

# Do Alpacas Represent the Latest Speculative Bubble in Agriculture?

by

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*The benefits of raising alpacas are touted routinely on national television, and alpaca-breeding stock in the United States sells routinely for prices in the range of \$25,000 per head, many times higher than prices obtainable in Peru where the world's largest alpaca herd resides. We ask whether current prices for alpaca stock can be justified by fundamental economic conditions governing the industry, or whether alpacas represent the latest speculative bubble in American agriculture.*

The alpaca industry in the United States began in 1984 when the first animals were imported from South America. Touted in advertisements on national television (e.g., see exhibit 1) as an alternative to the corporate lifestyle, the U.S. alpaca herd has grown substantially over the past twenty years, with the stock of registered animals exceeding 62,000 at the start of 2004.

The average auction price of alpaca-breeding stock in the United States may exceed \$25,000, while in Peru, home to over three million alpacas and the world's only viable alpaca textile industry, alpacas sell for a small fraction of this price. The pricing dichotomy between the United States and Peru is especially striking considering that U.S. alpacas are of recent South American origin and boast few, if any, distinguishing characteristics from their ancestors.

This paper asks whether current alpaca prices in the United States are supportable by market fundamentals or, instead, likely reflect a speculative bubble that is destined to burst to the ultimate dismay of investors swayed by the pervasive advertising campaigns and the animals' appealing appearance.

## Evolution of the U.S. Alpaca Industry

The Alpaca Owners and Breeders Association (AOBA) was established in 1988 and, upon inception, created the Alpaca Registry, Inc. (ARI) to undertake blood typing, DNA testing, and the registering of animals being imported into the United States. Although originally any alpaca could be registered with the ARI regardless of its country of origin, screening processes were instated eventually and became increasingly stringent over time until the ultimate closure of the registry in 1998 when registration became restricted to only those offspring (cria) of a registered sire and dam. Currently, nearly 99 percent of all alpacas in the United States are registered, and animals in the United States without this distinction have minimal value.

Although the registration requirements and the closure of ARI themselves represent a form of supply restriction and a barrier to the importation of alpacas, additional import restrictions are in place due to disease concerns. Peru is not classified by the USDA as a foot-and-mouth disease (FMD)-free country, which precludes the importation of any ruminant from Peru into the United States. Chile is the only South American country with an alpaca population that is eligible currently to export ruminants to the United States. Nonetheless, Chilean alpaca exports to the United States have not been a factor due to the substantial costs, quarantine time, and risks associated with intercontinental trade in live animals, and, since 1998, their preclusion from the ARI.

Table 1 provides an indication, based upon a survey of over 900 auction prices collected by the authors, of the U.S. alpaca prices. Although the table evinces considerable variation in the sales prices of alpacas, even the lowest prices recorded at the auctions surveyed were several thousand dollars, with average prices in most cases exceeding \$25,000, and with prices exhibiting a clear tendency to rise during the four-year period surveyed. These prices are broadly consistent with the information that AOBA provides to potential investors.

### Exhibit 1: Alpaca Television Advertisement Transcript

*Actor/Alpaca Rancher: I love alpacas because back in 1993, I was getting burned out in a high-stress medical practice. I discovered that raising alpacas allowed me to live a comfortable rural lifestyle and to spend more time with my family. Now, 10 years later, I can still say that it was a great decision.*

*Announcer: Alpacas are gentle and easy to raise. To get the full story, visit an alpaca farm or ranch. To locate one near you, go to [www.Ilovealpacas.com](http://www.Ilovealpacas.com).*

**Table 1. Alpaca Auction Price Statistics**

	2001	2002	2003	2004
(All prices are in U.S. dollars)				
Total Huacayaa				
Average	16,910	23,465	28,195	26,080
Observations	43	171	157	160
High	57,750	165,000	102,000	83,000
Low	3,900	6,500	6,000	6,000
Total Suria				
Average	16,867	26,4437	27,497	30,7967
Observations	27	111	86	79
High	34,100	265,000	84,000	103,000
Low	7,200	6,500	9,500	11,500

<sup>a</sup>Huacaya and Suri are the two major types of alpacas in the U.S. See the main text for further discussion.  
The following auctions were surveyed to compile the data in this table: 2004—America's Choice Alpaca Sale (ACAS), Breeder's Showcase Alpaca Sale (BCAS), Mapaca Jubilee Alpaca Sale, AOBA Alpaca Sale (AOBA-AS); 2003-- ACAS, Celebrity Alpaca Sale (CAS), AOBA-AS, Parade of Champions Alpaca Sale, Breeder's Choice Alpaca Sale (BCAS); 2002- ACAS, CAS, AOBA-AS, Accoyo Alpaca Sale (AAS), BCAS, 2001—Spring Celebration Alpaca Sale, AOBA-AS, BCAS, AAS.

### The Domestic and International Alpaca Fiber Industry

Sheared annually, the average alpaca produces between six and eight pounds of raw fiber per year. Alpaca fiber prices are determined primarily by two specific criteria: micron count and the type of alpaca (huacaya or suri) producing the fiber. Processors pay a premium for fiber with lower micron count. Huacaya alpacas comprise over 80 percent of the alpaca population in the United States while suri alpacas are rarer and earn a premium for their fiber.

The market for alpaca fiber in North America is limited due to lack of large-scale processing facilities. Revenue generated from the sale of alpaca fiber in North America emanates primarily from two sources: small-scale (cottage), independent textile producers or the Alpaca Fiber Cooperative of North America (AFCNA). Although reputable producers with established contacts in the niche textile markets are reportedly able to obtain upwards of \$44/lb. for raw fiber of highest quality, it is not possible to sell any significant volumes of fiber at these prices, forcing most producers to market their fiber through AFCNA, where members receive anywhere from \$5.00/lb. for top-quality fiber to 0.50/lb. for short or coarse/strong fiber. A premium of nearly \$2.50/lb. has been paid for high-quality fiber produced by suri alpacas. The AFCNA prices are above the prices paid for raw fiber in the world market, which as recently as 2002 reflected no premium for suri fiber, and the maximum price paid for any quality fiber was \$US 3.80/lb.

The AFCNA estimates that the feeding, vaccination and general health requirements of the average alpaca raised in the United States are approximately \$169 annually (about \$26/lb. of fiber harvested annually). Our independent estimate of food and nutrition costs is somewhat higher—on the order of \$308 per year (\$47/lb. of fiber harvested).

Based on AFCNA's conservative estimate of production costs, the price of unprocessed fiber would have to be nearly \$26/lb. for alpaca breeders to cover variable production costs from fiber revenues. Even those raising suri alpacas and producing the highest-quality fibers are receiving only on the order of \$7.50/lb. from AFCNA. Based upon our cost estimates, raw fiber prices would have to be about \$47/lb. for breeders to cover the variable costs associated

with maintaining their herds.

However, based upon the estimated price paid by cottage-industry textile producers of \$44/lb. for raw fiber, a producer would earn a variable profit per animal (net of harvest costs) from fiber sale of \$92 based upon AFCNA's estimates of costs. Thus, it is possible to generate isolated scenarios where fiber sales generate per-animal revenues in excess of per-animal variable production and fiber-harvest costs. This analysis, however, is too optimistic because the revenue estimates assume that all fiber produced is of highest quality and that other costs such as shipping and insurance are insignificant.

Table 2 summarizes the cost and revenue analysis, including the optimistic scenario involving sale to independent textile producers and more realistic scenarios involving a mix of fiber quality and sales at the prices paid by the AFCNA. Notably under the more realistic scenario, the value of a huacaya's fiber does not cover the variable costs associated with harvesting it.

### Are U.S. Alpaca Prices the Product of a Speculative Bubble?

The expected value at time  $t$ , derived from ownership of a male alpaca not used for breeding, can be expressed as the discounted sum over the animal's expected productive lifetime of the variable profits generated from its fleece production, less the husbandry costs incurred prior to its fiber-bearing life. The valuation equation for female alpacas includes the same terms as the valuation for fiber males, plus an additional term to reflect

the revenue derived from the female alpaca's ability to also produce cria. In general, a typical female alpaca bears her first cria at two to three years of age and has the ability to have six to seven offspring over her lifetime.

At current fiber prices and input cost levels, an alpaca in the United States whose sole economic purpose is to produce fiber, e.g., a gelded male, has no economic value under any of the scenarios depicted in table 2 that involve sale of fiber through AFCNA. Of course, proponents of the industry would argue that: (i) many alpacas (most females and some males) have considerable economic value as breeding stock, (ii) alpacas produce a desirable, luxury fiber that is likely to experience increasing demand as its properties become better understood by consumers, and (iii) as the U.S. alpaca herd grows, various costs of maintaining alpacas and processing fiber will fall.

These seemingly independent arguments about value as breeding stock and future profitability of fiber production and sale actually collapse to only one argument that hinges on the future profitability of producing and selling fiber. The economic value of a cria produced by a female alpaca whose valuation is at issue is determined by the value of the product(s) the cria is expected to produce in the future, namely fiber and still more cria. Thus, the capital-asset framework leads ultimately to a valuation process that requires forecasts of the market conditions for fiber and alpaca stock over the long term, in the limit to infinity. Of course, discounting applies to this valuation process, so events forecasted to occur further and further into the future become less and less important to the evaluation and ultimately can be ignored.

It is fundamental to the valuation process for an alpaca that its economic value, whether expressed directly through the animal's own production or indirectly through the production of its progeny, must be based exclusively upon forecasts of the value of producing and selling fiber—the only widely marketable product alpacas produce. Alpacas sold today as breeding stock have values wildly in excess of even the most optimistic scenarios based upon current fiber prices and

**Table 2. Revenue and Cost of Fiber Production in U.S. Dollars**

	Independent		
	Producer	AFCNA Member	
		Suri	Huacaya
	6.5 lbs. Micron<20	5 lbs Micron<22.9 1.5 lbs Micron<31.9	5 lbs Micron<22.9 1.5 lbs Micron<31.9
Net Revenue From Fiber	261	0.52	-9.48
Variable Cost (authors)	307.85	307.85	307.85
Variable Cost (AFCNA)	169	169	169
Profit From Fiber (authors)	-46.85	-307.33	-317.33
Profit From Fiber (AFCNA)	92	-168.48	-178.48

production costs. Thus, these stock prices can be justified by economic fundamentals only if investors can rationally forecast substantially better conditions in the fiber market in terms of higher fiber prices, lower production costs, or both that will make fiber production and sale a much more profitable proposition in the future.

What can a rational economic assessment tell us about the prospects for fiber production in North America? On the supply side, the stock of registered alpacas in the United States is rising rapidly. The population more than doubled between 1998 and 2002, rising from 19,384 registered animals to 46,105. The population rose further, to nearly 62,000, by the start of 2004.

Table 3 indicates the time in years required for the U.S. alpaca population to reach various levels based upon two scenarios and a simple, exponential growth model. Even under the more conservative growth rate, the U.S. alpaca herd size is projected to reach one million, 16 times its size in 2004, in just over 16 years. This rapid growth may enable the industry to capture economies of

**Table 3. Size of the U.S. Alpaca Herd for Alternative Growth Rates**

Population	Growth Rate	
	0.17	0.28
	Years Necessary to Reach Population	
1,000,000	16.37	9.94
1,500,000	18.75	11.39
2,000,000	20.45	12.41
2,500,000	21.76	13.21
3,000,000	22.83	13.86
3,500,000	23.74	14.41
4,000,000	24.52	14.89

size but also implies a roughly proportional expansion of domestic fiber supply, meaning that the lucrative niche cottage industries will become even less relevant as a market outlet for U.S. producers.

In contrast to the trade barriers for live alpacas, trade barriers for alpaca fiber have been virtually eliminated due to the passage of the Andean Trade Promotion and Drug Eradication Act (ATPDEA). Indeed, the Peruvian government estimated that the increased access to U.S. markets could cause alpaca fiber and textile exports to the United States to grow from 30 to 50 percent in one year.

Is it possible that a United States-Peru price differential of perhaps 800 percent or higher for live alpacas can be sustained when there are no barriers to arbitrage in the single marketable product these animals produce, namely fiber? The answer clearly would seem to be no. The economic value of alpacas, wherever they reside, is based upon the value of the fiber they and their progeny produce. If the fiber market is subject to free trade and arbitrage, then fiber prices across producing countries for a similar level of quality will converge with due allowances for transportation and other arbitrage costs, meaning that prices for the capital asset must converge also.

Inputs into alpaca production are less readily arbitrated across national borders, and this fact may lead to a sustainable equilibrium with some transnational differences in the value of alpacas. However, inputs to raising alpacas are cheaper in Latin America than in the United States, making animals there more valuable, other factors constant.

We designed a simple simulation analysis to answer the question of how rapidly fiber prices must increase over time as a consequence of demand growth, holding all costs constant at today's levels, to justify the types of prices we observe today for alpaca stock. The framework begins with a single juvenile alpaca female (age two) that might be purchased at auction today for a price in the \$15,000-25,000 range. This female was assumed to bear fiber annually from the time of her purchase over a 15-year life span. This female was assumed to bear a cria on average every 18 months, seven in total over her lifetime with a reproduction rate of 100 percent. Additionally, we assumed that 50 percent of all cria born are female. These cria also eventually bear fiber and, if female, bear additional cria, and so on as the generations unfold. All of this activity is attributable ultimately to the purchase of the original female and determines her value according to the capital-asset formula. Although the process

in principle continues indefinitely, we truncated the simulation at 20 years, assuming that this represents a maximum time horizon over which any rational investor would seek to recoup his investment.

Moderate growth in prices in the range of one, three, or five percent, sustained over the entire 20-year horizon, does not generate a positive economic value for the original female. For example, at a 10 percent discount rate, even sustained five percent annual growth in fiber prices leads to a discounted loss ranging from \$22,000-45,000, depending upon the alpaca type and maintenance-cost estimate utilized. Even a 10 percent growth in fiber prices does not produce a positive valuation. Indeed, an annual growth rate in prices in excess of 20 percent is needed to justify alpaca prices in the range of \$15,000 or higher.

However, it is far from clear that even substantial demand growth for fiber can translate into the substantial growth in prices that the simulation analysis demonstrates are needed to justify the current price levels for alpacas. As noted, the U.S. fiber supply is itself poised to grow rapidly and offset the price impacts of demand growth. The large Peruvian herd is also poised to grow rapidly, if fiber and textile prices rise, providing a further supply response to mitigate fiber and textile price increases caused by demand-side growth.

## Conclusion

Dramatic improvements over time in the alpaca fiber market are thus required to justify today's price levels for alpaca stock based upon their investment value. Such improvements in the market are extremely unlikely to occur. Thus, the evidence seems to be rather overwhelming that the current prices are not supportable by economic fundamentals and, thus, are not sustainable.

Our conclusion that today's prices for alpaca-breeding stock are the outcome of an unsustainable speculative bubble is not surprising, given the warning signs surrounding this industry. Advertising that focuses on attracting additional producers, limited information on the investment, control of the available information by industry representatives, investment appeals directed to small-scale investors, and commonly held misconceptions perpetuating unreasonable prices are telltale signs that have been prominent throughout the history of speculative bubbles in agriculture.

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