Three essays on the socioeconomics of gambling and pathological gambling

PhD thesis submitted to the Faculty of Economics
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by

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Defended in Lausanne, 7 May 2012
Executive summary

In Switzerland, approximately 1.5% of the population suffers from disordered gambling behaviour. This rate has remained relatively stable over the last decade. Thus, a significant number of individuals must cope with the severe adverse consequences that are associated with this disorder: most notably, depression, debt, divorce, violence and criminality. The efforts to address this public health concern have included several prevention measures that have been implemented at gambling venues and mass media campaigns that have been designed to inform the public about the addictive potential of this activity. Although these efforts appear to have prevented the prevalence of gambling from increasing despite the significant increase in opportunities for gambling, such efforts have not led to a decrease in gambling disorders. There may be several reasons for these results. First, a lack of concern (and thus funding) in the public sector may prevent efficient prevention measures from being implemented. Second, a lack of knowledge regarding the characteristics of at-risk groups may prevent these measures from targeting the appropriate individuals. Finally, because gambling operators encounter an obvious conflict of interest in enforcing measures that are intended to prevent problem gambling, these operators may be less resolute than one would hope in attempting to address the issue.

Through this dissertation, I aim to enhance the research on gambling and its consequences. For this purpose, the dissertation is divided into two main parts. The first part consists of a description of
problem gambling and its health-related consequences. Subsequently, the various prevention measures that can be implemented are discussed. The first section concludes with a description of the gambling landscape in Switzerland. The second portion of the dissertation consists of three empirical essays that provide insight into the consequences and characteristics of problem and pathological gambling and the gambling tax issue. The first essay fills the gap in the literature regarding the social cost of gambling; previous studies have consistently failed to estimate the health-related quality of life (HRQoL) cost associated with gambling and thus significantly underestimate the problem. In Switzerland, I estimated this cost to be more than CHF 3,800 per year per pathological gambler. This result implies that the loss of quality of life resulting from gambling generates more than 60% of the total social cost. The second study is designed to describe the characteristics of gamblers and problem gamblers. First, I highlight the differences between gamblers and non-gamblers. The individuals in the first group are notably more likely to engage in risk-taking behaviours, such as alcohol abuse, drug consumption or tobacco smoking. Subsequently, I compare recreational gamblers with pathological gamblers and find significant differences in terms of their socio-economic characteristics. Moreover, disordered gamblers are at a greater risk for smoking and suffering from depression. Interestingly, the type of gambling activity has a significant influence on one’s risk of developing a gambling problem; internet gamblers exhibit a seven-fold increase in risk. The third paper analyses the equity principle and the tax on gambling activities. In this study, I analyse the regressivity of this tax using gambling expenditures.
The results consistently show that lower-income individuals devote a higher proportion of their revenues to gambling than do higher-income individuals.

Keywords: gambling, pathological gambling, health-related quality of life, health utility index, HRQoL, SF-6D, intangible cost, risk factors, socio-economics, gambling tax, progressivity.
7 On the regressivity of gambling taxation in Switzerland.

7.1 Abstract

In this study, the author assesses whether the gambling taxes in Switzerland is regressive using a large, representative sample of the population and the reported gambling expenditures of the Swiss Health Survey 2007 (SHS 07). To analyse the tax incidence, the Suits index was constructed. This result is corroborated by a regression analysis, which highlights the income elasticity of gambling expenditures. The two measures provide converging results and demonstrate the regressive pattern of the gambling tax in Switzerland. As such, this taxation structure contributes to increased income inequality in Switzerland.

7.2 Introduction

In Switzerland, a significant part of the revenues of gambling providers is transferred to the state. A tax on the revenues of gambling providers reflects the expenditures of gamblers, thus raising the question of tax incidence. To analyse this pattern, this study investigates how gambling expenditures change with respect to income. This study examines whether lower income groups devote a higher part of their revenue to gambling expenditures than do higher income groups. If this
assumption is valid, the gambling tax in Switzerland can be said to contribute to increased income inequalities.

This assumption has been corroborated in international studies, in which casino and lottery taxes have been found to be predominantly regressive. Because lotteries are run by the state governments to finance public expenditures in the United States, many of these analyses have been conducted in this country to analyse the equity of this funding channel. Two main methods have been used to assess the regressivity of the gambling tax. The first type of measure is based on a concentration index inspired by the Gini coefficient. The second type of analysis estimates the income elasticity of gambling expenditures to describe the latter based on variations in income.

In 1977, Suits developed a concentration index to analyse the tax incidence (1977b). He used this construct to analyse the regressivity of casino and lottery taxes (Suits, 1977a) in Nevada. In that study, Nevada casino taxation was found to be progressive. However, when Suits restricted his analysis to Nevada residents, the contribution to the casino tax was found to be highly regressive. The author explained this pattern as the result of the significant costs of traveling to Nevada. Mason et al. (1989) highlighted the regressive pattern of the casino tax using income elasticity, and they corroborated this result with the Suits index.

In line with these results, similar studies have found that the lottery tax is also highly regressive. Clotfelter and Cook (1987) used survey data to conclude that the lottery tax in the United States was regressive. This early finding was corroborated by Mobilia (1992) with county-level data from the state of Kansas. Furthermore, a longitudinal study showed increasing regressivity from 1988 to 1992 (Pirog Good
and Mikesell, 1995). In fact, studies have consistently found the lottery tax to be regressive using either income elasticity coefficients or concentration measures (Price and Novak, 1999, Hansen et al., 2000). Two national surveys conducted in Canada and New South Wales (MacDonald et al., 2004, Worthington, 2001) concluded that lower income households spent a higher proportion of their revenues on gambling compared to higher income households. The international literature provides results that support these findings by demonstrating the overrepresentation of individuals with lower socioeconomic status among gamblers, including problem gamblers (Volberg and Abbott, 1997, Gerstein et al., 1999, Productivity Commission, 1999, Abbott and Volberg, 2000, Welte et al., 2002, Volberg and Steadman, 1989, Rönnberg et al., 1999, Volberg, 1994b, Petry, 2005).

The landscape of casino gambling in Switzerland is unique because the establishment and operation of casinos was banned from 1928 to 2000. A new law authorising gambling venues came into force on April 1, 2000. Currently, the casino industry in Switzerland consists of 19 gambling venues that generated CHF 936 million in gross revenues in 2009 (1.50 USD/CHF; PPP, 2011). This amount, which was obtained by subtracting the winnings returned to players from the sums they wagered, is the tax base used to levy the gambling tax, which totalled CHF 479 million in 2009. This amount is allocated to financing the Old-Age Insurance (OAI) and the expenditures of the different cantons that host casinos. The tax schedule consists in a progressive tax between 40% and 80% on the gross revenue. During 2009, CHF 406 million was transferred to the OAI, and CHF 73 million was transferred to the cantons.
According to the first article of the lottery law, lotteries are forbidden in Switzerland. However, exceptions are made for lotteries and raffles organized for recreational events that do not provide cash rewards. Article 5 stipulates that lotteries are allowed if they are designed to serve non-profit organisations or charities. In practice, two firms are allowed to run the lottery and betting business, namely, the Lotterie Suisse Romande (LoRo) in the western part of the country (i.e., the French-speaking part) and Swisslos in the eastern part (i.e., the German- and Italian-speaking part). In the last decade, the number of lottery games increased significantly with the establishment of a transnational lottery and the launch of video lottery terminals. As a result, the annual lottery sales from 2000 to 2009 rose from CHF 1,373 to CHF 2,833 million. In accordance with article 5 of the lottery law, all profit is transferred to cantonal commissions, which distribute this amount to non-profit organizations or charities. In 2009, the gross revenue of lotteries and betting rose to CHF 896 million, and the total profit (CHF 534 million) was transferred to non-profit organisations and charities. In this study, this amount is defined as the implicit tax on the lottery.

Because a significant part of the revenues of gambling providers is taxed by the government, the principle of tax equity must be respected. This golden standard implies that people must contribute to the government’s revenues according to their ability to pay. Therefore, individuals with the same income should contribute the same amount to government revenues (i.e., horizontal equity), and those with higher incomes should contribute more (i.e., vertical equity). To test the assumption that the gambling tax is regressive, I focus on the amount transferred by lotteries and casinos to either the state or the cantonal
commissions. I analyse this pattern using two different measures: the Suits index (Suits, 1977b) and the income elasticity of gambling expenditures. The former shows how the tax burden is distributed according to income repartition. The second estimates the variation in gambling expenditures based on variation in income. The results provide insight into the regressivity of the gambling tax in Switzerland. To the best of my knowledge, a study of this type has never been conducted in Switzerland. With this article, I aim to inform decision makers about the impact of the gambling tax on income distribution.

7.3 Data and Method

7.3.1 Sample

To conduct the analyses, I used a representative survey of the Swiss population, the Swiss Health Survey 2007 (SHS). The survey is conducted every five years on a cross-sectional sample of the Swiss population aged 15 years and older, based on a random stratified sample. The cantons constitute the different strata. Two-step random sampling is implemented for each stratum, where the households are defined as the primary units and the individuals living in the households are the secondary units. Using this method, 18,760 individuals were interviewed by phone. Respondents were also asked to complete a written survey that included questions on gambling. Of those who accepted, 14,393 returned the written questionnaires. Of these respondents, 6,036 reported having gambled during the past twelve months.
7.3.2 Measures of tax progressivity

Several methods can be applied to analyse the tax pattern. Point estimations of progressivity are based on an analysis of the tax schedule according to income. This is the case for measures such as marginal rate progression, average rate progression, liability progression and residual income progression (Mottu, 1997). However, these measures only provide a point estimate; they do not consider the tax impact on the entire population. To solve this problem, global measures based on the Lorenz curve and the Gini index can be used to account for the distribution of the tax burden. This is the case for the Suits index, which is used in this study together with a second analysis to verify the consistency of the Suits results. For this purpose, I use regression analysis to estimate the income elasticity coefficients of gambling expenditures.

The Suits index

The Suits index is the first measure used in this study to assess the progressivity of the tax. This index has been one of the most widely used instruments for this purpose since its development by Suits (1977b). It is inspired by the well-known measure of inequality, the Lorenz curve, and the resulting Gini ratio. The Suits index is obtained by plotting the accumulated percentage of the tax burden on the horizontal axis and the accumulated percentage of total income on the vertical axis. We can conclude that the gambling tax is regressive if the percentage of the total tax burden is always higher than the corresponding percentage of total income, as indicated by the C’ curve in figure 7.1. If the tax is progressive, the Lorenz curve will show the
same pattern as the C curve shown in figure 7.1. Finally, in the case of perfect proportionality, the Lorenz curve would follow a straight 45-degree line.

**Figure 7.1: Illustration of the Suits index**

The index is defined as

\[
S = 1 - \left( \frac{L}{K} \right),
\]

where \( L \) is the area \( 0ABC \), which is the area under the Lorenz curve indicated by the tax, and \( K \) is defined by \( 0AB \), which is the area under a straight 45-degree line that indicates perfect proportionality. The interpretation of \( S \) is straightforward. In the case of proportionality, \( L=K \), and so \( S=0 \). If a tax is progressive, the area under the Lorenz curve is
smaller than the area under the 45-degree straight line; as a result, index $S$ is positive. Conversely, if the tax is regressive, a higher part of the tax burden is paid by individuals with lower incomes. The Lorenz curve lies above the straight line, and so $S$ is negative. This measure has some interesting properties. First, any transfer of the tax burden from lower to higher income groups increases $S$. Second, the index value for several taxes in combination is the weighted average of the index for the individual taxes, and the weights are given by the proportion of the total revenue collected by the taxes.

To construct the Suits index, I need to know the gambling net expenditures to assess the tax burden on each individual. In the SHS, the individual-level monthly gambling budgets are reported. This amount gives the participation of each individual in the gross revenue of casinos and lotteries. Using the average tax rate for gambling, I obtain an estimation of the tax burden on each individual. It must be noted that these data from the SHS are related to the total expenditures on games of chance; I do not have desegregated information to assess the tax incidence of casinos and lotteries separately.

In the survey, the total monthly gambling budget is defined in intervals: less than CHF 10, between 10 and 99, between 100 and 999, between 1,000 and 2,499, between 2,500 and 9,999, and 10,000 and over. I use the middle of the interval to assess the total monthly gambling budget of each respondent. I apply a mean rate burden to these expenditures to obtain the tax burden on each individual. As supported by Blaszczynski et al. (1997a), I assume that the gambling budget reported by the respondents represents the net expenditures, corresponding to the gross revenue of casinos and lotteries. The gross
revenue represents the amounts paid by the gamblers less their winnings. This value is the tax base to levy the gambling tax among casinos. To determine the mean rate burden, I calculate a weighted average of the tax on the 19 casinos and the 2 lotteries in Switzerland. The weights are derived from the gross revenue of each casino and lottery. This calculation results in a mean tax rate of 56% on games of chance in Switzerland. However, it must be noted that changing this rate does not influence the value of the Suits index because the tax rate is the same for all gamblers. That is, the distribution of the tax burden does not change by changing the mean tax rate. The second variable required to calculate this index is the household income. The SHS collects the adjusted income of each individual. This variable represents the sum of the different incomes of the household and is adjusted by family size. This calculation considers the economy of scale of increasing the size of the household. By combining the tax burden and the adjusted household income, I estimate the Suits index.

_Income elasticity_

Another method of assessing the tax incidence is to analyse income elasticity. As with private goods, I expect the demand for gambling to rise with income because I assume that it is not an inferior good. Nevertheless, I do not know whether this increase will be proportional. To clarify this notion, suppose that all individuals have the same structure of tastes. Thus, with the same income, they all equally value their gambling expenditures and the social good provided by the implicit tax. In this case, individuals with an income of USD 20,000 may be willing to spend USD 2,000 gambling, of which USD 1,000 would
represent the implicit tax (assuming a tax rate of 50% on the gross revenues of gambling). If 1,000 units of the social good are provided, this implies that all individuals with an income of USD 20,000 value 1 unit of the social good at USD 1. If all other individuals with an income of USD 40,000 value the social good at USD 2, a proportional tax rate would apply based on the structure of tastes. If these individuals would be willing to pay only USD 1.50, the appropriate tax pattern would be a regressive schedule. This example shows us how the tax schedule depends on preference patterns. Indeed, if we assume high income elasticity, prices would increase rapidly with income. Nevertheless, if price elasticity is high, this increase will be reduced (Musgrave and Musgrave, 1989). To express this as a formula, I write the income elasticity as

\[ \mu_r = \frac{\Delta Q}{\Delta Y} \cdot \frac{Q}{Y} \]

and the price elasticity as

\[ \varepsilon_p = \frac{\Delta Q}{\Delta P} \cdot \frac{Q}{P} \]

using the two expressions, we have
\[
\left( \frac{\Delta P}{P} \right) \div \left( \frac{\Delta Y}{Y} \right) = \frac{\mu_c}{\epsilon_p}.
\]

The left side of the above formula is the definition of the tax price elasticity with respect to income. Therefore, in the case of a proportional tax, the ratio of tax to income remains constant and is equal to one. In the case of a progressive tax, this elasticity is higher than one. Conversely, it is lower than one for a regressive tax. This also demonstrates how the required schedule is linked to the ratio of income and price elasticity. In this study, to estimate the left side of this equation, I use regression analysis to explain the natural logarithm of a household’s gambling budget with the natural logarithm of the household’s income, controlling for the socio-economic variables. Indeed, because I assume a constant tax rate on gambling expenses, the resulting elasticity coefficient can be used to assess tax regressivity.

To facilitate comparison between the two estimations, I use the same adjusted household income for both analyses, and I control the regression with socio-demographic characteristics. Age is regrouped into four binary variables indicating the following age intervals: 15-35, 36-55, 56-75 and over 75. The effect of unemployment is captured in a binary variable separating individuals who are unemployed from other individuals. Marital status indicates whether the individual is married or not. Another binary variable is used to identify individuals who are Swiss from other respondents. Finally, the effect of educational level is captured with a categorical variable representing five different levels of scholarly achievement: compulsory school, general education,
vocational education, higher vocational education, and tertiary education.

### 7.4 Results

#### 7.4.1 Suits index

The summary statistics of the adjusted income and the monthly gambling budget used to calculate the Suits index are shown in table 7.1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly adjusted household income</td>
<td>13,725</td>
<td>4,239.12</td>
<td>3,118.53</td>
<td>46.67</td>
<td>80,000</td>
</tr>
<tr>
<td>Monthly gambling budget</td>
<td>12,181</td>
<td>25.68</td>
<td>95.70</td>
<td>0</td>
<td>1,750</td>
</tr>
</tbody>
</table>

Income exhibits a mean of CHF 4,239.1 with a standard deviation as high as CHF 3,119.5. This variable is limited to values between CHF 46.7 and CHF 80,000.0. The net monthly expenditures show a mean at CHF 25.7 with a small standard deviation of CHF 95.7. This pattern is explained by the fact that the values of this variable are bounded by CHF 0 and CHF 1,750. To obtain the estimation of the tax burden on each individual, I apply the average tax rate of 56% on gambling expenditures. Using these data, I compute the Suits index using STATA, finding an index of -0.184 and an average tax rate of 0.35% of the household income. This result unambiguously shows that the tax on casinos and lotteries is regressive and that lower income groups contribute proportionally more to the tax revenues than higher income groups.
7.4.2 Income elasticity

The second analysis of this study assesses the tax incidence by determining the income elasticity coefficient. It also analyses the ratio of the percentage change in gambling expenditures to the percentage change in a household’s income. To test whether this ratio increases, decreases or remains constant, I perform an ordinary least squares regression using the logarithm of gambling expenditures and income and controlling for socio-economic variables. The summary statistics of the different variables included in the regression are shown in table 7.2. Due to the characteristics of the natural logarithm, the following analysis is limited to individuals who gambled during the previous 12 months and had net expenses greater than 0 (n=6,036).

Table 7.2: Summary statistics of the regression variables.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly gambling budget</td>
<td>54.04</td>
<td>131.65</td>
<td>5.00</td>
<td>1750.00</td>
</tr>
<tr>
<td>Income</td>
<td>4245.81</td>
<td>2973.61</td>
<td>200.00</td>
<td>60000.00</td>
</tr>
<tr>
<td>Gender (ref: male)</td>
<td>0.505</td>
<td>0.500</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-35</td>
<td>0.263</td>
<td>0.440</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>36-55</td>
<td>0.405</td>
<td>0.491</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>56-75</td>
<td>0.289</td>
<td>0.453</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Over 75</td>
<td>0.043</td>
<td>0.202</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Swiss nationality</td>
<td>0.902</td>
<td>0.297</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Married</td>
<td>0.511</td>
<td>0.500</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.017</td>
<td>0.129</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Education (5 levels)</td>
<td>2.600</td>
<td>1.273</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

According to table 7.2, the monthly expenditures of gamblers range from CHF 5 to 1,750, with a mean value of 54.04 CHF. The
minimum adjusted household income in our sample is CHF 200, and the maximum is 60,000. Moreover, it has an average of CHF 4,246. With the exception of educational status, all other variables are binary variables. In this sample, 50.5% of the respondents are male, and two-thirds of the gamblers are younger than 56 years old. More than half are married, and only 9.8% do not have Swiss nationality. A fairly low unemployment rate is observed in the sample. Finally, the educational variable ranges from 1 to 5, with a mean value of 2.6.

The result of the regression analysis is shown in table 7.3. The adjusted $R^2$ is slightly higher than 6.5%, indicating that an important part of the variation in the dependent variable remains unexplained by the explanatory variables. However, this result is not unusual in cross-sectional gambling studies. The $F$-statistic demonstrates that the model is statistically significant at the 5% level. This last result allows to validate this model and to interpret its coefficients. In this study, the coefficient of interest is that associated with the income variable. This regression analysis reveals an income elasticity of 0.181 with a standard deviation of 0.036. As suggested by the p-value, this coefficient is statistically significant. This result is interpreted as follows: an increase of 10% in income will increase gambling expenditures by 1.81%. Conversely, a decrease in income will generate a decline in gambling expenditures, but less than proportional compared to the reduction in income. Thus, the tax on games of chance in Switzerland is highly regressive.
Table 7.3: Result of the ordinary least squares regression

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income (ln)</td>
<td>0.181***</td>
<td>0.036</td>
</tr>
<tr>
<td>Gender</td>
<td>0.479***</td>
<td>0.037</td>
</tr>
<tr>
<td>Age (ref: 15-35)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36-55</td>
<td>0.360***</td>
<td>0.046</td>
</tr>
<tr>
<td>56-75</td>
<td>0.600***</td>
<td>0.051</td>
</tr>
<tr>
<td>76 and over</td>
<td>0.346**</td>
<td>0.102</td>
</tr>
<tr>
<td>Swiss nationality</td>
<td>-0.039</td>
<td>0.062</td>
</tr>
<tr>
<td>Married</td>
<td>-0.052</td>
<td>0.038</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.165</td>
<td>0.144</td>
</tr>
<tr>
<td>Education (5 levels)</td>
<td>-0.115***</td>
<td>0.015</td>
</tr>
<tr>
<td>Constant</td>
<td>1.193***</td>
<td>0.291</td>
</tr>
</tbody>
</table>

$R^2 = 0.066$

$F = 44.42$

Significant $F < 0.001$

$N = 5'565$

*p<0.05; **p<0.01; ***p<0.001

For the other independent variables, gender is highly significant, with men spending 61.4% more on gambling than women do. The different age group dummies indicate that compared to individuals aged 15 to 35 years old, older individuals spend much more money on gambling than younger individuals do. Interestingly, the analysis shows that the more educational level increases, the more the gambling budget decreases. The remaining variables in the regression (i.e., nationality, marital status and unemployment) do not seem to have a significant effect on gambling expenditures.

This second analysis corroborates the Suits index estimated above, indicating a highly regressive pattern for gambling tax in Switzerland.
Changing the method did not change the conclusion. Therefore, I consider the results of the present paper robust.

7.5 Discussion and conclusion

This study concludes unambiguously that the tax imposed on gambling activities in Switzerland is highly regressive. Lower income individuals contribute proportionally more to the state revenues than do higher income groups. Indeed, the Suits index shows a negative value of -0.184, indicating a clear regressive tax pattern. This result is corroborated by regression analysis. The income elasticity of 0.181 is clearly and statistically lower than one, providing further proof of a regressive tax pattern. Decreasing income by 10% results in a decrease of only 1.81% in the gambling budget. Therefore, the economic incidence clearly shows that the final distribution of the tax burden is proportionally larger for individuals with lower incomes. Thus, this tax violates one of the main qualities of a fair tax in Switzerland, namely vertical equity. Vertical equity suggests that individuals with higher income should have a larger tax burden. However, this is obviously not the case in the present study.

Analysing horizontal equity, I underline the differences resulting from the gender, the age and the educational level. Thus, males, younger individuals and less educated individuals spend more money on gambling. According to the present analysis, state gambling revenues are expected to rise if the population that has access to gambling is poorly educated. My results lead to the surprising conclusion that the revenues to the state from games of chance will be higher if the
population is poor and not well educated. This finding is in line with the findings of Abt et al. (1985).

Why this subpopulation may be encouraged to spend money on gambling is addressed by Wisman (2006). He highlighted three reasons why poor people may be more “vulnerable to the promise of getting rich by ‘investing’ in gambling” (Wisman, 2006). The first reason is related to human capital. Because they have less access to high-quality schools, poor people have difficulty developing human capital, finding well-paid jobs or accessing credit to start businesses. Second, due to their poor human capital, low-income populations have a higher discount rate, and so they are more oriented toward the present. Poor people generally have a shorter life expectancy and live in a culture that is more preoccupied with the present because of uncertainties about the future. The third reason is that because poor people possess little control over their everyday lives, work or financial means, choosing lucky numbers provides them with a sense of control and participation. The first reason highlighted by Wisman may not be applicable in Switzerland because high-quality schools are accessible to all socio-economic classes. However, the overrepresentation of lower income groups in gambling expenditures may be a combination of a lower discount rate and the quest for the artificial feeling of control provided by gambling.

Several limitations to this study must be considered when interpreting the results. First, I focus the analysis on the tax incidence for gambling in Switzerland. However, I do not consider how the collected tax is spent, thus the whole budgetary incidence (or tax benefit incidence) is not assessed in the present study. This incidence is difficult
to compute for Switzerland because many expenses derived from gambling tax are not earmarked. While part of the tax imposed on casinos is transferred to the OAI, the other part is not earmarked and is given to the cantons, which are free to use this money as they wish. Due to this specific allocation, considering the benefits of casinos may decrease the regressivity of the present study. However, this observation does not hold for the tax lottery redistribution. Because an important part of the revenues collected by this tax are redistributed for cultural or leisure activities, the regressivity may increase. Therefore, if I could properly account for the benefits of this tax, the budgetary incidence may differ for casinos and lotteries. Another limitation of this study is related to how individuals reported their gambling expenditures. Rather than a continuous variable, the answers were designed to be grouped into a categorical variable with six categories, which reduces the precision of the answers. Moreover, the question asked how much the respondent spent on gambling. As shown by Blaszczynski et al. (2006), this question is biased and is subject to ambiguity because the question “how much money do you spend gambling?” may be interpreted in different ways and may lead to misinterpretation. Generally, this question is asked to determine the difference between the amount of money a person has at the beginning of a gambling session and the amount of money he or she has at the end. In other words, the information of interest is the net value of the money spent. Blaszczynski et al. (1997a) concluded that in response to this question, two-thirds of the respondents interpret this as their net expenditures. The rest of the respondents relate their answer to turnover or other alternative interpretations. In this study, I assume that the answer to the question asked in the SHS reflected the net expenditures.
Finally, I was unable to distinguish between casino and lottery expenditures. Because the incomes of these two categories of gamblers may be different, grouping these two types of expenditures may have an impact on the final results.

This study is in line with the international literature that finds that the gambling tax on casinos and lotteries exhibit regressive patterns (Mason et al., 1989). This conclusion was expected because several international studies have shown that poor and uneducated individuals tend to gamble more and to experience gambling problems more often. Thus, it is not unexpected to find that these individuals spend a proportionally larger part of their revenue on games of chance in Switzerland and that this tax violates vertical equity.

A means of restoring this equity and protecting uneducated individuals was proposed by Rivenbark (1998) and consists of introducing a substantial charge for entering casinos. In Switzerland, this is already the case in some, but not all, gambling venues. The aim of such a preventive measure would be to deter poor and less educated individuals from entering casinos. Moreover, this solution could also increase the state’s revenues and thus balance the decline generated by this preventive measure. Nevertheless, the fee has to discourage lower income groups to enter to casinos. If it is not the case, this measure would increase the regressivity. The results of this study should be of interest to Swiss policy makers insofar as the tax incidence is an issue that must be addressed whenever a new tax is considered. Finally, a more precise study could be undertaken if the next SHS separated casino and lottery expenditures to allow for separated estimations.
8 Concluding remarks

This chapter contains an overview of the various parts of this dissertation. I will first provide a summary of the introduction’s review of literature on the subject and address a few major, unanswered questions. The second part will consist of analysing the content and results of this dissertation’s three empirical essays. The main limitations of the studies are likewise mentioned as well as some ideas worthy of further investigation.

8.1 Part one: background

Tales of disordered gamblers have been told ever since Man began playing for money. Gambling was originally deemed a vice before eventually being recognised as an addiction. This shift to medicalization of the condition was initiated by scientists and psychologists before it was officially categorised as a disease in the third revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM). However, the majority of gamblers do not experience any adverse consequences to their gambling activities as they remain recreational gamblers. Nevertheless, the limit between this category and disordered gamblers needs to be defined. Therefore, a range of screening instruments has been developed to identify problem or pathological gamblers. Most of the instruments to screen for the disorder were designed and validated in clinical settings and subsequently used in population based surveys.

As this kind of method may introduce a bias in a prevalence survey.
among the general population, researchers developed instruments specifically aimed at identifying the disorder in the general public. All the instruments available have standardised, validated criteria to identify problem or pathological gamblers among the various populations studied.

Clarifying the definition of pathological gambling allowed researchers to analyse the different concurrent behaviours and disorders displayed by this specific population. The process revealed that problem gambling is related to several other mental and physical disorders. Indeed, these gamblers are more likely to show substance consumption disorders such as smoking and alcohol abuse. Additionally, mood disorders are overrepresented among this specific population, particularly major depression. The results concerning anxiety disorders are more ambivalent depending on the study. In fact, the association between anxiety-related mental disorders and problem gambling needs to be further investigated through general population surveys. Few studies analysed the link between problem gamblers and physical disorders. However, given common knowledge on the topic, subjects with gambling issues are more likely to report poorer physical health and a lower quality of life than non-problem gamblers or non-gamblers. Nevertheless, if all the above correlations are uniformly admitted, the causal path between comorbidities and problem gambling is as yet unclear. Indeed, a substantial lack of longitudinal studies prevents one from drawing unquestionable conclusions on the correlation between problem gambling and health issues.

To prevent problem gambling and its resulting negative consequences, prevention measures have recently been implemented.
The measures are divided into two groups - behavioural and structural interventions. The first are designed to increase the individuals’ cognizance of gambling’s potential risks or inform the public about possible treatments. Hence behavioural measures aim to change an individual’s behaviour through mass media campaigns or by implementing informative measures targeting more specific subgroups of the population. Despite the relatively low effectiveness of behavioural interventions, they are among the most regularly implemented to prevent problem gambling. Structural interventions consist in modifying the context in which gambling is made available, mainly through restrictions. The most widely implemented measures are notably age limitations, a limitation on the number of gambling venues as well as restrictions on the most harmful types of gambling. These restrictions were shown to have a relatively more substantial impact on problem gambling. However, estimates of such prevention measures’ effectiveness focus on intermediate indicators, such as the change in a gambler’s behaviour or beliefs rather than a change in the final prevalence rate. As a matter of fact, the conclusions resulting from these studies should not be used to infer potential final effects on the prevalence rate.

In Switzerland, prevention measures were just recently implemented as casinos have only been legalized since 2002. The measures currently consist of a combination of behavioural and structural interventions. Indeed, information about gambling’s potential dangers is provided by mass media campaigns within gambling venues as well as on lottery tickets. Swiss legislation imposes a gambling venue cap and gambling activities are only legal in casinos. In addition to banning gambling for individuals under 18 years of age, a self-exclusion
policy is enforced in the entire country. Despite these measures, no significant change in the prevalence of problem gambling has been identified. Thus, the potential increase in problem gamblers resulting from the opening of 19 casinos may have been balanced by these measures. Nevertheless, this assumption has yet to be validated and further research should focus on the effectiveness of such prevention measures.

8.2 Part two: empirical work

The three essays included in this dissertation are based on Swiss data and attempt to fill some gaps in the existing literature on gambling addiction. To that end, the first essay assesses the social cost of pathological gambling resulting from the associated lowering of the addict’s quality of life. The main objective of this study is to demonstrate that this additional figure represents a significant part of the total social cost and hence omitting its estimation results in a significant underestimation of the overall burden on society. For this ground-breaking study, I focused on pathological gamblers in Swiss treatment centres and used a representative sample of the Swiss population as the control group. To estimate the loss in quality of life, I used the SF-6D to obtain a Health Related Quality of Life (HRQol) index bordered between 0 and 1. I screened for several common co-morbidities associated with pathological gambling such as tobacco smoking, alcohol abuse, drug use, physical health issues and depression to control regression. Using a tobit regression to take censored data into account, I determined that pathological gamblers suffer from a loss in
quality of life as high as 0.076. Applying a conservative Value of a Life Year (VOLY) found in the literature, the cost of HRQol loss in pathological gamblers comes to CHF 3,830. Combining this estimate with the direct and indirect costs of the addiction found in Swiss literature, I demonstrated that over 60% of the total social outlay lies in HRQol cost. Therefore, one must factor in these HRQol estimated charges when evaluating pathological gambling’s overall social cost in order to avoid substantially underestimating said cost.

This study represents the first estimation of pathological gamblers’ HRQol based on survey data. Due to the difficulty of identifying this disorder in a population based survey, I focused on gamblers in treatment centres. As a matter of fact, the disordered gamblers in this study may not be representative of the average problem gambler. This study actually succeeded in proving that the SF-6D is sensitive enough for pathological gamblers. It may therefore be viewed as a pilot study for including this standard questionnaire in a national survey such as the Swiss Health Survey. This would enable estimating the HRQoL loss of an entire range of diseases based on a wide, representative sample of the Swiss population.

The second essay of this dissertation aims at identifying the characteristics of non-gamblers, gamblers and problem gamblers as well as what distinguishes these three types of individuals from each other. By analysing the conclusions, the institutions in charge of pathological gambling prevention have an interesting tool to develop more targeted measures. Using a large and representative survey of the Swiss population - the Swiss Health Survey 2007 (SHS 07) - I identified problem gamblers by implementing a validated screening
questionnaire. The comparison between gamblers and non-gamblers shows that gamblers demonstrate more harmful behaviours, notably in that they are more likely to smoke and are prone to alcohol abuse. In terms of socio-demographics, gamblers are more likely to be Swiss males under age 56 who have only received the basic, compulsory education required by Swiss law. Finally, they generally fall into an upper middle class income bracket. Comparing problem gamblers with recreational gamblers, I observed that problem gamblers are more likely to suffer from major depression and to smoke. Moreover, they are less likely to be Swiss and are usually fall within a lower income bracket. To analyse whether or not gambling activities have an impact on the probability of developing gambling problems, I identified three forms of gambling - namely casino, lottery and internet gambling. If casino gambling increases the risk of developing gambling problems by a factor of two, internet gamblers have a seven-fold increase in the risk of being likewise identified as problem gamblers. This last conclusion is crucial as many governments have decided to move towards liberalizing internet gambling. According to my results, such policies will significantly increase the risk of a rise in gambling-related behavioural disorders. The main limitation of this study lies in the standard questionnaire used to screen for problem gambling. Indeed, despite the fact that this particular screening questionnaire was validated in Switzerland, it is not one of the existing gold standard methods used to identify problem gamblers. Therefore one must accept this limitation, which impedes comparisons with international studies. As a matter of fact, including an internationally validated questionnaire to screen for gambling disorders in the next SHS would allow for better comparative studies on this topic.
The final essay focuses on tax equity. I used the SHS 07, which assesses gamblers’ expenditures on the lottery and in casinos. As these values represent the base line for levying taxes, a mean tax rate is applied to each individual’s expense in order to estimate the amount of tax each respondent disburses. By combining the reported income with this value, two methods are used to assess the tax’s progression. The first consists of a concentration measure, the Suits Index. The second analysis uses elasticity coefficients to assess the impact on gambling expenditures due to a change of income. The two methods presented converging results and indicate that gambling tax presents a regressive pattern. Thus, this tax violates the vertical equity principle which stipulates that individuals with higher incomes should contribute proportionally more to the tax burden than individuals with lower incomes. This tax is hence a contributing factor when it comes to a rise in income disparity. However, this conclusion must be considered with two principal limitations in mind. Firstly, the analysis focuses on gambling’s tax incidence and not on its budgetary incidence. As a matter of fact, taking into account of the redistribution of tax revenue may decrease the regressivity of the present study, particularly for casinos. Secondly, it was impossible to distinguish casino spending from lottery expenditures given the available data. As these two categories of gamblers may have different income patterns, grouping these two types of expenditure can impact on a study’s final results.

The three essays in this dissertation will give professionals in the field better insight into significant issues and the social impact of gambling addiction (as well as occasional gambling) activity in Switzerland. I hope my results will provide policy makers with food for
thought in implementing effective policies to decrease this growing public health issue.