MOST COMPREHENSIVE HORSE STUDY EVER REVEALS A NEARLY $40 BILLION IMPACT ON THE U.S. ECONOMY

by
The American Horse Council
June 28, 2005

I. Executive Summary

As a large, economically diverse industry, United States horse industry contributes significantly to the American economy. Horse owners and industry suppliers, racetracks and off-tracking betting operations, horse shows and other competitions, recreational riders and other industry segments all generate discrete economic activity contributing to the industry's vibrancy. The spending generated within the horse industry, and the subsequent spending between co-dependent industries contributes hundreds of thousands of jobs and billions of dollars to the economy on an annual basis.

The significance of the industry is reflected in the following:

- The horse industry contributes approximately $39 billion in direct economic impacts to the U.S. economy on an annual basis.
- Racing, showing and recreation all generate between $10 billion and $12 billion in annual direct impacts.
- When considering indirect and induced spending, the horse industry annually generates approximately $102 billion for the U.S. economy.
- Of the total $102 billion in economic impacts reported, approximately $32.0 billion is generated from the recreational segment, $28.8 billion from the showing segment, $26.1 billion from the racing segment and $14.7 billion for other industry segments.
- Approximately 1.96 million people own horses, with another 2 million people involved as volunteers or through a family affiliation.
- The horse industry sustains approximately 1.4 million full-time equivalent jobs on an annual basis, with over 460,000 of those jobs created from the direct spending within the industry.
- There are approximately 9.2 million horses in the U.S. with approximately 3.9 million involved in recreation and another 2.7 million horses participating in horse shows and other competition.
- The median household income of those individuals and families owning horses is approximately $60,000 with approximately 34% of the industry having a median household income of less than $50,000 and 28% of the horse owning population having an annual income of over $100,000.
- The horse industry pays approximately $1.9 billion in taxes on an annual basis to all levels of government.

This study was commissioned by the American Horse Council Foundation in 2004. The AHCF retained Deloitte Consulting LLP in June of 2004 to develop a study of the Economic Impacts of the U.S. Horse Industry. The final study was issued in June 2005.

II. Project Background

In 1996, the American Horse Council Foundation ("AHCF") commissioned a study to estimate the economic impacts of the horse industry on the United States. This study produced estimates for several key industry characteristics including: the number of horses in the United States, the total direct industry contribution to the U.S. Gross Domestic Product, and the total number of jobs created/sustained by the horse industry.

Since 1996, several changes have had a profound impact on the industry. Other forms of gaming at racetracks have gained increasing acceptance and approval, with video lottery terminals (slots and electronic gaming machines) and account wagering being approved in many jurisdictions across the United States, stimulating a new type of economic activity at each location. The proliferation of the Internet, both for the advertisement and purchase of goods and services, has had a profound impact on horse owners and horse industry suppliers, as well as the pari-mutuel wagering industry. New wagering technologies continue to be introduced at racetracks and OTBs, some of which have contributed to the growth in Off-Track wagering.

Changes to federal, state and local tax policies have also directly affected horse owners and farms. Advances in veterinary medicine and improved horse breeding practices have increased the life span of horses as well as the percentage of live foals to mares bred. There has also been expanded interest in retraining horses for second careers and long-term care for retired horses. These changes are just a few of the many examples illustrating differences in the current horse industry from the industry that was represented in the last version of the study.

Recognizing the industry's need for more current economic information, the AHCF retained Deloitte Consulting LLP ("Deloitte") in June of 2004 to develop a current economic impact analysis. The current study does not differ dramatically from the 1996 study. In fact, some of the same economic modeling and sampling approaches used for the 1996 study have been applied to the 2005 study. Applying a similar methodology allows for greater consistency between the 1996 study and this current version. However, the 2005 report goes beyond merely reproducing the work that was previously conducted. This study has made several enhancements to improve both the quality of data collected for this study, the accuracy with which the data has been reported, and the methods by which the information and findings are presented. In addition, previous studies have been more horse racing centric; this study has more thoroughly and effectively captured other vital elements of the industry (e.g. showing and recreation) in both the survey sampling and economic analysis.

Some of the key horse industry statistics and economic indicators reflected in this study include:

- Estimated number of horses in the U.S.
- Estimated number of horses in each of the 50 states
- Number of people participating in the industry
  - By form of participation (e.g., owner, industry supplier, volunteer, etc.)
  - By activity (e.g., racing, showing, recreation, other)
  - By breed (e.g., Quarter Horse, Thoroughbred)
- Direct, Indirect and Induced economic impacts of the industry on U.S. and individual state economies
  - Contribution to Gross Domestic Product
  - Number of Full-Time Equivalent (FTE) jobs produced

Note: The study provides breakouts for Thoroughbreds and Quarter Horses because The Jockey Club and American Quarter Horse Association provided the necessary additional funding.

Contemporary perceptions of the horse industry are frequently limited to horse racing and/or the farms that support horse racing. This study highlights the true diversity of the industry, from the individual owner who owns a single horse to corporations that may own several farms and hundreds of horses. The information will show how the industry is comprised of many different socio-economic segments, with each population contributing to the industry through their respective spending on goods and services, as well as by providing employment and volunteer opportunities.

With methodological enhancements, greater representation from the showing and recreation industry segments and the largest sample size of horse owners ever captured, this report is the most comprehensive economic impact study ever issued on the U.S. horse industry.

III. Report Overview

The 2005 economic impact analysis of the U.S. horse industry report is presented in two volumes. The organization of the report has been modified from the 1996 version. The two volumes include:

- National Summary – This section highlights economic impacts from the horse industry on a national basis. Statistical information is compiled and consolidated for the entire United States, and all economic data and associated impacts are provided on a national basis. The methodology and approach used to perform the study are introduced in this section, with additional details on the overall study approach including: survey sampling approach, data collection activities, sampling stratifications, and the development of the economic models included in the Technical Appendix. The Appendix also provides additional detail on the supporting rationale for key project assumptions.

- State Breakouts – A specific report was developed for each of the 15 "Break-Out States". Each report summarizes the economic impacts generated from the horse industry on that particular state. In addition, each section contains impact and employment information segmented by primary horse use (racing, showing, recreation, and other), as well as by breed (and a combination of both). The

Break-Out states contributed additional support to help fund the overall economic impact study.

In making economic impact estimates, generally accepted economic principals and modeling approaches have been used in this report. Impact estimates included in the report reflect not only the industry's direct contribution to the U.S. Gross Domestic Product, but also all of the additional spending stimulated in other inter-related industries. Consistent with the approach taken in the previous study, the economic impacts are not inclusive of patron spending outside of the actual showing or racing facility. For instance, major equestrian events such as the AQHA World Championship Show, Rolex Kentucky Three Day Event, Kentucky Derby, the Hambletonian or the Breeders' Cup World Thoroughbred Championships generate significant visitation from out-of-area patrons. These patrons spend money on airfare, hotels, restaurants, shopping and other travel related expenditures. These expenditures are not captured in this economic impact study, only those patron expenditures within the actual confines of the racetrack are captured. The same approach is taken for people traveling to attend and/or participate in horse shows. Including these "out-of-facility" expenditures would significantly increase the impact estimates shown in this report.

As this section will illustrate, the U.S. horse industry has a very large and positive economic impact on other segments of the U.S. economy. The economic impacts manifest themselves in the following ways:

Direct Effects are purchases made by individuals directly involved in the horse industry on goods and services required specifically for the horse industry. The purchases are exactly equal to the value of goods and services produced. For example, $100 spent by a horse owner to buy a saddle for a horse would be considered direct spending and would provide $100 in value to the horse industry.

Indirect Effects are purchases made by industry suppliers and their suppliers to support the manufacturing and delivery of their respective products. For example, the supplier selling a saddle must purchase raw materials to make the saddle, the equipment to manufacture the saddle (or pay another supplier to manufacture the saddle), and support services to deliver and market the saddle, etc. Each of the businesses involved in the manufacturing and delivery of the saddle also must pay their respective suppliers, and so on. This spending effect is reflected in the Indirect Economic Impacts.

Induced Effects are purchases made by individuals employed by the U.S. horse industry or the industry's suppliers. For example, a small business owner providing recreational trail rides presumably spends a percentage of their earnings on food, clothing, entertainment, etc. As a result of the business owner's spending workers in each of those other inter-related industries will be able to increase their production and consumption, and so on.

The economic activity generated by the horse industry quantified throughout this report is shown in terms of economic impacts, employment impacts and fiscal/tax impacts.

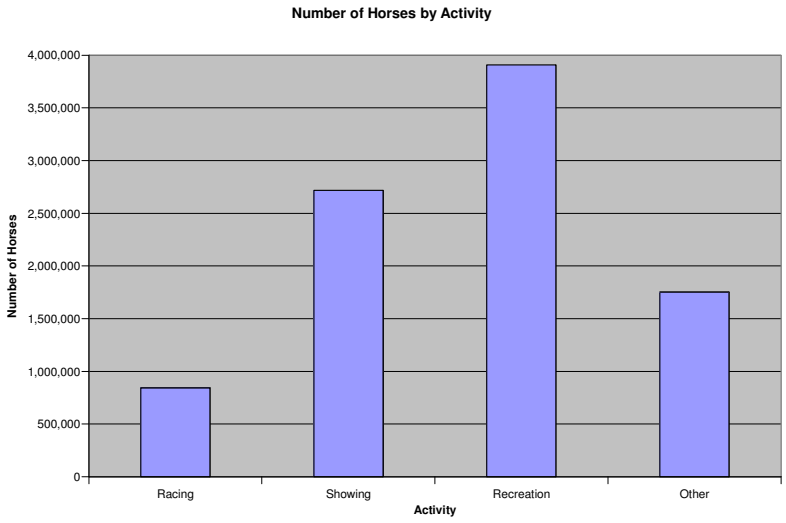
IV. Size of the U.S. Horse Industry

The U.S. horse industry not only sustains a diverse segment of businesses and suppliers across the entire United States, but the industry continues to provide recreation and enjoyment to millions of participants and non-commercial owners. The horse industry itself comprises many different sub-segments, from the small rural owner who owns a single horse for recreational purposes, to the largest commercial breeding farms and industry suppliers. The U.S. horse industry touches many economic segments including breeding, horse maintenance and training, recreation and many other lesser known horse-related activities. As Table 5 in this document will illustrate, all 50 states contain horses and as such, support horse-related activities.

The size of the industry can be seen in the following statistics:

Table 1
Number of Horses by Activity

Activity	*Horses*
Racing	844,531
Showing	2,718,954
Recreation	3,906,923
Other	1,752,439
TOTAL	9,222,847



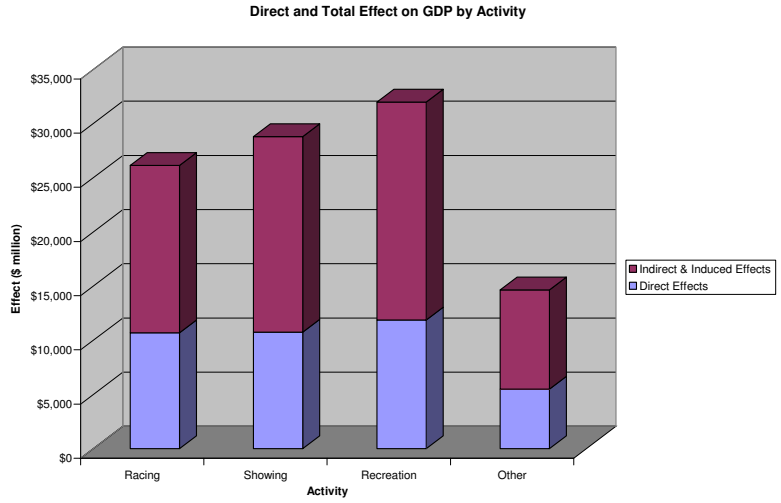
The United States horse industry consists of approximately 9.2 million horses representing many different breeds, uses and disciplines. As highlighted in Table 1, each of the primary use categories has a significant number of horses. Horses identified with a primary use of recreation comprise the largest horse population segment with over 3.9 million horses in the U.S.

Table 2
Direct and Total Effect on GDP by Activity(1)(2)

Activity	*Direct Effects*	*Indirect & Induced Effects*	***Total***
Racing	$10,697	$15,427	$26,124
Showing	$10,759	$18,029	$28,788
Recreation	$11,886	$20,089	$31,975
Other	$5,501	$9,150	$14,651
TOTAL	$38,843	$62,694	$101,538

(1) Numbers shown in millions

(2) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.



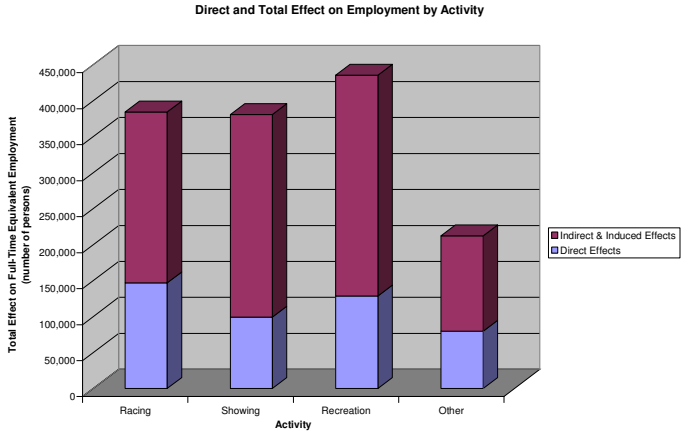
Horses from the racing, showing, recreation and other use categories stimulate a direct economic impact of $38.8 billion and an overall impact of $101.5 billion. As documented in Table 8, the total direct and overall impacts generated in the industry from all horses (including those who could not be categorized in a specific use category) are slightly higher as the impacts attributable to those horses that can not be categorized to a specific use category are not shown table 2.

Each of the primary use categories has a significant economic impact on the overall economy with recreation having a total impact of $32.0 billion, showing $28.8 billion, racing $26.1 billion and other use of $14.7 billion respectively. The direct impacts are generally referenced and relied upon more regularly by economists than total impacts as direct spending represents the direct input into the economy prior to the application of any multipliers (which are more open to interpretation).

Table 3
Direct and Total Effect on Employment by Activity(1)

Activity	*Direct Effects*	*Indirect & Induced Effects*	***Total***
Racing	146,625	237,201	383,826
Showing	99,051	281,365	380,416
Recreation	128,324	306,757	435,082
Other	79,612	132,398	212,010
TOTAL	453,612	957,722	1,411,333

(1) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. These economic data have been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.



The U.S. horse industry also creates a significant number of jobs for the U.S. economy. As Table 3 shows, the industry directly supports approximately 454,000 full-time equivalent employees. When including the indirect and induced employment impacts, the industry generates approximately 1.4 million FTEs. (As noted above, the number of total direct FTEs created by the industry is actually 460,000, but approximately 6,000 employees could not be attributed to a primary use category so are not shown in table 3).

Each segment of the industry plays a primary role in full-time job creation, with the recreation segment creating approximately 435,000 jobs, followed closely by the racing and showing segments, which create approximately 384,000 and 380,000 jobs respectively. Other use categories create approximately 212,000 jobs.

These economic data points included in this section provide compelling evidence of the size and importance of the horse industry. The approach used to estimate industry-related jobs and their characteristics is addressed in greater detail later in this report. Details regarding the actual calculations can be found in the Technical Appendix.

IV-1 Participation in the U.S. Horse Industry

To estimate the number of participants in the U.S. horse industry, it is necessary to establish a definition for the industry. This study and its surveys have remained consistent with the 1996 study by defining "the horse industry" as *activities directly contributing to the production of horses or to the production of entertainment and recreation services that utilize horses.* Based on this definition, the following individuals were included as industry participants:

- Horse owners, including partial owners with no active role in the care, maintenance or training of the horse(s).
- Employees of horse owners, industry suppliers, racetracks and shows, including all full-time, part-time and seasonal employees.
- Family members of owners and other volunteers who are involved in the care and maintenance of a horse(s) without pay.

Consistent with the 1996 approach, we have not included individuals that attend racing, shows or other horse-related events, or who lease horses on a short-term basis. Including these individuals would result in an even higher participation estimate.

Unlike the 1996 study we did not list separately the employees of the respondents that identified themselves as industry suppliers and did not own any horses. This group of industry suppliers includes individuals such as stable owners, trainers, veterinarians, rodeo stock contractors, horse transportation providers, jockeys, sulky drivers, rodeo cowboys, and mounted police, as direct participants. These are obviously important participants in the industry, but as will be discussed more fully below, they have been included as indirect participants. In addition, the economic impact of these segments will be captured through horse owner expenditures, as an indirect effect on GDP.

Table 4 illustrates total horse industry participants. This table does not include those industry participants who are under the age of 18. As part of the overall study, surveys were directed to only those industry participants of at least 18 years of age. Therefore the data reflected in Table 4 does not include a population that clearly represents an important industry segment. For instance, approximately 23% of the U.S. Equestrian Federation's total membership consists of junior members.

Expenditures incurred by this under-18 population are likely captured in the economic impact estimates as the expenditures associated with junior activities should be captured when adults complete their respective surveys as horse owners and include the horse-related expenditures they incur on behalf of their children (as directed by the survey instructions).

Adhering to this definition, it is estimated that 4.7 million people participated in the horse industry. Table 4 highlights the participation by industry sub-segment, as well as the percentage of the total ownership population each group represents. As the table illustrates, there are nearly 2.0 million horse owners, and another 2 million individuals who participate in the industry through a family association or as a volunteer. Of the 1.96 million horse owners, approximately 240,000 are dedicated primarily to breeding activities, while another 480,000 owners identified their primary role in the industry as competing.

Table 4
Number of Industry Participants by Form of Participation(1)

Type of Participation	*Number of Participants*	*Percent of Total Participation*
Horse Owners	**1,955,827**	**41.97%**
Primary Activity, Breeding	237,868	5.10%
Primary Activity, Competing	481,238	10.33%
Primary Activity, Other	1,117,330	23.98%
Primary Activity, Service Provider	119,392	2.56%
Employees	**701,946**	**15.06%**
of Owners	598,398	12.84%
of Racetracks	70,382	1.51%
of Shows	33,166	0.71%
Family Members and Volunteers	2,001,946	42.96%
TOTAL	4,659,719	100.00%

(1) Owner estimates not inclusive of horse owners under the age of 18

The horse industry also provides over 700,000 jobs across all use categories, these jobs are converted to Full-Time Equivalents jobs in subsequent tables.

IV-2 The Number of Horses

This study includes horse population estimates for the United States and each individual state. To generate these estimates, approximately 400,000 horse owners and industry suppliers were solicited either through a postcard survey invitation, an email invitation, or a telephone call and asked to provide information on their involvement in the industry, including a profile of their ownership status (e.g., number of horses owned, type of horses, sole or partial ownership, use of horses, etc.). The process of compiling horse owners was performed in several steps, with the names being provided by horse industry suppliers, breed associations and activity organizations. A more detailed account of this process is provided later in this volume.

The horse owners included in the survey sample are representative of all segments of the U.S. horse industry, with total horse estimates being fully inclusive of both recreational and commercial horse owners. As this is the first time horse estimates were required for all 50 states, a different weighting approach was used than in previous studies. Table 5 illustrates the number of horses within each state.

Table 5
Number of Horses by State

State	*Number of Horses*
Alabama	148,152
Alaska	11,449
Arizona	177,124
Arkansas	168,014
California	698,345
Colorado	255,503
Connecticut	51,968
Delaware	11,083
District of Columbia	33
Florida	500,124
Georgia	179,512
Hawaii	8,037
Idaho	158,458
Illinois	192,524
Indiana	202,986
Iowa	199,220
Kansas	178,651
Kentucky	320,173
Louisiana	164,305
Maine	37,854
Maryland	152,930
Massachusetts	37,529
Michigan	234,477
Minnesota	182,229
Mississippi	113,063
Missouri	281,255
Montana	129,997
Nebraska	150,891
Nevada	51,619
New Hampshire	14,681
New Jersey	82,982
New Mexico	147,181
New York	201,906
North Carolina	256,269
North Dakota	59,391
Ohio	306,898
Oklahoma	326,134
Oregon	167,928
Pennsylvania	255,763
Rhode Island	3,509
South Carolina	94,773
South Dakota	120,878
Tennessee	206,668
Texas	978,822
Utah	120,183
Vermont	24,540
Virginia	239,102
Washington	249,964
West Virginia	89,880
Wisconsin	178,636
Wyoming	99,257
TOTAL	9,222,847

Bold font indicates a focus state - with additional detail available in State Break-Out Volumes

Table 5-A
Number of Horses by State

	State	*Number of Horses*
1	**Texas**	978,822
2	**California**	698,345
3	**Florida**	500,124
4	**Oklahoma**	326,134
5	**Kentucky**	320,173
6	**Ohio**	306,898
7	**Missouri**	281,255
8	North Carolina	256,269
9	Pennsylvania	255,763
10	**Colorado**	255,503
11	Washington	249,964
12	Virginia	239,102
13	Michigan	234,477
14	Tennessee	206,668
15	**Indiana**	202,986
16	**New York**	201,906
17	Iowa	199,220
18	Illinois	192,524
19	Minnesota	182,229
20	Georgia	179,512
21	Kansas	178,651
22	Wisconsin	178,636
23	Arizona	177,124
24	Arkansas	168,014
25	Oregon	167,928
26	**Louisiana**	164,305
27	Idaho	158,458
28	**Maryland**	152,930
29	Nebraska	150,891
30	Alabama	148,152
31	**New Mexico**	147,181
32	Montana	129,997
33	South Dakota	120,878
34	Utah	120,183
35	Mississippi	113,063
36	**Wyoming**	99,257
37	South Carolina	94,773
38	West Virginia	89,880
39	**New Jersey**	82,982
40	North Dakota	59,391
41	Connecticut	51,968
42	Nevada	51,619
43	Maine	37,854
44	Massachusetts	37,529
45	Vermont	24,540
46	New Hampshire	14,681
47	Alaska	11,449
48	Delaware	11,083
49	Hawaii	8,037
50	Rhode Island	3,509
51	District of Columbia	33
	TOTAL	9,222,847

Bold font indicates a focus state - with additional detail available in Break-Out State Volume

As Table 5A highlights, Texas – with almost 1 million horses - has the most horses of any state. California and Florida are second and third highest with approximately 700,000 and 500,000 horses respectively. As the table highlights, every state in the U.S. has a presence of horses, with 45 of the 50 states representing at least 20,000 horses.

The methodology used in developing state-by-state horse estimates is highlighted in the Technical Appendix to this volume. It is important to understand that in estimating total horse counts, several factors can have an influence on the number of horses shown in a particular state, as well as explaining differences in horse counts from other published sources.

- Responses to the horse owner/industry supplier survey were tabulated based on the primary address of the respondent's home residence and/or operational headquarters. To simplify the survey process instrument, respondents were not asked to identify the states in which their horses were stabled, nor the states in which they competed. Asking additional state-specific questions would have significantly complicated the survey process and compromised the quality of respondent data.

- The survey process solicited input from all industry segments and ownership types. Other published sources frequently solicit data from only those horse owners that own at least five horses. As indicated, this study surveyed a range of owners, from those with only a single horse used for recreational purposes to large farms with hundreds of horses.

- Horse counts in this study reflect both registered and unregistered horses. It is also expected that some owners of unregistered horses may have indicated their horses were Thoroughbreds or Quarter Horses based on their animals having Thoroughbred or Quarter Horse bloodlines somewhere in the pedigree.

- While the horse counts in most states are consistent with (or higher than) expectations, some states, particularly a few in the Midwest and West, have lower counts than anticipated. It is possible that the understatement is due to the presence of large working and commercial ranches whose horse populations could not adequately be captured through the sampling scheme.

Survey respondents also identified the breed and primary use of the horse(s) for which they were either the primary or partial owner. Horse owners were asked to identify the primary use of their horse(s), with seven possible options (racing, showing, other competition, recreation, work, breeding and other). Owners were separately asked to identify the breed of the horses they own (Thoroughbred, Quarter Horse and other). In developing impact estimates it was determined that an insightful way of presenting the data would be by breed and use. Further, it was determined that the use categories should be collapsed to four primary activities (racing, showing, recreation, and other). The process by which these assignments were made is presented in the Technical Appendix.

Table 6 segments the total horse count by use and by breed. So of the 9.2 million horses, each horse was assigned to one of three breed categories (Thoroughbred, Quarter Horse, or Other), as well as assigned to one of four primary use categories (racing, showing, recreation, other).

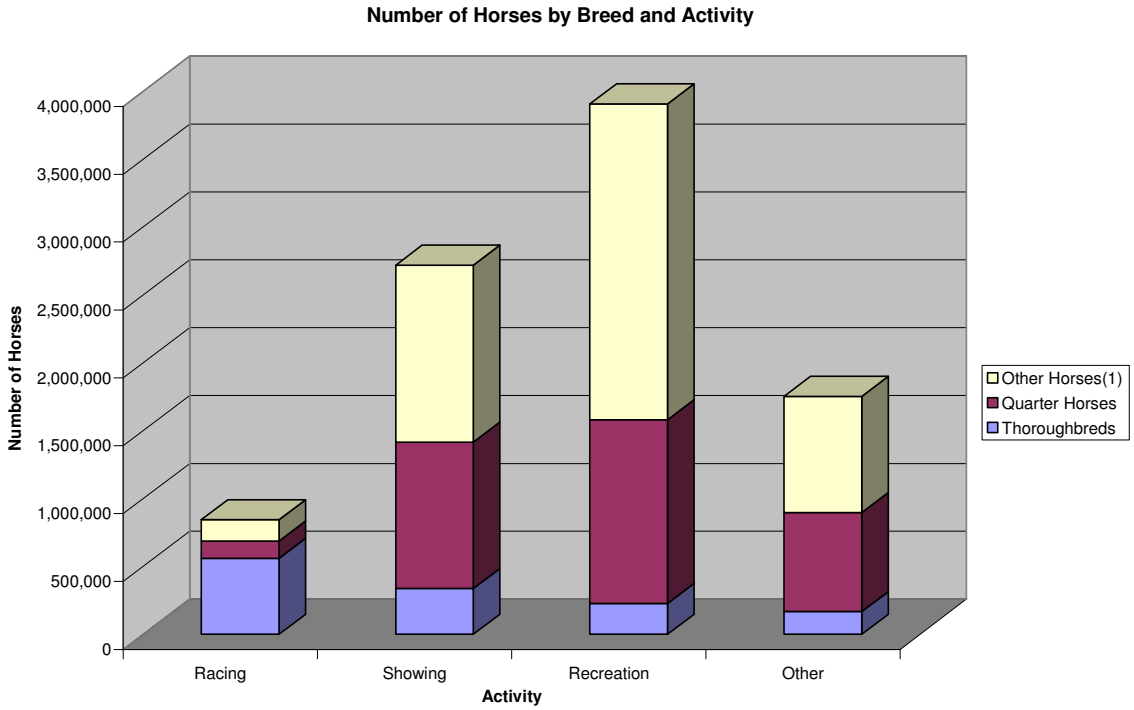
Horse assignments were based primarily upon the survey responses provided by the horse owner sample.

Note: The term "Other Horses" in the breed category refers to all other registered and unregistered horses.

Table 6
Number of Horses by Breed and Activity

	Racing	*Showing*	*Recreation*	*Other*	***Total***
Thoroughbreds	559,322	336,992	228,290	167,203	1,291,807
Quarter Horses	127,720	1,078,639	1,353,236	728,707	3,288,302
Other Horses$_{(1)}$	157,489	1,303,324	2,325,398	856,528	4,642,739
TOTAL	844,531	2,718,954	3,906,923	1,752,439	9,222,847

(1) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds



(1) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds.

Table 6 highlights some key industry characteristics:

- Almost 4 million horses are used for recreation - more than any of the 3 other primary uses.
- Quarter Horses represent the largest single breed in the showing industry with more than 1 million of the 2.7 million horses that compete in shows.
- As anticipated, Thoroughbreds make up the overwhelming majority of the racing segment with approximately 560,000 Thoroughbreds used for racing.

Note: The "Other" use category included horses whose primary use was identified as either work (on ranches, feedlots, riding stables, horse drawn carriages, back country packing, etc). "Other Competition," which was defined as horses whose primary use is any sanctioned competitive riding discipline that is neither racing nor showing, but is performed in competition with other horses or riders for compensation in the form of money, prizes or rewards, was included, after consultation with the Steering Committee, in the Showing category.

V. The Economic Impact of the Horse Industry on the U.S. Economy

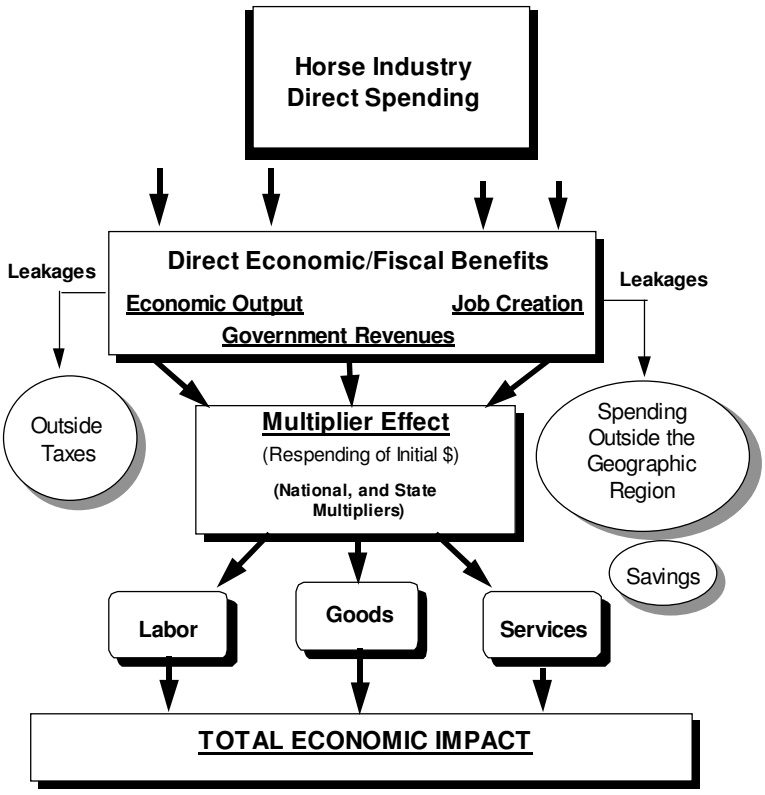
The horse industry, and every economic sector, provides/receives support from many other industry segments. The horse industry relies on the goods and services supplied from other industry segments. In turn, other industry segments are supported by the spending from horse industry participants.

Likewise, horse industry employees rely on other industries to meet their consumption demands, while horse industry jobs are supported and sustained by the spending and demand for goods and services by non-horse industry participants. These economic segment inter-dependencies each contribute to the overall U.S. economy.

The measurement of economic impacts is the quantification of internal and inter-dependent economic activities. As indicated earlier, economic impact can be measured in three different categories, direct, indirect and induced impacts.

Standard economic theory estimates the total economic impact of spending by applying a "multiplier" to the direct effect in order to calculate the indirect and induced impacts. Each multiplier is intended to estimate the number of times a single dollar of spending gets circulated through the economy. Multipliers differ depending on industry segment. For example, $1 of spending in the horse industry will have a different economic impact than $1 of spending in the telecommunications industry.

Overview of Economic Impact Approach



The methodology developed for this study uses the primary data collected from industry participants (racetracks, shows, horse owners and industry suppliers) to measure the spending internal to the horse industry. Another way to consider internal industry spending is by estimating the spending from industry participants, such as owners, tracks, OTBs, breeding farms and ranches and shows specifically related to the operation of horse-related activities. For each of the spending categories internal to the industry, a corresponding multiplier is applied to generate the overall indirect effects and induced effects. For instance, a multiplier for tack & equipment would be applied to the amount spent on tack & equipment. A more detailed description of the multiplier can be found in the Technical Appendix section of this report.

This is the approach that has been used to estimate the economic impacts. This approach, while conservative, minimizes a potential critique that total economic and employment impacts have been inflated as due to a loosely developed definition of "horse-related" activities. In this approach, the spending that is being estimated is clearly within the horse industry, and thus accurately reflects the operation of the industry. Moreover, direct spending/impacts (also referred to as GDP contribution) is generally referenced and relied upon more regularly by economists than total impacts, as direct spending represents the direct input into the economy prior to the application of any multipliers (which are more open to interpretation).

V-1 Horse Industry Direct Impacts/Contribution to U.S. Gross Domestic Product

The contribution to the United States Gross Domestic Product is estimated by taking the value of goods and services from each horse industry segment and providing a sum total from all segments (GDP contribution is the same as the "direct" effect). The estimated contribution to the GDP from the U.S. horse industry is approximately $39.2 billion per year.

This estimate was generated using a methodology consistent with the approach applied in 1996. When the Bureau of Economic Analysis (BEA) estimates total GDP contribution for various industries, the BEA does not capture a critical element of the horse industry when estimating the total value of horse related goods and services – more specifically the value of non-cash transactions. The survey tool applied to this project allows for the capture of information for which no cash transaction was involved. For example, a horse owner presumably derives value from a horse used entirely for recreation, which generates no net revenue/compensation for the owner, the same way an individual receives value from owning and selectively driving an antique automobile. Otherwise, there would be no purpose in owning a non-revenue generating horse, or any non-revenue generating item for that matter. The horse and the automobile both require care and maintenance, while providing no cash benefit.

As part of this process, we have included the non-cash value to horse owners from horse services in our impact estimates. We are not able to distinguish between those owners that are operating as a business and those who are in the industry for the pure pleasure of the participation. Therefore, as a conservative estimate of the non-cash value we excluded horse owner profits, either positive or negative, in the calculation of the impact. Our estimates indicate that most horse owners were operating at a "loss" in a simple accounting sense. That is, their horse-related revenues were smaller than their expenses. It should be noted that profits generated from horse shows and race tracks was assumed to be distributable (net of income taxes) to the owners of the various venues and part of the economic impact.

Table 7 summarizes the value of the horse industry's goods and services for various horse-related industry sub-segments. The direct effect is widely considered the most important economic indicator. The indirect and induced effects are included when estimating the total economic impact.

Table 7
Horse Industry Economic Impact on GDP by Expenditure Category(1)(2)

Expenditure Category	*Direct Effect*	*Indirect & Induced Effects*	*Total*
Spending that Generates Indirect Effects			
Horse-Related Goods (e.g., feed, tack, etc.)	$7,641	$13,504	$21,145
Horse-Related Services (e.g., boarding, training)	$9,484	$18,250	$27,734
Horse-Related Transportation (e.g., trailering)	$2,875	$5,071	$7,946
Overhead (e.g., utilities, office supplies, etc.)	$4,458	$6,287	$10,745
Capital Expenses (i.e. equipment and structures)	$8,238	$16,587	$24,825
Spending that Generates Induced Effects			
Employee Compensation	$1,309	$2,014	$3,323
Profits Distributable to Owners	$1,049	$1,613	$2,662
Taxes and Land Purchases	$4,143		$4,143
TOTAL	$39,196	$63,325	$102,522

(1) Numbers shown in millions

(2) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

Table 7 illustrates several key points about the annual operation of the horse industry, including;

- Contributions of nearly $40 billion to the U.S. GDP.
- Stimulates approximately $63 billion in indirect and induced impacts.
- Attracts investments of nearly $25 billion in capital equipment and structures.
- Creation of over $4.1 billion in taxes and land purchases.

Table 7 highlights the total direct, indirect and induced impacts generated from the horse industry. As with the total number of horses, the economic impacts were also segmented by the breed of the horse as well as the primary use of the horse. Table 8 highlights how the direct impacts are generated by breed and activity. Please note that the total direct impact shown does not reconcile to the total direct impact shown in the previous table; a small proportion of the spending and revenue were from respondents who described themselves as horse owners, but who reported having zero horses. We have speculated that in these instances the respondent may be caring for a horse owned by someone else, or the respondent may have sold the horse during the year. For this reason, this economic activity cannot be split across breed or activity, and so does not appear in Table 8.

Table 8

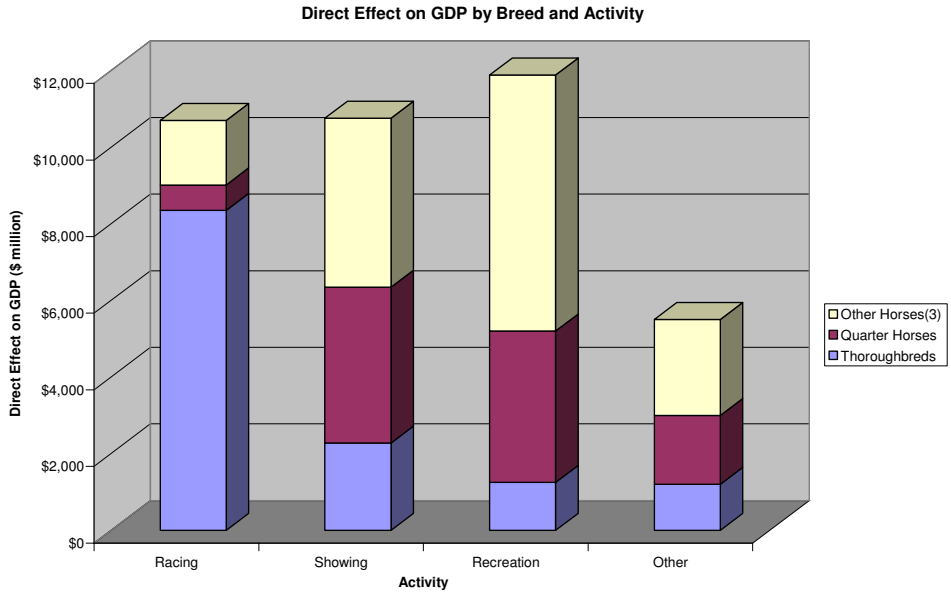
Direct Effect on GDP by Breed and Activity(1)(2)

	Racing	*Showing*	*Recreation*	*Other*	***Total***
Thoroughbreds	$8,354	$2,277	$1,253	$1,200	$13,084
Quarter Horses	$660	$4,070	$3,949	$1,799	$10,479
Other Horses(3)	$1,683	$4,411	$6,683	$2,502	$15,280
TOTAL	$10,697	$10,759	$11,886	$5,501	$38,843

(1) Numbers shown in millions

(2) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

(3) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds



(3) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds

Table 8 illustrates several important characteristics of the horse industry including:

- Racing, showing and recreation all generate between $10 billion and $12 billion in direct impacts. This is particularly important considering that the racing segment is commonly the only industry segment for which significant economic activity is generally associated.

- Thoroughbreds and Quarter Horses generate $13.1 billion and $10.5 billion respectively in direct economic impacts. Equally important, all "Other Horses" (registered and unregistered) in combination generate over $15.3 billion in economic impacts.

The significant amount of direct spending (almost $40 billion) stimulated by the horse industry contributes to economic activity in many other industries as well. These impacts are reflected in the indirect and induced impacts. Table 9 shows the horse industry contributes over $62 billion in indirect and induced spending - equaling $101.5 billion when added to the $39 billion in direct impacts shown in Table 8.

Table 9

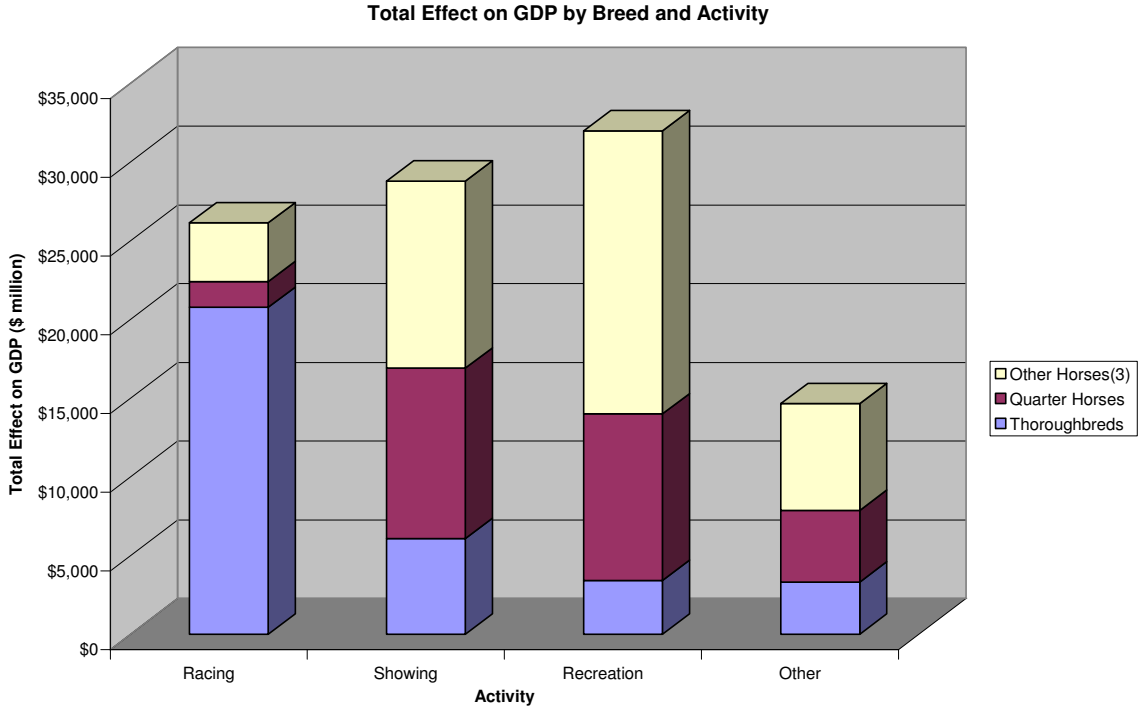
Total Effect on GDP by Breed and Activity(1)(2)

	Racing	*Showing*	*Recreation*	*Other*	***Total***
Thoroughbreds	$20,771	$6,089	$3,414	$3,324	$33,598
Quarter Horses	$1,627	$10,822	$10,582	$4,539	$27,569
Other Horses(3)	$3,726	$11,877	$17,979	$6,788	$40,371
TOTAL	$26,124	$28,788	$31,975	$14,651	$101,538

(1) Numbers shown in millions

(2) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

(3) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds



(3) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds

When considering indirect and induced expenditures, the racing, showing and recreational segments all generate over $26 billion dollars in economic impacts. Once again, the numbers highlight the significance of each industry segment as well as the impact of the Quarter Horse industry, the country's largest registered breed, and of the Thoroughbred industry, which generates the highest share of the horse industry's GDP.

The largest single contribution to GDP is generated by Thoroughbreds in racing, stimulating economic activity of approximately $20.8 billion. Quarter Horses generate in excess of $21 billion in combined showing ($10.8 billion) and recreation ($10.6 billion), while the combination of other breeds generates almost $12 billion and $18 billion in economic activity in showing and recreation respectively.

V-2 Full-Time Equivalent Jobs Provided by the Horse Industry

In determining the number of individuals participating in the horse industry, it is estimated that approximately 702,000 people participate as employees (see Table 4). In order to more accurately assess the number of horse industry employees, part-time and seasonal employees were converted into a Full-Time Equivalent basis. Following this conversion, it was estimated that the industry generates approximately 460,000 direct FTE jobs. When considering the jobs created from indirect and induced spending, the industry creates approximately 1.43 million full-time equivalent jobs.

Table 10
Direct, Indirect and Induced Effects on Full-Time Equivalent Employment(1)

	FTE Employment
Direct Effect	459,600
Indirect Effect	914,394
Induced Effect	54,698
TOTAL	1,428,692

(1) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

Table 11 summarizes all of the full-time equivalent jobs generated in the horse industry segmented by breed and primary use. As the table highlights, the racing segment contributes the greatest total jobs with total FTE employment in excess of 146,000. Within the racing segment, the Thoroughbred breed contributes approximately 114,000 of these jobs. In other segments of the industry showing and recreation generate approximately 99,000 and 128,000 jobs respectively for the horse industry. Those horses identified as having an "other" primary use contribute almost 80,000 jobs to the economy.

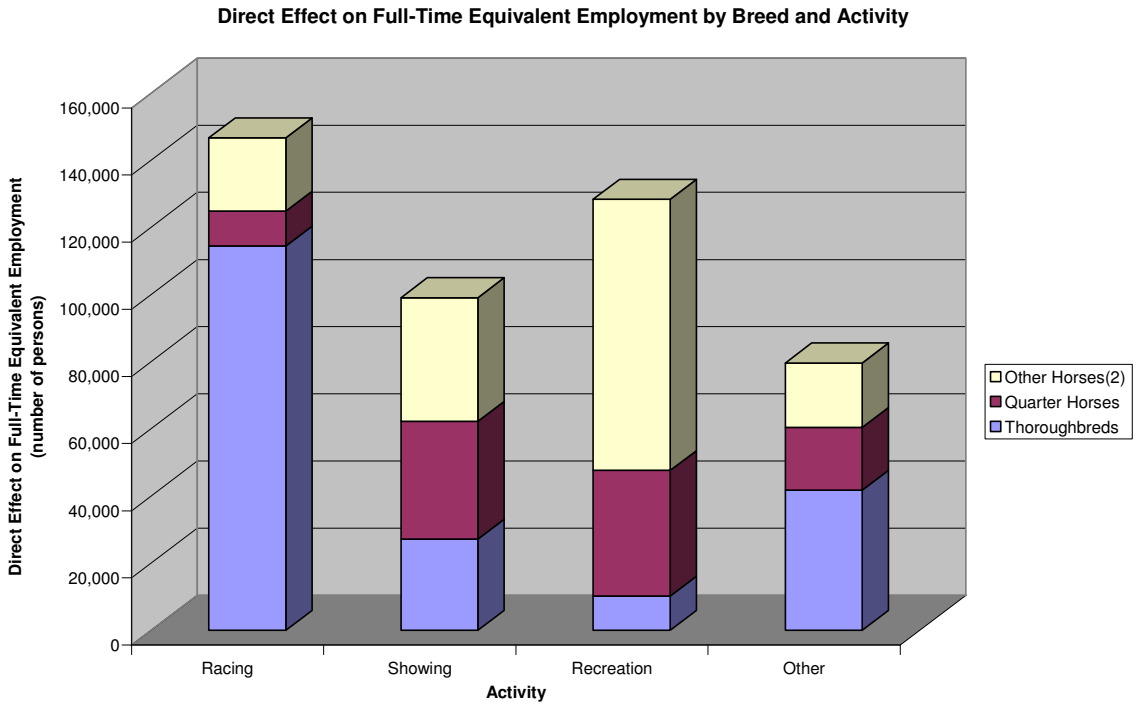
Table 11

Direct Effect on Full-Time Equivalent Employment by Breed and Activity(1)

	Racing	*Showing*	*Recreation*	*Other*	***Total***
Thoroughbreds	114,411	27,107	10,121	41,722	193,361
Quarter Horses	10,387	35,067	37,437	18,674	101,565
Other Horses(2)	21,827	36,877	80,766	19,216	158,686
TOTAL	146,625	99,051	128,324	79,612	453,612

(1) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

(2) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds



(2) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds

In the same way that multipliers are used to estimate economic impacts, multipliers are also used to estimate the total number of jobs created through indirect and induced spending.

- Direct employment are jobs provided by the industry itself (see section III).
- Indirect employment are jobs provided as a result of spending by industry suppliers.
- Induced employment are jobs provided as a result of spending by industry employees.

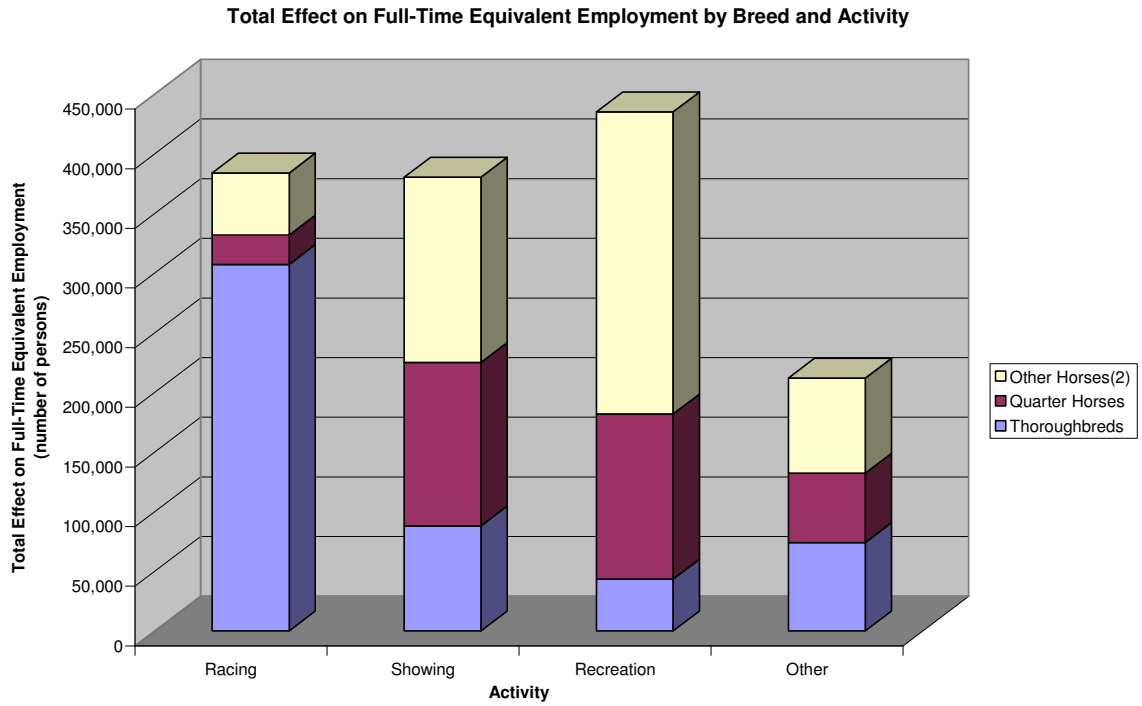
As mentioned, when considering indirect and induced job creation, the horse industry creates over 1.4 million jobs. Table 12 provides a summary on how those jobs are generated by breed and use.

Table 12
Total Effect on Full-Time Equivalent Employment by Breed and Activity(1)

	Racing	*Showing*	*Recreation*	*Other*	***Total***
Thoroughbreds	307,236	88,232	43,477	74,191	513,137
Quarter Horses	24,685	136,867	138,305	57,923	357,779
Other Horses(2)	51,905	155,317	253,300	79,896	540,417
TOTAL	383,826	380,416	435,082	212,010	1,411,333

(1) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

(2) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds



(2) Includes additional registered breeds and non-registered non-pedigreed horses. The horses primarily used for Racing and categorized under Other Horses are predominantly Standardbreds

As shown in Table 12, the racing and showing segments create approximately the same number of full-time equivalent jobs, with the respective segments generating 384,000 and 380,000 jobs. The recreation segment generates over 435,000 jobs, with over 250,000 of those jobs being generated by horses identified as a registered or unregistered horse other than Thoroughbred or Quarter Horse.

V-3 Taxes Paid by the Horse Industry

Taxes paid by the horse industry, while not included in indirect or induced impact estimates, do have a profound impact on local, state and federal budgets. Different taxes apply to different segments of the horse industry. In total, approximately $1.9 billion in taxes are paid on an annual basis by the horse industry to various levels of government.

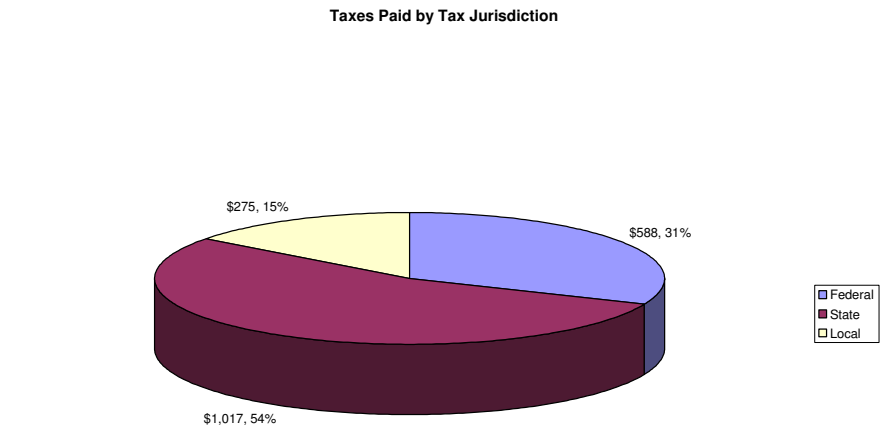
Tax estimates were developed using responses taken directly from the surveys. The same weighting approach was applied in estimating taxes as was used in estimating other revenues and expenses. In other words, the Federal, State and Local taxes reported on the surveys were combined, and then appropriately weighted to estimate the total taxes paid for the entire industry (by industry segment).

Table 13 summarizes the national tax impact generated by the U.S. horse industry.

Table 13
Taxes Paid by Tax Jurisdiction(1)

Jurisdiction	*Taxes Paid*	*Percent*
Federal	$588	31.26%
State	$1,017	54.12%
Local	$275	14.61%
TOTAL	$1,880	100.00%

(1) Numbers shown in millions



(1) Dollar magnitudes appear in millions.

VI. Characteristics of the Horse Industry

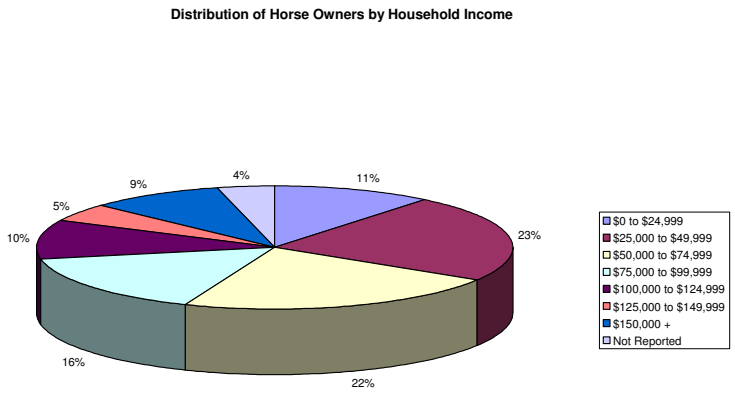
The entire horse industry comprises many different sub-sectors, with each sub-sector representing a diverse and vibrant cross-section of geographies and socio-economic classifications. The dynamic industry composition creates the overall economic impact.

Table 14 illustrates the economic diversity of the overall horse owner/industry supplier provider population. Approximately 46% of the total sample has a gross annual household income of between $25,000 and $75,000. Approximately 9% of the industry population has an income greater than $150,000 per year, while an almost equal amount (10.7%) has an annual income of less than $25,000. Table 14 helps to summarize the economic diversity of the horse industry and indicates how, depending on segment and activity, all different economic stratifications play a prominent role in the horse industry.

Table 14
Distribution of Horse Owners
by Household Income(1)

Household Income	*Count*	*Percent*
$0 to $24,999	209,879	10.73%
$25,000 to $49,999	453,511	23.19%
$50,000 to $74,999	435,930	22.29%
$75,000 to $99,999	306,797	15.69%
$100,000 to $124,999	199,646	10.21%
$125,000 to $149,999	94,672	4.84%
$150,000 +	179,268	9.17%
Not Reported	76,124	3.89%
TOTAL	1,955,827	100.00%

(1) Owner estimates not inclusive of horse owners under the age of 18



VI-1 Geographic and Age Diversity in the Horse Industry

The horse industry reaches into the far corners of all 50 states. The industry impact is generated from the smallest of rural communities to the largest cities. Certain activities such as breeding, training and maintenance are traditionally conducted in more rural areas, while racetracks and horse shows have generally operated in more urban areas. Regardless of primary type of involvement in the industry, the survey results indicate that horse owners and industry suppliers reside in a diverse geography.

Table 15 highlights the wide range of communities represented from the horse owner/industry supplier sample.

Table 15
Distribution of Horse Owners
by Community Size(1)

Size of Community	*Count*	*Percent*
Less than 1,000 people	301,529	15.42%
1,000 to 4,999	390,640	19.97%
5,000 to 19,999	427,525	21.86%
20,000 to 49,999	310,510	15.88%
50,000 to 99,999	171,458	8.77%
100,000 to 499,999	188,151	9.62%
500,000 +	139,942	7.16%
Not Reported	26,072	1.33%
TOTAL	1,955,827	100.00%

(1) Owner estimates not inclusive of horse owners under the age of 18

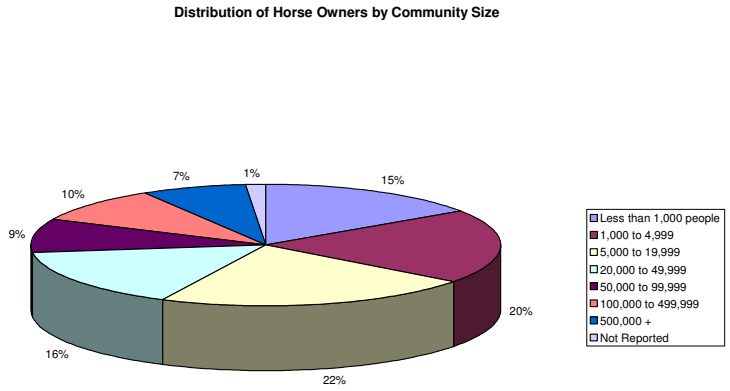


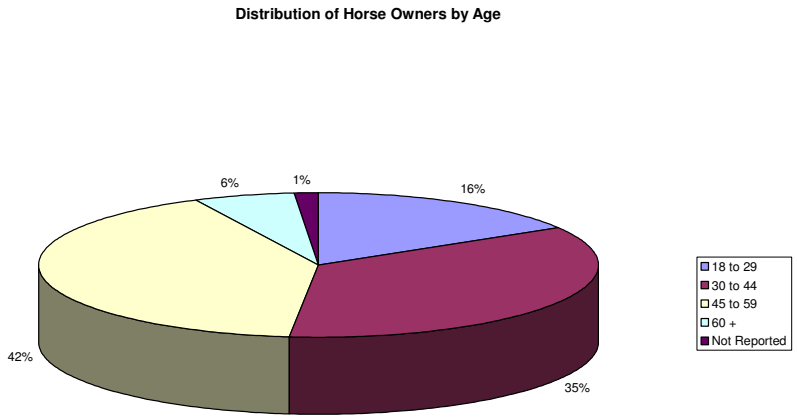
Table 15 highlights how the horse industry benefits from participation by individuals representing all different types of home communities. Approximately 55% of the total sample resides in communities with less than 20,000 individuals. This population segmentation confirms the expectation that the industry is strongly supported by those individuals residing in what by most standards would be considered rural. However, the industry also represents individuals living in more heavily populated areas, with almost 25% of the sample living in communities with at least 50,000 residents.

The horse industry also represents many different age categories as well. The majority of horse owners and industry suppliers are between the ages of 45 and 59. Almost 17% of the horse owner population is represented by a more youthful segment, between 18 and 29. What Table 16 does not include is all of the children that participate within the industry, primarily through recreational and showing activities, as the surveys were targeted to only individuals of at least 18 years of age.

Table 16
Distribution of Horse Owners by Age(1)

Age	*Count*	*Percent*
18 to 29	318,611	16.29%
30 to 44	692,517	35.41%
45 to 59	801,347	40.97%
60 +	117,762	6.02%
Not Reported	25,588	1.31%
TOTAL	1,955,827	100.00%

(1) Owner estimates not inclusive of horse owners under the age of 18



VII. Industry Spending Activity

This section provides a more micro view of the economic activity that is occurring within the industry. Economic impacts have been summarized based upon the spending reported from each of the various horse industry segments. Spending from all horse shows, racetracks, farms and owners in aggregate generate the direct impacts, and the impacts have been summarized on an industry-wide basis. This section provides revenue and expense information on a per-horse, per show and per racetrack basis.

The information collected from the industry surveys, in conjunction with the input of industry experts, was used to develop the Tables 17, 18 and 19.

Table 17 summarizes the industry revenue and expense averages on a per-horse basis.

Table 17
Annual Revenue and Expense per Horse, by Activity

Activity	*Racing*	*Showing*	*Recreation*	*Other (1)*	***Weighted Average***
Revenue	**$3,991**	**$1,289**	**$536**	**$1,050**	**$1,172**
Purses and Fees	$1,297	$205	$44	$118	$221
Stud Fees	$114	$52	$22	$47	$44
Horse Sales	$1,403	$519	$232	$378	$452
Boarding and Training	$960	$365	$145	$277	$309
Veterinary Services	$9	$12	$7	$15	$10
All Other Revenue	$208	$137	$87	$215	$136
Expense	**$5,712**	**$3,186**	**$2,319**	**$2,282**	**$2,882**
Horse Related Goods					
Feed, Bedding and Grooming Supplies	$711	$526	$482	$407	$502
Medicine and Vitamins	$140	$118	$113	$96	$114
Tack, Equipment and All Other Supplies	$200	$247	$228	$164	$219
Horse Related Services					
Boarding and Training	$1,614	$572	$372	$368	$545
Rider Education / Lessons	$13	$89	$64	$25	$59
Stud Fees	$331	$79	$31	$69	$80
Shoeing / Farrier	$221	$195	$172	$139	$177
Veterinary Services	$547	$260	$204	$198	$251
All Other Horse Services	$160	$44	$28	$51	$49
Transportation and Travel					
Trailering and Horse Transport	$229	$179	$137	$114	$153
Travel and Transportation	$176	$207	$143	$121	$161
General Operating Expenses					
Entry Fees	$121	$163	$41	$60	$88
Facilities Maintenance	$272	$171	$125	$139	$155
All Other Business Expenses	$264	$120	$71	$100	$109
Salaries					
Employee Compensation (Wages and Non-Cash)	$518	$127	$49	$140	$132
Taxes					
Federal Taxes	$104	$48	$31	$50	$46
State Taxes	$48	$23	$15	$27	$23
Local Taxes	$44	$19	$14	$13	$18

Table 17 illustrates a few important industry characteristics. For instance, and as mentioned earlier in the report, the expenses incurred from owning a typical horse exceed the revenues realized from the same horse. In this instance, the annual revenues realized are only approximately $1,200, while the expenses are approximately $2,900.

One should note that while the figures represent average revenue and expense amounts, they may not be typical amounts—for example, horse sales revenues are usually $0, but the average is obviously higher.

It is important to recognize that Table 17 shows per-horse data based on industry averages. On average, across all breeds and segments, the annual expenses associated with a horse exceed revenues by approximately $1,700.

The revenue and expenses characteristics of operating a typical horse show differ from individual horse ownership. Table 18 summarizes the revenue and expenses associated with a single horse show.

Consistent with the approach applied to horse ownership, this table provides information based upon industry averages. Revenues and expenses for horse shows may vary widely based upon size of the show, geographic location and number of participants.

Table 18
Horse Show Revenue and Expense, per Show

Activity	*Total*
Revenue	**$158,724**
Admissions, Concessions, Parking and Programs	$19,067
Sponsors and Advertising	$29,975
Entry Fees	$71,192
Stall Rentals	$19,039
All Other Revenue	$19,451
Expense	**$135,740**
General Operating Expenses	
Cash Prizes	$57,862
Facilities Maintenance	$7,799
Equipment, Vehicle and Facility Rental	$22,436
All Other Business Expenses	$15,588
Salaries, Wages and Benefits Paid	$31,451
Taxes	**$604**
Federal Taxes	$411
State Taxes	$101
Local Taxes	$93

On a per show basis; a typical horse show:

- Operates at a profit of approximately $23,000.
- Generates gross revenues of approximately $159,000.
- Generates gross expenses of approximately $136,000.

Entry fees are the largest and most important revenue stream for horse shows, and directly link to the amount that a horse show can pay to the participants in cash and prizes. It is also important to recognize that the economic impacts from horse shows are not just generated from the profit, but from all of the expenses associated with the horse show as well.

Race tracks are generally the most visible revenue generating mechanism in the horse industry. Table 19 summarizes the average revenues and expenses incurred for racetracks.

Table 19
Race Track Revenue and Expense, per Track

Activity	*Total*
Revenue	**$30,808,682**
Admissions, Concessions, Parking and Programs	$2,627,685
Total Wagering	$19,572,914
All Other Revenue	$8,608,083
Expense	**$28,751,756**
General Operating Expenses	
Veterinary Services	$888,615
Facilities Maintenance	$613,925
Salaries, Wages and Benefits Paid	$3,965,001
Equipment, Vehicle and Facility Rental	$7,139,258
All Other Business Expenses (1)	$7,242,897
Taxes	**$8,902,060**
Federal Taxes	$1,343,621
State Taxes	$6,640,614
Local Taxes	$917,825

(1) Inclusive of purses

On average, racetrack operations have revenues of approximately $30.8 million and expenses of approximately $28.8 million, including tax obligations. It is important to note, however, that the racetrack profit estimated for each track is not necessarily revenues minus expenses (as collected and defined in the survey). Depending on geography, each track has different financial obligations at both the local and/or state levels as to what they are required to pay, either as a percentage of net profits or as a percentage of gross revenues or both.

Clearly, racetrack operations are a key contributor to tax coffers. On average, a racetrack pays almost $9 million per year in annual taxes. The tax revenues included in this table do not reflect all of the additional sales taxes (e.g. merchandise, concessions) many tracks are required to pay within their respective states.

VIII. The Role of Breeding in the Horse Industry

The role of breeding plays a very significant role in the horse industry, generating billions in economic impacts and thousands of jobs. The breeding of horses has the most prominent role in the showing and racing segments of the industry.

Racing can be broken down into three tiers of production: racetrack operation/OTB facilities, maintaining competitive and potentially competitive horses, and breeding, which includes maintaining potential and retired breeding horses. Each tier is dependent on the other tier for its income. For instance, tracks and OTBs generate revenue from the general public which attends and/or wagers upon competitive racing horses, owners of competing horses derive their income from the racetracks in the form of purses, and breeders derive their income by selling horses to owners who want to own and enter horses into a competition.

Breeding plays a significant role in the racing industry. For instance:

- Approximately 430,000 horses are involved in the breeding process or are transitioning into or out of the breeding process – in the racing sector alone.

- Breeding horses in the racing segment produce a direct impact for the industry of approximately $2.2 billion and a total impact of almost $6 billion.

- Approximately 39,000 full-time equivalent jobs are created directly from breeding activity, a total of approximately 100,000 FTE jobs are created when considering the indirect and induced impacts.

Table 20
Measures of the Racing Sector by Tier of Production(2)

Tier	*Number of Horses*	*GDP Contribution (1)*	*GDP Impact (1)*	*FTE Jobs Provided*	*FTE Jobs Generated*
Track and OTB Operation		$5,382	$11,653	42,257	126,190
Competing Horses	416,708	$3,068	$8,507	65,792	158,350
Breeding Horses	427,823	$2,247	$5,964	38,575	99,286

(1) Numbers shown in millions

(2) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. These economic data have been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

Breeding also plays a significant role in the showing industry segment. While the showing segment may not have the national public attention that races like the Kentucky Derby or the Breeders' Cup generates for the racing industry, the showing segment features thousands of local, regional and national shows. Competitive horse shows have many of the same dynamics as racing, shows require horses to compete for prizes, and horses are bred specifically for the purposes of becoming competitive in the show ring.

Table 21
Measures of the Showing Sector by Tier of Production(2)

Tier	*Number of Horses*	*GDP Contribution (1)*	*GDP Impact (1)*	*FTE Jobs Provided*	*FTE Jobs Generated*
Showing Operations		$431	$1,019	6,558	15,872
Competing Horses	2,015,378	$8,052	$21,714	58,629	270,855
Breeding Horses	703,577	$2,277	$6,055	33,864	93,689

(1) Numbers shown in millions

(2) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

Table 21 illustrates the significant role breeding plays the showing segment. For instance:

- Approximately 705,000 horses are involved in the breeding process or are transitioning into or out of the breeding process – in the showing sector alone.

- Breeding horses in the showing segment produce a direct impact for the industry of approximately $2.3 billion and a total impact of almost $6.05 billion.

- Approximately 34,000 full-time equivalent jobs are created directly from breeding activity, a total of approximately 94,000 FTE jobs are created when considering the indirect and induced impacts.

Clearly the maintenance of competitive horses and the breeding of horses for the purpose of competition is a significant contributor to the overall impacts generated by the horse industry. When considering the racing and showing segments in combination with one another, the total impacts from breeding are even more significant as shown in Table 22.

Table 22
Measures of the Racing and Showing Sectors by Tier of Production(2)

Tier	*Number of Horses*	*GDP Contribution (1)*	*GDP Impact (1)*	*FTE Jobs Provided*	*FTE Jobs Generated*
Track, OTB and Showing Operations		$5,813	$12,672	48,816	142,063
Competing Horses	2,432,085	$11,119	$30,221	124,420	429,204
Breeding Horses	1,131,400	$4,524	$12,019	72,439	192,975

(1) Numbers shown in millions

(2) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

- Approximately 1,130,000 horses are involved in the breeding process or are transitioning into or out of the breeding process.

- Breeding produces a direct impact for the industry of approximately $4.5 billion and a total impact of almost $12 billion for the horse industry.

- Approximately 72,000 full-time equivalent jobs are created directly from breeding activity, a total of approximately 193,000 FTE jobs are created when considering the indirect and induced impacts.

As part of the survey process, horse owners were asked to identify whether their horses were used primarily for breeding, competing or for a different purpose. Depending on how the owners classified their respective horses, the owner revenue and expenses could be allocated either to breeding, competing or other classification category. This attribution of expenses was necessary in estimating the economic impacts and employment associated with each of the activities.

The appropriate classification of a horse during certain transition periods is not always clearly defined. For instance, young horses such as foals, weanlings, yearlings and two-year olds are expected to race eventually. However, as they have yet to start competing, their appropriate classification can be debated. For purposes of this study, the survey respondents were relied upon to determine the appropriate classification of each horse.

The number of horses involved in these activities was weighted appropriately to develop estimates for the entire horse population, consistent with other activities throughout the report and described in the Technical Appendix.

IX. Comparative Analysis of Break-Out States

As part of the economic impact study of the U.S. Horse Industry, state specific data and additional economic impact estimates were generated for a number of "break-out" states. Those states that contributed to the funding of the economic impact initiative were selected as break-out states. Individual break-out state reports contain economic impact and demographic data relevant to each respective state.

Table 23 provides a state-by-state comparison highlighting a few key economic indicators and industry characteristics.

Table 23
Rank Among Breakout States[3]

	Total Effect on GDP		*Number of Horses*		*Number of Industry Participants [2]*		*Total Effect on Full-Time Equivalent Employment*	
State	*Dollar Magnitude [1]*	*Rank*	*Count*	*Rank*	*Count*	*Rank*	*Employment Effect*	*Rank*
California	$6,972	1	698,345	2	311,119	3	130,470	1
Colorado	$1,569	9	255,503	8	102,417	9	21,325	14
Florida	$5,156	3	500,124	3	439,963	2	105,061	2
Indiana	$1,316	10	202,986	9	89,977	11	22,556	12
Kentucky	$3,548	4	320,173	5	194,275	4	96,179	4
Louisiana	$2,455	5	164,305	11	54,170	14	24,608	11
Maryland	$1,570	8	152,930	12	65,620	12	28,784	10
Missouri	$1,287	12	281,255	7	125,131	7	56,082	5
New Jersey	$1,149	13	82,982	15	55,897	13	21,380	13
New Mexico	$761	14	147,181	13	91,136	10	45,009	6
New York	$2,394	6	201,906	10	152,030	6	35,773	8
Ohio	$2,203	7	306,898	6	181,660	5	43,037	7
Oklahoma	$1,305	11	326,134	4	117,886	8	32,613	9
Texas	$5,230	2	978,822	1	455,649	1	97,041	3
Wyoming	$289	15	99,257	14	33,069	15	4,912	15

(1) Numbers shown in millions

(2) Is not reflective of industry participants under the age of 18 as this population group was excluded from the survey sample

(3) A small number of the horse owner survey respondents did not provide adequate information relating to the breed and use of their horse(s), but did provide economic impact information, such as revenues, expenses, and employee counts. This economic data has been included in our national and state-total results, but cannot be reported by breed and/or use. As a result, reported national and state-level totals for GDP impact and jobs are slightly higher than those reported by breed and use.

Horse Counts:

- Texas, with almost 1 million horses (978,822), has more horses than any other state.
- California and Florida each have over a half-million horses, with 698,345 and 500,125 respectively.
- The 15 break-out states represent over 51% of the U.S. horse population.

Total Effect on GDP

- The total effect on GDP is a factor of both the number of horses within a state, in conjunction with the number of racetracks and shows. As table 23 illustrates, there is a direct correlation in many states between the rank of number of horses and the total effect on GDP. For instance, Texas and California rank 1 and 2 respectively in the number of horses, and 1 and 2 in the total GDP contribution. While California has fewer horses than Texas, it has significantly more racetracks which generate additional economic impact. Kentucky, Florida, Ohio, New Mexico, Colorado and Wyoming all have essentially the same GDP ranking as horse ranking. States such as Louisiana, New York and Maryland have a greater impact on GDP than each state's comparatively lower horse ranking due in large part to the significant presence of racing in that state.
    - The 15 break-out states represent approximately 37% of the total horse industry U.S. GDP contribution.

- All but two of the break-out states annually contribute at least $1 billion to the U.S. GDP, with seven states contributing $2 billion or more.

Industry Participants

- Consistent with total horse count, Texas, Florida and California all have the most industry participants.
- The break-out states represent 53% of the total U.S. participation in the horse industry.

Note: *Industry participants* are not inclusive of individuals 17 years or younger as they were excluded from the survey sample

Total Effect on FTE Employment:

- More jobs are created in California (130,000) from horse industry activity than any other state.
- The horse industry creates approximately 96,000 jobs in the State of Kentucky, the 4th highest of all U.S. states and approximately 40,000 more jobs than the next closest state (Missouri).
- With the exception of Wyoming (a state with a very small population), every state in the break-out sample has at least 20,000 jobs generated by the U.S. horse industry, with seven states having at least 40,000 jobs generated by the horse industry.

State break-out summaries are available upon request from the American Horse Council Foundation and include additional information for each of the states included in the comparative table.

X. Capturing Gaming Machine and Electronic Wagering in the Economic Impact Analysis

As part of the survey process, each racetrack and off-track betting facility was asked to provide the following key revenue items:

1. Wagering revenue from Thoroughbred, Quarter Horse and Standardbred/other breed racing respectively
2. Total handle from Thoroughbred, Quarter Horse and Standardbred/other breed racing respectively
3. Revenue from admissions, concessions, parking and programs
4. "Other" revenue (electronic gaming, electronic wagering and Internet wagering)

The first three items are straightforward and common vernacular to the industry. The fourth, "other revenue," bears additional explanation.

Electronic Gaming Machines

Racetracks were queried about the presence of electronic gaming machines ("alternative gaming") at their tracks. For purposes of this survey, electronic gaming machines were defined as slot machines, video lottery terminals (VLTs), video poker, instant racing, electronic pull-tabs, electronic keno or any other video based electronic gaming machines. Approximately 19% of responding tracks provided data in connection with some form of electronic gaming option.

In the process of analyzing revenue information, it became apparent that some tracks included revenues from electronic gaming (if provided at the track), while others tracks did not, sometimes for reasons of confidentiality. For this reason, it was difficult to determine from survey responses the total amount of revenue realized from sources such as video lottery terminals (VLTs) and slot machines, and provide a reliable national estimate. Nonetheless, independent pari-mutuel wagering revenue estimates available through industry sources confirmed that participating tracks did include revenue attributable to alternative forms of gaming in the "other" revenue section of their survey. As noted, "other" revenue may include revenues from advance deposit wagering and Internet-based services in addition to alternative gaming.

Of those tracks offering electronic gaming machines, 4 of the 7 indicated that their tracks received 70% or more of their total revenue from this form of wagering. The average percentage of wagering revenues derived from electronic gaming machines was approximately 60% of total revenues.

The majority of tracks that responded to the survey did not offer alternative gaming, reflecting the relative scarcity of racetrack/casino facilities ("racinos") among the total population of racetracks in 2003.(1) As a result, the sample size for racinos was too small to draw firm conclusions about the use of electronic gaming for the entire industry.

In addition, the survey did not attempt to capture the extent of non-electronic forms of alternative gaming such as card clubs, which in 2003 existed only at racetracks in California, Florida and Minnesota.

In lieu of adequate survey data regarding electronic gaming, published data and citations to Web-based resources are included below. ***Note***: *Revenues from alternative gaming sources for a particular state may include non-horse facilities such as greyhound tracks or other stand-alone facilities. The figures below should not be added to any economic impact or revenue number expressed elsewhere in this report, but may be used as anecdotal evidence of the size and scope of electronic gaming as a sector of the horse industry.*

According to state gaming regulatory agencies, six states showed significant revenues from electronic gaming machines at horse racing facilities.

Gaming Machines at Race Tracks - 2003

State	Number of Machines	Gross Revenue (FY)	Source
Arkansas			
Delaware	2,000	$245,565,700	http://lottery.state.de.us/vdodata/modat2002.html
Iowa	1,414	$150,421,234	http://www.state.ia.us/irgc/FYTD03.pdf
Louisiana	2,397	$134,610,708	http://www.dps.state.la.us/lgcb/OldSltRevenue.htm
New Mexico	1,800		
West Virginia	8,469	$717,079,486	www.state.wv.us/lottery/vidsum.htm

In New Mexico, a "before and after" impact of gaming legislation on the horse racing industry reported that within three years of enactment, tax revenues, purses, operating expenses and jobs increased exponentially.

Gaming Machines at New Mexico Horse Tracks

	1997 (Before)	2000 (After)
Taxes & Fees	$ 5,164,667	$29,839,582
Purses	$ 9,960,942	$31,337,221
Total Operating Expenses	$18,626,038	$77,955,348
Payroll	$ 5,611,122	$18,843,763
Jobs	7,782	21,849

In a 2003, the University of Arizona Racetrack Industry Program conducted a study of the effects of gaming at racetracks on breeding and the racing product. Their finding indicated that the number of breeding stallions and mares, foals born in-state and average yearling sale prices at auction increased substantially in four of five U.S. states surveyed – Delaware, Iowa, New Mexico and West Virginia. Only Louisiana did not see a substantial increase until 2004 when slot machines replaced video poker machines at the horse tracks with a significant, almost 500%, increase in the numbers of machines. The quality of the racing product in terms of average number of horses per race, number of race days and races, and number of allowance and stakes races increased significantly in the same four states, especially when compared to surrounding states.

Electronic Wagering and Internet Wagering

Racetracks and off-track betting facilities were asked to indicate a presence of electronic wagering or advance deposit wagering at their respective facility. For purposes of this survey, electronic wagering was defined as off-track betting technology that allows for wagering by way of cable, phone, wire, or any other technology (excluding Internet) that is remote from the racetrack site. A total of 12 respondents reported the utilization of electronic wagering. The 12 respondents that reported the use of electronic wagering indicated the revenue their respective track realized from this form of wagering ranged from 1% to 90% annually. The average percentage of wagering revenues derived from electronic wagering was approximately 40%.

Because the survey queried only racetracks and off-track betting facilities, the scope of the electronic or advance deposit wagering industry may be understated. According to a 2002 Bear Sterns report, "The Global Account Wagering Industry: What Treasures Does It Hold?", more than 23 advance deposit wagering industry suppliers (many operating independent of any racetrack) exist in the United States. Additionally, the survey reflects statistics from 2003, when electronic and advance deposit wagering had only begun to show its promise as a pari-mutuel wagering service. According to The Jockey Club and Equibase LLC, an estimated 15.2% of the total wagering on U.S. horse racing in 2003 was derived from telephone and Internet based account wagering. This is a substantial increase from estimates of 6.2% and 10.0% in 2001 and 2002, respectively.

Finally, tracks were asked to indicate the use of the Internet to accept wagers through the racetrack. For purposes of this study, Internet wagering was defined as off-track betting technology that allows for wagering through the Internet or closed-loop online system by way of personal computer or hand-held device or any other technology (excluding phone betting) that is

remote from the racetrack site. A total of 19% of the racetrack respondent sample offered some form of Internet wagering. Six of the seven tracks providing Internet wagering reported that the percentage of total revenues collected through Internet wagering was 5% or less. One track reported that Internet wagering represented 13% of total wagering revenue.

As with electronic (off-track) wagering, surveys of racetrack-operated Internet wagering sites may understate the scope of this growing service sector, which in 2004 was believed to have handled an estimated $2 billion (13%) in U.S. pari-mutuel wagers.

Additional information on electronic gaming machine, electronic and Internet wagering in the U.S. pari-mutuel industry may be found in the bibliographic resources cited below.

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Footnote:
(1) In 2003, nine states – Arkansas, Delaware, Iowa, Louisiana, New Mexico, New York, Oregon, Rhode Island and West Virginia – had authorized slots/video gaming at pari-mutuel horse racing facilities. New York, however, had not yet installed any gaming machines at the end of 2003 and Rhode Island's were not located at horse racing facilities, leaving only seven states with economic impacts/revenues from alternative gaming.

XI. Summary of Project Methodology

Introduction

This section provides a summary of the primary data collection approach and methodology used to estimate economic impacts. Full details are included in the Technical Appendix.

The primary data sources of the estimates presented in this report are derived from four broad surveys of horse industry participants—horse owner/industry suppliers; racetracks, off-track betting organizations, and horse show managers/organizers.

Basic Approach

The 2005 study used an electronic-based surveying approach as its primary data collection mechanism (in contrast to the 1996 study, which relied exclusively on the use of hard copy surveys to collect the survey data). The primary mode of data collection was through an Internet Web site for which respondents were provided a pass code. An on-line reporting tool was developed to monitor survey returns, with electronic surveys being tabulated instantaneously once submitted through the Internet. Surveys were collected primarily during the second half of 2004, and thus, respondents were asked to report on calendar year 2003 information likely having the benefit of a 2003 tax return.

Postcard invitations asking individuals to participate in the study were sent to every individual/organization in the sampling frame over the period of five days. For a portion of the horse owner/industry supplier sample, an invitation (both a first invitation and/or follow-up) was sent via e-mail. Prior to the email distribution, we confirmed that a sampling bias was not being introduced into the survey frame by excluding those horse owner/industry supplier without an email record. For the horse show, racetrack and OTB segments, phone prompts were also made. Hard copy surveys were also available to members of the sample population(s) without access to a readily available computer.

In general, participation in this study was relatively strong. For example, 27,951 horse owner/industry suppliers participated in the survey process, with 18,648 individuals providing complete and usable surveys. This represents an increase of approximately 400% from the total number of participants in 1996.

Survey Content and Development

Each survey was designed to collect operating and financial information relevant to each of the four industry segments. For example, racetracks were asked to provide itemized revenue and expenses, on- and off-track handle, employees, type and number of races hosted, value of assets, capital expenditures, taxes paid, and other pertinent financial/operational information. The Horse Show Manager/Organizer survey focused on the operational characteristics of the horse show(s) the individual managed/organized. Questions focused on types of shows, number of employees, number of attendees, number of horses involved, taxes paid, as well as an itemized list of revenues and expenses.

The horse owner/industry supplier survey contained the most questions of the four surveys. This survey focused upon the respondent's primary role in the industry, the activities the owner/supplier engages in within the industry, the number and type of horses owned, their

ownership status (sole versus shared ownership), horse-related capital expenses, number of employees, the primary use of their horses, taxes paid, as well as asking for an itemized list of revenues and expenses pertinent to all of their horse-related activities. This survey also asked a series of demographic questions useful in developing a profile of the horse owner/industry supplier segment.

All four of these hard copy survey tools are included at the conclusion of the Appendix.

Collecting Names for the Survey Sample
An industry-wide list consisting of names for each of the four industry segments was created using a compilation of state and association membership lists. Membership information was gathered from approximately 80 different horse owner/industry supplier organizations and affiliates (a 300% increase over the number of participating organizations in the 1996 study). The Horse Show list was generated from the combined lists of 13 different showing organizations. The OTB and Racetrack lists are more static (e.g. the number of racetracks and OTBs remains relatively consistent year-to-year) and were generated from information maintained by the Project Steering Committee and from Equibase.

The list of names and addresses was cleansed and validated. Table 1 presents the number of usable addresses obtained through this process. With the exception of the horse owner/industry supplier survey, each list was sampled in its entirety.

Table 24
Number of Usable Addresses Before and After Removal of Duplicates

Survey	Before	After
Horse Owners/Industry suppliers	1,028,536	747,400
Horse Show Organizers		4,865
Race Tracks	NA	???
OTBs	NA	???

Horse Owner Survey

For the horse owner/industry supplier segment, a *stratified random sample* was selected from the 747,400 names. Horse owners and industry suppliers were divided into two basic groups: economically motivated horse owner/industry suppliers and recreational owners/participants. We assumed a comprehensive sampling frame for the economically motivated industry participants (i.e. we observed the entire population) and a representative sampling frame for the recreational participants. Our approach is comparable to the structure that was used in the 1996 study.

The individuals for both sampling frames came from the numerous association and commercial lists that were collected for this purpose. The methodology for determining the population of recreational owners is described below.

There were two issues that needed to be considered in preparing the lists for drawing the sample: the removal of duplicate names and the construction of sampling strata. The first issue was a

matter of making a unique database from the various lists collected. The lists contained a number of duplicate names and addresses (i.e. the same individual appears on different lists) and we wanted to ensure that each individual selected received only one copy of the survey. The second issue was related to making meaningful statements for each of the specific breakout groups (breed and state). To facilitate this process, the overall sample was broken into strata and the sample was selected based on the following categories.

1) Thoroughbred Lists
2) Quarter Horse Lists
3) Other Breed Lists
4) Non-Breed Association Lists
5) Retail/Commercial Lists

The mapping of the individual lists to their specific group and removal of duplicate names is detailed in the Technical Appendix.

As noted above, we assumed that the association lists provided the full population of the economically motivated owners. Given the sampling scheme, we needed to estimate the population of the non-economically motivated or recreational owners. To accomplish this we used assumptions similar to those used in the 1996 study. In particular, we took advantage of the fact that there was an overlap between the association lists and the retail lists. For example, individuals on the American Quarter Horse list were also found on the retail lists such as HorseCity.com. We assumed that non-economically motivated owners belonged to the retail lists in the same proportion as economically motivated owners. We allowed this proportion to vary by state. For example, if in one state we observed 25% of the economically motivated owners were also on a retail list, we assumed that the non-economically motivated owners on the retail list represented 25% of the total number of non-economically motivated owners. That is, to determine the relevant population for this group, we would inflate the number of non-economically motivated owners observed on our lists by a factor of four.

The overall survey response data was captured electronically and combined to form our sample data. After a data cleansing and validation process (detailed in the Technical Appendix), the database contained approximately 18,648 usable responses.

In designing the sampling methodology, we estimated the total number of horse owners and industry suppliers both nationally and by state using the association and membership lists provided to us by the Project Steering Committee. This process was described above. Based upon the number of responses we received from each state and stratum, we then extrapolated the responses from the survey both to national and state totals.

Horse Show Survey

For the Horse Show industry segment, we employed an *exhaustive* sampling approach. In an exhaustive sampling approach, every name/organization included in the database receives a solicitation to participate. This approach could be used in this instance because this segment has a relatively small number of names/organizations when compared to the Owner/Supplier sample, and therefore the associated postage, printing and distribution costs were within the project budget.

We identified 4,865 Horse Showing organizations as the national population of the Horse Showing industry. This group would include shows such as the AQHA World Championship Show and the Rolex Kentucky Three Day Event and very small local and regional shows. We received 186 survey responses from this group, for a response rate of 3.82%.

Racetrack and OTB Survey

For the Race Track industry segment, we also employed an *exhaustive* sampling approach. We identified 122 primary racing tracks, both Thoroughbred and non-Thoroughbred, nationally for this study.

Although originally the survey had intended to include off-track betting facilities, we received only six survey responses from these types of facilities. After carefully reviewing data from many different industry sources including Equibase, the Association of Racing Commissioners International, The Jockey Club, the *2004 Trotting and Pacing Guide*, state racing summaries, the *Thoroughbred Times Racing Almanac* and others, it was concluded that the OTB revenue information was being reported in the total handle figures reported by participating racetracks. Therefore, to eliminate the possibility of double-counting, we relied exclusively on the racetrack sample to provide information of the racing segment of the industry. Impacts attributable to OTBs are captured in the indirect and induced effects.

We received 47 raw completed surveys from race tracks; 14 from telephone interviews and 33 from completed electronic surveys. However, some of the telephone surveys were follow-up surveys from the same tracks that had completed electronic surveys, so the final number of completed unique surveys represented 41 tracks, including six responses from non-racing venues such as steeplechase events and state/county fair events. Removing these responses from the surveys resulted in 35 survey responses.

Derivation of Economic Impacts

To calculate the overall economic impact of the horse industry we used the IMPLAN economic impact assessment modeling software. IMPLAN is a widely used input-output model of the U.S. economy to measure aggregate economic effects. In this study IMPLAN was used to calculate the economic impact generated by: 1) operating expenditures and 2) compensation to employees.

The total economic impact of operating expenditures by horse owners, racetracks and shows is defined as the sum of direct, indirect and induced effects. Direct expenditures were classified in various expense categories. For horse owners, for example, we used categories ranging from Feed, Bedding and Grooming supplies to expenditures on Equipment and Structures. These direct expenditures trigger incremental expenditures called indirect effects. As an example, the construction of a new building will require expenditures on building materials. These building materials themselves require additional expenditures on raw materials, and so on. The IMPLAN input-output model produces multipliers for 509 industries to summarize the chain of subsequent expenditures. In order to calculate the direct effects we first determined the industries that are represented within each expense category. The multiplier for each expense category was then calculated as the output-weighted average of the different industry output multipliers. For U.S. total calculations we used national output levels; for the individual state calculations we used state output levels. To estimate the indirect output effects we used the Type I industry output multipliers as calculated by the IMPLAN model. We similarly calculated induced effect multipliers for each expense category.

Induced effects are caused by the additional expenditures received by the employees at each stage in the chain of subsequent expenditures caused by the initial direct expenditures. To estimate the induced output effects we used the Type N industry output multipliers as calculated by the IMPLAN model. To calculate the impact of these expenditures on employment we used the employment multipliers as calculated by the IMPLAN model in a similar fashion.

To estimate the additional output impact caused by the direct employee compensation we calculated a weighted average output multiplier on the distribution of consumption expenditures across all IMPLAN industries. We similarly calculated the employment effect associated with direct employee compensation.

Handling of Taxes

In estimating the total economic impact of the horse industry, we had to account for payments of taxes by horse industry participants. Taxes are deemed a "leakage" when estimating economic impacts, as the dollars paid in taxes do not induce spending or hiring in the private sector. In the horse owner/industry suppliers segment, employee compensation amounts are reduced by taxes to reflect the fact that employees of the horse industry spend only after-tax wages directly in the economy. As previously stated, profits are ignored for Horse owner/industry suppliers. In the Horse Show and Racing segments, we also reduced employee compensation amounts by estimated tax amounts. Profits from these segments are included, and profits are assumed to be distributed to owners, and then taxed at personal tax rates before being introduced into the economy to stimulate indirect and induced spending and economic activity.

We used a blended federal, state, and local personal income tax rate for each state, based on statistics from the Tax Foundation, and applied these rates when calculating indirect and induced economic activity.

Technical Appendix

A. Introduction

The primary data sources of the estimates presented in this report are derived from four broad surveys of horse industry participants—horse owner/industry suppliers, racetracks, off-track betting organizations, and horse show managers/organizers. This section describes the methodology used to implement the survey and generate economic impact estimates. The first subsection is an overview of the survey approach applicable to all four surveys. We then describe for each survey component (1) the sampling plan; (2) the survey implementation; (3) the survey data acquisition and data cleansing; (4) the imputation of missing data; and (5) the weighting of responses to a representative national estimate. After these steps, the methodology used to derive economic and employment impact estimates is discussed. This includes a discussion of the creation of composite variables used to estimate tiers of production, how taxes were handled, aggregation issues, and how economic multipliers were applied to estimate indirect and induced effects from the horse industry.

B. Basic Approach

All four surveys were fielded during the second half of 2004. Survey respondents were asked to report on calendar year 2003 information as respondents would likely have had the benefit of a 2003 tax return.

In general, participation in this study was relatively strong. For example, 27,951 horse owner/industry suppliers participated in the survey process, with 18,648 individuals providing complete and usable surveys. This represents an increase of approximately 400% from the total number of participants in 1996.

The 1996 study relied exclusively on the use of hard copy surveys to collect data from each of the four horse industry sub-segments (e.g. horse owner/industry suppliers, racetracks, off-track betting organizations, and horse show managers/organizers). For this project, the Project Steering Committee assessed opportunities to improve the process by which surveys were distributed and collected, as well as the actual survey instrument itself. After careful consideration, it was determined that the 2004 study would use an electronic-based surveying approach as its primary data collection mechanism. The primary mode of data collection was through an Internet Web site for which respondents were provided a pass code. The Project Steering Committee was, however, sensitive that all members of the sample population(s) may not have a readily available computer on which to complete the survey. Therefore, each person/organization in the survey sample was also provided with an opportunity to request a hard copy survey, complete the survey by hand, and return the survey in a business reply envelope or by facsimile.

Survey Content and Development

The collection of meaningful primary data is a critical component of any economic impact analysis. The quality of data is, of course, dependent upon the quality of the tool used to collect the data. The 2004 survey(s) contained many of the same areas of focus as the 1996 surveys, while placing additional emphasis on areas such as survey length/convenience and respondent understanding. The development of the survey tools was a collaborative effort between Deloitte and the Project Steering Committee.

Each survey was designed to collect operating and financial information relevant to each of the four industry segments. For example, racetracks were asked to provide itemized revenue and expenses, on- and off-track handle, employees, type and number of races hosted, value of assets, capital expenditures taxes paid, and other pertinent financial/operational information. The OTB survey was similar in nature to the racetrack survey, without the questions pertinent to race-days and attendance.

The Horse Show Manager/Organizer survey focused on the operational characteristics of the horse show(s) the individual managed/organized. Questions focused on types of shows, number of employees, number of attendees, number of horses involved, taxes paid, as well as an itemized list of revenues and expenses.

The horse owner/industry supplier survery contained the most questions of the four surveys. This survey focused upon the respondent's primary role in the industry, the activities the

owner/supplier engages in within the industry, the number and type of horses owned, their ownership status (sole versus shared ownership), horse-related capital expenses, number of employees, the primary use of their horses, taxes paid, as well as asking for an itemized list of revenues and expenses pertinent to all of their horse-related activities. This survey also asked a series of demographic questions useful in developing a profile of the horse owner/industry supplier segment.

All four of these hard copy survey tools are included at the conclusion of this Appendix.

Collecting Names for the Survey Sample

An industry-wide list of names for each of the four industry segments did not exist, so Deloitte and the Project Steering Committee set out to create a comprehensive database of owner/supplier names based on the compilation of state and association membership lists.

Deloitte gathered membership information from approximately 80 different horse owner/industry supplier organizations and affiliates. This membership list collection process was considered successful, considering only 20 organizations participated in the 1996 study. In addition, the Horse Show list was generated from the combined lists of 13 different showing organizations. The OTB and Racetrack lists are more static (e.g. the number of racetracks and OTBs remains relatively consistent year-to-year) and were generated from information maintained by the Project Steering Committee and from Equibase.

Once a consolidated list of names and addresses was compiled from each of the respective lists, the information had to be cleaned and validated, including the removal of duplicate entries (as each database, particularly the horse owner/industry supplier database, was the compilation of many different membership lists, an individual or organization might belong to several different membership organizations making it likely than certain names might appear on more than one list).

Once the data cleaning/validation process was completed, including the removal of duplicate entries, each database contained the following number of usable names/addresses. Table A-1 presents the number of usable addresses obtained through this process. With the exception of the horse owner/industry supplier survey, each list was sampled in its entirety.

Table A-1
Number of Usable Addresses Before and After Removal of Duplicates

Survey	Before	After
Horse Owners/Industry suppliers	1,028,536	747,400
Horse Show Organizers		4,865
Race Tracks	NA	??
OTBs	NA	??

Not Applicable

The Postcard Invitation Approach

Several different approaches to solicit participation from each industry segment were carefully considered. After weighing the potential options, the chosen approach included the usage of a postcard invitation. This postcard invitation served as the primary mechanism by which each

individual/organization would be initially contacted and asked to participate in the study. For a portion of the horse owner/industry supplier sample an invitation was sent via e-mail. For several of the other survey components phone prompts were also made.

The following sections describe how these lists were then used to produce a representative sample from which to survey.

C. Horse Owners/Industry Suppliers

(1) Sampling Plan

For the horse owner/industry supplier segment, a *stratified random sample* was selected from the 747,400 names. We divided horse owners and industry participants into two basic groups: economically motivated owners/participants and recreational owners/participants. We assumed a comprehensive sampling frame for the economically motivated industry participants (i.e. we observed the entire population) and a representative sampling frame for the recreational participants. Our approach is comparable to the structure that was used in the 1996 study.

The individuals for both sampling frames came from the numerous association and commercial lists that were collected for this purpose. The economically motivated participants come from lists tied to specific breeds (e.g. American Quarter Horse Association) and from other horse-related associations (e.g. New Jersey Horse Council). The recreational owners are based on the lists that are associated with retail or commercial outlets (e.g. HorseCity.com). The methodology for determining the population of recreational owners is described below.

There were two issues that needed to be considered in preparing the lists for drawing the sample: the removal of duplicate names and the construction of sampling strata. The first issue was a matter of making a unique database from the various lists collected. The lists contained a number of duplicate names and addresses (i.e. the same individual appears on different lists) and we wanted to ensure that each individual selected received only one copy of the survey. The second issue was related to making meaningful statements for each of the specific breakout groups (breed and state). To facilitate this process, we broke out the overall sample into strata and select the sample based on these.

The lists are grouped into the following categories. The number to the left of the list type indicates reflects the hierarchy of how names were selected for the survey sample.

1) Thoroughbred Lists
2) Quarter Horse Lists
3) Other Breed Lists
4) Non-Breed Association Lists
5) Retail/Commercial Lists

The mapping of the individual lists to their specific group is shown in Table A-4. The removal of duplicate records was based on the hierarchy described above. For example, if an individual appears on both the Thoroughbred list and the Quarter Horse list, the name was only drawn from the Thoroughbred list stratum. This does not necessarily imply that the individual has a lower chance of being selected into the sample (it could actually be higher) or that the individual will not be asked about horses of all breeds. The order of the hierarchy was chosen to ensure that

adequate numbers of each breed was included in each stratum. For example, since the overall list of horse owners includes a comparatively small sample of participants from the Thoroughbred lists, it was important to put this list at the top of the hierarchy to ensure adequate representation of this group.

As noted above, we assumed that the association lists provided the full population of the economically motivated owners. Given the sampling scheme, we needed to estimate the population of the non-economically or recreational owners. To accomplish this we used assumptions similar to those used in the 1996 study. In particular, we took advantage of the fact that there was an overlap between the association lists and the retail lists. For example, individuals on the American Quarter Horse list were also found on the retail lists such a HorseCity.com. We assumed that non-economically motivated owners belonged to the retail lists in the same proportion as economically motivated owners. We allowed this proportion to vary by state. For example, if in one state we observed 25% of the economically motivated owners were also on a retail list, we assumed that the non-economically motivated owners on the retail list represented 25% of the total number of non-economically motivated owners. That is, to determine the relevant population for this group, we inflated the number of non-economically motivated owners observed on our lists by a factor of four.

(2) Survey Implementation

To initiate the survey, postcard invitations were sent to every individual/organization in the sampling frame over the period of five days.

Several weeks following the initial postcard invitation distribution, it was determined that additional respondents were required. Unlike with the other survey segments, telephone follow-up was not a viable option due to the size of the Owner/Provider sample, and the number of additional responses desired. Therefore, for the horse owner/industry supplier sample, an email solicitation was initiated to a larger sample to generate additional response.

Prior to the email distribution, we confirmed that a sampling bias was not being introduced into the survey frame by excluding those horse owner/industry suppliers without an email record. Of the approximately 747,400 Owners/Suppliers, we had approximately 352,072 email records. In addition, the horse owner/industry suppliers that received a postcard invitation AND had an email address received an email follow-up/reminder to complete their survey.

This phase two approach was successful at stimulating additional response from the horse owner/industry supplier sample. The email solicitation increased the total number of responses from approximately 4,500 to approximately 18,648. The final number of participating horse owner/industry suppliers is approximately 400% greater than the total number of responses (4,759) received in the 1996 version of this study.

(3) Data acquisition and data cleansing

The survey response data were captured electronically and combined to form our sample data. From the raw sample data, we identified and excluded incomplete and invalid response data to arrive at a useable horse owner/industry supplier data set. In addition, for a very limited number of surveys, we corrected certain contradictory responses where the intent of the respondent could be determined from the respondent's answers to other questions.

We first removed incomplete survey responses. Specifically, we identified those respondents who did not fully complete the survey; of the original 27,951 responses received, there were 9,126 respondents who initiated the on-line survey, but "dropped off" prior to completion. In most of these cases, almost all of the survey was left incomplete. We removed these records in their entirety from the sample.

We also identified survey responses that, while complete, did not provide enough useful information to be included in the sample. This included, for example, cases in which all economic response data, including employment, were zero or NULL. We also identified six surveys that were invalid on their face, and removed them from the sample. These steps removed an additional 177 survey responses.

The removal of invalid or incomplete surveys from our raw sample yielded a usable total of 18,648 responses. With these responses, we then performed a limited number of steps to resolve internal inconsistencies in survey responses. For example, respondents report the number of horses owned both by breed and by use; for a small number of respondents these counts were not the same. As another example, some respondents reported they were not a horse owner, but then reported sole and/or partial ownership of horses later in the survey. In these instances, we determined a hierarchy of responses, then adjusted response data from lower hierarchies to conform to response data from higher hierarchies.

Removal of Revenue and Expense Outliers

After the removal of obvious invalid or incomplete survey responses, we examined revenue and expense variables to determine whether the extreme (maximum) values observed in the survey responses were legitimate or whether they represented false data. The Project Steering Committee provided what "typical" revenue and expense values would be per horse across a range of uses, then assisted in the review of outlier responses in each revenue and expense category. This process was lengthy and iterative, as we examined the revenue and expense variables across a number of dimensions. We determined that the extreme values we observed were likely false responses, and excluded them using the following method.

To ensure that we did not bias our sample results downward by only excluding extreme maximum values, we also excluded an equal number of minimum value responses for each expense and revenue category, in other words, we removed the extreme "tails" of the distribution, of both high and low responses. We reviewed a number of descriptive statistics for each variable using a number of different exclusion thresholds, and with the guidance of the Project Steering Committee, decided to exclude the top 1% and the bottom 1% of the responses for each revenue and expense variable. These values were set to missing, and then were imputed (as described in the next section below) using other survey responses.

We removed outliers for the following variables: Revenues: purses, stud fees, horse sales, boarding, veterinary, and other. Expenses: feed, vitamins and medicine, tack and equipment, boarding, rider education, stud fees, shoeing/Ferrier, veterinary, other horse related, transport/trailering, other transport, entry fee, facilities, other business, salary and wage, state, Federal, and local tax expenses.

Handling of Invalid Capital Expenditure Responses

It became apparent when examining the survey responses that several respondents did not properly understand two questions relating to their capital expenditures on land and equipment during the calendar year. Survey respondents were asked to list their horse industry-related calendar year 2003 capital spending on equipment and structures for one question, and their horse industry-related calendar year 2003 capital spending on land in a second question. Then respondents were then asked for the fair-market value of their horses in one question and the fair-market value of their horse-related assets (excluding the fair market value of their horses) in a second question. For many respondents, the capital investment amounts for the calendar year were the same as the fair-market value of all of their horse related assets. We suspect that many survey respondents incorrectly provided their cumulative total capital spending rather than their capital spending for 2003 alone.

We reviewed a number of alternative methods for handling these invalid responses, including imputation. We were not satisfied, however, with the suitability of various statistical models in accurately imputing capital expenditure amounts. We therefore decided to identify records likely entered erroneously, then exclude them from the sample, and re-weight the sample (only for calculating weighted investment amounts) to account for fewer survey responses during gross-up.

After consultation with accounting and horse-industry experts regarding typical capital expenditure levels across a broad range of ownership types, we determined to exclude from the sample (only for purposes of capital investment weighting) those survey responses where the sum of capital expenditures for calendar year 2003 exceeded 30% of the total fair market value of all horse related assets (excluding the value of the horses) owned by the respondent. This resulted in 5,065 capital expenditure responses being excluded from the sample, out of 18,648, or 27%. This left 13,583 valid responses for use in estimating land and equipment capital expenditures from horse owners and industry suppliers.

(4) *Imputation of missing data*

While many survey respondents fully completed the survey, there were many surveys that required some form of imputation on questions that were skipped. Without imputation, a skipped question would have been treated as a response of "zero" when aggregating across all survey respondents. For some survey questions, such as horse counts by breed, it was reasonable to assume that if the question was skipped, then zero was the intended answer. However, for particular questions, such as grouped questions like those for revenues and expenses, it would have led to distortions in revenue, expense, and economic impact totals if the non-responses were treated as zeros. For these variables, we imputed responses, based upon a variety of statistical techniques, as described below.

Identifying Horse Counts by Breed

As part of the survey process, horse owners were also asked to identify the primary use of their horse(s), with seven possible options (racing, showing, other competition, recreation, work, breeding and other). Owners were separately asked to identify the breed of the horses they owned (Thoroughbred, Quarter Horse and other breeds). In developing impact estimates it was determined that an insightful way of presenting the data would be by breed and use. Further, it

was determined that the use categories should be collapsed to four primary activities (racing, showing, recreation, and other). For approximately one half of the sample, the breed and use could be uniquely determined based on the individual response. For example, the respondent may have reported having two Thoroughbreds. The same respondent may have also reported owning two race horses. Therefore, we concluded that this owner had two Thoroughbreds used in racing.

For respondents for which we could not uniquely determine the actual breed/use of each horse, we assigned each of the owner's horses to the breed/use cells in such a manner that restricted each of the rows and columns summed to the actual known responses. This methodology allowed for individual variation across breed and use. We followed a two step process. In the first step, we allocated the horses by breed counts to each of the seven original use categories, based upon the percentage of horses the respondent had in each use category. For example, if the respondent indicated that 50% of his/her horses were used for recreation, and 50% were used for breeding, and the respondent had 6 Quarter Horses and 6 other breeds, we assigned 3 Quarter Horses (50%) to recreation and 3 Quarter Horses to breeding (50%), and the same number each for Other Breeds.

After step 1, we had counts of horses by breed for each of the seven uses. In the second step, we then collapsed these seven use categories to the four categories represented throughout the report (Racing, Showing, Recreation, Other). Horse counts in the use category "Breeding" were divided amongst the other categories based upon consultation with industry experts - separate "factors" were established by breed in this process. For example, the percentage of Thoroughbreds used in breeding for Racing was obviously higher than the percentage of Quarter Horses used in Breeding for Racing. The reverse was true for Showing.

Imputing Employee Hours

A series of questions in the survey asked the respondent to quantify the number of persons who worked for the survey respondent on a full-time, part-time, seasonal, and volunteer basis. For part-time employee counts, the survey additionally asked how many hours per week and how many weeks per year those part-time employees worked. Similarly, for seasonal employees, the survey respondent was queried about the number of weeks the seasonal employees worked in 2003, and for volunteers, how many hours were donated in 2003. For a small number of surveys, respondents provided an employee count, but neglected to report the number of weeks and/or hours. We determined the most appropriate method to use to impute the number of hours and/or weeks for missing responses was to use a simple average from the set of non-missing responses for each type of employee. The frequency of imputation for each question is provided in table A-2:

Table A-2
Imputation of Employee / Volunteer Hours and Weeks

Variable	Average of Non-Missing Responses	# Non-Missing Responses	# Missing Responses	Fill Rate (%)
Part-Time Hours	17.45 hrs/week	838	38	4.5%
Part-Time Weeks	29.85 weeks	836	40	4.8%
Seasonal Weeks	21.18 weeks	562	27	4.8%
Volunteer Hours	185.24 hours/yr	2995	94	3.1%

The employee counts were used to estimate total number of jobs in the industry. Hours and weeks were used to convert these employee participation counts into a full-time equivalent basis.

Imputing Revenues and Expenses

If a survey respondent failed to answer all revenue and expense questions, but provided employee counts and otherwise completed the survey (e.g., reported owning horses), we imputed their responses based upon the primary activity of the respondent as a horse owner or industry supplier (competing, breeding, or other if an owner, and breeder, farm, goods, stabling, training, or veterinary if a industry supplier) and the number and use of the horses the respondent claimed to own (racing, showing, other competition, breeding, recreation, work, and other), using the responses from survey respondents who did provide this information as a base.

This was done using a multi-factor *Tobit* regression model for each revenue and expense variable, separately for owners and industry suppliers. The *Tobit* procedure is a regression model that is commonly used when the estimation (response) variable(s) are "censored" in some fashion—meaning that they cannot fall below or above a certain level. Purse revenue is a fitting example—purse revenue is zero for many horse owners, but does not fall below zero. The use of a Tobit procedure ensures the estimates do not fall below zero, while maintaining desirable statistical properties.

We decided to run separate regressions for horse owners and industry suppliers to capture distinctive revenue and expense patterns unique to each group, rather than combine and blend these groups together.

We imputed values for the following variables: Revenues: purses, stud fees, horse sales, boarding, veterinary, and other. Expenses: feed, vitamins and medicine, tack and equipment, boarding, rider education, stud fees, shoeing/farrier, veterinary, other horse related, transport/trailering, other transport, entry fee, facilities, other business, state, federal, and local tax expenses.

For purposes of determining the economic impact from salary and wage expense, we combined the responses from two questions: one on actual salaries, wages, and benefits paid to employees, and one on the estimated cash-value of non-cash compensation provided to employees (such as free housing or use of horse, etc.). With this aggregate variable, we then employed a Tobit regression to impute missing values, as described above, except we added three additional explanatory variables: the number of full-time employees, the number of part-time employees, and the number of seasonal employees.

The number of imputed values, for each variable, using a TOBIT regression is displayed in table A-3.

Table A-3
Imputation of Revenue and Expense variables

Variable	Owners	Industry suppliers	Total	% of Responses[1]
All Revenue & Expense Values Imputed	985	99	1,084	6.1%
Revenue Variables (outlier count)				
Purses	191	9	200	1.1%
Stud Fees	173	9	182	1.0%
Horse Sales	197	11	208	1.2%
Boarding	183	11	194	1.1%
Veterinary	159	9	168	1.0%
Other Revenue	173	11	184	1.0%
Expense Variables (outlier count)				
Feed	289	15	304	1.7%
Vitamins and Medicines	275	15	290	1.6%
Equipment	277	15	292	1.7%
Boarding	229	11	240	1.4%
Rider Education	199	9	208	1.2%
Stud Fees	189	9	198	1.1%
Shoeing / Ferrier	283	15	298	1.7%
Veterinary	279	15	294	1.7%
Other Horse Related Expenses	175	9	184	1.0%
Transportation / Trailering	219	11	230	1.3%
Transportation	221	11	232	1.3%
Entry Fees	227	11	238	1.3%
Facility Expenses	207	11	218	1.2%
Other Business Expenses	209	13	222	1.3%
Federal Taxes	167	11	178	1.0%
State Taxes	169	11	180	1.0%
Local Taxes	165	9	174	1.0%

1: There were 17,631 responses from owners & industry suppliers.

Calculating Profits

Of the 16,671 respondents included in the economic impact calculation, 15,054 (90.3%) reported a loss or profits of zero. While some owners may participate in this industry with a goal of making a profit, we can not distinguish such owners in our sample. As such, we can not determine which owners own horses and incurring expenses purely for the simple joy of owning a horse. To be consistent with the 1996 study, we wanted to capture the non-cash value of horse ownership in the economic impact of the horse industry. In contrast to the 1996 study, however, we decided to take a more conservative approach in handling this issue. Whereas the 1996 study "added-back" losses (while keeping gains) to capture the non-cash economic value of horse

ownership, we have removed all profits, both positive and negative, from our calculations of economic impact from horse owners.

(5) ***Weighting of Responses to National and State Estimates***

Overall

In designing the sampling methodology, we estimated the total number of horse owners and industry suppliers both nationally and by state using the association and membership lists provided to us by the Project Steering Committee. This process was previously described. Based upon the number of responses we received from each state and stratum, we then extrapolated the responses from the survey both to national and state totals. For example, in California for category 3 (other breed lists), we identified 12,381 addresses. We had 262 useable responses from this state and stratum, or a 2.1% response rate. To extrapolate the survey results for this state and stratum, we weighted-up the responses from the 262 surveys to reflect the population they represent, the 12,381 in total for that state and stratum. In this case, each survey response is given a weight of 47.256 (or the 1 divided by 2.1%) to reflect its proportion of the total for California, non-breed association members. To generate a state total, we calculate weights separately in the same manner for the other four strata, then sum across all survey responses, weighting each response by its proportion of the total for its state and stratum. In the table below, we show the response rate for each state and stratum.

Table A-4

State / Stratum Population counts, Response counts, and Base Weights

ST	#	Group	# Addresses	Base Responses	Response Rate from Sample	Base Weight
AK	1	Thoroughbred Association Lists	9.00	0	0.0%	#N/A
AK	2	Quarter Horse Association Lists	321.00	44	13.7%	7.30
AK	3	Other Breed Association Lists	213.00	27	12.7%	7.89
AK	4	Non-Breed Association Lists	199.00	11	5.5%	18.09
AK	5	Retail/Commercial Lists	4,739.63	46	1.0%	103.04
AL	1	Thoroughbred Association Lists	184.00	8	4.3%	23.00
AL	2	Quarter Horse Association Lists	4,574.00	169	3.7%	27.07
AL	3	Other Breed Association Lists	2,754.00	55	2.0%	50.07
AL	4	Non-Breed Association Lists	1,353.00	58	4.3%	23.33
AL	5	Retail/Commercial Lists	24,027.32	39	0.2%	616.09
AR	1	Thoroughbred Association Lists	613.00	9	1.5%	68.11
AR	2	Quarter Horse Association Lists	5,064.00	113	2.2%	44.81
AR	3	Other Breed Association Lists	1,860.00	38	2.0%	48.95
AR	4	Non-Breed Association Lists	638.00	4	0.6%	159.50
AR	5	Retail/Commercial Lists	21,972.60	38	0.2%	578.23
AZ	1	Thoroughbred Association Lists	846.00	17	2.0%	49.76
AZ	2	Quarter Horse Association Lists	5,694.00	204	3.6%	27.91
AZ	3	Other Breed Association Lists	3,401.00	60	1.8%	56.68
AZ	4	Non-Breed Association Lists	1,234.00	19	1.5%	64.95
AZ	5	Retail/Commercial Lists	43,511.03	78	0.2%	557.83
CA	1	Thoroughbred Association Lists	6,151.00	45	0.7%	136.69
CA	2	Quarter Horse Association Lists	17,565.00	665	3.8%	26.41
CA	3	Other Breed Association Lists	12,381.00	262	2.1%	47.26
CA	4	Non-Breed Association Lists	9,333.00	62	0.7%	150.53
CA	5	Retail/Commercial Lists	136,833.21	268	0.2%	510.57
CO	1	Thoroughbred Association Lists	479.00	15	3.1%	31.93
CO	2	Quarter Horse Association Lists	8,584.00	342	4.0%	25.10
CO	3	Other Breed Association Lists	4,472.00	112	2.5%	39.93

ST	#	Group	# Addresses	Base Responses	Response Rate from Sample	Base Weight
CO	4	Non-Breed Association Lists	2,817.00	36	1.3%	78.25
CO	5	Retail/Commercial Lists	45,726.78	101	0.2%	452.74
CT	1	Thoroughbred Association Lists	211.00	8	3.8%	26.38
CT	2	Quarter Horse Association Lists	858.00	80	9.3%	10.73
CT	3	Other Breed Association Lists	900.00	51	5.7%	17.65
CT	4	Non-Breed Association Lists	1,220.00	15	1.2%	81.33
CT	5	Retail/Commercial Lists	8,968.77	56	0.6%	160.16
DC	1	Thoroughbred Association Lists	1.00	1	100.0%	1.00
DC	2	Quarter Horse Association Lists	22.00	2	9.1%	11.00
DC	3	Other Breed Association Lists	-	1*	#DIV/0!	#N/A
DC	4	Non-Breed Association Lists	418.00	0	0.0%	#N/A
DC	5	Retail/Commercial Lists	2.00	2	100.0%	1.00
DE	1	Thoroughbred Association Lists	125.00	1	0.8%	125.00
DE	2	Quarter Horse Association Lists	221.00	19	8.6%	11.63
DE	3	Other Breed Association Lists	264.00	19	7.2%	13.89
DE	4	Non-Breed Association Lists	164.00	7	4.3%	23.43
DE	5	Retail/Commercial Lists	3,529.07	22	0.6%	160.41
FL	1	Thoroughbred Association Lists	5,263.00	41	0.8%	128.37
FL	2	Quarter Horse Association Lists	6,994.00	283	4.0%	24.71
FL	3	Other Breed Association Lists	6,442.00	128	2.0%	50.33
FL	4	Non-Breed Association Lists	5,758.00	38	0.7%	151.53
FL	5	Retail/Commercial Lists	94,654.00	130	0.1%	728.11
GA	1	Thoroughbred Association Lists	327.00	6	1.8%	54.50
GA	2	Quarter Horse Association Lists	5,156.00	252	4.9%	20.46
GA	3	Other Breed Association Lists	3,525.00	83	2.4%	42.47
GA	4	Non-Breed Association Lists	3,142.00	88	2.8%	35.70
GA	5	Retail/Commercial Lists	38,259.02	84	0.2%	455.46
HI	1	Thoroughbred Association Lists	9.00	0	0.0%	#N/A
HI	2	Quarter Horse Association Lists	417.00	28	6.7%	14.89
HI	3	Other Breed Association Lists	151.00	8	5.3%	18.88
HI	4	Non-Breed Association Lists	121.00	7	5.8%	17.29
HI	5	Retail/Commercial Lists	3,885.25	11	0.3%	353.20
IA	1	Thoroughbred Association Lists	428.00	12	2.8%	35.67
IA	2	Quarter Horse Association Lists	6,269.00	196	3.1%	31.98
IA	3	Other Breed Association Lists	2,774.00	64	2.3%	43.34
IA	4	Non-Breed Association Lists	1,514.00	27	1.8%	56.07
IA	5	Retail/Commercial Lists	24,325.34	50	0.2%	486.51
ID	1	Thoroughbred Association Lists	407.00	12	2.9%	33.92
ID	2	Quarter Horse Association Lists	4,881.00	179	3.7%	27.27
ID	3	Other Breed Association Lists	1,680.00	55	3.3%	30.55
ID	4	Non-Breed Association Lists	1,315.00	19	1.4%	69.21
ID	5	Retail/Commercial Lists	22,868.93	41	0.2%	557.78
IL	1	Thoroughbred Association Lists	1,343.00	27	2.0%	49.74
IL	2	Quarter Horse Association Lists	5,763.00	247	4.3%	23.33
IL	3	Other Breed Association Lists	3,488.00	104	3.0%	33.54
IL	4	Non-Breed Association Lists	2,278.00	48	2.1%	47.46
IL	5	Retail/Commercial Lists	42,389.33	83	0.2%	510.71
IN	1	Thoroughbred Association Lists	817.00	19	2.3%	43.00
IN	2	Quarter Horse Association Lists	5,802.00	267	4.6%	21.73
IN	3	Other Breed Association Lists	3,883.00	71	1.8%	54.69
IN	4	Non-Breed Association Lists	1,198.00	16	1.3%	74.88
IN	5	Retail/Commercial Lists	34,257.54	92	0.3%	372.36
KS	1	Thoroughbred Association Lists	260.00	14	5.4%	18.57
KS	2	Quarter Horse Association Lists	6,463.00	211	3.3%	30.63
KS	3	Other Breed Association Lists	1,753.00	74	4.2%	23.69
KS	4	Non-Breed Association Lists	1,446.00	17	1.2%	85.06
KS	5	Retail/Commercial Lists	24,364.08	54	0.2%	451.19
KY	1	Thoroughbred Association Lists	7,085.00	67	0.9%	105.75
KY	2	Quarter Horse Association Lists	3,958.00	148	3.7%	26.74
KY	3	Other Breed Association Lists	4,428.00	59	1.3%	75.05

ST	#	Group	# Addresses	Base Responses	Response Rate from Sample	Base Weight
KY	4	Non-Breed Association Lists	1,422.00	21	1.5%	67.71
KY	5	Retail/Commercial Lists	40,892.12	101	0.2%	404.87
LA	1	Thoroughbred Association Lists	1,793.00	16	0.9%	112.06
LA	2	Quarter Horse Association Lists	5,327.00	142	2.7%	37.51
LA	3	Other Breed Association Lists	1,843.00	43	2.3%	42.86
LA	4	Non-Breed Association Lists	939.00	5	0.5%	187.80
LA	5	Retail/Commercial Lists	22,354.64	37	0.2%	604.18
MA	1	Thoroughbred Association Lists	418.00	10	2.4%	41.80
MA	2	Quarter Horse Association Lists	874.00	89	10.2%	9.82
MA	3	Other Breed Association Lists	1,385.00	52	3.8%	26.63
MA	4	Non-Breed Association Lists	2,096.00	62	3.0%	33.81
MA	5	Retail/Commercial Lists	14,194.56	53	0.4%	267.82
MD	1	Thoroughbred Association Lists	1,585.00	34	2.1%	46.62
MD	2	Quarter Horse Association Lists	1,446.00	102	7.1%	14.18
MD	3	Other Breed Association Lists	1,511.00	85	5.6%	17.78
MD	4	Non-Breed Association Lists	1,668.00	23	1.4%	72.52
MD	5	Retail/Commercial Lists	23,214.41	77	0.3%	301.49
ME	1	Thoroughbred Association Lists	19.00	0	0.0%	#N/A
ME	2	Quarter Horse Association Lists	574.00	50	8.7%	11.48
ME	3	Other Breed Association Lists	665.00	49	7.4%	13.57
ME	4	Non-Breed Association Lists	252.00	8	3.2%	31.50
ME	5	Retail/Commercial Lists	7,359.01	52	0.7%	141.52
MI	1	Thoroughbred Association Lists	617.00	12	1.9%	51.42
MI	2	Quarter Horse Association Lists	4,799.00	259	5.4%	18.53
MI	3	Other Breed Association Lists	5,365.00	108	2.0%	49.68
MI	4	Non-Breed Association Lists	1,794.00	21	1.2%	85.43
MI	5	Retail/Commercial Lists	49,993.29	131	0.3%	381.63
MN	1	Thoroughbred Association Lists	450.00	8	1.8%	56.25
MN	2	Quarter Horse Association Lists	5,363.00	237	4.4%	22.63
MN	3	Other Breed Association Lists	3,654.00	102	2.8%	35.82
MN	4	Non-Breed Association Lists	1,232.00	22	1.8%	56.00
MN	5	Retail/Commercial Lists	32,141.58	87	0.3%	369.44
MO	1	Thoroughbred Association Lists	376.00	5	1.3%	75.20
MO	2	Quarter Horse Association Lists	9,084.00	282	3.1%	32.21
MO	3	Other Breed Association Lists	3,839.00	80	2.1%	47.99
MO	4	Non-Breed Association Lists	1,432.00	41	2.9%	34.93
MO	5	Retail/Commercial Lists	44,021.04	89	0.2%	494.62
MS	1	Thoroughbred Association Lists	163.00	4	2.5%	40.75
MS	2	Quarter Horse Association Lists	4,211.00	97	2.3%	43.41
MS	3	Other Breed Association Lists	2,011.00	31	1.5%	64.87
MS	4	Non-Breed Association Lists	672.00	10	1.5%	67.20
MS	5	Retail/Commercial Lists	16,594.98	42	0.3%	395.12
MT	1	Thoroughbred Association Lists	285.00	8	2.8%	35.63
MT	2	Quarter Horse Association Lists	5,246.00	124	2.4%	42.31
MT	3	Other Breed Association Lists	1,447.00	45	3.1%	32.16
MT	4	Non-Breed Association Lists	1,215.00	9	0.7%	135.00
MT	5	Retail/Commercial Lists	22,151.44	25	0.1%	886.06
NC	1	Thoroughbred Association Lists	299.00	10	3.3%	29.90
NC	2	Quarter Horse Association Lists	5,318.00	211	4.0%	25.20
NC	3	Other Breed Association Lists	4,321.00	123	2.8%	35.13
NC	4	Non-Breed Association Lists	4,679.00	113	2.4%	41.41
NC	5	Retail/Commercial Lists	50,452.23	92	0.2%	548.39
ND	1	Thoroughbred Association Lists	121.00	3	2.5%	40.33
ND	2	Quarter Horse Association Lists	2,274.00	84	3.7%	27.07
ND	3	Other Breed Association Lists	551.00	36	6.5%	15.31
ND	4	Non-Breed Association Lists	161.00	4	2.5%	40.25
ND	5	Retail/Commercial Lists	7,686.23	21	0.3%	366.01
NE	1	Thoroughbred Association Lists	390.00	16	4.1%	24.38
NE	2	Quarter Horse Association Lists	5,687.00	147	2.6%	38.69
NE	3	Other Breed Association Lists	995.00	44	4.4%	22.61

ST	#	Group	# Addresses	Base Responses	Response Rate from Sample	Base Weight
NE	4	Non-Breed Association Lists	653.00	8	1.2%	81.63
NE	5	Retail/Commercial Lists	18,979.53	34	0.2%	558.22
NH	1	Thoroughbred Association Lists	102.00	4	3.9%	25.50
NH	2	Quarter Horse Association Lists	457.00	52	11.4%	8.79
NH	3	Other Breed Association Lists	784.00	57	7.3%	13.75
NH	4	Non-Breed Association Lists	454.00	12	2.6%	37.83
NH	5	Retail/Commercial Lists	6,623.83	55	0.8%	120.43
NJ	1	Thoroughbred Association Lists	1,174.00	22	1.9%	53.36
NJ	2	Quarter Horse Association Lists	1,397.00	98	7.0%	14.26
NJ	3	Other Breed Association Lists	1,230.00	53	4.3%	23.21
NJ	4	Non-Breed Association Lists	2,407.00	37	1.5%	65.05
NJ	5	Retail/Commercial Lists	26,489.17	88	0.3%	301.01
NM	1	Thoroughbred Association Lists	704.00	13	1.8%	54.15
NM	2	Quarter Horse Association Lists	4,029.00	106	2.6%	38.01
NM	3	Other Breed Association Lists	1,403.00	53	3.8%	26.47
NM	4	Non-Breed Association Lists	950.00	15	1.6%	63.33
NM	5	Retail/Commercial Lists	24,704.87	33	0.1%	748.63
NV	1	Thoroughbred Association Lists	206.00	1	0.5%	206.00
NV	2	Quarter Horse Association Lists	2,139.00	95	4.4%	22.52
NV	3	Other Breed Association Lists	1,222.00	41	3.4%	29.80
NV	4	Non-Breed Association Lists	412.00	6	1.5%	68.67
NV	5	Retail/Commercial Lists	13,107.64	41	0.3%	319.70
NY	1	Thoroughbred Association Lists	2,362.00	27	1.1%	87.48
NY	2	Quarter Horse Association Lists	3,654.00	203	5.6%	18.00
NY	3	Other Breed Association Lists	3,430.00	110	3.2%	31.18
NY	4	Non-Breed Association Lists	4,115.00	26	0.6%	158.27
NY	5	Retail/Commercial Lists	54,667.47	145	0.3%	377.02
OH	1	Thoroughbred Association Lists	1,177.00	31	2.6%	37.97
OH	2	Quarter Horse Association Lists	7,883.00	343	4.4%	22.98
OH	3	Other Breed Association Lists	5,295.00	112	2.1%	47.28
OH	4	Non-Breed Association Lists	2,391.00	43	1.8%	55.60
OH	5	Retail/Commercial Lists	57,120.16	139	0.2%	410.94
OK	1	Thoroughbred Association Lists	1,542.00	25	1.6%	61.68
OK	2	Quarter Horse Association Lists	12,265.00	276	2.3%	44.44
OK	3	Other Breed Association Lists	4,385.00	56	1.3%	78.30
OK	4	Non-Breed Association Lists	1,248.00	15	1.2%	83.20
OK	5	Retail/Commercial Lists	47,598.00	60	0.1%	793.30
OR	1	Thoroughbred Association Lists	586.00	19	3.2%	30.84
OR	2	Quarter Horse Association Lists	5,458.00	199	3.6%	27.43
OR	3	Other Breed Association Lists	3,590.00	82	2.3%	43.78
OR	4	Non-Breed Association Lists	1,506.00	26	1.7%	57.92
OR	5	Retail/Commercial Lists	34,521.13	67	0.2%	515.24
PA	1	Thoroughbred Association Lists	1,222.00	15	1.2%	81.47
PA	2	Quarter Horse Association Lists	5,059.00	245	4.8%	20.65
PA	3	Other Breed Association Lists	4,134.00	106	2.6%	39.00
PA	4	Non-Breed Association Lists	4,294.00	49	1.1%	87.63
PA	5	Retail/Commercial Lists	58,466.38	139	0.2%	420.62
RI	1	Thoroughbred Association Lists	40.00	2	5.0%	20.00
RI	2	Quarter Horse Association Lists	169.00	22	13.0%	7.68
RI	3	Other Breed Association Lists	144.00	7	4.9%	20.57
RI	4	Non-Breed Association Lists	254.00	12	4.7%	21.17
RI	5	Retail/Commercial Lists	1,898.99	30	1.6%	63.30
SC	1	Thoroughbred Association Lists	257.00	12	4.7%	21.42
SC	2	Quarter Horse Association Lists	2,277.00	113	5.0%	20.15
SC	3	Other Breed Association Lists	1,982.00	55	2.8%	36.04
SC	4	Non-Breed Association Lists	741.00	16	2.2%	46.31
SC	5	Retail/Commercial Lists	18,224.27	86	0.5%	211.91
SD	1	Thoroughbred Association Lists	107.00	4	3.7%	26.75
SD	2	Quarter Horse Association Lists	3,914.00	115	2.9%	34.03
SD	3	Other Breed Association Lists	912.00	24	2.6%	38.00

ST	#	Group	# Addresses	Base Responses	Response Rate from Sample	Base Weight
SD	4	Non-Breed Association Lists	255.00	1	0.4%	255.00
SD	5	Retail/Commercial Lists	10,827.98	27	0.2%	401.04
TN	1	Thoroughbred Association Lists	260.00	3	1.2%	86.67
TN	2	Quarter Horse Association Lists	5,194.00	201	3.9%	25.84
TN	3	Other Breed Association Lists	5,558.00	73	1.3%	76.14
TN	4	Non-Breed Association Lists	1,175.00	17	1.4%	69.12
TN	5	Retail/Commercial Lists	36,705.58	66	0.2%	556.15
TX	1	Thoroughbred Association Lists	4,227.00	50	1.2%	84.54
TX	2	Quarter Horse Association Lists	34,433.00	887	2.6%	38.82
TX	3	Other Breed Association Lists	11,448.00	171	1.5%	66.95
TX	4	Non-Breed Association Lists	5,718.00	30	0.5%	190.60
TX	5	Retail/Commercial Lists	146,205.71	189	0.1%	773.58
UT	1	Thoroughbred Association Lists	350.00	10	2.9%	35.00
UT	2	Quarter Horse Association Lists	4,335.00	146	3.4%	29.69
UT	3	Other Breed Association Lists	1,549.00	59	3.8%	26.25
UT	4	Non-Breed Association Lists	784.00	7	0.9%	112.00
UT	5	Retail/Commercial Lists	21,625.38	39	0.2%	554.50
VA	1	Thoroughbred Association Lists	1,672.00	34	2.0%	49.18
VA	2	Quarter Horse Association Lists	3,342.00	169	5.1%	19.78
VA	3	Other Breed Association Lists	3,199.00	85	2.7%	37.64
VA	4	Non-Breed Association Lists	2,184.00	23	1.1%	94.96
VA	5	Retail/Commercial Lists	42,113.75	111	0.3%	379.40
VT	1	Thoroughbred Association Lists	22.00	0	0.0%	#N/A
VT	2	Quarter Horse Association Lists	480.00	38	7.9%	12.63
VT	3	Other Breed Association Lists	581.00	38	6.5%	15.29
VT	4	Non-Breed Association Lists	594.00	32	5.4%	18.56
VT	5	Retail/Commercial Lists	5,898.92	52	0.9%	113.44
WA	1	Thoroughbred Association Lists	1,803.00	29	1.6%	62.17
WA	2	Quarter Horse Association Lists	6,064.00	294	4.8%	20.63
WA	3	Other Breed Association Lists	4,887.00	123	2.5%	39.73
WA	4	Non-Breed Association Lists	3,660.00	22	0.6%	166.36
WA	5	Retail/Commercial Lists	52,799.29	114	0.2%	463.15
WI	1	Thoroughbred Association Lists	149.00	7	4.7%	21.29
WI	2	Quarter Horse Association Lists	4,685.00	277	5.9%	16.91
WI	3	Other Breed Association Lists	3,965.00	112	2.8%	35.40
WI	4	Non-Breed Association Lists	1,570.00	60	3.8%	26.17
WI	5	Retail/Commercial Lists	35,153.24	108	0.3%	325.49
WV	1	Thoroughbred Association Lists	391.00	4	1.0%	97.75
WV	2	Quarter Horse Association Lists	1,251.00	58	4.6%	21.57
WV	3	Other Breed Association Lists	1,092.00	37	3.4%	29.51
WV	4	Non-Breed Association Lists	394.00	5	1.3%	78.80
WV	5	Retail/Commercial Lists	14,898.55	47	0.3%	316.99
WY	1	Thoroughbred Association Lists	75.00	3	4.0%	25.00
WY	2	Quarter Horse Association Lists	3,520.00	108	3.1%	32.59
WY	3	Other Breed Association Lists	915.00	41	4.5%	22.32
WY	4	Non-Breed Association Lists	611.00	6	1.0%	101.83
WY	5	Retail/Commercial Lists	13,253.32	32	0.2%	414.17

** One survey respondent listed Puerto Rico as the home state on the association list, but responded to the survey with an address in DC. This survey response was excluded from the calculations.*

The total number of responses reported in the list above is 18,608. In addition to these responses, we also separately surveyed 40 large farm operations to ensure that horse counts, economic impacts, and employment figures for this important group were all fully captured. Each of these survey responses received a weight of one, since collectively they represented the full population of this group.

Re-weighting for Capital Expenditures

As discussed above, we adjusted these weights when estimating state and national totals for capital expenditures. In essence, for the purposes of weighting up reported capital expenditure figures, we excluded survey responses and re-calculated a weight specifically for this calculation, again by state and stratum, with the new weights based on only the responses we did not exclude.

Re-weighting for Economic Impacts

Since the survey reached industry participants that were primarily horse owners as well as industry participants that were primarily industry suppliers (a self-reported question on the survey), expenditures of the Owners group were also captured (i.e., "double-counted") as the revenues of the Industry Supplier group. To avoid double-counting the economic impact of these dollars, we had to choose which point in the stream of dollars upon which we would base the economic impact estimates—the direct spending of the horse owners, or at the second-tier of the spending stream, from the industry suppliers. We chose to select the most direct, first tier of spending, where the dollars are introduced into the economy, i.e., the spending figures of the horse owners.

We excluded revenues and expenses of industry participants who completed the survey and responded that their primary activity in the horse industry was as an industry supplier (industry supplier revenues would have already been counted as expenses from their horse-owning customers, and industry supplier expenses would be counted as indirect expenses of the original expenses from their customers.) We excluded from the economic impact analysis the horse owners who identified themselves as primarily industry suppliers since it was unclear whether their revenue and expenses related only to their horse owner activities or to their industry supplier activities. To account for the fact that we excluded a number of surveys in the calculation of the economic impact, we re-weighted the sample to reflect the smaller base of surveys from which we were extrapolating.

The effect of excluding industry suppliers from the economic impact calculations was to reduce the overall size of the sample for economic impact and job creation purposes to 16,436 survey responses.

C. Horse Shows

(1) Sampling Plan

For the Horse Show industry segment, we employed an *exhaustive* sampling approach. In an exhaustive sampling approach, every name/organization included in the database receives a solicitation to participate. This approach could be used in this instance because this segment has a relatively small number of names/organizations when compared to the Owner/Supplier sample, and therefore the associated postage, printing and distribution costs were within the project budget. The total number of horse shows in the sample was 4,865.

(2) Survey Implementation

Survey Distribution and Follow-Up
Postcard invitations were sent to every individual/organization in the sampling frame over the period of five days. An on-line reporting tool was developed to monitor survey returns, with electronic surveys being tabulated instantaneously once submitted through the Internet.

Several weeks following the initial postcard invitation distribution, it was determined that additional responses were needed. It was determined that administering the survey over the telephone was going to be the most direct and aggressive approach to stimulate survey response. Every Horse Show for which we had a phone number received at least one phone call in an attempt to secure their participation.

We identified 4,865 Horse Showing organizations as the national population of the Horse Showing industry. This group included larger shows such as the AQHA World Championship Show and the Rolex Kentucky Three Day Event andd small local and regional shows. We received 192 survey responses from this group, for a response rate of 3.82%.

(3) Data Acquisition and Data Cleansing

We collected 192 survey responses from the Horse Show industry segment, from both the electronic surveys and the telephone surveys. These data were combined to form our sample data.

In general, there were few data corrections or imputations required in the Horse Show response data. We suspect this fact owes itself to the lower level of complexity of the survey instrument vis-à-vis the horse owner/industry supplier survey instrument, and due to the high proportion of telephone survey responses.

From the raw sample data, we identified and excluded one invalid survey response and five duplicate surveys (we acquired telephone surveys from five participants who then also submitted electronic surveys) to arrive at 186 useable survey responses.

(4) *Imputation of missing data*

Imputing Employee Hours
As with the Horse Owner/Industry Supplier survey, the Horse Show survey posed a series of questions relating to the number of persons who worked for the survey respondent on a full-time, part-time, seasonal, and volunteer basis. For a small number of surveys, respondents provided an employee count, but neglected to report the number of weeks and/or hours. As with the Horse Owner / Industry Supplier survey, we used the simple average hours or weeks from the set of non-missing responses for each type of employee. The frequency of imputation for each question is provided in the table below.

Table A-5
Imputation of Employee / Volunteer Hours and Weeks

Variable	Average of Non-Missing Responses	# Non-Missing Responses	# Missing Responses	Fill Rate (%)
Part-Time Hours	23.43 hrs/week	37	3	7.5%
Part-Time Weeks	13.72 weeks	36	1	10.0%
Seasonal Weeks	6.79 weeks	53	1	1.9%
Volunteer Hours	96.12 hours/yr	169	4	2.4%

The employee counts were used to estimate total number of jobs in the industry. Hours and weeks were used to convert these employee participation counts into a full-time equivalent basis.

Imputing Revenues and Expenses

In five instances, a survey respondent provided employee counts, but failed to answer the questions concerning annual employee compensation. A survey respondent's employee compensation was determined from two survey questions, as with the Horse Owners/Industry Suppliers survey—it is the combination of actual salaries, wages, and benefits paid to employees, and the estimated cash-value of non-cash compensation provided to employees (such as free housing or use of horse, etc.).

We imputed their responses using a multi-factor *Tobit* regression model, identical in form to the one used in the Horse Owner/Industry Supplier survey described above. As explanatory variables, we used in the regression the number of AQHA shows they managed, the number of non-AQHA shows they managed, and the number of full-time, part-time, and seasonal employees.

Table A-6
Imputation of Employee Compensation

Variable	Total Responses	Responses with Employee Compensation	Responses with NULL Employee Compensation	% of Responses Imputed
Employee Compensation	186	116	5	4.13%

(5) *Weighting of Responses to National and State Estimates*

For national estimates of the Horse Showing segment of the horse industry, we simply weighted each response by the inverse of the ratio of survey respondents to the full population we sampled from, as was done for horse counts in the Horse Owner / Industry supplier survey. Thus, with 186 survey responses from a population of 4,865 Horse Show organizations, we have a response rate of 3.82% (186/4,865). The weight then is simply the inverse of this ratio (4,865/186), or 26.156.

For state estimates, we could not use the same technique, because of the clustering of survey responses in some states and the relative paucity of responses in others. For example, we received only two responses from Horse Shows in Florida, an important break-out state with a large horse showing industry. Extrapolating the responses from those two surveys would not necessarily be representative of the horse showing segment in Florida as a whole. Similarly, we received no responses for some states, and thus had to devise a method for estimating the economic impact in those states.

Using information provided by the Project Steering Committee and the American Quarter Horse Association, we tabulated the number of sanctioned and unsanctioned horse shows in 2003 for each state. We then allocated the national totals to each state based upon its share of the number of shows nationally. The table below shows the number of horse shows for each state for calendar year 2003 which were used in allocating national totals to each state:

Table A-7
Horse Show State Weighting Schema

STATE	# of Shows	% of Total
AL	46	2.2%
AK	14	0.7%
AZ	42	2.0%
AR	22	1.1%
CA	106	5.1%
CO	58	2.8%
CT	17	0.8%
DE	15	0.7%
FL	85	4.1%
GA	49	2.4%
HI	5	0.2%
ID	27	1.3%
IL	54	2.6%
IN	47	2.3%
IA	49	2.4%
KS	28	1.4%
KY	61	3.0%
LA	34	1.6%
ME	12	0.6%
MD	11	0.5%
MA	13	0.6%
MI	63	3.1%
MN	44	2.1%
MO	51	2.5%
MS	46	2.2%
MT	23	1.1%
NC	59	2.9%
NE	43	2.1%
NV	13	0.6%
NH	9	0.4%

STATE	# of Shows	% of Total
NJ	26	1.3%
NM	35	1.7%
NY	71	3.4%
ND	28	1.4%
OH	65	3.2%
OK	63	3.1%
OR	34	1.6%
PA	58	2.8%
RI	0	0.0%
SD	22	1.1%
SC	41	2.0%
TN	77	3.7%
TX	180	8.7%
UT	30	1.5%
VA	41	2.0%
VT	1	0.0%
WA	54	2.6%
WV	43	2.1%
WI	36	1.7%
WY	11	0.5%
Total	2062	100.0%

D. Survey Sampling Approach for Racetrack and OTB facilities

(1) Sampling Plan

For the Race Track industry segment, we also employed an exhaustive sampling approach. We identified 122 primary racing tracks, both Thoroughbred and non-Thoroughbred, nationally for this study. These tracks all had a significant number of race days and also wagering components. Included in our original examination of potential tracks, we considered tracks with limited race days (fewer than 10 or 15 days per year, including limited Thoroughbred, Quarter Horse, other breed, harness racing, etc.), county fair racing (with wagering), steeplechase events, hunt club events, carnivals and rodeo events, and fairs without racing. However, these secondary events were not included in the racetrack sample as it was determined that the racing activity did not contain a sanctioned wagering component of a material size.

Although originally the survey had intended to include off-track betting facilities, we received only six survey responses from these types of facilities. After carefully reviewing many data from many different industry sources including Equibase, Association of Racing Commissioners International, The Jockey Club, racing summaries published by state governments, *Thoroughbred Times Racing Almanac, 2004 U.S. Trotting and Pacing Guide* and others, it was concluded that the OTB revenue information was being reported in the total handle figures reported by participating racetracks. OTB impacts are captured in the indirect and induced impact categories, but were not included in the primary data sample as OTB revenues could not be discretely separated and segmented from the information that the racetracks were providing,

in addition to the fact that the participating sample was too small to make meaningful statements. Therefore, OTB information was excluded to eliminate the possibility of redundant information being included in the estimates.

(2) Survey Implementation

Survey Distribution and Follow-Up
As with the Horse Show survey instrument, responses to the original survey instrument were instigated from postcard invitations that were sent to every organization in the sampling frame over the period of five days. In similar fashion to the other survey responses, an on-line reporting tool was developed to monitor survey returns, with electronic surveys being tabulated instantaneously once submitted through the Internet.

During the review of the initial survey response returns, we noticed that not only were additional responses needed, but also some survey respondents appeared to be confused as to how to report handle—whether gross or net of certain (or all) expenses. In an effort to understand and clarify the information reported on racetrack surveys, additional follow-up was required. Deloitte contacted each participating racetrack, primarily by phone, to discuss the information that was reported. This process was not initiated in any way to change or influence the information that was reported. It was conducted exclusively for the purpose of facilitating an understanding of exactly what revenues were being reflected in the participant's answers.

(3) Data acquisition and data cleansing

We received 47 raw completed surveys from race tracks; 14 from telephone interviews and 33 from completed electronic surveys. However, some of the telephone surveys were follow-up surveys from the same tracks that had completed electronic surveys, so the final number of completed unique surveys represented 41 tracks, including six from non-racing venues such as steeplechase events and state/county fair events. Removing these responses from the surveys resulted in 35 survey responses.

(4) *Imputation of missing data*

Imputing Employee Hours
As with the other survey instruments, a small number of survey respondents provided an employee count, but neglected to report the number of weeks and/or hours of those employees. We again used the simple average hours or weeks from the set of non-missing responses for each type of employee. The frequency of imputation for each question is provided in the table below:

Table A-8
Imputation of Employee / Volunteer Hours and Weeks

Variable	Average of Non-Missing Responses	# Non-Missing Responses	# Missing Responses	Fill Rate (%)
Part-Time Hours	23.31 hrs/week	29	1	3.3%
Part-Time Weeks	35.18 weeks	28	2	10.0%
Seasonal Weeks	N/A	34	0	0.0%

The employee counts were used to estimate total number of jobs in the industry. Hours and weeks were used to convert these employee participation counts into a full-time equivalent basis.

Imputing Employee Compensation

In seven instances, a survey respondent provided employee counts, but failed to answer the questions concerning annual employee compensation. Race tracks were asked to provide annual employee compensation expense directly.

To ensure predicting non-negative compensation values, we again imputed their responses using a multi-factor *Tobit* regression model. As explanatory variables, we used in the regression the number of Thoroughbred race days, Quarter Horse race days, and other breed race days (e.g., Standardbred) and the number of full-time, part-time, and seasonal employees. There were 28 survey responses used in the model, as shown in the table below:

Table A-9
Imputation of Employee Compensation

Variable	Total Responses	Responses with Employee Compensation	Responses with NULL Employee Compensation	% of Responses Imputed
Employee Compensation	35	28	7	20.0%

Imputing Data for Non-Reporting Race Tracks

The 35 responses received from racetracks would not have been enough information to provide state-specific economic and employment impacts for a number of states, so the survey information was supplemented with additional data collection. We obtained total handle reported for each of the 122 racetracks, using Equibase and ARCI statistical information for Thoroughbred and Quarter Horse facilities and the 2004 Trotting and Pacing Guide (published by the U.S. Trotting Association) for Standardbred tracks.

After analyzing the handle information for the non-reporting tracks, we determined that weighting the observed sample responses to national estimates would have misrepresented the national population of racetracks—the racetracks that did not respond to the survey were smaller tracks in general than those that did respond. However, both groups of tracks—those that reported and those that did not—reflected a range of small, medium, and large tracks. As such, we determined that we could obtain the best national and state-specific estimates by imputing the non-reporting tracks using survey responses from those that did respond.

We imputed revenue, expense, and employment information for 57 Equibase racetracks and 28 non-Equibase racetracks. We did this by using the observed relationship between the reported handle from each track and each revenue, expense, and employment survey response from the 35 reporting tracks. For example, we assumed that the relationship between reported handle and

admissions, concessions, parking, and programs revenue would be the same for non-reporting tracks as reporting tracks.

The nature of the relationship between any given revenue, expense, or employment (wages) category was extensively tested to provide the most accurate estimate for each item we imputed. As such, we used different imputation algorithms for each category, depending upon which method was most reasonable and provided the best "fit" to the observed survey responses. Table XI-4-3 summarizes the imputation algorithm used for each category:

Table A-10
Imputation Methods for Revenues and Expenses of Non-Reporting Racetracks

Item / Category	Method Used
Admissions, concessions, parking, and programs revenue	TOBIT
All other revenue	TOBIT
Veterinary services	TOBIT
Facilities maintenance	TOBIT
Equipment, vehicle and facility rental	TOBIT
All other business expenses (e.g., utilities, insurance, etc.)	TOBIT
Capital investment in equipment	TOBIT
Capital investment in land	TOBIT
Federal taxes	TOBIT
State taxes	TOBIT
Local taxes	TOBIT
Salary and wage expenses	OLS, No Constant
Total wagering[1] revenue	OLS, No Constant
# of Employees (total)	OLS
# of Employees (Full-time equivalent)	OLS

1 Total Wagering here represented.

In general, the fit characteristics of the models we employed for imputation were excellent, with highly significant coefficients and strong correlations.

(5) ***Weighting of Responses to National and State Estimates***

As mentioned above, the set of 122 racetracks we collected and imputed data for represented the full population of racetracks used extensively during the year for horse racing nationally. As such, we did not need to weight the responses up to arrive at national or state-specific totals.

When estimating economic and jobs impacts by breed, we allocated the total economic and jobs impact to each breed group (Thoroughbreds, Quarter Horses, and other breeds) as follows:

- For racetracks that responded to the survey, the share of each racetracks economic impact was equal to its share of wagering revenue on that breed—thus if a racetrack reported that 90% of its wagering revenue came from thoroughbred racing, then 90% of the employees and 90% of the economic impact generated from that racetrack was assigned to the Thoroughbred breed's impact.

- For racetracks that did not respond to the survey, but were included in the Equibase database, we allocated 89% of the racetrack's economic impact to Thoroughbreds, and 5.5% each to Quarter Horse and other breeds (primarily Standardbred in most states). These proportions were developed in consultation with Equibase officials and the Project Steering Committee.

- For racetracks that did not respond to the survey and also were not included in any of our primary databases, we assumed that all of the economic impact was attributable to other breeds.

E. Handling of Taxes

In estimating the total economic impact of the horse industry, we had to account for payments of taxes by horse industry participants. Taxes are deemed a "leakage" when estimating economic impacts, as the dollars paid in taxes do not induce spending or hiring in the private sector. In the horse owner/industry suppliers segment, employee compensation amounts are reduced by taxes to reflect the fact that employees of the horse industry spend only after-tax wages directly in the economy. As previously stated, profits are ignored for Horse owner/industry suppliers. In the Horse Show and Racing segments, we also reduced employee compensation amounts by estimated tax amounts. Profits from these segments are included, and profits are assumed to be distributed to owners, and then taxed at personal tax rates before being introduced into the economy to stimulate indirect and induced spending and economic activity.

We used a blended federal, state, and local personal income tax rate for each state, based on statistics from the Tax Foundation, and applied these rates when calculating indirect and induced economic activity.

F. Aggregation / Tiers of Production

Horse counts, economic impacts and employment estimates are also calculated by segment of the industry, by horse breed, and by the primary use of the horse. We calculate separate economic and employment effects nationally and by state for the following categories:

- By Breed (Thoroughbred, Quarter Horse, and Other Breeds).
- By Use (Racing, Showing, Recreation, and Other).

Breed, Use, and Breed-by-use splits can be directly calculated for the horse owner/industry supplier segment. As described above, we calculated for each respondent the share of that respondent's totals that relate to each breed, to each use, and to each breed and use combination. To generate a total for any given breed, use, or breed-and-use combination from the horse owner/industry supplier segment, we simply sum across all respondents the share of their totals for that breed, use, or breed-and-use combination.

Racetracks economic and employment impacts are all attributed to the Racing Use segment. As described in the Racing section above, the Racing segment's economic and employment impact totals were allocated across each breed segment based upon each track's share of wagering

revenue from each breed segment (tracks with predominantly Thoroughbred racing would be allocated predominantly to the Thoroughbred breed segment).

Horse Show economic and employment impacts are all attributed to the Showing Use segment. To allocate across the breed segments, we asked Horse Show survey respondents to provide the number of approved AQHA shows they managed and the number of other shows they managed. We allocated Horse Show impacts on a per-respondent basis according to their share of total shows managed that were AQHA approved and non-AQHA approved. We allocated to the Quarter Horse breed segment the share of a respondents totals equal to the share of the respondents total shows that were AQHA approved, and we allocated the balance of the survey respondent's totals to the Other breed segment.

G. Derivation of Economic Impacts

To calculate the overall economic impact of the horse industry we used the IMPLAN economic impact assessment modeling software. IMPLAN is a widely used input-output model of the U.S. economy to measure aggregate economic effects. In this study IMPLAN was used to calculate the economic impact generated by: 1) operating expenditures and 2) compensation to employees.

The total economic impact of operating expenditures by horse owners, racetracks and shows is defined as the sum of direct, indirect and induced effects. Direct expenditures were classified in various expense categories. For horse owners, for example, we used categories ranging from Feed, Bedding and Grooming supplies to expenditures on Equipment and Structures. These direct expenditures trigger incremental expenditures called indirect effects. As an example, the construction of a new building will require expenditures on building materials. These building materials themselves require additional expenditures on raw materials, and so on. The IMPLAN input-output model produces multipliers for 509 industries to summarize the chain of subsequent expenditures. In order to calculate the direct effects we first determined the industries that are represented within each expense category. The multiplier for each expense category was then calculated as the output-weighted average of the different industry output multipliers. For U.S. total calculations we used national output levels; for the individual state calculations we used state output levels. To estimate the indirect output effects we used the Type I industry output multipliers as calculated by the IMPLAN model. We similarly calculated induced effect multipliers for each expense category.

Induced effects are caused by the additional expenditures received by the employees at each stage in the chain of subsequent expenditures caused by the initial direct expenditures. To estimate the induced output effects we used the Type N industry output multipliers as calculated by the IMPLAN model. To calculate the impact of these expenditures on employment we used the employment multipliers as calculated by the IMPLAN model in a similar fashion.

To estimate the additional output impact caused by the direct employee compensation we calculated a weighted average output multiplier on the distribution of consumption expenditures across all IMPLAN industries. We similarly calculated the employment effect associated with direct employee compensation.

G. Confidence Intervals on Horse Counts

A key part of this report is the calculation of the population of horses for the entire U.S. and for each state. As described above, these estimates are based on the responses provided to the horse owner/industry supplier survey and the corresponding sample weights. Table A-11 provides the 95% confidence intervals for our national and state estimates. For example, the 95% confidence interval around our estimate of 9,221,541 horses is ± 355,080 horses.

Table A-11
Confidence Intervals on Horse Count Estimates

State	Estimated Population	95% Confidence Interval Lower Bound	Upper Bound
*US	9,221,541	8,866,461	9,576,621
AK	11,561	9,696	13,425
AL	142,521	115,346	169,695
AR	173,744	138,560	208,928
AZ	175,877	151,219	200,536
CA	707,919	593,318	822,520
CO	246,980	208,118	285,842
CT	55,489	16,172	94,807
DC	35	(7)	77
DE	9,690	6,681	12,699
FL	495,935	340,478	651,393
GA	176,808	145,645	207,971
HI	10,139	5,717	14,562
IA	203,566	152,714	254,417
ID	151,995	127,858	176,132
IL	187,593	144,416	230,771
IN	205,031	158,902	251,161
KS	174,763	148,440	201,086
KY	322,794	251,667	393,921
LA	161,495	126,586	196,405
MA	39,242	32,723	45,761
MD	154,522	99,507	209,537
ME	37,447	22,795	52,098
MI	233,367	188,843	277,890
MN	181,902	152,424	211,380
MO	281,966	230,045	333,887
MS	108,628	87,879	129,378
MT	129,172	94,888	163,456
NC	258,506	194,642	322,369
ND	59,877	46,122	73,632
NE	148,627	109,582	187,672
NH	15,986	13,852	18,121
NJ	85,568	64,998	106,139
NM	139,364	109,451	169,278
NV	59,426	50,233	68,620
NY	203,464	173,498	233,430

		95% Confidence Interval	
OH	308,382	245,658	371,106
OK	329,084	276,943	381,226
OR	169,459	129,875	209,042
PA	257,347	202,261	312,433
RI	3,716	3,054	4,378
SC	87,782	77,251	98,314
SD	117,688	87,395	147,981
TN	206,890	169,925	243,854
TX	978,169	819,103	1,137,236
UT	119,260	88,509	150,011
VA	244,832	172,749	316,916
VT	22,242	17,352	27,131
WA	248,886	211,307	286,464
WI	176,670	154,944	198,395
WV	90,940	48,513	133,366
WY	109,193	83,295	135,091

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