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Department of Economics

Maria João Kaizeler and Horácio C. Faustino

Demand for Lottery Products: A Cross-Country Analysis

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Demand for Lottery Products: A cross-country analysis

Maria João Kaizeler
Piaget Institute, ISEIT – Higher Institute of Intercultural and Transdisciplinary Studies, Almada, Portugal, and SOCIUS

Horácio Crespo Faustino
ISEG, Technical University of Lisbon and SOCIUS - Research Centre in Economic Sociology and the Sociology of Organizations, Lisbon, Portugal

Abstract: Varieties of lottery games are played regularly in more than half of the world's countries. When considering the probability of winning a lottery jackpot, we have a sense of the illogicality in buying a lottery ticket. This begs the question, why do people buy lottery products? This paper investigates the socio-economic and demographic features that help to explain the behavioural trend of lottery product purchasing throughout the world. With a multivariate linear regression analysis, this study uses macroeconomic data and qualitative variables to explain the variation of a country's per-capita lottery sales. Some very interesting results were obtained. For example, the higher a country's level of education, percentage of males and Christians, the higher are the lottery sales. The relationship between lottery sales and per-capita GDP is an inverted U: lottery sales increase simultaneously with increases in per-capita GDP up to a point and then start to decrease. These results are of interest because they suggest a link between certain socio-economic and demographic characteristics and consumer behaviour and may give a boost to the use of these characteristics in consumer research.

Key words*:* Gambling; Lotteries; Education; Religiosity; Culture; Cross-country.
JEL Classification: D12, D14, D81.

Addresses:

Maria João Kaizeler

Rua Quinta do Paizinho, 22.

1400 – 306 Lisboa, Portugal

T: (00351) 939586431; Fax: (00351) 214724415; E-mail: mkaizeler@gmail.com

Horácio Crespo Faustino

ISEG – Instituto Superior de Economia e Gestão

Rua Miguel Lúpi, 20 . 1249-078 Lisboa. Portugal

T: (00351) 213925902 ; Fax: (00351) 213966407 ; E-mail: faustino@iseg.utl.pt

Home Page: www.iseg.utl.pt/~faustino

I. Introduction

People are found to play lottery games in more than half of the world's countries. For example, in the United Kingdom, more than half of the adult population plays the lottery every week.

The main purpose of this study is to analyze the determinants of the expenditure on 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. We use a cross-country regression to test the explanatory hypotheses that we have formulated.

One of the most elementary considerations of conventional economics and finance is that people are rational "wealth maximizers" who seek to expand their own well-being. According to traditional economics, emotions and other superfluous factors do not influence people when it comes to making economic choices. Nevertheless, in most cases, this postulation does not reveal how people behave in real life. The fact is that people recurrently behave irrationally. Many individuals purchase lottery products with the simple hope of winning the jackpot. From a purely logical point of view, it is illogical to buy a lottery ticket when the odds of winning are overwhelmingly against the ticket holder. In spite of this, tens of millions of people regularly spend amounts on the activity ranging from the minimum for a single bet to much more significant sums. These biases have encouraged academics to look to cognitive psychology in order to gain insights into this irrational and illogical behaviour.

The study of the behaviour of lottery-players can teach us about our common aspirations, beliefs and emotions, in addition to helping us answer the many questions of finance, such as the construction of portfolios and the nature of the equity premium.

Although much research has been conducted into lotteries, certain questions remain that need to be answered.

The following questions will be addressed in this paper: (i) Is it possible that the wealthier a country is, the less money is spent on lottery products? (ii) Is this issue determined by culture (for example, do Latin or African countries spend more than the others)? (iii) Does religion influence the consumption of this type of product? (iv) Is gender important to an understanding of the consumer behaviour in respect of lotteries? (v) What other factors affect the lottery sales in an economy?

The paper provides an empirical investigation and its results confirm that cultural and religious factors, as well as gender, are statistically significant in the explanation of the variation of lottery expenditure. Our hypothesis that consumer demand for lottery products is positively related to per-capita GDP up to a point (a maximum) and then becomes negatively related is also confirmed by the data. The paper also seeks to answer some questions that were raised in the review of the theoretical literature and empirical studies, and synthesized in our formal hypotheses.

The paper is organized as follows. In the next section, the literature is reviewed. The third section presents and describes our formal hypotheses. The fourth section presents the econometric model and explains the empirical findings. The final section considers the study's implications and presents our concluding remarks.

II. Review of the Theoretical Literature and Empirical Studies

Lotteries possess unusual and unique attributes that make the phenomenon attractive to researchers. It is a combination of an investment, as stated by Selinger (1993), and entertainment according to Wagman (1986). This combination accounts for the fact that lotteries play a significant part in the lives of consumers nowadays (Miyazaki et al. 1999). Lotteries are the only risk-laden products sponsored and marketed by government agencies for government gain; the rapid growth of this type of consumer product in the United States gave rise to disputes with regard to government-sponsored gambling and the rules and policy that should be imposed at state level (Clotfelter and Cook 1989).

The fact that very little research was conducted into the purchasing behaviour underlying the growing consumption of government-sponsored lotteries inspired Miyazaki et al. (1999) to explore people's purchase and non-purchase motivations in respect of lotteries. The study attempted to investigate the motives both for playing and for not playing lottery games.

Previous studies have sought to find a possible correlation between lottery purchasing behaviour and demographic characteristics, such as age, gender, race, income and educational attainment, but with little consensus achieved among researchers. The study of Clotfelter and Cook (1989) suggested that lottery players who have relatively low incomes play for money, while those who have higher incomes play for entertainment; hence, low income-earners participate with a stronger desire to win.

The study of Miyazaki et al. (1999) found that the enjoyment, the sense of participating in government-sponsored activities, and a belief in one's own luck to be of no significant bearing in the lottery purchasing behaviour of individuals.

Lottery games involve the concept of randomness, which simply suggests that the outcome of an event is unknown prior to the actual occurrence of the event (Draper and Lawrence 1970). As put by Miyazaki et al. (2001) in their study of consumer misconceptions about random events, if consumers hold a mistaken belief about the random nature of lotteries, *i.e.*, that they are in control of the outcomes of random events, such misconceptions will tend to influence the decision to play lottery games.

This latter assertion is in tandem with the argument of Ladouceur and Walker (1998), who state that people (the majority, if not all) behave and think irrationally when gambling. Such erroneous behaviour and thinking signifies that gamblers fail to consider the concept of randomness and uncertainty in the event. This universal, abiding misconception on the part of gamblers determines the development and maintenance of their gambling habit.

The study of Balabanis (2002) identified the positive correlation between lottery-ticket and scratch-card buying behaviour and compulsiveness. This study was sufficiently profound to draw findings on the three types of personality that can be related with buying compulsiveness in both lottery tickets and scratch cards – extraverts who are more prone to compulsive buying of lottery tickets or scratch-cards while intellectuals and individuals who score high with agreeableness are less prone to the said compulsive act.

Most of the studies concerning the behavioural characteristics of lottery products consumers involved surveys conducted in the USA. Despite this, we can find some international papers that use community samples in order to explain a country or region gambling features. For example, in the UK, Croups et al. (1998) used a community sample of 160 adults (101 females, 59 males) in order to understand the correlations and

predictors of lottery play in that country. The most significant findings in their study relied on the positive correlations between the individual's lottery play and friends' lottery play. They also found that in the UK, lottery play is negatively correlated with education level and that misunderstanding of lottery probability and lottery play are positively correlated. Layton and Worthington (1999) examined the socio-economic determinants of gambling expenditure on lotteries, Lotto and Instant Lotto, TAB/on-course betting, poker machines and casino-type games in Australia. Using a sample of 8,389 Australian households in 1993-1994, they found that ethnicity, income sources and income level influence the probability of a household's gambling.

Although much research has been done on lotteries, there has been little investigation that provides empirical analysis and comparison on lottery games around the world. In Garrett's (2001) paper an international comparison is made using 1997 data, where the GDP and lottery sales are related. According to Garrett (2001) his paper presents "the first-ever examination and comparison of lottery games from around the world".

III. Hypotheses

This paper comprises an investigation in which some formal hypotheses will be empirically tested.

H1: The higher the level of per-capita income, the smaller the per-capita lottery sales.

Income has been identified as one of the most important factors explaining the demand for lottery products. According to several scholars such as Friedman and Savage (1948) and Blalock et al. (2007), the idea of desperation has been suggested (the

"desperation" hypothesis of gambling) in order to establish an antagonistic relation between wealth and gambling.

In order to analyze if richer countries consume less lottery products we use per-capita GDP in purchasing power parity terms in US dollars (PCGDP). We expect that as wealth increases people buy less lottery products. Therefore, the coefficient is expected to have a negative sign.

H2: The relation between per-capita lottery sales and per-capita GDP is an inverted U.

We expect that lottery sales increase together with increases in GDP up to a point where a country has reached a level at which the GDP is high enough and lottery sales (or expenses on the part of consumers) become an inferior good and as a result, start to decrease. In order to analyze this relation and to discover what that GDP maximum level might be, we included the variable $PCGDP^2$.

H3: Per-capita lottery sales vary among income classes.

In order to analyze if the theory proposed by Thomas Garrett (2001) maintains with 2004 lottery sales data, and for the 80 countries studied in the present paper, an equal distribution of 4 quartiles was made (with each quartile containing 20 countries).

We created four dummy variables in order to have four categories of per-capita income:

Class 1 =1 if per-capita GDP is lower than 4,614 USD and zero otherwise;

Class 2 =1 if per-capita GDP is between 4,615 USD and 11,654 USD and zero otherwise;

Class 3 =1 if per-capita GDP is between 11,655 USD and 28,079 USD and zero otherwise;

Class 4 =1 if per-capita GDP is higher than 28,080 USD and zero otherwise.

These dummies were then interacted with country GDP, giving us the 4 variables to be included in the model: Class1*PCGDP, Class2*PCGDP, Class3*PCGDP and Class4*PCGDP.

H4: The higher the level of education, the smaller will be the per-capita lottery sales.

The studies of scholars such as Croups et al. (1998), Ghent and Grant (2006) and Giacopassi et al. (2006) have revealed the existence of an inverse relationship between education and lottery consumption.

By including the variable, Education (EI), an attempt is made to infer the influence of education in the demand for lottery products. We assume that the higher a country's level of education is, the less misinformed consumers are, the better they understand the odds of winning a prize and so, the less will they gamble. Therefore, we expect a negative relation between the education index and lottery sales.

H5: There is a negative correlation between per-capita sales of lottery and young players aged between 15 and 29.

According to Clotfelter and Cook (1989), the pattern of lottery participation by age is an inverted U, with the broad middle range (25-64) playing more than the young (18-24) and the old (65 and above).

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.

Therefore, we anticipate a negative relation between per-capita sales of lottery and young players.

H6: The higher the male to female ratio (gender ratio), the higher the per-capita lottery sales.

Lottery studies have revealed that males play more than females (Clotfelter and Cook, 1989). There are some factors that intensify gambling behaviour in men. Men are more likely to be less risk-averse, in addition to being more susceptible to over-confidence (e.g., Barber and Odean (2001)).

We expect men to spend more money on lotteries than women. Consequently, we expect a positive relationship between the gender ratio and lottery sales.

H7: The higher the level of urban development, the higher the per-capita lottery sales.

Shiller (2000) defends that an individual's geographical whereabouts (urban or rural) may induce gambling, which he justifies by highlighting several explanations. One is the greater availability of gambling facilities in urban areas, providing more opportunities to buy tickets. Another reason is the aspiration level that is expected from an urban individual due to the exposure he has to affluent people. Consequently, an urban investor will most certainly exhibit stronger gambling tendencies.

Hence, we expect a positive relationship between the percentage of urban population and lottery sales.

H8: The higher the percentage of Christians, the higher the per-capita lottery sales.

Roberts et al. (1959) ascertain a relation between gambling and religion, pointing out the existence of a common interest in establishing a contact with the unknown, the human capacity to have faith and the hope of achieving success with the help of a divine power. We expect that Christians play more than other religious groups. Thus, there will be a positive relationship between the percentage of Christians in a country and lottery sales.

H9: There is a positive relation between inequality ratios and per-capita lottery sales.

The Friedman-Savage (1948) utility function, elaborated upon expected utility theory, argues that utility in a specific segment of wealth is increasing. Therefore, the expected value of each additional unit of wealth is worth more than the preceding unit, and the concave utility function formerly supported by economists, has a convex segment. The explanation given by Friedman and Savage was the ambition for social improvement. The dream of moving up into a higher class is the explanation that Friedman-Savage utility function gives to explain gambling and the purchase of lottery products. This dream arises from socio-economic inequalities and we should therefore anticipate that gambling is more frequent and intense in countries with more acute social inequalities. In economic terms, gambling has a greater utility in itself in such countries. In order to analyze this phenomenon, we use the GINI index. We expect that the higher the index, the more lottery sales a country will have.

H10: Latin countries spend more money on lottery products than others.

Another feature studied by various authors is the link between race, ethnicity and gambling behaviour.

Clotfelter and Cook (1989), and Price and Novak (1999) defend that Hispanics are more likely to gamble than other ethnicities. We expect that Latins buy more lottery products than other ethnicities. Therefore, there will be a positive relationship between lottery sales and Latin countries. In order to analyze this, we include one dummy variable to obtain two categories of ethnicities: Latin = 1 if a country is Latin and 0 otherwise. Countries that are non-Latin form the base group.

H11: African countries spend more money on lottery products than others.

Kearney (2005) found that, in the USA, black respondents spend almost twice as much on lottery tickets as do white and Hispanic respondents.

We expect that Africans spend more money purchasing lottery products. Thus, we anticipate a positive relationship between lottery sales and African countries.

Similarly to the procedure for Latin countries, we include one dummy variable in order to obtain two categories of ethnicities: African = 1 if a country is African and 0 otherwise. Countries that are not African form the base group.

IV. Empirical Results and Data Source

In order to compare lottery sales on a national basis around the world, we used data from La Fleur's 2005 World Lottery Almanac. This almanac provides worldwide

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. Our dependent variable consists of the total sales that aggregates the seven categories of games tracked in La Fleur's almanac, including lotto, numbers, keno, toto, draw, instant and others (e.g. bingo)**,** converted to US currency.

The explanatory variables were obtained from some highly recognized world data bases. These include: World Bank data, which provided information on GDP, population, the percentage of the country's urban population and the GINI Index; the US Census Bureau International Data Base, which yielded information on the age and gender distribution of a country's population; and the UN Human Development Report, which provided information concerning the educational levels of the countries considered.

IV.1. General Econometric Model

The general econometric model is specified as follows:

$$Yi = \beta_0 + \beta_1 Xi + \varepsilon i$$

Where Yi stands for PCS15 (per-capita sales over 15 years), X is a vector of explanatory variables in normal values or in natural logs and ε_i is a random disturbance assumed to be normal, independent and identically distributed (IID) with E (εi) =0 and Var (εi) = $\sigma^2 > 0$. It is assumed that the explanatory variables are exogenous.

We decided to select the explanatory variables in accordance with theory and other empirical studies and specify a small number of alternative models.

IV.1.1. Dependent Variable

PCS15 – Total per-capita sales, age over 15. Source: La Fleur's 2005 World Lottery Almanac, divided by mid-year 2004 population, with age over 15.

IV.1.2. Explanatory Variables

PCGDP – 2004 gross domestic product (in purchasing power parity terms in US dollars) divided by mid-year population.

$PCGDP^2$ – The Square of 2004 per-capita gross domestic product.

PCGDP*Class 1 –Obtained by the interaction of per-capita GDP and class 1 dummy. It assumes the value of per-capita GDP if this is lower than 4,614 USD and 0 otherwise.

PCGDP*Class 2 –Obtained by the interaction of per-capita GDP and class 2 dummy. It assumes the value of per-capita GDP if this is higher than 4,615 USD and lower than 11,654 USD and 0 otherwise.

PCGDP*Class 3 –Obtained by the interaction of per-capita GDP and class 3 dummy. It assumes the value of per-capita GDP if this is higher than 11,655 USD and lower than 28,079 USD and 0 otherwise.

PCGDP*Class 4 –Obtained by the interaction of per-capita GDP and class 4 dummy. It assumes the value of per-capita GDP if this is higher than 20,080 USD and 0 otherwise.

EI – 2004 Education Index.

AGE - Population with ages between 15 and 29 as a percentage of total population.

GenderRatio – Total male population aged over 15 divided by total female population aged over 15.

UPOP – Urban population as a percentage of total population.

CHRISTIAN – 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.

GINI – Gini Index.

LATIN – It assumes 1 if a country is Latin and 0 otherwise.

AFRICAN – It assumes 1 if a country is in Africa and 0 otherwise.

IV.2. Regression Results

In Table 1, we specified two models. In the first model (regression 1), we were particularly interested in testing Hypothesis 2, that is, the hypothesis on a relation between PCSales and PCGDP that configures in an inverted U. In the second model (regression 2), we sought to specify a model similar to that used by Garrett (2001), although we used different control variables. In the table**,** we decided to apply the logarithm transformation to the initial models in order to obtain the elasticity (regressions 3 and 4).

Table 1

Lottery Demand Estimates

Dependent Variable: Per-capita Sales 15 years and above

	1		2		3		4	
Explanatory Variables								
Constant	**-432.67**		**-186.46**		**-19.5083**		**-17.26400**	
	[-3.20357]		[-1.01088]		[-3.6719]		[-2.57234]	
PCGDP	**0.014249**	***			**1.5067**	***		
	[4.19495]				[3.92594]			
$PCGDP^2$	**-1.5875E-07**	***			**-3.8304E-10**	*		
	[-3.56822]				[-1.78801]			
PCGDP*Class1			**3.590E-02**	**			**1.20831**	
			[2.27542]				[1.21405]	
PCGDP*Class2			**1.861E-02**	***			**1.29605**	
			[2.8563]				[1.4548]	
PCGDP*Class3			**1.735E-02**	***			**1.38146**	
			[3.10264]				[1.65165]	
PCGDP*Class4			**1.069E-02**	***			**1.30863**	
			[4.53497]				[1.62923]	
EI			**-269.25**	**			**-3.19216**	
			[-2.22582]				[-1.39415]	
AGE	**-604.49**		**-929.22**	*	**-17.3701**	**	**-19.02320**	**
	[-1.48038]		[-1.85045]		[-2.49349]		[-2.51674]	
GenderRatio	**519.39**	***	**453.65**	**	**13.3609**	***	**14.56830**	***
	[3.13014]		[2.26508]		[4.14022]		[4.21108]	
UPOP			**3.87**				**1.37981**	
			[0.03593]				[1.00298]	
Christian	**40.20**		**77.39**	*	**0.6229**		**0.89248**	**
	[0.738047]		[1.94137]		[1.26303]		[2.17232]	
GINI			**115.71**				**0.77637**	
			[0.682614]				[0.335984]	
Latin	**6.68**				**-0.2368**			
	[0.294104]				[-0.61697]			
African	**51.19**	**			**0.4307**			
	[2.39747]				[0.715642]			
N	80		73		80		73	
Adjusted R^2	0.509541		0.57496		0.784053		0.827186	

t-statistics (heterokedasticity corrected) are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes:

1. In Regressions 1 and 2, the dependent variable is per-capita lottery sales, considering individuals aged 15 years and over. In regressions 3 and 4, the dependent variable is the natural logarithm of per-capita sales, aged 15 and over.

2. In Regression 3, the explanatory variable PCGDP is in natural logarithmic form.

3. In Regression 4, the explanatory variables related to income classes are in natural logarithmic form.

Table 1 displays the OLS estimation results. Regression 1 includes as explanatory variables the per-capita GDP, the square of per-capita GDP, age, gender ratio and percentage of Christian followers. We have also included in this regression the variables concerning ethnicity (Latin and African). The variable square of per-capita GDP was incorporated into the model in order to respond to Hypothesis 2, i.e., to find a maximum. The variables concerning income classes were not included in this equation, in order to avoid colinearity problems. Therefore, we opted to include them in another equation (regression 2). We obtained an adjusted R^2 of almost 51%. In regression 2, we used all the variables except those concerning ethnicity (due to the high correlation between the African and education index variables) and the ones related to PCGDP (PCGDP and $PCGDP^2$), for the reasons mentioned above. Therefore, the variables included here are those regarding the income classes, education index, age, gender ratio, percentage of urban population, percentage of Christians and the Gini Index. We obtained an adjusted R^2 of almost 58%. In regressions 3 and 4, we logarithmized the dependent variable (PC sales, aged 15 and over) in order to study the impact of the variation of the variables in percentages. In regression 3, PCGDP is also in logarithmic form as are the variables in regression 4 related to the income classes, so that we may understand the income elasticity of demand for lottery tickets, in general and by income class. We obtained an adjusted R^2 of almost 80% and 83% for regressions 3 and 4 respectively. Next, we analyze the results, considering all regressions.

REGRESSION 1. (i) Per-capita GDP shows high significance. The results show that an increase of 1 USD in per-capita GDP will lead to an increase of 0.014249 USD in a country's per-capita lottery sales. Some studies have argued that lotteries are regressive

since they are a means by which states may exploit the poor. 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. Our results show the opposite. The increase of a country's wealth (in absolute terms) leads to more gambling. (ii) The square of per-capita GDP is also statistically significant. As we expected, lottery sales increase together with an increase in GDP up to a point and then start to decrease (the coefficient is negative). The value at which per-capita lottery sales reach their maximum is 44,879.023 USD. This means that lottery sales increase together with increases in GDP until a country's per-capita GDP reaches 44,879 USD and from there starts to decrease. (iii) The higher the percentage of people aged between 15 and 29, the fewer lottery products are purchased. This variable did not show a significant result for this model. (iv) The results show that the higher the country's percentage of male population relative to the female population, the higher the lottery sales. It appears that men play more than women. The coefficient on the gender ratio is positive and highly significant, meaning that the increase of 1% in a country's male to female ratio implies an increase of per-capita lottery sales of 519.39 USD. (v) We found a positive relation between Christians and lottery sales. The increase of 1% in a country's Christian followers leads to an increase in per-capita lottery sales of 40.20 USD. This variable was not significant for the model. (vi) The coefficient on African countries is positive and significant. This positive effect is consistent with the results that we expected. African countries spend, on average, 51 USD more per capita than other countries. (vii) The sign of Latin countries is also positive, but in this case, it is not significant. The conclusion drawn from the value obtained is that, on average, Latin countries spend 6.68 USD more per capita than other countries.

REGRESSION 2. (i) All the classes of income showed high significance in this regression. This leads us to conclude that lottery sales diminish across income classes. Countries in the first class of per-capita GDP spend about 0.036 USD on lottery products. Those in class 2 spend about 0.019 USD. Class 3 countries spend almost 0,017 USD. Class 4 consists of the countries where the least money is spent, about 0.011 USD, on lottery products. Although not consistent with the findings from regression 1 (that lottery sales increase with rising GDP), the results obtained in this regression show the antagonistic relation between wealth and gambling. (ii) Fewer lottery products are sold in countries with higher levels of education, which is what we would expect. The increase of 1% in the Education Index (EI) diminishes per-capita lottery sales by approximately 270 USD. In this regression, the EI appeared significant at 5%. (iii) The higher the percentage of people aged between 15 and 29, the fewer lottery products are sold. This variable (AGE) is significant at 10% in this model. (iv) Consistent with our expectation and with the results obtained in regression 1, the coefficient on gender ratio is positive and significant. The increase of 1% in a country's male to female ratio implies an increase in per-capita lottery sales of almost 454 USD. (v) The sign on the percentage of urban population is positive, which is as we expected, but it is not significant. (vi) We can conclude that Christians, on average, purchase more lottery products than the followers of other religions (having an additional 1% of Christians in a country implies an increase of about 77 USD of per-capita lottery sales). In this regression, the variable is significant at 10%. (vii) As we expected, the sign on the Gini Index is positive. Countries in which inequalities are more marked will consume more lottery products. Although not significant, this relation is in harmony

with our prior expectation. A 1% increase of this index implies an increase of about 116 USD in a country's per-capita lottery sales.

REGRESSION 3. (i) The third regression reveals that the global income elasticity of demand for lottery products is approximately 1.51. Any percentage change in income is met with a greater percentage change in lottery expenditure. Although we expected a negative sign that showed the regressivity of lotteries, in accordance with the studies made by Friedman and Savage (1948) and Blalock et al. (2007), this result is consistent with that obtained by Garrett (2001). (ii) The results of the variable, AGE obtained in regression 1 and those obtained in this regression are identical. The increase of 1% in the percentage of population aged between 15 and 29 will imply a decrease of about 17% in a country's per-capita lottery sales. Although the sign remains negative, the variable shows higher significance in this regression. (iii) The variation of gender ratio by 1% implies an increase of about 13.4% of a country's per-capita sales. This result is consistent with those obtained in regressions 1 and 2. In regression 3, the variable is very significant (at 1%). We can conclude that the country's percentage of males relative to females is a clearly important factor to take into account in explaining lottery sales in that country. (iv) A 1% increase in the Christian population leads to an increase of approximately 0.62% in a country's per-capita lottery sales. In regression 3, this variable is not significant. (v) In regression 3, the coefficient on African countries is positive and not significant. This positive effect is consistent with the results expected. African countries spend, on average, 0.43% more than other countries on lottery products. (vi) While the sign of Latin countries is negative in this regression, contradicting the results obtained in regression 1, it remains not significant.

REGRESSION 4. (i) When considering the natural logarithmic of per-capita sales, the results obtained for the income classes are different from those in regression 2. The variables, unlike in regression 2, are not significant. Despite this, we can see that the coefficients reveal that lottery ticket sales increase together with the increase in income until Class 3 and then decrease. The results suggest that for the three lowest income-class countries, changes in income lead to a change in the demand for lottery products of 1.21%, 1.30% and 1.38% respectively. For the highest income-class countries, changes in income lead to an increase of 1.31% in lottery sales. (ii) The results obtained for the Education index (EI), considering the logarithmic of per-capita lottery sales show the same trend as that observed in the previous regressions. The increase of 1% in this index leads to a decrease of 3.19% in a country's per-capita sales. In addition, the variable EI is not significant. (iii) In this regression, the conclusion on the results obtained for the variable AGE is similar to those in the preceding regressions. The increase of 1% in the percentage of the population aged between 15 and 29 will imply a decrease of about 19% of a country's per-capita sales. Although the sign remains negative, the variable shows higher significance in this regression (at 5%). (iv) The variation of gender ratio by 1% implies an increase of about 14.57% of a country's per-capita sales. This result and its significance are consistent with those obtained in the previous regressions. (v) An increase of 1% in a country's urban population leads to a rise of per-capita lottery sales of about 1.38%. Although the sign is positive, the variable is not significant to the model. (vi) The sign of the coefficient on the Christian population remains positive in this regression. The interpretation we can make is that an increase of 1% in the percentage of a country's Christians implies an increase of 0.89%

in per-capita lottery sales. This regression is where this variable assumes the highest significance (at 5%). (vii) While not significant, the coefficient on the GINI Index shows the expected sign. The variation of the Gini Index by 1% implies an increase of per-capita lottery sales of approximately 0.78%.

V. Implications and Conclusion

This study has fulfilled the stated objectives and identified the pattern of lottery products buying behaviour around the world. The findings are useful, since they provide constructive insights into a very little-researched area of consumer behaviour, i.e., worldwide lottery participation.

Some studies have argued that lotteries are regressive, since they are a means by which states can exploit the poor. However, our results reveal the contrary, namely, that the increase of a country's wealth (in absolute terms) leads to more gambling.

When considering the square of PCGDP, a very interesting result was obtained: lottery sales increase together with increases in GDP up to a point, then start to decrease. The point at which lottery sales reach their maximum is when a country's per-capita GDP stands at 44,879 USD.

Countries with higher levels of education sell fewer lottery products. From a practical point of view, it appears that the higher the level of education, the more informed a country's population is in respect of the probabilities of winning a prize and thus, the less is the consumption of this type of product.

The higher the percentage of the population segment aged between 15 and 29, the fewer lottery products are sold.

While we did not find any significance between the percentage of a country's urban population and lottery sales, we did obtain a positive relation.

Countries in which inequality is more accentuated have higher lottery consumption rates. Although it is not significant, this relation is in harmony with the findings of the existing literature.

The results show that countries in which the percentage of males is higher than that of females reveal higher lottery sales.

Christians, on average, purchase more lottery products than the followers of other religions.

African countries purchase more lottery products than other countries.

Theoretically, these results are of interest because they suggest a link between certain socio-economic and demographic characteristics and consumer behaviour and may give a boost to the use of these features in consumer research. A possible managerial implication is that it could be feasible for marketers of financial products to make use of the insights revealed in respect of potential investors' attitudes to risk. Strategies could be developed to embrace segmentation schemes and positioning concepts that target the spectrum of personality types among lottery-playing investors in many different countries. They can use this information in order to develop new products that group countries participating in international lotteries into market niches and thereby increase sales. This study has incorporated a number of factors that affect lottery ticket-buying behaviour. However numerous issues remain beyond the scope of the present study, but that still call for investigation. For example, the scope of our study relied on a static comparison (we covered the 2004 lottery sales in 80 countries). An historical dimension would be of great interest, in order to analyze whether the factors and behavioural

characteristics identified are maintained through time. In the present study, macroeconomic data was used. Other scholars have used surveys to discover the characteristics behind lottery gambling. Such surveys could reveal other features, as yet undiscovered by research. In conclusion, it is clear that many potential research avenues remain to be explored with regard to this field.

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