

Examining Patterns in and Drivers of Rural Land Values

Corey Allan and Suzi Kerr

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Motivation

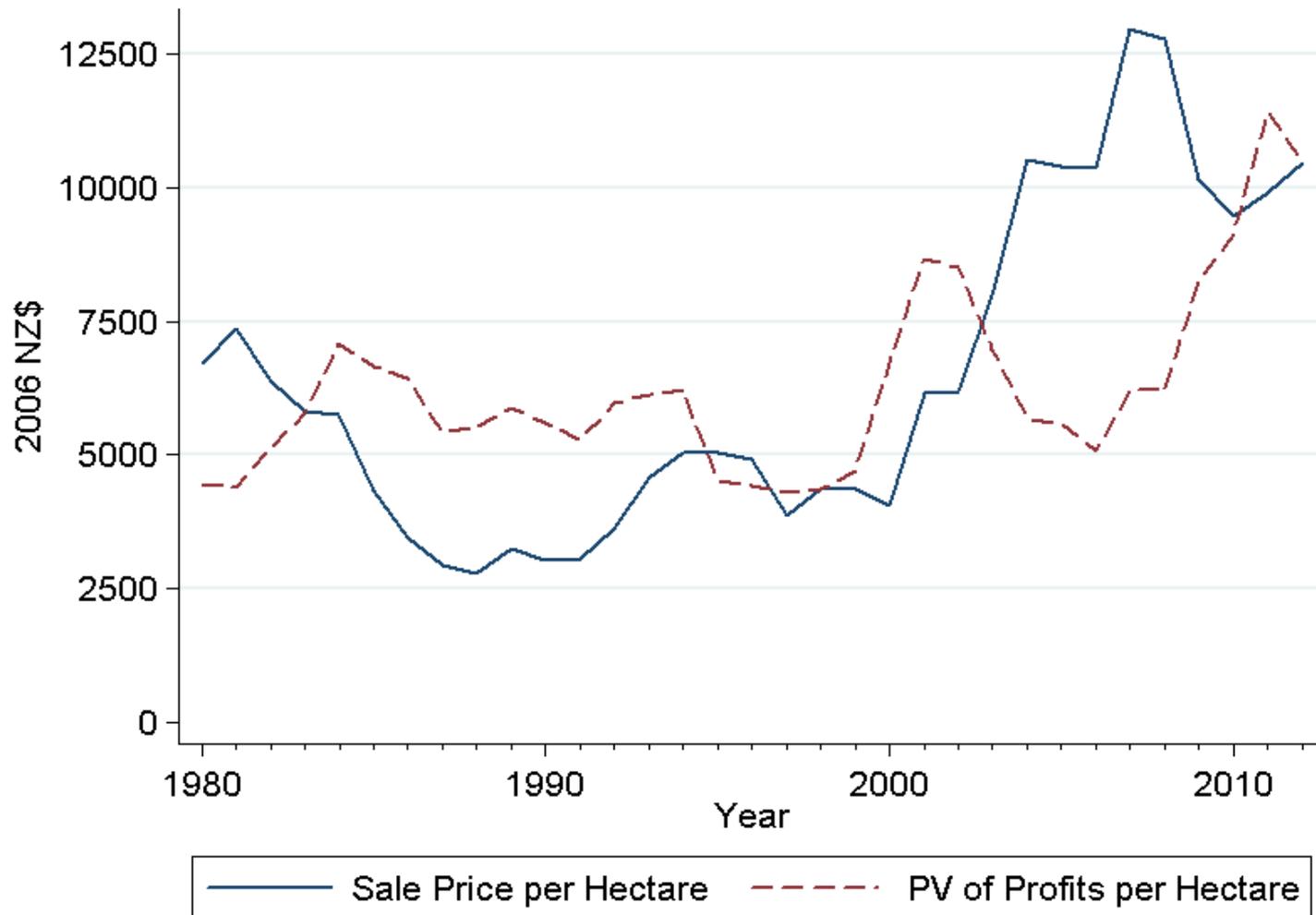
Rural land is a key input into agricultural production and a key source of wealth in New Zealand

Relatively little known about the drivers of rural land values in New Zealand



Motivation

Rural sale price per hectare and present value of profits per hectare
(5% real discount rate)



Conceptual Framework

$$LV_{ijt} = \sum_{s=0}^{\infty} \frac{E\pi_{ij^*,t+s}}{(1+r)^s}$$

where

$$\pi_{ijt} = p_{jt}Q_{ijt} - c_{ijt}(Q_{ijt})$$

and

$$j_t^* = \operatorname{argmax}_j \left\{ \sum_{s=0}^{\infty} \frac{E\pi_{ij^*,t+s}}{(1+r)^s} : j \in \{D, SB, F, C, H\} \mid E_t(\mathbf{P}, \mathbf{A}) \right\}, \forall t$$

Conceptual Framework

Farmland is more than an input to agricultural production

Amenity value of farmland

$$LV_{ijt} = \sum_{s=0}^{\infty} \frac{E\pi_{ij^*,t+s} + V(M_{ij^*,t+s})}{(1+r)^s}$$

Conceptual Framework

Farmland also has an option value – the option to convert to a non-agricultural land use in the future

$$LV_{ijt} = \sum_{s=0}^c \frac{E\pi_{ij^*,t+s} + V(M_{ij^*,t+s})}{(1+r)^s} + \sum_{s=c}^{\infty} \frac{R_{iU,t+s}}{(1+r)^s}$$

Empirical Strategy

Estimate long-run equilibrium relationship between present value of expected profits and land values

$$\log Value\ha_t = \beta_0 + \beta_1 \log PV EProfit_t + \beta_2 Trend + \epsilon_t$$

We observe current profits – conceptual framework emphasises long-run expected profitability

Empirical Strategy

$$PV EProfits_t = PV \widehat{Profits}_t + \eta_t$$

Problem: even assuming prices follow a random walk and ignoring productivity trends, our measure of expected profits contains measurement error because of, for example, droughts

Solution: IV estimation strategy, using global agricultural commodity prices as an instrument for profits.

Data

QVNZ Data

Sales

- 1980-2012
- Total sale price, land area sold, number of sales by MB/year/QV use category
- Variable of interest – average sale price per hectare

Valuations

- 1989-2012
- Total capital value, land area assessed, number of assessments by MB/year/QV use category
- Used to check representativeness of sales data
- Weights derived from land area assessed

Data

Profit data – Beef and Lamb NZ and MPI Monitor Farm Reports

- Dairy and sheep/beef economic farm surplus
- Assume a form of adaptive expectations

Commodity prices from Kerr and Olssen (2012)

- Unit export prices for dairy, meat/wool
- Adjusted for removal of agricultural subsidies
- Create a trade weighted agricultural commodity price index



Results

	OLS	IV	IV
$\log PV PROFITS_t$	0.222 (0.207)	1.256*** (0.406)	
$\log PV PROFITS_{t,1982}$			1.096*** (0.283)
<i>Trend</i>	0.037*** (0.0086)	0.024** (0.011)	0.037*** (0.007)
<i>Constant</i>	-51.33*** (16.9)	-50.566*** (19.2)	-74.68*** (13.9)
<i>T</i>	31	31	31
R^2	0.583	-	-
<i>EG</i> τ -stat	-3.584 ⁺	-3.752*	-4.211**

Effects of macro conditions on land values

$\frac{\textit{impaired assets}}{\textit{gross lending}_t}$	-0.061*** (0.018)
<i>Constant</i>	0.101 (0.102)
<hr/>	
<i>T</i>	23
<i>R</i> ²	0.145

Notes: The left hand side variable in the above regression is the residuals from the regressions column 2 of the previous slide. Robust standard errors are in parentheses. *** indicates statistical significance at the 1% level.

Low levels of credit availability reduce option value and may affect current profitability

Conclusions

Strong long-run relationship between profits and land values – close to 1.

No sign of long-term irrationality in market for rural land

There are periods when the value of rural land is higher than implied by profitability:

- when credit is easily available so land use change is more rapid, and
- the economy is doing well in general so may reflect higher amenity and option values