# A PARTIAL ECONOMIC IMPACT ANALYSIS OF ARIZONA'S HORSE INDUSTRY

## PROJECT COMPLETION REPORT

Project Sponsor: Arizona State Horseman's Association

Phase I: Pleasure Horse and Racing Impact Update

Phase II: Horse Show Impact

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# EXECUTIVE SUMMARY

Three major activities make up Arizona's horse industry—pleasure riding (private and commercial), participant and spectator events (racing, shows, rodeos, roping, polo), and breeding. This report provides estimates of Arizona economic activity associated with private pleasure horses, horse racing, horse shows, and resident spectators at rodeos, roping, polo, and gymkhana events. *Major categories not accounted for include commercial pleasure riding, participants at rodeo, roping, and polo events, and breeding of horses for export sale (outside Arizona)*. Despite these omissions, Arizona's horse industry **exceeds a billion dollars** annually in direct, indirect, and induced expenditures—between **$1.1 to $1.3 Billion.**

**TOTAL DIRECT EXPENDITURES:** Direct expenditures on private pleasure horse maintenance and ownership, horse racing and horse show activity, and by resident spectators at other horse-related events was estimated to be between **$660 to $760 Million** in 2001.

- **Arizona Pleasure Horse Owners** spend an estimated **$500 to $600 Million** on the care and maintenance of pleasure horses and related infrastructure (including the annualized cost of horse, tack, equipment, land and facilities ownership).

- **Horse Racing in Arizona** generates an estimated **$108 Million** in expenditures.

- **Horse Show Events** contributes an estimated **$43 Million** in expenditures.

- **Arizona-Resident Expenditures as Spectators at Other Horse-Related Events** (rodeos, roping, polo, gymkhana) come to **$9 Million**.

**INDIRECT AND INDUCED EXPENDITURES:** The combined indirect and induced (ripple) effect of the above direct expenditures contributes an additional **$444 to $504 Million** owing to horse-related activity in Arizona.

**HOUSEHOLDS AND HORSES:** The number of Arizona households owning one or more pleasure horses or commercially involved in the horse industry falls in the range or 48,000 to 64,000. The number of horses in Arizona likely exceeds 170,000 head.

**BY WAY OF COMPARISON:** Direct expenditures on horses exceed gross sales receipts of most of the major sub-sectors comprising Arizona's agricultural industry. In terms of importance to the Arizona economy, direct horse-related expenditures rival state government expenditures on "security and safety."

# A PARTIAL ECONOMIC IMPACT ANALYSIS OF ARIZONA'S HORSE INDUSTRY

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## Phase II: Horse Show Impact

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**Preamble**

In March of 2000 the authors (sans Mortensen) entered into an agreement with the Arizona State Horseman's Association (ASHA) to update insofar as possible a 1990 study by Gum, Archer, Henry, and Carpenter, *The Economics of the Horse Industry in Arizona,* Extension Report #9033, College of Agriculture, University of Arizona (hereafter referred to as the "1990 study"). The 1990 study provided estimates of the direct, indirect, and induced economic impacts of "pleasure horse," "spectator," and "commercial and semi-commercial" segments of Arizona's horse industry. In addition to updating economic impact estimates of the 1990 study for the "pleasure" and "spectator" segments, the research proposal called for (1) the inclusion of updated estimates from a 1997 study by the Arizona State University, College of Business, *The Economic Contributions of the Pari-Mutuel Racing Industry to the Arizona Economy* and (2) the estimation of the economic impact of "commercial pleasure riding"—a missing component of the 1990 study.

In December of 2000, at the request of ASHA, the original proposal was revised. The commercial pleasure-riding objective was dropped in favor of a horse show objective. The 1990-study update of the "pleasure horse" segment plus a "new" racing component (adapted from the 1997 ASU study) is referred to as Phase I. Phase II presents an update of the "rodeo, gymkhana, and polo spectators" component of the 1990 study and analysis of the economic contribution of participants at four major horse shows held annually in Arizona. In addition, a rough estimate of other shows beyond the four major shows is provided. This combined Phase I and Phase II report constitutes the completion report for the project.

# I. INTRODUCTION

The prominence of horses in Arizona's historical and cultural heritage is well known. While once primarily utilitarian (transportation, power, and farm and ranch work) the role of the horse is now largely pleasure and recreational. Arizonans and visitors enjoy horse racing, rodeos, gymkhana, horse shows, and the most popular of all, trail and pleasure riding. Surprisingly, the U.S. horse population is many times what it was in the early part of the 20th century. To partially document the importance of horse ownership and activity in Arizona the Department of Agricultural Economics at the University of Arizona with partial support from the Arizona State Horseman's Association undertook a study in 1989 and 1990 on the contribution of the horse industry to Arizona's economy. The research results in this report update the principal findings and fill in some of the missing components of the 1990 report.

In updating of the 1990 study, a number of difficulties—some anticipated and some not anticipated—were encountered. The main difficulty had to do with the so-called "commercial and semi-commercial" segment (pp. 20-26 of the 1990 report). Three obstacles made updating of the 1990 estimates problematic. First, given that an attempt was made in the 1990 study to contact every "commercial and semi-commercial" firm in the State, the response rate was surprisingly low (10% or less). This suggests two possibilities. Either, turnover in the commercial horse business is greater than for other businesses. Or, people in the commercial horse business are reluctant to reveal proprietary economic information. In either case, the 1990 estimates of numbers of commercial firms, their economic impact, and their horse numbers likely would not be indicative of the situation in 2001. To simply "update" the fragile 1990 numbers would have been heroic.

A related problem with the 1990 study results was that the kind of detailed information obtained from pleasure-horse owners was not collected for the "commercial and semi-commercial" segment because of "failure to obtain cooperation" and insufficient study budget. Thus the production cost information obtained from "commercial and semi-commercial" firms was less detailed and less reliable than for the "pleasure horse" segment.

A final problem was double counting of economic impact. The preferred way to do impact analysis is to consider activities in support of *final demand* as *indirect*. Final demand is the ultimate reason that economic activity takes place—the "end use" activity or the activity at the end of the marketing chain. Final demand examples for the horse industry include pleasure horse riding and wagering on (or watching) a horse race. Breeding, training, and boarding, on the other hand, represent activities in support of final demand. In the jargon of the impact analyst, they are indirect support activities.

We suspect a double counting problem in the 1990 study between the "pleasure horse" and "commercial and semi-commercial" segments and between "horse racing" and other components of the "commercial and semi-commercial" segment. Commercial

business activities included breeding, training, and boarding among other things. Expenditures for breeding, training, and boarding by horse owners *should* be fully reflected in the costs of pleasure and race horse care and ownership, and these costs *should* only be counted once. It is inappropriate to count the impact of breeding, boarding, and training as direct impact and then once again as part of the indirect impact.

An appropriate place to begin is to discuss the components and linkages that define Arizona's horse industry. This is the subject of Section II. A brief outline of the research approach is provided in Section III. Specific assumptions and other methodological details are provided in subsequent sections where appropriate. In Section IV the costs of pleasure horse care and ownership, costs of facilities maintenance and ownership, and estimates of the direct economic impact on the Arizona economy are presented. A similar analysis of horse racing activity is the subject of Section V. Section VI presents estimates of expenditures of Arizona residents and non-residents as participants and spectators at horse shows and as resident spectators at other non-show and non-racing events. Section VII discusses the indirect and total economic impacts on the Arizona economy emanating from the direct components discussed in Sections IV, V and VI. An update of the estimated number or horse households and horses in Arizona, together with a brief comparison of direct horse industry expenditures versus other selected sectors, constitutes Section VIII. A brief summary of findings, conclusions, and recounting of unaccounted components is the topic of the Executive Summary at the front of the report.

# II. THE STRUCTURE OF ARIZONA'S HORSE INDUSTRY

Arizona's horse industry includes many diverse interests and activities. Horse related activity requires inputs from a variety of businesses and individuals, such as farriers, veterinarians, and fence and building supply firms. In turn, these businesses and individuals buy various goods and services from yet other suppliers. The purchases of horse owners and users are known as *direct effects* of the industry. The ripple effects throughout the economy, kicked-off by expenditures of "end users" are called *indirect effects* and *induced effects* of the industry.

Figure 1 is a schematic of the horse industry *final demand* (end use) categories and their linkage to other economic sectors. The schematic assists in several ways. First, it helps explain the connection between various parts of Arizona's horse industry. Second, it provides a framework (taxonomy) for developing and reporting the economic impact of those components. Last, it makes clear which components have been counted and which components remain unaccounted for in this study.

In doing economic impact analysis, it is helpful to think in terms of three main effects —direct, indirect, and induced. Each of these is discussed with reference to Figure 1, starting with the direct effects of Arizona's horse industry.

## Direct Effects

In Figure 1 the first three rows of blocks represent the primary components (segments) of Arizona's horse industry. They are the final demand components (the primary sub-sectors of the industry). These components ("end uses of horses in Arizona") give rise to the *direct economic impact*. The direct impact is usually expressed in terms of output or expenditures in the economy of interest—in this case, the Arizona economy.

The first block of Figure 1 includes pleasure and trail riding by household horse owners and Arizona-based commercial firms that provide such services (dude ranches, resort hotels, others). Household owners are primarily Arizona residents (Column # 1) and non-resident visitors who bring their horse(s) with them to Arizona (Column # 2). The users of commercial pleasure and trail riding services are primarily out-of-state visitors (Column # 4) and Arizona residents who enjoy riding but who do not own or otherwise (through friends and relatives) have access to a horse (Column # 3). In Column # 5 are Arizona households who own race horses or frequent racetracks.

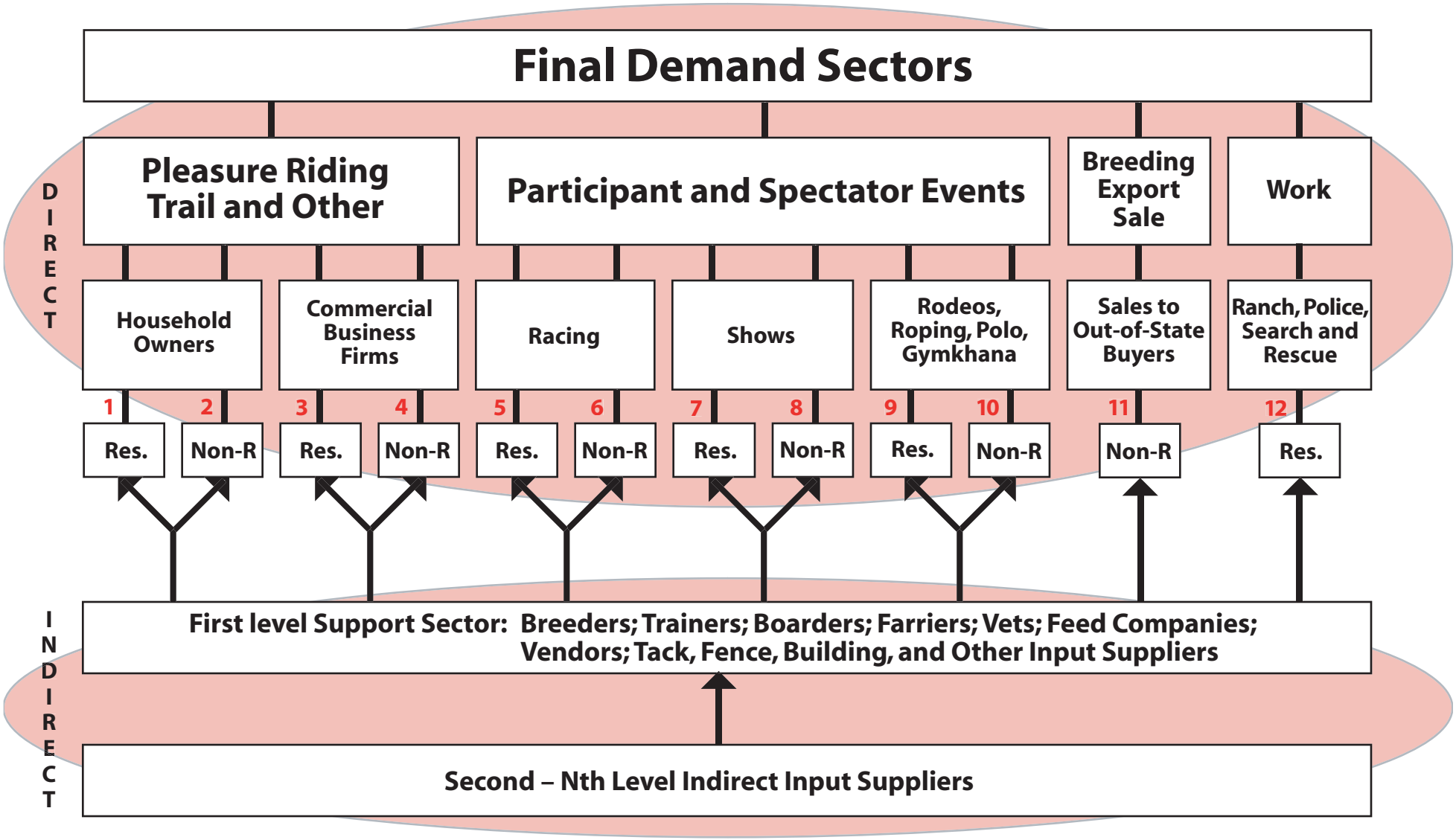



**Figure 1.**
**Schematic of Arizona Horse Industry by Principal and Related Sectors**
(Input flows in direction of arrows; payment/expenditure flows in reverse direction)

Column # 6 represents non-resident owners who race their horses in Arizona and non-resident visitors who frequent racetracks. Columns # 7 and # 8 and Columns # 9 and # 10 have analogous interpretation for horse shows and for other events (such as rodeos, roping, polo).

Not withstanding the earlier discussion of support sectors and the need to avoid double counting, there is an important aspect of horse breeding that is appropriately considered a final demand sector of the Arizona horse industry. That aspect is the breeding of horses for export sale—for sale to individuals and firms not located in Arizona (Column # 11). The last final demand sector (Column # 12) is Arizona-based horses employed in work-related activities (ranching, sheriffs' posses, search and rescue).

### Indirect Effects

A final demand sub-sector, like pleasure horse riding in Arizona, is linked to other sectors of the economy. Linkages among input suppliers give rise to economic ripples (indirect effects) throughout the local (Arizona) and larger (U.S.) economies. In the first row of the indirect effect section of Figure 1 are the indirect service sectors that provide inputs to the final demand sectors of Arizona's horse industry. These sectors include a myriad of individual entrepreneurs and business firms that supply inputs to the "pleasure riding," "participant and spectator events," "export sale breeding," and "work" sectors. Examples include trainers, farriers, veterinarians, feed companies, and tack, building and other input suppliers. These "1st level support sector" businesses sell inputs to individuals and firms represented among the many final demand components. The arrows from the "1st level support" block to the direct effect blocks depict this flow of inputs. The flow of funds (payments for inputs) not shown on the diagram is, of course, in the opposite direction.

The second row of the indirect block pools many sub-rows. The feed company in the "1st level support" row purchases its inputs (e.g., feed ingredients, delivery vehicles, fuel and lubricants) from other sectors further down the input chain. Accordingly, the indirect effects of a final demand industry (a business that services end users like the Arizona horse industry) are "backward-linked" support sectors. Another example would be a food and beverage vendor at a horse show. The vendor would be a "1st level support" person for spectators and exhibitors attending the show. In turn, that vendor would purchase food and beverage inputs from his/her vendor (a 2nd level supplier) who in turn purchases from other vendors, and so on, creating a backward ripple in the economy.

The extent of the indirect effect depends on the size of the "local" economy—in this case Arizona. Once the linkage involves importation of goods or services from outside the state, then the indirect effect chain is broken as far as the impact on the Arizona economy is concerned. Consider again our horse feed example. If one of the necessary ingredients in the local feed company's ration is purchased from an out-of-state supplier, then the Arizona indirect impact of that transaction, except for some in-state transportation, stops at the level of the "1st support supplier," the local feed company. Obviously, the less comprehensive the "within economy" input supply chain, the smaller

will be the local area ripple effect. This is one of the reasons that the "indirect or ripple" effect is so often over-stated in impact analyses (Beattie and Leones). This often-ignored issue is called *leakage*. The less self-contained an economy, the greater the leakage and the smaller the local economy indirect effect. Conversely, the larger and more integrated the local economy, the greater the indirect effect. Because of leakage, the indirect effect of Arizona's horse industry on the U.S. economy is greater than is the Arizona indirect effect, which in turn is greater than the indirect effect on, say, the Pima County economy.

### Induced Effects

The last component of local economy economic impact considered is the *induced effect* of a change in economic output associated with a final demand sector. All levels of an interrelated (input-supply-linked) industry involve entrepreneurs (business firms) and the employment of labor. Business owners and workers earn profit and wages, respectively. When these employees and business owners reside in the local economy, again in our case Arizona, they do what all households do—they consume. When they spend from earnings (profits or wages) for food, housing, local area vacations, and so forth, that too contributes to the ripple effect in the local economy.

Like indirect effects discussed above, induced effects are generally overstated and for the same reason—leakage. Estimation of the indirect and induced linkage effects is generally accomplished in tandem, using what is commonly called economic multipliers. This study reports combined indirect and induced effects using Type-II multipliers. A Type-II multiplier accounts for *both* indirect and induced effects. In contrast, a Type-I multiplier accounts only for the input-flow linkages (the indirect effects).

### Components of Arizona's Horse Industry Included and Not Included

Direct, indirect, and induced economic impacts of Arizona's horse industry on the Arizona economy have been estimated for those components identified in Figure 1 that are listed below. In some instances the estimate for 2001 involved simply updating previous estimates by applying an inflation factor and a population adjustment. In other cases, such as for costs of maintaining and owning pleasure horses and related land, buildings, and equipment, the 2001 estimates reflect a completely new approach or new research.

- Column # 1 – Arizona Household Pleasure Horse Owners
- Part of Column # 2 – Non-Resident Household Pleasure Horse Owners (A substantial part, but not all, of Column # 2 has been accounted for. In particular, "long-term" winter visitors who bring their horses with them and are in Arizona long enough to establish local telephone service could have been included in the 1990 telephone survey as Arizona residents.)
- Columns # 5 and # 6 – Resident and Non-Resident Participation at Arizona Race Tracks

- Columns # 7 – Resident Participation at Arizona Horse Shows
- Column # 8 – Non-Resident Participation at Arizona Horse Shows
- Part of Column # 9 – Resident Participation at Other Arizona Horse Related Events [rodeos, roping, polo] (Included spectators, but not participants.)
- Column #12 – Horses for Work (Most of this category is likely accounted for under "Arizona Household Pleasure Horse Owners" [Col. #1]. The pleasure horse owner category included all persons who listed pleasure as either the first or second reason for horse ownership. Given the current limited use of horses for work, it seems safe to assume that most "horses for work" double primarily or secondarily as pleasure horses.)

Components missing in the 1990 study that remain unaccounted for include:

- Part of Column # 2 – Non-Resident Household Pleasure Horse Owners (In particular, short-term winter visitors who bring their horses, but who do not stay sufficiently long to obtain Arizona telephone service in their own name.)
- Columns # 3 and # 4 – Commercial Pleasure and Trail Riding (dude ranches, resorts, other commercial pleasure-riding providers)
- Part of Column #9 – Resident Participation at Other Arizona Horse Related Events [rodeos, roping, polo] (The participant component is missing.)
- Column # 10 – Non-Resident Participants and Spectators at Other Arizona Horse Related Events [rodeos, roping, polo]
- Column # 11 – Horse Breeding in Arizona for Out-of-State Sales (including stud service)

The missing components are, to varying degree, significant omissions. Accordingly, the appropriate context in which to interpret the results of this study is as the title suggests—a *partial* economic analysis of the economic impact of the horse industry in Arizona.

Despite the missing components, the largest components (in terms of number of horses and economic impact) have been accounted for in this study—in particular, Arizona pleasure horse owners and Arizona and non-resident participants and spectators at horse shows and racing events. The impact of Arizona resident spectators at rodeo, roping, and polo events also has been accounted for. Missing in this regard are the "short-stay" non-resident participants and spectators and the participation cost of Arizona resident pleasure horse owners. The other two important missing pieces are the out-of-state sales of Arizona-based breeding firms and commercial pleasure and trail-riding service providers. Filling in these four missing components would be high priority for further research to complete the full picture of the contribution of the horse industry to Arizona's economy.

## III. GENERAL RESEARCH APPROACH AND PROCEDURES

This study takes some base data and several assumptions from the 1990 study as a starting point. For the "pleasure horse" and "spectator" segments, the 1989-90 data were based on a statistically valid survey to determine the percentage of Arizona households that owned one or more pleasure horses or whose family member(s) participated in horse-related spectator events. That survey also elicited information on household expenditures for horse and facilities ownership and maintenance and for event participation as spectators or as participants. The 1990 study also gathered aggregate "cost of production" (operation, maintenance, and capital investment) data from commercial and semi-commercial business firms involved in the horse industry. However, that effort was fraught with pragmatic and conceptual difficulties.

The Arizona-resident pleasure horse component of this study uses the 1989-90 findings for resident participation rates and horses per household, and two alternative assumptions about the number of pleasure-horse households in Arizona in 2001. For pleasure horse and facilities ownership, operation, and maintenance costs a different approach from that of the 1990 study was taken. In this study we developed original "cost-of-production" budgets for the maintenance, operation, ownership, and related expenses associated with horse ownership and maintenance. These budgets, like "cost-and-return" budgets for representative crop and livestock operations, are based on widely accepted principles and standards and solicited opinions from knowledgeable persons in the industry. A number of questions raised concerning the reported costs in the 1990 study were remedied including the handling of land and facilities investment costs and farrier and other routine horse maintenance costs.

Estimates for components of the horse racing sector were obtained from the 1997 ASU study and adjusted for inflation to reflect 2001 dollars.

The economic contribution of participants at four major annual Arizona horse shows and other "less major" shows, as well as an update of expenditures by Arizona-resident spectators at other non-racing events, were also included. Expenditure estimates for both resident and non-resident horse show exhibitors were based on a survey questionnaire of participants during the 2000-01 show season. The aggregate economic impact, including the indirect and induced effect, of the major components of Arizona's horse industry were calculated using inter-industry (input-output) multipliers for Arizona. Specific methodological details are included in Section VII.

# IV. EXPENDITURES OF ARIZONA RESIDENTS FOR OWNERSHIP AND CARE OF PLEASURE HORSES

Discussion of expenditures of Arizona residents for ownership and care of pleasure horses is organized as follows. First, estimated costs of maintaining and owning a pleasure horse and the requisite infrastucture (tack, equipment, buildings and facilities, and land) are presented and interpreted. Next, an estimate of the *direct impact* of pleasure horse ownership and use on the Arizona economy is presented. In terms of Figure 1, direct impact findings for Column # 1—pleasure horse use and ownership by Arizona households—is the focus of this section.

## Costs of Maintenance and Ownership of a Pleasure Horse

Costs of maintaining and owning a pleasure horse are summarized in three tables, the "pleasure horse summary budget" (Table 1), the "commercial boarding budget" (Table 1a), and the "owner care and maintenance budget" (Table 1b). The three budgets are supported by the information in Table 2—Investment and Ownership Costs: Pleasure Horses. The costs from Table 2 are utilized in summary form in the budget tables (1, 1a, and 1b) to reflect the annualized costs of pleasure horse ownership and related support facilities and equipment—land, buildings, vehicles, and other durable inputs (inputs with an expected life of more than one year).

The Pleasure Horse Summary Budget (Table 1), compiled from Tables 1a and 1b, depicts the annual average cost of owning a *single* pleasure horse for a representative Arizona household. This is the principal source of information used in estimating the direct economic impact of resident pleasure-horse ownership and use. The cost numbers reported in the table represent the average of the annualized "high cost" and "low cost" estimates from the commercial boarding and owner care budgets, Tables 1a and 1b, respectively.

The Commercial Boarding and Owner Care and Maintenance Budgets (Tables 1a and 1b) as well as the Table 2 data were based on personal interviews of experts knowledgeable about typical expenditures associated with owning and maintaining pleasure horses—both with and without boarding. The commercial boarding scenario presumes horse, tack, trailer, and tow vehicle ownership with hired care, feed, and lodging of the horse(s). The owner care and maintenance scenario presumes care, feed, and lodging by the owner or family on land and facilities owned (or rented) by the horse owner.

# Table 1. Pleasure Horse Summary Budget

| VARIABLE COSTS | | | | | |
|---|---|---|---|---|---|
| 1. FEED COSTS (per horse) | AVERAGE QUANTITY | UNIT | AVERAGE PRICE | BOARDING MANAGEMENT[1] | OWNER CARE MAINTENANCE[2] |
| HAY/PELLETS[3] | 67 | BALES | $9.50 | $0 | $637 |
| GRAIN | 730 | LBS. | $0.20 | $66 | $146 |
| SALT and MINERAL[4] | 30 | LBS. | $0.50 | $8 | $18 |
| | | | SUB TOTAL FEED COSTS[5] | **$74** | **$801** |
| 2. OTHER VARIABLE COSTS (per horse) | QUANTITY | | AVERAGE PRICE | | |
| BOARDING[6] | 12 | MONTHS | $300.00 | $3,600 | $0 |
| BEDDING | | | | $0 | $600 |
| HORSE CARE PRODUCTS | | | | $45 | $75 |
| FARRIER SERVICE | 6 | | $55.00 | $330 | $330 |
| VET AND MEDICINE | | | | $375 | $375 |
| MISCELLANEOUS[7] | | | | $113 | $200 |
| 3. OTHER OPERATING COSTS (per household) | | | | | |
| OPERATING COSTS-VEHICLE | | | | $550 | $550 |
| OPERATING COSTS-BLDG/IMPROVEMENTS | | | | $0 | $38 |
| OPERATING COSTS-MACH/EQUIP | | | | $0 | $40 |
| | | | SUB TOTAL OTHER COSTS | **$5,013** | **$2,208** |
| | | | TOTAL VARIABLE COSTS | **$5,086** | **$3,008** |
| 4. ANNUAL OWNERSHIP COSTS | | | | | |
| Capital Recovery[8]: | | | | | |
| Horse & Tack (per horse) | | | | $551 | $551 |
| Land, Buildings & Improvements (per household) | | | | $0 | $1,847 |
| Equipment, Trailers & Vehicles (per household) | | | | $917 | $942 |
| Taxes & Insurance (per household) | | | | $307 | $914 |
| | | | TOTAL OWNERSHIP COSTS | **$1,775** | **$4,254** |

1) The numbers in this column represent the average of the "high cost" and "low cost" values from the Commercial Boarding Budget Table 1a.

2) The numbers in this column represent the average of the "high cost" and "low cost" values from the Owner Care & Maintenance Budget Table 1b.

3) Hay amount assumes one horse will eat 2% body wt. for 365 days using 120 lb bales. If pellets are fed, then add $50 to $80 to the cost of hay.

4) The salt & mineral needs assume the consumption of approximately 39 grams per day.

5) All numbers are rounded to the nearest dollar

6) Best management boarding includes most feeding/bedding/exercising/labor cost.

7) Miscellaneous fees include items such as trail access fees, breeding fees, training, riding lessons, breed registration.

8) Annual capital recovery is the method of calculating depreciation and interest recommended by the National Task Force on Commodity Costs and Returns Measurement Methods.

# Table 1a. Commercial Boarding Budget

**VARIABLE COSTS**

| 1. FEED COSTS (per horse) | TYPICAL QUANTITY | UNIT | HIGH PRICE | LOW PRICE | HIGH COST | LOW COST |
|---|---|---|---|---|---|---|
| HAY | 0 | BALES | $10.50 | $8.50 | $0 | $0 |
| GRAIN | 730 | LBS. | $0.22 | $0.18 | $0 | $131 |
| SALT and MINERAL[1] | 30 | LBS. | $0.70 | $0.50 | $0 | $15 |
| | | | | SUB TOTAL FEED COSTS[2] | **$0** | **$146** |
| **2. OTHER VARIABLE COSTS (per horse)** | **QUANTITY** | | **HIGH PRICE** | **LOW PRICE** | | |
| BOARDING[3] | 12 | MONTHS | $450.00 | $150.00 | $5,400 | $1,800 |
| HORSE CARE PRODUCTS | | | | | $60 | $30 |
| FARRIER SERVICE | 6 | TIMES | $75.00 | $35.00 | $450 | $210 |
| VET and MEDICINE[4] | 1 | TIMES | $600.00 | $150.00 | $600 | $150 |
| MISCELLANEOUS[5] | 1 | TIMES | $150.00 | $75.00 | $150 | $75 |
| **3. OTHER OPERATING COSTS (per household)** | | | | | | |
| OPERATING COSTS-VEHICLE | | | | | $1,000 | $100 |
| | | | | SUB TOTAL OTHER COSTS | **$7,660** | **$2,365** |
| | | | | TOTAL VARIABLE COSTS | **$7,660** | **$2,511** |

**4. ANNUAL OWNERSHIP COSTS**

| | | |
|---|---|---|
| **Capital Recovery[6]:** | | |
| **Horse and Tack (per horse)** | $551 | $551 |
| **Trailers and Vehicles (per household)** | $917 | $917 |
| **Taxes and Insurance (per household)** | $307 | $307 |
| **TOTAL OWNERSHIP COSTS** | **$1,775** | **$1,775** |

1) The salt & mineral needs assume the consumption of approximately 39 grams per day.

2) All cost are rounded to the nearest dollar.

3) High cost boarding includes feeding hay & grain, bedding, exercising, indoor stall, etc.
Low cost boarding includes only covered pen, bedding and twice per day hay feeding only.

4) High cost veterinarian & medicines include all recommended vaccinations, worming, dental, and an estimated one emergency visit per year.
Low cost veterinarian & medicines include vaccinations & worming administered by the owner, no dental but an estimated one emergency visit per year.

5) Miscellaneous fees include items such as trail access fees, breeding fees, training, riding lessons, breed registration.

6) Annual capital recovery is the method of calculating depreciation and interest recommended by the National Task Force on Commodity Costs and Returns Measurement Methods.

# Table 1b. Owner Care and Maintenance Budget

**VARIABLE COSTS**

| 1. FEED COSTS (per horse) | TYPICAL QUANTITY | UNIT | HIGH PRICE | LOW PRICE | HIGH COST | LOW COST |
|---|---|---|---|---|---|---|
| HAY[1] | 67 | BALES | $10.50 | $8.50 | $704 | $570 |
| GRAIN | 730 | LBS. | $0.22 | $0.18 | $161 | $131 |
| SALT and MINERAL[2] | 30 | LBS. | $0.70 | $0.50 | $21 | $15 |
| | | | | SUB TOTAL FEED COSTS[3] | **$885** | **$716** |

| 2. OTHER VARIABLE COSTS (per horse) | QUANTITY | | HIGH PRICE | LOW PRICE | | |
|---|---|---|---|---|---|---|
| BEDDING | | | | | $1,200 | $0 |
| HORSE CARE PRODUCTS | | | | | $100 | $50 |
| FARRIER SERVICE | 6 | TIMES | $75.00 | $35.00 | $450 | $210 |
| VET and MEDICINE[4] | 1 | TIMES | $600.00 | $150.00 | $600 | $150 |
| MISCELLANEOUS[5] | 1 | TIMES | $300.00 | $100.00 | $300 | $100 |

| 3. OTHER OPERATING COSTS (per household) | | |
|---|---|---|
| OPERATING COSTS-VEHICLE | $1,000 | $100 |
| OPERATING COSTS-BLDG./IMPROVEMENTS | $75 | $0 |
| OPERATING COSTS-MACH/EQUIP | $65 | $15 |
| SUB TOTAL OTHER COSTS | **$3,790** | **$625** |

| | | |
|---|---|---|
| TOTAL VARIABLE COSTS | **$4,675** | **$1,341** |

**4. ANNUAL OWNERSHIP COSTS**

| Capital Recovery[6]: | | |
|---|---|---|
| Horse and Tack (per horse) | $551 | $551 |
| Land, Building, and Improvements (per household) | $1,847 | $1,847 |
| Equipment, Trailers and Vehicles (per household) | $942 | $942 |
| Taxes and Insurance (per household) | $914 | $914 |
| TOTAL FIXED COSTS | **$4,254** | **$4,254** |

1) Hay amount assumes one horse will eat 2% body wt. for 365 days using 120 lb bales.
If pellets are fed, then add $50 to $80 to the cost of hay.

2) The salt & mineral needs assume the consumption of approximately 39 grams per day.

3) All costs are rounded to the nearest dollar.

4) High cost veterinarian & medicines include all recommended vaccinations, worming, dental, and an estimated one emergency visit per year.
Low cost veterinarian & medicines include vaccinations & worming administered by the owner, no dental but an estimated one emergency visit per year.

5) Miscellaneous fees include items such as trail access fees, breeding fees, training, riding lessons, breed registration.

6) Annual capital recovery is the method of calculating depreciation and interest recommended by the National Task Force on Commodity Costs and Returns Measurement Methods.

# Table 2. Investment and Ownership Costs

## Pleasure Horses

| **Land, Buildings And Improvements** | Opportunity[1] Cost Rate | Purchase Price | Salvage/Cull Value | Useful Life | Annual Taxes & Insurance | Opportunity Costs Annual Capital Recovery |
|---|---|---|---|---|---|---|
| Land[2] | 4.0% | $60,000 | $60,000 | | $528 | $1,200 |
| Facilities | 4.0% | $5,500 | $275 | 20 | $48 | $395 |
| Fencing | 4.0% | $3,500 | $175 | 20 | $31 | $252 |
| | **Sub Totals** | $69,000 | | | $607 | $1,847 |
| **Machinery and Vehicles** | | | | | | |
| Tow Vehicle | 4.0% | $23,169 | $2,317 | 10 | $204 | $400 |
| Horse Trailers | 4.0% | $4,500 | $450 | 10 | $40 | $517 |
| Equipment | 4.0% | $350 | $18 | 20 | $3 | $25 |
| | **Sub Total** | $28,019 | | | $247 | $942 |
| **Horse and Tack** | | | | | | |
| Horses | 4.0% | $4,500 | $450 | 15 | $40 | $382 |
| Tack[3] | 4.0% | $2,350 | $118 | 20 | $21 | $169 |
| | **Sub Total** | $6,850 | | | $60 | $551 |
| | **Total** | $103,869 | | | $914 | $3,340 |

1) The Opportunity Cost Rate is the rate recommended by the National Task Force on Commodity Costs and Returns Measurement Methods.

2) All cost are rounded to the nearest dollar.

3) Tack includes items such as bridles, blankets, chaps, spurs, saddle, brushes, combs, etc.

All three budget tables include variable costs (such as feed, boarding, fence repair, and equipment operation) and ownership costs taken from Table 2. The cost estimates under the commercial boarding scenario (Table 1a) and under the owner care and maintenance scenario (Table 1b) assume a "high" and a "low" cost range, representing different levels or quality of horse care and maintenance.

**Variable Costs.** Variable costs are expenses that vary annually, depending on input prices and the number of horses. For the budgets, variable costs are on a per horse basis, except for operating costs of buildings and improvements, machinery and equipment, and vehicles, which are on a per household basis. Variable costs are outlined under three sub-categories, feed costs, other variable costs, and other operating costs.

a) Feed costs include hay, grain, and salt and mineral. All feed costs are based on the total consumption per year for a light-duty, 1200-pound, horse.

b) Other variable costs include items such as boarding, bedding, horse care products, farrier services, veterinary services, medicine, and miscellaneous.

c) Other operating costs included buildings and improvements, machinery and equipment, and vehicles expenses.

**Annual Ownership Costs.** Ownership or fixed costs are costs that typically do not change in a given year. Ownership costs represent the annualized value of investment in durable assets. Table 2 lists the assets typically associated with pleasure horse ownership. The annualized ownership cost estimates in Table 2 are the same for all three budget tables, except that the commercial boarding scenario (Table 1a) presumes a lesser investment in land, buildings, and facilities on the part of the horse-owning household.

Ownership cost estimates were developed using the *capital recovery method.*[1] Assets in Table 2 are divided into three categories: a) land, buildings, and improvements, b) vehicle, trailer, and equipment, and c) horse and tack. All asset values reflect current replacement values. Horse and tack are on a per horse basis; all other assets are on a per household basis and presume 2.07 horses per household (the average number of horses found per Arizona pleasure-horse household in the 1989-90 survey).

a) Land, buildings, and improvements. The amount and value of privately-owned acreage associated with the representative horse property is highly variable and subject to local conditions and surrounding land use. Whatever number is chosen will be subject to legitimate criticism. Ideally the figure should be "representative" of Arizona—a formidable task when thinking of horse property in Scottsdale in contrast to rural Cochise County. The difficulty in choosing a land value is exacerbated because one does not want to include the value of dwellings and improvements attached to the property. The desired value represents horse-related land value only.

[1] Annual capital recovery is the method of calculating depreciation and interest recommended by the National Task Force on Commodity Costs and Returns Measurement Methods.

Facilities and fencing values (reported separately from land) represents the average investment needed to provide shelter, feeding area, and containment for approximately two horses.

b) Machinery and Equipment. Machinery and vehicles include the replacement value of a typical truck and horse trailer needed to safely transport horses. Equipment value includes the value of items such as wheelbarrows, rakes, pitchforks, fencing pliers, and other items needed to maintain horse-housing facilities, tack, etc. Truck cost is adjusted to reflect an estimated 15% use related to horse activity. Most Arizona pleasure-horse households use their trailer-tow vehicle for a host of other purposes in addition to towing their horse trailer or hauling feed, or other horse-related activity.

c) Horse and Tack. The value of an Arizona pleasure horse was estimated at approximately $4,500. The typical horse assumed in this study is defined as a horse that is well broke and used for pleasure activities such as trail riding, parades, or 4-H activities.[2] Tack includes items such as bridles, blankets, chaps, spurs, saddle, brushes, and combs needed for the riding and care of a horse.

### Summary of Per Household Costs of Ownership and Maintenance of Pleasure Horses

The 1989-90 survey found that the average number of horses per Arizona pleasure-horse household was 2.07. Assuming the same number of horses per household in 2001 and using the cost estimates in Tables 1 and 2, the *annual per household expenditure/cost for the ownership and maintenance of horses and associated infrastructure* can be summarized as follows:

*Self-Housed and Self-Boarded Horses:*

- Investment in horses and tack (including taxes and insurance)—$611 x 2.07 = **$1,265**
- Investment in land, buildings, and improvements (including taxes and insurance)—**$2,454**
- Investment in equipment, trailers, and vehicles (including taxes and insurance)—**$1,189**
- Cost of feed—$801 x 2.07 = **$1,658**
- Other variable costs (bedding, horse care products, farrier services, vet and medicine, miscellaneous) *excluding* operating costs of buildings and improvements, machinery and equipment, and vehicles—$1580 x 2.07 = **$3,271**
- Operating costs of buildings and improvements, machinery and equipment, and vehicles—**$628**
- **Total Annual Cost per Pleasure-Horse Household—$10,465**

[2] By assuming a well-broke horse, the value of the investment in that horse implicitly assumes appropriate prior investment in training of the horse.

*Commercially-Boarded Horses:*

- Investment in horses and tack (including taxes and insurance)—$611 x 2.07 = **$1,265**
- Investment in equipment, trailers, and vehicles (including taxes and insurance)—**$1,189**
- Cost of incidental feed—$74 x 2.07 = **$153**
- Cost of boarding—$3,600 x 2.07 = **$7,452**
- Other variable costs (horse care products, farrier services, vet and medicine, miscellaneous)—$863 x 2.07 = **$1,786**
- Vehicle operating costs—**$550**
- **Total Annual Cost per Pleasure-Horse Household—$12,395**

According to the 1990 study survey of Arizona households, 36% of Arizona pleasure-horse households board their horse(s)—19% board one horse, 11% board two horses, 3% board three horses, 2% board four horses, and 1% board five or more horses. Assuming six horses for the last category and calculating a weighted average of this percentage distribution based on 2.07 horses per household, suggests that 31% of Arizona-household pleasure horses are boarded.

Finally, taking a weighted average of "Self-Housed and Self-Boarded" and "Commercially-Boarded" categories results in an **Average Total Cost per Pleasure-Horse Household of $11,063 per Year** for the care and ownership of pleasure horses.

## Direct Economic Impact of Pleasure Horse Ownership by Arizona Households

An estimate of the number of pleasure-horse households is needed to complete our task. To determine the total impact on the Arizona economy we need to multiply $11,063 by the number of pleasure-horse households, unfortunately an unknown number. Making a good guess is problematic. The 1990 study found that 3.16% of Arizona households owned one or more pleasure horses. Based on that percentage, the 1990 researchers estimated that there were 41,505 Arizona pleasure-horse households owning 85,884 pleasure horses.

So what would be a reasonable way to estimate the number of Arizona pleasure-horse households in 2001? We offer two approaches—one that we believe to be conservative and a second that is less conservative, but plausible. We briefly present the two approaches, discuss the pros and cons of each, and then present a range of plausible total expenditure estimates based on the two alternative approaches.

*A Conservative Approach:*

A conservative approach would be to assume the same number of pleasure-horse households (and the same number of pleasure horses) in 2001 as was the case in 1990. That is, 41,505 pleasure-horse households with 2.07 horses per household or 85,884

horses. This approach presumes a decline in the percentage of pleasure-horse households from 3.16% in 1990 to 2.1% in 2001, a 33.5% decline. This seems too large a decrease. Yet it is not unreasonable to believe that the percentage has dropped over the past decade given the very large increase in the total number of Arizona households. Between 1990 and 2001 the number of Arizona households increased from about 1.3 million to nearly 2 million—about a 50% increase.

*An Optimistic Approach:*

A considerably less conservative approach would be to assume that as Arizona's population and household income have grown, so has interest in pleasure horses. However, Arizona's population growth has not been proportionately distributed across all age strata. Further, the age distribution in pleasure-horse households differs from that of all households. The 1990 study found that the age distribution for the average 3.21 person pleasure-horse household had 0.38 persons less than age 7, 0.40 persons from age 7 to 12, 0.33 persons from age 13 to 18, 0.70 persons from age 19 to 30, 1.31 persons from age 31 to 60, 0.05 persons from age 61 to 70, and .04 persons over age 70. Assuming the same age distribution of residents of Arizona pleasure-horse households in 2001 as in 1990 and knowing Arizona's population growth by age strata (Arizona Department of Economic Security), an age-weighted estimate of the number of Arizona pleasure-horse households for 2001 is 57,000 households. This is in contrast to the 41,505 households used under the "conservative approach." For this "less conservative" approach, the implied percentage of 2001 Arizona pleasure-horse households is 2.9% in contrast to 2.1% for the "conservative approach" and in contrast to 3.16% in 1990.

*Arguments For and Against Each Approach:*

Arguments favoring the first approach (no more horses than in 1990) are that Arizona's population growth over the past decade has several characteristics working against horses. The state has experienced rapid urbanization. The population is becoming more elderly, more distant from rural and traditional western roots, and less tolerant of some of the perceived "negative effects of horses in the neighborhood." Finally, horse property has become more scarce and costly.

Arguments favoring the second approach (more horses than in 1990, but less than in proportion to overall population growth) are that Arizona's population has increased and therefore there has been an increase in the potential number of persons interested in horse ownership. Not only has population increased, but so too has household income. Pleasure horse ownership tends to be associated with higher-income households. Finally, part of Arizona's attractiveness to in-migrants is its warm and dry climate and historical western culture conducive to year around horse-related activities.

*Pleasure-Horse Impact Estimates:*

The actual number of Arizona pleasure-horse households is probably somewhere between the "conservative" and "less conservative" estimates. The "conservative approach" yields

an estimate of the direct expenditure impact on the Arizona economy of resident-owned pleasure horses of $459.2 Million annually. That is, 41,505 x $11,063 = $459,169,815. The “optimistic approach” yields an estimate of $630.6 Million **(**57,000 x $11,063 = $630,591,000). On balance, we are comfortable with an estimate of the direct impact on the Arizona economy of resident-owned pleasure horses in the range of **$500 to $600 Million** in annual expenditures.

# V. EXPENDITURES OF ARIZONA RESIDENTS AND NON-RESIDENTS ASSOCIATED WITH HORSE RACING

This section presents updated estimates of components of Arizona's horse racing industry. We draw extensively on the 1997 Arizona State University report, "The Economic Contribution of the Pari-Mutuel Racing Industry to the Arizona Economy." That study presents the direct impact of six components of horse and dog racing activity in Arizona—1) race tracks, 2) training and maintenance of racing animals, 3) visitor expenditures by out-of-state owners, 4) breeding of racing animals, 5) off-track betting, and 6) spending by out-of-state race fans. Fortunately the estimates provided in the ASU report enable the separation of horse racing activity from dog racing activity. Table 3 at the end of this section presents the ASU estimates for the horse racing components, adjusted for inflation. That is, the values reported in Table 3 are updated to 2001 to reflect the increase in the Consumer Price Index. No adjustment was made for Arizona population change because a comparison of the attendance and participation data, as reported in the FY 2000 Arizona Annual Report of the Arizona Department of Racing, revealed no appreciable increases in participation, neither attendance nor betting, from 1996 to 2000.

Arizona has three commercial horse tracks. Attendance at the tracks was about 359,000 in 1999-2000 (Arizona Department of Racing). Total on- and off-track attendance was 840,000. Total betting was $134 Million during the 2000 season. All of Arizona counties also hold County Fair races. Attendance totaled more than 184,000 and total wagers surpassed $20 Million. These numbers have remained fairly stable over the previous five years. In the future, some expansion seems plausible. The facility at Prescott has grown, and there seems a good chance that some of the events currently held in states to the north could move to Arizona. These events also should increase the number of out-of-state visitors.

Retained earnings of the racetrack industry were about $27 Million in 1999-2000 (Arizona Department of Racing). Additional revenues accrue from competitor fees, concessions, and gate receipts. These sources of revenue probably are small. Off track betting retail activity generated $7.3 Million in 1996, for example. Profits accruing to the racetracks were only a small share of this total. Admission fees are only a few dollars per person.

Total revenues must cover expenses for the racetracks (ASU, 1997). Direct purchases of goods and services by the industry were $11.1 Million in 1996. The tracks employed about 900 workers with an annual payroll of $6.2 Million. Off-track betting retail activity was composed of $4.6 Million in expenditures for goods and services and $2.3 Million in labor cost to 230 workers.

Expenditures on goods and services for maintenance of racehorses totaled $26.6 Million in 1996. The sector employed about 1000 workers with a wage bill of $12.2

Million. These costs were well in excess of revenues. Winnings were only $12 Million. Racehorses do not seem a very profitable undertaking, although some further revenues may be raised from selling breeding stock and additional activities. Similar results were found in a Maryland study. Losses are channeled more to owners of the horses than to breeders. Breeding costs for local horses were estimated to be $9.2 Million, composed of purchases of goods and services for $6.3 Million and labor payments of $2.9 Million.

In addition, the industry receives economic input from out-of-state participants. Expenditures on visits by out-of-state horse owners (800) were estimated to be $5.9 Million. Out-of-state fans make up a prominent share of horse racing attendance. For example, they make up nearly a third of the attendees at the track in Phoenix. Their expenditure was estimated at about $15 Million.

Total direct contribution of the racing industry to the economy was estimated for the year 2001. Results are presented in Table 3. Empirical estimates are based on the 1996 data, assumed to increase to the year 2001 at the same rate as the Consumer Price Index. This increase factor amounts to 12%.[3] The results suggest that in total, the racing industry directly contributes more than **$100 Million** to the state economy.

**Table 3. Estimated Expenditures of Various Components of Arizona's Horse Racing Industry, 2001.**

| Item | Million |
|---|---|
| Race Track | $22.9* |
| Off-Track Betting | 7.7 |
| Horse Training & Maintenance | 43.5 |
| Breeding | 10.3 |
| Combined Out-of-State Fans & Owners | 23.4 |
| **Total** | **107.8** |

***Includes estimated profits accruing to Arizona-resident shareholders of $3.5 Million.

[3] Since the CPI index is not yet available for 2001, we assumed the same annual rate of increase for 2000 to 2001as from 1996 to 2000.

# VI. EXPENDITURES OF ARIZONA RESIDENTS AND NON-RESIDENTS AS PARTICPANTS AND SPECTATORS AT NON-RACING EVENTS

This section presents estimates of the economic activity related to annual Arizona-based horse show events. In the winter and spring months of 2001, 2,750 exhibitors, about two thirds of which were from out-of-state, and 4118 entered horses were involved in four major shows. Two shows—The Copper Country Paint Show and the Hunter/Jumper Show—are held at the Pima County Fairgrounds, Tucson. The other two shows—the Sun Circuit Quarter Horse Show and the Arabian Show—take place at WestWorld, Scottsdale. Participant information was collected at each show using a questionnaire survey of exhibitors. The sample survey results were converted to total activity figures using data obtained from the show management on exhibitors and horse numbers and from the facility management of each of the four shows. Show and facility management also supplied information about items not included in the questionnaires. To respect confidentiality, results are shown only in the form of aggregate figures for the four major shows. Following the reporting of expenditures at the major horse shows an estimate is made of the activity associated with other Arizona-based horse shows beyond the four surveyed shows. The section concludes with an updated estimate from the 1990 study of expenditures of Arizona residents as spectators at rodeo, gymkhana, and polo events.

The direct economic activity accruing from the four major horse shows is measured in terms of participant costs and expenditures on the following items:

Transportation (people and horses)
Lodging (hotels, motels, campsites)
Food and drink
Gifts, souvenirs, clothing, etc.
Recreation and entertainment
Participation and admission fees
Feed and bedding
Tack and other horse supplies
Stall fees

Expenditures on stall fees and participation and admission fees were obtained as aggregate figures from show and facility management. The other items were estimated from the sample survey, in some cases supplemented with information from show and facility authorities. Where relevant, spectator admission fees were added to the estimated expenditures, whereas other spectator expenditures at the shows were disregarded. Wages and salaries to paid assistants—predominantly trainers—were not included in the survey. For trainers employed by out-of-state exhibitors the economic base is outside Arizona and should not be counted here. For in-state exhibitors, there might be a case for assigning a certain share of annual wage costs to the particular show. However, in Section IV it was assumed that the value of horses included training costs. Prior

investment in appropriate training of horses thus was taken into account in the pleasure horse section.

### Questionnaire Survey

A questionnaire was distributed to exhibitors at the four shows. The questionnaire was designed in cooperation with Carol Whittaker, Senior Research Specialist at School of Public Administration and Policy, University of Arizona. Whittaker also distributed and collected the questionnaires. Completed questionnaires were dropped off anonymously without personal contact with the surveyor. A follow-up could therefore not be arranged in relation to non-respondents and respondents who experienced difficulties in replying to certain questions. The relatively large sample—13 percent of participants in the four shows—and close scrutiny of each returned questionnaire hopefully mitigated sampling bias and measurement error.

To determine whether the four sample surveys were representative, an evaluation was conducted based on the number of entered horses per exhibitor. Data on entered horses per exhibitor were available from the surveys and the aggregate data from show and facility management. For three of the four shows there was a close correspondence. For the fourth show a significant discrepancy appeared because exhibitors with few entered horses were underrepresented in the survey sample. Fortunately, in this case, a total list of exhibitors and their horses was available. Stratification of the questionnaire sample according to the total list yielded a weighted sample average very close to the aggregate average figure of horses per exhibitor. Consequently, for this show all averages were weighted based on the stratified survey sample, whereas simple survey averages were used for the other three shows.

Processing of data from the returned questionnaires yielded average figures per exhibitor (respondent) at each show regarding party size, number of horses, days spent at the locality, number of vehicles, miles traveled, mode of lodging, value of purchased souvenirs, gifts, tack, etc. These results were combined with non-sample information on typical lodging rates, daily expenditures on food and drinks, fuel prices, and mileage performance by type of vehicle to establish survey average expenditures for each show. Averages were raised to totals by multiplying by the number of exhibitors at each show.

### Expenditures According to Surveys

**Transportation Costs.** Costs of transportation are the sum of the following items:

- Calculated costs of round trip road transport of horses and persons in exhibitor's party from residence for Arizona residents, and from pertinent Arizona border crossing for non-residents, to show site
- Expenditures on car rental during show
- Calculated costs on local transport during show

Length of road transport to the pertinent show site and back was based on location of residence (city or town) in Arizona as stated in the returned questionnaires. For out-of-state residents the distance to the show site was measured from the most obvious of six Arizona border crossings for each respondent. It was decided only to consider the cost of fuel using an average fuel price of $1.50 per gallon. Depreciation, repairs and service, and capital remuneration were disregarded. For out-of-state residents, these items would normally represent economic impact at the point of residence and they should therefore be excluded. For Arizona residents, a case might be made for assigning a full costs figure per mile because the full costs would normally represent in-state economic activity. However, it could also be argued that participation in a particular show would only marginally affect length of life, repair costs, or other items. Further, maintenance and ownership cost of horse trailers and tow vehicles have already been accounted for in Section IV for Arizona based pleasure horse owners. So, this would only be an issue for passenger cars and RVs. For these reasons, transportation costs were limited to fuel costs for both in-state and out-of-state participants.

Three types of vehicles were considered: tow trucks pulling horse trailers, passenger cars, and RVs. Average fuel consumption per mile was based on inquiries to car and RV dealerships. For cars, a figure of 20 mpg was applied, and for tow trucks and RVs, the figures were 10 and 7.5 mpg, respectively. The estimated fuel costs per mile is 7.5, 15, and 20 cents for passenger cars, tow trucks, and RVs, respectively. These average figures conceal a significant variation depending on types and makes of vehicles and driving habits.

The number of tow trucks per exhibitor was established on the basis of the number of horses conveyed to and from the show assuming a maximum of five horses per horse trailer. Where RV or trailer camping was indicated, it was assumed that only one RV was used. In a few cases, the number of persons lodging at RV or trailer campsites exceeded the capacity of one camper unit. It was assumed that the resulting underestimation was balanced by the fact that the daily cost of hook-up was based on the RV fee, which could be higher than the fees for certain other types of camping. The number of own passenger cars used by each party was established as the total number of vehicles, excluding tow trucks, minus one unit where lodging at campsite was indicated.

The costs of road transport for each party to and from the show site was found by combining the above elements. In cases where the respondents transported one or more horses for other exhibitors, towing costs were reduced proportionally. Costs of car rental and other paid transport during the show were based on replies to the questionnaire.

Fuel costs using own or rented vehicles for local transport during the show period accounts for commuting between place of lodging, meals, and show site. Estimates were established based on the following: reported size of party and days at the location, an assumed maximum of three persons per vehicle, a daily average of 30 miles per vehicle, the average fuel performance for passenger cars, and a fuel price of $1.50 per gallon. When paid trainers also assisted other exhibitors, the fuel cost calculation was prorated

based on the number of horses in care for the respondent and for other exhibitors, respectively.

The estimated aggregate transportation cost in Arizona for all four shows was $1,520,600.

**Lodging.** Replies to the questionnaire revealed how many days that each party attended the show. Further, replies gave information about the accommodation of individual party members by type of lodging: 1) with relatives in the area, 2) at resorts/hotels with full service, 3) at other hotels/motels, 4) at RV or trailer campsite, and 5) "with the horses."

The show management and fairground facility management provided information about the costs of lodging at the show site "with the horses." Other lodging expenditures were calculated on the basis of information given in the returned questionnaires and estimated daily rates by type of lodging.

Lodging with relatives was assumed to be free. The calculated daily rates in Table 4 were obtained via telephone interviews with about 60 randomly selected individual campgrounds, motels, hotels, and resorts, divided equally between Scottsdale and Tucson. The interviewed persons quoted daily rates per room and hook-up fees per RV unit based on weekly leases during the weeks of the individual shows. Lodging rates in resorts, hotels, and motels assumed a maximum of two persons per room. Resorts and hotels with full service were pooled to represent "resort" in the questionnaire, and hotels with limited service were taken together with motels to represent "hotel/motel" in the questionnaire. The average daily "resort" rate for Scottsdale was $255 and for Tucson, $183; the average daily "hotel/motel" rates were $115 and $82, respectively, for Scottsdale and Tucson.[4]

## Table 4. Estimated Average Daily Lodging Prices during Show Period

| Type of lodging | Scottsdale | | Tucson | |
|---|---|---|---|---|
| Resort | $255 | 255 | $220 | 183 |
| Full-service hotel | 255 | | 145 | |
| Limited-service hotel | 150 | 115 | 102 | 82 |
| Motel | 80 | | 61 | |
| RV site | | 26 | | 27 |

[4] For comparison, during the period January 1–April 15, the per diem allowance per person for lodging in connection with university business travel was $107 and $80 for the Scottsdale and the Tucson area, respectively (Financial Service Office of the University of Arizona).

Lodging costs for participants in the four shows were found by combining the above information about number of persons by length of stay and type of lodging with the estimated daily lodging costs in Table 4. Adding the costs of fairground lodging, total lodging costs came to $12,175,000.

**Food and Drink.** Food and drink expenditures were estimated on the basis of information in returned questionnaires about number of persons in exhibitors' parties, days of stay in connection with the show, and a daily rate of $35 per person. The $35 rate is a little higher than, for example, the official university per diem allowance. The slightly higher rate was used to allow for drinks and snacks between meals. The rate was used for all participants without deduction of normal daily costs of living for Arizona residents. Spectator expenditures for food and drink were not included.

For participants staying with friends or relatives, these rates may not reflect the costs of home cooking. On the other hand, in these situations eating out may often take place and at additional costs if the visitors treat their hosts as a sort of payment for free lodging.

Actual daily expenditures per person no doubt vary significantly among show participants. Some participants may frequent fast food facilities at rates well below the average rate of $35. Others may spend considerably more.

For participants at the four shows, total food and drink expenditures were estimated to be $6,910,200.

**Feed and Bedding.** Participants who did not bring sufficient amounts of own feed and bedding for their horses acquired these items from services available at the shows. The calculation of total expenditures, according to the surveys, was supported with information from show and facility management about total sales of feed and bedding when available.

The total feed and bedding expenditures for the four shows came to $729,200.

**Other Expenditures.** The questionnaire surveys also explored the extent of other horse-related expenditures and spending on leisure and recreation during the show periods. The calculated total expenditures were as follows:

| | |
|---|---|
| Tack and other horse supplies | $1,125,400 |
| Souvenirs, gifts, clothing, etc. | 2,578,200 |
| Recreation and entertainment | 767,900 |

Tack and other horse supplies included purchase of horse trailers in the amount of $351,700. A few horses, worth $150,000 were also traded at the shows. This item was not included because no economic activity is created when horses change hands among participants at a show. To the extent Arizonans sell horses to out-of-state individuals the transactions would be captured when considering export breeding sales as a final demand sector (see Section II).

### Participant Entry and Stall Fees and Spectator Admission Fees

Participants incurred show-related costs in the form of fees for entry of horses in the competitions and for the use of stables at the show site during the show period. Show management provided information about the aggregate amounts of collected fees. The organizer of one of the shows was not based in Arizona. In this case, only the payment from the show management to the fairground for use of facilities was taken into account. Any surplus of collected fees after payment for lease of fairground facilities was not included because it would not have a direct impact on the Arizona economy. Spectator admission fees were only collected at one of the four shows. The amount, provided by the show management, was included in the estimate of direct economic impact.

For the four surveyed shows the participant and spectator fees amounted to $1,905,900.

### Summary of Expenditures Related to Four Surveyed Horse Shows

Table 5 summarizes the calculated direct economic activity associated with the four major horse shows surveyed during the period December 2000–March 2001. Lodging of persons belonging to the exhibitor parties accounted for almost half of the nearly **$28 Million** in total economic activity. Expenditures on food and drink were another major item, with a total expenditure of almost $7 Million. Fuel for transportation of persons and horses to and from the shows came to $1.5 Million. Horse-related expenditures (feed, bedding, tack, etc.) amounted to almost $2 Million, and expenditures on souvenirs, recreation, and other miscellaneous items were over $3 Million. The sum of participant and spectator fees was $1.9 Million.

## Table 5. Total Direct Economic Activity at Four Surveyed Horse Shows

| | |
|---|---|
| **Based on sample surveys:** | |
| Transportation | $1,520,600 |
| Lodging | 12,175,000 |
| Food and drinks | 6,910,200 |
| Feed and bedding | 729,200 |
| Tack and other horse supplies | 1,125,400 |
| Souvenirs, clothing, etc. | 2,578,200 |
| Recreation and entertainment | 767,900 |
| | 25,806,500 |
| **Participant and spectator fees:** | |
| Entry, stall, and spectator admission fees | 1,905,900 |
| **Total estimated direct economic activity** | **27,712,400** |

## Direct Economic Activity at Other Arizona Horse Shows

Each year, significant activity takes place at other Arizona horse shows beyond the four major shows surveyed. Other shows vary in size, length of show period, and attraction of participants from outside the local area. A detailed analysis of the economic impact owing to these other shows was beyond the scope of this study.

However, an informed judgement of the potential impact was made based on information and estimates provided by experts within the different horse organizations. Some key elements were considered and compared with information from the four surveyed shows:

Number of horses entered in other shows per year
Approximate average length of stay at other shows
Level of expenditures per entered horse at other shows

It was assumed for "other shows" that the average number of horses per exhibitor and the size of exhibitor party were the same as for the four surveyed shows. The first step was to compare the total number of show days at other shows—number of entered horses times average length of time that horses, exhibitors, and their parties stayed at the different shows—with the same information and total expenditures at the four surveyed shows. In the group of other shows, some attract participants from across Arizona and from other states. Others attract predominantly local participants. To extrapolate expenditures from the major shows to other shows based only on the number of entered horses and average length of show would therefore tend to overestimate economic activity at other shows, especially transportation and lodging expenditures.

For all "other shows" lodging was calculated assuming a 25 per cent lower daily rate than for the four surveyed shows reflecting that many other shows take place outside the prime tourist season. A further 25 per cent reduction was made for shows held outside high-cost metropolitan areas.

Lodging costs were further reduced assuming that only half of participants at local shows utilize out-of-home accommodation. Also, no road transport costs were calculated for "local participants." For the remaining participants at other shows, mileage was assumed to be the same as for Arizona residents attending the surveyed shows.

Using these assumptions, it was estimated that the direct economic activity in connection with other shows amounts to **$16 Million.** Clearly, these calculations are only what one might call rough guesses. However, we have purposefully tried to err on the conservative side.

For all Arizona shows—Paint, Quarter Horse, Arabian, and Hunter/Jumper, both major and other—the estimated total annual direct economic activity is **$43 Million.** This figure excludes horse racing, rodeos, polo, and roping events.

### Arizona Resident Spectators at Rodeo, Gymkhana, and Polo Events

Based on the telephone survey of a random sample of Arizona residents, the 1990 study estimated spectator expenditures to attend horse racing, horse show, rodeo, gymkhana, and polo events. Horse racing and show events have been accounted for elsewhere in this report (Section V and this section). According to the 1990 report, the total expenditure of Arizona residents as spectators at rodeo, gymkhana, and polo events was $5,837,000 in 1990 dollars. Updating this number to 2001 dollars and adjusting to reflect a reasonable increase between 1990 and 2001 in the number of Arizona households attending rodeo, gymkhana, and polo events yields an estimate of **$9.3 Million.**

This estimate was reached by first multiplying the 1990 total dollar amount of $5.837 Million by 1.35 to convert to 2001 dollars.[5] This number was then multiplied by 1.18 to reflect the number of additional Arizona households that might likely attend such events in 2001 in contrast to 1990. Choice of the factor 1.18 follows the logic outlined in Section IV. That is, we assume the same proportional increase in Arizona resident spectators at rodeo, gymkhana, and polo events as the average estimated increase in pleasure-horse households under our "conservative" and "optimistic" approaches (see pp. 17–18).

[5] Since the CPI index is not yet available for 2001, we assumed the same annual rate of increase for 2000 to 2001as from 1996 to 2000.

# VII. CONTRIBUTION OF SUB-SECTORS OF ARIZONA'S HORSE INDUSTRY TO THE ARIZONA ECONOMY

This section presents estimates of the indirect and induced effects of the direct expenditures in Sections IV (Pleasure Horses), V (Racing), and VI (Selected Other Events). Those impacts are summarized in Table 6. Before turning to the results, a word of caution is given about proper interpretation of indirect and induced effects, followed by a brief discussion of procedures used.

## A Word of Caution

Two common mistakes are made in considering indirect and induced impacts. Both mistakes involve claiming more indirect and induced impact than is appropriate (Beattie and Leones). First, is failure to acknowledge that the part of the ripple effect that occurs beyond the boundaries of the economy of interest should not be counted as part of the impact *on that local economy*—in the context of this study, the Arizona economy. This common mistake has to do with failure to understand or account for *leakage* (see Section II).[6]

A second mistake is failure to recognize that all sectors have ripple effects and that most input supply sectors are not dependent on supplying inputs to a single final demand sector. Most support sectors will expand service to other sectors if demand wanes in an existing part of their market. For example, suppliers of building materials sell to all kinds of "end users" and "intermediate goods and services providers" throughout the Arizona economy—just one part of which is buildings and corrals for stabling horses. The indirect economic impact of building materials sales, or how much it expands or contracts due to increased or reduced pleasure horse activity, depends on whether resources in the local economy are fully employed and on the ability to attract additional resources from outside the local economy. If resources are fully employed and new resources are not attracted to an economy from outside, then an increase in economic activity in one area will result in reduced activity in another area. The net effect in that case is negligible. The upshot is that indirect (and induced) effects are generally overstated.

[6] The problem of leakage, in fact, goes beyond just indirect and induced effect considerations. It is an issue that requires close attention when accounting direct expenditures as well. We are confident that we have avoided the overcounting problem with regards to our calculations of indirect and induced effects by using IMPLAN rather than RIMS multipliers (see "Estimation Methodology, this section). We cannot be certain, however, that all direct expenditures on the part of Arizona horse household are exclusively purchases from Arizona-based suppliers.

## Estimation Methodology

Estimates of the indirect and induced effects of Arizona's horse industry are based on the most commonly used approach—interindustry economic multipliers. Table 6 presents the estimates of combined indirect and induced effects using Type II multipliers from the Arizona IMPLAN interindustry model. The Arizona IMPLAN model is the model used by the Economic and Business Research Program at the University of Arizona. The U.S. IMPLAN model, from which many state and local models, including the "Arizona model," are derived, was developed by the Forest Service (U.S. Department of Agriculture). The other commonly used model is the RIMS model maintained by the U.S. Department of Commerce. RIMS multipliers are generally larger than IMPLAN multipliers. This study uses the IMPLAN model because the procedure used to "scale down" from the U.S. model to state and local area models accounts more carefully for "cross haul and leakage" effects than does the RIMS modeling procedure (Richardson).

The 1990 study also used an Arizona IMPLAN model. The implicit Type-II output multipliers used in that study were 1.6 for the "pleasure segment," 1.7 for the "commercial/semi-commercial segment," and 1.9 for the "spectator segment." In the 1990 study, the expenditure categories and amounts from each direct segment were assigned to related indirect economic sectors in the model to ascertain the indirect and induced effects. This laborious approach was used because no sectors in the IMPLAN model correspond exactly to the horse industry sub-sectors of interest. The IMPLAN model has a single racing sector that includes horse, dog, and auto racing. Interestingly, the output multiplier for that sector is 1.9, the same as the "spectator segment" implicit output multiplier in the 1990 study. The IMPLAN model also has an "agricultural services" sector, the closest thing to the 1990 "commercial pleasure horse" sector, with an output multiplier of 1.7. There is no "private pleasure horse" sector in the IMPLAN model. Yet there is the close correspondence of the "racing" and "agricultural services" sector multipliers with the "spectator" and "commercial/semi-commercial" output multiplier implicit[7] in the 1990 study. Accordingly, the 1990 study multipliers are used for pleasure horses as well as for racing and other horse-related spectator events.

## The Direct, Indirect and Induced, and Total Impact Estimates

Estimates of the direct, indirect and induced, and total impacts of the various components of Arizona's horse industry are summarized in Table 6.

[7] Because of the creative and careful way in which the indirect and induced effects were calculated in the 1990 study the multipliers per se are implicit rather than explicit. However, the implicit multipliers are readily determined from the reported direct, indirect, and induced impacts in Table 36, on p. 36 of the 1990 report.

## Table 6. Estimated Economic Impacts of Arizona's Horse Industry, 2001

| | | | **Expenditure** (Million Dollars) |
|---|---|---|---|
| **Direct** | | | |
| | Pleasure Horses [a] | | 500 to 600 |
| | Horseracing [b] | | 108 |
| | Horse Shows [c] | | 43 |
| | Other [d] | | 9 |
| | | **Total** | 660 to 760 |
| **Indirect and Induced** | | | |
| | Pleasure Horses | | 300 to 360 |
| | Horseracing | | 97 |
| | Horse Shows | | 39 |
| | Other | | 8 |
| | | **Total** | 444 to 504 |
| **Total** | | | |
| | Pleasure Horses | | 800 to 960 |
| | Horseracing | | 205 |
| | Horse Shows | | 82 |
| | Other | | 17 |
| | | **Total** | **1,104 to 1,264** (or $1.1 to $1.3 Billion) |

[a] Includes private pleasure horse ownership and expenditures by Arizona residents and long-stay non-residents. Excludes commercial pleasure and trail riding and short-stay non-resident expenditures.
[b] Includes participation and expenditures of both Arizona residents and non-residents.
[c] Includes Arizona resident and non-resident participation and expenditures at Paint, Quarter Horse, Arabian, and Hunter/Jumper shows.
[d] Rodeo, roping, polo, and gymkhana. Includes Arizona-resident spectator expenditures only.

## VIII. HORSE AND HOUSEHOLD NUMBERS AND COMPARISON WITH OTHER SECTORS

This section touches briefly on two topics. First, Table 7 provides an updated estimate (projection) of the plausible number of horses in Arizona and a plausible number of Arizona households having direct involvement in the horse industry either through pleasure horse ownership or through commercial or semi-commercial horse-based businesses. The updated numbers for 2001 are based on findings from the 1990 study. Assumptions upon which the 2001 projected numbers are based are enumerated in the notes to Table 7.

A final point of interest is to place the estimated direct expenditures on horses in Arizona (a measure of the relative contribution or "importance" of horses to the Arizona economy) in perspective. Figure 2 does this in compact, visual terms by comparing direct expenditures on horses against gross sales from selected agricultural sectors[8] and against *state government* expenditures on "protection and safety" in Arizona. The figure reveals that direct expenditures on horses and those horse-related activities included in this study exceed that of most of the major sub-sectors comprising Arizona's agricultural industry and rival what the state government spends annually on law enforcement, the national guard, state prisons, and the like.

The "bottom-line" results of Tables 6 and 7 and Figure 2 are summarized in a one-page *Executive Summary* at the front of this report (see p. vi).

[8] While at first it may seem a bit curious, comparison of expenditures to gross sales is appropriate under the assumption of a perfectly competitive industry. When markets are highly competitive, as is generally the case in agricultural markets, and when costs of production (expenditures) include an accounting for a "normal" rate of return on investment and payment of an opportunity cost wage to business owners/ managers in the industry, then zero *economic* profit is the expected long-run equilibrium outcome. Since profit equals gross sales less costs of production, then when profit (after appropriate payment for invested capital and owner-family labor is made) is zero, gross sales will equal expenditures.

## Table 7. Projection of Horse Household and Horse Numbers for 2001 from 1990 Estimates

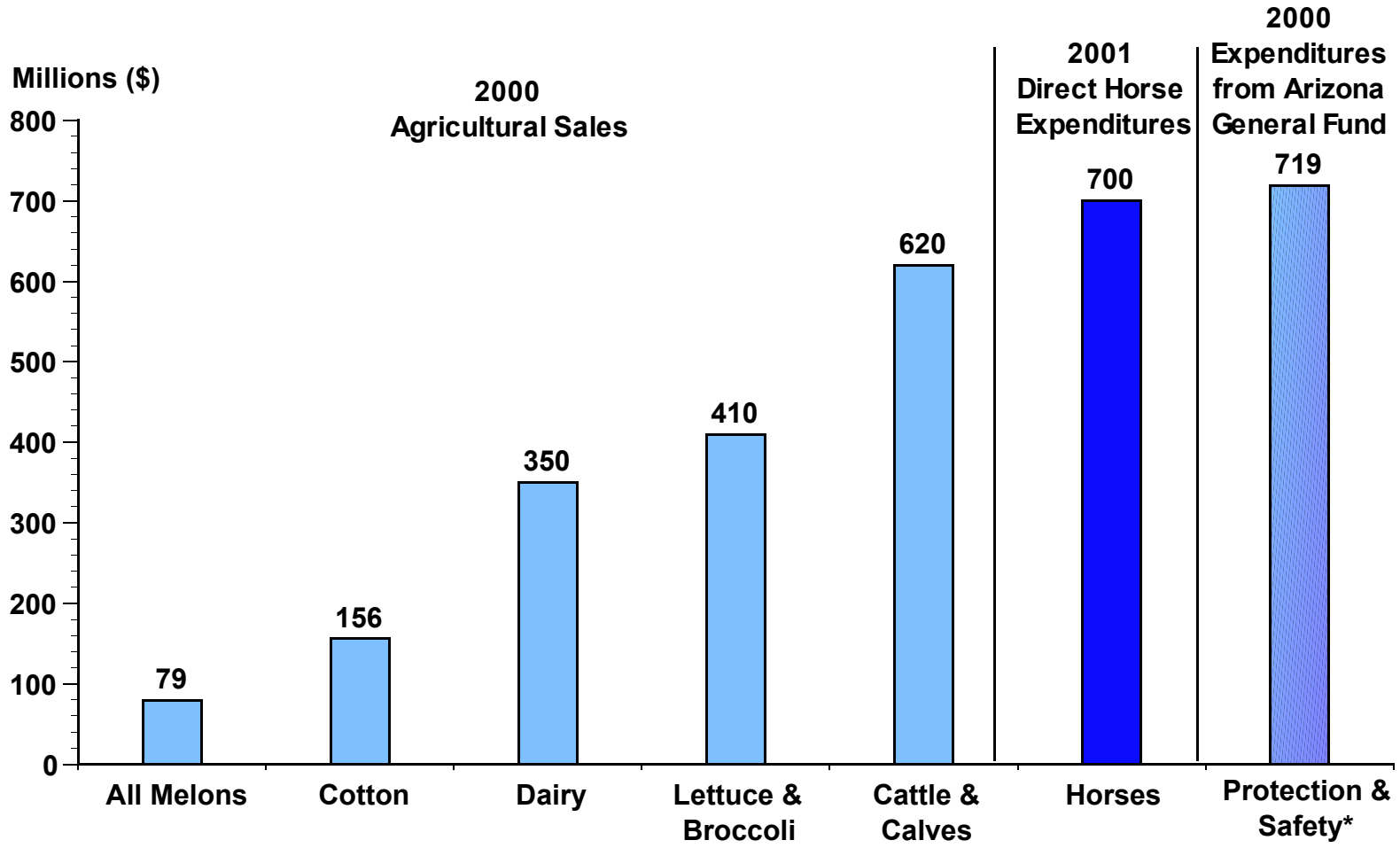
| | 1990[a] | 2001 |
|---|---|---|
| Pleasure-Horse Households | 41,505 | 41,500 to 57,000[b] |
| Pleasure Horses | 85,884 | 86,000 to 118,000[c] |
| Commercial/Semi-Commercial Firms (Households) | 6,700 | 6,700[d] |
| Commercial Horses | 80,550 | 81,000 |
| **Total Households** | **48,205** | **48,000 to 64,000** |
| **Total Horses** | **166,434** | **167,000 to 199,000** |

[a] Source: 1990 study report, pp. 3, 20, and 35.

[b] See pp. 17–18 of this report.

[c] Assumes 2.07 horses per pleasure-horse household based on finding of the 1989–90 survey.

[d] Conservatively assumes that Arizona-based commercial or semi-commercial firms are single family operations.




* Protection and Safety includes law enforcement, military, custody and related services provided to the general public.

**Figure 2.**

**Comparison of Direct Expenditures on Horses to Agricultural Commodity Sales and State Government Expenditures on Protection and Safety**

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