CONTRIBUTI DI RICERCA CRENOS

THE EFFECT OF SOCIO-ECONOMIC AND EMOTIONAL FACTORS ON GAMBLING BEHAVIOUR

Anna Bussu
Claudio Detotto

WORKING PAPERS

2013/05

CUEC

CENTRO RICERCHE ECONOMICHE NORD SUD
(CRENOS)
UNIVERSITÀ DI CAGLIARI
UNIVERSITÀ DI SASSARI

CRENOS was set up in 1993 with the purpose of organising the joint research effort of economists from the two Sardinian universities (Cagliari and Sassari) investigating dualism at the international and regional level. CRENoS' primary aim is to improve knowledge on the economic gap between areas and to provide useful information for policy intervention. Particular attention is paid to the role of institutions, technological progress and diffusion of innovation in the process of convergence or divergence between economic areas. To carry out its research, CRENoS collaborates with research centres and universities at both national and international level. The centre is also active in the field of scientific dissemination, organizing conferences and workshops along with other activities such as seminars and summer schools.
CRENoS creates and manages several databases of various socio-economic variables on Italy and Sardinia. At the local level, CRENoS promotes and participates to projects impacting on the most relevant issues in the Sardinian economy, such as tourism, environment, transports and macroeconomic forecasts.

www.crenos.it
info@crenos.it

CRENoS – CAGLIARI
VIA SAN GIORGIO 12, I-09100 CAGLIARI, ITALIA
TEL. +39-070-6756406; FAX +39-070- 6756402

CRENoS - SASSARI
VIA TORRE TONDA 34, I-07100 SASSARI, ITALIA
TEL. +39-079-2017301; FAX +39-079-2017312

Title: THE EFFECT OF SOCIO-ECONOMIC AND EMOTIONAL FACTORS ON GAMBLING BEHAVIOUR

ISBN: 978 88 84 67 817 1

First Edition: March 2013

Via Is Mirrionis, 1
09123 Cagliari
Tel./Fax 070 291201
www.cuec.it

The effect of socio-economic and emotional factors on gambling behaviour

Anna Bussu[a c], Claudio Detotto[b]

[a] *Department of Political Science, Communication Sciences and Information Engineering, University of Sassari,*
[b] *Department of Economics and Business (DiSEA) and CRENoS, University of Sassari*

Abstract

Gambling represents a channel through which some relevant aspects of our social life, such as audacity, competition and risk, manifest themselves. Gambling is both a pleasing diversion and a way of socialisation, where gratification and problematic issues alternate. Most gamblers are social players who participate in games without any relevant implications on their life, regardless of how frequently they engage in the activity. Unfortunately, in some cases gaming activities can have a dramatic impact on the player to the point that he/she has little control over them. In such cases, the approach to gaming can be defined as critical or even pathological. Pathological gambling is a serious form of addiction that causes gamblers to suffer from social and financial problems as they constantly look for ways to increase their "dose".

This study proposes a bivariate ordered probit approach aimed at examining the emotional factors of gambling expenditures and problematic behaviour or addiction while also controlling for socio-economic determinants. It is based on a survey among 1,315 gamblers in Sardinia (Italy) in the time span from June 2004 to March 2005. To measure gambling-related problems and gaming addiction we use survey responses on the existence of problems caused by game participation (in terms of psychological, relational, economic, labour difficulties directly linked to gambling) and on the need for help and/or the intention to stop the gambling experience.

The findings show that women bet less than men and that income and gambling frequency are positively correlated with the amount of money allocated to gambling. Furthermore, having a sense of omnipotence and being willing to replay in case of a win increase the propensity to bet more money. Notably, women have a higher probability to be problematic gamblers after controlling for all other characteristics. Income is negatively associated with problematic gamblers while those who experience guilt or frustration after a loss and bet a higher amount of money have a higher probability of exhibiting gambling-related problems.

Those who have other players in their family (wife/husband, children, brother/sister, parents and grandparents), do not play alone and gamble for many hours a day have a higher probability to become pathological gamblers. In addition, income positively affects the probability to have pathological consequences while education is negatively correlated to it. Finally, experiencing satisfaction in case of a

win, disappointment in case of loss and excitement in the middle of the game is negatively associated with pathological players.

[c] Corresponding author: email: abussu@uniss.it - Department of Political Science, Communication Sciences and Information Engineering, University of Sassari, Piazza Università 11, Sassari (I-07100

Jel Codes: C35; D01; D81; D87
Psycinfo Codes: 3233
Keywords: problem gambling; risk factors; emotional factors; gambling behaviour

1. Introduction

Gambling refers to any activity involving a bet and whose final outcome is essentially influenced by aleatory elements and, in some cases, by a gambler's skill. The interest in carrying out a research on gambling activities arises from the fact that it involves large sections of the adult population in many social aspects such as competition, boldness, risk-propensity and consumption choices (Zuckerman, 1983; Zuckerman and Khulman, 2000).

The gambling industry is very large all around the world and it accounts for several billions of dollars. In the United States one-third of all adults regularly participate in games (Narayanan and Manchanda, 2012) and, according to "H2 Gambling Capital" (2012), a consultancy based in London, the country exhibits the highest gross win in the world ($80.45 billions) while Italy, with an average per capita loss of $517 and gaming revenues of $19.05 billion, is the leading country in Europe and the 4th in the world. It is not a surprise that some of the European countries that suffer the most from the economic crisis are at the top of this ranking, namely Spain, Greece, Italy and Ireland. As a matter of fact, economic literature have highlighted the role of business cycles on gambling and how during economic recessions lotteries are seen as a way to increase disposable income, especially among people on a low-wage[1]. Such phenomenon is particularly evident in urban areas due to the higher supply of games and the higher presence of potential clients (Imbucci 1997, 1999; Sarti and Triventi, 2012). In fact, the main incentive for participation in a lottery is the disproportion between the very low cost of the ticket and the potentially very high winning prizes, which makes it accessible also to risk-adverse and low-income consumers. However, since lotteries and games are an easy way to collect resources, many states tend to incentivize such activities during recessions in order to finance public needs.

It is worth noticing that gaming activity has not just an economic motivation but it is also a pleasant and compensatory diversion and an interesting chance for people to come together, socialise and share special moments (Conlisk, 1993; Chantal, 2001).

[1] For many years gambling has been considered a recession-proof business but it does not seem to be the case in last economic crisis, probably due to industry saturation in many developed countries (Tripoli, 2009).

Unfortunately, an inappropriate relationship with it, characterized by a lack of self-control on the player's part, can result in serious consequences relating to psychological, relational and economic aspects of the player's life (Zuckerman, 1999; Zuckerman and Khulman, 2000). The problems associated with gambling activity occur when it unleashes unstoppable and uncontrollable impulses that, in the long run, may dramatically affect the gambler's life. In such cases, we speak of dependency or, more accurately, of addiction. While the first term refers to medical issues and is more closely associated with the physiological consequences of substance taking, the concept of "addiction" refers to the psychological dimensions that drive the individual towards the desired object, producing behavioural effects such as compulsion and loss of control (Patrizi and Bussu, 2008). In this sense, pathological gambling can be defined as an "addiction without a substance" because of the uncontainable impulse that leads the individual to engage in an activity that is in itself rewarding but progressively affects both the subjective capacity to manage the behaviour of game and other spheres of activity (Langer, 1975; Langer and Roth, 1975).

As in all other types of addiction, the gambler may increase his/her "dose of gambling", betting even more in order to achieve the same level of excitement (tolerance) and/or recover his/her losses. Notably, a strong state of anxiety is experienced when he/she is unable to play or has decided to stop playing (abstinence) (Custer, 1982). In fact, when gambling activity becomes predominant, gamblers could, with a lot of time and effort, conceive, a (kind of) parallel life that is often deliberately hidden to others.

According to Hulen and Burns (1998), gamblers can be classified in several ways, including by psychological needs, motivation, addiction degree, and typology of game. For example, players classified by psychological needs are of two types: *action gamblers* or *escape gamblers*. The former prefer active games in which the skill and strategy of the player are crucial, such as cards, sports betting etc.; the latter, especially when they are women, participate just to escape from stressful situations or events and select games where the luck component prevails (Hulen and Burns, 1998).

The majority of gamblers fall under the category of *social gamblers,* who can play regularly or occasionally for fun or socialising without losing control over their own actions, thus avoiding any negative consequences. In contrast *problematic gamblers* suffer from psychological, relational and affective disorders along with economic problems due to

their little control over the game (Dickerson, 1984). When the player approaches the stage of despair and does not have any self-control over gambling activity, he/she can be considered a *pathological gambler* (Custer, 1982; Dickerson, 1984). According to Steel and Blaszczynski (1996), on the one hand, pathological gamblers affected by impulsivity and antisocial personality are more at risk of experiencing negative consequences as a result of their behaviour; on the other hand, those who develop significant problems of gambling addiction could become more impulsive and antisocial in response to attempts to deal with their plight.

Notably, people invest money in the game not only to increase their expected income but also to obtain intangible benefits, such as entertainment, or other intangible goods, such as excitement and enjoyment (Blanco et al. 1996; Loba et al., 2001). Undeniably, among the various needs that gambling is able to satisfy, the search for pleasure is perhaps the most obvious and at the same time the most complex to analyse (for a detailed literature review see Johansson et al., 2009). Many players gamble in order to get the instant gratification associated with the risk of the bet (Zuckerman, 1983). For such reason, many people will prefer to participate in games that give a higher level of excitement, such as poker, horse racing, sports betting, etc.

The emotional elements are not the sole factors influencing gambling activities. In fact, socio-economic and demographic factors affect individual preferences and risk-aversion and, consequently, a player's attitude to gambling. For example, Mikesell (1991) and Eaton (2000) show that income and gambling expenditures are positively correlated, although the share of per capita spending on gambling decreases as income becomes higher. According to Sawkins and Dickie (2002) and Worthington et al. (2007), age positively affects the propensity to gamble among American and Australian players, respectively, while a negative correlation between age and gambling is found by Scott and Garen (1994), Niffenegger and Muuka (2001) and Welte et al (2004). Interestingly, Mikesell (1991) shows that betting expenditure increases with age, although there is a turning point at averagely 44 years old.

Other empirical studies find that different ethnical groups are associated with different attitudes to gambling activities (Clotfelter and Cook, 1987; Livernois 1987; Scott and Garen, 1994; Stranahan and Borg 1998a, 1998b; Liu, 2006; Welte et al., 2004; Tan et al., 2010). Education has a significant and negative impact on game consumption, which

means that more educated people are more risk adverse (Scott and Garen, 1994; Stranahan and Borg, 1998a, 1998b). Niffenegger and Muuka (2001) empirically observe that people with tertiary education, on average, spend more in lotteries than other educated groups.

As highlighted by the abovementioned literature, game expenditures and gambler typology are affected by individual characteristics. Unfortunately, many empirical analyses are limited by the presence of latent variables that could lead to biased estimates and misleading inference. The aim of this study is to overcome such empirical limits by examining the determinants of the spending behaviour of a sample of gamblers and their status of dependence/problems via a bivariate ordered probit model. Precisely, this econometric model is a system of equations, which can overcome the latent variables problem by controlling for potential endogenous variables and correlations between the residuals of each equation.

The study uses a sample of 1,315 gamblers collected through "face to face" questionnaires in Sardinia (Italy) between June 2004 and March 2005 in various typical gambling venues, such as game rooms, bingo rooms and sport betting shops, and it takes into account several types of game, such as lotteries, video poker and casino games. The questionnaire draws inspiration from the South Oaks Gambling Screen (SOGS) (Lesieur and Blume, 1987). Italy is an important case study not only because of its very high per capita expenditure in gaming activity compared to other developed countries, such as the US, the UK, Germany and Japan, but also due to a recent state intervention that will expand the gaming supply dramatically (Hooper, 2012) and might further increase Italians' propensity to gamble. Moreover, the analysis is focused on Sardinia – an island of 1.6 millions inhabitants – which reduces any problems of heterogeneity that may arise from cultural differences among Italian regions.

An important issue concerns the measuring of gambling addiction and gambling-related problems. Since it is impossible to measure such phenomena objectively, we use the subjective responses of the interviewed. Precisely, in our study the problematic gambler is identified by a set of items investigating the presence of psychological, economic, relational, labour, emotional and sexual problems directly related to game activities, while the pathological gambler is associated not only with gaming problems but also with those respondents who

state their need for help and/or their intention to stop the gambling experience. In order to limit the well-known problems[2] of underestimation – due to the gamblers' reluctance to manifest their condition – and overestimation – owing to some people trying to get attention – different items have been compared in order to verify the robustness of the results.

Notably, the need for help in the case of pathological gambling behaviour is not always related to the gamblers' awareness of being suffering from an addiction but rather to the impact that critical and stressful situations and emotional components have in their lives. Unfortunately, the most important barriers preventing the gamblers from stopping their betting activity and asking for counselling are shame, denial and social factors and not a lack of information or trust in local support agencies (Evans and Delfabbro, 2005).

The individual factors under study refer to a broad range of characteristics: age, income, education, family status, presence of other gamblers in the respondent's family, attitude to playing alone and so on. Furthermore, a set of emotional indicators are considered in order to estimate the effects of the emotions felt during the game and after a win/loss on gambling expenditures and the probability of the player being a social, problematic or pathological gambler.

The paper is organised as follows. Section 2 describes the econometric approach and the dataset in detail. The results of the paper are presented in Section 3. Finally, Section 4 concludes the paper.

2. Empirical approach

Following the empirical literature on gambling behaviour (Delfabbro and Thrupp, 2003; Worthington et al., 2007; Tan et al., 2010), this study proposes the bivariate ordered probit model illustrated below to explore the impact of socio-economic and emotional factors on gambling expenditures and gambling-related problems or addiction. To be precise, by using a survey of 1,315 gamblers in Sardinia from June 2004 to March 2005, the following econometric model is estimated:

[2] See Johnson et al. (1998) for a detailed review of the literature.

$$y_{1i} = X_{1i}\beta_1 + e_{1i} \quad (1a)$$
$$y_{2i} = y_{1i}\gamma + X_{2i}\beta_2 + e_{2i} \quad (1b)$$

for $i = 1, 2, \ldots, n$. Model (1a)-(1b) constitutes a system of equations (Sajaia, 2012), where y_{1i}, *BET*, is associated to four stated gambling expenditure classes (1 for bets of less than 10 euros, 2 for bets between 11 and 50 euros, 3 for bets between 50 and 300 euros, 4 for bets higher than 300 euros), while y_{2i} represents two binary variables: 1) the respondents' subjective social representations of problems caused by gambling activities (*PROBLEMS*); 2) the need for help and/or the intention to stop the gambling experience (*PATHOLOGY*). In this sense, two different systems are regressed by using one indicator at a time. Notably, 21.2% of the sample claimed to be engaging in gambling activities due to relationship problems with family and friends, economic problems, sexual difficulties and psychological stress, while 12.5% of respondents declared to also have asked for help and/or to have had the intention to stop the gambling experience. BET indicates the daily amount of money spent on gambling: 56.3% of the respondents bet less than 10 euros, 27.44% between 11 and 50 euros, 14.09% between 50 and 300 euros, 2.2% more than 300 euros.

With this model it is possible to have the expected joint dependence of both dependent variables. To be precise, the endogenous y_{1i} is simultaneously determined with y_{2i}. Hence, X_1 and X_2 are matrices of observables, β_1 and β_2 are vectors of parameters, γ is a scalar representing the effect of y_{1i} on y_{2i}. Finally, e_1 and e_2 are two error terms, assumed to be jointly normal with correlation coefficient ρ and uncorrelated with the explanatory variables, i.e. $E(X_i,e_{1i}) = 0$ and $E(X_i,e_{2i}) = 0$. The parameters in the system of equations (1a)-(1b) are identified only if $X_1 \neq X_2$, i.e. at least one column of X_1 should not be present in X_2 (Sajaia, 2012). Notably, the simultaneous bivariate ordered probit model expressed in equations (1a)-(1b) is simplified in a seemingly unrelated specification when $\gamma = 0$, as shown in the following system:

$$y_{1i} = X_{1i}\beta_1 + e_{1i} \quad (2a)$$
$$y_{2i} = X_{2i}\beta_2 + e_{2i} \quad (2b)$$

In the above specification, y_{1i} has no effect on y_{2i} but the system takes into account the correlation between the two error terms, e_1 and e_2, increasing the efficiency of the estimates β_1 and β_2 (Greene, 2003).

According to the statistical test on the parameter γ, specification (1a)-(1b) or (2a)-(2b) is considered.

The matrices X_i includes the following socio-economic and behavioural factors. AGE_i represents the age of the i-th respondent, while $FEMALE_i$ is a dummy variable that has a value of one if the player is female. *SINGLE*, *DIVORCED*, *WIDOWER* and *MARRIED* are dummies that indicate the family status of the gamblers.

DISTANCE measures the distance in kilometres between the respondents' residences and their habitual gambling places. The expected sign is not obvious. On the one hand, since the higher are the distances the higher is the cost of transfers, we might expect long distances to be associated with low bets due to budget constraints. On the other hand, a positive relationship between distances and bets could be also expected because players can reduce the number of transfers and increase the amount of money they play as the distance increases.

EDUCATION and *INCOME* indicate individual education and income level, respectively. According to Winters et al. (1993) and Ladouceur et al. (1999), a negative relationship exists between education and the risk of pathological gambling. A positive correlation between *INCOME* and gambling expenditure is expected since higher income level can be associated with the allocation of higher amount of money to gambling consumption.

TIME_EXPERIENCE measures the number of years passed since the first gambling experience. As gambling expenditures exhibit a positive trend, a positive sign is expected (Bolen and Boyd, 1968). *ALONE* is a dummy that has a value of one if the gambler usually plays alone.

GENETIC and *FAMILY* are two dummies that have a value of one if the parents and grandparents were gamblers and if other members of the family (wife/husband and children) gamble regularly. This way, we can control for genetic and/or emulative behaviour of gamblers. In both cases a positive relationship is expected (Gupta and Derevensky, 1997; Bergh et al., 1997).

WEEK_TIMES and *N_HOURS* indicate the number of times per week and the number of hours per day in which respondents gamble. Since pathological gamblers tend to increase their "dose" over time, a positive sign is expected for both variables.

The last set of variables includes emotional dummies that can affect gamblers' behaviour. To be precise, the feelings and psychological processes of gamblers during their gambling activities are collected

through survey questionnaires. The information is divided in three groups according to whether such feelings were experienced during the game, in case of win or in case of loss. Each respondent can indicate up to three choices per group.

The first set of dummies represents the feelings in case of win: *WIN_EUPHORIA*, *WIN_PLEASURE*, *WIN_SATISFACTION*, *WIN_REPLAY* (it has a value of one when the gambler feels the desire to replay immediately), *WIN_OMNIPOTENCE* (it equals one when the gambler feels a sense of omnipotence) and *WIN_OTHERS*. The second group of covariates represents the feelings in case of loss: *LOSS_GUILT*, *LOSS_FRUSTRATION*, *LOSS_DISAPPOINTMENT*, *LOSS_EXCITEMENT*, *LOSS_ANGER*, *LOSS_REDEEM*, *LOSS_LOW_SELF_ESTEEM* and *LOSS_HELPLESSNESS*. Finally, the third set accounts for the gamblers' emotions during the game: *DURING_EUPHORIA*, *DURING_PLEASURE*, *DURING_SATISFACTION*, *DURING_ANXIETY*, *DURING_EXCITEMENT*, *DURING_FRUSTRATION*, *DURING_ANGER* and *DURING_OTHERS*. Table 1 shows a short description of all these variables.

All the abovementioned variables are included in both matrices X_1 and X_2, except for *DISTANCE,* which is included in X_1 and not in X_2 as it only affects gambling consumption. Table 2 summarises the descriptive statistics of all the variables in use.

[TABLE 1 HERE]

[TABLE 2 HERE]

3. Results and discussion

In a first stage, equations (1a)-(1b) are estimated by using a two-stage approach. The simultaneous specification is tested through the statistical test on the γ parameter. If it is statistically different from zero, the simultaneous specification of (1a)-(1b) is displayed, otherwise the seemingly unrelated specification of (2a)-(2b) is regressed and presented.

Table 3 shows the results of the bivariate order probit using both gambling expenditures and the respondents' subjective social representations of gambling-related problems as dependent variables. Looking at the bottom of the columns (1) and (2) of Model (1), the significance of the ρ statistic (=-0.624; p-value < 0.10) and the

Likelihood Ratio (LR) test of independent equations (=12.63; p-value < 0.01) provide evidence that the residuals in the two equations are correlated, thus justifying the use of a bivariate model. Furthermore, the γ statistic (=0.824; p-value < 0.01) is highly significant, which indicates an endogenous relationship between the dependent variables. As one can expect, γ is positive, i.e. the higher is the average bet the more likely it is that problems will arise. In other words, by using a bivariate ordered probit model it is possible to control for the effect of the amount of money played by gamblers on their subjective statement through the parameter ρ, the presence of latent variables not included into the analysis and through the parameter γ, which could affect both dependent variables. Furthermore, all the cut-offs (*/CUT11*, */CUT12*, */CUT13* and */CUT21*) statistical tests and the Wald test on the joint significance of the coefficients are quite beyond the critical value (at 99% level confidence). They can be considered as an index of goodness of fitting of the model.

Notably, age and family status have no effects on the amount of money played by the players. On average, women bet less money than men while income is positively related with bet values. Such a result is quite intuitive since the higher the disposable income, as in the case of male and wealthy individuals, the higher the amount of money allocated for gambles. Furthermore, Wärneryd (1996), Sawkins and Dickie (2002) and Welte et al. (2004) show that women are more risk averse than men, which leads to a reduction in gambling participation. The non-linearity of the income effect is also tested by including a quadratic transformation of *INCOME* into the model (see column (1) of Model (2)) but its coefficient is not statistically different from zero.

Interestingly, *DISTANCE*, *WEEK_TIMES* and *N_HOURS* increase the probability of gamblers betting higher values, which indicates that bets rise as the distance travelled and the weekly and daily frequency increase. Such findings empirically confirm the effects of problematic gambling showing that gamblers constantly look for ways to increase their "dose" both in terms of time and money allocated for gambling activities. As indicated in Model (2), two interaction variables, namely "*WEEK_TIMES* × *DISTANCE*" and "*N_HOURS* × *DISTANCE*", are inserted among the regressors in order to check for the presence of a trade-off between the distance travelled and the frequency of gambling activities. The rationale is that one could reduce the time frequency of gambling activity as the distance to reach the place increases in order to minimise travel costs. According to the

statistical test on the significance of the coefficients in column (1) of Model (2), no trade-offs seem to appear.

In relation to the emotional factors that might have an effect during or at the end of the play, two indicators, namely *WIN_REPLAY* and *WIN_OMNIPOTENCE*, are statistically significant. To be precise, those gamblers who exhibit the willing to replay or a sense of omnipotence after a win tend to have a higher probability to bet more than other players. In such a model, no effect seems to derive from the emotions felt during the gambling activities or after a loss. In this sense, emotions associated with positive events (win) seem to play a relevant role in explaining the amount of money allocated for gambling.

Column (3) and (4) of Model (1) show the effects of regressors on the respondents' subjective assessment of having health, wealth, affective or relational problems directly stemming from their game participation. As before, the variables *FEMALE* and *INCOME* are statistically significant. Interestingly, women and low-income people are more likely to state their problems. A possible explanation of these last findings is that individuals with lower income might be more easily affected by economic problems due to more binding budget constraints.

Those players who experience guilt (*LOSS_GUILT*) and frustration (*LOSS_FRUSTATION*) when they lose are more likely to be problematic gamblers. Hence, one can say that negative feelings arising from a loss can be a positive factor as players who experience them are more likely to recognise their condition and problems. In other words, the sense of guilt and frustration could be used as an indicator allowing specialists to identify gamblers at risk of problematic condition.

Table (4) shows the results of the seemingly unrelated bivariate ordered probit regression[3] using the four bet classes (*BET*) and the subjective statement of need for help and/or the intention to stop the gambling experience along with the problematic condition (*PATHOLOGY*). The variable *PATHOLOGY* is more binding than the one used before (*PROBLEMS*) because players are aware not only of the problems arising from gambling activity but also of the advantages they could obtain by stopping it. In this sense, admitting their need for help

[3] In a preliminary analysis, the presence of the endogenous term γ has been tested and the null hypothesis of absence of endogeneity cannot be rejected. Hence, Model (2a)-(2b) is regressed and presented.

or the intention to stop gambling means that the benefits, both in emotional and monetary terms, associated with such games have become less relevant than the costs they entail.

In the bottom of Column (1)-(2)-(3)-(4) of Model (1) diagnostic tests are presented. All the cut-offs (*/CUT11*, */CUT12*, */CUT13* and */CUT21*) statistical tests and the Wald test on the joint significance of the coefficients are quite beyond the critical value (at 99% level confidence), which indicates a more than satisfactory goodness of fitting of the model. The ρ parameter statistical test (=0.371; p-value < 0.01) and the LR test of independent equations (=13.69; p-value < 0.01) are also quite beyond the critical values.

Columns (1)-(2) of Model (1) represent the estimates of the factors that can affect bet choices. As before, *FEMALE*, *INCOME*, *DISTANCE*, *WEEK_TIMES*, *N_HOURS*, *WIN_REPLAY* and *WIN_OMNIPOTENCE* are significant while the quadratic term of *INCOME* and the interaction variables "*WEEK_TIMES* × *DISTANCE*" and "*N_HOURS* × *DISTANCE*" in Column (1)-(2) of Model (2) are not statistically different from zero.

In Columns (3)-(4) of Model (1), the results of the second equation of the system are shown. *EDUCATION*, *ORIGIN*, *FAMILY* and *N_HOURS* are positively related with the probability of becoming a pathological gambler while *ALONE* and *INCOME* are negatively correlated to it. Notably, a high gaming frequency and the presence of other players in the family (wife/husband, children, brother/sister, parents and grandparents) increase the willingness to stop gambling activity. Furthermore, those gamblers who bet alone are less likely to admit that they need help or that they have the intention to stop gambling.

The feelings in case of win/loss and during gambling affect the probability of respondents being suffering from malaise. Precisely, the self-reported emotions of satisfaction in case of win (*WIN_SATISFACTION*), disappointment (*LOSS_DISAPPOINTMENT*) in case of loss and excitement during the game (*DURING_EXCITEMENT*) decrease the probability of respondents being suffering from a pathologic condition. Hence, such emotions lead to a reduction in the benefits arising from the game and make gamblers desire to stop playing or ask for help in this matter.

4. Conclusions

The relationship between socio-economic variables and gambling behaviour has been widely analysed by scholars, while, to our knowledge, the impact of psychological and emotional factors have not been fully explored, despite their importance in theoretical literature. In fact, the emotions felt at the end, both in case of win or loss, and during the game affect individual utility, since they increase costs and benefits associated with game output, and, consequently, the probability to switch from a social gambler typology to a problematic or a pathological one. Gambling can be explained with the need of sensation seeking where the positive reinforcement is linked to the anticipatory arousal felt during the game (Zuckerman, 1979), depending on the player and on game typologies (Coventry and Brown, 1993; Le Breton, 1995).

Understanding the risks of gambling and investigating how to maintain a proper relationship with games represent the first step in providing social policies that effectively contain gaming problems. Gaming is not negative in itself since it reflects some relevant aspects of our social life, such as audacity, competition and risk. Hence, promoting prevention campaigns and providing psychological interventions is necessary not only in the presence of gambling addiction or problems but also in case of recreational gambling activities as it incentivizes responsible approaches to gaming.

By employing a bivariate ordered probit approach, this paper aims to examine both the socio-economic and the emotional determinants of game behaviour, in terms of expenditures and probability for a player to become a problematic or pathological gambler, among a survey of 1,315 players in Sardinia (Italy). The self-reported information about the existence of problems due to game participation (in terms of economic, psychological, labour difficulties directly linked to gambling, etc.) and also the need for help and/or the intention to stop the gambling experience are taken as measures of gambling-related problems and gambling addiction, respectively.

The findings show that being male, gambling with high frequency, having a sense of omnipotence and being willing to replay in case of a win are positively associated with a higher average gaming consumption. Such findings are perfectly in line with recent literature (Breiter et al., 2001; Kuhnen and Knutson, 2005; Lee and et., 2007) indicating that positively aroused feelings may incentivize risk taking.

Female players show, *ceteris paribus*, a higher probability of being problematic gamblers. Income is negatively associated with problematic

gambling while those who experience guilt and frustration after a loss and bet a higher amount of money have a higher probability of exhibiting gambling-related problems.

Those who have other players in their family (wife/husband, children, brother/sister, parents and grandparents), do not play alone and gamble for many hours a day have a higher probability of being pathological gamblers. The familial gambling is a relevant aspect as far as problematic gamblers are concerned. In this regard, by employing a survey analysis in Montreal, Gupta and Derevensky (1997) find that "86% of children who gamble regularly reported gambling with family members".

Income positively affects the probability of having pathological consequences while education is negatively correlated with them. Finally, experiencing satisfaction in case of a win, disappointment in case of a loss and excitement in the middle of the game is negatively associated with pathological players.

However, when interpreting these results, one should be aware of some caveats. Firstly, although self-related data offers many information about emotions and health of respondents, some problems could arise from underestimation and overestimation of problematic/pathological gamblers rates, which might reduce the explanative power of our models. To avoid such bias, different items have been compared in order to verify the robustness of respondents' answers. Secondly, the results of the present study may have limited generalizability since it focuses only on a specific area of Italy but, at the same time, heteroscedasticity problems arising from different cultural factors among Italian regions are more likely to be avoided. Finally, as a further step of this research and subject to data availability, the analysis will be extended to the estimation of the risk factors – both emotional and socio-economics – of gambling behaviour in different typologies of game.

References

Blanco, C., Orensanz-Munor, L., Blanco-Jerez, C., & Sàiz-Ruiz, J. (1996). Pathological gambling and platelet MAO activity: A psychobiological study. *American Journal of Psychiatry*, *153*, 119–121.

Bergh, C., Eklund, T., Sodersten, P., & Nordin, C. (1997). Altered dopamine function in pathological gambling. *Psychological Medicine*, *27*, 473–475.

Bolen, D. W., & Boyd, W. H. (1968). Gambling and the gambler: a review and preliminary findings. *Archives General Psychiatry*, *18*, 617-630.

Breiter, H.C., Aharon, I., Kahneman, D., Dale, A., & Shizgal, P., (2001). Functional imaging of neural responses to expectancy and experience of monetary gains and losses. *Neuron*, *30*, 619–639.

Chantal, Y., Vallerand, R. J., & Vallières, E. F. (2001). Motivation and gambling involvement. *The Journal of Social Psychology*, *135*, 755-763.

Clotfelter, C. T., & Cook, P. J. (1987). Implicit taxation in lottery finance. *National Tax Journal*, *40*, 533–546.

Conlisk, J., (1993). The utility of gambling. *Journal of Risk and Uncertainty*, *6*, 255-275.

Coventry, K. R., & Brown, R. I. F. (1993). Sensation seeking, gambling and gambling addictions. *Addiction*, *88*, 541-554.

Custer, R. L. (1982). Pathological gambling. In Whitfield A. (Ed.), Patients whit alcoholism and other drug problems. New York: Year Book Publisher.

Delfabbro P., & Thrupp L. (2003) "The social determinants of youth gambling in South Australian adolescents", *Journal of Adolescents*, *26*, 313-330.

Dickerson, M. G. (1984). *Compulsive gamblers*. New York: Longman Group Ltd.

Eaton, D.H. (2000) *The Kentucky lottery*. Research Article. College of Business and Public Affairs, Murray State University, Murray, KY. [WWW document]. URL

http://www.murraystate.edu/qacd/cbpa/bber/articles/eaton.pdf (accessed on 11 March 2013).

Evans, L., Delfabbro, P. H. (2005). Motivators for Change and Barriers to Help-Seeking in Australian Problem Gamblers, *Journal of Gambling Studies*, *21*, 2, 133-155.

Greene, W. H. (2003). Econometric Analysis. (5th Edition). New Jersey: New York University.

Gupta, R., & Derevensky, J. (1997). Familial and social influences on juvenile gambling behavior. *Journal of Gambling Studies*, *13*, 179-192.

H2 Gambling Capital (2012). *Leading Global Gambling Nations – Asia and eGaming Continue to Out Perform*. [WWW document]. URL http://www.h2gc.com/article/leading-global-gambling-nations--asia-and-egaming-continue-to-out-perform (accessed on 11 March 2013).

Hooper, J. (2012). Gambling addiction takes its toll in Italy. *The Guardian*. [WWW document]. URL http://www.guardian.co.uk/world/2012/dec/25/gambling-addiction-takes-toll-taly (accessed on 11 March 2013).

Hulen, D., & Burns, P. (1998). *Differences in Pathological Gamblers in Arizona*. Arizona Council on Compulsive Gambling. [WWW document]. URL http://azccg.org/Action_or_Escape.html (accessed on 11 March 2013).

Imbucci, G. (1997). *Il gioco. Lotto, totocalcio, lotterie. Storia dei comportamenti sociali*. Venezia: Marsilio.

Imbucci, G. (1999). *Il gioco pubblico in Italia. Storia, cultura e mercato*. Venezia: Marsilio.

Johansson, A., Grant, J. E., Kim, S. W., Odlaug, B. L., Götestam, K. G. (2009). Risk Factors for Problematic Gambling: A Critical Literature Review. *Journal of Gambling Studies, 25*, 67-92.

Johnson, E. E., Hamer, R. M., & Nora, R. M. (1998). The lie/bet questionnaire for screening pathological gamblers: A follow-up study. *Psychological Reports*, *83*, 1219-1224.

Kuhnen, C. M., & Knutson, B. (2005). The Neural Basis of Financial Risk Taking. *Neuron*, *47*, 763-770.

Ladouceur, R., Boudreault, N., Jacques, C., & Vitaro, F. (1999). Pathological gambling and related problems among adolescents. *Journal of Child & Adolescent Substance Abuse*, *8*, 55–68.

Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, *32*, 311-328.

Langer, E.J., & Roth, J. (1975). Heads I win, tails it's chance: The illusion of control as a function of the sequence of outcomes in a purely chance task. *Journal of Personality and Social Psychology, 32*, 951-955.

Le Breton, D. (1995). *La passione del rischio*. Torino: Gruppo Abele.

Lesieur, H., & Blume, S. B. (1987). The South Oaks Gambling Screen (The SOGS): a new instrument for the identification of pathological gamblers. *American Journal of Psychiatry*, *144*, 1184-1188.

Livernois, J. R. (1987). The redistributive effect of lotteries: evidence from Canada. *Public Finance Quarterly*, *15*, 339–351.

Lee, H. P., Chae, P. K., Lee, H. S., & Kim, Y. K. (2007). The five-factor gambling motivation model. *Psychiatry Research*, *150*, 21–32

Liu, L. (2006). Casinos winning big by betting on Asians. *Washington Post*. The Associated Press.

Loba, P., Stewart, S. H., Klein, R. M., & Blackburn, J. R. (2001). Manipulations of the features of standard Video Lottery Terminal (VLT) games: Effects in pathological and non-pathological gamblers. *Journal of Gambling Studies*, *17*, 297–320.

Mikesell, J. L. (1991). Lottery expenditure in a non-lottery state. *Journal of Gambling Studies*, *7*, 89–98.

Narayanan, S., & Manchanda, P. (2012). An empirical analysis of individual level casino gambling behavior. *Quantitative Marketing and Economics*, *10*, 27-62.

Niffenegger, P., & Muuka, G. N. (2001). To gamble or not to gamble? An empirical survey of the gambling preferences of residents of Marshall County, Kentucky. *Journal of Business and Public Affairs*, *28*, 94–102.

Patrizi, P., & Bussu, A. (2008). Il giocatore d'azzardo: la narrazione tra socialità e problematicità. *Rassegna di Psicologia*, *3*, 59-83.

Sajaia, Z. (2012) "Maximum likelihood estimation of a bivariate ordered probit model: implementation and Monte Carlo simulations", *The Stata Journal*, forthcoming.

Sarti, S., & Triventi, M. (2012). Il gioco d'azzardo: l'iniquità di una tassa volontaria. La relazione tra posizione socio-economica e propensione al gioco. *Stato e Mercato*, *96*, 503-533.

Sawkins, J. W., & Dickie, V.A. (2002). National lottery participation and expenditure: preliminary results using a two stage modelling approach. *Applied Economics Letters*, *9*, 769–773.

Scott, F., & Garen, J. (1994). Probability of purchase, amount of purchase, and the demographic incidence of the lottery tax. *Journal of Public Economics*, *54*, 121–143.

Steel, Z., & Blaszczynski, A. (1996). The factorial structure of pathological gambling. *Journal of Gambling Studies*, *12*, 3–20.

Stranahan, H. A., & Borg, M. O. (1998a). Separating the decisions of lottery expenditures and participation: a truncated Tobit approach. *Public Finance Review*, *26*, 99–117.

Stranahan, H. A., & Borg, M. O. (1998b). Horizontal equity implications of the lottery tax. *National Tax Journal*, *51*, 71–82.

Tan, A. K. G., Yen, S. T., & Nayga Jr., R. M. (2010). Socio-demographic determinants of gambling participation and expenditures: evidence from Malaysia. *International Journal of Consumer Studies*, *34*, 316–325.

Tripoli, L. (2009). Wasn't the gaming law business supposed to be recession-proof? *Gaming Law Review and Economics*, *13*, 23-26.

Zuckerman, M. (1979). *Sensation seeking: beyond the optimal level of arousal*. New Jersey: L. Erlbaum Associates.

Zuckerman, M. (1999). *Vulnerability to Psychopathology: A biosocial Model*. (1st ed.). Washington: American Psychiatric Association.

Zuckerman, M., & Khulman, D. M. (2000). Personality and risk taking: Common biosocial factors. *Journal of personality*, *68*, 999-1028.

Zuckerman, M. (1983). La ricerca di forti sensazioni, *Psicologia Contemporanea*, *59*, 26-32.

Wärneryd, K. E. (1996). Risk attitudes and risky behavior. *Journal of Economic Psychology*, *17*, 749-770.

Welte, J. W., Barnes, G. M., Wieczorek, W. F., Tidwell, M. C. O., & Parker, J. C. (2004). Risk factors for pathological gambling. *Addictive Behaviors*, *29*, 323–335.

Winters, K. C., Stinchfield, R., & Fulkerson, J. (1993). Patterns and characteristics of adolescent gambling. *Journal of Gambling Studies*, *9*, 371–386.

Worthington, A.C., Brown, K., Crawford, M., & Pickernell, D. (2007). Socioeconomic and demographic determinants of household gambling in Australia. *Review of Economics of the Household*, *5*, 209–222.

Table 1. Description of variables

Variable	Description
BET	A categorical variable that has a value of 1 for bets of less than 10 euros; 2 for bets between 11 and 50 euros; 3 for bets between 50 and 300 euros; 4 for bets higher than 300 euros.
PROBLEMS	A dummy variable that has a value of 1 if the respondent states to be suffering from gambling-related problems, namely economic, relational, labour, emotional and sexual problems.
PATHOLOGY	A dummy variable that has a value of 1 if the respondent states to be in need of help and/or wanting to stop the gambling experience.
AGE	It represents the age of the respondent.
FEMALE	A dummy variable that has the value of 1 if the respondent is female.
DISTANCE	A categorical variable that represents the distance travelled to go to the gaming venue: it has a value of 1 for distances of less than 5 km; 2 for distances between 6 and 25 km; 3 if distances are between 26 and 40 km; 4 if they are between 41 and 60 km; 5 if they are between 60 and 100 km; 6 if they are higher than 100 km.
SINGLE	A dummy variable that has the value of 1 if the respondent is single.
DIVORCED	A dummy variable that has the value of 1 if the respondent is divorced.
WIDOW/ER	A dummy variable that has the value of 1 if the respondent is a widow/er.
MARRIED	A dummy variable that has the value of 1 if the respondent is married.
EDUCATION	A categorical variable that, accordingly to the highest education degree, has a value of 1 if the respondent is illiterate or unschooled; 2 if he/she has a primary school dipolma; 3 if he/she has a middle school diploma; 4 if he/she has a secondary school diploma; 5 if he/she has a tertiary degree; 6 if he/she has a post-graduate degree.
INCOME	A categorical variable that has a value of: 1 for incomes of less than 10,000 euros; 2 for incomes between 10,000 and 15,000 euros; 3 for incomes between 15,000 and 20,000 euros; 4 for incomes between 20,000 and 30,000 euros; 5 for incomes between 30,000 and 40,000 euros; 6 for incomes higher than 40,000 euros.
TIME_EXPERIENCE	A categorical variable that indicates how old the respondent was when he/she gambled for the first time. It has a value of 1 if he/she was less than 15

	years old; 2 if he/she was between 15 and 18 years old; 3 if he/she was between 18 and 25 years old; 4 if he/she was between 26 and 30 years old; 5 if he/she was between 31 and 45 years old; 6 if he/she was between 46 and 60 years old; 7 if he/she was older than 60.
GENETIC	A dummy variable that has a value of 1 if the respondent's father, mother or grandparents gamble.
FAMILY	A dummy variable that has a value of 1 if the respondent's family (wife/husband or his/her children) gambles.
WEEK_TIMES	A categorical variable that indicates how many times the respondent gambles in a week. It has a value of 1 if he/she never gambles; 2 if he/she does it once; 3 if twice; 4 if three times; 5 if more than 3 times.
N_HOURS	A categorical variable that indicates for how long the respondent gambles in a day. It has a value of 1 if he/she never gambles; 2 if he/she gambles for less than 30 minutes; 3 if he/she gambles for 30 to 1 hour; 4 if he she gambles for 1 to 2 hours; 5 if he/she gambles for 2 to 4 hours; 6 if he/she gambles for more than 4 hours.
ALONE	A dummy variable that has a value of 1 if the respondent usually plays alone.
WIN_EUPHORIA	A dummy variable that has a value of 1 if the respondent is euphoric in case of win.
WIN_PLEASURE	A dummy variable that has a value of 1 if the respondent feels pleasure in case of win.
WIN_SATISFACTION	A dummy variable that has a value of 1 if the respondent feels satisfied in case of win.
WIN_REPLAY	A dummy variable that has a value of 1 if the respondent feels an urge to try again in case of win.
WIN_OMNIPOTENCE	A dummy variable that has a value of 1 if respondent feels a sense of omnipotence in case of win.
WIN_OTHERS	A dummy variable that has value of 1 if the respondent feels a different emotion from the ones listed before in case of win.
LOSS_GUILT	A dummy variable that has a value of 1 if the respondent feels a sense of guilt in case of loss.
LOSS_FRUSTRATION	A dummy variable that has a value of 1 if the respondent feels frustrated in case of loss.
LOSS_DISAPPOINTMENT	A dummy variable that has a value of 1 if the respondent is disappointed in case of loss.
LOSS_EXCITEMENT	A dummy variable that has a value of 1 if the respondent is excited in case of loss.
LOSS_ANGER	A dummy variable that has a value of 1 if the respondent is angered in case of loss.
LOSS_REDEEM	A dummy variable that has a value of 1 if the

	respondent feels some need of redeeming himself/herself in case of loss.
LOSS_LOW_SELF_ESTEEM	A dummy variable that has a value of 1 if the respondent has low self-esteem in case of loss.
LOSS_HELPLESSNESS	A dummy variable that has a value of 1 if the respondent feels helpless in case of loss.
DURING_EUPHORIA	A dummy variable that has a value of 1 if the respondent is euphoric during the game.
DURING_PLEASURE	A dummy variable that has a value of 1 if the respondent feels pleasure during the game.
DURING_SATISFACTION	A dummy variable that has a value of 1 if the respondent feels satisfied during the game.
DURING_ANXIETY	A dummy variable that has a value of 1 if the respondent is anxious during the game.
DURING_EXCITEMENT	A dummy variable that has a value of 1 if the respondent is excited during the game.
DURING_FRUSTRATION	A dummy variable that has a value of 1 if the respondent feels frustrated during the game.
DURING_ANGER	A dummy variable that has a value of 1 if the respondent is angry during the game.
DURING_OTHERS	A dummy variable that has a value of 1 if the respondent feels a different emotion from the ones listed during the game.

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
BET	1228	1.622	0.806	1	4
PROBLEMS	1259	0.212	0.409	0	1
PATHOLOGY	1315	0.125	0.331	0	1
AGE	1254	34.719	12.446	14	79
FEMALE	1300	0.226	0.418	0	1
DISTANCE	1248	1.514	1.022	1	6
SINGLE	1297	0.570	0.495	0	1
DIVORCED	1297	0.355	0.479	0	1
WIDOW/ER	1297	0.048	0.213	0	1
MARRIED	1297	0.027	0.162	0	1
EDUCATION	1301	4.108	1.216	1	6
INCOME	1069	2.727	1.478	1	6
TIME_EXPERIENCE	941	3.040	1.300	1	7
GENETIC	1315	0.030	0.170	0	1
FAMILY	1315	0.023	0.152	0	1
WEEK_TIMES	1255	3.245	1.205	1	5
N_HOURS	1229	2.944	1.399	1	6
ALONE	1235	0.481	0.500	0	1
WIN_EUPHORIA	1315	0.344	0.475	0	1
WIN_PLEASURE	1315	0.490	0.500	0	1
WIN_SATISFACTION	1315	0.487	0.500	0	1
WIN_REPLAY	1315	0.173	0.378	0	1
WIN_OMNIPOTENCE	1315	0.036	0.186	0	1
WIN_OTHERS	1315	0.049	0.215	0	1
LOSE_GUILT	1315	0.111	0.314	0	1
LOSE_FRUSTRATION	1315	0.062	0.242	0	1
LOSE_DISAPPOINTMENT	1315	0.576	0.494	0	1
LOSE_EXCITEMENT	1315	0.056	0.230	0	1
LOSE_ANGER	1315	0.254	0.435	0	1
LOSE_REDEEM	1315	0.234	0.424	0	1
LOSE_LOW_SELF_ESTEEM	1315	0.013	0.113	0	1
LOSE_HELPLESSNESS	1315	0.031	0.174	0	1
DURING_EUPHORIA	1315	0.270	0.444	0	1
DURING_PLEASURE	1315	0.449	0.497	0	1
DURING_SATISFACTION	1315	0.251	0.434	0	1
DURING_ANXIETY	1315	0.247	0.431	0	1
DURING_EXCITEMENT	1315	0.176	0.381	0	1
DURING_FRUSTRATION	1315	0.018	0.134	0	1
DURING_ANGER	1315	0.047	0.212	0	1
DURING_OTHERS	1315	0.104	0.306	0	1

Table 3. Results of the simultaneous bivariate ordered probit regression

	Model (1)				Model (2)			
	Dependent variable: BET		Dependent variable: PROBLEMS		Dependent variable: BET		Dependent variable: PROBLEMS	
	Coeff.	Std. Er.	Coeff.	Std.Er.	Coeff.	Std.Er.	Coeff.	Std.Err.
AGE	0.005	*(0.005)*	0.009	*(0.008)*	0.005	*(0.005)*	0.005	*(0.008)*
FEMALE	-0.239*	*(0.136)*	0.312*	*(0.168)*	-0.243*	*(0.136)*	0.316**	*(0.154)*
DISTANCE	0.118**	*(0.050)*			0.215	*(0.146)*		
SINGLE	-0.379	*(0.254)*	-0.144	*(0.382)*	-0.392	*(0.254)*	0.021	*(0.354)*
DIVORCED	-0.279	*(0.246)*	-0.265	*(0.378)*	-0.288	*(0.246)*	-0.100	*(0.354)*
WIDOW/ER	-0.069	*(0.311)*	-0.423	*(0.400)*	-0.071	*(0.312)*	-0.302	*(0.383)*
EDUCATION	0.030	*(0.037)*	0.001	*(0.049)*	0.028	*(0.037)*	-0.012	*(0.044)*
INCOME	0.125***	*(0.033)*	-0.130***	*(0.046)*	-0.017	*(0.136)*	-0.015	*(0.153)*
					0.023	*(0.021)*	-0.020	*(0.023)*
TIME_EXPERIENCE	-0.051	*(0.042)*	-0.072	*(0.067)*	-0.048	*(0.042)*	-0.041	*(0.063)*
GENETIC	0.116	*(0.256)*	0.720	*(0.404)*	0.095	*(0.260)*	-0.487	*(0.446)*
FAMILY	0.389	*(0.270)*	0.904	*(0.592)*	0.371	*(0.270)*	0.562	*(0.599)*
WEEK_TIMES	0.267***	*(0.044)*	-0.044	*(0.118)*	0.248***	*(0.057)*	-0.122	*(0.095)*
					0.023	*(0.025)*		
N_HOURS	0.323***	*(0.040)*	-0.111	*(0.129)*	0.395***	*(0.053)*	-0.193*	*(0.097)*
					-0.044	*(0.027)*		
ALONE	-0.032	*(0.100)*	0.005	*(0.125)*	-0.032	*(0.100)*	0.012	*(0.113)*
WIN_EUPHORIA	0.110	*(0.126)*	-0.075	*(0.157)*	0.101	*(0.126)*	-0.092	*(0.142)*
WIN_PLEASURE	0.037	*(0.118)*	-0.075	*(0.147)*	0.040	*(0.118)*	-0.063	*(0.134)*
WIN_SATISFACTION	0.006	*(0.120)*	-0.064	*(0.150)*	0.013	*(0.121)*	-0.055	*(0.137)*
WIN_REPLAY	0.367***	*(0.138)*	-0.009	*(0.227)*	0.366***	*(0.138)*	-0.123	*(0.197)*
WIN_OMNIPOTENCE	0.723***	*(0.225)*	-0.156	*(0.379)*	0.702***	*(0.226)*	-0.360	*(0.316)*
WIN_OTHERS	-0.031	*(0.243)*	0.029	*(0.295)*	-0.044	*(0.245)*	0.021	*(0.273)*
LOSE_GUILT	-0.208	*(0.150)*	0.368**	*(0.181)*	-0.216	*(0.150)*	0.346**	*(0.177)*
LOSE_FRUSTRATION	-0.018	*(0.183)*	0.434*	*(0.251)*	-0.034	*(0.183)*	0.342	*(0.255)*
LOSE_DISAPPOINTMENT	-0.148	*(0.113)*	0.147	*(0.145)*	-0.146	*(0.114)*	0.152	*(0.130)*
LOSE_EXCITEMENT	0.190	*(0.186)*	0.154	*(0.267)*	0.197	*(0.187)*	0.038	*(0.249)*
LOSE_ANGER	-0.041	*(0.119)*	0.037	*(0.147)*	-0.051	*(0.119)*	0.043	*(0.134)*
LOSE_REDEEM	0.114	*(0.118)*	-0.047	*(0.153)*	0.116	*(0.118)*	-0.078	*(0.138)*
LOSE_LOW_SELF_ESTEEM	-0.042	*(0.338)*	0.427	*(0.414)*	-0.051	*(0.341)*	0.355	*(0.398)*
LOSE_HELPLESSNESS	-0.050	*(0.266)*	-0.267	*(0.356)*	-0.078	*(0.266)*	-0.171	*(0.326)*
DURING_EUPHORIA	-0.192	*(0.124)*	0.109	*(0.164)*	-0.189	*(0.124)*	0.152	*(0.144)*
DURING_PLEASURE	-0.143	*(0.118)*	-0.105	*(0.183)*	-0.141	*(0.118)*	-0.034	*(0.168)*
DURING_SATISFACTION	-0.019	*(0.126)*	-0.111	*(0.161)*	-0.013	*(0.126)*	-0.074	*(0.148)*
DURING_ANXIETY	0.027	*(0.134)*	0.047	*(0.167)*	0.042	*(0.134)*	0.028	*(0.152)*
DURING_EXCITEMENT	0.048	*(0.135)*	-0.024	*(0.167)*	0.053	*(0.135)*	-0.031	*(0.152)*
DURING_FRUSTRATION	-0.049	*(0.378)*	0.315	*(0.446)*	-0.078	*(0.380)*	0.302	*(0.421)*
DURING_ANGER	-0.005	*(0.255)*	0.331	*(0.324)*	-0.022	*(0.255)*	0.253	*(0.308)*
DURING_OTHERS	-0.181	*(0.190)*	0.175	*(0.241)*	-0.170	*(0.191)*	0.189	*(0.217)*
RHO	-0.624*	*(0.316)*			-0.809*	*(0.212)*		
GAMMA			0.824***	*(0.241)*			0.958***	*(0.143)*

/CUT11	2.164***	*(0.497)*			2.132***	*(0.486)*		
/CUT12	3.254***	*(0.504)*			3.221***	*(0.495)*		
/CUT13	4.789***	*(0.547)*			4.760***	*(0.507)*		
/CUT21			1.763***	*(0.683)*			1.488**	*(0.212)*
WALD TEST	$Chi^2(36) = 269.66$***				$Chi^2(36) = 269.27$***			
LR TEST OF INDIP. EQNS.	$Chi^2(1) = 12.63$***				$Chi^2(1) = 14.61$			
N. OBS	710				710			
LOG LIKELIHOOD	-885.536				-883.857			

Notes: 1) Wald-statistic is a test where all slope coefficients are jointly zero. 2) Standard errors in parenthesis. 3) ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 4. Results of the seemingly unrelated bivariate ordered probit regression

	Model (1)				Model (2)			
	Dependent variable: BET		Dependent variable: PATHOLOGY		Dependent variable: BET		Dependent variable: PATHOLOGY	
	Coeff.	Std.Er.	Coeff.	Std.Er.	Coeff.	Std.Er.	Coeff.	Std.Err.
AGE	0.004	*(0.005)*	0.013	*(0.007)*	0.005	*(0.005)*	0.012	*(0.008)*
FEMALE	-0.231*	*(0.135)*	-0.260	*(0.178)*	-0.232*	*(0.135)*	-0.245	*(0.179)*
DISTANCE	0.093*	*(0.049)*			0.152	*(0.185)*		
SINGLE	-0.353	*(0.254)*	-0.420	*(0.338)*	-0.361	*(0.229)*	-0.414	*(0.313)*
DIVORCED	-0.258	*(0.246)*	-0.592	*(0.387)*	-0.259	*(0.230)*	-0.586	*(0.385)*
WIDOW/ER	-0.040	*(0.311)*	-0.313	*(0.413)*	-0.055	*(0.313)*	-0.289	*(0.415)*
EDUCATION	0.026	*(0.037)*	0.193***	*(0.067)*	0.025	*(0.037)*	0.195***	*(0.066)*
INCOME	0.126***	*(0.033)*	-0.133**	*(0.067)*	0.012	*(0.136)*	-0.018	*(0.261)*
INCOME^2					0.017	*(0.020)*	-0.024	*(0.040)*
TIME_EXPERIENCE	-0.050	*(0.042)*	0.015	*(0.057)*	-0.048	*(0.042)*	0.019	*(0.057)*
GENETIC	0.162	*(0.253)*	0.770**	*(0.350)*	0.165	*(0.314)*	0.779**	*(0.354)*
FAMILY	0.376	*(0.269)*	1.022***	*(0.374)*	0.373	*(0.331)*	1.034***	*(0.322)*
WEEK_TIMES	0.250***	*(0.044)*	0.049	*(0.062)*	0.298***	*(0.075)*	0.050	*(0.062)*
WEEK_TIMES * DISTANCE					-0.033	*(0.042)*		
N_HOURS	0.335***	*(0.040)*	0.157**	*(0.075)*	0.316***	*(0.068)*	0.157**	*(0.076)*
N_HOURS * DISTANCE					0.013	*(0.039)*		
ALONE	-0.068	*(0.099)*	-0.630***	*(0.214)*	-0.078	*(0.100)*	-0.635***	*(0.243)*
WIN_EUPHORIA	0.105	*(0.126)*	-0.199	*(0.179)*	0.105	*(0.126)*	-0.200	*(0.179)*
WIN_PLEASURE	0.032	*(0.118)*	-0.059	*(0.165)*	0.034	*(0.118)*	-0.060	*(0.166)*
WIN_SATISFACTION	0.006	*(0.120)*	-0.616***	*(0.169)*	0.009	*(0.121)*	-0.626***	*(0.169)*
WIN_REPLAY	0.359***	*(0.138)*	0.389	*(0.186)*	0.364***	*(0.138)*	0.398*	*(0.237)*
WIN_OMNIPOTENCE	0.667***	*(0.222)*	0.172	*(0.290)*	0.682***	*(0.223)*	0.164	*(0.290)*
WIN_OTHERS	-0.018	*(0.242)*	-0.154	*(0.304)*	-0.014	*(0.243)*	-0.145	*(0.304)*
LOSE_GUILT	-0.190	*(0.149)*	0.210	*(0.189)*	-0.185	*(0.149)*	0.222	*(0.189)*
LOSE_FRUSTRATION	0.076	*(0.179)*	0.170	*(0.245)*	0.066	*(0.179)*	0.181	*(0.245)*
LOSE_DISAPPOINTMENT	-0.142	*(0.113)*	-0.358*	*(0.209)*	-0.132	*(0.113)*	-0.367*	*(0.209)*
LOSE_EXCITEMENT	0.191	*(0.186)*	-0.275	*(0.291)*	0.193	*(0.187)*	-0.299	*(0.292)*
LOSE_ANGER	-0.042	*(0.119)*	0.084	*(0.162)*	-0.043	*(0.119)*	0.080	*(0.162)*
LOSE_REDEEM	0.110	*(0.117)*	0.319	*(0.203)*	0.115	*(0.117)*	0.311	*(0.163)*
LOSE_LOW_SELF_ESTEEM	-0.030	*(0.336)*	-0.956	*(0.809)*	-0.063	*(0.338)*	-0.899	*(0.891)*
LOSE_HELPLESSNESS	-0.015	*(0.262)*	-0.556	*(0.518)*	-0.020	*(0.263)*	-0.564	*(0.551)*
DURING_EUPHORIA	-0.179	*(0.123)*	0.359	*(0.232)*	-0.181	*(0.124)*	0.372	*(0.232)*
DURING_PLEASURE	-0.123	*(0.118)*	0.191	*(0.168)*	-0.121	*(0.118)*	0.196	*(0.168)*
DURING_SATISFACTION	-0.010	*(0.126)*	-0.149	*(0.179)*	-0.023	*(0.126)*	-0.146	*(0.179)*
DURING_ANXIETY	0.016	*(0.134)*	0.133	*(0.187)*	0.010	*(0.135)*	0.121	*(0.187)*
DURING_EXCITEMENT	0.059	*(0.134)*	0.442*	*(0.244)*	0.048	*(0.135)*	0.446*	*(0.243)*
DURING_FRUSTRATION	-0.141	*(0.350)*	0.095	*(0.424)*	-0.146	*(0.352)*	0.099	*(0.425)*
DURING_ANGER	-0.188	*(0.251)*	-0.464	*(0.725)*	-0.207	*(0.253)*	-0.438	*(0.726)*
DURING_OTHERS	0.030	*(0.188)*	0.369	*(0.259)*	0.014	*(0.189)*	0.392	*(0.259)*
RHO	0.371***	*(0.093)*			0.382***	*(0.093)*		
/CUT11	2.113***	*(0.416)*			2.076***	*(0.507)*		

/CUT12	3.195***	*(0.424)*			3.158***	*(0.514)*		
/CUT13	4.701***	*(0.441)*			4.675***	*(0.525)*		
/CUT21			2.652***	*(0.708)*			2.835***	*(0.775)*
WALD TEST	$Chi^2(36) = 270.01$***				$Chi^2(39) = 270.94$***			
LR TEST OF INDIP. EQNS.	$Chi^2(1) = 13.69$***				$Chi^2(1) = 14.28$***			
N. OBS	714				714			
LOG LIKELIHOOD	-744.194				-743.156			

Notes: 1) Wald-statistic is a test where all slope coefficients are jointly zero. 2) Standard errors in parenthesis. 3) ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Ultimi Contributi di Ricerca CRENoS

I Paper sono disponibili in: http://www.crenos.it

13/04 *Luc Bauwens, Edoardo Otranto,* "Modeling the Dependence of Conditional Correlations on Volatility"

13/03 *Oliviero A. Carboni, Claudio Detotto,* "The economic consequences of crime in Italy"

13/02 *Pasqualina Arca, Gianfranco Atzeni, Luca Deidda,* "Economics of bankruptcy exemption: Signaling value of collateral, cost of credit and access to credit"

13/01 *Miguel Casares, Luca Deidda, Jose E. Galdon-Sanchez,* "Business cycle and monetary policy analysis with market rigidities and financial frictions"

12/36 *Maria Chiara Di Guardo, Raffaele Paci,* "M&A and knowledge flows in the European Union's Neighboring Countries"

12/35 *Raffaele Paci, Emauela Marrocu,* "Tourism and regional growth in Europe"

12/34 *Fabio Cerina,* "Endogenous Growth and Sustainable Tourism"

12/33 *Michele Battisti,Filippo Belloc, Massimo Del Gatto,* "Unbundling technology adoption and tfp at the firm level. Do intangibles matter?"

12/32 *Massimo Del Gatto, Filippo di Mauro, Joseph Gruber, Benjamin Mandel,* "The "Revealed" Competitiveness of U.S. Exports "

12/31 *Marinella Cadoni, Roberta Melis, Alessandro Trudda,* "Financial Crisis: a new measure for risk of pension funds assets"

12/30 *Oliviero A. Carboni, Paolo Russu,* "Global Indeterminacy in a Tourism Sector Model"

12/29 *Oliviero A. Carboni, Paolo Russu,* "A Model of Economic Growth with Public Finance: Dynamics and Analytic Solution"

12/28 *Maria Giovanna Brandano, Claudio Detotto, Marco Vannini,* "Comparative efficiency of producer cooperatives and conventional firms in a sample of quasi-twin companies"

12/27 *Bianca Biagi, Maria Giovanna Brandano, Dionysia Lambiri,* "Does tourism affect house prices? Some evidence from Italy"

12/26 *Gabriele Cardullo, Maurizio Conti, Giovanni Sulis,* "Sunk Capital, Unions and the Hold-Up Problem: Theory and Evidence from Sectoral Data"

12/25 *Fabio Cerina, Fabio Manca,* "Catch me if you learn: development-specific education and economic growth"

12/24 *Andrea Pozzi, Fabiano Schivardi,* "Demand or productivity: What determines firm growth?"

12/23 *Dimitri Paolini, Juan de Dios Tena,* "Institutional Complexity and Managerial Efficiency: A Simple Model"

12/22 *Miguel Jara, Dimitri Paolini, Juan de Dios Tena,* "Management Efficiency in Football: An Empirical Analysis of two Extreme Cases"

12/21 *Marta Foddi, Stefano Usai,* "Regional innovation performance in Europe"

12/20 *Juan de Dios Tena, Claudio Detotto, Dimitri Paolini,* "Do managerial skills matter? An analysis of the impact of managerial features on performance for the Italian football"

Finito di stampare nel mese di Maggio 2013
Presso **Copy…Right! studio grafico & stampa digitale**
Via Turritana 3/B – Tel. 079.200395 – Fax 079.4360444
07100 Sassari

www.crenos.it

ISBN 978-88-84-67-817-1