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Abstract. This paper examines the lottery sales of 99 countries by type of product in order to analyze the socio-economic and demographic features that help to explain gambling consumption around the world. With a panel data analysis covering 13 years, this study explains the variation of a country's per-capita lottery sales in general and by type of game: lotto, numbers, keno, toto, draw and instant. This paper found that the richer countries spend more than the poorer countries and the income elasticity of the demand for lottery products is greater than one. So, we may assert that there is an implicit progressivity tax in games when we consider countries rather than households. Several studies have also revealed an inverse relationship between education and the consumption of lottery products. This paper confirms this hypothesis for lotteries in general, but not for the specific lottery products.

***Key words**:* Gambling. Lotteries. Religiosity. Education. Culture. Age. Panel Data.

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I. Introduction

It is fair to state that humanity has an age-old fascination and passion for gambling. Due to the negative social consequences that might arise from gambling, various countries have, at some time in their history, forbidden this activity. Such a measure, however, invariably led to the increase of illegal gambling and crime. The only way that countries found to counteract these tendencies was to legalize gaming, together with the application of strong regulation. Nowadays, gambling is deemed acceptable in most countries, on condition that it is adequately and appropriately regulated.

In 2006, at least 200 countries and states around the world organized lotteries, including those countries that run several lotteries. (see La Fleurs web site). Since World War II, there has been a growing consumption of government-sponsored lotteries and in 2006, global lottery sales reached almost US$202.6 billion. The world's largest Lottery in 2006 was the Italian Lottomatica, which achieved sales of US$14.2 billion.

In an era of globalization, populations remain distinguished from each other by characteristics such as culture, education and history, which bring about different behavior concerning individuals' expectations, ambitions, needs and the consumption of products. However, the study of the behavior of lottery-players can teach us about our common aspirations, beliefs and emotions and give us some insights into ways to perfect the products and services offered to different consumers throughout the world.

The main purpose of this study is to analyze, historically, the determinants of the expenditure on the diverse types of lottery products for consumers of different nationalities. We identify the factors influencing people's enthusiasm for gambling across countries. The wealth status of the country, age and gender distribution and religion are some of the relevant factors examined. With a panel data analysis covering 13 years, this study uses macroeconomic data to explain the variation of a country's per-capita lottery sales, by type of product.

The paper is organized as follows. The second section presents the theoretical approach and a review of the literature. The third section presents the econometric model and describes the empirical estimation. The fourth section explains the empirical findings. The final section considers the study's implications and presents our concluding remarks.

II.Theoretical Approaches and Literature Review

Investigating the reasons why people gamble in general, or play lotteries in particular, has elicited many different explanations, ranging from rational and irrational arguments to psychological needs or social inclusion models. A socio-economic analysis of lottery playing should seek to answer some of the more common questions in relation to lottery-consumption behavior. Does income alter participation levels? Do men play more than women? Are Catholics more likely to play than Protestants? Do Blacks and Hispanics play more than Whites? Do middle-aged adults play more than youngsters and the elderly? Is unemployment correlated with more expenditure on lotteries? Is it a fact that lottery playing decreases with more educational attainment? Do less educated people play more because they are not aware of the odds against winning? Are lotteries regressive, i.e. that lower-income households spend a higher percentage of their income on lotteries? Do people buy lottery tickets for fun, or do they simply lack access to relevant information? In this section, we will attempt to address some of the more common theoretical expressions dealing with this subject.

The question posed in the title to this paper presupposes a kind of perplexity. If we question the motives leading people to gamble, it is because gambling does not seem to be a particularly wise activity for informed and rational individuals. If one is well aware of the odds involved in lottery playing, he/she may be expected to simply maintain a distance from such activities and find a more rewarding way to dispose of the funds. In every single lottery

played around the world, the costs of playing exceed the rewards derived from the prizes on offer. So, one of the first explanations we come across that justify lottery involvement is the irrationality of gamblers, either because they are unable to calculate the probabilities of winning or because their irrationality is rooted in mechanisms that diminish the possibility of a wise move or an intelligent choice. Many informed actors play because they are trapped in several types of gambling fallacies, like underestimating the costs, or overestimating the probability of winning, or more commonly, thinking that maintaining a rigid strategy of repeating a set of chosen numbers on every ticket will increase the odds in favor of their winning. Irrationality can also manifest itself in the adherence to superstitious routines. Many participants believe that they have a system that can positively influence the odds, giving them a decisive advantage over the others. Hope, superstitions and belief in signs and omens are common across different cultures, as Ariyabuddhiphongs & Chanchalermporn (2007) have demonstrated.

A second set of explanations advance cognitive reasons for playing that complement the irrationality hypothesis. Gambling activities are a fertile ground for the exercise of counterfactual behavior or imagination, i.e., imagining the possible outcomes of "striking it rich". The exercise of this type of imagination leads people to believe that the desirable and the possible might converge in one fortuitous moment. People fantasize over what they will do with the money and fantasies become so vivid that they will justify playing. This type of explanation emphasizes cognitive biases and some form of invulnerability illusion – "I" am different from all the others and, in some mysterious way, "I" defy statistical distributions. Garrett and Sobel (1999) state that results are more important to gamblers than chances. Gamblers may be risk-averse, but they are also attracted to the positive skewedness of returns offered by low probabilities and high-variance bets. As is well known, the knowledge of a

theory is not directly linked to acting upon that same theory, or to taking the necessary steps to put into action the logical consequences of the knowledge itself.

If irrationality and cognitive biases present an image of mistaken, ill informed or simply foolish players, a third group of causes advances a completely different way of explaining lottery consumption. Sociology attempts to reconcile the pattern of lottery consumption with a particular form of social logic – far from being irrational, lottery playing makes sense in particular social settings and in some specific moments. These arguments stress that gambling is seldom the product of an individual choice or rational enterprise. Playing is very much a social initiative and patterns of playing can be observed in cultural units, regardless of economic wealth. The quest for excitement and the sense of community experienced in the collective involvement in buying lottery tickets reflect the communal dimension of gambling. Stressing the dimension of enjoyment in lottery playing would lead us to believe that people take part because of the fun and entertainment involved, especially for those who cannot participate in more expensive activities. Blalock (2007) goes even further, claiming that for the poor, the desperation hypothesis – lotteries seen as the only way to legally escape poverty – is more likely to explain participation than the entertainment hypothesis or the quest for excitement. Lottery sales, indeed, rise with increases in the poverty rate.

Addiction is one of the major causes for gambling. Some of the strongest opponents of lotteries do not hesitate to underline that there is a possibility of fomenting addiction by playing lotteries. Those who are addicted to playing have often proceeded along a causal chain of events that starts with mild and apparently innocuous games and leads to more perverse, dangerous activities. What may well have started as entertainment can culminate in a habit laden with harmful effects.In these terms, lotteries can be seen as a form of initiation ceremony that will draw the neophyte gambler into a universe of addiction, potentially destructive to him/her and all the other members of his/her social circle. Those who are

oppose lotteries claim that they send out the wrong message, in the apparent promise of acquiring plenty in return for no effort, thus promoting idleness. The virtues of work would no longer be paramount. Considering that the poor are the most likely to buy lottery tickets, governments could be obliged to raise taxes further to create new welfare measures to support those who lose too much money by playing these games. This clearly means that gambling can be equated with drugs and alcohol, in terms of its potential for causing serious damage to the fabric and wellbeing of families and communities. However, *w*hen it comes to assessing the relationship between gambling and illegal activities, since lotteries can be seen as a legal form of gambling they probably promote a shift from illegal to legal practices, contributing to the reduction of the crime rate inside society. Nevertheless, the fact remains that illegal gambling is never totally eliminated by having access to legal and sometimes state-sponsored lotteries.

The functionalist tradition in sociology also offers some suggestions for the reasons behind people's gambling habits. Frey (1984) gives us an account that creates a hermeneutical circle between causes and consequences of gambling. In every society we can find more gamblers than non-gamblers, which leads to the consideration that the act is normal in itself, like every social practice that exists, persists across the ages and becomes institutionalized. Considering this triple dimension, gambling might very well be seen as functional to a society. Even if anomie and alienation lie at the roots of the gambling habit, gambling gives thrills and emotions that animate society and assures social stability, fulfilling needs and helping to release pressure and stress. Gaming can be considered a shock absorber, acting as a social safety valve. Lotteries are recreational but can also be addictive and compulsive. Social frustration may lead to gambling in a search for control and thrilling experiences.

Among the social reasons for gambling, religion is one of the more commonly proposed, both in lay assemblies and theoretical domains. The widespread presence of lotteries around the

world in countries with different creeds and religious beliefs does not add much to support the importance of faith in the determination of gambling behavior. However, we should perhaps concentrate not on the doctrinal aspects of religion, but rather on its social dimension. Taking this into account, religious attendance (or being part of a community of believers) should be considered more important than faith itself (Lam, 2006). Another question, seldom explored, is the importance of being a part of a minority or a majority denomination. The behavior of a Catholic in the USA is possibly different from the actions taken by a Catholic in Spain or Italy. Studies suggest that Catholics are more positive and tolerant towards the legalization of gambling than Protestants (Brown et al., 2003) but, at the same time, high attendancy rates correlate with more suspicion on gambling. Diaz (2000) corroborates the idea that Catholics are more prone to gambling, thus proving that, in their case, attitudes favorable to gambling are matched by a consonant set of actions. Religiosity may also play an indirect role, since it is commonly associated with risk aversion (Lesieur, 1994). Even if the direct correlation between religious involvement and gambling is far from conclusive, it is undeniable that church groups have been, especially in the USA, the strongholds against lotteries. At this level, the moral issue of condemning material enrichment obtained through mere good fortune without effort overpowers the morality of promoting lotteries to forge good – by means of collecting funds on behalf of charitable institutions. The fact that social support activities in Catholic countries have been associated for many years with lotteries makes it easier to understand the population's acceptance and even enthusiasm for them.

The association between socio-demographic variables and lottery playing has been extensively made during the last two decades, offering some insightful results: older people buy more lottery tickets than the young (Aasved, 2003; Herring & Bledsoe, 1994); lottery purchases are negatively correlated with income (Abbott & Cramer, 1993; Herring & Bledsoe, 1994) and negatively correlated with education (Browne, Kaldenberg, & Browne,

1992; Herring & Bledsoe, 1994). Some studies have also departed from the traditional idea that lotteries have exactly the same dynamics as other types of games. At this level, it is important to mention Freund & Morris (2006), who argue that the lottery, contrary to other types of gambling, is associated with increasing social inequality, opening new avenues of socio-economic research.

Most studies have examined a single means of measuring lotteries: focusing on only one type of product or in the total sales of a county, state or country. Few studies have focused on the analysis and comparison of the different lottery games, using econometric models.

Jackson (1994) used cross-sectional OLS regressions to calculate and compare the 1983 and 1990 sales per-capita for each product of the Massachusetts Lottery. He used several explanatory variables, including education, income, race, ethnicity and age.

In Germany, Albers and Hubl (1997) used a probit technique to estimate the individual pattern of legal gambling in that country. With a sample of 1,586 adults, they estimated separate functions of participation for all forms of commercial gambling. They developed a survey in order to have a set of explanatory variables that covered the following socio-economic characteristics: age, gender, education, income, family status, employment status, home ownership, occupation and importance of maximum prize in lotto for the gambler to explain the participation and/or non-participation in the different types of gambling – lotto, draw lotteries, TV-lotteries, soccer toto pools, horse-race betting, gaming machines and casinos. Their results point out that income, in Germany, has a positive and significant influence on the participation in most commercial games, suggesting that gambling is a widespread (superior) consumption good; the exceptions are Soccer Toto, which declines with income, and Lotto, for which income was found to have no impact.

Price and Novak (1999) used a regression analysis to study three separate lottery games in Texas: Lotto, Pick 3, and Instant. They found all games highly regressive and concluded that

the instant game should be classified as an inferior good. Their results also indicate that the more regressive games are purchased by Black and Hispanic minorities, by people with lower education levels and by older people.

Worthington, et al. (2003) used a regression modeling in order to predict gambling patterns in Australia. They gathered data from the Australian Bureau of Statistics Household Expenditure Survey of 6,892 households. Eight categories of gambling expenditure, from lottery tickets to casino gambles, were examined and the determining factors analyzed included income, family composition, gender, age, race, ethnicity and geographic location. They concluded that participation in lotteries in Australia is strongly influenced by age, ethnicity and household composition.

Ghent and Grant (2007), with a regression analysis, studied separately the factors that influence the purchases of three types of lottery products offered by the South Carolina Education Lottery: instant scratch-cards, fixed-odds online games and Lotto and examined their distributional effects across income and demographic factors. Their results show that when analyzing different types of game, different conclusions are retrieved. The conclusions show that the estimated effects of the various demographic variables differ on sales among products. This indicates the need to analyze separately the determinants of demand for products offered by lotteries.

III. Empirical Model and Data Source

In order to compare lottery sales on a national basis around the world, we gathered information from La Fleur's World Lottery Almanacs on the lottery sales in 99 countries (see Appendix 1) during 13 years (from 1994 until 2006). These almanacs provide information of lottery sales by game and by continent for Africa, Asia and the Middle East, Europe, Central

America, South America and the Caribbean and North America. The explanatory variables were obtained for the same range of years from some highly recognized world data bases. These include: World Bank data, which provided information on GDP; the UN Human Development Report, which provided information concerning the educational levels of the countries considered; the US Census Bureau International Data Base, which yielded information on the age and gender distribution of a country's population; and the CIA World Fact Book, which supplied information on religions in each country.

III.1. Regression Model

For each of the lottery games, a regression model was estimated using the natural logarithm of per-capita sales as the dependent variable and per-capita GDP, education index, age, gender and religion as explanatory variables. The general equation is given below:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it}$$

Where Y_{it} stands for sales per-capita of Total (total games), Lotto (lotto games) Numbers (number games), Keno (keno games), Toto (toto games), Draw (draw games) and Instant (instant games) in country i and in year t, X_{it} is a vector of economic and demographic characteristics in country i and in year t and ε_{it} is a random disturbance assumed to be normal, independent and identically distributed (IID) with $E(\varepsilon_{it}) = 0$ and $Var(\varepsilon_{it}) = \sigma^2 > 0$. It is assumed that the explanatory variables are exogenous. We do not include the unobserved time-invariant country-specific effects, since this would remove some relevant variables that do not vary along time and that are important to the robustness of the results. We control for time effects by including a time dummy variable (year).

The Dependent Variables

Data for each game was obtained from the La Fleur's World Lottery Almanacs from 1994 to 2006. The lottery games sales were then divided by mid-year population, with age over 15, obtained from the U.S. Census Bureau International Data Base, for each year and country. Total is the logarithm of total per-capita sales, age over 15 **(PCS)**. Lotto, Numbers, Keno, Toto, Draw and Instant are the logarithm of the respective per-capita sales, age over 15.

The Explanatory Variables

Country characteristics included in X_{it} consist of income, education, age, gender and religion. Several authors have argued that lotteries are a regressive form of taxation (Clotfelter & Cook, 1987; Price & Novak, 1999; Ghent & Grant, 2007). Price & Novak (1999) considered that "Income elasticity coefficients can be used as a measure of tax regressivity because tax revenue from lottery sales is a constant proportion of the lottery ticket price". Thus, we use as an explanatory variable the natural logarithm of per-capita gross domestic product, in purchasing power parity terms in US dollars **(PCGDP)**, from the World Bank. Since the sales and income variables are measured in logarithms, the estimated regression coefficients are income elasticity coefficients. A positive correlation between PCGDP and PCS is expected. A positive, greater than one coefficient signifies an implicit progressive tax between countries.

Most studies conducted on lotteries have revealed the existence of an inverse relation between education and the consumption of lottery products (Clotfelter & Cook, 1987, 1990; Kitchen & Powells, 1991; Croups, Haddock, & Webley, 1998). The level of education in a country is measured by the Education Index, which is one of the three indices on which the Human Development index is constructed. It is based on the adult literacy rate and the combined gross enrolment ratio for primary, secondary and tertiary education levels and was obtained from the Human Development Reports. By including the variable, Education **(EI)**, an attempt

is made to infer the influence of education in the demand for lottery products. We expect this variable coefficient to present a negative sign.

According to Clotfelter & Cook (1989), people aged between 25 and 64 are more likely to consume lottery products. Jackson (1994), in his study of the Massachusetts State Lottery, found that in 1983, the proportion of the population in the over-65 age group was inversely related to per-capita lottery sales, but by 1990, this relationship had become inverted. Therefore, according to the literature, those who play the least are the young and therefore, a country with a high percentage of young people will have smaller lottery sales. In order to determine if this is correct internationally, 4 intervals of age were considered: **AGE1**- [15-29]; **AGE2** - [30-44]; **AGE3 -** [45-64]; **AGE4** - [65+]. The population with ages in the intervals established as a percentage of total population was obtained from the U.S. Census Bureau International Data Base. We expect a smaller coefficient for variables AGE1 and AGE4 than for variables AGE2 and AGE4.

Lottery studies have revealed that men play more than women (Clotfelter & Cook, 1989). In the study of Price & Novak (1999), this result is confirmed when analyzing loto games but is contradicted for instant and numbers games. The variable **GenderRatio – t**otal male population aged over 15 divided by total female population aged over 15, obtained from the U.S. Census Bureau International Data Base, is used in order to examine this finding. We expect men to play more in most lottery games and therefore, a positive coefficient is expected for the GenderRatio variable in the Total, Lotto, Keno, Toto and Draw regressions and a negative sign in the Numbers and Instant regressions.

Several studies have pointed out the existence of a relationship between gambling and religion. There are some contradictions in the various studies made by the authors considering this subject. For instance, while Rubenstein & Scafidi (2002) considered in their analysis that the individuals who consistently attend church are more averse to gambling activities,

Giacopassi, Nichols, & Stitt (2006) contradicted this finding and Ghent & Grant (2007) asserted the non-existence of any relation between religion and lottery sales. **Christian** is the percentage of Christian followers in a country's population. This was obtained by considering it to be the sum of the percentage of Catholics, Protestants and Orthodox Christians in each country obtained from the 2007 CIA World Factbook. We expect a positive relation between the percentage of a country's Christian followers and the general consumption of lottery products.

IV.Regression Results

Table 1 displays the panel estimation results. We specified seven models. In the first model (regression 1), we were particularly interested in analyzing the determinants of demand for lotteries in general. In the other six models, the paper analyses the specific determinants of demand by type of product.

TABLE 1: Lottery Demand Estimates. (Dependent Variable: Natural Logarithm of Per Capita Sales 15 years and above by type of game)

	Total		**Lotto**		**Numbers**		**Keno**		**Toto**		**Draw**		**Instant**	
Constant	**-84.93**		**-47.34**		**262.13**		**-16.66**		**-46.06**		**-43.83**		**131.92**	
	(-1.75773)		(-0.67453)		(1.45941)		(-0.1714)		(-0.47391)		(-0.39361)		(2.25255)	
PCGDP	**2.04**		**1.94**		**1.21**		**1.19**		**0.84**		**1.11**		**1.88**	
	(7.58304)	***	(5.81081)	***	(1.38438)		(4.0429)	***	(1.44114)		(1.16961)		(6.55981)	***
EI	**-3.09**		**-0.74**		**2.57**		**-3.79**		**-0.57**		**0.69**		**-1.05**	
	(-1.77071)	*	(-0.34241)		(0.41482)		(-1.4793)		(-0.15325)		(0.20674)		(-0.60379)	
AGE1	**-21.34**		**0.47**		**-9.57**		**-46.76**		**-11.51**		**-52.98**		**-24.37**	
	(-1.67961)	*	(0.03622)		(-0.29999)		(-2.5122)	**	(-0.51360)		(-2.27332)	**	(-2.54473)	**
AGE2	**-2.92**		**-9.93**		**-29.28**		**-59.99**		**-27.87**		**19.85**		**-20.01**	
	(-0.39870)		(-1.02266)		(-1.59754)		(-4.9180)	***	(-1.98791)	**	(1.18456)		(-2.05345)	**
AGE3	**-3.04**		**-0.25**		**-2.02**		**-0.67**		**0.47**		**-8.86**		**0.37**	
	(-2.04517)	**	(-0.17114)		(-0.48719)		(-0.3554)		(0.15161)		(-2.58064)	***	(0.19056)	
AGE4	**10.69**		**8.09**		**9.14**		**-23.38**		**16.68**		**31.72**		**-15.86**	
	(1.72062)	*	(1.02723)		(0.37138)		(-1.8225)	*	(1.05365)		(1.65954)	*	(-1.39355)	
GenderRatio	**0.11**		**0.14**		**0.23**		**0.10**		**0.24**		**0.36**		**0.10**	
	(2.55053)	**	(1.98590)	**	(2.08184)	**	(1.7404)	*	(2.42473)	**	(2.93365)	***	(2.30905)	**
Christian	**0.98**		**1.79**		**-1.26**		**1.13**		**0.77**		**-0.14**		**0.57**	
	(2.36278)	**	(3.47248)	***	(-1.51438)		(1.8633)	*	(0.75152)		(-0.13548)		(1.15174)	
N	583		418		158		163		322		316		467	
Adjusted R^2	0.746174		0.698759		0.205358		0.52979		0.438965		0.465579		0.658435	

t-statistics (heterokedasticity corrected) are in parenthesis.
* significant at 10%; ** significant at 5%; *** significant at 1% .
PCGDP is in the Natural Logarithm form.

REGRESSION 1. (i) The first regression reveals that the global income elasticity of demand for lottery products is 2.04. Any percentage change in income is met with a greater percentage change in lottery expenditure. So, there is an implicit progressive tax when we model income for different countries. Ghent & Grant (2007) also concluded that "…the lottery may not be as regressive as the body of literature suggests it once was, and indicates that when estimating lottery sales with regression, it may be better to model the distribution of income rather than its level". Thus, the regressivity of the games within the same country is also an open question.

(ii) The results obtained for the Education index (EI), considering the logarithmic of total per-capita lottery sales, show that the increase of 1% in this index leads to a decrease of 3.09% in a country's per-capita sales. The variable EI is significant at 10%. (iii) As was expected, younger people consume fewer lottery products. An increase of 1% in the percentage of population aged between 15 and 29 will imply a decrease of about 21% in a country's per-capita total lottery sales. On the other hand, and contrary to the prior expectation, those in the interval of 65 and over consume more lottery products. The increase of 1% in the percentage of population aged over 65 will imply an increase of nearly 11% in a country's per-capita total lottery sales. Variables Age1 and Age4 presented significance at 1% in this regression. Variable Age3 is significant at the 5% level while the variable Age2 is not statistically significant. (iv) The variation of gender ratio by 1% implies an increase of about 0.11% of a country's per-capita total sales. This result is consistent with what was expected. In this regression, the variable is significant at 5%. We can conclude that the country's percentage of males relative to females is clearly an important factor to take into account in explaining lottery sales in that country. (v) The sign of the coefficient on the Christian population is positive and significant at 5% in this regression. This leads us to infer that an

increase of 1% in the percentage of a country's Christians implies an increase of 0.89% in per-capita total lottery sales.

REGRESSION 2. (i) The analysis of the determinants of demand for Lotto games reveals that the income elasticity of demand for this type of product is 1.94. This variable is significant at 1%. (ii) The variable EI is not significant in this regression. (iii) In this regression, all the variables related with age are statistically insignificant. (iv) Similarly to what occurred in the first regression, the variation of gender ratio by 1% implies an increase of about 0.14% of a country's per-capita lotto sales. The variable maintains the significance at 5%. (v) Comparing with the first regression, the sign of the coefficient on the Christian population is still positive, but more significant (at 1%) in this regression. This means that an increase of 1% in the percentage of a country's Christians implies an increase of 1.79% in a country's per-capita Lotto sales.

REGRESSION 3. When considering the sales of numbers games, most variables lose their significance. The only significant variable in this regression is the one related with gender. The variation of gender ratio by 1% implies an increase of about 0.23% in a country's per-capita numbers sales. This result is consistent with what was expected. In this regression, the variable is significant at 5%.

REGRESSION 4. (i) The income elasticity of demand for Keno is 1.19. Any percentage change in income is followed by a greater percentage change in Keno expenditure. This variable is significant at 1%. (ii) The education index (EI) is not significant. (iii) In this regression, the coefficients of the variables related with age all present a negative value and only AGE3 (percentage of people aged between 45 and 64) is not statistically significant.

Countries with a higher percentage of people aged between 30 and 44 are those that sell the fewest Keno games. An increase of 1% in the percentage of population aged between 30 and 44 will imply a decrease of nearly 60% in a country's per-capita Keno sales. This variable (AGE2) is significant at the 1% level.(iv)Similarly to what was found in the other regressions, the variation of gender ratio implies an increase in a country's per-capita Keno sales. In this regression, the variable is only significant at 10%. (v) Comparing with the first two regressions, the sign of the coefficient on the Christian population is still positive, but only statistically significant at the 10% level. An increase of 1% in the percentage of a country's Christians implies an increase of 1.13% in a country's per-capita Keno sales.

REGRESSION 5. In this regression, for Toto, most of the explanatory variables are not significant. The only significant variables are AGE2 and GenderRatio. (i) When considering the variables related with age, the only one that is significant in this regression is AGE2 (significant at 5%). A 1% increase in a country's population aged between 30 and 44 leads to a decrease of 27.87% in a country's Toto sales. (ii) The variation of gender ratio by 1% implies an increase of about 0.24% in a country's per-capita Toto sales. This result is consistent with what was expected. In this regression, the variable is significant at 5%.

REGRESSION 6. (i) The variables PCGDP, EI, AGE2 and Christian are not statistically significant. (ii) Countries with a higher percentage of young people consume less Draw games. An increase of 1% in the percentage of population aged between 15 and 29 (AGE1) will imply a decrease of nearly 53% in a country's per-capita Draw sales. The coefficient of variable AGE1 is significant at 5%. It would thus seem to be a bad strategy for countries with a high percentage of young people to invest in this type of product (for instance, African countries). The variable AGE3 is very significant in this regression (1% level). An increase of

1% in the percentage of population aged between 45 and 64 leads to a decrease of 8.86% in a country's per-capita Draw sales. The coefficient on variable AGE4 presents significance at the 10% level and has the highest coefficient. This seems to be the game preferred by the elderly. An increase of 1% in a country's population aged over 65 leads to an increase of nearly 32% in a country's Draw sales. Therefore, this should be the product to be developed and marketed by countries with older populations (for example, by European countries).

(iv) The variable GenderRatio is significant at the 1% level. Consistent with our expectation, males consume more Draw games than females. A 1% increase in a country's gender ratio leads to an increase of 0.36% in that country's Draw sales.

REGRESSION 7. (i) Price & Novak (1999) concluded in their study that the Instant game was the most regressive game in Texas and that it should even be classified as an inferior good. In our cross-country study, the variable concerning income presents a positive and very significant value in Instant games. The income elasticity of demand for such games is 1.88. (ii) Countries with a higher percentage of young people consume fewer Instant games. An increase of 1% in the percentage of population aged between 15 and 29 will imply a decrease of nearly 24.37% in a country's per-capita Instant sales. The coefficient of variable AGE1 is significant at 5%. The variable AGE2 is negative and significant at 5% in this regression. An increase of 1% in the percentage of population aged between 30 and 44 leads to a decrease of about 20% in a country's per-capita Instant sales. (iii) In this regression, the variable GenderRatio is significant at 5%. Consistent with our expectation, males consume more Instant games than females. A 1% increase in a country's gender ratio leads to an increase of 0.10% in that country's Instant sales.

V.Conclusions

This paper has studied the pattern of lottery-product buying behavior around the world. We believe that the findings are useful, since they provide insights into a little researched area of consumer behavior, i.e., worldwide lottery participation. Most of the studies that analyze lottery determinants in a specific country find that on average, lotteries are regressive. This means that the lottery is implicitly taxed, since the cost of all lottery products is higher than its expected value. If lotteries are mainly consumed by the poor, then this tax is regressive, because lower-income households spend more, on percentage, than higher-income households. The results of this paper suggest that the games are not regressive between countries, because richer countries consume more lottery products than poorer countries. Several studies have revealed the existence of an inverse relation between education and the consumption of lottery products. The results of this paper only confirm this hypothesis for the total games (regression 1). According to equation 1, an increase of 1% of a country's education index leads to a decrease of about 3% of total lottery sales. The studies that inquire into the distribution of lottery-product consumption by age are contradictory. Our results suggest that when considering total sales, people in the age interval of 65 and older are the greatest consumers of lottery products, while the young [15-29] consume the least. Analyzing by age, it appears that the game most preferred by young people is Instant and the games that they dislike are Keno and Draw. For the second age range, the favorite game is Toto. For the third age range, we are unable to make conclusions, because this variable is only significant in the Draw equation. Finally, older people consume more Draw games and dislike Keno. Lottery studies have revealed that men play more than women and are more likely to be problem gamblers than females when compared to the general population. This result is confirmed when analyzing all games. All the coefficients related to the GenderRatio variable

showed positive signs. Furthermore, this variable is significant, at some level, in all regressions. Another interesting result is that men prefer Draw games. Several studies have revealed the existence of a relationship between gambling and religion. There are some contradictions in the results of the studies investigating this subject. We found the existence of a positive relation between religion and gambling, Christians having, on average, a positive effect on per-capita lottery sales. The game in which this tendency is most marked is Lotto. Our findings are of interest because they confirm a link between certain socio-economic and demographic characteristics and consumer behavior and may thus be of some value to future consumer research.

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Appendix 1: List of Countries Analyzed

Albania	Ghana	Niger
Algeria	Gibraltar	Norway
Argentina	Greece	Panama
Australia	Honduras	Peru
Austria	Hong Kong	Philippines
Belgium	Hungary	Poland
Benin	Iceland	Portugal
Bolivia	India	Puerto Rico
Brazil	Ireland	Romania
Bulgaria	Israel	Russia
Burkina Faso	Italy	Senegal
Burundi	Jamaica	Singapore
Cameroon	Japan	Slovakia
Canada	Kazakhstan	Slovenia
Chile	Kenya	South Africa
China	Korea, South	Spain
Colombia	Latvia	Sri Lanka
Congo	Lebanon	Suriname
Costa Rica	Lithuania	Sweden
Cote d'Ivoire	Luxembourg	Switzerland
Croatia	Madagascar	Taiwan
Cyprus	Macedonia	Tanzania
Czech Rep.	Malaysia	Thailand
Denmark	Mali	Togo
Dom. Rep.	Malta	Trinidad
Ecuador	Mauritius	Tunisia
Estonia	Mexico	Turkey
Ethiopia	Moldova	U.K.
Finland	Morocco	U.S.
France	Mozambique	Ukraine
Gabon	N. M. Islands	Uruguay
Gambia	Netherlands	Venezuela
Germany	N. Zealand	Zimbabwe