma x_{DS} t + \varepsilon_t \tag{4}$$

where V_t is the real per hectare farmland price expressed in millions of \$/ha at constant pesos of 1998 (Chilean peso of 1998 = 0.0019 US \$); t represents the time trend and is included to capture farmland value tendency; x_{1t} is the agricultural property size (hectares); and $x_{it} \forall i \in [2, n]$ are productive and spatial variables, infrastructure and residential pressure variables, and agricultural export variables. The fifth expression of equation (4) is the interaction of time with the distance-to-Santiago variable (x_{DS}). Finally, ε_t is the stochastic mean zero error term. The variables considered in equation (4) are presented in Table 1. Because the hedonic price model is heteroscedastic, equation (4) is estimated with generalized least squares using a robust estimator of the variance employing White's correction (1980).

The farmland price trend increases for both periods, so we expect α to be positive and significant. The productive and spatial variables consider intrinsic attributes such as soil aptitude and spatial attributes such as the distance of the agricultural farm to

Table 1. Variables included in the farmland value hedonic function.

Variable	Type of Variable	Label
Price per hectare	Continuous	Natural logarithm of MMS/hectare
Surface	Continuous	Natural logarithm of the surface (hectares)
Time trend	Count	Time trend
Fruit aptitude	Binary	Takes the value of 1 when soil aptitude is fruit, 0 in any other case
Forest aptitude	Binary	Takes the value of 1 when soil aptitude is forest, 0 in any other case
Crop aptitude	Binary	Takes the value of 1 when soil aptitude is crop, 0 in any other case
Animal Production aptitude	Binary	Takes the value of 1 when soil aptitude is animal production, 0 in any other case
Construction	Binary	Takes the value of 1 when land has constructions, 0 in any other case
Distance to the regional capital	Continuous	Distance from farmland to the regional capital in kilometers
Distance to the national capital	Continuous	Distance from farmland to the national capital in kilometers
Price of the region's main agricultural product	Continuous	Price (Chilean Pesos of December 2008)
Constant	Continuous	Model Intercept

the main urban center. Decimavilla *et al.* (2008) and Guiling *et al.* (2009) find that agricultural land value corresponds to the present value of the future flow of agricultural profits. However, there are no disaggregate data on agricultural profits available; thus, the price of the region's main agricultural product, determined using ODEPA-INE (2007) data, was used as a proxy variable. This same procedure was employed by Schönhaut (1999) and Odepa (2009). Infrastructure is a dichotomous variable that refers to the presence of construction on the farmland.

The data on land prices were collected from content published in the ads of El Mercurio for the period 1978-1983 and from the ads of the Revista del Campo of El Mercurio for the period 1984-2008. The data correspond to land prices

published the first Sunday of January, March, June, and September. The data were restricted to agricultural land properties whose surfaces were larger than or equal to five hectares to exclude suburban country plots in the sample. Land prices were collected from the Region of Atacama to the Los Lagos Region. Data on the land's intrinsic attributes, such as soil aptitude, existence of construction, and irrigation infrastructure were also collected from El Mercurio ads. The number of observations for the periods 1978-1998 and 1999-2008 are 968 and 1105, respectively (Table 2).

Land price data were complemented by information on spatial attributes such as distance between the property and the main urban centers (regional and national capital). The prices of the region's main agricultural product were collected from ODEPA

Table 2. Descriptive statistics of land price determinants during 1978-1998 and 1999-2008.

	Period 1978-1998 No. observations: 968				Period 1999-2008 No. observations: 1105			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Time trend	11.240	5.820	1.00	21.00	6.364	2.732	1.00	10.00
Total surface (100 ha)	2.913	9.371	0.30	200.00	4.617	16.256	0.30	290.00
Distance to Santiago (100 km)	2.768	2.632	0.00	11.98	4.037	3.519	0.00	10.25
Distance to Regional Capital (100 km)	0.721	0.531	0.00	2.85	0.809	0.622	0.00	4.86
Presence of constructions	0.542	0.498	0.00	1.00	0.217	0.413	0.00	1.00
Cropland aptitude	0.323	0.468	0.00	1.00	0.109	0.311	0.00	1.00
Forestry aptitude	0.082	0.274	0.00	1.00	0.074	0.262	0.00	1.00
Frit aptitude	0.395	0.489	0.00	1.00	0.179	0.384	0.00	1.00
Animal production aptitude	0.200	0.401	0.00	1.00	0.127	0.333	0.00	1.00
Price of the main Ag. Prod (\$ unit ⁻¹)	64.828	79.014	4.96	453.30	172.699	127.772	82.12	835.93
Farmland unit price ha ⁻¹ (MM\$)	2.147	2.211	0.01	18.88	2.900	3.562	0.09	37.09

(2009). The distance of the farm to the region's capital was calculated using Google Earth.

Comparing mean values of the variables between periods (Table 2), we conclude that the offered average farmland size has increased in the last decade. Farms offered for sale during 1999-2008 are, on average, farther from Santiago than

those offered during the 1978-1998. Similarly, the average distance to the regional capital is slightly higher in the last decade. During the last decade, the average of all farmland aptitudes is lower compared with the period 1978-1998. The price of the most important agricultural product in the region increased significantly between both periods.

Results and discussion

The results of the econometric model estimated for the period 1978-1998 and 1999-2008 are presented in Table 3. The explanatory power of the model is significantly greater for the period 1978-1998 ($R^2=67\%$) than for 1999-2008 ($R^2=29\%$). The F-test statistic is associated with the following hypothesis:

$$H_o: H_o: \beta_i^{p1} = \beta_i^{p2} \forall i$$

$$H_a: H_a: \beta_i^{p1} \neq \beta_i^{p2} \text{ for at least one } i$$

where p_1 and p_2 represent period 1 (1978–1998) and period 2 (1999–2008), respectively, and has a p-value of 0.001. Thus, the null hypothesis is rejected, indicating that the determinants of land value have changed between each period. Thus, different sets of factors determine farmland value for each time period. Further research is required to identify the determining factors of farmland value during the last decade.

Both models show consistent results for all parameters in terms of sign, with the exception of the interaction of time with distance-to-Santiago

Table 3. Estimated coefficients of the farmland value hedonic function for the periods 1978-1998 and 1999-2008.

	Coefficient	SE	t-Student	Significance ¹
Period 1978-1998. Adjusted R ² 0.6666				
Time trend	0.021	0.007	2.95	***
Total surface	-0.029	0.002	-18.48	***
Distance to Santiago	-0.102	0.0224	-4.54	***
Distance a Regional Capital	-0.064	0.054	-1.19	
Presence of constructions	0.101	0.054	1.94	*
Forestry aptitude	-1.313	0.113	-11.56	***
Fruit aptitude	0.734	0.64	11.44	***
Animal production aptitude	-0.696	0.074	-9.40	***
Price of the main Agric. Product	0.001	0.000	2.48	**
Trend x dist. Santiago	0.002	0.002	1.39	
Intercept	0.107	0.095	1.13	
Period 1999-2008 (Adjusted R ² 0.2939)				
Time trend	0.049	0.018	2.74	***
Total surface	-0.013	0.001	-10.8.3	***
Distance to Santiago	-0.053	0.022	-2.39	**
Distance a Regional capital	-0.136	0.53	-2.56	**
Presence of constructions	0.334	0.084	3.97	***
Forestry aptitude	-0.609	0.142	-4.29	***
Fruit aptitude	0.262	0.087	3.00	***
Animal production aptitude	-0.034	0.109	-0.31	
Price of the main Agric. Product	0.001	0.000	2.67	***
Trend x dist. Santiago	-0.003	0.003	-0.82	
Intercept	0.417	0.136	3.07	***

¹Significance: ***: $P \leq 0.01$, **: $0.01 \leq P < 0.05$, *: $0.05 \leq P < 0.10$.
SE: Standard Error.

variable, which is positive for the first time period and negative for the second. However, this coefficient is not significant.

The coefficient associated with the farmland price trend is positive and significant at a 1% level of significance for both models, as expected, because farmland values have increased during both periods. The coefficient is at least two times greater for the period 1999-2008 than 1978-1998, thus indicating that farmland values have increased at a greater pace during the last decade. This increase may be explained by several factors, including increases in land productivity over time, the incorporation of new technology, the development of road infrastructure, the evolution of the sector's profitability, the growth of urban zones, and the growing limitation of available agricultural land.

The agricultural land surface has a negative effect on per-hectare land value and is significant at a 1% level of significance for both models. The negative effect of land surface on the per-hectare price can be explained in part by the greater transaction costs associated with the sale of larger agricultural farms. This result is consistent with the results of Schönhaut (1999) and Bravo-Ureta and Fuentes (2003) in their studies for Chile and with the results obtained by Guiling *et al.* (2009) for the State of Oklahoma in the United States.

In general, the parameter estimates of the group of productive and spatial variables are statistically significant in both models, with some exceptions. The distance of the farmland to Santiago has a negative and significant impact on farmland prices during both periods. It is interesting to note that this marginal effect on farmland prices has decreased during the last decade, which can be explained by the increase in public investment in rural connectivity during this period. Additionally, the coefficient of the variable distance of the farmland to the regional capital is significant in explaining farmland values during the last decade. This result could be explained by the

decentralization efforts, which have increased the importance of regional agricultural markets.

During 1978-1998, the fruit land aptitudes present a positive and statistically significant coefficient, while parameter estimates of animal production and forestry aptitudes are negative and significant. Thus, land with fruit aptitude presents a higher land value with respect to cropland, and forest and animal production aptitudes present lower land values than cropland. This also holds for the relationship between land aptitudes and land values for the past decade, with the exception of animal production aptitude, which maintains its sign but is no longer significant.

The price of the region's main agricultural product presents a positive and significant effect on farmland values for both periods, which is consistent with the results of Decimavilla *et al.* (2008) and Guiling *et al.* (2009), who indicate that agricultural land value is positively correlated with agricultural profits.

Finally, the interaction between time and the distance between the farmland and Santiago is not significant in either model. This result is inconsistent with the previous result indicating that the marginal effect on farmland prices of the distance from Santiago has decreased during the last decade with respect to the period 1978-1998. Thus, further research is required on the impact and its evolution over time.

Table 4 ranks the importance of each variable for each time period, where the importance is measured by land price elasticity with respect to each variable ($d(\ln y)/d(\ln x)$), where the Halvorsen and Palmquist (1980) methodology is employed when the explanatory variable is binary. Some variables maintained their relative importance during both time periods. Such is the case of the importance of the distance between the farm and Santiago, ranked second in both periods, and total farm surface, ranked fifth. All other variables present changes in their relative importance. The

price trend increases from the third to first rank in the last decade. The price of the most important agricultural product increases five positions, ranking third during the period 1999-2008. The distance of the farm to the regional capital increases from the last position during 1978-1998 to the fourth

position during the last decade. Other factors that increased in importance are the interaction between the distance to Santiago with the time trend and the presence of construction. The variables that reduce their relative importance are the farmland aptitude variables.

Table 4. Ranking variable elasticities for the periods 1978-1998 and 1999-2008.

		Elasticities "d(lny)/d(lnx)"	
		Period 1978-1998	Period 1999-2008
Fruit aptitude	2.855	Time trend	0.74 ↑
Distance to Santiago	-2.55	Distance to Santiago	-0.523 =
Time trend	2.251	Price of the main Ag. Prod.	0.284 ↑
Animal production aptitude	-1.623	distance to Regional capital	-0.275 ↑
Total surface	-1.381	Total surface	-0.257 =
Forestry aptitude	-0.961	Trend x dist. Santiago	-0.159 ↑
Trend x dist. Santiago	0.693	Presence of constructions	0.146 ↑
Price of the main Ag. Prod.	0.629	Fruit aptitude	0.102 ↓
Presence of constructions	0.529	Forestry aptitude	-0.084 ↓
Distance to Regional capital	-0.473	Animal production aptitude	-0.008 ↓

Source: own (2009).

Thus, the factors that determine farmland prices have significantly changed between the periods 1978-1998 and 1999-2008. Further research is required to determine the relevant factors for the last decade.

The results obtained in this study are consistent with those reported by previous studies of agricultural land values in Chile. Bravo-Ureta and Fuentes (2003) determine that the presence of infrastructure, time trend, and the percentage of farmland with irrigation have a positive and significant impact on land value. The same authors also conclude that land size and the distance of the farm to the closest city or highway present a negative effect on land price, which is in agreement with the results obtained in this work. Likewise, the results presented coincide with the results of Hurtado *et al.* (1979). These authors indicate that

the presence of infrastructure and the proportion of surface under irrigation have a significant and positive effect on land value. On the contrary, the distance from the capital of the province where the farm is located to Santiago has a negative impact. Likewise, the results obtained by Schönhaut (1999) indicate that the surface under irrigation has a significant and positive effect on land value, while the total surface of the farm and animal production or forest aptitudes have significant and negative effects on land values. Thus, our results are consistent with Schönhaut's (1999) results. Similarly, the results obtained in this study coincide with those presented by Guiling *et al.* (2009), who find a negative and significant effect of farmland size on the per-hectare agricultural land values for the State of Oklahoma in the United States.

Resumen

G. Donoso, J. Cancino, R. Olguin y D. Schönhaut. 2013. Una comparación de los factores determinantes del valor de la tierra agrícola en Chile entre los períodos 1978-1998 y 1999-2008. Cien. Inv. Agr. 40(1): 85-96. Este trabajo estima un modelo de precios hedónicos para identificar los principales factores que determinan el precio de tierras agrícolas para el período 1978-1998 y 1999-2008. El poder explicativo del modelo es significativamente mayor para el período 1978-1998 ($R^2 = 67\%$). La menor potencia explicativa del modelo para el período 1999-2008 ($R^2 = 29\%$) indica que los factores no considerados en el modelo han aumentado su importancia en la última década. Por lo tanto, un conjunto diferente de factores determinan el valor de tierras agrícolas para cada período de tiempo. Se requiere investigación adicional para identificar los factores determinantes del valor de tierras agrícolas durante la última década. Algunas variables mantuvieron su importancia relativa durante los dos períodos de tiempo. Este es el caso de la importancia de la distancia entre el predio agrícola y Santiago, factor que ocupó el segundo lugar en ambos períodos, y la superficie agrícola total, que ocupa el quinto lugar. Todas las demás variables presentan cambios en su importancia relativa. La tendencia de los precios aumenta desde el tercer lugar al primero en la última década. El precio de los productos agrícolas más importantes subió posiciones, ocupando el tercer lugar durante el período 1999-2008. La distancia de la granja a la capital regional aumenta desde la última posición durante el período 1978-1998 a la cuarta posición en la última década. Otros factores que incrementaron su importancia son la interacción entre la distancia a Santiago con la tendencia en el tiempo y la presencia de construcciones. Las variables que reducen su importancia relativa son las variables de aptitud de las tierras agrícolas.

Palabras clave: Determinantes del valor de las tierras agrícolas, , modelo hedónico de precios de la tierra agrícola, Valor de tierras agrícolas.

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