An Evaluation of Horse Racing Revenues and Factors Affecting It*

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Summary: The present study aimed to investigate periodic chances in horse racing revenues between the 2002 and 2011 with the real values of 2012 in the world's top 10 countries, and to estimate the determinants of Turkey's horse racing revenues. The present study was based on data obtained from International Federation of Horce Racing Authorities and Turkish Jockey Club. Revenue indices were calculated using the 2002 as the base year. Stepwise regression procedures were used to estimate the determinants of horse racing revenues. According to the average of the top 10 countries per start and per horse prize money indices with real values were found 163 and 172, respectively; they were found 95 and 78 for Turkey, respectively. Variables included the regression models were found to be statistically significant predictors and the models explained 91% (p<0.001) and 22% (p<0.05) of the total variance for prize money payment and betting revenue, respectively. There is a need for finding alternative resources for horse racing revenues, which show a downward tendency especially in United States, United Kingdom and Turkey. In order to ensure long–term economic sustainability in the Turkish horse racing industry, total number of starts could be increased, and tax rates could be reduced.

Key Words: Economics, horse racing, index, model, revenu

At Yarışı Gelirlerinin Değerlendirilmesi ve Ona Etkili Faktörler

Özet: Bu çalışmada dünyanın ilk 10 ülkesinde 2002 ve 2011 yılları arasında at yarışı gelirlerinde meydana gelen değişimin 2012 reel değerleriyle incelenmesi ve Türkiye'de at yarış gelirleri üzerindeki belirleyicilerin tahmin edilmesi amaçlanmıştır. İhtiyaç duyulan veriler Uluslararası At Yarış Otoriteleri Federasyonu ve Türkiye Jokey Kulübünden temin edilmiştir. Gelir endeksleri hesaplanırken 2002 yılı temel yıl olarak seçilmiştir. At yarış gelirleri üzerindeki belirleyicilerin tahmininde adım adım seçme ve eleme regresyon prosedürü kullanılmıştır. Reel değerlerle start başına ve at başına para ödülü endeksleri ilk 10 ülkenin ortalamasına göre sırasıyla 163 ve 172, Türkiye için ise sırasıyla 95 ve 78 olarak belirlenmiştir. Regresyon modeline dahil olan değişkenler istatistiksel olarak anlamlı bulunmuş ve para ödülü ve bahis gelirlerindeki toplam varyansın sırasıyla %91 (p<0.001) ve %22 'sini (p<.05) açıklamışlardır. Özellikle Anerike Birleşik Devletleri, İngiltere ve Türkiye'de aşağı yönlü bir trend izleyen at yarışı gelirleri için alternatif kaynakların bulunmasına ihtiyaç duyulmaktadır. Türk at yarışı endüstrisinde uzun dönemli ekonomik sürdürülebilirliğin sağlanabilmesi için toplam start sayısı artırılabilir ve vergi oranları azaltılabilir.

Anahtar Kelimeler: At yarışı, ekonomi, endeks, gelir, model

Introduction

Horses, which were used for agricultural, transport and military purposes for thousands of years, are mostly used for racing and sporting purposes today, due to the increase in agricultural mechanization, proliferation of motor vehicles (18, 21, 33) and the densification of population in the urban areas. They are currently more and more used as companion animals (8). It is reported that horse racing, which is one of the oldest sports, dates back to Turkish tribes in central Asia and is first officially held in the United Kingdom (UK) and the United States (US) in 17th century (6). Horse racing in today's context in Turkey, which started in İzmir in 1856 in the Ottoman period, had continued until Firs World War. The horse racing in the Republic period, which began in 1927, has been continue in eight different provinces (25). Arabian and Thoroughbred types are being increasingly used for racing and competitive events both locally and internationally (15). Some of the breeding statistics about throughbred horses, obtained from International Federation of

Horce Racing Authorities (IFHA), in many part of the world including Turkey are given in Figure 1.

Figure 1. Some of the breeding statistics about thoroughbred horses in in many part of the world including Turkey for the year 2012 (Figure 1 was created by the author)

The horse racing industry provides a significant employment and a valuable opportunity to various professionals, including veterinarians, trainers, jockeys, ovners, and stud breeders. Moreover, it constitutes an important financial resource for the state budget with the corporate deductions and taxes that make a siginificant contribution to government revenue. Furthermore, Hoye (15) emphasizes that in return the racing industry receives revenue that is used for race prizemonies, subsidies for breeding programmes, racecourse development, race stewarding services and general funding of racing activities. It is reported that horse racing industry has reached €120 billion in the world, direct employment was provided to 126.000 people and indirect employment was provided to 400.000 people, only by Thoroughbred horse breeding (7). Horseracing is one of the biggest industries in the UK, estimated to be worth £4 billion to the economy, in addition to generating an additional £5 billion in gambling turnover (30). Gordon (14) reported that if the value of volunteer labour is included as in social national accounts the contribution of the industry to the Australian economy is over $8 billion a year. Horse racing and breeding are important economic and social events for Turkey, just as other developed countries. Köseman and Özbeyaz (19) indicated that especially breeding has been recognized as an important activity in Turkey, and after than authorities have built stud farms and stallion centers for Thoroughbreds. It was reported that 46.419 horse races (grass and sand) carried out between the year of 1996 and 2011 in eight different city, and more than fifty percent of them performed three biggest city of the Turkey (2). One and half billion US dollar total revenues for the year of 2011 clearly demonstrated the economic importance of the horse races for Turkey (16).

Factors such as available taxes, international buyers, incentive schemes (17), number of horses, number of racetracks, number of racing day, number of starts (5, 26), current online sports betting (20), economic development and unemployment (3) have a significant impact on national horse racing revenues.

The present study aimed to investigate periodic chances in horse racing revenues between the 2002 and 2011 with the real values of 2012 in the world's top 10 countries, and to estimate the determinants of Turkey's horse racing revenues (between the 1997 and 2011) with multiple linear regression (MLR) analysis. It is thought that the results of the study will present valuable feedback and suggestions to the shareholders of the industry and the decision makers.

Materials and Methods

Required data were obtained from IFHA and Turkish Jockey Club (TJC). The technical and financial data which were sent to IFHA between the 2002 and 2011 by the 61 member countries were used in determining the betting revenues, prize money distributed and taxes collected in the racing. The technical and financial data regarding the Thoroughbred and Arabian racing between the 1997 and 2011 in Turkey were obtained from official database of the TJC and IFHA.

The total betting revenue and prize money payments of the 61 member countries, which were submitted their data to the IFHA, between the 2002 and 2011 were carefully examined in order to determine top 10 countries in the world. Due to all of the betting revenues and prize money payments are avaliable in Euro in IFHA's data base, it was converted to U.S.Dollars using European Central Bank exchange rates. Thereafter, revenues and prize money payments of each country were separated from the effect of inflation with the help of Consumer Price Index of the respective country using Microsoft Excel 2010 and were converted to the real values of 2012 (10). Each country's total, per horse and per start prize money amounts and indices were calculated and afterwards, 2002 was chosen as the base year for the index to understand clearly the direction and level of the indices.

In this study, MLR was used to examine the influence of determinants on Turkey's horse racing revenues. MLR is one of the most widely used applied statistical analyses. It is a general system for examining the relationship of a collection of independent (predictor) variables to a single dependent variable (4). In this study, stepwise procedures were used and two different models were constructed. Stepwise regression procedure has been used to iden-

tify only those predictive attributes that significantly improved the regression at given level. The method is explained as a combination of forward enter and backward elimination procedures (31). The procedure begins with the choosing an equation containing the single best independent variable and then attempts to build up with subsequent additions of variables as long as these additions are worthwhile (9). Candidate variables and final variables for the current study are presented in Table 1.

The multiple regression model can be formulated as follows,

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots \ldots + \beta k X k + \mathcal{E}$$

Where: Y is the dependant variable, X is the independent or regressor variable, k is the number of independent variables, β is the constant and subsequent β are the coefficients, $\mathcal{E}$ is a term that includes the effects of unmodelled sources of variability that affect the dependant variable (1).

Table 1. Candidate variables and final variables for the constructed regression models

| Microorganism | Growth medium | Incubation | | |
		Temperature, °C	Time, h	Conditions
Total aerobic mesophilic bacteria	Plate Count Agar (Oxoid CM 325)	30	48-72	Aerobic
Enterobacteriaceae	Violet Red Bile Glucose Agar (Oxoid CM 485)	37	24-48	Aerobic
Coliform bacteria	Violet Red Bile Lactose Agar (Oxoid CM 107)	30	24-48	Anaerobic
Staphylococci and micrococci	Baird Parker Agar (BB-DM 905) Egg Yolk Telluride Emulsion(Oxoid R054)	37	24-48	Aerobic
Coagulase positive staphylococci	Brain Heart Infusion Broth (Oxoid CM 375) Coagulase Rabbit Plasma With EDTA (Oxoid R 21060)	37	24	Aerobic
Psychrophilic bacteria	Plate Count Agar (Oxoid CM 325)	4	168-240	Aerobic
Yeast/Mold	Rose Bengal Chloramphenicol Selective Agar (Oxoid CM 0549), Chloramphenicol Selective	25	120	Aerobic

In the present study, linear relationship between dependent and each independent variable included the regression model was examined by using scatter diagrams. Autocorrelation and multicollinearity were examined by Durbin-Watson statistics and Variance Inflation Factors (VIF), respectively. In this study, some of the candidate variables (number of horses, number of racing day, online sports betting revenues except horse racing, gross national income per capita, and annual inflation rates) were excluded the models due to multicollinearity. In order to reduce the influence of extreme values and make the distribution closer to the normal distribution, logarithmic transformation was applied to the data, such as Turkey's annual prize money payment and revenue for horse racing and Gross National Income per capita (SPSS version 15.0). Thus, the final dependent and independent variables are as follows:

$$LnY_1 = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \mathcal{E}$$
(1st regression formula)

$$LnY_2 = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \mathcal{E}$$
(2nd regression formula)

where: Y_1 is the Turkey's annual betting revenues for horse racing (United States Dollar–$), Y_2 is the

Turkey's annual prize money payment for horse racing (United States Dollar–$), X_1 is the total mumber of starts at races (number/year), X_2 is the tax rates related to horse racing in Turkey (%), X_3 is the Turkey's Gross National Income per capita (United States Dollar–$), and X_4 is the Turkey's betting revenues for horse racing (United States Dollar–$).

Results

The total betting revenue and prize money of the 61 members of IFHA, which submitted their data to the institution in 2011, were nearly $82 billion and $4 billion, respectively. Taking into account of the 61 member contries' total revenue, share of the top 10 countries' betting revenue and prize money were determined as 81% and 94%, respectively.

The top 10 countries with the highest rates of betting turnover between the 2002 and 2011 with the real prices of 2012 can be seen at Table 2. The countries are written in ascending order, with Japan being the first country and Turkey being the last. In 2011, the largest decrease in the index (2002 = 100 points) occurred in the US with 40 points and the largest increase occurred in Ireland with 332 points. In Turkey, it can be seen that the betting revenue index was ranked 10th, after Italy and it dropped to 94 points in 2011. In Table 2, also the highest

prize moneys distributed in the horse racing worldwide regarding the periodic averages between the 2002 and 2011 were classified. In 2011, the largest decrease in the index (2002 = 100 points) occurred in US with 40 points while the largest increase occurred in South Korea with 636 points.

In the top 10 countries, the prize money distributed in 2011 varied between 2-11%, the tax deductions varied between 1-28% and the highest taxes were applied in Turkey with 28%. The redistributed, distributed, collected and taxed rates of the top 10 countries according to the periodic averages

Table 2. Horse race betting revenues and prize money payments of the top10 countries with the real values of 2012

Countries		Ranking of the top10 countries for the years of 2002–2011 (1.000.000 $/year)									
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Japan	B	29.936	24.570	24.681	20.969	26.400	27.699	33.511	31.495	33.727	33.581
	P	1.496	1.228	1.234	1.048	1.320	1.384	1.675	1.574	2.023	2.014
United Kingdom	B	16.122	17.934	21.085	–	24.382	–	–	–	10.944	–
	P	161	179	210	–	243	–	–	–	109	–
United States	B	27.417	17.061	16.379	15.058	16.752	16.274	14.535	13.170	11.956	10.961
	P	2.193	1.364	1.310	1.204	1.340	1.301	1.162	1.053	956	876
Australia	B	9.287	10.607	10.651	10.151	10.575	9.235	9.368	13.649	15.406	14.587
	P	557	636	639	609	317	277	281	409	462	583
France	B	8.240	8.200	9.431	8.294	12.008	14.454	13.924	14.440	13.165	13.052
	P	659	656	754	663	960	1.156	1.113	1.155	789	1.305
Hong-Kong	B	9.334	8.502	7.843	7.363	10.015	–	9.440	10.631	11.086	11.340
	P	186	170	156	147	200	–	188	212	221	226
South Korea	B	6.108	4.773	4.470	4.302	6.491	8.806	6.301	6.354	6.279	5.972
	P	122	95	89	258	389	485	126	508	627	776
Ireland	B	1.142	2.453	2.994	2.888	5.099	5.024	5.355	4.888	4.521	3.793
	P	22	49	59	57	101	120	107	97	90	75
Italy	B	–	–	3.583	2.890	4.332	–	3.426	3.071	2.440	1.823
	P	–	–	358	289	433	–	342	307	341	255
Turkey	B	1.649	1.820	1.789	1.689	1.696	2.362	1.868	1.723	1.702	1.546
	P	115	127	125	118	118	165	186	189	153	139
Top 10 Average	B	10.346	8.665	8.182	8.178	9.337	12.019	10.859	11.047	10.028	10.736
	P	612	500	493	488	542	611	576	612	577	694

B: Betting revenues; P: Prize money payments.

between the 2002 and 2011 were 77%, 6%, 7% and 10%, respectively. According to the periodic averages between the 2002 and 2011, the highest payment from total betting revenues was made in UK with 89%, Japan was first with 11% regarding the deductions by the betting institution and Turkey was first with 33% regarding the tax deductions.

Total, per horse and per start prize money of the top 10 countries with the real prize of 2012, were found to be $558.607.997, $71.450 and $11.448,

respectively. According to the 10-year averages, the highest and lowest prize money per horse was distributed in Hong Kong with $168.121 and Australia (AU) with $15.315, respectively.

Prize money index changes with the real values of 2012 according to average of the top 10 countries and Turkey are summarized in Figure 2. In the top 10 countries, the average prize money has been following a fluctuating course in the 10-year period. On the other hand a steady upward trend have
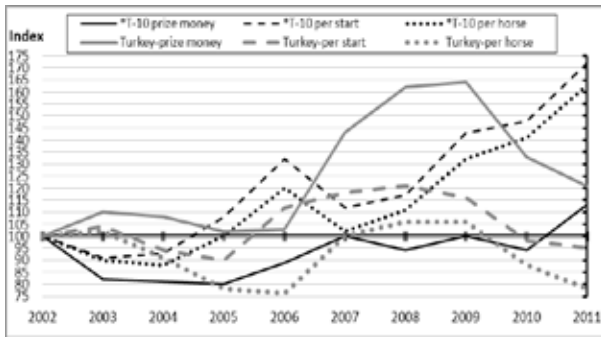
Figure 2. Prize money index change in horse racing with the real values of 2012 according to average of the top 10 countries and Turkey. ˣAnnual index values of the Top 10 countries

been observed in per start and per horse prize money since 2007 and it reached to 163 and 172 points in the year 2011, respectively. In Turkey, the averages per start and per horse prize money payments started to decrease after 2008 and were 95 and 78 points in the year 2011, respectively. The

annual real prize money distributed in the horseracing between the 1997 and 2011 in Turkey followed a fluctuating course and the highest prize money of the Thoroughbred and Arabian racing were distributed in 2000, 2001 and 1999 respectively, for both breeds (Table 3).

Correlation matrix of the variables included the regression models are presented in Table 4. Results of the MLR analysis can be seen at Table 6 and 7. No any serious autocorrelation (see Durbin-Watson statistics) and multicollinearity (see VIF statistics) problems were found. As a result of this study, MLR revealed that variables are significant predictors. Models explained 91% (p<0.001) and 22% (p<0.05) of the total variance for prize money payment and betting revenue, respectively. Final regression equations can be written as follows:

Horse racing betting revenue ($/year) = 7.133 + 0.527 (number of strats)

Horse racing prize money payment ($/year) = 1.078 + 0.797 (betting revenue) – 0.438 (tax rate)

Table 3. The prize money indices of the Thoroughbred and Arabian racing in Turkey between the 1997 and 2011 with the real values of 2012

Years	Total prize indices (USD–$)		Per horse prize indices (USD–$)		Per start prize indices (USD–$)	
	Thoroughbred	Arabian	Thoroughbred	Arabian	Thoroughbred	Arabian
1997	100	100	100	100	100	100
1998	186	187	168	182	173	187
1999	228	214	176	197	178	201
2000	293	267	197	216	194	217
2001	245	221	134	153	142	165
2002	223	206	110	127	114	143
2003	226	209	104	116	108	140
2004	183	167	77	84	80	104
2005	148	134	57	60	64	85
2006	146	131	55	58	61	81
2007	163	145	57	61	67	85
2008	199	173	67	66	75	91
2009	198	161	66	58	70	81
2010	163	135	56	51	62	69
2011	168	142	57	52	62	68
	($76.340.373)	($62.855.633)	($23.271)	($24.506)	($2.825)	($2.318)

Table 4. Correlation matrix of the variables included the regression models

Variables		(I)	(II)	(III)	(IV)	(V)
TR-Bet money	(I)	1				
Prize money payment	(II)	0.859**	1			
Number of start	(III)	0.527*	0.740**	1		
Tax rates	(IV)	-0.141	-0.550*	-0.545*	1	
GNI per capita	(V)	0.245	0.549*	0.789**	-0.619*	1

*$p < 0.05$; **$p < 0.01$

Table 5. Descriptive statistics related to independent variables included the models

Variables	N	Mean	Std. Dev.
Betting revenues ($)	15	1.708.736 288	355.925.526
Number of starts	15	32 988	8 731
Tax rates (%)	15	34.13	4.26
GNI per capita ($)	15	6 445	2 739

Table 6. Result of the regression analysis for horse racing betting moneys

Model	B	Adj.R^2	F	Sig F	β	p	*Durbin-Watson*	VIF
Model–1		0.222.	4.996	0.044			1.056	
Constant	7.133					0.000		
Number of starts					0.527	0.044		1.000

Table 7. Results of regression analysis for horse racing prize money payments

Model	B	Adj.R^2	F	Sig F	β	p	*Durbin-Watson*	VIF
Model–1		0.717	36.529	0.000				
Constant	-1.157					0.464		
TR-Bet money					0.859	0.000		1.000
Model–2		0.913	74.279	0.000			2.002	
Constant	1.078					0.276		
TR-Bet money					0.797	0.000		1.020
Taxes					-0.438	0.000		1.020

Discussion and Conclusion

Results of the present study indicated that there was no considerable change regarding top10 countries' real betting revenues and price money payments from 2002 to 2011. However, steady upward trend have been observed in top10 countries' per start and per horse prize money since 2007. Japan has the highest horseracing turnover in the world over the last 10 years, and this condition will most likely continue many more years. It can be stated that UK and US have negatively affected the average betting revenues and prize money payments of top 10 countries' over the last 10 years. It is thought that in order to ensure financial sustainability of horseracing especially in US, UK, Italy, Ireland and Turkey, which show a downward tendency, alternative resources, should be found for the horse racing revenues. In the event that this unfavourable economic trend continues in the following years, most likely the rate of employment will be negatively affected in these countries.

The real prize money distributed in Turkey was at peak level during 1999, 2000 and 2001, which also involved the period of financial crisis (see Table 3). It can be said that the situation is one of the possible and expected outcomes of financial crisis. According to Albers (3) gambling is correlated with economic development and unemployment and lower formal education increases participation.

The results of MLR revealed that number of starts, taxes and betting revenues are significant predictors. Models explained 91% and 22% of the total variance for prize money payment and betting revenue, respectively (see Tables 6 and 7). Some important factors such as number of horses, number of racing day, online sports betting revenues except horse racing, gross national income per capita, and annual inflation rates were excluded the models due to multicollinearity. Our models may be better explained by considering socio-economical characteristics of the horse racing lowers and followers.

While the racing organizations are held by a single institution in some countries including UK, South Korea and Turkey, there are 374, 138 and 137 institutions in AU, US and FR respectively (16). In Turkey, the authorization to organize horse racing is delegated to TJC with the law No. 6132 until 2013. The organization, control and inspection of horseracing are performed by The Board of High Stewards by the Ministry of Food, Agriculture and Livestock (27). Professional horseracing can be broadly divided into flat racing and jump racing (30). Altough developed countries organize jumping and trotting racing as well as flat racing, only flat horse races are organized in Turkey, within official race programmes (26). For instance, there have been 49.998, 15.619 and 11.071 trotting racing;

159, 95 and 2.210 jumping racing in US, France and AU, respectively (16). With its $9.890 gross national product (GNP) in 2010 (32), Turkey is below the average of the top 9 countries, which have the highest horse race revenues, with $39.057. Low income levels can affect the national competitive goals and race revenues negatively. Despite the above-mentioned problems in Turkey, the upward tendency of the number of horses, registered jockeys and trainers is continuing (26). It is thought that the increase in GNP, urbanization rate and the youth population (28) can have a positive influence on the industry.

Governments provide the regulatory environment to enable racing activities to take place (15) and tax policy is very important in terms of sectoral activities. Turkey is now the country that collects the largest amount of tax from horseracing. According to Act No. 5602 "on the Tax, Funds and Shares Collected from Gambling", 7% tax is collected from horseracing. Furthermore, with the addition of other tax items (private consumption tax, value added tax etc.), the total amount of tax which is collected is 33%, compared to the average of 2002-2010. Revenue of $380 million was generated from gambling games that was 0.23% of the total tax revenue of the Turkey in 2010 (22). For promoting the attention and participation to the racing, the amount of taxes and deductions can be reduced to a level less than 10%, which is the developed countries level. This additional resource should be transferred to relevant stakeholders such as owners, breeders, trainers and jockeys.

There is a fact that horseracing financial sustainability should not be entirely depend on betting revenues both developed and developing countries. Forrest (12) indicated that betting carries risks for sports and authorities do not want to be completely depending on betting revenues due to most likely corruption. Although researchers conclude that bettors are risk lovers it is suggest that they are skewness lovers, not risk lovers (13). MacManus and Graham (20) indicated that breeding and racing is linked so closely with gambling that all aspects of this leisure activity are threatened by the cessation of gambling (enforcement of regulation as shown in China and New York) or by the inability of governments and most recently with the emergence of internet gambling. Recently, there are rapid increases in the number and types of online betting, internet and illegal gambling in many countries, considerably attracting consumer attention. It is stated that the illegal gambling has negatively affected the interest in horseracing and the combat with illegal gambling should be enhanced in order to ensure the financial sustainability of horse racing (7). Turkey issued a "Regulation on Online Betting" in 2006 for following and controlling the illegal online betting. It is stated at Article 5 of this Regulation

"no betting businesses can be established, organized or played online" (29).

It is clear that horse diseases have a considerable economic impact on both industry and government. Financial losses in the Australian harness racing industry due to the equine influenza outbreak, limited and disrupted horse racing related economic activities, were estimated to be $23.816.635 (23). Taking continued growth in international trade and travel into consideration, control of notifiable diseases seems to be very important issue (24). If importing horses could bring any disease to the local population, a disease outbreak could result in cancellation of an important international event (10). In 2007, equine influenza outbreak caused the cancellation of 261 Standardbred race meetings in Australia (23). It is indicated that control of African horse sickness, glanders, dourine, equine infectious anemia, vesicular stomatitis, equine encephalomyelitis, anthrax and rabies appears to have been largely successful in Turkey, and there have been no reported cases of any World Organization of Animal Health-OIE List A diseases for many years. It can be said that if the control programs against equine infections can be effectively maintained in Turkey, it will provide more secure environment for international racing events (33). Taking the above into consideration, veterinarians can be considered an important part of the industry.

Periodic changes in horse racing revenues needs to be carefully monitored by responsible authorities in order to maintain economic sustainability. In order to gain enough support from horse racing lovers, total number of starts must be increased, and taxes must be reduced as indicated by regression models. Better models may be obtained by selecting characteristics of the horseracing lovers. Further comprehensive studies are needed to evaluate the influence of socio-demografic and socio-economic determinants on horse racing revenues. In the short term there is a need for increasing the combat against illegal betting for ensuring the financial sustainability of horse racing in the world, while in the long term there is a need for finding alternative resources for horse racing revenues, which show a downward tendency especially in US, UK and Turkey. By being in the top 10 regarding the horse racing revenues, Turkey has shown that it is a global actor.

References

1. Agha SR, and Alnahal MJ.Neural network and multiple linear regression to predict school children dimensions for ergonomic school furniture design. Appl Ergon 2012; 43:979-84.

2. Akyüz İ. Geçmişten günümüze Şanlıurfa hipodromu at yarışları ile ilgili bir araştırma. YYU Veteriner Fakultesi Dergisi 2012; 23:159-66.

3. Albers N. Gambling market and individual patterns of gambling in Germany. J Gambl Stud 1997; 13:125-44.

4. Aiken LS, West SG, Pitts SC. Multiple linear regressions. In, Handbook of Psychology. 2003; 19: 481-507. Wiley Online Library, New York, USA.

5. Ali MM, Thalheimer R. Transportation costs and product demand: wagering on parimutuel horse racing. Appl Econ 1997; 29: 529-42.

6. Anonymous. Horse racing history. http://www. equine world.co.uk/horse_sports/horse_ racing_history.asp#.UrRWB9JdWE4; Accessed: 21.02.2012

7. Anonymous. Horse breeding in the word economy. International Seminar. Sheraton, Ankara, Turkey. http://www.tjk.org/; Accessed: 04.03.2013

8. Digard JP. Un animal interme´diaire: le cheval. In, Les francais et leurs animaux, Fayard, Paris, 1999; pp. 51-70.

9. Draper NR, Smith, H. Selecting the "Best" Regression Equation, in Applied Regression Analysis, Third Edition, John Wiley & Sons, Inc., Hoboken, NJ, USA. 1998; doi: 10.1002/9781118625590.ch15

10. Ellis P, Watkins KL. International movement of athletic horses – quarantine and regulatory controls. In, Equine sports medicine and surgery, Elsevier, Amsterdam. 2004; pp.1227-38,

11. European Central Bank. Statistics. http://www. ecb.int/stats/html/index.en.html; Accessed: 17.02.2012

12. Forrest D. Sport and gambling. Oxford Rev Econ Pol 2003; 19, 598-611.

13. Golec J, Tamarkin M. Bettors love skewness, not risk, at the horse track. J Pol Econ 1998; 106: 205-25.

14. Gordon J. The horse industry contributing to the Australian economy. A report of The Rural Indisturies Research and Development Corporation. In, RIRDC Publication No 01/083, Canberra, Australia, Science 2013; 33:1021-30.

15. Hoye R. Governance reform in Australian horse racing. Managing Leisure 2007;11:129-38.

16. International Federation of Horseracing Authorities (IFHA). Numerical and financial statistics.http://www.ifhaonline.org/wageringDisplay.asp?section=4&country=66; Accessed: 26.07.2013

17. Jackson MA, Vizard AL, Anderson GA, Clarke AF, Whitton RC. Association between the purchase price of thoroughbred yearlings and their performance during the 2- and 3-year-old racing seasons. Aust Vet J 2011; 89: 151-58.

18. Kırmızıbayrak T, Aksoy AR, Tilki M, Saatçi M. An investigation on morphological characteristics of Turkish native horses in Kars region. Kafkas Univ Vet Fak Derg 2004; 10: 69-72.

19. Köseman A, Özbeyaz C. Some phenotypic and genetic parameters of racing performance in Arabian horses. Ankara Univ Vet Fak 2009; 56: 219-24.

20. McManus P, Graham R. Horse racing and gambling: comparison attitudes and preferences of racetrack patrons and residents of Sydney, Australia. Leisure Studies 2012; DOI:10.1080/02614367.2012.748088.

21. Paksoy Y, Ünal N. The factors affecting horse racing performance. Lalahan Hay Arast Enst Derg 2010; 50: 91-101.

22. Revenue Administration of Turkey. Tax statistics between 2006 and 2010. http://www.gib.gov.tr/index.php?id=253; Accessed: 12.05.2013

23. Smyth GB, Dagley K, Tainsh J. Insights into the economic consequences of the 2007 equine influenza outbreak in Australia. Aust Vet J 2011; 89: 151-8.

24. Timoney PJ. The increasing significance of international trade in equids and its influence on the spread of infectious diseases. Ann New York Acd Sci 2006; DOI: 10.1111/j.1749-6632.2000.tb05274.x

25. Turkish Jockey Club. History. http://www.tjk.org/TR/Kurumsal/Static/Page/Tarihce. Accessed: 11.04.2012.

26. Turkish Jockey Club. Statistics. http://www.tjk.org/ ; Accessed: 10.03.2013

27. Turkish Official Newspaper. Law about horse racing. No. 8458, dated 10.07.1953. http://www.resmigazete.gov.tr/default.aspx; Accessed: 11.12.2011

28. Turkey Statistical Institute. Turkey's statistical yearbook. First Edition. Ankara: Turkish Statistical Institute Press, 2011; pp.366-69.

29. Turkish Official Newspaper. Regulation for online games of chance No. 26108. http://www.resmigazete.gov.tr/default.aspx; Accessed: 09.03.2012

30. Turner M, Balendra G, McCrory P. Payments to injured professional jockeys in British horse racing (1996 -2006). Br J Sports Med 2008; 42: 763-66.

31. Qiu Y, Fu B, Wang J, Chen L, Meng Q, Zhang Y. Spatial prediction of soil moisture content using multiple-linear regressions in a gully catchment of the Loess Plateau, China. J Arid Environ 2010; 74: 208-20.

32. World Bank. Data, indicators. GNI per capita, atlas method. http://www.worldbank.org/; Accessed: 15.08.2012

33. Yilmaz O, Wilson RT. The domestic livestock resources of Turkey: occurrence and control of diseases of horses, donkeys and mules. J Equine Vet Sci 2013; 33: 1021-30.

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