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Minnesota Agricultural Economist

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Minnesota Farm and Timber Land Prices Stay Up in 1999

Steven J. Taff

Average Minnesota farmland prices rose again in 1999, according to our just-released sales figures. The number of sales was off by 20 percent from 1998, perhaps signaling some slowdown in the number of parcels offered for sale. But the average price, measured in several different ways, exceeded that of 1998. Farmland markets still provide no evidence of an impending rural crisis. In this article, I'll tell you how I came to these conclusions.

Why So Late with the Figures?

Longtime readers of *Minnesota Agricultural Economist* are accustomed to receiving the farm real-estate issue every January. Not this year. Up to now, we were able to publish previous-year data so quickly because the state had a special fast-track reporting procedure for farmland sales. That special reporting procedure is no more: the 1999 legislature repealed the law that (indirectly) necessitated it. The state now processes farmland sales at the same pace as all other property types. As a result, we don't get final sales data for the October–September record year until the next April. Barring future legislative action, this timing is unlikely to change.

Your patience is rewarded, at least in part, by the fact the April data almost always contain more sales than the fast-track, but provisional, data of years gone by. For consistency, I've gone back and pulled out all the past ten years' April reports. That gives us over 25,000 farmland sales to examine in this article.

Farmland Sales

All sales summarized in this article are from the state's repository of certificates of real-estate value, filled in by the buyer at the time of a transaction. Prices are adjusted by the Department of Revenue to reflect the terms of a contract for deed, if any, and to account for inflation since January 1 of the sale year. To be counted as "farmland" for present purposes, a transaction must be listed as agricultural use before and after the sale, cover twenty acres or more, and have a per-acre price of less than $10,000.

For each sale, we know (among other information) the sales price, the size of the parcel, the number of tillable acres (usually), the soil productivity rating (sometimes), the sale date, and the township or city within which the parcel is

(See *Sales Prices* on page 2)

How Do Farmland Values Respond to Changes in Returns and Rents?

Bill Lazarus

Farmland values went through boom and bust in the 1970s and 1980s, probably due to the volatile farm income situation at the time. Today, farm income is once again volatile as gyrating commodity prices, compensatory government policies, and unpredictable weather interact. How might all this affect future farmland values? Will we see a return to the devastating cycle of the early 1980s? To find out, let's explore the historical relationship between crop returns, cropland rents, and farmland values in Minnesota.

How Much Rent Should a Farmer Pay?

Over the long run, logic suggests that

- tenants can't pay land rents higher than the amount of money that remains from the sale of product minus the cash costs of operating the farm—called the "breakeven" rent, and
- tenants' expected net returns from crops are probably the main factor that determines how much rent they should pay.

In this article, for the sake of simplicity, I'll focus only on the returns from corn and soybean production and will ignore costs and returns from other farm enterprises—such as livestock production, which may subsidize or draw from the crop enterprises during the year.

Expected Net Returns

The expected net return of tenants, however, involves making predictions about future crop prices and yields, government subsidies, and cash expenses. To calculate the expected rate of return for tenants who rent cropland, I gathered cost, income, and land-rental rates from the 1983–99 annual reports of the Southwestern Minnesota Farm Business Management Association (SWFBMA) and calculated a breakeven rental rate by subtracting out land costs from total costs. The results are shown in table 4.

(See *Farmland Values* on page 9)

University of Minnesota Extension Service

Figure 1. Distribution of 1999 Minnesota farmland sales

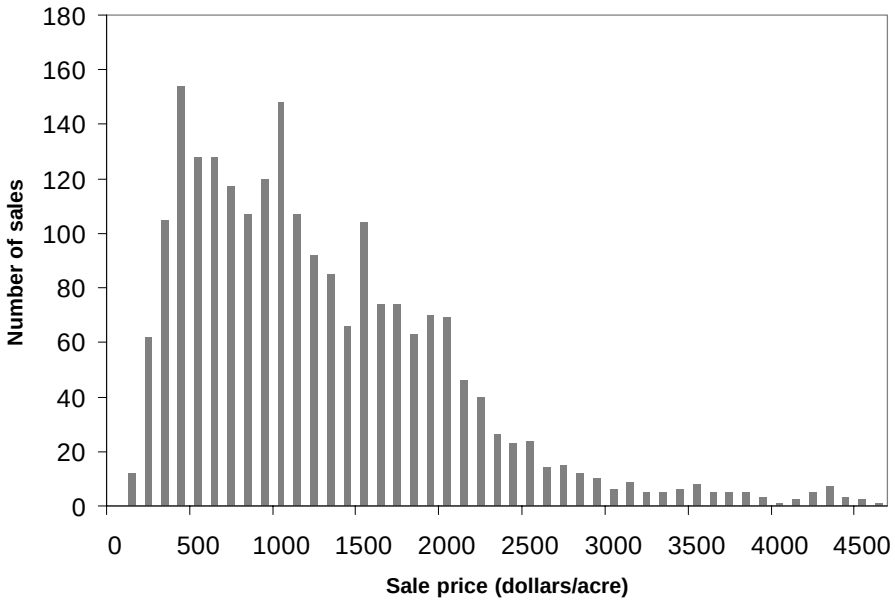


Table 1. Statewide Minnesota farmland sales

	1998	1999	Percent change
Number of sales	2,724	2,214	(18.7)
Acres sold	303,968	245,842	(19.1)
Median price	$1,000	$1,023	2.3
Transaction mean price	$1,183	$1,273	7.6
Area mean price	$1,016	$1,055	3.8
Location-weighted median price	$1,079	$1,143	5.9

Figure 2. Farmland sales reporting districts

(*Sales Prices* from page 1)

located. Sales are summarized on an October 1–September 30 "record year" basis.

All the raw sales data have been posted to the new Minnesota Land Economics Web site. Just point your browser to http://apec.umn.edu/landeconomics. You can select the locations and years of coverage, then view the results on your screen or download the data for later use. (For more information about the Web site, see the special section at the end of this article.)

The Sales at a Glance

We never, of course, see an average price of land: what we observe are prices associated with thousands of transactions. To start to tell an economic story about these sales, it's useful to first construct a price histogram (figure 1), a summary chart that shows how many sales fall into various per-acre price ranges. The higher the bar, the more of the sales were in that price range.

Even though examination of the histogram really tells us a great deal—note especially the wide range of prices—most readers want it distilled into a single number, an "average," that is expected to capture at least a flavor of the full distribution. (Later I'll discuss whether or not I think this is a good idea in the first place.) This is easier said than done; we've got several possible averages to choose from. In table 1, four are presented: median, transaction mean, area mean, and location-weighted median price. Which is best? It depends.

The transaction mean is the simple arithmetic mean of the per-acre sales prices: it treats every transaction equally and gives what we might call the "typical price." It is not disproportionately influenced by the actions of a single large sale involving only one buyer and one seller, so it suggests how nonrepresented market *actors*—future buyers and sellers—might value other lands sold in the future.

The area mean is weighted by the size of the parcel: it treats every acre equally and gives "the price of a typical acre." It better hints at the sale price of any given future piece of *land,* because giving greater weight to larger parcels better reflects the pool of unrepresented acres.

Table 2. Minnesota farmland sales prices by region

	1998			1999		
	Number	Acres	Median price	Number	Acres	Median price
North West	352	54,465	410	289	42,710	419
North Central	67	8,686	384	99	12,335	475
North East	25	2,416	567	20	1,716	458
West Central	469	55,834	753	336	41,021	860
Central	579	58,220	952	461	44,288	1,000
East Central	291	23,774	842	288	20,535	950
South West	297	37,544	1,333	218	28,656	1,398
South Central	357	33,676	1,813	270	31,020	1,879
South East	287	29,353	1,334	233	23,561	1,457
STATE	2,724	303,968	1,000	2,214	245,842	1,023

The median price is the per-acre price above which half the transactions fall. I use this frequently in this article because it is the most stable of the averages in the face of extreme values. It doesn't change if a handful of sales are really big, for example.

Finally, the location-weighted median, which I discuss in more detail below, provides an average price that better deals with the sampling problems that beset all sales price data series. It is designed to give a consistent and representative indicator of land prices over a period of time.

All four of the statewide averages in table 1 were higher in 1999 than in 1998. For the most part, price increases were seen at the sub-state level as well. Even in regions beset by low commodity prices, the median price ticked upward (table 2)—in some cases substantially. (Sub-state, regional boundaries are shown in figure 2.)

Regional Differences in Land Prices

The average prices summarized in table 2 are calculated from distributions that vary across space and time, just as did the statewide distribution in figure 1. Box-and-whisker plots can be used without losing much of this useful distribution information (figure 3). The range of sales prices for each region for each year is shown by the endpoints of the vertical lines. The ends of each box show the prices at which 25 percent of the sales were higher (or lower). The median is indicated by the horizontal bar within each box.

With these charts you can track the progress of the average (median, in this case) sale price by eyeing just the horizontal bars. Or you can get an idea of the change in the bulk of the data by looking at how the height and the size of the box (the "interquartile range") change over time.

When we examine the numbers, it is clear that the driving force in the rise of median sales prices noted in figure 3 was an increase in the number of sales at the higher end of the price distributions. More sales at the high end pull up the median, or midpoint, price. Figure 3 also shows that the dispersion of prices, suggested by taller boxes, also increased in recent years.

Within-Year Price Changes

Knowledgeable farm real-estate people tell us that farmland market activity can vary substantially during the course of the year. Do our data bear this out? Are there any discernible patterns in sales volumes or sales prices (figure 4) when viewed on a quarterly basis? You bet there are. Notice how the highest prices and (usually) the largest number of sales are reported in the January–March quarter of each year. Note also the fact that, year in and year out, between 200,000 and 300,000 acres of farmland (roughly 1 percent of the state's farmland total) are sold, even though each year the buyers and sellers are different people.

Other Price Series

Our U of M (University of Minnesota) study reports what *actually* happened last year, not what somebody thinks *might* happen next year. How does our study compare to studies that attempt the latter?

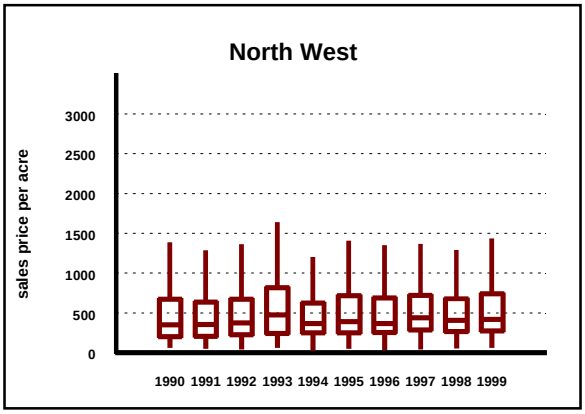
Each spring, the USDA (United States Department of Agriculture) reports an estimated farm real-estate value (land plus buildings) for the whole state. Sampled landowners were asked (in the preceding fall) what they thought their farms would be worth on the coming January 1. The responses are combined to give a statistically valid average for the whole state, but not for any sub-state areas.

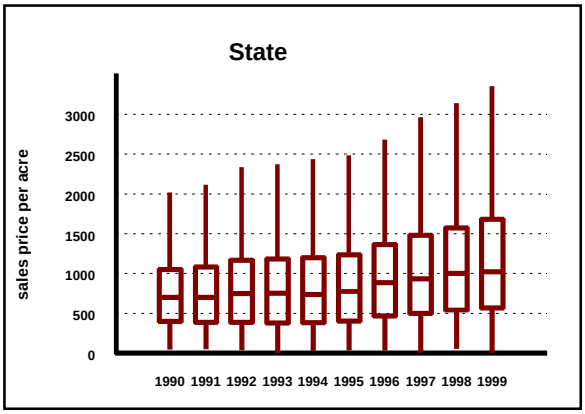
Each fall also, Minnesota county assessors estimate the market value of each parcel in their jurisdictions as of the coming January 1. This information is made public in the so-called mini abstracts, released in late spring. I combined these data for each of the 1,840 townships and cities that reported for the entire 1993–99 period. I divided the total estimated market value by the number of reported farmland acres to create a size-weighted mean sales price.

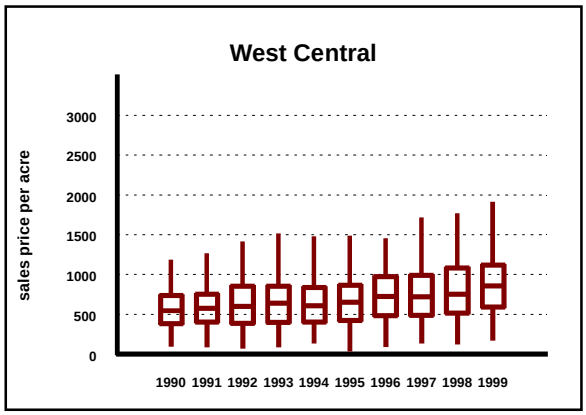
For the past several years, at least, actual sales prices have tracked both the USDA and assessor value estimates fairly closely (figure 5). Although I don't show it here, this is true for the assessor estimates at the regional level as well.

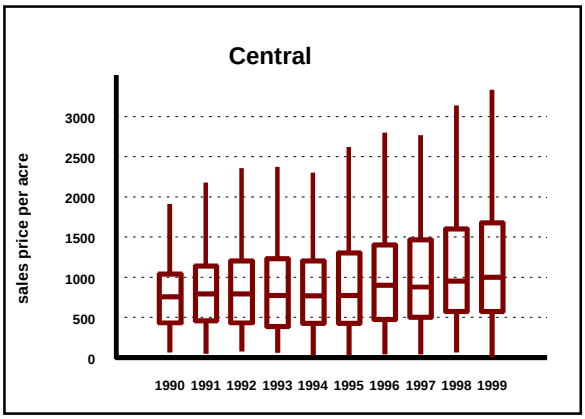
(See *Sales Prices* on page 5)

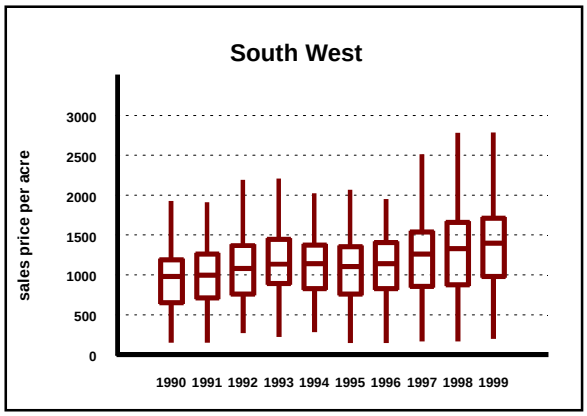
Figure 3. Minnesota farmland price distributions by reporting district

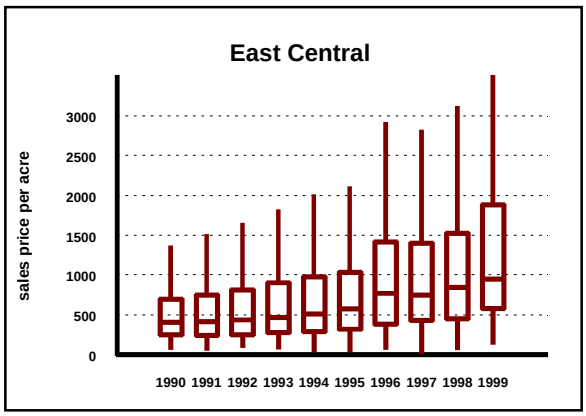


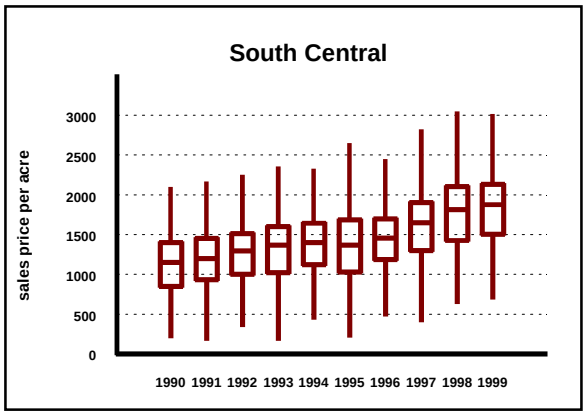


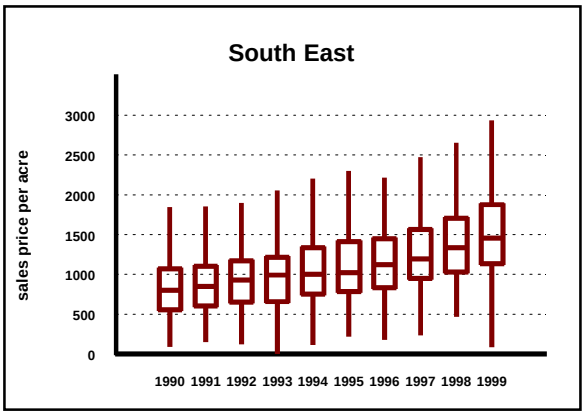












(*Sales Prices* from page 3)

It looks like the two predictors are pretty good—if a single "average" is what you want. This is useful to know, because it gives you some options in your explorations of farmland markets. If all you need is a prediction of price movements in the coming year, use the USDA number, which is available in April. If you need sub-state predictions, wait until June and go to our new Web site, where I post the assessor estimates as soon as they're released. But if you want real market evidence, not predictions, you've got to wait until April the following year when the U of M study comes out.

I speculated on the origins of such consistency among the farmland series in last year's farmland price report (http://www.extension.umn.edu/newsletters/ageconomist/ag237-695a.html). Briefly, I argued that there is no single market for land in Minnesota. Instead, there are hundreds of quite local markets, made up of but a very few potential buyers and sellers, and guided by a handful of appraisers and assessors. It might be these markets' circularity that forges the convergence of predicted and observed prices.

Can We Trust the Average?

The average price of an acre of land is really just an index, a number that summarizes a group of transactions over the years. Indexes are everywhere: the Dow-Jones average, the world's average temperature, the average speed of the Internet. All take a set of disparate observations—the prices of each of several stocks, the temperatures at each of thousands of sampling stations—and combine them into single numbers that purport to tell us something useful.

In many instances, indexes are calculated from repeated readings of the same stock, or at the same location. But in land sales studies, each observed transaction is for a different piece of land: we rarely see the same parcel sell more than once in a number of years. We opportunistically use observed sales as a "sample" from which to estimate the average price of *all* land—sold and unsold combined.

But the average of our sample (which statisticians sometimes call a "sample of convenience") may not be a good estimate of what we really want, the (hidden) average of all parcels.

Figure 4. Minnesota farmland sales by quarter

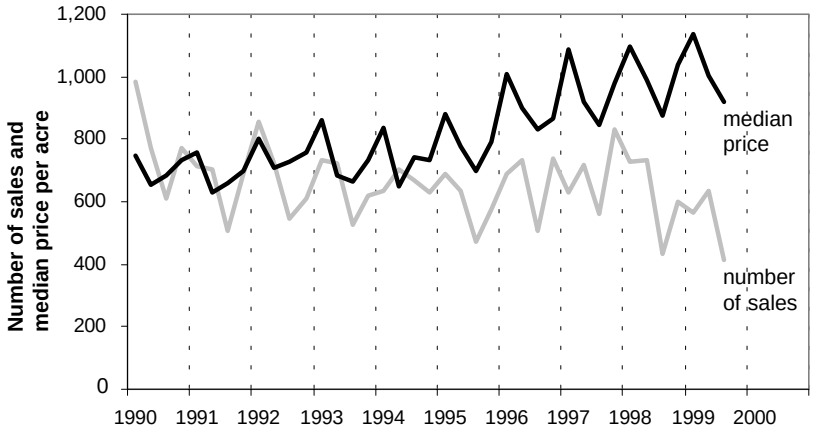
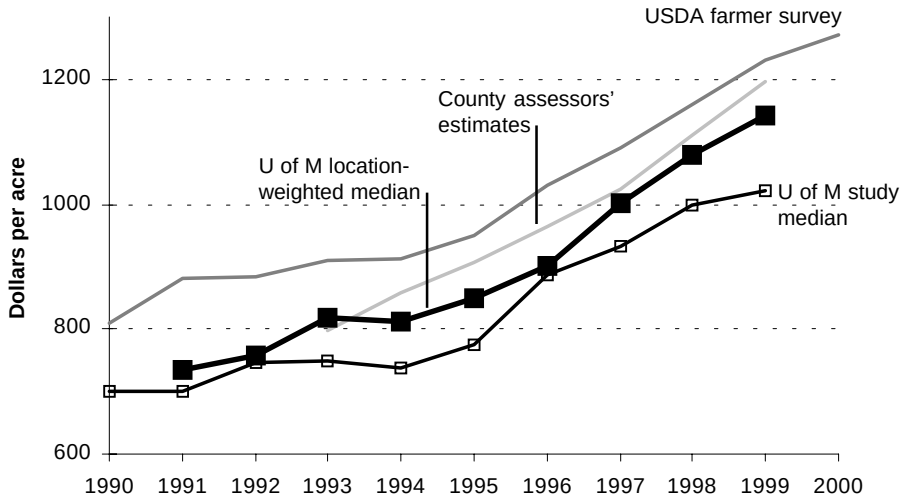


Figure 5. Estimates of average Minnesota real-estate values



For example, consider what in previous articles I've dubbed the "Problem of Composition." If proportionately more sales in one year happen to be from a lower-value geographic area than was the case in the previous year, then the calculated average sale price for the whole state will be lower, all else being equal—even if the true (unobserved) average price of all land remained unchanged. We need some way to ensure that geographic areas are treated equally from year to year.

The calculated average sales price can also be influenced by what I'll call the "Problem of Representation." If observed sales happen to be from parcels that disproportionately represent one end of a wide range of prices for all parcels, both sold and unsold, then the sample's average again can mislead us. The wider the range, the more likely it is there will be representation problems. We need a way to calculate an average that best reflects the range of real prices in the area. For this we need a price distribution that is fairly tight.

A solution—well, at least an approach—to dealing with both these problems is laid out below.

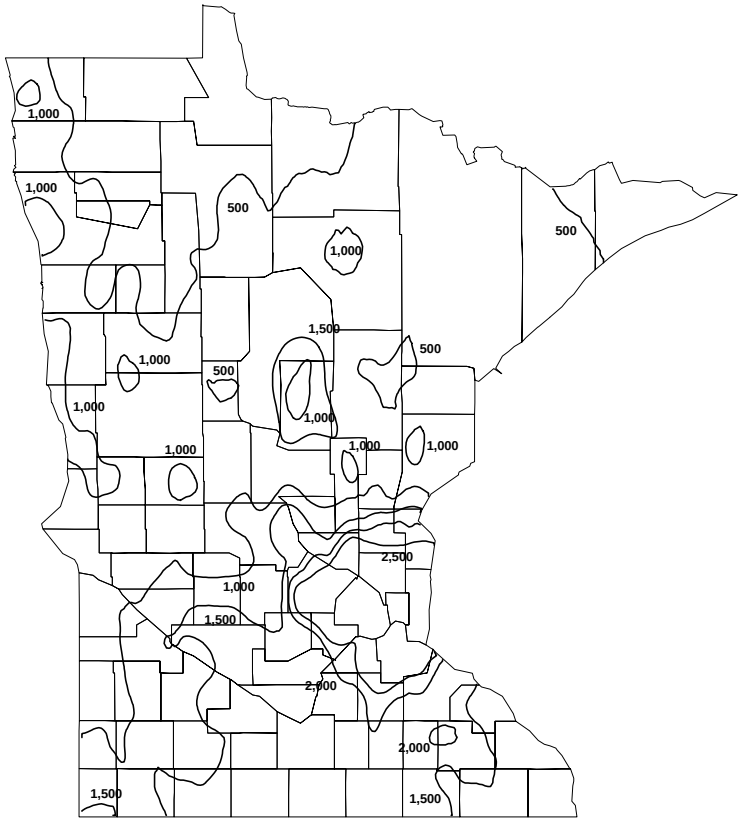
A Location-Weighted Average Price

One way to deal with the Problem of Representation is to base it on samples that are small enough for the (unknown) per-acre price distribution to be tight and, at the same time, large enough to provide a useful number of observations.

I have chosen to use counties for this purpose. Townships would be too small: there are many that have no land sales at all from year to year. The USDA National Agricultural Statistics Service's reporting districts, like those used in figure 2, would be too large: there is

(See *Sales Prices* on page 6)

Figure 6. Location-weighted median sales price of farmland in Minnesota



(Sales Prices from page 5)

such a wide range of land types within a typical district that we would have trouble maintaining our tight distribution requirement. So, calculating the annual median sales price for each county is our first step.

The Problem of Composition can be dealt with by ensuring that the relative influence of the average price from any given county is consistent from year to year. Here, I've chosen to weight each observed county median price by that county's proportion of the state's total farmland. That way, sales from counties where there is the most farmland are given the most emphasis in creating an overall state average price.

So the next step is to multiply each county's weight by its median price. The location-weighted median price is simply the sum of the weighted prices. Figure 5 shows how this new series compares to the other measures we've used.

The Geography of Prices

Minnesota is characterized by one of the widest ranges of agricultural production conditions of any state. These extremes in production—part due to climate, part due to soils, and part due to historic accident—are reflected by an equally wide range of land prices, as can be seen in the map in figure 6, which is built from township average sales prices over the past three years. I chose to put the data into contour form to hide some of the reporting irregularities that beset any real dataset, and to show that the geographic distribution of prices, while by no means uniform, is also not random. There is a clear gradient of downward prices as one moves from the south and southeast to the northwest.

Get Your Timberland Sales Data Here!

Timberland and farmland tend to be bought and sold in separate markets in Minnesota. But these transactions are recorded in the same way as farmland, so similar data analyses can be carried out. I'll give you only a taste here, since this is supposed to be, after all, an article about farmland prices.

The Minnesota timberland market has at least two distinct sub markets, primarily characterized by the size of the parcel. It seems reasonable to suppose that smaller parcels (less than 40 acres for present purposes) are intended largely for recreational use, even though their designation on the certificate of real-estate value is "timber," both before and after the sale. These smaller parcels are selling at a much higher price per acre than are the over-40 timberland parcels (figures 7 and 8). Note, too, the ten- to twenty-fold difference in the total acres sold each year in the two size classes.

The districts listed in table 3 are the same as we used for farmland sales (figure 2). I include only those that had a substantial number of sales. Not surprisingly, most timberland market activity in Minnesota is in the northern and northeastern parts of the state—just the opposite of farmland sales. The price reported here is the area mean for the district, and the year is the same October–September record year used in the farmland sales report. The state average shown in the table is the regular area mean, not weighted for location as in figure 6.

Because there are relatively few reports of smaller (less than 40 acres) sales, I would expect unusually high-priced or relatively large parcels to lead to volatility in calculated averages. That would seem to explain the observed swings in average price in this sales class in, for example, the North West and North Central districts, which declined considerably from 1988 to 1999—the opposite of the other areas. In addition, 1998 was a particularly active year in timberland sales, as figure 7 clearly shows.

I've added the raw timberland sales data to the new Web site, so you can explore further some of these market nuances yourself.

Why Are Prices Up?

Turning again to farmland prices, it has to be asked. If farming is as unprofitable as we have been led to believe, why are land prices still going up? I can think of four possible reasons. The first is that maybe prices really aren't "too high" at all. Maybe it's that people are accepting a lower rate of return in farmland than they used to.

A second reason might be that, for many farmers, farming really isn't all that unprofitable, especially with the substantial government subsidies of the past few years. We know for a fact that

some producers, year after year, net more from a typical acre than do their neighbors. Maybe these folks are buying land and making money from it.

A third reason might be that the real-estate market values farmland less and less for what it produces and more and more for the overall financial advantages (including eventual sale, perhaps for nonagricultural uses). What may not make sense on a per-acre basis may make abundant sense from an overall farm financial perspective.

And the fourth reason? Perhaps we just haven't waited long enough; perhaps prices will start coming down in 2000—despite predictions to the contrary. (You'll want to check back with us next year to find out.)

And Finally…

I think the economics profession (and the real-estate profession and the media—plenty of blame to go around here!) has lulled people into thinking that the average price of land is both straightforward to calculate and easy to interpret once reported. I don't agree. I think The Average is one of our most dangerous mathematical constructs. It can obscure more than it reveals, and it very often tells us a misleading story. Far better is for *you* to form a judgment about the movement of all prices by looking at the data yourself. That's why we give you price distributions in this report.

And if you're wondering about a particular piece of farmland that you happen to own and are thinking of selling—don't trust averages at all! Hire an appraiser, talk to local realtors, examine your personal needs and aspirations for that land. You're sitting on too big a store of wealth to be making decisions based on summaries of what other people think.

Now it may seem that I've spent this article criticizing what, after all, the University of Minnesota has been doing since 1917—publishing an annual investigation into farmland values. Far from it! I argue, on the contrary, that many people can validly use the data we report. But I want, at the same time, to use these articles to teach readers how to be better consumers of the numbers we produce. I'm confident that such knowledge will lead to a better-functioning Minnesota economy, one where both buyers and sellers of land enter open-eyed into potential transactions.

Figure 7. Sales of smaller timberland (under 40 acres) in Minnesota

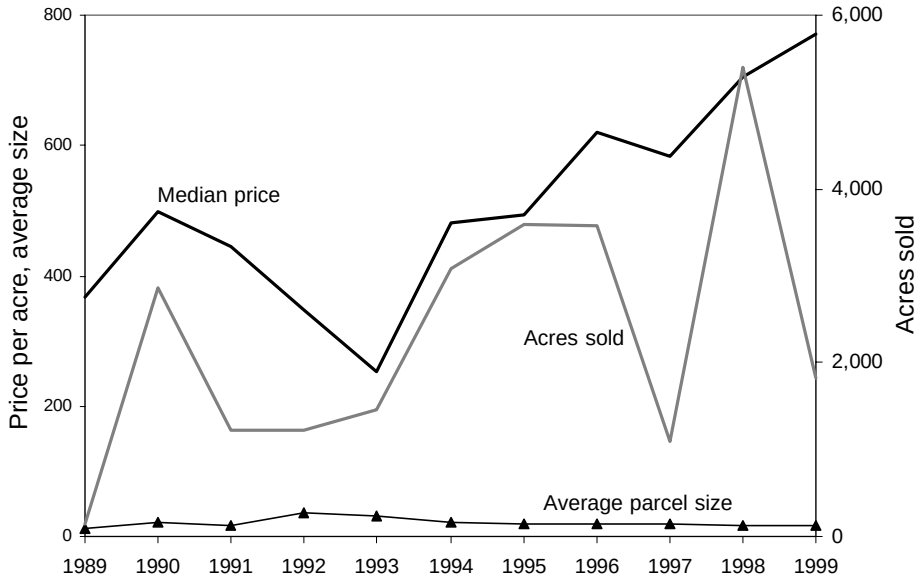
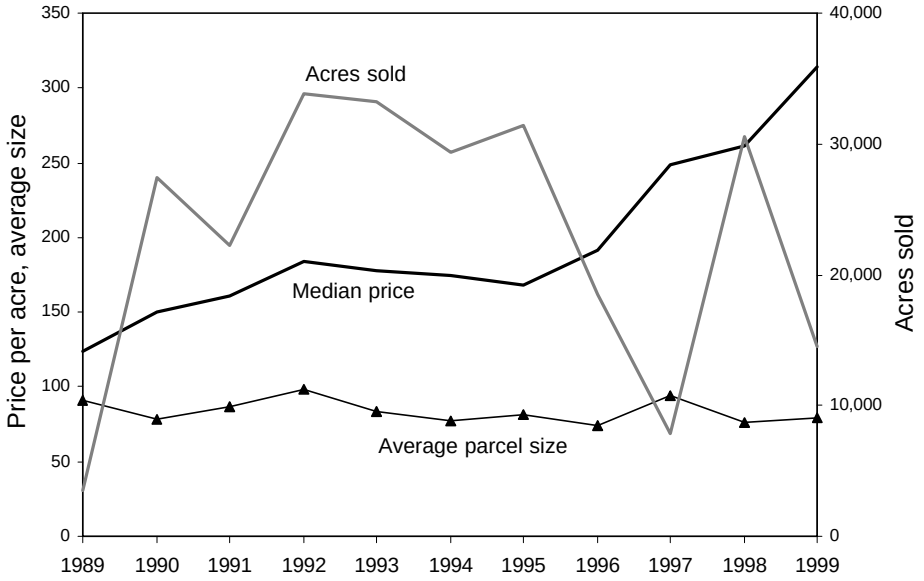


Figure 8. Sales of larger timberland parcels (over 40 acres) in Minnesota



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Check Out Our New Land Economics Web Site

The Minnesota Land Economics Web site is now open for business, thanks to the financial support of the State Board of Soil and Water Conservation and the ongoing cooperation of the Minnesota Department of Revenue. Just point your browser to http://apec.umn.edu/landeconomics. We've got the data you've been asking for: farmland sales, timberland sales, estimated market values, and land productivity ratings. In a few months, we'll be adding such delights as Farm Service Agency soil rental rates and RIM (Reinvest in Minnesota) Reserve easements. Everything is on a fully searchable basis. You can select the locations and years of coverage and view the results on your screen or download the data for later use. The site also contains additional text and graphics about these data. Come check us out! A sample of what you can get on the new Web site is shown in figure 9.

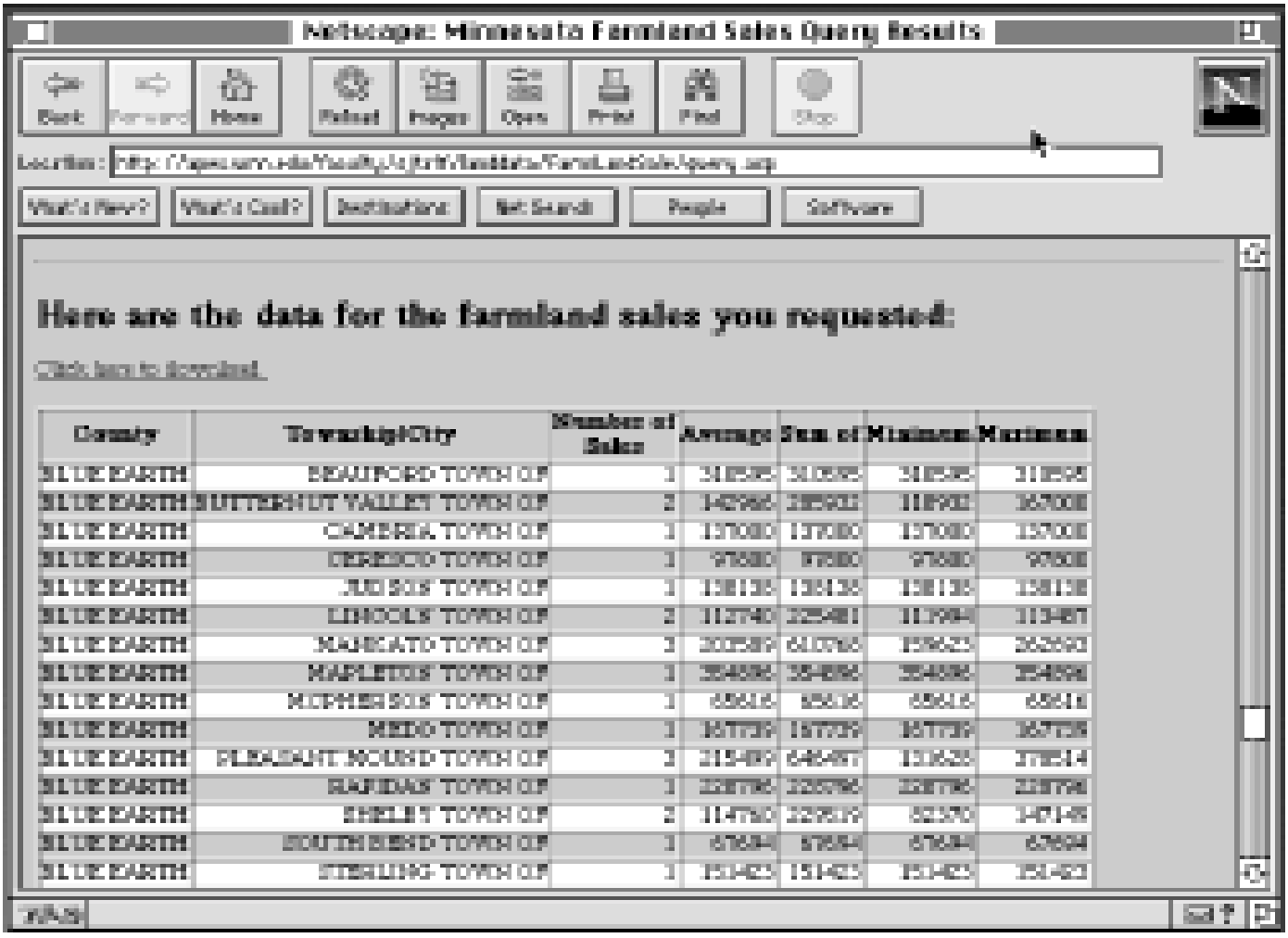
Steven J. Taff is an associate professor and extension economist with the Department of Applied Economics at the University of Minnesota.

Table 3. Minnesota timberland sales in selected districts

	Smaller sales (<40 acres)				Larger sales (>40 acres)			
	1998		1999		1998		1999	
	Number	Price*	Number	Price	Number	Price	Number	Price
North West	18	543	7	324	42	288	15	294
North Central	47	799	12	495	84	275	23	266
North East	145	958	61	1,264	132	271	78	322
East Central	78	776	22	1,046	132	328	60	437
STATE	307	845	118	1,052	408	300	188	385

* Area mean price per acre (dollars)

Figure 9. Sample screen from the new Minnesota Land Economics Web site (http://apec.umn.edu/landeconomics)



(*Farmland Values* from page 1)

Table 4. Breakeven amount available to pay rent at different prices and yields, 50-50 corn-soybean rotation

	Corn/Soybean prices ($/bu.)			
	1.60/4.27	1.80/4.81	2.00/5.34	2.20/5.87
Corn/Soybean yields (bu.)	Rent per acre of cropland			
140/45	69	72	90	116
150/48	81	85	105	132
160/51	94	98	119	149
170/54	107	111	133	165

The data in table 4 were calculated using the following assumptions:

- Tenants used a 50-50 corn-soybean rotation on a 700-acre farm.
- Soybean prices were 2.67 times higher than corn prices, and soybean yields were 32 percent of corn yields. These figures are based on averages from SWFBMA records for the past ten years.
- Tenants received production flexibility contract payments (transition payments) of $30 per acre for corn (based on the year 2002, when payments are expected to decline 75 percent in comparison to 1997), and $0 per acre for soybeans. The transition payment analysis also assumed transition rates were normal, without extra disaster-relief payments.
- Loan deficiency payments put effective price floors at 1999 loan rates, that is, at $1.75 for corn and $5.15 for soybeans. Loan rates are an effective price floor for farmers who sell at the same time they take the loan deficiency payment; pricing the crop at an earlier or later time may result in higher or lower effective prices depending on market movements.
- Higher crop yields were assigned higher production costs to factor in the increased costs of trucking, drying, fertilizing, and combining. Over the long run, these costs can amount to $0.63/bu. for corn and $0.71/bu. for soybeans.

Calculating Breakeven Rents

The data in table 4 show that when corn sells for $1.60/bu. and yields 140 bu./acre, the breakeven rent is only $69 per acre. For farmers to continue to pay rent at 1999 levels, however, corn must sell for $2.00/acre and yield about 140 bu./acre. In contrast, if corn sells for $2.20/bu. and yields 170 bu./acre, the breakeven rent increases to $165/acre. (These figures for corn, of course, are based upon the associated yield and price figures listed for soybeans in table 4.)

Figures 10 through 12 show the relationship between year-to-year changes in breakeven rents, rents paid, and land values during the period 1983–99. The numbers are adjusted to account for any required acreage set-aside that might have been in effect.

Figure 10 shows that the United States Department of Agriculture (USDA) land values seem to track the SWFBMA rents fairly well, but appear somewhat more volatile as values rose more than rents in both the early 1980s and the late 1990s. (Figure 10 uses data collected by the USDA's National Agricultural Statistics Service, which defines land value as the value of land *and* buildings.) Because of the difference in geographic coverage, the statewide USDA rental rates and values are not directly comparable to the SWFBMA data—but they do give an indication of trends prior to 1983 before the Association rent data became available.

Breakeven Trends from 1983 to 1999

Figures 11 and 12 show the breakeven amounts that remained to pay rent. Figure 11 is based on estimated harvest-time corn and soybean prices, while figure 12 is based on the average prices received in the next calendar year. In both figures, the lower, light-shaded area is the (calculated) amount that remains to pay rent from market returns after subtracting cash operating expenses, depreciation, and the opportunity cost of operator labor and management. The upper, dark-shaded area shows the contribution made to breakeven amounts by government payments and small amounts of miscellaneous farm income.

Both "willingness to pay" rent based on next year's expected returns, and "ability to pay" rent, based on proceeds from last year's crop, probably figure into what tenants offer landlords each fall when they renegotiate rental rates.

Figure 11 is an attempt to get at tenants' willingness to pay based on expected returns at the time of negotiation. Harvest-time prices are probably the most current price information available at that time. (I lagged the rental rates by one year for comparing to figure 11's breakevens because the next year's rates would have been negotiated around the time those breakevens were becoming apparent, around harvest time.)

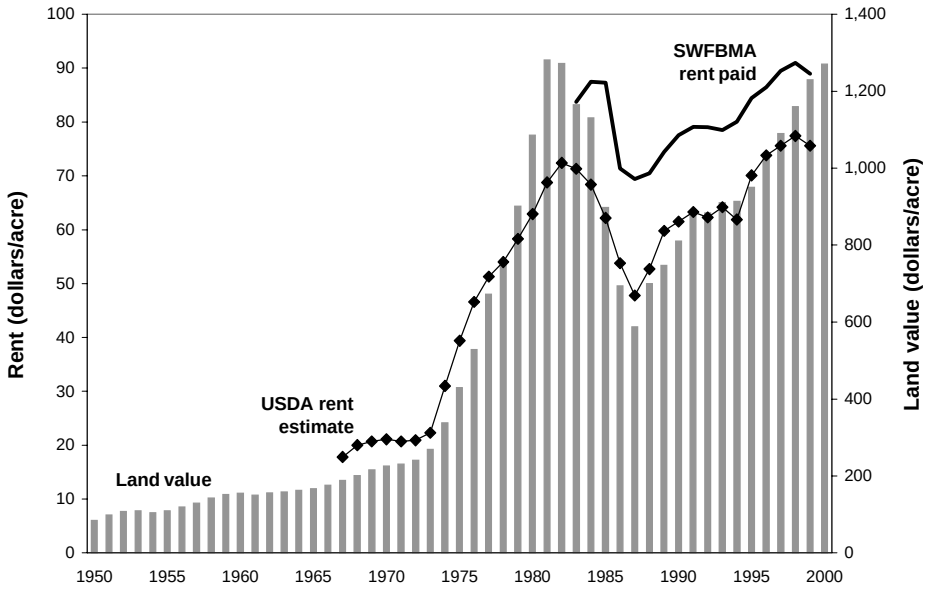
Figure 11 shows that breakevens based on harvest-time prices never exceeded $120 in any year, but they did at least exceed actual rents in every year except for 1991–93. Over the past five years, Association corn-soybean breakevens averaged $14 per acre more than rents actually paid. Looking back further over the entire 16 years, breakevens averaged $9 per acre more than harvest-time breakevens.

Figure 12 attempts to get at tenants' ability to pay by calculating the breakevens based on average prices received for corn and soybeans in the next calendar year. Many farmers store grain because they believe they can do better than selling at harvest time. Storage involves additional costs such as shrinkage, interest payments to the government on outstanding loans on the crop, and facility costs.

Farmers who store crops probably expect prices to increase in order to cover these added costs—but this is a bet that has not paid off over the past couple of years. Comparing annual average

(See *Farmland Values* on page 10)

Figure 10. Land values and rents paid 1950–1999



(Farmland Values from page 9)

corn prices over the 16-year period 1983–98 with year-earlier harvest-time prices, annual prices averaged $2.22 compared to average harvest-time prices of $2.18. Cash corn prices were higher than at harvest in seven of the 16 years. Soybean annual prices averaged $5.87 compared to the harvest-time average of $5.77.

Calendar-year average prices have been more volatile than harvest-time estimates. As a result, figure 12's calculated breakeven amounts based on the calendar-year prices are also more volatile. (Rental rates are lagged two years in figure 12 because the marketing year would not be completed in time for the first year.)

Returns were sufficient to pay the reported paid rent in 12 of the 15 years for which data are available, but there were shortfalls in 1988, 1993, and 1997. In years where a shortfall occurred, breakeven rents (after all costs were deducted) declined by 59 percent (1987–1988), 69 percent (1992–1993), and 56 percent (1996–1997).

Rental Rates and Land Values

The two main sources of economic returns that a landlord stands to gain from owning cropland are current-year rents and expected future capital gains when the land is sold. Future capital gains, in turn, may be related to expected future rent increases.

The relationship between land rents and values was a popular research topic during the run-up and later collapse of land prices during the 1970s and 1980s. A central question of this research was whether a simple capitalization formula (value=[annual rent / capitalization rate]) could predict land prices in the current year based on current rental rates, or whether a more sophisticated model is needed. We usually don't observe a capitalization rate; instead, we infer it from the ratio of land price and annual rental rates.

Capitalization Rate Trends

In the mid-1970s, farmland increased in value by over 20 percent per year. Rental rates (after paying property taxes) increased even faster, and the calculated capitalization rate peaked at 8.3 percent in 1975. Expectations of future price increases may have been a factor in land prices being bid up during the early 1980s—even though rental rates were leveling off. The result was that capitalization rates bottomed out at 5 percent in 1981. When land prices declined in the mid-1980s, rates rose for a few years, then declined once again.

Another estimate of the capitalization rate can be calculated using the ending-market balance sheets of farms in the SWFBMA. In 1998 the average farmer owned 219 acres of cropland valued at $348,007. This translates into an implied cropland value of $1,589 per acre. The corresponding after-tax average rental rate was $76 per acre, which means that the inferred capitalization rate for farms in the SWFBMA was 4.8 percent in 1998.

Other trends are also apparent in figure 10. For example, in Minnesota as a whole, land price movements appear to have overshot the upward trend in rents in the early 1980s and "overshot" the downward trend in 1987—and might be overshooting rents at the present time. This suggests that a simple capitalization model probably does not predict land prices with any useful level of accuracy.

Forecasting Future Land Values

How much could land values change if they responded in direct proportion to the range of breakeven rents shown in table 4? It seems clear from figures 10–12 that rents and values do not respond very quickly to changes in farm income, but a series of good or bad income years eventually do bring about a response. Under a pessimistic production scenario of 140 bushels of $1.60 corn (using an after-tax cap rate of 6.2 percent and property taxes that vary in proportion to rent), the calculated capitalized land value is $930 per acre. At the other extreme, 170 bushels of $2.20 corn and a 4.8 percent cap rate yield a land value of $2,883 per acre.

The range of prices and yields discussed in this article suggest that in the next several years, land values might be as much as 40 percent lower or 80 percent higher than the current SWFBMA average value of $1,589 per acre. It depends on where prices and yields end up. By comparison, in the last boom-and-bust cycle, land values peaked in 1981, declined by over 50 percent during the next six years, leveled off in 1987, and climbed back to today's levels.

So what does the future hold for land values in Minnesota? That depends on how farmers react to future changes in the prices and yields of the crops they grow. It also depends on whether or not the federal government maintains the recent very high levels of subsidies paid to Minnesota crop farmers.

Bill Lazarus is an associate professor and extension economist with the Department of Applied Economics at the University of Minnesota.

Figure 11. Calculated breakeven rents—harvest-time price basis

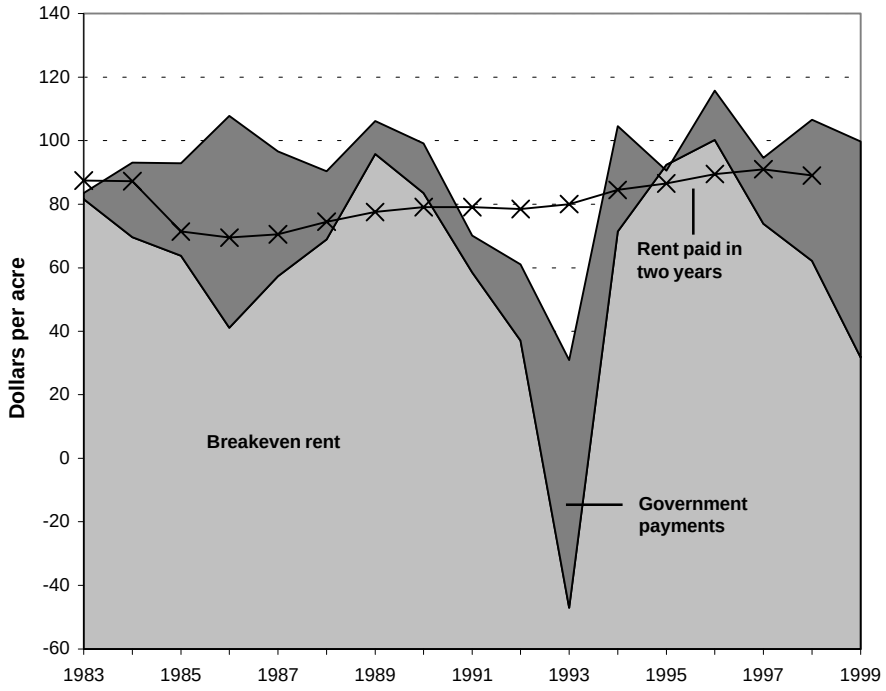
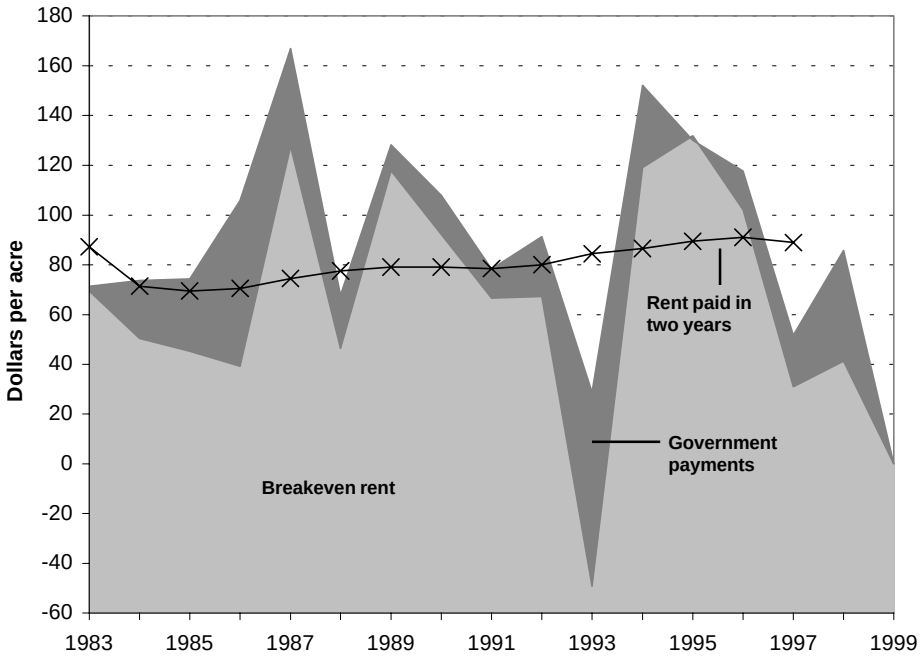


Figure 12. Calculated breakeven rents—average annual price basis



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